आज़ादी का अमृत महोत्सव

100 STORIES

S S S : India @ 75

100 Super Success Stories from Indian Fisheries!

National Fisheries Development Board

Department of Fisheries

Ministry of Fisheries, Animal Husbandry and Dairying

Government of India

Rajendranagar, Hyderabad - 500 052

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सत्यमेव जयते

डॉ. सी. सुवर्णा भा.व.से.
मुख्य कार्यपालक

Dr. C. Suvarna, IFS
Chief Executive

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PREFACE

The National Fisheries Development Board (NFDB) has been playing a major role in enhancement of fish production and productivity in the country and coordinating the fishery development activities in an integrated and holistic manner. It has promoted, coordinated and funded various modern and feasible techniques among the fisher population viz. seaweed cultivation, popularization of the intensive culture systems like Recirculatory Aquaculture Systems (RAS) and Biofloc, cage culture and pen culture.

NFDB has been promoting the dissemination of new and improved technologies and imparting awareness about financial and infrastructure assistance schemes among the fishers, fish farmers, entrepreneurs, etc. To further expand the promotion of these initiatives to larger population, the idea of making a platform where the successful fisheries and aquaculture practices/ techniques all over India could be presented came out. It is a great pleasure to see this initiative turning into reality in the form of the book "**SSS: India @75; 100 Super Success Stories from Indian Fisheries!**"

The book depicts the successful experience of practicing different techniques and showcases how the innovative practices in the field of fisheries has enabled the fishers and the farmers to obtain the higher yield. Some of the practices have made homemaker women turning into entrepreneurs, under privileged tribal women flourishing in value-added fish products preparation and sale, formation of fish farmer producer organization to prevent the exploitation by middle men and holistic development of the whole area including the water body, fisheries resources, fishers' income and social structure by institutional interventions especially by ICAR institutions, KVKs, NGOs etc. I wholeheartedly hope the book would be a great resource for anyone who wants to take up and/ or upscale any of the successful practices mentioned there in.

NFDB gratefully acknowledges the support and information provided by the Fisheries Departments of the States/ UTs, ICAR institutions, CSIR institutions, Aqua One Centres and the empanelled consultants and NGOs and the collection and compilation by its staff and the PMC-EY.

15/11/22
(C. SUVARNA)

परशोत्तम रूपाला
PARSHOTTAM RUPALA

सत्यमेव जयते

आजादी का अमृत महोत्सव

मंत्री
मत्स्यपालन, पशुपालन एवं डेयरी
भारत सरकार
MINISTER
FISHERIES, ANIMAL HUSBANDRY & DAIRYING
GOVERNMENT OF INDIA

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D.O. No. .....MIN(FAH&D)/2022-23

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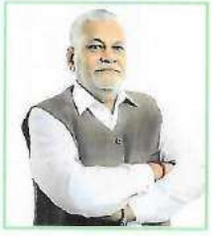

FOREWORD

Blessed with a coastline of over 8,000 km, an Exclusive Economic Zone (EEZ) of over 2 million Square Km, and with extensive fresh water resources, Fisheries is a major growing sector of our country. India is the third largest fish-producing country in the world contributing 7.93% towards global fish production and is the second largest among the aquaculture fish-producing countries globally.

Tremendous development strides have taken place in the Fisheries Sector during the last decade. The implementation of the Blue Revolution (BR) Scheme and the specialized Pradhan Mantri Matsya Sampada Yojana (PMMSY) have brought stupendous changes in the lives of fishers with significant economic development and overall fisheries growth. PMMSY has been rolled out with the ambitious goal to increase the average national aquaculture productivity from 3 tons to 5 tons per ha, doubling the exports to ₹1,00,000 Crores, doubling fishers' and fish farmers' income, etc. The need of the hour which the Government focuses on is sustainable and productive fisheries & aquaculture to promote economic growth, increase food & nutritional security, increase income & improve livelihoods, and protect our environment & natural resources.

It gives me immense pleasure to learn about the efforts of the National Fisheries Development Board (NFDB), to record the significant outcomes of the fisheries sector in the last decade through the book titled "SSS:India@75; 100 Super Success Stories from Indian Fisheries!" on the occasion of celebrating the World Fisheries Day-2022. I am sure that this book will provide an insight into the initiatives and advancements made in the Fisheries Sector of India. This information-packed book published by the NFDB has been well prepared with creative representation of the successful practices supported by photographs and also good practices from all corners of India.

I place on record my heartfelt congratulations and best wishes on the occasion of the release of this book by NFDB to create more interest for the prospective fishers and entrepreneurs in India and across the globe.

(PARSHOTTAM RUPALA)

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डॉ० संजीव कुमार बालियान
DR. SANJEEV KUMAR BALYAN

सत्यमेव जयते

आज़ादी का अमृत महोत्सव

राज्य मंत्री
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय
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FOREWORD

Fisheries and aquaculture is an important source of food production, nutritional security, employment, income, and foreign exchange in India and has immense potential. A tremendous change has been observed in the development of the fisheries sector in India through the initiatives of the Government. The blue Revolution/ Neel Kranti Mission facilitated the economic prosperity of the country and the individual fishers and fish farmers which contributed towards food and nutritional security.

Our government launched the Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme, an exclusive platform to address the crucial gaps in the fisheries value chain of fish productivity, production, quality, post-harvest infrastructure, technology, and marketing. It aims to strengthen and modernize the value chains, establish a fisheries management framework, and enhance traceability while ensuring the socio-economic welfare of fish farmers and fishers. From the year 2011-12 to 2020-21 our export of fish and fishery products has increased from ₹ 16,597.23 crores to ₹ 43,720.98 crores invalue and from 8,62,021to11,49,510 metric tonnes in quantity. Now, the emphasis must be on ensuring a steady supply of quality fish in both domestic and international markets. This will be achieved through increased aquaculture production and a strong supply chain.

Since its inception, the National Fisheries Development Board (NFDB) has played a vital role in the holistic development of the fisheries sector through pioneering culture-based capture fisheries, intensive aquaculture, and knowledge-based farming suitable to different geographical areas. The achievements made in the fisheries sector have been well documented by NFDB with the objective to unveil the success of the Blue Revolution and PMMSY as well as to share the good practices and technologies for attaining success. The proactive involvement of NFDB indisseminating successful aquaculture and marketing practices in the fisheries sector across the country is commendable.

I feel privileged to unveil the book **"SSS:India@75;100 Super Success Stories from Indian Fisheries!"** brought forth by the NFDB on **World Fisheries Day-2022**. I take this opportunity to congratulate NFDB for their sincere effort in bringing out this book for the benefit of the fisheries sector to build our nation.

(Dr. Sanjeev Kumar Balyan)

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Dr. L. MURUGAN

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मत्स्य पालन, पशुपालन और डेयरी मंत्रालय
भारत सरकार
MINISTER OF STATE FOR
INFORMATION & BROADCASTING AND
FISHERIES, ANIMAL HUSBANDRY AND DAIRYING
GOVERNMENT OF INDIA

Message

Indian Fisheries sector has seen transformational changes in the last eight years. The series of initiatives under the visionary leadership of Prime Minister Shri Narendra Modi, notably the Blue Revolution, Fisheries and Aquaculture Infrastructure Development Fund, the Pradhan Mantri Matsya Sampada Yojana and importantly, formation of a separate ministry for Fisheries, Animal Husbandry and Dairying have not only brought unprecedented amount of investment (more than ₹ 32,000 crore) and focus to the fisheries sector, but have also promoted the spirit of entrepreneurship in our thousands of fisher brothers and sisters.

This has led to growing number of ventures in fisheries Sector, especially in the field of efficient fish rearing, capture, handling, storage, transportation, processing and marketing. From Avantipura to Nellore, and from Shillong to Udupi, I have witnessed the zeal and enthusiasm among our young men and women, who have taken impressive strides in successfully establishing these ventures. The ever increasing fish production and ever rising exports are the results of this Atmanirbhar Bharat spirit. Each successful venture of our talented and hardworking entrepreneurs is contributing to the success of Indian fisheries.

It is pertinent that these success stories must reach every corner of the country and should be easily accessible to all. I am glad that National Fisheries Development Board has come up with the book "**SSS:India@75; 100 Super Success Stories from Indian Fisheries!**". This book offers a look into the template of each successful venture, highlighting the core ethos and initiatives, that have made them successful. The book is an important document, capturing the journey of Indian Fisheries, at this important juncture of Azadi Ka Amrit Mahotsav. I am sure, it will help our budding entrepreneurs and guide them to follow the path of success in their own chosen field.

(Dr. L. Murugan)

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सचिव
Jatindra Nath Swain, IAS
Secretary

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आज़ादी का अमृत महोत्सव

मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय
मत्स्यपालन विभाग
कृषि भवन, नई दिल्ली–110001
Ministry of Fisheries,
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FOREWORD

The Indian fisheries sector has evolved a long way since independence, with production rising from 0.75 million tons in 1950-51 to 14.7 million tons in 2020-21. All this has been made possible due to the tireless efforts of our fishers, fish farmers, extension agents and fisheries scientists. Recognizing the potential of the sector, Government of India has brought forth several initiatives from time to time including the current flagship scheme of PMMSY to facilitate development of viable and sustainable fisheries and aquaculture through suitable interventions at critical points of the value chain.

The PMMSY has set a target of fish production of 22 million tonnes and of an additional employment generation of 55 lakh manpower by 2024-25. However, such is possible only if productivity increases through a series of continuous innovations in production and in value chain. Innovations happen in two different ways: through hi- tech research & development in laboratories and through incremental improvements by practitioners in the field. Over the years the country has seen significant advances in formulation of new technologies through the efforts of ICAR institutions and State Agricultural Universities. These advances have also been translated into successful projects in the field. It is now important to highlight such cases of successful adoption and acclimatization before a wider audience for their widespread acceptance.

It is heartening to know that NFDB has taken initiative in this regard by conceptualizing the book **"SSS: India @75; 100 Super Success Stories from Indian Fisheries!".** The book beautifully narrates the successful techniques and practices adopted by field practitioners in fisheries and aquaculture across the country. I wholeheartedly appreciate the efforts made by NFDB in bringing out this book and I am sure this will greatly assist the process of spreading these best practices among fishers and fish farmers situated across the length and breadth of India and help them improving their productivity and incomes.

Jatindra Nath Swain

(Jatindra Nath Swain)

INDEX

Woman Boat Owner Expands her Horizon to Fish Kiosk

Name	Dilleshwari
District	South Andaman
Union Territory	Andaman & Nicobar Island
Education	8th Standard
Mobile number	9434278624
Year of establishment	2022
Position	Owner
Business activity	Fish kiosk
Production capacity	45 tonnes per annum
Annual turnover	₹ 90 lakhs
Employment generated	5

Mrs Dilleshwarii is a fishing boat owner from South Andaman. Her boats are registered with the Department of Fisheries (DoF), Andaman and Nicobar (A & N) Administration. Due to market dynamics, she was unable to sell all her full harvest at times. To solve this problem, she decided to set up a fish kiosk facility for storage and sale and inter alia create self-employment. DoF, A & N Administration supported her to get the financial assistance for this, under PMMSY scheme "Construction of fish kiosk including kiosk of aquarium/ ornamental fish".

She established the kiosk at Bathu basthi, Port Blair with the total project of ₹ 35 lakhs. Out of this, ₹ 6 lakh rupees were availed as grant under PMMSY and ₹ 29 lakhs was her own contribution.

Her average monthly income prior to the establishment of this facility was a meagre ₹ 15,000. With this facility the monthly income increased 600% amounting to roughly ₹ 1 lakh. The facility is able to generate employment for 5 local youth including one women. She plans to expand her facility in future and create more employment opportunities.

A Silent Aquaculture Revolution in South Andaman by ICAR-CIARI

Aquaculture in Andaman and Nicobar Islands is known for its huge demand for freshwater fish as the settler population prefers those. Thus, freshwater aquaculture holds great potential for the Island farmers. However, around 60% of the operational cost in aquaculture is spent on feed and its management practices. Because of this and due to the lack of knowledge on supplementary feeding, farmers tend to follow "extensive" aquaculture and in turn get lower fish production than that of the mainland. To solve this problem, the ICAR-CIARI, Port Blair formulated 'Dweep Carp Grower Feed' and established a pilot scale fish feed mill of production capacity of 80 to 100 kg per hour with the financial support of NABARD under the Farm Sector Promotion Fund. The facility is extended as an incubation facility in order to promote startups in fish feed production for Island aquaculture.

Mrs Jaya Lakshmi from M/s. Meyor Nature, South Andaman was one of the people who utilized this facility. Her farm unit at Garacharma comprises of freshwater aqua farm, poultry farm, vegetable cultivation, plant nursery, organic manure production, etc and its marketing. She started feeding the fish in her ponds with the 'Dweep Carp Grower Feed'. Impressed with the growth performance of the fish in her unit, she ventured into fish feed production. ICAR-CIARI signed an MoU with M/s. Meyor Nature in February, 2022 for the commercialization of 'Dweep Carp Grower Feed' technology and for extending incubation facility for 3 months. During the period of incubation, hands-on training was provided by ICAR-CIARI to Mrs Lakshmi and her team on various aspects of feed production. At the facility, the team produced 1,025 kg feed and earned the revenue of ₹ 51,250 from its marketing.

The team now plans to expand the fish feed production by establishing their own fish feed mill in their unit at Garacharma and to improve livelihood and employment opportunities to the Island youth.

Technological intervention	**ICAR-CIARI**
Beneficiary	Jaya Lakshmi
District	South Andaman
State	Andaman & Nicobar Islands
Educational qualification	Higher Secondary
Category	General
Occupation	Government servant (Retired)
Mobile number	9476045005
Business activity	Fish feed production
Year of establishment	2022
Position	Owner
Unit name	M/s. Meyor Nature
Fish feed production (3 months)	1,025 kg
Turnover (3 months)	₹ 51,250
Employment generated	4

Entrepreneur to Torch Bearer of Social Reform

Name	M.S. Dharma Lingam
District	South Andaman
Union Territory	Andaman & Nicobar Island
Education Qualification	8th Standard
Occupation	Fishing vessel and ice plant owner
Mobile number	9434288201
Year of establishment	2021-22
Position	Owner
Firm's name	M/s. D.S.N. Ice Plant
Business activity	Ice plant
Annual production	6,480 tonnes
Annual turnover	₹ 51.84 lakhs
Employment generated	12

Mr M. S. Dharma Lingam is an entrepreneur. He runs an ice plant unit of 8 tonnes capacity and also has two mechanized fishing vessels registered with the Department of Fisheries (DoF), Andaman and Nicobar (A & N) Administration. Due to the increase in number of fishing vessels in the island, the fish catch in the island increased and in turn the demand for ice. To meet this requirement, Mr. Dharma Lingam wanted to construct another ice plant having bigger capacity.

With the support of DoF, A & N Administration, he applied under PMMSY scheme for "Construction of ice plant". After getting it sanctioned in FY 2021-22, he constructed an ice plant unit of 18 tonnes capacity at Dundus point, Port Blair. The facility was constructed in 300 square meter area. The total project cost was ₹ 43 lakhs. He received ₹ 16 lakhs as grant under PMMSY. His own contribution together with the bank loan was ₹ 27 lakhs. He also arranged a truck service facility from the ice plant to sea shore and back, to ease the process and to reduce the turnaround time.

The average income Mr Dharma Lingam incurred with the previously established ice plant was ₹ 32,000 per month, but with the expansion of the facility under PMMSY, he is now earning more than ₹ 1.2 lakhs per month i.e., 400% growth. The overall turnover has now increased from ₹ 30 lakhs to ₹ 51 lakhs per annum. Establishment of this facility has benefited around 1,500 fishers in the vicinity and helped them to increase the shelf life of their harvest. Further, Mr Dharma Lingam is planning to set up a cold room for storage of ice blocks during lean period.

Rear Vannamei and Raise Income

Mr Potaiah belongs to fisherman family in Prem Nagar, South Andaman. He was earning ₹ 30,000 per month. He got motivated by one of his friends to adopt the brackish water aquaculture and approached the Department of Fisheries (DoF), Andaman and Nicobar (A&N) Administration for getting details regarding the same.

Under their guidance he applied for the "Construction of new ponds for brackish water aquaculture" under PMMSY. The project got sanctioned and he constructed one shed and one pond in the leased area of 1 ha for *Vannamei* culture. The total project cost was ₹ 28.40 lakhs. Out of this, he received ₹ 1.63 lakhs as grant under PMMSY. The rest of the amount was contributed by himself. He adopted best practices such as good water quality management, quality seed and timely feeding in his culture ponds. Currently, the pond is running with the annual production capacity of 7 tonnes.

With the intervention of DoF, A&N Administration, his monthly income has doubled to approximately ₹ 65,000. He now earns the average annual net profit of roughly ₹ 8 lakhs. Additionally, it generated employment opportunity for 3 people. Mr Potaiah is planning to expand the production capacity in near future to create better income level and to generate more employment to local youth.

Name	Potaiah
District	South Andaman
Union Territory	Andaman & Nicobar Island
Education	7th Standard
Occupation	Fishing
Mobile number	9476028301
Year of establishment	2021
Position	Owner
Business activity	Shrimp culture
Species	*Penaeus vannamei*
Annual production	7 tonnes
Annual turnover	₹ 28 lakhs
Employment generated	3

Prosperity through Skill Development

Training intervention	**CIFNET**
Financial intervention	**NFDB**
UT	Andaman and Nicobar Islands
Activity	Skill development training programme
Period	March 15 - April 13, 2022

The fishermen and fisherwomen of Andaman and Nicobar Islands were accustomed to use the traditional fishing methods mainly simple gillnet operation and line fishing. This greatly hampers the growth in fish production. The Central Institute of Fisheries Nautical and Engineering Training (CIFNET) intervened in this situation to equip the islanders with the modern techniques. CIFNET is a national training institute under the Government of India and is engaged in skill development activities.

NFDB funded one such training programme under PMMSY which was conducted for the marginalized fishers of Andaman and Nicobar Islands. The programme was organized in association with Department of Fisheries, Andaman & Nicobar Islands and Fishery Survey of India, Port Blair base, at the fish landing center of Junglighat, Portblair. The training was imparted to 387 fishers of 10 batches for a period of one month. During the programme, "long line fishing and tuna handling onboard fishing vessel", "defect rectification and maintenance of boats", and "communication and navigation equipment onboard fishing vessel" were discussed. The fisher community utilized this opportunity and learned new fishing techniques, safety measures, longline gear materials and importance of various types of hooks. They also learned about different kinds of tuna fishing operations, sashimi grade tuna preparation, importance of tuna resources, various navigational and electronic equipment, various fishing gears, firefighting equipment and sea safety equipment.

This programme was a great success. The fishers could adopt better safety measures during fishing. The fishers of Junglighat are now able to use longlines for tuna fishing which enhanced the quantity of their harvest.

Fish Farmer Producing Company : A Profitable Company

Mr G. Bhupesh Reddy is a Managing Director of Bhavi Aqua and Fish Farmer Producer Company (BAFFPC) situated in Nidimusali village of Nellore district, Andhra Pradesh, having 989 members engaged in the marketing of fish and prawns which was found to boost fisher folk's income and to mainly address the problem of getting a better price for their catch. To solve this problem, they started aggregating fish collected from all the farmers and selling them in bulk quantity to export companies, to get better margins for their produce. They sell their produce in Nellore city market and market outlets at Kavali, Kovuru, and Guduru. This technique helped them to overcome their immediate financial needs, before harvesting the whole crop.

NABARD initially supported Bhavi Aqua with ₹ 4.42 lakhs. Later, ₹ 8.66 lakhs were given to them for business development, and ₹ 5.16 lakhs to set up a small shop offering one-stop solution to farmers. Small Farmers Agribusiness Consortium (SFAC) gave financial aid of ₹ 8.07 lakhs for the BAFFPC's operation. To help the Joint Liability Groups, a loan of ₹ 40 lakhs was provided by Andhra Pragathi Grameena Bank (APGB). With the subsidy of ₹ 80 lakhs provided by the Department of Fisheries, Andhra Pradesh BAFFPC distributed 500 aerators to its members. This new technology is being introduced to properly manage inland rearing and give better access to fish for oxygen.

The FFPO prepared an action plan for their business activities subsequently, resulting in an increase in sales from ₹ 1.35 lakhs (2017-18) to ₹ 51.70 lakhs (2019-20) and 60% of turnover was from the sale of fish. Recently, they started branding their products under the brand name "Gunapatis" and trying to connect the farmers directly with the consumers. This move is also aimed at empowering farmers with digital marketing. To get better prices, BAFFPC is carrying out value addition activities like making fish pickles, fish chutneys, and fish manures as a by-product of fish waste. They offered capacity-building programs for their members by organizing 20 awareness programs, 5 Training of Trainers (ToTs), exposure visits, and a conclave at the World Brackishwater Aquaculture Conference. This helped them learn about scientific management of fish cultivation, and fish health management which increased their productivity. Regular convergence meetings with farmers, feed mills, and hatcheries are facilitated for easy availability of seed and feed. They are promoting awareness among farmers not to use antibiotics.

Name	G. Bhupesh Reddy
District	Nellore
State	Andhra Pradesh
Education	MBA
Category	General
Occupation	Marketing
Mobile number	9949747160
Firm's name	Bhavi Aqua Fish Farmer Producer Company
Year of establishment	2017
Position	Managing Director
Activity	Trading, value added products
Species	Fish and Prawn
Annual turnover	₹ 60.82 lakhs
Annual Production	175 tonnes
Employment generated	6

Hatchery : A Handsome Business

Name	M. Venkataramana
District	East Godavari
State	Andhra Pradesh
Education	B.Sc.
Category	General
Occupation	Entrepreneur
Mobile number	9848011451
Firm's name	MSR Aqua Private Limited
Year of establishment	2018
Position	Director
Activity	Marine fish hatchery
Species	Multi-species
Annual turnover	₹ 4 crores
Annual fish seed Production	3-5 million in number
Employment generated	34

Mr Medisetti Venkataramana established MSR Aqua Private Limited in the year 2017 in East Godavari district, Andhra Pradesh. The unit consists of a hatchery spanning over an area of 2.20 acres along with a lab facility. The facility has a ten-member team that focuses on rearing silver pompano, Indian pompano, cobia, and sea bass.

He received his first financial assistance of ₹ 1.03 crores under Blue Revolution Scheme. The ICAR-CMFRI provided technical support for modifying the existing shrimp hatchery by providing suitable designs. He also got financial assistance of ₹ 4.53 crore from other sources for enhancing the infrastructure, renovation, additional machinery, and operational expenses. The established facility is installed with an annual capacity of 50 million spawn per year and 3.50 million post larvae per year. The hatchery has produced about 23,59,400 fingerlings during the years from 2018-19 to 2020-21 of which 22,81,900 Asian sea bass fingerlings are supplied to farmers for nursery rearing and farming. This has generated a revenue of ₹ 1.06 crores in the last 3 years.

The hatchery is currently maintaining brood stock of cobia (*Rachycentron canadum*), silver pompano (*Trachinotus blochii*) and Indian pompano (*Trachinotus mookalee*) in the brood stock holding tanks enabled with Recirculatory Aquaculture Systems (RAS). The hatchery supplies spawn and fingerlings through their incredible market linkages with hatcheries and nursery rearing units of Andhra Pradesh and Karnataka.

The hatchery is serving as a model hatchery for multispecies marine fish seed production in the country. With such consistent and dedicated efforts, Mr Venkataramana is keen to start multi marine species culture in RAS and supply spawn, fry, and fingerling across India.

Confidence from Cage Culture: ICAR-CMFRI's Impact

Mr Nagaraju from Lakshmipuram Village of Andhra pradesh mainly depended on traditional fishing in creeks for his livelihood. The major issue he faced in this was irregular income. He was earning a meagre of ₹ 1.50 lakhs per annum. During this period, he came to know about ICAR-CMFRI's cage culture activity and approached them to get awareness on marine finfish culture. The technical team of the Regional Center of ICAR-CMFRI, Vishakhapatnam comprising of Dr Sekar Megarajan and his colleagues demonstrated to him the coastal cage culture of Asian sea bass using the fish seed available from commercial nursery rearing facilities.

He established 2 units of fish culture cage systems of 5 x 5 x 3 m^3 size and 650 kg capacity each. The total project cost was ₹ 5 lakhs. He stocked the cages with fish seed at the rate of 12 per m^3. Mr Nagaraju received partial financial support of ₹ 4 lakhs from the Regional Center of ICAR-CMFRI, Vishakhapatnam under NFDB funded "Coastal cage culture demonstration scheme" and he himself invested the rest of ₹ 1 lakh. At the end of 10 months of grow-out culture period, market size fish (1 to 1.10 kg size) were harvested and sold in domestic markets. The harvest was around 1.2 tonnes of fish in total and was sold at the rate of ₹ 350 to 450 per kg.

At present, he has expanded his culture system to 4 cage units and he employs 2 men in his farm. His annual income is about ₹ 3 lakhs through this activity which is roughly two fold compared to his income before taking up this activity. Fish farming has definitely helped him to earn additional income along with his regular fishing activities. Furthermore, the cultured fish are being fed with small fishes caught while fishing. This has considerably reduced the feed cost.

Intervention	**ICAR-CMFRI**
Beneficiary	Nagaraju
District	Krishna
State	Andhra Pradesh
Education	Primary level
Category	ST
Occupation	Fishing
Mobile number	9502576406
Business activity	Coastal cage culture
Species	Asian sea bass
Year of establishment	2020
Position	Owner
Fish production	1.2 tonnes
Annual turnover	₹ 2 to 3 lakhs
Employment generated	2

Smart Yield through Shrimp Toilet

Name	N. Nagaraju
District	Krishna
State	Andhra Pradesh
Education	B.Sc.
Category	General
Occupation	Shrimp farmer
Mobile number	9951694422
Firm's name	Nagahanuman Fish and Shrimp Farm
Year of establishment	2020
Position	Owner
Activity	Shrimp culture
Species	Vannamei
Annual turnover	₹ 96 lakhs
Annual shrimp production	48 tonnes
Employment generated	7

Mr N. Nagaraju belongs to Ogirala village in the Krishna district of Andhra Pradesh. He is a graduate in B.Sc. and was an agricultural farmer prior to venturing into Vannamei culture. The research conducted by the Village Fisheries Assistant of the Fisheries Department motivated him to utilize new technologies in Vannamei culture, and in the year 2020, he started using the technique of "shrimp toilet" in a 4 ha Vannamei culture farm with a production capacity of 24 tonnes per crop. The total project cost of ₹ 10 lakhs was invested by himself.

Generally, shrimp get affected by the polluted environment created at the bottom of the pond because of the sludge. The affected shrimp do not take feed and become weak in return. They will be prone to various bacterial and viral diseases. This leads to disease outbreaks in culture farms resulting in shrimp mortality and financial loss. To overcome this problem, he adopted shrimp toilet technology. By this, the bottom sludge could be collected at the central pit and pumped out by a sludge motor. Thus, the shrimp do not get stressed by the polluted environment and this enhances their growth and feed intake. He gave employment to 5 men and 2 women. During FY 2021-22, he achieved an average annual production of 48 tonnes and with an average net profit of ₹ 36.00 lakhs.

Mr Nagaraju uses best practices to produce a semi-organic, disease-free, and antibiotic-free harvest. By following this new technology, he and other farmers in his area are getting a good profit. He wants to continue shrimp culture using innovative technologies. At his farm, the Department of Fisheries, Andhra Pradesh organizes the Matsya Sagu Badi program (a program on farming techniques conducted for farmers). This enriched the surrounding farmers with the knowledge on technology and were encouraged to use this technology for maintaining good health, resulting in getting good production from their aquaculture systems.

Empowerment to Entrepreneurship through Fish Farming

Until a few years ago, the tribal women of Kodikallavalasa village in Pachipenta Mandal of Andhra Pradesh were involved in collecting and selling firewood from the forest for a mere ₹ 40 per day. The Jaljeevika an NGO, in association with the "Tata Trust" and the State Fisheries Department, introduced these women to the cage culture in 2016. Despite initial reluctance, 10 women from Kodikallavalasa showed interest in learning this innovative technology after their exposure to the success of cage culture in Dimbhe Reservoir, Pune.

The Jaljeevika organized training for them and taught them to construct cages from locally available material. These women learned technicalities of cage culture, cage maintenance, ornamental fish rearing, and fish feed management, disease management etc. In October 2017, they experienced their first success when they sold 5,000 fish weighing about 65 kg and earned ₹ 10,800. ICAR-CIFA acknowledged their success and awarded them the "Entrepreneur of the Year award" to the Self-Help Group (SHG) in 2021. In 2017, Jaljeevika introduced more than 160 rural people from four districts of Andhra Pradesh (Visakhapatnam, Vizianagaram, Srikakulam, and Anantapur) to efficient fish farming techniques. According to the NGO, these initiatives fetched nearly ₹ 1.1 crores in a year. Women's success in fish farming has inspired men too, and the men's cooperative started getting sustainable income through fish farming.

During Covid, providing the pandemic situation got worsened for the local fish farming community, and during post covid times, the collective is engaged in fish seed enterprises and selling fish in the local market. Jaljeevika framed a plan to establish women fish farmers' FPC to have infrastructure support for market linkages.

Establishment	Women collective
State	Andhra Pradesh
Beneficiary	Tribal women
Activity	Cage culture
Intervention	Jaljeevika and Tata Trust

ICAR-CMFRI's Pompous Pompano Culture Transforms Realtor into Fish Farmer

Technological intervention	**ICAR-CMFRI**
Beneficiary	U.T. Krishna Prasad
District	Konaseema
State	Andhra Pradesh
Education	Master's Degree
Category	General
Occupation	Marketing and real estate business
Mobile number	9848444125
Business activity	Pond fish culture
Species	Indian pompano
Year of establishment	2020
Position	Owner
Fish production	7 tonnes
Annual turnover	₹ 20 to 25 lakhs
Employment generated	5 direct and 5 indirect

The ICAR-CMFRI has taken up several initiatives towards creating awareness and popularizing marine fin fish culture in the coastal ponds. Mr U. T. Krishna Prasad is one of the several fish farmers benefited from these initiatives. Prior to entering into fish farming, he was involved in small scale marketing and real estate business, earning around ₹ 10 lakhs per annum. The challenge of irregular income in his business dragged him towards the idea of another business. During this period, he came into contact with the Regional Center of ICAR-CMFRI, Vishakhapatnam and approached the scientists there. The scientists there gave him a thorough demonstration on grow-out culture of Indian pompano in coastal pond. The fish seed used for the same were produced at the Regional Center itself.

He received the financial support of ₹ 12 lakhs under the NFDB funded "Marine fin fish pond culture demonstration scheme" from the Regional Center of ICAR-CMFRI, Vishakhapatnam and he invested ₹ 4 lakhs. With this support, three pond units having the production capacity of 2.7 tonnes each were established. In these ponds, the Indian pompano seed were stocked at the rate of one per cubic metre. Mr Krishna Prasad adopted the best practices such as the use of a separate nursery-rearing facility till the fish seed reached the size of 75 g followed by the grow-out culture in a separate pond. This method yielded good survival rate. At the end of one year culture period, 7 tonnes of fish was harvested and sold in domestic markets at the rate of ₹ 300 to 340 per kg. The size of the individual fish ranged from 900 g to 1.10 kg.

With this experience, Mr Krishna Prasad has now expanded his fish farm and presently he is doing fish culture in 40 acres. Of these in 8 acres, different marine fin fish species are being cultured. The rest of the pond area is used for shrimp culture. Mr U. T. Krishna Prasad generated employment and in turn improved the standard of living for around 10 people with this activity.

Vasanthi Premium : a Reliable Brand for Shrimp Feed

In 1995, Mr M. Karuna Raju and Mr Krishnam Raju, jointly set up a farm and started shrimp farming in Bapatla, Guntur district of Andhra Pradesh. Presently the farm spreads over 88 ha, practicing shrimp farming. In 2015, both the partners jointly established a firm titled Sai Aqua Feeds. They were facing the challenge of the high cost of shrimp feed. Hence, they installed a feed mill of 2 tonnes per hour capacity and established a feed quality control laboratory investing ₹ 3 crores. The feed which was produced in their unit was given the brand name as "Vasanthi Premium" and used on their farm which yielded good returns. The cost of production has been reduced by 20% with the usage of the feed. Apart from self-consumption, the feed was also sold to neighboring farms at a competitive price of ₹ 55 per kg to ₹ 65 per kg as against the market price of ₹ 88 per kg. During the last three years, 7,633 tonnes of shrimp feed were produced and used by small and medium farmers which cumulatively resulted in a saving of ₹ 916 lakhs for Sai Aqua Feeds.

Using innovations such as the use of different raw-material and methods were the key contributors to this inspiring journey. For improving pond productivity, biomimicry technique i.e. use of organic juice which is prepared by fermentation of rice bran and soya is used. This helped in improving the water quality, phytoplankton and zooplankton production, etc., and in turn, survival rate increased by 20%. Besides, culturing different species of shrimp is being practiced at the farm to increase sustainability. The firm also sells input tools and machinery to aqua farmers

'Vannamei Plus' developed by ICAR - Central Institute of Brackishwater Aquaculture (ICAR-CIBA) and acquired by Sai Aqua Feeds, is a cost-effective quality feed made with locally available ingredients and indigenous feed manufacturing technology. By using the feed, small farmers were able to earn an increased profit margin of ₹ 50,000 to ₹ 60,000/crop/ha. Seeing the success, additional five units of feed mills were established in Andhra Pradesh, Kerala, Gujarat, Haryana, and West Bengal by the small and medium-scale farmers. Owing to a such successful journey and giving employment opportunities to 70 people, the firm received an award of "Best Fisheries Enterprise" on World Fisheries Day- 2020 by the Government of India.

Name	M. Karuna Raju and Krishnam Raju
District & State	Guntur Andhra Pradesh
Education	B.Tech
Category	General
Occupation	Entrepreneur
Mobile number	9885553555
Firm's name	Sai Aqua Feeds
Year of establishment	2015
Position	Managing Partner
Activity	Shrimp culture and feed mill
Annual turnover	₹ 20 crores
Annual fish feed Production	7,633 tonnes
Employment generated	70

Model Raceway : Rainbow Farm

Name	Dorjee Khandu Khrimey
District	West Kameng
State	Arunachal Pradesh
Education	B.A.
Category	ST
Occupation	Farmer
Mobile number	6009940128
Firm's name	Rainbow Farm
Year of establishment	2018
Position	Owner
Activity	Raceway culture
Species	Trout
Annual turnover	₹ 4.80 lakhs
Annual fish Production	600 kg
Employment generated	2

Mr Dorjee Khandu Khrimey was working as a Senior Executive in Reliance Power Ltd. in Aalo, West Siang District of Arunachal Pradesh. Due to unforeseen circumstances, he resigned from the job in 2019 and returned to his hometown. He came to know about trout farming and the demand for trout when he visited Shergaon Trout Farm. He then decided to take up trout farming. He approached the Department of Fisheries regarding the subsidies available for trout farming in his state and was encouraged by the department to take up trout farming. Soon he started his farm, naming it as "Rainbow Farm" at Jigaon Village. Within seven months of his culture period, he started earning from the farm.

At present, he has 3 units of concrete raceways, 1 earthen raceway and 1 earthen fishpond. The total project cost was ₹ 9 lakhs, of which ₹ 3.60 lakhs was funded by the Government as the financial assistance under the Blue Revolution Scheme. He also availed ₹ 5 lakhs as loan from a private bank. In FY 2021-22, The total production was 600 kgs and earned a net profit of ₹ 2.80 lakhs by marketing was the produce. He takes utmost care in maintaining hygienic condition in the farm, segregation of fish every two months, and timely intervention during disease outbreaks. Such good management practices has helped him to sustain his farm productivity with profit.

At present, his farm is regularly visited by the Government officials, fish farmers, and tourists from other states to have a glimpse and gain knowledge regarding trout farming. Because of trout farming Mr Khrimey was able to uplift the livelihood of his family. He has given employment to 2 people in his village, thus helping them improve their standard of living. He is planning to establish a fish hatchery, fish feed mill and expand the area of his farm in near future.

An Agriculturist turned into an Aquaculturist

Mr Nelekta Chowhai is a resident of Village Mudoi in Changlang District, Arunachal Pradesh. Before taking up fish farming he was an agriculture farmer earning about ₹ 70,000. The Department of Fisheries, Arunachal Pradesh encouraged him to take up aquaculture as it has high returns.

Under the guidance and support from the State Fisheries Department, he applied for the activity "Table fish production of IMC and exotic carps" under the scheme Mukya Mantri Neel Kranthi Abhiyaan (MMNKA) and successfully constructed 7 units of grow-out ponds with a 3.50 tonnes production capacity of each pond during FY 2019–20. Under this scheme, he received financial assistance of ₹ 12.60 lakhs, against the total project cost of ₹ 21 lakhs, and the rest of ₹ 8.40 lakhs was invested by himself.

The technical inputs and guidance from the fisheries department have played a significant role for him in understanding aquaculture and its practices. A major challenge he faced was the availability of good low-cost quality feed in the locality. He understood that the production could be enhanced many-fold if this issue was sorted out with the knowledge, he acquired with fish farming. He uses feed in proper feeding ratio and maintains different water quality parameters. Mr Nelekta started earning a good income with the annual turnover of ₹ 7.50 lakhs for himself and created employment opportunities for others. He plans to expand his farm area and wants to gain experience in the intensive fish culture of high-value fish.

Name	Nelekta Chowhai
District & State	Changlang Arunachal Pradesh
Education	High school
Category	SC
Occupation	Farmer
Mobile number	9366367734
Year of establishment	2019
Position	Proprietor
Activity	Table fish production
Species	IMC and exotic carps
Annual turnover	₹ 7.50 lakhs
Annual fish Production	3.50 tonnes
Employment generated	3

Quality Seed : Quality Income

Name	Amal Medhi
District	Nalbari
State	Assam
Education	B.A.
Occupation	Farmer
Mobile number	8812838707
Firm's name	Medhi Quality Fish Seed Producer and Supplier
Year of establishment	2008
Position	Owner
Activity	Fish seed production
Species	Desi magur, singhi and pabda, IMC and exotic carps
Annual turnover	₹ 3.50 crores
Annual fish seed Production	1 crore in number
Employment generated	15

Mr Amal Medhi is from Sondha village in the Nalbari district of Assam. Till 2008, the main livelihood of his family was agriculture farming. They had 50 cents of farming land, cultivating paddy, which barely earned any income to them. Hence, he used his 50 cents of farmland to construct a fishpond and bought spawn in 10 lakhs numbers from the local hatchery by investing ₹ 20,000 and started culturing. The survival rate of spawn was about 50%. When the spawn turned into fingerlings, he sold them back in the local market earning him ₹ 50,000 for the first time. High returns motivated him to increase his production. He availed a loan of ₹ 1.95 lakhs from the local banks and purchased two ponds of one acre each in the year 2010 and started rearing spawn to fingerlings. In the year 2010, he started breeding Indian Major Carps (IMC) and exotic carps through hapa system. This increased the survival rate of spawn from 50% to 60%.

He attended training on indigenous breeding techniques of magur, koi, singhi, and pabda in Assam in 2012. In 2014, he earned four times more than his investment by adopting the new techniques. He bought 10 acres of land and leased 15 acres in neighboring villages, where he is practicing mass culture and breeding. He started breeding desi magur, singhi and pabda. Today, the indigenous seed produced by him gets supplied in his district and other states. So far, he has spent about ₹ 65 lakhs on building infrastructure.

Mr Medhi was recognized for his excellent work and has been awarded as the "Best fish farmer" and the "Best quality fish seed producer" in 2016 and was nominated as "Fisheries Brand Ambassador of Assam" in 2019 by the Department of Fisheries, Assam. He was also awarded for "Adopting and promoting new technology in the field of Agriculture and allied area during state level Farmers Fair for Doubling Farmers income by 2020 in Assam".

An Entrepreneur Successful in Multi-Faceted Aquaculture Development

Mr Binanda Baro belongs to Bamunjhar Village of Assam. He completed his MBA in 2005 and started his career in 2006 as a management trainee. Currently, he is working in the position of Co-Founder & Managing Director of Susconnect Pvt. Ltd. In 2019, he installed 4 pigsties in 100 square feet of his own land. In 2020, he ventured into aquaculture by converting a 0.9 ha paddy field into 3 fish ponds and started "Aie Chaneki Agrovet Services" with the objective to empower rural people, especially women for sustainable development. Once lockdown was imposed, he took full advantage of the time and converted the pond banks into small horticulture gardens and converted his pig farm into an integrated pig cum fish farm with 200 pigs of the breeds hampshire, yorkshire, duroc, etc. Officials from the State Animal Husbandry and Fisheries Departments played major roles in helping Mr Baro to excel in all directions. Once the lockdown was extended, he converted his initial 3 fish ponds to an integrated duck cum fish farm with 1,200 ducklings. In the same year, he also started goat farming on small scale with 3 goats of the beetal breed, and later increased the strength to 10 goats.

In 2021, 4 hatcheries were established on 0.25 ha of land, along with the extension of the pig cum fish integrated farm to 0.62 ha. He has also constructed approximately 1 km road (width 14 feet) to his piggery by purchasing land. In 2022, he converted his 2.75 ha land into 3 ponds to adopt paddy cum fish culture. Along with this, he started 5 new nursery ponds, 1 brood stock pond, and 1 rearing pond. In total, he has 15 fish ponds covering approximately 3.5 ha. With the technical guidance from KVK, Darrang he ventured into horticulture too.

He wisely invested all his farms' income in expansion and achieved his own set target. Although the farm was in its initial stages, he earned approximately ₹ 15 lakhs in 2020-21. He was awarded an appreciation certificate by the ICAR- Agriculture Technology Application Research Institute for his integrated farming system in 2021. Further, he is planning to set up a weaving industry for women empowerment, a rice mill, an oil mill, another hatchery for quality fish seed production, and fish and cattle feed mill.

Beneficiary	Binanda Baro
District	Baksa
State	Assam
Education	MBA
Occupation	Agriculture and allied activities
Mobile number	9401801117
Business activity	1. fish cum pig farming 2. fish cum duck farming 3. fish cum paddy farming 4. goat farming 5. fish seed production
Firm's name	Aie Chaneki Agrovet Services
Year of establishment	2020
Position	Owner
Annual turnover	₹ 15 lakhs
Employment generated	more than 20

Empowered by Entrepreneurship

Name	Chumi Bordoloi
District	Nagaon
State	Assam
Education	M.A. Sanskrit
Category	OBC
Occupation	Social worker
Mobile number	8723003589
Firm's name	Charu Food Processing Unit
Year of establishment	2001
Position	Proprietor
Activity	Integrated farming and fish processing
Species	IMC and exotic carps
Annual turnover	₹ 20 lakhs
Annual fish Production	22.05 tonnes
Employment generated	14

Mrs Chumi Bordoloi is a resident of Hationi Bheta village in Nagaon district in Assam. She did her M. A. in Sanskrit. Though she was a school teacher, she always aimed to become a social worker, for enabling women's empowerment. To fulfil her dream to make rural women self-dependent and financially sound, she decided to form Self-Help groups (SHG) and Non-governmental organizations (NGO). She started a model food processing unit named "Charu Food Processing Unit" and an NGO working in the integrated farming sector in the year 2001. The NGO trains women in different sectors through government training programs. About 5000 women in total have been trained by the organization and post-training she guides them either to get into jobs or start their own enterprises. She also serves as the Secretary of the Integrated Agro-Farming Development Society (Karbi Lalung Krishi Pum, Rodali Farmer producer Company).

She owns 32 bighas of land at Berhampur in Nagaon District and 165 bighas of land at Kapahera in Morigaon District of Assam. The integrated fish farming system she established included paddy cum fish farming, duck cum fish farming, goat farming, piggery, nursery, beekeeping, etc. She also offers a quality training in these areas. The integrated farm area has an extent of 90 ha with a production capacity of 5000 kg and an annual turnover of ₹ 20 lakhs. She uses 100% organic bio-fertilizers to produce a good quality and quantity of harvest. In the future, she plans to open an aqua fish tourism resort.

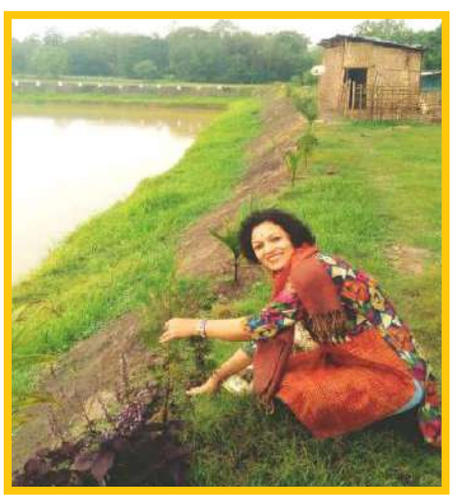
She was awarded with many excellence awards by the Government of India, viz. the Best Entrepreneur of Food Processing of Assam, 2019, the Best Empowering Lady of India, 2019, the Best Lady Fish Farmer of Assam 2018 and Best Lady Farmer of India, 2015.

An Art Teacher Turning into a Fish Farmer

Mrs Gargee Gitom Bora is a resident of Morikolong village of Nagaon district, Assam. After completing her Diploma and M.A. in Painting in 2006, she started working in Jawaharlal Nehru Navodaya Vidyalaya as an Art teacher. However, after her marriage, she faced problems in balancing both personal and professional life. This has led her to venture into an entrepreneurial journey and starting her own art school. Additionally, she started an oil mill for mustard oil manufacturing, but it did not work out ending up in financial crisis. Then she took a break for two years and started a food processing unit by availing bank loan. She name her unit as "Jaagriti Food Products." Through this brand, she intended to manufacture different types of fish and vegetable pickles and namkeen. When she started, she faced the challenge of getting raw materials on time. To overcome this, especially fish shortage, she ventured into integrated farming.

Though Mrs Bora started her business all by herself, she approached the State Fisheries Office at Nagaon, to gain more knowledge in integrated farming and the available Government schemes. Under the guidance and support of the Department of Fisheries, she got financial assistance for the activity "Integrated Farming" under PMMSY during the FY 2020-21 and constructed a new pond. The farm consists of a piggery, duck farm, and crops like lemon, coconut, betel nut, banana tree, etc in addition to the fishpond. Under PMMSY, she received financial assistance of ₹ 80,000 for the first year. An amount of ₹ 7.77 lakhs were invested by herself. The total project cost was ₹ 8.50 lakhs. The oil mill and manufacturing of fish food products were not enough for Mrs Bora to regulate her livelihood. However, after starting integrated farming, she became financially stronger than before. She uses mustard oil cake, pig dung, and duck droppings for pond fertilization. Soon, she is going to set up a biofloc tank and a Recirculatory Aquaculture System for fish farming. As her land is attached to a highway, she plans to open a resort too.

Name	Gargee Gitom Bora
District	Nagaon
State	Assam
Education	M.A. in Fine Arts
Category	OBC
Occupation	Teacher
Mobile number	9401515959
Firm's name	Jaagriti Food Products
Year of establishment	2020
Position	Proprietor
Activity	Integrated Fish farming
Species	Locally available fish species
Annual turnover	₹ 6.04 lakhs
Annual fish Production	4.40 tonnes
Employment generated	10



Entrepreneurial Adventurer Fresh Out of College

Beneficiary	Nitul Chandra Das
District	Kamrup (Rural)
State	Assam
Education	B. A.
Category	SC
Occupation	Fish farmer
Business activity	Fish seed production, integrated fish farming, composite fish culture
Year of establishment	2014
Position	Owner
Firm's name	NCD Fish Farm
Annual production	11.8 tonnes of table fish and 120 miilion spawn
Annual turnover	₹ 36.6 lakhs
Employment generated	20

Mr Nitul Chandra Das belongs to the Kamrup district of Assam. Just after his studies, in 2014 he began his career in aquaculture on his 0.15 ha property. As a college educated youth having no white collar job, he had to bear societal pressure greatly in the early days of the establishment of farm infrastructure. Not being discouraged, he attended different skill development programs in fisheries provided by the NFDB and the Department of Fisheries, Assam to know more about modern aquaculture techniques. Thanks to his efforts and in turn, the revenue generated from aquaculture, he became successful in aquaculture.

He has now extended his fish farming to 8 ha. He does fish cum duck integrated farming, with the capacity of 1,000 ducks in his farm. Additionally, he has a Chinese circular hatchery with one breeding pool, five hatching pools, one overhead tank, and one spawn collection tank. He also has a small wetland of about 4 ha area where he stocks advanced fingerlings of improved varieties of Indian Major Carps and exotic carps. The feed he uses is the rice polish and mustard oil cake mixture (1:1) at a rate of 2 - 3% per kg body weight.

Today, Mr Das has the annual turnover of ₹ 36.6 lakhs and has established a very strong revenue-producing model in fisheries that may be replicated in other parts of the North Eastern region of India.

Traditional Fish Farming to Modern Fish Farming

Mrs Ranjita Saikia Deka is a resident of Medhikuchi village in Kamrup Metro district, Assam. Since 2005 she is providing online services in information technology to rural people. As she hails from a traditional fish farming family where she was getting ₹ 3-4 lakhs as her income, she started aquaponics in her home. Success gained in aquaponics encouraged her to start the Recirculatory Aquaculture System (RAS) under the guidance of the Department of Fisheries, Assam. She successfully established the RAS project in 2020 through the financial assistance received under the Blue Revolution Scheme. She constructed 8 tanks under a tin-roofed shed with a total volume of 6 lakhs litres of water. She got a total production of 16 tonnes during FY 2020–21.

Under Blue Revolution Scheme, she received a financial assistance of ₹ 30.00 lakhs. Fish farming in RAS was not an easy task for her as she was not accustomed to RAS technology. In the first year, she faced several unexpected situations as she wasn't well versed in the technicalities of RAS, but in the second year, she became relatively familiar with the system and gradually was able to tackle all the constraints.

By adopting the RAS system, she learned to produce a greater quantity of fish with less space and labor. Also, she gains ₹ 8.55 lakhs net profit by selling fish produce in her locality. The annual turnover is approximately ₹14.80 lakhs. Now, her family is able to manage their business without any hassle and could provide employment to youth. Her plan is to set up a live fish market complex near Guwahati.

Name	Ranjita Saikia Deka
District	Kamrup Metro
State:	Assam
Education	B.A.
Category	ST
Mobile number	7002098870
Firm's name	Rodali inc (online services) and Ranjita Saikia Deka's RAS
Year of establishment	2020
Position	Owner
Activity	RAS
Species	IMC, Grass and Amur carp, Singhi, Koi and Pangasius
Annual turnover	₹ 14.80 lakhs
Annual fish Production	16 tonnes
Employment generated	3

Fish Farming: A lucrative Business

Beneficiary	Uttam Mandal
District	Udalguri
State	Assam
Education	10th Standard
Category	SC
Occupation	Fish farmer
Mobile number	9101413273
Business activity	seed production and grow-out culture
Year of establishment	2009
Position	Owner
Firm's name	Uttam Mandal Fish Farm
Annual production	5.90 lakhs of fish seed and 4.74 tonnes of table fish
Annual turnover	₹ 34.31 lakhs
Employment generated	2

Mr Uttam Mandal is a fish farmer in Udalguri, Assam. In 2009, with the technical assistance from the Udalguri Office of the Department of Fisheries (DoF), he built two ponds of total water area of 0.50 ha and began scientific fish culture in these ponds. He expanded his fish culture using the profit he got from this and built another pond with the total area of 1.20 acres. He is always enthusiastic to acquire more knowledge in aquaculture and practice modern techniques in his farm. Recently, he attended a three-day skill development training program on scientific techniques in freshwater aquaculture offered by the NFDB-North East Region Centre, Khanapara, from 3rd to 5th March 2022, in Kalaigaon, Udalguri. He uses paddle wheel aerator in his pond to improve the oxygen level and feeds the fish with pelleted sinking and floating fish feed having crude protein content of 26-28 %.

He is also engaged in the fish seed rearing. He concentrates mainly on the seed rearing of improved varieties of catla, rohu, mrigal, amur common carp, silver carp, and grass carp. In FY 2021-22, he produced 4.50 lakhs of fry, 1.40 lakhs of fingerlings and 4,740 kg of table fish. His total net income from all these sources amounted to ₹ 15.50 lakhs in FY 2021-22.

The local fish farmers now depend on Mr Uttam Mandal's fish seed facility to purchase high-quality fish seed at reasonable price. His fish farm is also utilized by the DoF, Udalguri for conducting demonstration for other fish farmers. Based on his achievements, he was recognized as the best progressive fish farmer by the DoF, Udalguri, on National Fish Farmers Day-2021.

Prosperity through Fish Processing

ICAR- Central Institute of Fisheries Education (ICAR-CIFE), Mumbai had set up a pilot plant of 200 kg per day capacity for value-added fish products under the North Eastern Hill (NEH) scheme in Guijan village of Assam. It was inaugurated on October 8, 2021. Since then, 200 women of different Self Help Groups (SHG) were benefited from four training programs conducted by ICAR-CIFE. In March 2022, two women SHGs comprising 20 members upgraded their skills in making uniform quality fish products. Though they had constituted their SHGs, their activity was minuscule and income was negligible until they learned techniques of preparing value-added fish products.

After acquiring the necessary skills and knowledge for the preparation of value-added fish products, the team of 20 women started processing and sale of value-added fish products on their own as a part-time activity from April 2022. They formed sub-groups comprising five members, each sub-group spending 3 to 4 hours daily for the activity on a rotation basis. Their monthly turnover at present is ₹ 40,000 with a monthly net profit of ₹ 20,000.

They are being monitored locally by the Associate Director of Extension, Assam Agriculture University, NGO Jeeva Suraksha, and the local Fisheries Department under the technical guidance of ICAR-CIFE, Mumbai. The women are enthusiastic to continue their journey and plan to expand their business.

Establishment Name	Pilot scale plant for value added fish products
District	Tinsukia
State	Assam
Year of establishment	2021
Beneficiary	Women Self Help Groups
Contact person	Mrs Ranjita Bania
Mobile number	9678891071
Activity	Preparation and sale of value-added fish products
Technological intervention	ICAR-CIFE

Floods to Flourishing Fish Farming

Name	Chandan Kumar
District	Sitamarhi
State	Bihar
Education	Bachelor's Degree
Category	General
Occupation	Farmer
Mobile number	9431620811
Year of establishment	2020
Position	Owner
Activity	Fish farming
Annual turnover	₹ 3.61 lakhs
Annual fish Production	2.50 tonnes
Employment generated	20

Mr Chandan Kumar is a bachelor's degree holder from Parihar, Sitamarhi district of Bihar. He cultivated cereals and vegetables prior to shifting into aquaculture activity. The area where he lives is prone to frequent floods by which he suffered crop losses frequently. With a meagre annual income of ₹ 50,000 - ₹ 70,000 that he was getting from his crops, it was difficult for him to manage his financial needs. These hurdles prompted him to shift to aquaculture.

He visited the Krishi Vigayan Kendra office and learnt about different fish farming practices, benefits, conceptual technology related to fish farming, etc. Based on the learning, he submitted a detailed project report on polyculture fish farming to the State Fisheries Department. The total project cost of ₹ 6.66 lakhs was sanctioned of which, he received ₹ 2,66,500 financial assistance to set up the farm. The remaining ₹ 3,99,900 was invested by himself. In the year 2021-22, his total production was 2.50 tonnes with a net profit of ₹ 2.32 lakhs.

Mr Kumar uses good quality fish seed and adopts good management activities for his farm. He has generated employment for 20 people in his village with this project. Presently he is happy with the progress and he aspires to expand his farm and gain more profit in the coming years.

Fisher Collective Culturing Fish

The Rulhi maun of Bihar is a cut-off meander of Dhanauti River which seasonally gets connected through a link channel. Approximately, 150 fishers practice subsistence fishing under the Cooperative Society "Motihari Prakhand Matsyjivi Sahyog Samiti Limited". Though the maun has a fish production potential of 976-1003 kg/ha/year, the yield from the natural fisheries was found to be in the range of 115-130 kg/ha/year because of the absence of scientific management regimes. The ICAR-CIFRI took up an innovative project, "Fisheries development in Rulhi wetland of Bihar through stakeholders' participatory fisheries management model (Co-management) in a sustainable manner" funded by NFDB to demonstrate and train the farmers of Rulhi maun in CIFRI's technology for improving fish yield, especially Culture Based Fisheries (CBF). The ICAR-CIFRI organized fishers and gave them awareness and training on CBF.

A total of 1,68,000 advanced fingerlings were stocked in the maun in a phased manner from September - October onwards when flood threat was minimal. The harvesting started after the closed season from September reaching a peak during January-February. As harvesting progressed, this harvest pattern created more space and natural food for the fish. Another seed stocking was done in January-February. This seed would reach harvest size by September onwards. A sustained supply of quality seed was ensured through the production of advanced fingerlings of Indian major carps and exotic carps in 8 prefabricated "CIFRI pen HDPE" installed in the marginal areas of wetland. In addition, a battery of 6 shallow "CIFRI GI cages" were installed in the deep pool for the production of table-size Pangasius. This would provide them with a compensatory income during the fishing ban period. Six nursery ponds were also excavated on the banks of wetland for rearing of fingerlings to support timely stocking of fish seed. Fisheries inputs like 6 tonnes of "CIFRI CAGEGROW" feed for nursery and cage rearing of seed, 150 fishing nets, one FRP boat, and two wooden plank-built boats were distributed to the fishers. These interventions in Rulhi maun increased fish productivity to 300 kg/ha/year.

These fisheries management practices demonstrated in the wetland are to be followed in the coming years also. It is anticipated that it will further improve fish yield and livelihood opportunities.

District	East Champaran
State	Bihar
Year of establishment	2017
Beneficiary	Fisher collective
Business activity	Culture based fisheries and seed production
Technological intervention	ICAR-CIFRI

Government Teacher Turned into a Progressive Fish Farmer

Name	Rajesh Paswan
District & State	Patna Bihar
Education	Graduation
Category	SC
Occupation	Government teacher
Mobile number	6201005266
Year of establishment	2021
Position	Owner
Activity	Polyculture
Species	IMC and Bighead carp
Annual turnover	₹ 5.5 lakhs
Annual fish Production	3.20 tonnes
Employment generated	3

Mr Rajesh Paswan is a government teacher in Fateha village in Patna District, Bihar. He was earning very little through his profession which made him look for an alternative source of income. Seeing the vast potential in the fishing sector, he was determined to start fish culture. He started carp monoculture in a small pond of about one acre, from which he did not get enough money to meet the family requirements. He saw an advertisement in Gramshree Kisan regarding the services they provide in fisheries. He was curious about the best management practices in fish farming, so, he contacted them and participated in one of the training programs organized by Gramshree. There, Mr Paswan got information from the fisheries expert on how to maintain the growth of fish, ideal stock density, and increase the total production.

With a total project cost of ₹ 5.30 lakhs, he is now successfully doing polyculture of Indian Major Carps (IMC) and bighead carp in 2 units of the ponds on his farm of 1.9 acres with a production capacity of 2.5 tonnes. By adopting the practices he learnt through Gramshree, helped to reduce the fish mortality rate. He uses fish sanitizers on the infected fish, which disinfects the fish within 2-3 days. He feeds the fish using hanging bags of farm-made feed, which reduces the wastage of feed and prevents it from settling down reducing the ammonia formations. These practices helped him increase total fish production and achieve a profit of ₹ 1.50 lakhs.

Mr Pawan's socioeconomic status has improved and is able to meet the needs of the family. He created employment opportunities for 3 people. He plans to construct one more pond on 91.40 cents of land and intends to create more job opportunities for poor people. He shared that fishery experts from Gramshree has helped him with end-to-end hand-holding support, right from the construction of the pond to marketing of the produce enagling him to gain profit.

Scientific Interventions in Sirsa Maun

Sirsa maun is a seasonally open oxbow lake connected to River Dhanauti through a link channel. Fishing in the water body is carried out by 125 fishers under the cooperative society "Motihari Prakhand Matsyjivi Sahyog Samiti Limited". The fish production potential of this wetland is estimated to be 1,181-1,332 kg/ha/year. However, because of the failure in auto-recruitment, shrinkage of link channel, weed infestation, predators, unavailability of quantity and quality fish seed, insufficient stocking with inappropriate species composition, lack of seed rearing facility, etc. the productivity was reduced to 140 kg/ha/yr. With financial assistance from NFDB, the ICAR-CIFRI implemented an innovative pilot project, "Fisheries development in Sirsa wetland of Bihar through in-situ fish seed rearing and fisheries enhancement techniques for tapping fish production potential" to develop fisheries of this wetland.

ICAR-CIFRI provided training the fishers to follow standardized culture-based fisheries (CBF) protocol. Advanced carp fingerlings were stocked in the wetland twice a year, once in October (40%) until the fishing ban and another in mid-February (60%) with the onset of warm climatic conditions. A total of 1,52,000 carp seed were released into Sirsa maun in 2018 and 2019 respectively. A part of carp seed was raised in pens and the rest were procured from a commercial hatchery. The harvesting was initiated in September, peaking during January-February. The harvest pattern led to more space and availability of natural food for stocked fishes. The society was provided with 12 CIFRI model GI cages for table-size fish culture and prefabricated "CIFRI Pen HDPE" for production of advanced carp fingerlings, "CIFRI Cage Grow" feed for cage and pen culture, mono-filament gill net (discourages catching of small fishes), one FRP boat and one plank-built boat. A total of 576 kg advanced fingerlings were harvested in November after 72 days and released to the maun. Pangasius and Singhi were cultured in the cages in 2018 and 2019 respectively during the closed fishing season generating revenue of ₹ 2,00,950/ and ₹ 34,800/ each year.

The implementation of CBF in a scientific approach led to doubling the fish production (432 kg/ ha/ year), fishing man-days (from 32 to 62 days), and their income within two years. The practice of migration of fishers in the region to other states in search of employment also reduced.

District	East Champaran
State	Bihar
Year of establishment	2017
Beneficiary	Fisher collective
Business activity	Culture based fisheries and seed production
Technological intervention	**ICAR-CIFRI**

Transformation of Wetland

District	East Champaran
State	Bihar
Year of establishment	2017
Beneficiary	Fisher collective
Business activity	Culture based fisheries and seed production
Technological intervention	**ICAR-CIFRI**

At Kararia maun, around 132 fishers practice subsistence fishing under the Primary Fishermen's Cooperative Society "Motihari Prakhand Matsyjivi Sahyog Samiti Limited". Though the estimated production potential of Kararia maun is in the range of 3,183 to 3,437 kg/ha/year, the recorded production was 190 kg/ha/ year. This was due to the absence of scientific management. To mitigate this issue, ICAR-Central Inland Fisheries Research Institute (ICAR-CIFRI) implemented an innovative pilot project "Fisheries development in Kararia wetland of Bihar through the empowerment of communities and stakeholder's participation for capacity building and improved livelihood" with financial assistance from NFDB.

ICAR-CIFRI advised the beneficiaries to follow the standard protocol of Culture Based Fisheries (CBF), such as selecting suitable fish species and their composition, seed size, stocking density, stocking time/season, and harvesting schedule. Advanced fingerlings of Rohu, Catla, and Mrigal, Grass carp, and Common carp in 2,46,000 numbers were released in a staggered manner in the open water. Additionally, the fishers were trained in rearing and production of overwintered seed in excavated nursery ponds. Initially, stocked seeds were outsourced; later, the trained fishers-initiated seed production from the excavated ponds in the following years. The nursery ponds measuring 1.50 ha area (4 in number) and "CIFRI Pen HDPE"(8 in number) provided a sustained source of quality seeds to pursue CBF in this wetland. The fishers were provided monofilament gill nets, one fibre boat, and two plank-built wooden boats for security patrolling, pen monitoring, fishing, etc. Another pilot trial of table fish production of indigenous catfish singhi in a pond was also conducted. Fingerlings were stocked at low density (14/ m^3) during late December and the fishes were fed with CIFRI CAGEGROW floating feed. After 5 months of culture, production was 93 kg, fetching a price of ₹ 400 per kg.

The project improved the capacity of fishers for operation, production, and management of the seed production system. Currently, through CBF approach, production increased from 190 to 592 kg/ ha/ year and fishing days from 44 days to 151 days from 2017 to 2020.

Refugee into Raising Fish

In 1960, Late Mr Satish Mandal's family migrated from Bangladesh to Chhattisgarh, India as refugees. In 1985, he and his three sons started aquaculture as a business to earn their livelihood. They bought fish varieties like Rohu, Catla, and Pangasius from Andhra Pradesh and traded them in Chhattisgarh & earned a good profit.

In 2007, the Mandal brothers constructed a pond with an investment of ₹ 25 lakhs and received a ₹ 10 lakhs subsidy under the Rashtriya Krishi Vikas Yojana (RKVY). Within six months, they earned a good profit with the culture of Rohu fish in the pond. This motivated the Mandal brothers to expand their fish farming business. On 3rd September 2008, the Mandal brothers started their own company and registered it as M.M. Fish Seed Cultivation Private Limited earning a profit of ₹ 20 lakhs annually. Since 2017, the company has been producing Monosex Tilapia and Pangasius seed by setting up a hatchery. Live Pangasius are sold to nearby company farms. The rapid expansion in fish farming has prompted the Mandal brothers to diversify into different businesses under a conglomerate "Mandal Group of Companies Pvt. Ltd". Presently, the group of companies is doing its production on 140 Ha (108 Ha of own farm and 32 Ha on lease) of pond area in seven districts of Chhattisgarh where Indian Major Carps, Pangasius, Mono sex Tilapia, Koi, Chitol are produced. The company has also opened Fish Farmers Help Centre at Raipur and Bilaspur to help marginalised farmers.

M.M. Fish Seed Cultivation Private Limited has fetched many rewards & recognitions in the field of fish farming. The company had received several National and State awards such as the Shresth Matsya Palak Award, Krishi Ratna Prize, Krishi Basant Prize, Smt Bilasa Bai Kevanteen Matsya Prize & State Best Fish Farmer in 2018 by the Government of India.

Name	Sukdeb Mandal
District	Raipur
State	Chattisgarh
Education	Master's in Economics
Category	General
Occupation	Fish farming
Mobile number	9755347874
Firm's name	M.M. Fish Seed Cultivation Private Limited
Year of establishment	1985 (Parent company)
Position	Director
Activity	Seed production, growout culture, sale of fish, feed, and fish pond care products
Species	Mono-sex tilapia and Pangasius
Annual turnover	₹ 100 crores
Annual production	Grow-out fish of 8,000 tonnes and fish seed 5 crores in number
Employment generated	360 Direct & 2700 Indirect

Agarwal into Aquaculture

Name	Sanjay Agrawal
District	Raipur
State	Chhattisgarh
Education	12th Standard
Category	General
Occupation	
Mobile number	7024148417
Firm's name	M/s. Agrawal Trading Co.
Year of establishment	2008
Position	Director
Activity	Production and distribution of CIFAX and fish feed
Annual turnover	₹ 15 crores
Annual production	4,000 tonnes
Employment generated	47

Agrawal Trading Company established in 2008 is one of the premier companies manufacturing, marketing, and promoting ICAR-CIFA's Technologies (CIFAX, Diagnosis kits, CIFA Carp Starter, CIFA Carp Grower, and Nano plus). The Agrawal Trading Company is ISO 9001:2015 certified partnership firm, popularly known for its optimum quality products and transparent dealings.

Mr Agrawal is a proponent of branding and hence has trademarks registered for CIFAX, CIFA Carp Starter, CIFA Carp Grower and CIFA Nano and obtained patents for the two technologies. He established infrastructure related to fisheries over the years for better positioning of the units such as the CIFAX production unit in 2014 with a production capacity of 1,000 litres per day, the disease diagnostic production unit in 2017 and feed mill unit of 200 tonnes in 2020. Mr Sanjay Agrawal visited a plethora of feed companies located in different parts of India to obtain in-depth knowledge about processing technology like grinding and mixing feed ingredients, extraction technology, drying and packing, and reprocessing activities and followed the sale of value products commercialized by ICAR-CIFA. The company developed notable associations because of which they were able to acquire quality raw material and market the products through dealer networks and financial linkage with banks. The company took the initiative of producing diagnosis kits for several fish diseases.

The company has earned a net profit of ₹ 30 lakhs with an annual turnover of ₹ 15 crores during the FY 2021-22. During COVID-19, the company faced challenges with procurement and supply of products due to restrictions on transportation but later managed it well without losses. The company has reached out to 20,247 farmers in a year to ensure that the continuous supply of the required technology is provided for the development of aquaculture. They conducted 30 awareness programs, 10 ToTs (Training of Trainers), and 17 seminars/ workshops to enrich the fisher communities with access to knowledge, and usage of technology in fisheries sector.

Culture Pangasius and Enjoy Cuisine!

Ms Vandana Churendra and Mr Pushpak Rathia are residents of Dugatola Village of Rajnandgaon District, Chhattisgarh. Ms Churendra did M.Tech. in Food Process Engineering. She and Mr Rathia jointly ventured into biofloc technology in 2019. Compared to pond culture, they achieved 30-50% more fish production by practicing using biofloc technology. They mainly sell Pangasius fingerlings and marketable sizes of 0.90 to 1.5 kg Pangasius. In addition, they also own "Fried fish outlets" and "Live fish outlets". They supply fish to local markets and also sell through their own outlets. At the fried fish outlets, snacks like crispy fish, fish burger, fish finger, tawa fish fry, fish manchurian, etc. are sold at a good profit margin.

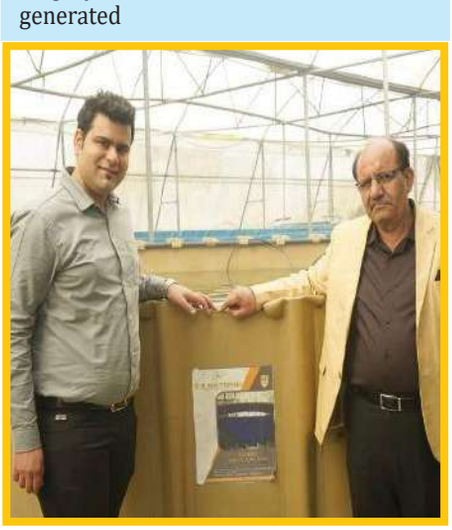
They manufacture liner tanks, round tanks, rectangular tanks and provide training to farmers on different cultural techniques. The company employs around 40-50 persons in total either directly or indirectly in fish farming, tank construction work, fish transportation work, etc, which therefore leads to cooperation among the folks and improves their socio-economic status.

The company plans to open fried fish outlets and spread its presence all over India. They have already opened 3 outlets in Raipur, Chhattisgarh and planned to open 10 more outlets in the Durg and Raipur, Chattisgarh. ,r area of Chhattisgarh.

Name	Vandana Churendra and Pushpak Rathia
District	Durg
State	Chhattisgarh
Education	M. Tech. Food Processing Engineering
Category	ST
Occupation	Fish farming and fish marketing
Mobile number	7999521372
Firm's name	Koytur Fish Farming Private Limited
Year of establishment	2019
Position	Director
Activity	Biofloc culture and retailing of live fish and fish food products
Species	Pangasius
Annual turnover	₹ 56 lakhs
Annual fish production	60 tonnes
Employment generated	34

A Journey from the Power Plant to Powerful Technologies in Fisheries

Name	Siddharth Mehta
District	West Shalimar Bagh
State	Delhi
Education	PG in International Business
Category	General
Occupation	Entrepreneur
Mobile number	9310670971
Firm's name	R.S. Polymers (Parent company)
Year of establishment	1988
Position	Proprietor
Activity	Manufacturer and exporters of RAS/ Biofloc/ Cold storage and Cages
Annual turnover	₹ 43.61 crores
Annual production	1,000 tonnes
Employment generated	110



R.S. Polymers, owned by Mr Vimal Mehta was established in 1988 and is one of the leading companies in executing thermal and hydro power projects and is a manufacturer and supplier of aquaculture tanks, fish feed, fish farming tanks, and biofloc tank, etc. As a successor, his son Mr Siddharth Mehta who did his Post Graduation in International Business noticed the business potential in the fisheries sector. He traveled all over the world to learn new techniques in the fisheries sector. While attending seminars in Thailand and Singapore on 'Modern technology in fish and shrimp cultivation, he observed Re-circulatory Aquaculture System (RAS) and Biofloc as the most effective technologies for high-density fish farming. He realized that introducing these techniques would help farmers significantly, so he started R.S. Polyplast in 2012, a subsidiary company, with a vision to empower the fish farmer to increase production and reduce crop loss.

R.S. Polyplast was set up on one acre of land to conduct free technical training, demonstrations, and development of modern techniques of inland farming along with Research & Development for innovations in the aquaculture industry in India. Additionally, R.S Polyplast has curated special employment generation initiatives through aquaculture like the 'Engagement through Biofloc' program supporting the ex-servicemen with Indian Air Force's collaboration, 'Employment through modern aquaculture' designed for supporting the widows and disabled to generate income in convergence with Indian Army and 'Young entrepreneur in Aquaculture' to support the young entrepreneurs in aquaculture.

Today, R.S Polymers provides a one-stop solution to source all the products required for Biofloc and RAS units with State-of-the-art Technology in-house manufacturing plants. He benefitted 10,000 fish farmers in setting up their plants. Additionally, R.S Polymers has an in-house cold storage unit and processing facility with 4 tonnes/ day capacity. They also offer competitive prices to the farmers who are interested in selling their harvest.

Biofloc : Benefiting Business

Mr Zaheer Karmali is from Beri Village, North Goa District, Goa. He was engaged in the retail business and had the urge to diversify into something which is not only promising but also sustainable. He was interested in aquaculture due to the rising demand prospects and economic viability. So, he applied for the activity "Construction of Medium Biofloc" activity under Pradhan Mantri Matsya Sampada Yojana (PMMSY) and successfully constructed 8 tanks with 120 m^3 volume each during FY 2021–22. Under this scheme, he received financial assistance of ₹ 20 lakhs with a total project cost of ₹ 1.39 crores, and a loan of ₹ 150 lakhs from the Bank.

He has set up his farm using fusion technology of Biofloc and RAS systems, in which he cultures sea bass and sells the harvest at the rate of ₹ 650 per kg. Each tank has different equipment, which makes each unit more efficient.

He suggests that his model can be replicated throughout India as it has the potential to generate employment for the youth. This technology reduces the exploitation of marine fishery resources and in a way promotes the conservation of the marine ecosystem. He plans to expand Zash Farms into crab and mussel culture.

Name	Zaheer Karmali
District	North Goa
State	Goa
Education	B. Com.
Category	General
Occupation	Retail business
Mobile number	9326144800
Firm's name	M/s. Zash Farms
Year of establishment	2021
Position	Partner
Activity	Sea bass culture in biofloc
Annual turnover	₹ 68 lakhs
Annual production	48 tonnes
Employment generated	12

Prosperity: Pond to Plate

Name	Manoj Mohanlal Sharma
District	Surat
State	Gujarat
Education	Ph.D.
Occupation	Fisheries entrepreneur
Mobile number	9824112856
Firm's name	Mayank Aaquaculture Private Limited
Year of establishment	2005
Position	Director
Activity	Shrimp farming
Species	Freshwater prawn
Annual turnover	₹ 25 crore
Annual shrimp production	500 tonnes
Employment generated	185

Dr Manoj Mohanlal Sharma was born in Nanded, Maharashtra, and always had a keen interest in fisheries sector since childhood. Pursued his master's in Fisheries Resource Management from the Central Institute of Fisheries Education, Mumbai. His expertise lies in sustainable shrimp farming. Presently, Dr Sharma is the Director of Mayank Aqua Products, Gujarat. He is one of the key persons behind the Blue Revolution in Surat and has helped in transformation of coastal wetland into one of the most viable farming areas for shrimp and in turn provided livelihood to thousands of people. He has been invited as a speaker to many countries to discuss better management practices in shrimp farming.

Mayank Aquaculture Private Limited. (MAPL) is now one of the pioneer companies in shrimp farming with 250 ha shrimp farms in Gujarat. The farms are spread across Gujarat covering Surat, Bharuch, and Bhavnagar districts. Their Aquaculture probiotic product line, "VIVALINE" was launched in 2013. The product line supports disease prevention and sustainable shrimp farming. He founded "Mayank Aqua Products" in 2019 and ventured into multi-phase indoor shrimp farming technology, which involves indoor rearing of shrimp post-larvae under the complete bio-security protocol. The multi-phase indoor shrimp farming technology allows the farmer to have cost-effective and disease-free seed throughout the year making it easy to take two crops per year by doubling the production. He started Zhingalala Restaurant serving both local and exotic cuisines with the "Pond to Plate" concept as its core vision. The first of its kind pesco vegetarian restaurant serves only farm-raised shrimp and over 45 different shrimp delicacies.

Over the years, the contribution of Mayank Aquaculture Private Limited and Dr Sharma toward the fisheries sector has been well recognized and the firm has been awarded with numerous accolades.

Thinking Outside the Box, A Homemaker Creates Emplyment for Others

Mrs Kuldeep Kaur belongs to Chormarkhera village of Sisra District, Haryana. She is a homemaker who wanted to take up work so that she could support her family. She considered taking up agricultural farming, but there was lack of canal water and the subsurface water was salty, making the land unsuitable for agriculture. This prompted her to think about other options especially, aquaculture.

To know more about aquaculture, she sought the guidance of the Department of Fisheries, Haryana. Under their supervision, she applied for the activity "saline/alkaline white shrimp cultivation" under PMMSY during FY 2021-22. The total project cost was ₹ 15 lakhs. She received ₹ 7.94 lakhs of financial support as the first-year input under PMMSY. She successfully built two units of ponds in one ha area with the total output capacity of 6.63 tonnes. In FY 2021-22, she produced 6.8 tonnes of white shrimp, and sold 100% of her output. Her net profit for the year was ₹ 12.20 lakhs against the expenditure of ₹ 15 lakhs.

She follows best management practices in her farm. Shrimp farming revenue has improved her standard of living. She has walked past of her desire to support her family to giving employment to others. Her farm now employs four other people in addition to herself. She intends to expand her farm in future with species specific and regional specific requirement.

Beneficiary	Kuldeep Kaur
District	Sirsa
State	Haryana
Education	10th Standard
Category	General
Mobile number	9859829700
Business activity	Shrimp farming
Species	White shrimp
Year of establishment	2021
Position	Owner
Firm's name	Sarpanch Jhinga Farm
Annual fish production	6.80 tonnes
Annual turnover	₹ 27.20 lakhs
Employment generated	4

Fish Farming is a Fantastic Farming

Name	Amrit Lal
District	Solan
State	Himachal Pradesh.
Education	B. Sc. Chemistry
Category	OBC
Occupation	Fish farmer
Mobile number	9816428592
Year of establishment	2021
Position	Owner
Activity	Fish farming
Annual turnover	₹ 7 lakhs
Annual fish production	7 tonnes
Employment generated	1

Mr Amrit Lal is a businessman from Surajmara village of Solan district, Himachal Pradesh. Due to less demand in the market for trading business, he could not get expected income. To improve the income, he wanted to start fish farming activity opting for acquaculture. To know more about the fishing technologies, culture techniques, and available schemes he reached out to the Fisheries Office at Nalagarh in Solan. After being ensured by the Fisheries Department officials of the feasibility of aquaculture, he was convinced to start acquaculture business. To begin with, he took some land on lease and applied for the construction of ponds under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) scheme. During the FY 2020-21, he received financial assistance of ₹ 2.68 lakhs for the construction of ponds and ₹ 1.28 lakhs as input cost against the total project cost of ₹ 6.72 lakhs. The balance amount was managed out of his savings. With these, he constructed three ponds spreading over a 0.80 ha water area. He received hands-on training on the culture of fish which helped him to adopt the new technologies in his ponds.

He adopted polyculture in his ponds to make judicious use of the total food material present and produced 7 tonnes as the first harvest of which 5 tonnes produce was sold. Access to technical guidance from the Department and continuous monitoring of pond water quality and fish health has helped him get a good harvest and returns. Dissemination of technical information, financial assistance, and extension services by the Department of Fisheries, Himachal Pradesh helped him to manage his farm with less risks leading to the annual production of 7 tonnes with a net profit of ₹ 4.05 lakhs.

By adopting improved production techniques and better management practices, fisheries had become an income-generating activity for Mr Lal. He is now self-reliant and provides employment to one person on his farm. His profits have doubled after taking up fisheries.

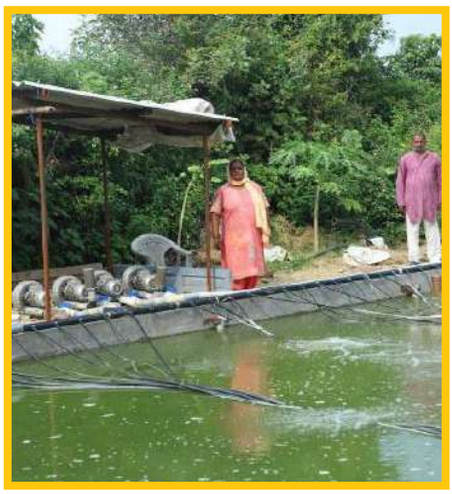
Biofloc : Bountiful Returns

Mrs Reshma Devi an inhabitant of Chowki Manyar village in Bangana block of Una district, Himachal Pradesh was a tailor by profession. Additionally, she was practicing traditional farming with her husband, Mr Subhash Chand who is differently abled. They both could generate a nominal monthly income of ₹ 5,000 from all the activities they were engaged in, but it wasn't enough to run the household business. Her entrepreneurial mindset and instinct to take up new challenges paved the way to enter into fisheries activity. She learned about various fisheries and aquaculture activities out of interest. To know more about different technology-induced initiatives she approached Department of Fisheries, Himachal Pradesh. She actively participated in several training sessions and workshops conducted by the Department of Fisheries to equip herself with fishing practices and techniques.

During FY 2018-19, she formally started fisheries activity by constructing a small rearing unit of size (30m X 20 m). To further enhance her production and earnings from fisheries, she applied for the "Construction of Biofloc Pond" activity under the PMMSY scheme during the FY 2020-21 and was subsequently selected as an eligible beneficiary by the State Fisheries Department. She received a financial assistance of ₹ 8.40 lakhs under the women's category which amounts to 60% of the total project cost of ₹ 14 lakhs. For the rest of the fund, she availed a loan of ₹ 1.50 lakhs from KCC and ₹ 0.80 lakhs from Chowki Manyar Co-operative Society for setting up the Biofloc Unit.

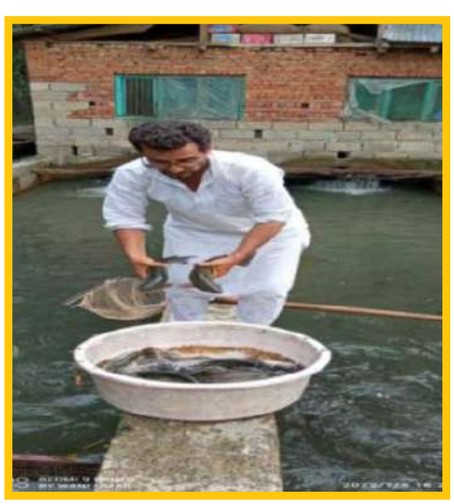
With the funds received she constructed Biofloc ponds spreading over 24 cents with amenities like office rooms and facility for watchman. The Biofloc unit was completed in 2021 and she has successfully harvested the first crop. Mrs Devi's family was struggling to make ends meet before. But the good harvest produced through biofloc has led to a better life, good returns which is way higher than what she was earning while doing tailoring. Currectly, fisheries has become the primary source of income. She would like to consantrate on the same activity and further expand it.

Name	Reshma Devi
District	Una
State	Himanchal Pradesh
Education	10th Standard
Category	OBC
Occupation	Tailor
Mobile number	9805544779
Firm's name	Choudhary Fish Farm
Year of establishment	2020
Position	Proprietor
Activity	Biofloc
Species	IMC
Annual turnover	₹ 7.23 lakhs
Annual fish production	7 tonnes
Employment generated	3



Teacher to Trout Farmer

Name	Hamidullah Khanday
District	Anantnag
State	Jammu and Kashmir
Education	M.A., B. Ed.
Category	General
Occupation	Private School teacher
Mobile number	9622519202
Year of establishment	2019
Position	Proprietor
Activity	Hatchery and rearing unit
Species	Trout
Annual turnover	₹ 18.5 lakhs
Annual fish seed production	3.31 tonnes
Employment generated	4



Mr. Hamidullah khanday is from Khangund Verinag Village, Anantnag District of Jammu and Kashmir. He started his career in 2011 as a private school teacher, from which he was getting very meagra income to meet the family's needs. Once, he attended awareness camps organized by the Department of Fisheries, which motivated him toward fish farming. As a result, he established two trout rearing units with production capacity of 6000 nos. fingerlings under Rashtriya Krishi Vikas Yojana (RKVY) during FY 2009-10 and subsequentlyl, under the same scheme he received financial assistance of ₹ 4.20 lakhs against a total project cost of ₹ 30 lakhs and constructed additional eight tanks (120 m^3 volume each).

After so many experiments and efforts, in the year 2021, he constructed a hatchery unit with a capacity of 50,000 fingerlings, which is employing others also. With an increase in seed production, he is managing to sell 400 kg of trout/ month and was supported by Department of fisheries in marketing his produce. He and his family are living comfortably with the income he is getting out of this business. He plans to gain more scientific knowledge about seed production and wants to export the seed nationally. He also suggests youths to take up fisheries. He even creates awareness to youth on the different schemes, technical guidance and financial support the Department of Fisheries provides.

ICAR-CIFT turns Students into entrepreneurs!

Zarin Gourmet Private Limited is a company formed by three friends, Rifat Amin, Syed Faaiz Qadri, and Saurav P. Satish. The company focuses on supporting fish farmer communities of Kashmir Valley to sell rainbow trout across the country. The idea came to their mind during their training period at Naropa Fellowship Program, Ladakh. They traveled extensively to places viz., Anantnag, Kulgam, Pulwama and Kupwara to understand the challenges faced by the rainbow trout farmers. The major difficulties the farmers faced were in selling the produce and finding consistent buyers. This happened due to lack of connectivity and poor logistics, both of which are critical to make successful business.

To explore a solution to this problem and to know about technicalities of fish supply chain, they attended training and internship program at ICAR-CIFT. They learned the basics of fishing handling, packaging, freshness and quality evaluation of fish, etc. during this 6-weeks training program. After getting trained, they attempted a trial shipping of rainbow trout consignment from Kashmir to Kochi. This was quite successful. Then they decided to ship the product further in pan-Indian level considering the enticing consumers for the rain bow trout. They came up with a B2B (Business-to-Business) model and associated with various seafood business entities in different metropolitan cities. In the year 2021-22, they supplied around 2.5 tonnes of fish across India, earning around ₹ 20 lakhs. Today they supply rainbow trout to business platforms like Fresh2Home, Licious, Captainfresh, Pescafresh, Metro Cash & Carry, Nandu's, Spar Hyper Market, Star Bazaar, and many other super/ hyper markets in Bengaluru. With their passionate effort, the Himalayan trout is now served in premium restaurants and cafes in Mumbai, Bengaluru and Kochi.

Technological intervention	**ICAR-CIFT**
Beneficiary	Rifat Amin, Syed Faaiz Qadri, Saurav P. Satish
District	Srinagar
State	Jammu & Kashmir
Education	B.Com., B.A., BBA respectively
Category	General
Mobile number	6006179457
Business activity	Supply of rainbow trout
Year of establishment	2020
Position	Founders and Directors
Firm's name	Zarin Gourmet Private Limited
Annual fish supply	2.50 tonnes
Annual turnover	₹ 20 lakhs
Employment generated	15 to 20 per business entity

Pond Culture to Cage Culture

Name	Jodhan Prasad
District	Hazaribagh
State	Jharkhand
Education	B.A.
Category	OBC
Occupation	Fish farming
Mobile number	9955585695
Year of establishment	2016
Position	Owner
Activity	Cage culture
Species	Pangasius
Annual turnover	₹ 7.12 lakhs
Annual fish production	8 tonnes
Employment generated	90

Mr Jodhan Prasad a resident of Chedra Village, Hazaribagh district, Jharkhand turned into a fish culturist from agriculture farming. After completing B.A., he started culturing fish in a small pond. Though this helped him earn ₹ 32,000 per month and meet his requirements, he faced challenges like disease outbreaks and a shortage of capital. During this phase, he went on to meet many fish farmers engaged in cage culture and learned about practices followed, production and profit earned. This motivated him to take up cage culture.

Under the guidance and technical support of the State Fisheries Department, he applied for the activity "Cage culture" under Blue Revolution Scheme during FY 2016-17 and successfully installed one cage battery consisting of two cages with 1.8 x 2.4 x 1.2 m^3 dimensions and a production capacity of 12 tonnes in Jamuniya reservoir. The total project cost was ₹ 3 lakhs, out of which ₹ 2.7 lakhs were received as financial assistance for the first-year input cost and the rest of the amount was contributed by himself.

He follows good management practices viz. regular clearing and treatment of the cage net, shifting of the cage at regular intervals for better water exchange, application of lime in the winter season by hanging a lime bag in each cage, feeding management, and timely harvest of grow-out fish helped him get better yield from cages. He is developing infrastructure for temporary seed storage and a live fish selling centre with an aeration facility, electronic weighing machine, live fish transportation facility, etc. Cage culture proved to be a major source of livelihood and regular income for him; hence he wants to expand it in the future by installing a minimum of five cages with diversified species and expects getting two crops per year.

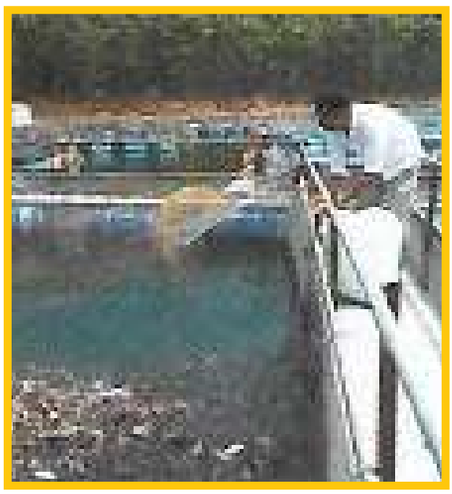
Nothing to Something in Fish Farming

Mr Navkishar Gope was a displaced man but became a resident of Gangudih Punarwas Village in Saraikela District, Jharkhand. He had a very poor socio-economic background lacking basic amenities. He couldn't even afford to hire even a bicycle or motorcycle to commute. He had no land to construct a pond nor culture fish. transportation nor any assist as land to construct a pond and culture fish. Against all odds and hardships he managed to become a member of "Chandil Bandh Visthapit Matsya Jivi Sahakari Samiti" fishing society.

Under the guidance of the Fisheries Department, Mr Gope applied for the "Cage Culture" project under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and the same was sanctioned. He received financial assistance of ₹ 51,000 against a total project cost of ₹3 lakhs to construct a fish culture cage with a production capacity of 5 tonnes.

During the initial stages, he was not much aware of the fish culture practices and had little information regarding marketing linkages. As a result, he got a limited net profit. After the intervention and guidance of the State Fisheries Department officials he adopted the best practices like the usage of medicine, monthly cleaning of the cage net, etc. The adoption of these practices helped him to reduce fish mortality, increase production, and, in turn, to become the best fish farmer in the district. He had very meagre income before taking up this activity. By doing this activity, he gets ₹ 3.20 lakhs profit. The cage culture practice helped him to improve his financial status resulting in creating assets like owning a house and a moped. He aspires to extend his business by setting up more fish culture cages in the future.

Name	Navkishar Gope
District	Saraikela
State	Jharkhand
Education	10th standard
Category	OBC
Occupation	Fish farmer
Mobile number	6201189371
Firm's name	Chandil Bandh Visthapit Matsya Jivi Sahakari Samiti
Year of establishment	2017
Position	Member
Activity	Cage culture
Species	Pangasius
Annual turnover	₹ 5.55 lakhs
Annual fish production	6 tonnes
Employment generated	2



Keeping Together: Returns on Riverine Aquaculture

Name	Gudu Baitha
District	Ranchi
State	Jharkhand
Education	Bachelor's degree
Category	SC
Occupation	Fishing
Mobile number	7646086847
Year of establishment	2020
Position	Partner
Activity	Cage/ pen culture
Species	Tilapia and pangasius
Annual turnover	₹ 32 lakhs
Annual fish production	30 tonnes
Employment generated	50

Mr Gudu Baitha belongs to Ranchi, Jharkhand. He is a bachelor's degree holder belonging to the fishermen community. Though he was involved in small-scale fishing activity at Getalsud dam, the income he was getting was not enough to meet his requirements. He attended Matsya Krishak Goshthi Programme organized by the State Fisheries Department which became a turning point in his life. With the support of the State Fisheries Department, Mr Baitha formed a team of 16 interested people in fishing and applied for the Riverine Fish Farming Project under the Blue Revolution scheme 2019-20 and got it rolled.

They started the project with the amount of ₹ 8.50 lakhs invested by themselves against the total project cost of ₹ 36 lakhs. Eleven members of the group availed KCC loans ranging from ₹ 36,000 to ₹ 40,000 which got sanctioned in FY 2021-22. They established 12 units of 120 m length of fish cages and pens having a depth of 40 to 50 feet in the Subarnarekha river covering approximately 40 acres of the closed water body. The major species cultivated were tilapia and Pangasius. The fish production they achieved in FY 2020-21 was of 25 tonnes and in FY 2021-22 it increased to 30 tonnes, as a result, their net profit increased from ₹ 21.60 lakhs to ₹ 27.00 lakhs. At present, they are happy with their achievement.

The fish culture activity resulted in better financial returns, improved their standard of living. They employed around 50 people from their village. They are encouraging people in the village to come up with more fishing activities.

Designer's Desire for An Innovative Culture

Mr Chethan Raj is a resident of R.R. Nagar Village in Bengaluru Urban, Karnataka. He is an interior designer with an MBA in Finance. The high demand for fish in the city and the Blue Revolution Scheme of the Government of India, motivated him to venture into the aquaculture business. Initially, he started shrimp farming on a small scale. Graduvally wanted to develop a live fish market so that he could sell his harvest and establish an uninterrupted supply.

Later he started tilapia culture with the support of the State Fisheries Department and it became a great success. He then applied for the "Construction of Freshwater Biofloc Ponds" in 0.1 ha under Pradhan Mantri Matsya Sampada Yojana (PMMSY) during FY 2020-21. He constructed 2 ponds for murrel culture under the scheme, with a total production capacity of 4 tonnes in a total area of 0.2 ha. He received financial assistance of ₹ 11.20 lakhs against ₹ 28 lakhs of the total project cost under the scheme. He markets his produce through online and offline modes. He was earning ₹ 60,000 per annum before venturing into fisheries. Currently, by doing aquaculture his monthly income is doubled, getting ₹ 1.20 lakhs per annum.

With substantial support received under PMMSY scheme, he could manage manage the costly high protein & diet required for murrel culture. His farm is now a full-fledged, sustainable farm, which doesn't depend solely upon outside supply. He is planning to use emerging technologies on his farm so that the yield could be greater than that of normal pond culture. The continuous support from the Fisheries Department and the schemes for youth has encouraged him to invest more in this sector. He started investing in biofloc technology and found that it is an effective method for intensive culture and can yield more production from a small unit consuming less area.

Name	N. Chethan Raj
District	Benguluru Urban
State	Karnataka
Education	MBA
Category	General
Occupation	Interior designer
Mobile number	9620466091
Firm's name	Namma Benguluru Fisheries
Year of establishment	2020
Position	Owner
Activity	Fish and shrimp culture
Species	Tilapia, murrel, and shrimp
Annual turnover	₹ 23 lakhs
Annual fish/ shrimp production	18 tonnes
Employment generated	5

Architect Turning into an Aqua Culturist

Name	Soumya Sathyanarayana
District	South Bangalore
State	Karnataka
Education	B. Tech. in Architecture
Category	General
Occupation	Aquaponic farmer and an architect
Mobile number	9880265330
Firm's name	GROW Sustainable Farm
Year of establishment	2020
Position	Owner
Activity	Recirculatory Aquaculture System
Species	Tilapia
Annual turnover	₹ 23.70 lakhs
Annual fish production	22.50 tonnes
Employment generated	11

Mrs Soumya Sathyanarayana is from Uttari village in South Benguluru district, Karnataka. Before entering into fish farming, she was an architect. In 2014, she started Aquaponics and started earning ₹ 60,000 monthly. But later, she faced problems in marketing. When she came to know about the Recirculatory Aquaculture System (RAS) and wanted to try this technology.

Under the guidance and support of the State Fisheries Department, she applied for the activity "large RAS" under PMMSY during FY 2020-21 and successfully constructed 20 tanks with 40 tonnes production capacity. Under this scheme, she got financial assistance of ₹ 30 lakhs for first-year input against a total project cost of ₹ 55.94 lakhs. To compensate, ₹ 15 lakhs were borrowed, and ₹ 25.94 lakhs were invested by herself.

Her farm has a unique and innovative filtration system with mechanical and biofilters, degassing and sludge tanks, a lab facility, and a storeroom for fish feed. She does periodic grading for the optimization of fish feed and harvest stress to get less mortality. She provides employment to 11 people to work in her facility. She plans to further optimize the farm operations and rearing-harvesting cycles so that maximum output can be extracted from the infrastructure. The present year's focus will be on rearing high-value fish, entering into the fish processing sector, and potentially foraying into the business-to-consumer (B2C) model line of business under their own brand "GROW"

Story of the Fashion Designer who became a Fish Farmer

Mr Anand is a graduate degree holder in fisheries belonging to the urban area of Bangalore, Karnataka. He completed B.F.Sc. in the year 1998 from the College of Fisheries, Mangalore, followed by working as a technologist in a shrimp hatchery for 2 years. In the year 2001, he joined fashion and apparel designing industry as General Manager at Bombay Rayon Fashions Limited, Bengaluru, Karnataka. In 2003, he established his own company in fashion and apparel designing named as "SAPPS Innovation" in Bangalore. The company became one of the successful manufacturers and traders in apparel business within the short span of one year.

In the year 2021 when the "Covid-19 pandemic" struck the whole nation, the apparel business of Mr Anand got severely affected. To overcome this situation, himself being a fisheries graduate he decided to venture into the business of fish farming. Being detached from the field of fisheries for many years, he was compelled to start everything from the scratch. He and his wife Sowbhagya approached the Department of Fisheries, Karnataka, and received quite a positive and encouraging response regarding this and the required information for starting the fish farming business. Equipped with the necessary information, they started fish farming of *Channa striatus* (snakehead murrel). They purchased the murrel seed from a nearby fish hatchery at the rate of ₹ 12 per seed of 3-inch size, stocked 10,000 fingerlings in 0.2 ha pond and reared for 8 months by adopting the best management practices. At the end of the culture period, they were able to fetch 6.5 tonnes of fish ranging from 0.8 to 1.2 kg size. They marketed the produce in the local fish market at the rate of ₹ 280 to 300 per kg of fish yielding the profit of around ₹ 100 per kg fish.

Mrs and Mr Anand are quite happy and satisfied with the profit they received from fish farming and decided to expand their business further. Mrs Sowbhagya applied under PMMSY and recently received the financial assistance of ₹ 16 lakhs under PMMSY for establishing a Biofloc unit for murrel culture. Biofloc pond was constructed by adopting the latest techniques and it's under CCTV surveillance for efficient monitoring. They are also planning to venture into Vannamei culture next year. By going for fish farming, they got income enhancement and they generated employment for 4 people.

Stakeholders	Sowbhagya and Anand
District	Bangalore Urban
State	Karnataka
Education	B.F.Sc.
Category	SC
Occupation	Manufacturer and trader of apparel
Mobile number	9483467528
Business activity	Fish farming
Year of establishment	2022
Position	Owner
Unit name	SA Farm
Annual fish production	6.5 tonnes
Annual turnover	₹ 22 lakhs
Employment generated	4

Commercialization of Seaweed based Bioactives and Nutraceuticals

Technological intervention	**ICAR- CIFT**
Contact person	Boby Kizhakethara
District	Cochin
State	Kerala
Education	MBA
Category	General
Mobile number	9446516060
Business activity	Manufacturing of sea weed based products
Year of establishment	2020
Position	Managing Director
Firm's name	Bodina Naturals Private Limited
Production	1,000 kg per day
Annual turnover	₹ 25 lakhs
Employment generated	more than 60

Seaweed is considered as an excellent source of nutrients and other beneficial compounds. ICAR-Central Institute of Fisheries Technology (CIFT), Kochi realised the bioactive and nutritional potential of these seaweed resources and scientifically developed seaweed based bioactive compounds and nutraceuticals for the benefit of larger population. These products are now commercialized through M/s Bodina Naturals Private Limited (BNPL), a company dealing with Ayurvedic products in PPP mode.

In 2020, BNPL established a manufacturing unit of 2,500 square metre area for seaweed-based products developed by ICAR-CIFT in Kochi, Kerala with the support of the Institute. The unit has the production capacity of 1,000 kg per day. The total project cost is ₹ 50 lakhs. The company has received "Productization Grant 2021" from Kerala Start Up Mission. In December, 2020 three seaweed- based products under the brand name of "ZAFORA" viz., ZAFORA seaweed hand sanitizer, ZAFORA-360 enriched fucoidan capsules and ZAFORA gargle were launched by the Director, ICAR-CIFT in the presence of Mr Boby Kizhakethara, Managing Director, BNPL. The products possess antiviral, nutritional and immune modulatory effects and contain carrageenan, fucoidans etc., from seaweed.

The unit generated direct employment for 16 people and indirect employment for more than 50 people. In its first year of its establishment, the unit generated ₹ 10 lakhs turnover. Now, the total annual turnover is about ₹ 25 lakhs. The product has received tremendous response in the local market because of its branding, quality & nutritional values, and packaging. Now, the company is aiming to introduce new FMCG products from seaweeds and other nutraceuticals.

Story of a Young Entrepreneur : Foo Foods

Kozhikode district in Kerala is the heritage capital of old Malabar province and is famous for its authentic and exquisite delicacy of mussel products. This allured the 21-year-old budding entrepreneur Mr Mohammed Fawas to explore opportunities in mussel products. In 2018, he partnered with Mr N. Rameesh and Mr M. Irfan to establish a small production unit and ventured into seafood sector with green mussel products. The product got good demand both in local and overseas markets because of its ethnic taste, but it failed to sustain its shelf life due to poor packaging. Initially they used locally available aluminum foils to pack the stuffed mussels which failed to uphold the quality of the product that tend to decay fast within a few hours of storage, resulting in heavy loss. Under this situation, they approached ICAR-CIFT for support.

ICAR-CIFT suggested them about scientific thermal processing technique which can improve the shelf life of the product at normal room temperature without using refrigeration/ preservatives/ additives to retain the food quality and wholesomeness. The keeping quality, freshness and taste of the food products would be the same throughout the year. ICAR-CIFT provided the necessary technical support to Mr Fawas to process the classic Malabar snack 'stuffed green mussel' from the inception stage itself and extended incubation facility. After successful test marketing, Mr Fawas registered the company as M/S Foo Foods Pvt. Ltd. in April, 2019. The technology was transferred by ICAR-CIFT through signing a MOU with the party and the product was launched as "Kallummakkaya Nirachath" under the brand name "FOO FOODS". The product is now available in hypermarkets and supermarkets of Kozhikode and Malabar region round the year with the market price of ₹ 140 per pack weighing 125 g.

The company is expected to generate the business turnover of ₹ 25 crore by the year 2025 and planning to launch more ethnic food recipes in near future. Currently the products are marketed from their own website www.foofood.in and digital platforms like Amazon.

Technological intervention	**ICAR-CIFT**
Beneficiary	Mohammed Fawas
District	Kozhikode
State	Kerala
Education	BBA
Business activity	Green mussel products manufacturing
Year of establishment	2019
Position	Founder
Firm's name	M/s Foo Foods Pvt. Ltd.
Annual production	4.5 tonnes (on average)
Annual net profit	₹ 17.1 lakhs (on average)
Annual turnover	₹ 4 crores

Start-Up Venture into Seaweed Cookies

Technological intervention	**ICAR-CIFT**
Beneficiary	Najeeb Bin Haneef
District	Ernakulam
State	Kerala
Education	M.Tech. Biotechnology
Category	OBC
Mobile number	9539938147
Business activity	Algal and seaweed based food and beverages
Year of establishment	2019
Position	Founder and CEO
Firm's name	Zaara Biotech
Production	450 kg per day
Annual turnover	upto ₹ 25 lakhs
Employment generated	26

The Agri-Business Incubation (ABI) Centre established at ICAR-CIFT, Kochi supports operations on business projects as a measure of enhancing the foundation for new technology-based industries and establishing a knowledge-based economy. One such company that got benefited by ABI, ICAR-CIFT is Zaara Biotech, a biotechnology start-up company focusing on research in energy and food crisis using micro-algae. The company's journey started in 2016, in the college dorm of "Sahrdaya College of Engineering and Technology, Kerala" by a group of students with the dream of improving the quality of life and economy through algal and seaweed-based products, though it was officially established only in 2019. In 2016, they developed an innovative seaweed and algal based cookies activity under the brand name "SPIROBYTE" which received wide recognition.

The group improved upon its products with algal-seaweed technology adding quality and taste in the research facility of ICAR-CIFT. They got support from ICAR-CIFT at different stages of market penetration and to launch the improved products under the brand "B-lite Cookies". The initial manufacturing of these products for test marketing was done in the pilot plant at ICAR-CIFT and the final manufacturing in the Government of India research institute facility. Today, Zaara Biotech runs at the production capacity of 450 kg per day and has two quality assurance laboratories linked with ICAR-CIFT, Kochi.

Their products are sold locally through e-commerce platforms. The company also exports the products to UK, Japan, Australia, etc. The company's business activity has currently expanded into food and beverage manufacturing, cosmetics, research and consultation services in Fast-Moving Consumer Goods (FMCG) sector, bio-informatics, health care in the IT sector, educational platform for product development, design and development of photo-bioreactors and artificial trees. The company also designs and manufactures sustainable environmental solutions based on advanced technology.

Producer Company Producing Ornamental Fisheries

Fish farmers of Kerala have been growing ornamental fishe in ponds constructed in their backyards. The 2009 subsidy scheme has boomed the ornamental fish culture in the state. However, the farmers faced constraints in marketing due to the interference of middlemen and in turn reduced the price for their produce. To solve the issue, a few of the farmers from Keezhillam of Ernakulam District formed a production company naming it as Sahyadri Aquarium Fish Producer Company under the guidance and support of MPEDA. The company was registered in 2014 by five aquarium fish farmers as founding members.

The company acts as a platform that connects the farmers and aquarium shop owners directly and thus preventing the exploitation of the middlemen. Now the company has 35 permanent and 15 contractual farmer members. The company set up a marketplace which opens once in a week. The farmers and the wholesale buyers/ aquarium shop owners would gather there and do business every Tuesday. At present, the company generates an income of ₹ 2.5 lakhs to ₹ 3 lakhs per week.

The market displays a diverse collection of ornamental fish prices ranging from ₹ 2/ fish to ₹ 2000/ fish depending upon fish species. Currently, 300 aquarium shop owners are visiting the market; they are also digitally connected through WhatsApp groups with approximately 600 shop owners who have shown keen interest in buying ornamental fishes. "The company model is beneficial for both the farmers and the aquarium shop owners", says one of the founding members Mr Thomas T.C. The farmers get 40% to 60% margin on the price as these is no indulgence of middle men. The aquarium shop owners get quality ornamental fish and are also provided with 24 hours guarantee for the fish from the cooperative. The farmers of the Sahyadri Fish Producer Company envision networking the ornamental fish farmers and aquarium shop owners throughout the country and create a single platform for fish trading.

District	Ernakulam
State	Kerala
Occupation	Fish trading
Contact Person	Thomas T. C.
Mobile number	9447032517
Firm's name	Sahydari Aquarium Fish Producing Company
Year of establishment	2014
Position	Member
Activity	Marketing
Species	Ornamental fish
Annual turnover	₹ 14.6 crores

Solar Hybrid Dryer: Source of Income

Technological intervention	**ICAR-CIFT**
Beneficiary	Suneer V. A.
District	Ernakulam
State	Kerala
Education	Bachelor degree
Category	OBC
Mobile number	9633459759
Business activity	Manufacturing & marketing of dry seafood
Year of establishment	2020
Position	Owner
Firm's name	The Ocean Harbour
Annual production	1 tonne
Annual turnover	₹ 20 lakhs
Employment generated	12

ICAR-CIFT has developed several types and capacities of solar dryers for the hygeinic drying of fish. One such fish dryer is CIFT-Hybrid type solar dryer which provides uninterrupted drying of fish even in adverse weather circumstances using LPG, biomass, and/ or electricity as backup heating sources. These dryers have the tray spreading surface area ranging from 6 to 110 square metre to produce dried fish in the range of 10 to 500 kg. These eco-friendly and energy-efficient solar hybrid dryers designed by CIFT are gaining popularity among fishers and dry fish business start-ups alike.

Mr Suneer V. A., an ICAR-CIFT-ABI incubatee for solar fish drying technology, installed one such unit of CIFT solar-electrical hybrid dryer in 1,000 square meter area at the total cost of ₹ 5 lakhs and launched a new startup in the dry fish sector. The daily production capacity of the dryer is 1,000 kg. The dried products are marketed under the brand name 'The Ocean Harbour' and are sold at the price of ₹ 600 per kg.

By adopting this technology, he expanded his partnership to more than 20 supermarkets, wholesalers, and retail shops and improved his capacity for executing orders. He further plans to diversify the variety of products the company produce, by adding fish and shrimp pickles, as well as other value-added products.

Teacher turning into Exporter

Mrs V. B. Havva is a retired teacher from Aumagu village of Minicoy Island, Lakshadweep. Post-retirement, she didn't want to sit idle. She realized that there is no facility for storing the fish in the village. This triggered her to start a cold storage facility.

In 2007, she established a cold storage with minimal capacity in her village. Later in 2021, with the support of the Department of Fisheries (DoF), Lakshadweep she established a bigger cold storage of 10 tonnes capacity. Out of the total project cost of ₹ 90 lakhs, she availed ₹ 16.29 lakhs as grant under PMMSY and another ₹ 53.70 lakhs as loan from bank. She managed to get remaining ₹ 20 lakhs from other sources. Recently she started canning facility and fresh fish export also. In her facility, she manufactures value-added products such as masmin from tuna. She has also set up one research and development facility for other value added products and to have sustainable business operations.

She now sells masmin at the rate of ₹ 400 per kg on an average, canned tuna at ₹ 110 per kg and fresh fish at ₹ 100 per kg. Her average annual income prior to the establishment of cold storage was only ₹ 3 lakhs. With the establishment and functioning of cold storage, her income and standard of living have improved considerably. Additionally, it created employment opportunities and income generation for the local youth.

Name	V.B. Havva
District	Lakshadweep
Union Territory	Lakshadweep
Education	10th Standard
Category	ST
Occupation	Teaching (Retired)
Mobile number	9447722341
Year of establishment	2007
Position	Owner
Unit name	Minicoy Island Novelty Mas Producer's Society Ltd
Business activity	Cold storage, fish export and value added products manufacturing
Species	Skipjack tuna, yellowfin tuna and lagoon fishes
Annual turnover	₹ 18.50 lakhs
Employment generated	10

Homemaker to Aquafarmer

Name	Amina Begum Gindiyal
District	Kargil
State	Ladakh
Education	Uneducated
Category	ST
Occupation	Farmer
Mobile number	9419855157
Year of establishment	2018
Position	Owner
Activity	Raceway culture
Species	Rainbow rout
Annual turnover	₹ 4.40 lakhs
Annual fish production	1.12 tonnes
Employment generated	1

Mrs Amina Begum Gindiyal is a resident of Majidam Village of Kargil district, Ladakh. She is a homemaker and wanted to improve her economic standard by farming. Due to unfavorable, harsh, and cold climatic conditions of her locality which is second to Siberia in terms of coldest inhabited place, she could not start any farming other than trout culture in a flow-through system. The high demand for fresh farmed fish also motivated her to do trout culture.

With the opportunity provided by the Government of India, she applied for the "Trout Culture activity in Raceways" under the Blue Revolution Scheme in FY 2017-18. With support from the government, she constructed one raceway with a production capacity of 0.35-0.50 tonnes and stocked 300 rain bow trout fingerlings. She got financial assistance of ₹ 3.60 lakhs for the first-year input cost against a total project cost of ₹ 4.50 lakhs. The rest of the amount was adjusted by her.

Trout farming has uplifted her socioeconomic conditions ensuring regular livelihood and income. She wants to expand her business by constructing additional raceways for which she would opt financial support under the PMMSY scheme. The outcome generated through the unit drew the interest of her spouse and he started helping her in managing the unit. Through their small efforts, trout culture is gaining popularity in the region and providing sustainable income to the family.

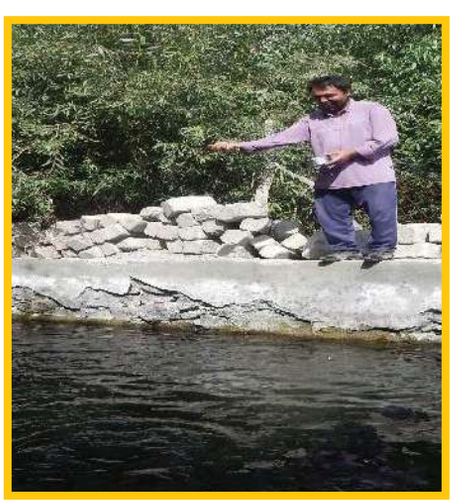
Talent Led to Trout Farming

Mohd Ilyas Ahmed is a resident of Majidam Village of Kargil District Ladakh. Being educated, he could opt for government or private jobs, but he chose to culture fish. Though he wanted to start some form of farming he could not do it due to unfavorable harsh cold climate conditions in Ladakh. He learnt that more income can be generated through fish farming with less effort. This motivated him to choose fish farming to overcome his financial issues.

Under the opportunity provided by the Department of Fisheries, he applied for the "Trout Culture in Raceways" activity under blue revolution in FY 2017-18. With the financial assistance received under the scheme, he constructed one raceway with a production capacity of 0.35-0.50 tonnes and stocked 300 numbers of rainbow trout fingerlings. He got financial assistance of ₹ 3.60 lakhs for input cost against the total project cost of ₹ 4.50 lakhs and the rest was invested by himself. Trout farming has enhanced his socio-economic conditions, ensuring regular income.

He has expressed his intentions to expand his unit by constructing an additional raceway under the PMMSY scheme. Seeing the development, his parents helped him in managing the unit. He provides employment and supports the unemployed youth by guiding them to start a business in the fisheries sector. This is an example of entrepreneurship qualities displayed by the beneficiary.

Name	Mohd Ilyas Ahmed
District	Kargil
State	Ladakh
Education	12th Standard
Category	ST
Occupation	Farmer
Mobile number	9469730457
Year of establishment	2018
Position	Owner
Activity	Raceway culture
Species	Rainbow Trout
Annual turnover	₹ 4.28 lakhs
Annual fish production	1.12 tonnes
Employment generated	2



Fruit Vendor to Fruitful Hatchery Owner

Name	Kailash Chanda Verma
District	Dhar
State	Madhya Pradesh
Education	B.Sc.
Category	OBC
Occupation	Farming and seed production
Mobile number	9993461204
Firm's name	Ramesh Chandra Verma Kailash Chandra Verma Matashya Beej Utpada Kendra
Year of establishment	1989
Position	Co-founder
Activity	Producing fish seed, feed and ornamental fish
Species	IMCs and ornamental fish
Annual turnover	₹ 3 crores
Annual fish seed production	5,000 lakhs spawn and 100 lakhs fry
Employment generated	50

Mr Kailash Chandra Verma and his family were in the fruit vending business. The income earned by his father was very scanty, this made Kailash and his brothers explore different business opportunities. They started collecting information on fish seed production units in their district and realized the fact that fish seed supplied to their district was coming from West Bengal. This seemed like a great opportunity for them to start the fish seed production unit in their village. In 1989, he availed a loan of ₹ 2.18 lakhs from the Bank of Maharashtra and constructed two earthen ponds. He stocked fish seed brought from West Bengal in the pond. To begin with, he started rearing catla, rohu, mrigal & common carp from spawn to fry stage. Post rearing from spawn to fry stage, he started selling them to the local fish farmers. Instead of bringing and buying fry from West Bengal, the fish farmers started realizing the financial benefits of buying from him, which paved the way for him to initiate the fish business.

He decided to expand his business and increase fish production. So, he availed an additional loan of ₹ 13 lakhs in 2006 and purchased one-acre land. He constructed 40 new cement ponds and 4 incubation ponds. This resulted in increased spawn production of 1500 lakhs and fry production of 700 lakhs per annum. In 2010-11, he further increased spawn production to 5000 lakhs and fry to 1100 lakhs.

At present, he supplies the spawn, fry, and fingerlings of catla, common carp, rohu, mrigal, silver carp, and grass carp in the districts of Madhya Pradesh, Gujarat, Rajasthan, and Maharashtra. In 2017-18 under the Blue Revolution scheme, he established a fish feed mill and availed a 40% subsidy. At present, his farm is of 12 ha with 12 incubation ponds, 110 rearing tanks, and 25 brooder tanks. He is also aiming to establish a Fish Milt Cryopreservation unit in the future. Currently, his average annual income is about ₹ 25 lakhs. Owing to his vision and hard work, Mr Varma received awards such as "The Best Fish Producer", "Indian Achievement Award" and "The Best Finfish Hatchery" by National Fisheries Development Board (NFDB) on World Fisheries Day-2020.

Avid Agriculturist to an Amazing Fish Farmer

Mrs Kamala Ajabrao Kurwade is a resident of Morshi Village in Amravati District, Maharashtra. She was an agriculturist, managing the livelihood of her family. However, due to an irregular rain pattern and fluctuations in market rates, she faced a financial crisis. During such time, she attended a one-day training program in Amravati and a three-day information program in Ratnagiri, which were organized by the Fisheries Department, and got motivated to start fish culture. Meanwhile, she discovered that her farm, which is 1.5 kilometers away from her house, is suitable for fish culture because there is enough water nearby and the farm has good quality soil.

With the guidance and support of the State Fisheries Department officials, she applied for the activity "Construction of new grow out pond" project under Pradhan Mantri Matsya Sampada Yojana (PMMSY) during FY 2020–21 and constructed a pond on 0.60 ha land with a production capacity of 20–25 tonnes. The total project cost was ₹ 14.50 lakhs. She received a sum of ₹ 2.56 lakhs as financial assistance under PMMSY. Another ₹ 6.80 lakhs was sanctioned as a loan. The rest of the amount was invested by herself.

Nowadays, she properly manages feed and fish quality. She learnt to culture only those species that have a high demand so that she gets good market price in the nearest market. This has considerably increased her income. She plans to adopt good management practices in the near future to improve the quality of her produce.

Name	Kamala Ajabrao Kurwade
District	Amravati
State	Maharashtra
Education	4th standard
Category	Nomadic Tribe - B
Occupation	Agriculture farmer
Mobile number	9561968792
Firm's name	Zero Mile Fish farm
Year of establishment	2020
Position	Owner
Activity	Grow-out pond culture
Species	IMC and Pangasius
Annual turnover	₹ 25 lakhs
Annual fish production	22 tonnes
Employment generated	16 direct and 20 indirect

Beautician to Ornamental Farmer

Name	Pallavi Dipak Panzade
District	Washim
State	Maharashtra
Education	12th standard
Category	SC
Occupation	Aquarium and ornamental fish shop
Mobile number	9028437900
Firm's name	Panzade Fish Aquarium
Year of establishment	2022
Position	Owner
Activity	Sale of fish and aquariums
Annual turnover	₹ 5 lakhs
Annual production	5 tonnes
Employment generated	2

Mrs Pallavi Dipak Panzade belongs to the Washim district of Maharashtra. After completing her schooling, she started her career as a beautician and later motivated to start ornamental fish business. It's being sixteen years that she is in the same business. Initially, she started it as a hobby by setting up an aquarium at her home. Unfortunately, her first few trials failed due to lack of knowledge in maintenance of aquarium resulting in high rate of fish mortality. After many trials and errors, she was successful in setting up an aquarium. She also faced problems in selling large-sized aquariums as they got leaked or cracked and in turn, she had to refund the full amount to the clients. There was a time when Mrs Panzade and her husband used to go on a bicycle after closing their shop for aquarium servicing at night. She got solutions for all her problems after attending a seminar arranged by the NFDB and the local Fisheries Department.

Her hard work, failures, and circumstances made her strong enough to launch a small aquarium business at her home. During the FY 2021-22 she finally opened an ornamental fish kiosk under Pradhan Mantri Matsya Sampada Yojana (PMMSY) and installed a unit of 100 sq. ft. area with a total capacity of 500 fish. As the business was thriving, they could employ two people. Mrs Panzade received financial assistance of ₹ 6 lakhs for setting up this unit. The total net profit in the first year was ₹ 5 lakhs. Currently the Panzade Fish Aquarium is a brand in itself and is well known as best aquarium shop in the region. Mrs Panzade uses good quality fish seed, fish feed, and aquaculture drugs. The unit follows "Good Handling Practices" with proper hygiene and sanitation. This improved the firm's total export and brand value.

Coupled by her hard work, support from her spouse, and family motivated her to march on to become a successful entrepreneur. Her aim is the to expand the business by opening franchises thus creating employment opportunities to youth.

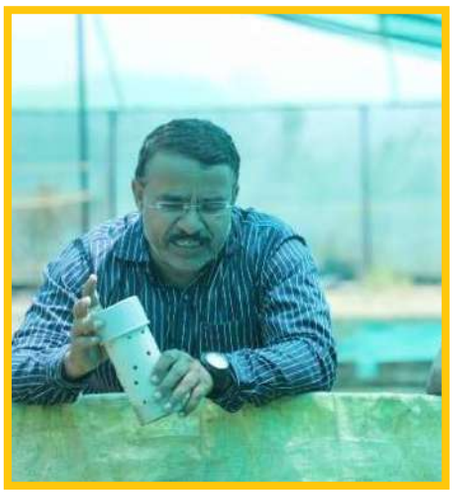
Pawar Turned to Protein Producer

Mr Ramesh Narayanrao Pawar is a resident of Village Chindhawli, District Satara in Maharashtra. After completing his education, he tried out many businesses, but due to his passion for nature and agriculture, he determined to do something for the farmers around him. Hence, after doing agriculture for some time he learnt aquaculture due to its immense financial potential. He attended training conducted by NFDB on Biofloc at KVK Baramati and started Biofloc activity in 2019.

The total project cost was ₹ 36 lakhs out of which he managed to get some amount from others as personal loans, bank loans, and ₹ 16 lakhs was invested by himself. He constructed 25 tanks (4m x 1m), 12 tanks (6m x 1.2m), and 5 Ponds (100 m^3) in 2019 and one pond (1200 m^3) spread across 0.35 ha in 2020. As a newbie to the technology, he had faced challenges in understanding certain things like low aeration in tanks, the high mortality rate, unavailability of good quality seed, spike in ammonia levels etc. As he progressed in the business, he replaced the entire aeration system of the diaphragm pump with ring blowers and further studied online articles on biofloc to tackle water issues. As a result, he succeeded in his business and encouraged farmers to learn the same by providing hands-on training on his farm. Within a year he trained more than 25 farmers who started about 200 biofloc units.

He uses airlift technology for the removal of sludge as it helps minimize the wastage of water. The nearby farmers who were facing losses in agriculture have gradually shifted to aquaculture after seeing his progress. He plans to erect a good-quality seed hatchery and intends to establish a feed mill that will manufacture feed by using Black Soldier Fly (insect protein), which will be of a low-cost initiative. In past 3 years, he has been financially stable and created awareness about consumption of fish protein among people.

Name	Ramesh Narayanrao Pawar
District	Satara
State	Maharashtra
Education	B.Com.
Category	General
Occupation	Farmer
Mobile number	9130017808
Firm's name	Golden Fish Farm
Year of establishment	2019
Position	Proprietor
Activity	Biofloc
Species	Pangasius
Annual turnover	₹ 32 lakhs
Annual fish production	48 tonnes
Employment generated	5



Contractor to Cage Aquaculturist

Name	Sangini Sitaram Ghayal
District	Pune
State	Maharashtra
Education	B.Com.
Category	General
Occupation	Interior contractor
Mobile number	9890003498
Project's name	Cage Culture project
Year of establishment	2019
Position	Owner
Activity	Cage culture
Species	GIFT tilapia
Annual turnover	₹ 44.10 lakhs
Annual fish production	31.50 tonnes
Employment generated	8

Ms Sangini Sitaram Ghayal belongs to Pune, Maharastra. She worked as an interior contractor after completing B. Com. The idea of doing cage culture business triggered when she visited the office of Regional Deputy Commissioner Fisheries, Pune in 2018. She had detailed discussion with the District Fisheries officials about her idea of starting cage culture. After a productive discussion with district officials, she found that the cage culture could be a lucrative business in near future. This way, her journey started with Cage Culture Project. Initially, for six months she attended various hands-on training programs in Hyderabad organized by the Department of Fisheries and Rajiv Gandhi Centre for Aquaculture (RGCA) and gained considerable knowledge on fish farming.

She started the cage culture with a total project cost of ₹ 89 lakhs and received ₹ 32.40 lakhs as financial assistance under the PMMSY scheme, and for the remaining amount she availed loan from the bank. In the FY 2019-20 she installed 24 cages with a production capacity of 1.50 tonnes per cage. During the initial days of culture, she encountered a few challenges viz. high feed prices, decreased market value due to Covid-19. To meet her financial needs she sold her ancestral property and invested the same amount in business. In the FY 2021-22, she got the annual production of 31.50 tonnes of Genetically Improved Farmed Tilapia (GIFT) yielding ₹ 18 lakhs net profit. This FY 2022-23 she is expecting 50 tonnes of production with ₹ 70 lakhs turnover.

She also generated employment for the youth of her village by employing them directly or indirectly in marketing. With an overall positive response from all her vendors and suppliers, she has been running this project for three and a half years successfully.

Matsya Sakhis Turning into Mentors

Ralegaon Village in the Yavatmal District of Maharashtra is blessed with many natural resources. In 2015, three groups of tribal women farmers numbering 70, started fish rearing in about 70 ponds by stocking free seed provided by the NGO Jaljeevika. During the first year of their rearing, the net profit was ₹ 1.2 lakhs. The profit increased from the second year onwards due to the adoption of best management practices and utilizing smaller seasonal water bodies for fish seed rearing. Nowadays, they mainly practice monosex tilapia culture. The pond productivity increased from 3-4 tonnes to 5-6 tonnes per ha with the scientific management of the pond. In 2020, the net profit was ₹ 4.5 lakhs with a turnover of ₹ 6 lakhs.

In 2016, they started their hatchery for seed production of Indian Major Carps in six seasonal ponds. During the first year, fish seed production was only 60,000 to 65,000 fingerlings but it increased to ₹ 20 lakhs in 2020. By selling fish seed to nearly 150 fish farmers, they earned another ₹ 4.5 lakhs.

Now the women from the first batch of fish farmers are working as extension agents in the village and supporting new farmers. Under the "Krishi mangal program"- a joint initiative of Cisco India CSR and Social Alpha, Jaljeevika helped 15 women extension agents, named "Matsya Sakhi", to impart knowledge and support to nearly 577 small-size pond owners. Due to constant advisory-based intervention of "Matsya Sakhi", average household income increased from ₹ 22,000 to ₹ 65000 per annum. Currently, a group of these 15 women ventured into sale of fish seed, feed, lime, and other inputs. Additionally, women have applied for a feed mill of 2 tonnes capacity per day under the PMMSY scheme. They also plan to apply for a cage culture project and refrigerated vehicles under the PMMSY scheme.

Establishment	Women collective
State	Maharashtra
Beneficiary	Tribal women
Activity	Culture of monosex tilapia and IMCs, extension and sale of farm inputs
Intervention	Jaljeevika

Value Addition : Adding Value

Establishment	Pilot scale plant for value-added fish products
District	Nandurbar
State	Maharashtra
Year of establishment	2021
Beneficiary	Nav Jeevan Tribal Fisherman Co-Operative Society, Khairwe
Contact person	Mr Dinesh Vasave
Phone number	9359131262
Business activity	Preparation and sale of value added fish products
Technological intervention	**ICAR-CIFE**

Nav Jeevan Tribal Fisherman Co-operative Society Khairwe, Navapur is very active and recently they started the cage culture of Pangasius in a battery of 6 cages. The average annual fish production from the cages is roughly 12 tonnes. Considering their outstanding contribution in the cage culture activities, the Department of Fisheries, Nandurbar recommended this tribal fisherman cooperative society to establish a pilot plant facility for value-added fish products.

Accordingly, a pilot plant of 200 kg capacity per day was set up under the Tribal Sub Plan (TSP) scheme of ICAR-CIFE, Mumbai. The facility was inaugurated on September 16, 2021, at Nav Jeevan Tribal Fishermen Co-operative Society, Khairwe. Since then, four training programs were conducted on the preparation of value-added fish products by the experts from ICAR-CIFE, Mumbai which benefited 200 tribal women. Further, about 24 tribal women were selected from the 200 beneficiaries who were interested to upscale their skills. They started sale of value-added fish products as a part-time activity in March 2022. They spent 2 to 3 hours daily on the activity. So far, the group has earned ₹ 16,000 as net income.

The group is in the process of increasing the production, which will further increase their net worth. This would ensure that every tribal woman or youth gets at least ₹ 500 daily. Currently they are getting ₹ 100-₹ 200 after being engaged in work for eight hours in the field. They are expecting to get ₹ 500 which will certainly increase their standards of living.

Positive Approach to a Profitable Fish Farming

Mr Keipha Akham Maring is a native of Kaziphung, a small hillside village in the Chandel district of Manipur. After completing secondary education, he took up paddy cultivation as his livelihood since his family's primary occupation was paddy cultivation. Initially, he worked as a labourer in other's agricultural fields. The family could hardly manage their day-to-day household expenditure with the income there were getting.

Many farmers in Manipur have taken up fish farming as a source of income diversification to fight poverty and inequality. Mr Maring realized that Kaziphung village is located on a low-lying homestead land and is highly suitable for undertaking aquaculture rather than paddy cultivation. He immediately took up pond fish culture in a small area of 0.5 ha on his land. With the technical guidance from State Fisheries Department officials, he gradually expanded his area of aquaculture activities. During the FY 2017-18, he was selected as one of the eligible beneficiaries under the Blue Revolution Scheme for the activity "Composite Fish Culture System". He received financial assistance of ₹ 0.90 lakhs utilizing which he constructed grow-out ponds spreading over a 2 ha area. Currently, he is engaged in the grow-out culture of Indian Major Carps, grass carps, and common carps. In his two nurseries, the fry and small fingerlings procured from the local farms are grown up to the advanced fingerlings stage and then restocked in the grow-out ponds. In the year FY 2020-21, he produced 4.15 tonnes of fish with a net profit of ₹ 2.55 lakhs.

Today fish farming is the primary source of earnings for Mr Maring and his effort in aquaculture provides a sufficient income for his family. He provided employment opportunities to some people.

Name	Keipha Akham Maring
District	Chandel
State	Manipur
Education	10th standard
Category	SC
Occupation	Fish farmer
Mobile number	8414828087
Year of establishment	2015
Position	Owner
Activity	Grow out fish culture
Species	IMC, grass carp, and common carp
Annual turnover	₹ 2.55 lakhs
Annual fish production	4.15 tonnes
Employment generated	4

Culturing Fish for Curing Heart Problems

Name	Xavier Nengkhanlam
District	Churachandpur
State	Manipur
Education	B. A.
Category	ST
Occupation	Fish farmer
Mobile number	8119980156
Year of establishment	2017
Position	Owner
Activity	Fish culture
Species	IMCs and exotic carps
Annual turnover	₹ 60,000
Annual fish production	375 kg
Employment generated	2

Mr Xavier Nengkhanlam belongs to Thingkangphai Village, Churachanpur District, Manipur. He did Bachelor's degree in Arts and started doing business earning ₹ 15,000/ per month. Most of the dwellers in his place were diabetic at risk of heart problems due to consumption of red meat. Even Mr Xavier had diabetes and used to consume red meat. He found that fish could be the best food to replace red meat. This made him dig deeper to know the health benefits by consuming fish. While doing research, he noticed that the fish business is expanding and he can get into the same. This helped him to leave his traditional "slash and burn" Jhum cultivation because it devastated the ecology and led to deforestation. Gradually, he decided to pursue fish culture which could provide him with a more stable income and create jobs in rural areas.

With the guidance and technical support from the Department of Fisheries, Manipur, he constructed three ponds having a 0.2-tonne production capacity. He received financial assistance of ₹ 1.42 lakhs against the total project cost of ₹ 4.50 lakhs under NEC, and Mr. Nengkhanlam adjusted the remaining amount. He attended various classes and courses on aquaculture, like 250 hours of hands on training at the College of Fisheries, Central Agriculture University, Lembucherra, Tripura State in 2019.

He cultured different species, mainly Rohu, Catla, Mrigal, Grass carp, and Common Carp, at the stocking density of 700 fingerlings in each pond. He followed the procedures of BMPs, like regular checking of water content, manure like cow dung, lime, etc.; however, providing supplementary feed was not affordable by him. He procured a locally made aerator to enhance the DO level of the pond water. He also observes the fish's weight and body length once every two months and harvests the crop in a time span of 8 to 12 months. He is planning to start biofloc unit.

Dhaneshwar's Determination Resulted in a Decent Livelihood

In the 1960s, the fish traders from the neighboring state of Assam used to buy and transport fish from the neighboring villages like Dudhnai and Krishnai to Guwahati and Shillong. The traders used to buy fish seed for ₹ 3/kg and transport it to Guwahati and Shillong. Seeing this and the profit earned by his fellow villagers, Mr. Dhaneshwar Rabha's father who was an agriculture farmer shifted fish farming. Since he was confident of earning profits out of fisheries, he constructed a pond of 0.5 ha at his own expense and started fish culture.

Mr. Rabha wanted to construct a fish pond, so he approached State Fisheries Department for financial and technical support. In 1983, he received a subsidy of ₹ 300. In the initial stage, to equip himself with relevant skills, he didn't get any opportunity to undergo any training related to fish farming. However, his desire to start fish farming didn't fade away; instead, it helped him to continue fish culture. Seeing the success of his fish farming, the Department of Fisheries assisted him with ₹ 3 lakhs as first-year input cost against the total project cost of ₹ 5 lakhs under Blue Revolution during FY 2018-19. This assistance was provided to his son, Mr Bhaskar Rabha for constructing a pond of one ha. Currently, he has farm area of 1.5 ha.

As an outcome of the intervention undertaken, he is generating additional revenue of ₹ 1.5 lakhs/year. He uses proper feeding practices with formulated feed and monitors fish health. As cheap and good-quality seed is not easily available in his area, he had to import from the neighboring state. This led Mr. Rabha to establish a hatchery for fish seed production. He expressed his interest in integrated fish farming and establishing hatchery. Now, he mentors youth to take up fish farming as a profession for income generation.

Name	Dhaneshwar Rabha
District	North Garo Hills
State	Meghalaya
Education	5th Standard
Category	ST
Occupation	Fish farmer
Mobile number	9612834168
Year of establishment	1983
Position	Owner
Activity	Fish culture
Species	IMC and exotic carps
Annual turnover	₹ 2.25 lakhs
Annual fish production	810 kg
Employment generated	3

Supporting Family through Seed Production & Farming

Name	Griti Arengh
District	West Khasi Hills
State	Meghalaya
Education	no formal education
Category	ST
Occupation	Homemaker & fish farmer
Mobile number	9862703391
Year of establishment	2018
Position	Owner
Activity	Fish culture & seed production
Species	IMCs and catfish
Annual turnover	₹ 1.50 lakhs
Annual fish production	1 tonne from grow-out fish pond
Employment generated	35

Mrs. Griti Arengh is from Lower Rajapan Village, South West Khasi Hills District of Meghalaya. She was a homemaker, and was facing financial crisis. She decided to do something to meet their needs. As she lives in the border area adjoining Bangladesh, and the climate is favorable for aquaculture she desided to venture into fisheries activity. Hence she approached the State Department of Fisheries and shared her interest. With the guidance and technical support from officers Mrs. Arengh embarked on a journey to do fish farming.

Under Blue Revolution 2018-19, she ventured into fish farming to develop more ponds by applying for the construction of grow-out and rearing ponds with a total project cost of ₹ 8.5 lakhs. She harvested 200–300 kg of fish in the initial stage of her fish farming activity. In 2021, She increased the stocking rates and could manage to harvest 800-1000 kg. She used to sell the fish at farm gate through which many people came to know about the farm. She fetched a good profit from fish farming by selling fingerlings, and table-sized fish. She cultured rohu, catla, singhi, pangas, china puti, and chitol. Her well-managed ponds and the income she was getting positively impacted the neighborhood. Most of the harvest is sold at Photkroh and Balat markets, as well as at the farm. The ponds attract a lot of anglers. However, angling is not encouraged and only a few are permitted at the rate of ₹ 500 per fishing rod per day.

Besides fish culture, she also sells fish seed and aims to provide good fish seed to the adjoining villages. She practices integrated farming which helps her to reduce the cost of providing feed. The income generated is decent enough to meet family and domestic expenses.

Rilian Opted for Reliable Fish Culture

Mrs. Rilian Nonglang is from Jakhong Village in West Khasi District, Meghalaya. Before practicing fish farming, she was engaged in agriculture. Due to the lack of basic infrastructure like pucca roads and transportation, it was getting harder for her to market agriculture produce; hence she thought of an alternate source of income. She approached the Department of Fisheries and expressed her desire to start an activity in fisheries.

Under the guidance and support of the Department of Fisheries, she constructed one pond in a 0.25-acre area under the Pradhan Mantri Matsya Sampada Yojana during FY 2020-21. She got financial assistance of ₹ 0.74 lakhs as a first-year input against the total project cost of ₹ 1.24 lakhs and the rest of the amount was invested by herself.

She stocked 1000 nos. of fingerlings and harvested one tonne fish and sold it at ₹ 300/kg in her village. She used all types of pond management practices, i.e., pre-stocking, stocking, and post-stocking management practices. Mrs. Nonglang is trying her best to make fish farming in her pond a means to improve her socio-economic status. She has become an inspiration to her neighbors to take up fish farming by providing employment opportunities.

Name	Rilian Nonglang
District	West Khasi Hills
State	Meghalaya
Education	Lower Primary
Category	ST
Occupation	Farmer
Mobile number	8837362876
Year of establishment	2021
Position	Owner
Activity	Fish culture
Annual turnover	₹ 30, 000
Annual fish production	1 tonne
Employment generated	3

Passionate Hobby to a Productive Profession

Name	F. Laldingliana
District	Champhai
State	Mizoram
Education	Bachelor's degree
Category	ST
Occupation	Fish farmer
Mobile number	8414962807
Year of establishment	2017
Position	Owner
Activity	Fish culture
Species	Common carp
Annual turnover	₹ 7 lakhs
Annual fish production	2 tonnes
Employment generated	8

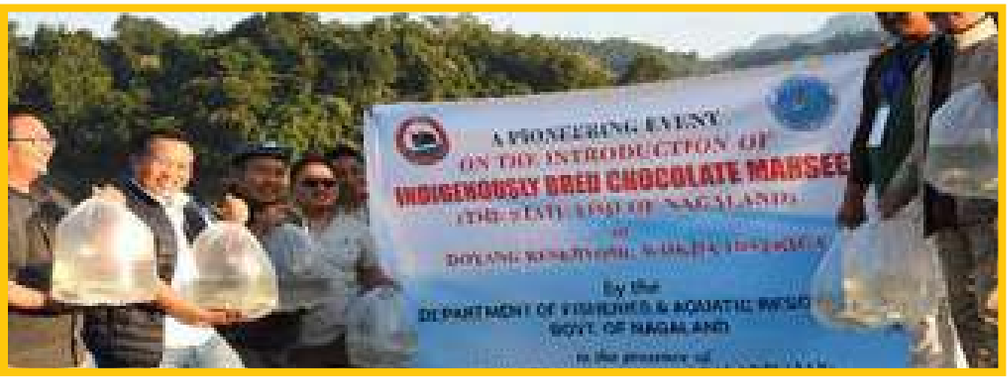
Mr. F. Laldingkiana is from Kahrawt Village of Champhai District, Mizoram. He is a member of his village council. Before starting fish farming, he was an agriculture farmer earning a meagre income from farming. On his land, he practised only agriculture farming; later to enhance his income he took up aquaculture. The health benefits and reasonable returns motivating him to shift to fish farming.

He applied for "Construction of new ponds" activity under the Blue Revolution scheme during FY 2017 and he successfully constructed 19 no. of ponds in a two ha area. Against the total project cost of ₹ 8 lakhs, he received financial assistance of ₹ 1.73 lakhs as first-year input and ₹ 6.27 lakhs was invested by the beneficiary himself.

In last five years, total fish production was 8 tonnes with total expenditure of ₹ 10 lakhs with returns of ₹ 31 lakhs earning him a net profit of ₹ 21 lakhs. After 5 years of fish farming practice, he improved his knowledge in common carp breeding, thus helping himself-sustain aquaculture activity. He adopted composite fish culture techniques at his farm.

Mr Laldingliana is earning an additional income from the fish culture which improved his savings. He provided employment opportunities to eight fisher folks. He aims to improve his fish culture technique for better livelihood. He received the Best Fish Farmer Award (from the North East States) in 2019.

Integrated Farming to Model Fish Farming



Mr Imnatoshi belongs to Longkong village of Mokokchung district, Nagaland. In 2010, he started integrated fish farming with a few grow-out ponds and piggery, and a vegetable garden. As a novice in the activity, he incurred loss and faced financial crisis. When he approached the Department of Fisheries to get guidance on the losses, he learned that the income from fisheries sector is much higher than the income generated by other farming activities.

With the guidance and support of the Department of Fisheries, Nagaland, he applied for a grow-out pond and one hatchery unit for Mahseer under Blue Revolution during FY 2017-18. For the breeding of Mahseer, he got technical assistance from ICAR-Directorate of Coldwater Fisheries Research, Bhimtal. Currently, he has 12 grow-out ponds. As has a good water source in his farm, he started producing electricity from water and uses for himself and provides the same to the neighboring farmers. He has started fishery-based eco-tourism by providing angling and other recreational activities on his farm.

At present, his farm is considered and recognized as a Model farm in the District and he is planning to bring it up as one of the best eco-tourism farms in the North Eastern India. During the last two years of fish culture, piggery, vegetable farming, and fishery based eco-tourism, his annual turnover was ₹ 20 lakhs with a net profit of ₹ 12 lakhs. As a result of his practices and efforts he has uplifted his economic status and provided employment to others. He plans to establish his existing farm as a model fish farm.

Name	Imnatoshi
District	Mokokchung
State	Nagaland
Education	10th Standard
Category	ST
Occupation	Farmer
Mobile number	8837098298
Firm's name	Sudatloanndan Fish Farm
Year of establishment	2017
Position	Owner
Activity	Grow-out pond culture and seed production
Species	Mahseer
Annual turnover	₹ 20 lakhs
Annual production	2 tonnes
Employment generated	17

Integrated farming: A Model of Sustainable Food Production

Name	Arnapurna Nayak
District	Khordha
State	Odisha
Education	High school
Category	General
Occupation	Farming
Mobile number	7008799926
Year of establishment	2016
Position	Owner
Activity	Aquaculture, horticulture and poultry
Annual turnover	₹ 2.50 lakhs
Annual fish production	1,200 kg
Employment generated	5

Mrs Arnapurna Nayak is a resident of Purohitpur village of Khordha district, Odisha. She is a homemaker and did agriculture farming to meet her daily needs. She faced various problems like erratic rainfall, unavailability of quality seed material, and leading to meagre income. To mitigate this, she decided to transform her agriculture field to fish farming. She underwent a series of training programs conducted by ICAR-CIFA in 2016. She constructed one pond of one-acre land and expanded her agriculture farm by constructing one more pond of four acres.

In 2017, she started a horticulture farm on one acre and a poultry farm on 1.10 acres. For expanding her business and constructing more farms, she invested ₹ 18 lakhs. In FY 2022, she received returns of ₹ 2.5 lakhs from aquaculture and a net profit of ₹ 1.50 lakhs. Her total returns from all the activities were ₹ 8.24 lakhs. She gave employment to five people. The Annual turnover is about ₹ 2.50 lakhs from a one-acre pond.

To improve her socio-economic status, she plans to expand the aquaculture activity commercially in her village.

Integration of Activities : Example of an Entrepreneur Model

Mrs Jhina Parida, from Odisha, started her entrepreneurial journey with a solid determination to venture into the fisheries sector. She established "Maa Budhi Jagulei Fish Seed Hatchery" at Bhagabanpur and produced two million Common Carp seeds with the technical support of ICAR-CIFA. In the first year, she made a net profit of ₹ 7 lakhs. Mrs Parida's desire and zeal to improve the business led to a new association when she came to know about the improved varieties of seed promoted by NFDB-NFFBB. She procured amur carp seed from NFDB-NFFBB. In one year, the amur common carp showed tremendous growth up to 1.50 to 2.50 kg. She also reared amur fry up to fingerling stage and sold 15,000 fingerlings to 150 farmers. Since then, she did not turn back and her net profit rose to ₹ 11 lakhs in the following year. As on date, she has seed rearing units spread across 32 acres of land.

Now the Farm has a network of 3000 farmers, for whom they not only supply Fish Seed but provides technical support by establishing Aqua One Centre with the support of NFDB and FISHCOPFED in the hatchery, to provide the technical support services to the Fish Farmers. She attributes her journey to her hard works which helped her grow from a small fish seed grower to an entrepreneur. Now she is focusing on production of "Amur Common Crap" seed by maintaining genetic protocols. From the profit she earns a "Farmer's Welfare Fund" was created for the free treatment of fish diseases and organizing free camps in collaboration with ICAR-CIFA. She gained fame by doing aquaculture and supporting other fish farmers. In the future, she aims to expand the nursery area to 50 acres, purchase a seed transport vehicle, and encourage more women to take up these kinds of enterprises.

Name	Jhina Parida
District	Bhagabanpur
State	Odisha
Education	12th standard
Category	General
Occupation	Entrepreneur
Mobile number	9777637276
Firm's name	Maa Budhi Jagulei Fish Seed Hatchery
Year of establishment	2016
Position	Owner
Activity	Hatchery and Aqua One Centre
Species	Genetically Improved IMC
Annual turnover	₹ 1.50 crores
Annual fish seed production	80 million
Employment generated	3,000 direct and indirect

Seamless Business: Seed Business

Name	Sapan Kumar Patra
District	Bolangir
State	Odisha
Education	M.F.Sc. Aquaculture
Category	General
Occupation	Entrepreneur
Mobile number	9437240655
Firm's name	Sapan Fish Seeds Farm
Year of establishment	2000
Position	Proprietor
Activity	Fish hatchery, trading of medicines, and other aquaculture inputs
Annual turnover	₹ 1.50 crores
Annual fish seed production	20 crores spawn, 2 crores fry, 1 crore fingerlings, 10 tonnes yearlings, and 10 tonnes table fish
Employment generated	20 permanent families and 50 seasonal staff

On a small-scale aquaculture project, Sapan Fish Seeds Farm was started by Mr Sapan Kumar Patra's father Mr Prabhakar Patra. Fish species viz. rohu, catla, mrigal, common carp, grass carp, silver carp, Jayanti rohu, and amur carp were being reared in the hatchery. With a vision to take his father's business to greater heights, and to gain more knowledge in aquaculture, he did post-graduation in Fisheries Science and joined his father's business. The farm is spread over an area of 15 ha, which contains a Chinese circular hatchery, a rearing unit and a packing unit.

He received financial assistance from different sources like ₹ 2 lakhs from the Fish Farmers Development Agency (FFDA) for pond construction, ₹ 4.50 lakhs under the Blue Revolution Scheme for pond construction, ₹ 4 lakhs under Matsya Pokhari Yojana, and ₹ 15 lakhs under PMMSY scheme for activity 'Construction of Hatchery' during FY 2020-21. Currently, his farm has 3 big brood stock tanks, 28 rearing ponds, and 20 nursery tanks.

He implemented Best Management Practices (BMP), probiotic-based biosecurity measures, application of lime, and semi-intensive scientific and nutritional feed management etc. to develop wholesome brood stock and to reduce the spread of diseases. A small Lab Testing facility was established in collaboration with FISHCOFED under NFDB's funded Aqua One Centre project. A packaging shed has been set up for poly-oxygen packaging, and an aerated pick-up van for seeds and brood transport. In 2019, he signed a Memorandum of Understanding with the National Freshwater Fish Brood Bank (NFDB-NFFBB), Bhubaneswar, to be part of the network of the hatcheries and develop enhanced broods of amur carp, Jayanti rohu, and improved catla. He plans to use the latest technologies, breed new species, and develop new trends in the aqua industry and train youth. He provides spawn, fingerlings, and fry to farmers in Odisha and Chhattisgarh and has more than 2,200 farmers as members. Additionally, study tours for students from agriculture universities, exposure visits of SHGs and farmers, and other activities are being performed at his farm.

Woman Entrepreneur Reshaping Value Chain in Fisheries

Aurofish is a brand of fish and fishery products owned by a woman entrepreneur Mrs Anitha Muthuvel with support from the Ocean Partnership Project funded by GEF/World Bank and implemented by BOBP. In 2018 a modern fish processing unit was set up by converting her ancestral house and an adjacent piece of land at Vaithikuppam village, Puducherry. AUROFISH was started as an innovative model to encourage the fishers to source fish responsibly and ensure that the catch reaches the consumer in a hygienic condition. For this, Mrs Muthuvel formed a cooperative with a network of 20 fishers owning small FRP boats from Vaithikuppam and Nadukuppam villages. After having her team of fishermen trained in the post-harvest handling of tuna, she agreed to pay double the price to farmers. By doing so, she disproved the popular belief that "more fish means more income". She convinced the fishers that "if the potential value of fish is realized, even less fish also can fetch more income"

AUROFISH slowly ventured into supplying sashimi-grade ahi tuna loins (yellowfin tuna), and other products and tapped the Japanese export market. AUROFISH gradually ventured into the domestic market supplying the best premium grade fresh seafood at retail and wholesale prices to hotels, restaurants, and to high-end supermarkets.

Further, Aurofish started marketing ready-to-cook products in a vacuum-packed zip-top bags in urban areas. The fish and fish products are stored under chilled conditions at 2-4 °C in thermo boxes filled with ice gel till they reach the end consumers. Aurofish has now expanded to other metropolitan regions of India. In the journey, it has not only won many accolades but also created employment for about 400–500 people involved in its value chain. In recognition of the service rendered by Mrs Muthuvel, numerous awards were received by her over the years. A few to mention are India Biodiversity Awards- 2021, K. Chidambaram Memorial Annual Award- 2021, etc. and she was featured in a video film: 'Anitha Mouttouvel-A fisheries entrepreneur turns the tide (https://youtu.be/IQh6ZOdW9_E).

Name	Anitha Muthuvel
District	Puducherry
State	Puducherry
Education	B.A.
Category	OBC
Occupation	Fish processing and marketing of fresh and ready-to-cook fish products
Mobile number	9786147288
Firm's name	Aurofish
Year of establishment	2018
Position	Proprietor
Activity	Seafood processor and supplier
Annual turnover	₹ 10 lakhs
Annual production	8.50 tonnes
Employment generated	5 direct and 50 indirect

Shrimp Farming as an Alternative for Agriculture

Name	Avtar Singh
District	Subhan
State	Punjab
Education	B.A.
Category	General
Occupation	Agriculturist
Mobile number	9653534545
Firm's name	J S Shrimp farm
Year of establishment	2019
Position	Proprietor
Activity	Shrimp Farming
Annual turnover	₹ 20 lakhs
Annual shrimp production	5 tonnes
Employment generated	2

Mr. Avtar Singh is a progressive young shrimp farmer from Arjiwala Subhan, Punjab. He completed uner- graduation and was engaged in Agriculture. He was getting very low returns due to the salinity of the water. The saline-affected nature of the land had considerably reduced the agricultural yield in last 10 years, thus, it left him with no option but to seek better employment opportunities. To meet his needs, he had to earn an additional income which led him to start shrimp aquaculture in 2019-2020 on a non-subsidized piece of land which further expanded to 1.6 acres of additional land in 2021-22.

As he wanted to start a business in shrimp farming, he approached Punjab State Fisheries officials to seek proper guidance, training and other inputs on subsidy-related matters. In due course of time, he applied under the PMMSY scheme to get financial support from the government. This scheme provided financial assistance for various components like Excavation, Tube well, Aerator, Generator, and sampling kits to check the physio-chemical parameters. He also got training from the Central Institute of Fisheries Education regional centre, Rohtak, Haryana.

He availed financial assistance under the PMMSY scheme and KCC. He started with approximately 1.5 acres of the pond for shrimp culture in FY 2019-20 and expanded it to another 1.6 acres in FY 2021-22. When he started shrimp culture, the production was 4 tonnes, which has later increased to 5 tonnes per year. Additionally, he managed his ponds in terms of bio-security measures in an exceptional manner as many adjoining ponds were affected by the White fecal disease but his farm was not affected. He maintained the physico-chemical parameters of water by getting his water tested at regular intervals and applying pre-biotics. His monthly income increased manifold, positively impacting his living standards. He also employed two people at his farm.

Livelihood Model for Tribal Fishers

The tribal population is predominant in the Udaipur Division of Rajasthan. Earlier, three large reservoirs, namely Jaisamand (Udaipur) of 7235-hectare, Mahi Bajajsagar (Banswara) of 13300 hectares, and Kadana Backwater (Dungarpur) of 4000 hectares, were being used for fishing activities on a contract basis before the year 2013-14.

In the year 2013-14, the State government initiated a zero-revenue model for the economic betterment, regular employment, and upliftment of tribal fisheries societies by giving three large reservoirs Jaisamand (Udaipur), Mahi Bajajsagar (Banswara), and Kadana Back Water (Dungarpur) to tribal fishermen for their livelihood earning by catching fish without any license fee. Under this model, to ensure a fair market price for them, the Department of Fisheries, Rajasthan, issued a tender to finalize fair market price for these fishermen. Through this process, minimum support price was provided to the tribals. According to the species and size of fish, payment of ₹ 170.52/kg to ₹ 180.27/kg is being made by the Department directly to the tribal fishermen.

Presently, a total of 57 tribal fish producer cooperative societies are working with 6,218 members getting regular employment and income through this model. About 2,324 new boats and 49,040 kg fishing nets have been distributed to the tribal fishers under the livelihood model. In addition, a modern fish landing centre of 50 tonnes capacity was constructed at Bundh Jaisam and under Rashtriya Krishi Vikas Yojana for ₹ 75.50 lakhs. In addition, regular skill development and awareness programs are organized with the financial assistance of the National Fisheries Development Board, Hyderabad, for adopting new fishing practices in reservoirs. As anticipated under this model, tribal fishers are getting regular staple food in the form of fish protein for better health conditions for their families, getting regular income, and an assured premium price for fish, which is one of the highest in the country.

Establishment	Fish producer cooperative societies
State	Rajasthan
Beneficiary	Tribal fishermen and women
Activity	Fishing
Intervention	Government of Rajasthan

Progressive Pearl Farmer

Name	Vinod Kumawat
District	Sikar
State	Rajasthan
Education	Graduation
Category	OBC
Occupation	Farmer
Mobile number	7023706942
Firm's name	Bharti Moti Palan Kendra
Year of establishment	2015
Position	Owner
Activity	Pearl culture
Annual turnover	₹ 39 lakhs
Annual pearl production	25,000 pearls
Employment generated	20

Mr Vinod Kumawat is a resident of Bay Village of Sikar district, Rajasthan. After graduation, he started practicing agriculture on his land to satisfy his family's needs. Hardly he earned ₹ 10,000, which was not enough to run the family. Later, to get a better job, he did Diploma in Computer Science and an Entrepreneurship Diploma in nursery management. After that, he started a nursery farm on his land to fulfil his daily needs. One day, he read an online article on pearl farming and thought of starting pearl farming of his own. He attended farmers' melas organized by the Government of India, studied pearl culture techniques, and got trained in pearl culture before starting his own pearl farm in 2015.

To enhance his knowledge in pearl farming, he approached the State Fisheries Department of Rajasthan and received technical guidance from them. Then he applied for the "Pearl Farming" activity under Blue Revolution Scheme during FY 2016-17 and successfully constructed five ponds. He started his pearl farm on 0.013 acres with 500 oysters and produced 1,000 pieces of pearls. In the year 2021, he expanded his pearl farm to 1.03 acres and successfully produced 25,000 pieces of pearls, and got a turnover of ₹ 39 lakhs with ₹ 29.25 lakhs expenditure and a net profit of ₹ 9.75 lakhs. He provided employment to 20 people on his farm and became the first successful and progressive pearl farmer in the State. Pearl farming helped him to uplift his socioeconomic status. He plans to provide free training on pearl culture under the Entrepreneurship development skill scheme or under any other scheme to poor farmers, laborers, unemployed youths, and homemakers.

Trout Farming Transformed the Livelihoods

Mr Da Norbu Sherpa is a native of Upper Rumbuk village located in West Sikkim district, Sikkim. He comes from middle-class family background and could have education only up to the 8th standard. To meet the family requirement he joined his family's profession of crop farming but the earning was ₹ 5,000 which was not sufficient to meet the ends. He was exploring more opportunities to get high returns so that it becomes easier for him to take care of his family's needs. He attended the awareness programs conducted by the Department of Fisheries, Sikkim and wanted to start fish farming.

Directorate of Fisheries, Sikkim selected Mr Sherpa for undertaking trout culture and in 2017, under the Blue Revolution, he received the financial assistance of ₹ 2.40 lakhs against the total cost of ₹ 4 lakhs for inputs and for constructing a trout raceway. Later in 2019, he constructed one more raceway of 17m x 2m x 1.5m long, spread over 34 m2 area with a production capacity of one tonne. During the initial days of trout farming, he noticed that the mortality was as high as 30% by the time it reached the stage of advanced fingerlings. To address this, he started feeding the fingerlings with liver, egg yolk, and starter feed at an interval of two hours every day until it reached the advanced fingerling stage post which, he fed them with pelleted floating trout feed at 2% of the body weight twice a day. As a result, he successfully harvested six quintals of trout fish in 2020 and 2021 each, from which he generated a net profit of ₹ 3.30 lakhs for each year and contributed to improving the economic condition of his family.

Financial support and technical assistance from the Department of Fisheries, Sikkim helped him to take up the trout farming which has resulted in improved production. As a result. Mr Sherpa employs 2 women and a man in his unit. Trout farming has helped him improve his standard of living by owning a house and able to meet the requirement of the family.

Name	Da Norbu Sherpa
District	
State	West Sikkim
Education	8th Standard
Category	ST
Occupation	Fish farmer
Mobile number	9547222650
Firm's name	Upper Rumbuk Trout Fish Farm
Year of establishment	2017
Position	Owner
Activity	Raceway culture
Species	Trout
Annual turnover	₹ 3.30 lakhs
Annual fish production	600 kg
Employment generated	3

Rainbow Trout : Added Colors to the Life

Name	Kal Bahadur Gurung
District	Soreng
State	Sikkim
Education	4th Standard
Category	OBC
Occupation	Fish Farmer
Mobile number	9593771184
Firm's name	Rainbow Trout Farm
Year of establishment	2018
Position	Owner
Activity	Fish hatchery and raceway culture
Species	Trout
Annual turnover	₹ 30.70 lakhs
Annual production	1.80 tonnes table size trout and 1.36 lakhs numbers of seeds
Employment generated	6

Shri Kal Bahadur Gurung of Upper Sreebadam village has abundant land and water resources. Having good land and water resources motivated him to start the trout culture. He consulted the District Fisheries Officers regarding this, and with their guidance, he constructed two raceways, each measuring 15m x 2m x 1.5m. One raceway was constructed totally at his own expense, and for another raceway, he got 50% subsidy amounting to ₹ 50,000 with inputs (seed and feed) under the Rashtriya Krishi Vikas Yojana (RKVY) for one raceway. The technical training provided by the State Fisheries Directorate and the officials' frequent visits helped him gain the required knowledge in trout farming. In 2016–17, he constructed one more raceway at his own expense and applied for another trout raceway under the Blue Revolution scheme and received a 60% subsidy of ₹ 1.2 lakhs for the construction. Again, in 2019–20, he applied for two more raceways under the Blue Revolution scheme and received support for inputs.

He is harvesting a good quantity of trout and most of his produce is sold at the farm gate. He supplies trout to resorts in the adjacent town and through online orders which are handled by one of the youths in his locality. He regularly participates in fish melas and festivals to promote his product.

The main constraint he faced was the availability of quality seed and feed. Due to the increasing problem with seed availability, he started rearing brood stock and commenced breeding activities by constructing a temporary hatchery. Since then, he has been self-sufficient in seed requirement. In 2018-19, he could produce 1, 36,000 no. of trout fingerlings which he sold to the local farmers at ₹10- 20/piece earning a good sum of money. The problem of getting feed was a constant challenge for which he had to consult State Fisheries Department. As directed by the fisheries department, he started procuring trout feed directly from the growers. Now he not only procures feed for himself but also sells small quantities of feed as and when required by the local marginal farmers who cannot afford to procure feed at times. Trout culture has become his primary livelihood, which made him self-sufficient paving way for considerable change in his life by enhancing yield and income. He proposes to start a hatchery to produce at least 5 million fingerlings and 8-10 million-eyed ova per year in the near future.

Re-modeling the Lives through Rearing Trout

Mr Subash Rai belongs to Pakyong, Sikkim and a member of local cooperative society. Desiring to do his own business, he invested in many activities like piggery, poultry, etc but could not earn much profit. While doing all these, he noticed that a few of his neighbours were doing trout farming and earning a good income. This is when Mr Rai decided to start trout farming as he already had abundant land and water resources. In 2017 he started trout farming with the technical assistance of the District Fisheries Officers. He constructed six raceways each measuring 17m X 2mX 1.5m. The total cost of construction of one raceway was ₹ 2 lakhs. He got a 60% subsidy amounting to ₹ 1,20,000 for each raceway. He was also provided with inputs (seed and feed) under the Blue Revolution scheme for the first year. Initially, he was provided with technical training by the State Fisheries Department. The officials used to visit his farm regularly to provide technical support. Slowly he gained the required knowledge and started doing well in trout farming.

The main constraint faced by him was the availability of quality seed and feed. Due to the increasing challenge of the dearth of seeds, he started rearing brood stocks and initiated breeding activities by constructing a contemporary hatchery in the year 2018. Since then, he is self-sufficient in seed requirement. Another problem faced by him is the non-availability of trout feed in the local market. Recently he tied up with other progressive farmers to purchase trout feed from some reputed companies. During the year 2021-2022, he harvested around 1.5 tonnes of trout fish from his business activity which he sold in the local market. His participation in various events like fish melas, exhibitions, etc in the year 2021-22 helped him get good earnings.

With the increase in the production of trout fish year after year and due to the production of trout fingerlings, his income has increased substantially. He has undoubtedly improved the living standard of his family. Besides he has also employed two people from his village. His future plan is to expand his farm by increasing the number of raceways. He also plans to expand his hatchery to produce more seeds so that he can meet the increasing seed demand of the local trout farmers.

Name	Subash Rai
District	Pakyong
State	Sikkim
Education	10th Standard
Category	OBC
Occupation	Farming and driving
Mobile number	7679742224
Year of establishment	2017
Position	Owner
Activity	Raceway culture
Species	Trout
Annual turnover	₹ 12 lakhs
Annual fish production	1.50 tonnes
Employment generated	2

The Sea Change Brought by Sea bass : ICAR-CIBA



Technological intervention	**ICAR-CIBA**
Beneficiary	Women SHG 1. Dr. APJ Abdul Kalam Magalir Meen Valarpu Kuzhu, 2. Dr. Muthulakshi Reddy Magalir Meen Valarpu Kuzhu, 3. Annai Therasa Magalir Meen Valarpu Kuzhu
District	Chengalpattu
State	Tamil Nadu
Education	up to Higher Secondary
Category	SC
Occupation	Oyster meat collection
Contact person	Mrs Anjugam
Mobile number	918610206340
Business activity	Nursery rearing and grow-out culture
Species	Sea bass
Year of establishment	2021
Annual production	50,000 fingerlings and 1 tonne table fish
Turnover (1 cycle)	₹ 4.20 lakhs
Employment generated	50

Asian sea bass is an economically important food fish in India. The availability of 'optimum size' fingerlings for stocking is the main constraint for the expansion of its farming. To tackle this and to get increased survival rate, the Fish Culture Division of ICAR-CIBA developed an improved scientific rearing method for sea bass fingerlings. This technology has been promoted under the Scheduled Caste Sub Plan (SCSP) program to create additional livelihood avenues for fisher women. Earlier the fisher women of Kottaikadu, Tamil Nadu were solely dependent upon the collection of oyster meat for their income. The ICAR–CIBA trained these women on nursery rearing and brackish water cage farming of sea bass and supported them with the required implements and the financial assistance of ₹ 6.50 lakhs under SCSP. The SHG themselves bore another ₹ 3.50 lakhs in the form of services they delivered.

They installed a crab fence (30 m x 60 m, mesh size 25 mm) in the backwater where the nursery rearing of sea bass was planned. A few hapas of 2 x 1.5 x 1 m^3 (L x H x W) size were set up within the boundary of the fence and were stocked with fingerlings (3-4 cm, 1.2-1.5 g) at the rate of 300 per hapa. In total, 12,000 fingerlings were stocked and were fed twice or thrice a day with formulated feed (crude protein 45% and crude fat 10%) for one cycle of 45 days. Weekly grading of the fingerlings was done to prevent cannibalism. At the end of the period, the fingerlings attained the size of 4-5 inch and 13.5 g. The women earned good profit by selling these at the rate of ₹ 40 per fingerling. Additionally, they are also engaged in table fish production by cage culture in three GI cages of 30 m^3 size.

Due to ICAR–CIBA's intervention, the fisher women are now able to improve their income, and in turn, their standard of living. The income for each member increased from ₹ 4,000-5,000 per month from oyster collection to additional ₹ 12,000 per cycle for nursery rearing.

Seaweed: Source of Sustainable Income

Jeya Lakshmi, Jeya, Thangam, and Kaleeswari belong to Mandapam village, Ramanathapuram district of Tamil Nadu. These women are not well educated and belong to poor families. They were homemakers without any additional income thus completely depending on their husband's income. However, it was quite difficult for them to meet the family expenditure and children's education. These friends then decided to start a business on their own to meet their regular expenses. Once the State Fisheries Department of Tamil Nadu arranged an awareness campaign and training on seaweed farming, they participated and learned the basics of seaweed farming and schemes that benefit them in this regard.

They started seaweed cultivation under the PMMSY scheme. The total project cost was ₹ 67,500. They have invested ₹ 27,000 for the same. A financial assistance of ₹ 5,000 was received from TAFCOFED as a short-term loan and a 60 % subsidy for Seaweed Cultivation Project under the PMMSY scheme. When they started seaweed farming, they faced challenges such as cyclones, nutrient depletion for seaweed culture places, damage to rafts due to movements of boats, climatic conditions, marketing problems, inadequate seedlings supply, etc. Despite all these challenges they could produce 36,000 tonnes of wet weight.

This not only made them financially independent but also helped them to improve their self-esteem and create employment opportunities for others. This culture activity has employed many fisher-women, leading to the uplifting of their livelihood. These women have set a good example and motivated the illiterate or less educated women of their locality to start up business in seaweed production.

Name	Jeya Lakshmi, Jeya, Thangam, Kaleeswari
District	Mandapam
State	Tamil Nadu
Education	12th Standard
Category	OBC
Occupation	Homemaker
Mobile number	9025446269
Year of establishment	2017
Position	Owner
Activity	Seaweed farming
Annual turnover	₹ 3.78 lakhs
Annual seaweed production	36,000 tonnes in wet weight
Employment generated	6

Wealth from Waste

Name	T. Kennit Raj
District	Chennai
State	Tamil Nadu
Education	8th Standard
Category	OBC
Occupation	Fish farmer
Mobile number	9940252803
Firm's name	Nambikkai Fish Farmers SHG
Year of establishment	2019
Position	Member
Activity	Fish waste processing
Annual turnover	₹ 8 lakhs
Annual production	13 tonnes
Employment generated	7

Mr Kennit Raj is a fisher residing in Nambikkai Nagar, near Marina beach in Chennai, Tamilnadu. His occupation was fishing and selling fish in the local fish market. He used to dump the fish waste at a common place in the surrounding locality where other fishers also disposed off the fish waste. This led to the repugnant smell and unhygienic living conditions making the lives of fishers living around difficult. In 2014, the Swachh Bharat campaign called for the nation by the Prime Minister towards cleanliness, triggered the fishermen community at Nambikkai Nagar to initiate fish waste management activities. Mr Kennit Raj volunteered to clean the garbage and approached many people for help, but none came forward. However, his prior experience as Panchayat President came in handy at this dire time. While he was scouting for assistance, he got connected with authorities at the Central Institute of Brackishwater Aquaculture (CIBA) for guidance and support.

In 2016, Mr Kennit Raj formed the Nambikkai Fish farmers Self Help Group (SHG) by gathering a few fish farmers and started recycling waste at his own house. ICAR-CIBA came forward to support this SHG in establishing a "Fish Waste Processing Unit" on February 18, 2019. This unit is being operated by the Nambikkai SHG producing value-added products like Plankton plus and Horti plus under Swachh Bharat initiative. This fish waste processing unit has a production capacity of 2,000 litres of Plankton plus per month. The annual turnover of one unit is ₹ 16.80 lakhs with a net profit of ₹ 4.56 lakhs. After the agreement with a private company, the group produced 4,500 litres of Plankton plus and 550 kg of Horti plus and received ₹ 2.78 lakhs.

In their words, the vision and perseverance of the Nambikkai SHG members is moving toward a clean society. Their dedicated efforts resulted in inclusive growth and sustainable living by creating an alternate livelihood from the concept of "Wealth out of waste". For their efforts, Nambikkai Fish Farmers Group" was awarded as "Best Self-Help Group" by the Government of India in the year 2020.

Cage Culture : An Alternative for Fishers

Mr M. Rayappan and Mr M. Muthaiah are residents of Sippikulam village of Thoothukudi district, Tamil Nadu. They belong to the fishermen's community and were earning a very low-income (₹ 10,000 per month). The Government of Tamil Nadu announced a model pilot project under Fisheries Management for Sustainable Livelihood (FIMSUL-II) Project, funded by the World Bank, to promote fish farming in cages for an alternative livelihood for the marine fishermen.

Under the project, one cage was allotted for Thoothukudi district for the year 2018-19 with the unit cost of ₹ 5 lakhs (₹ 1.25 lakhs for fabrication of cages and ₹ 3.75 lakhs for operational cost) on 100 % subsidy for a demonstration to the fisher folk. Public announcements were made to identify the beneficiaries who were interested and doing fishing as their livelihood. Three interested fishermen from Sippikulam fishing village of Thoothukudi district were selected as beneficiaries and were given training on open sea cage culture at ICAR-CMFRI, Mandapam. Mr Rayappan and Mr Muthaiah were among them. After the training, they agreed to involve in the open sea cage culture activity. One cage of 6 m diameter having 2.5 tonnes production capacity was installed in the sea off Sippikulam fishing village with the technical support of ICAR-CMFRI officials, but ICAR-CMFRI faced certain challenges, viz. lack of awareness about open sea cage culture among the fishers, rough sea, and unavailability of marine fin fish seeds for the cage culture. Out of the two cages, ₹ 3 lakhs was earned as net profit in 12 months. Usually, one cage is harvested after 4-5 months, and the survival rate is up to 88 %.

Currently, they have three units. They gained experience and now confident of doing cage culture in their district. Mr Rayappan and Mr Muthaiah are very much interested in cage culture as it is an alternative income source for their livelihood. They motivated nearby village fishermen to engage in this activity. There is a growing demand for marine finfish and offshore fish farming for Indian aquaculture. So, they plan to do offshore mariculture and produce fish seeds.

Name	M. Rayappan and M. Muthaiah
District	Thoothukudi
State	Tamil Nadu
Education	10th Standard
Category	OBC
Occupation	Fishermen
Mobile number	9786488292
Year of establishment	2016
Position	Owner
Activity	Open sea Cage culture
Species	Sea bass and lobster
Annual turnover	₹ 8 lakhs
Annual fish production	2.50 tonnes
Employment generated	27

Stella's Stellar Seaweed Culture

Name	Stella Mary
District	Thoothukudi
State	Tamil Nadu
Education	10th Standard
Category	OBC
Occupation	Seaweed farmer
Mobile number	9791666459
Year of establishment	2006
Activity	Seaweed culture
Annual turnover	₹ 60,000
Annual seaweed production	10 tonnes in wet weight
Employment generated	12

Mrs Stella Mary is from Puthiyathuraimugam village of Thoothukudi district, Tamil Nadu. She is a fisherwoman getting low income searching for an extra source of income. She realized that seaweed culture is an alternative method of generating income that can last throughout the year. In 2006, she started seaweed farming with the financial assistance from Aqua Agri Processing Pvt. Ltd. She would get a monthly income of ₹ 6,000 from the firm. She underwent a training on seaweed culture organized by ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI) and the State Fisheries Department, Tamil Nadu. After a decade, the seaweed farmers were encouraged by the Sea6 Energy Private Limited.

In 2022, she applied for the activity "seaweed culture by monoline method" under Pradhana Mantri Matsya Sampanda Yojana (PMMSY) scheme and started the culture with a production capacity of 10 tonnes (wet weight). The total project cost was ₹ 16,000 with a financial assistance of ₹ 9,600 as the first-year input cost and ₹ 6,400 was invested by her.

She practices a culture period of 35-45 days. Regular monitoring is carried out to develop good quantity and quality of seaweed. This includes weekly checking of the culture ropes to prevent the growth defecting factors and the inspection of anchorage to prevent complete loss of the seaweed. She regularly inspects the anchorage to avoid a total loss. She uses discarded plastic bottles and beverage bottles as floats and stones as sinkers to reduce the cost. The growth pattern is also monitored regularly to earn more income. The harvested seaweed is sold out either in cleaned and dried form or in the wet form to the Sea6 Energy Private Limited. Since this is a pilot project, 10 fisher women are engaged in the activity and two fishermen to maintain and operate rafts. Mrs Stella plans to involve the local community in framing suitable policies for aquaculture.

Self-Help Group to Self -Made Women

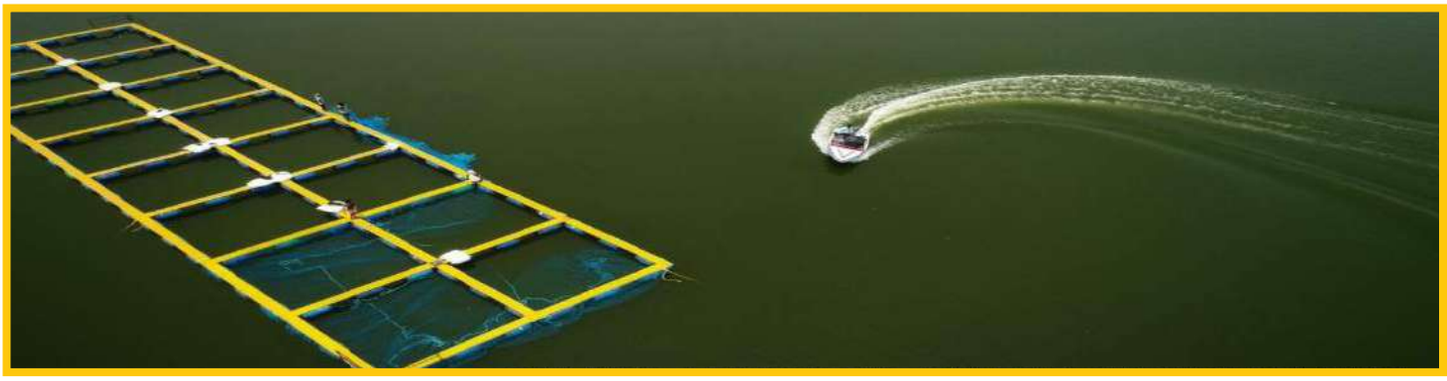
Nearly two decades ago, it was a challenging task for Hyderabad's fisherwomen to earn bread for their families. Hyderabad city, located on the banks of the Musi River around artificial lakes were polluted and fishermen hardly found livelihood in fishing activity. Fisherwomen mainly depended on fresh fish sales on footpaths of the city roads even though the city is one of India's fastest-growing metropolitan cities and has enormous potential for fresh fish marketing and fish based value-added products. These fisherwomen had good knowledge of pre & post-harvest operations and value-added processing products but were scattered and had no support system. Although Fishermen Cooperative Societies existed, not much emphasis was given to the fisherwomen.

In 2000, field officers from the Department of Fisheries approached them and explained the benefits of being organized into Fisherwomen Cooperative Societies (FCSs). Soon, they realized there should be a binding factor and manageable size for the institution to sustain. This thinking weaved the concept of Matsya Mitra group: Self Help Group and the formation of various societies consisting of 10-20 members. To date, 21 FCSs with a membership of 1069 Fisherwomen and 84 Matsya Mitra Groups (Self Help Groups) have been formed and have been functional for more than a decade. The society of the concerned groups monitors the regular functioning of the groups and establishes linkages with external financial institutions and Government Departments for accessing various benefits. Together they successfully established Matsya Bhavan in Hyderabad, where they sell fish foods and earn good profits. They have been setting up fish stalls in exhibitions and expos with the support of the Fisheries Department. They also set up a fish food stall in the AquaEx international Fisheries Expo organized by the Government of Telangana and the Society for Indian Fisheries and Aquaculture. The group prepared 20 varieties of Fish Food items and sold them thus receiving a turnover of ₹ 2.50 lakhs profit i.e. ₹ 5,000 per woman is earned from the sale.

Intending to increase fish consumption, they organized a 3- day "Fish Food Festival" at NTR Stadium in 2020 with the financial support of NFDB. During the event, 22 stalls involving 106 fisherwomen & men from 13 Fishermen & Fisherwomen Coop. were set up. Societies of Hyderabad District participated in food preparation and serving. The business turnover was ₹ 25.88 lakhs in 3 days and made a profit of ₹ 7.18 lakhs. They aspire to explore the vast opportunities in fish-based livelihoods by setting up fish food kiosks, processing units, and retail and wholesale markets in Hyderabad.

Establishment	Fisherwomen Co-operative Societies and Self-Help Groups
State	Telangana
Beneficiary	Fisherwomen
Activity	Exhibition stalls, melas etc.

Cooperative's Collective Effort into Cage Culture



District	Khaammam
State	Telangana
Beneficiary	Fishermen Co-operative Society
Business Activities	Cage Culture
Technological Support	**ICAR-CIFRI**

Palair reservoir, a perennial water body, occupies paramount focus in Telangana State for its freshwater prawn production. It is a major balancing reservoir for the N.S.P canal located in Kusumanchi Mandal, having 1,748 ha of water spread area and it provides a considerable livelihood for fisher folk around its fringes. The Fishermen Co-operative Society, Palair, was organized and registered in 1977. There are 1,200 members in the society from 18 villages, which includes six villages in Nalgonda district and 12 villages in Khammam district. The reservoir is under licensing scheme and more than 1,200 fishermen's families are directly benefitted from the reservoir fisheries. Nearly 300 are getting indirect benefits through marketing, net making, and retail sales.

During FY 2015-16, the Palair Reservoir was selected for taking up the cage culture on a pilot basis. A working group of 13 fishermen of Fishermen Co-operative Society, Palair were sent by the State Fisheries Department to Chandil reservoir of Jharkhand for an exposure visit. One battery of 12 cages was installed in the Palair reservoir. These cages were stocked with 50,000 pangasius and 25,000 tilapia seed. The trained fishermen managed the cages and performed activities like feeding, net cleaning, fish health monitoring etc. The fish was sold out through auction at ₹ 80/ kg rate. Around 19.77 tonnes of harvested fish worth ₹ 15.54 lakhs were sold. From the next crop, the cage unit was transferred to the working group. During the year 2016-17, the said group stocked 60,000 pangasius fish seed. After 10 months of the culture period, they harvested 22 tonnes of fish and earned the profit of ₹ 17.60 lakhs. During 2017-18, four cages were installed and allocated to 40 members @ 10 per group in Palair Reservoir under the scheme of Blue Revolution. The unit cost per battery was ₹ 30 lakhs and the pattern of assistance was 50% subsidy by the Govt. of India (shared by GoI and the State), additionally 30% by the State Government, and 20% contribution from beneficiaries. A total of ₹ 2.40 lakhs of pangasius fish seed were stocked in cages in December 2017 and nearly 96 tonnes of fish was harvested with the average of 24 tonnes/ battery.

Further, with the technical support of the ICAR-CIFRI, 4 batteries were installed and allocated to 40 beneficiaries in Palair with each battery consisting of 16 cages. In these cages, alternate species having good market demand were cultured along with Pangasius. These cages were also utilized for raising advanced fingerlings (fish seed with 100 mm and above) to increase the productivity of the reservoir. Now, these cages are providing direct livelihood support to 93 members. Women are selling fish on roadside and getting a profit of ₹ 20 per kg. There is an additional fish production of 210 tonnes from 16 cages. On average, each woman sells 30 kg fish per day and earns ₹ 600 per day. The project has created a market for fresh and hygienic fish availability round the year in the locality.

Civil Engineer into Aqua Engineering

Mrs Y. Santhi Sri is a resident and a Civil Engineer by profession from Rampally, Medchal-Malkajgiri, Telangana. She observed that Telangana State imports fish from Andhra Pradesh. Since fish is a perishable product and people prefer consuming fish fresh, she decided to start fisheries activity and cater to urban customers with fresh and live fish. So, she applied for the activity "Recirculating Aquaculture System (RAS)" under Blue-Revolution with a total project cost of ₹ 80 lakhs and received financial assistance of ₹ 30 lakhs, and the rest was invested by self. With the assistance received, she successfully constructed 8 tanks spreading across 0.15 ha and could get 40 tonnes production capacity.

Through the RAS project, she gets fresh, grown fish around the year and is able to deliver the same to her customers. Now, she has stable fish production in terms of availability irrespective of seasonal variations, locations, climates, and environmental conditions. She is rearing tilapia, Pangasius, and murrel in high-density culture using food grade (SS304) stainless steel in indoor tanks in which water is purified in four stages and gets reused, which reduces water consumption. She designed her RAS system in such a way that fish seed from nursery tanks are transferred to culture tanks automatically. She uses a compact bio-reactor, drum filtration, and UV Sterilization processes for solid waste separation which are part of the system. By doing all these, she got better production.

She used best practices like frequent monitoring of water quality parameters; periodic training/ study on diseases; sourcing of the right seed and feed; equipment preventive maintenance, etc. which helped her to acclimatize the system to the climatic conditions. She plans to develop a supply chain for live fish, work on shrimp and crab, set up the solar plant, and aquaponics.

Name	Name
District	Medchal-Malkajgir
State	Telangana
Education	Advanced Institute of Education
Category	General
Occupation	Civil engineer
Mobile number	8008866778
Firm's name	Aqua Fauna
Year of establishment	2019
Position	Proprietor
Activity	Recirculatory Aquaculture System
Species	Tilapia, Pangasius, and murrel
Annual turnover	₹ 28 lakhs
Annual fish production	20 tonnes
Employment generated	4

Catchy Fishing: Catfishing

Name	Ajit Das
District	South Tripura
State	Tripura
Education	Bachelor's Degree
Category	SC
Occupation	Farmer
Mobile number	8729898163
Firm's name	M/s Manasha Fishery & Co.
Year of establishment	2020
Position	Proprietor
Activity	Seed production and Marketing
Species	Catfishes
Annual turnover	₹ 1.65 lakhs
Annual fish seed production	55,000
Employment generated	2

Mr Ajit Das is a resident of Durgapur village, South Tripura district, Tripura. Catfish and air-breathing fish like pabda, magur, singhi, and koi are in good market demand due to their medicinal characteristics, and their species can grow easily in extreme conditions and fetch good market prices. Hence, he was motivated to start fish farming. He then discussed with State Fishery Department officials to start breeding and seed rearing of catfish, particularly magur, singhi, and koi as there is a huge demand for catfish seeds in the locality. He has been doing fish farming for the last 7 years, but engaged in catfish culture for the last two years. Currently, he owns two units of the catfish pond in an area of 0.24 ha.

In FY 2020–21, he adopted seed production of magur through induced breeding after experiencing practical exposure to the breeding of catfishes at the National Fish Seed Farm, South Tripura. Later, he began breeding magur in his farm, producing 10,000 Magur earning a profit of approximately ₹ 30,000.

In FY 2021-22, the Department of Fisheries sponsored the activity "Establishment of breeding units for locally important indigenous fish species in the North East Region" under PMMSY, with a project cost of ₹ 2.0 lakhs in which he got financial assistance of ₹ 1.20 lakh for input cost ₹ 20,000 as KCC loan and rest was invested by self. As a result, he produced 20,000 nos of magur and 5,000 nos of singhi seed and sold each per ₹ 3 per fry and gained a profit of about ₹ 40,000 by selling the seeds locally.

He uses pelleted feed with self-prepared feed with mustard oil cake, rice bran, dry fish powder, etc. Moreover, he uses an organic juice mixture for the zooplankton production for magur larvae. Mr Das is a progressive fish farmer in Belonia Sub-division and plans to add more no of breeding and rearing tanks for breeding of pabda, catfish and IMC breeding on his farm.

A Small Scale Fish Farmer to Fish Breeder

Mr Madhusudhan Bhattacharjee is a progressive fish farmer of Kunjaban GP, Tripura. He has 11 fish ponds with the total area of 4 ha. Out of these 11 ponds, he has been practicing composite fish culture in 4 ponds (1.44 ha) since 1979. Recently, he developed an interest in induced breeding of fish and started breeding fish in his farm. At present, he does the induced breeding of rohu, catla, mrigal, silver carp, grass carp, common carp, and *Puntius javanicus*.

Earlier he used to do fish culture and fish breeding in the traditional manner but there used to be high mortality of fish and fish seed incurring huge financial loss. So he approached the Department of Fisheries (DoF), Tripura to learn the technical know-how of fish breeding in eco-hatchery. He applied for the establishment of carp hatchery under PMMSY and in FY 2021-22 the DoF, Tripura sanctioned finfish hatchery under PMMSY. The total project cost was ₹ 25 lakhs. He received financial assistance of ₹ 10 lakhs under the scheme and invested ₹ 15 lakhs by himself. He successfully constructed 4 breeding tanks, 12 hatching tanks, and egg collection chambers having 9 million production capacity and produced 20 lakh Indian major carp fingerlings. He received the net profit of ₹ 9.90 lakhs against the expenditure of ₹ 5 lakhs.

He has improved his socio-economic status since he started producing spawns in his hatchery. Now he is a role model for others in Udaipur sub-division. He has constructed "motka tank" for saving the area and stocking huge quantities of eggs so that eggs do not get damaged by the conical structure of the rectangular tank. Because of his valuable contribution to the development of the fisheries sector, he was awarded as the Best Fish Farmer in the Fish Festival (State level) organized by DoF, Tripura in the FY 2019-20.

Beneficiary	Madhusudhan Bhattacharjee
District	Gomati Tripura
State	Tripura
Education	8th Standard
Occupation	Fish farmer
Mobile number	7641005662
Business activity	Fish seed production
Year of establishment	2004
Position:	Owner
Firm's name	M/S Bhattacharjee Matsya Hatchery
Annual fish seed production	20 lakhs in number
Annual turnover	₹ 22.5 lakhs
Employment generated	8

Passion Led to becoming a Progressive Farmer

Name	Rajkumar De
District	South Tripura
State	Tripura
Education	Bachelor's Degree
Category	OBC
Occupation	Entrepreneur
Mobile number	9436515998
Firm's name	M/s Rajarshi Matsha Hatcheries
Year of establishment	2019
Position	Proprietor
Activity	Seed production
Species	Indian Major Carps and catfish
Annual turnover	₹ 36.53 lakhs
Annual fish seed production	8.08 tonnes
Employment generated	6

Mr Rajkumar De is a resident of Village Rangamura, District South Tripura of Tripura state. He was motivated and got into fisheries when he realized that high-value fish like pabda, magur, singhi, and koi have good market demand in Tripura because of their good taste. In the year 2011-12, the Department of Fisheries, Tripura, provided him with a paddle wheel aerator and other farm inputs under the Rashtriya Krishi Vikas Yojana (RKVY) scheme. He started seed production and fish rearing of Indian Major Carps on his farm. Later he underwent training on cat fish breeding at the College of Fisheries, Agartala, and the National Fish Seed Farm, South Tripura during FY 2019-2020 and started seed production of catfish.

Under the guidance and support of the Department of Fisheries, Tripura, he applied for "Hi-tech fish culture using an aerator" activity under the RKVY scheme during FY 2021-22 and successfully constructed 12 hatchery tanks with a production capacity of 20 lakhs seeds. He received financial assistance of ₹ 0.39 lakhs from the government, availed ₹ 1.60 lakhs as bank loan through KCC Fishery, and invested ₹ 9.50 lakhs by himself. He produced 1 lakh pabda, 50,000 magur, 1, 50,000 singhi and 2 lakhs koi seeds. In the same year itself, about 80-90 kg of pabda brood fish were produced earning him a net profit of ₹ 16.96 lakhs.

By undertaking breeding and seed-rearing technology for catfish, he has diversified his farming activities and as a result, he gets better income from his farm. He now owns 1.48 ha of land in which there are 12 hatchery tanks, 8 rearing tanks, and 7 ponds that are operating for the last ten years. He uses pelleted and farm-made feed for fish and organic fertilizer to produce zooplankton in the pond and feeding the same to magur larvae to reduce mortality.

Tribal Farmer to Successful Entrepreneur

Mr Dharmendra, a young tribal farmer, belongs to the Katundhi Village of Uttar Pradesh. He used to grow vegetables on small scale, produce fish seed, and rear fish in two ponds (0.63 acres). However, he was getting a meagre income. He faced problems like the unavailability of quality fish seed in his area, the high mortality of fish seed brought from faraway places, the high cost of fish seed, etc.

In this scenario the ICAR-National Bureau of Fish Genetic Resources (ICAR-NBFGR), Lucknow came to his support. He was selected under the Scheduled Tribe Component (formerly Tribal Sub Plan) initiative of ICAR-NBFGR (FY 2016-17) and got trained, supported, and promoted. With the continuous support of the technical guidance and troubleshooting from the ICAR-NBFGR and through the knowledge he acquired from the awareness program of ICAR-NBFGR at the beginning, he installed a portable hatchery infrastructure and started conducting onsite demonstrations.

This led him into the successful entrepreneurial running of a fish seed production unit and doubling of his income. The local availability of quality fish seed resulted in lowering the input costs by way of reduction in transportation and manpower costs and reduced the seed mortality. He extended his farm from two ponds of 0.63 acres to nine ponds of 2.65 acres water area. He now earns ₹ 6.34 lakhs as annual income. In the last five years, his income has increased by 400%. During the 5 years since the interventions were introduced at his farm, the production and sale of seed has increased each year. He is encouraging and motivating other tribal farmers in the area through farm visit arrangements and training. A total of 78 fish farmers from 38 villages in three States (Uttar Pradesh, Jharkhand, and Madhya Pradesh) purchased seed from him so far and it has benefitted around 110 ha of the pond area.

Technological intervention	**ICAR-NBFGR**
Beneficiary	Dharmendra
District	Sonbhadra
State	Uttar Pradesh
Education	Intermediate level
Occupation	Fish farmer
Mobile number	8707584888
Business activity	Seed production and marketing
Species	IMC
Year of establishment	2016
Annual production	6 crores of spawn, 800 kg of fry & fingerlings, 300 kg of brood fish
Annual income	₹ 6.34 lakhs
Employment generated	78

Improved Variety : Improved Income

Name	Gautam Chaudhry
District	Baghpat
State	Uttar Pradesh
Education	MBA
Category	OBC
Occupation	Private employee
Mobile number	9068680591
Year of establishment	2019
Position	Owner
Activity	Grow-out culture and seed rearing
Species	Genetically Improved IMC
Annual turnover	₹ 24 lakhs
Annual production	5 tonnes grow out fish and 6 lakhs fingerlings in number
Employment generated	12

Mr Gautam Chaudhry is from Rathaura village of district Baghpat, Uttar Pradesh. Before venturing into the fisheries sector, he was a private employee in a MNC. He saw the increasing demand for fish consumption in the district and started thinking about his career in culturing fish. He has land and freshwater resources, so he started his journey of fish culture by stocking 15000 no. yearlings in one ha pond. He fed the fish with supplementary farm-made feed and harvested 5000 Kg of fish. He sold the fish for ₹ 100/kg at the farm gate and successfully earned ₹ 5 lakhs turnover and ₹ 2 lakhs net profit.

In subsequent year, he made a net profit of ₹ 3.8 lakhs, almost double the amount he got from the first crop. However, he struggled to get quality seed for the grow-out farm, but then he came to know about ICAR-CIFA and attended pearl culture training in 2020. While taking training, he visited NFDB-NFFBB as part of his field visit. After knowing about the improved variety, he applied for the Grow-out and seed rearing of genetically improved varieties of Indian Major Carps under Blue Revolution during FY 2019-20 and constructed one grow out in one ha area and four nursery ponds in 0.25 ha area each. The total project cost was ₹ 15 lakhs with financial assistance of ₹ 6 lakhs as first-year input and 9 lakh rupees were invested by himself. Then, he registered his farm as a network seed grower with NFDB-NFFBB, which changed his farming practices and made a huge difference in selling the seed and making 30 % more profit than earlier with no disease incidence.

As a result, he was awarded as the best progressive farmer for the production of improved variety in Meerut Mandal. He has undergone training in RAS, Biofloc, and Pearl culture to enrich his knowledge and recently started culturing designer pearls. Also, he is giving consultancy services and guidance to other farmers. His plan is to generate more employment by training the young generation with the help of the Government of India.

A Realtor Reaping Good Returns using RAS

Mr Mohd. Asif Siddiqui is a native of Gangwara, Barabanki district, Uttar Pradesh (U. P.). He was working in the real estate sector and his family's main occupation was agriculture. The family incurred huge losses for 2 consecutive years. This is when he came in contact with one of his close friends Mr Parvesh, who was doing fish farming using RAS technology and was getting a handsome income. Seeing his friend's profitable fish business, Mr Siddique ventured into fish farming in 2015. To improve his knowledge, he attended various training programs organized by the Department of Fisheries, U.P., a certification course on 'Start-ups and innovation in agriculture entrepreneurship', 2016 from National Bureau of Fish Genetic Resources (NBFGR), Lucknow and NFDB sponsored training on Recirculating Aquaculture Systems (RAS) conducted by NBFGR.

This gave him the confidence to start the business by constructing 15 earthen ponds in one acre area with a stocking density of ₹ 1.50 lakhs per acre. In 6-7 months, he harvested 62 tonnes of fish which gave him the confidence to further convert his agricultural land into ponds and expand his farm to 6 acres.

He procures seed from West Bengal at the rate of ₹ 3 per seed, further rears it in the nursery for 20-25 days, and sells at the price of ₹ 120 per kg. He uses locally procured pelleted feed. He follows waste management practices by reusing the drained water of the fishponds to irrigate the neighboring agricultural fields, thus reducing the water consumption by 30 %. In the year 2018, he received a subsidy of ₹ 6 lakhs from the Department of Fisheries, U. P. for installing a 30 KW solar plant, fixation of aerators, and a 5 HP solar pump in the ponds which reduced the cost of production.

Several Colleges and Universities are also organizing exposure visits to his farm to understand the best practices adopted by him. He also shares his knowledge of fish culture with local farmers and encourages enthusiastic farmers to take up fish farming as part of their livelihood activities.

Name	Mohd. Asif Siddiqui
District	Lucknow
State	Uttar Pradesh
Education	Bachelor's degree
Category	General
Occupation	Agriculture and real estate agency
Mobile number	9839470411
Firm's name	A.Q. Fisheries
Year of establishment	2015
Position	Proprietor
Activity	High density fish farming
Annual turnover	₹ 8.40 lakhs
Annual fish production	210 tonnes
Employment generated	50

Perseverance Leading to Persistent Livelihood

Name	Piushika Yadav
District	Firozabad
State	Uttar Pradesh
Education	M. Com.
Category	OBC
Occupation	Teaching
Mobile number	9193366099
Firm's name	Khairgadh Farms
Year of establishment	2020
Position	Owner
Activity	Grow-out culture and seed rearing
Species	Genetically Improved IMC
Annual turnover	₹ 38 lakhs
Annual production	30 tonnes
Employment generated	5

Mrs Piushika Yadav is from the village Nagla Himmat of Firozabad district, Uttar Pradesh. Before coming into the fisheries sector, she was a teacher and was getting monthly income of ₹ 35, 000. As her income was not sufficient to fulfil her family's needs, she was looking for a business that would sustain longer and soon she found a solution, Fish Food business. Apart from that, she realized there is a demand from consumers for fresh fish round the year. In 2020, she constructed two ponds for culture in 1.7 ha area and three ponds in 0.3 ha area for seed rearing. She initially built it for personal farming, but with the ongoing demand of the local farmers, visiting and watching them day by day, their involvement to learn more in fish culture motivated them to start the business of seed rearing for the local farmers.

In the project's initial phase, the biggest hurdle was acquiring quality seed for production. For this, she approached the NFDB-NFFBB, Bhubaneswar, and procured high-quality seed of improved breeds like Jayanti Rohu, Amur common carp, and improved Catla. As a result, she produced 2.5 lakhs early fry from the first batch. She also faced challenges related to untrained laborers, high electricity charges, and lack of infrastructure to transport seeds. Later, she not only trained her workers but also helped them to earn their livelihood and purchased vehicles for the transportation of fish seed.

She manages to the culture ponds through proper maintenance of water quality parameters, feeding the fish with proper feed, and fish stock sampling at regular intervals which helped in increasing the survival ratio up to 30% to 40% against the usual 20%. Since the temperature at her location is generally high, she kept the water level of the pond to 3.5 m, which is helping her to maintain the health of the fish with low or no mortality. She ensures the delivery of live fish seed to the farmers. She engages people in harvesting, sampling, and transporting the fish, thus providing employment to many. She wants to start grow-out culture of singhi, desi magur, and murrel in the 10 ha area in near future.

Improving Lives through Integrated Farming

Mr Rajnish Kumar is from Patla Village, Ghaziabad District, Ghaziabad, Uttar Pradesh (U. P.). After completing B. Tech in 2004, he worked in various corporate companies for 14 years. While working he had a desire to start his own business and was interested to explore the fisheries sector. After doing extensive research, he entered into the aquaculture industry. He toured various places for a few months and visited a number of farms to study various technologies and practices (RAS/ Biofloc/ In-Pond Raceway System (IPRS)/ & cage culture), and recognized the demand and supply gap domestically and globally. The potential expandable nature of the business further motivated him to venture into the same. He left his job in 2017 and planned his career in fish farming. In 2018, he started a fisheries project on 12 acres of land in his native place. His entrepreneurial journey was not easy, yet he didn't give up.

He constructed 2 ponds with 150 tonnes production capacity under Pradhan Mantri Matsya Sampada Yojana (PMMSY) and gradually expanded his farm to 50 acres for farming Indian Major Carp (IMC) and Pangasius. Later, he took up the expansion of his firm by starting a seed bank in 2019 with 2 million production capacity. In 2020, his firm was empanelled with NFDB. He undertook backward integration through seed rearing for of catfish. Through nursery, he produced yearlings and developed a live fish market in 2021. He realized that there was a lack of education about fish farming in his place. So he took the initiative to train more than 400 candidates comprising individuals, entrepreneurs, and farmers in fish farming within a span of 12 months. He manages a YouTube channel called "PVR Aqua" to educate and create awareness about fish farming. In the last 4 years, Mr Kumar has brought a revolution in fish farming in his region by disseminating information regarding fish farming.

He aims to expand his farm to 365 acres so that he can harvest one acre of fish daily and provide employment to the youth willing to set up live fish sales facilities in every corner of the national capital region. In future, he is interested to start a feed production unit to optimize the cost and to develop U. P. aqua sector.

Name	Rajnish Kumar
District	Ghaziabad
State	Uttar pradesh
Education	B.Tech.
Category	General
Occupation	Fish farming and seed production
Mobile number	9910515234
Firm's name	PVR Aqua
Year of establishment	2018
Position	Owner
Activity	Integrated aquaculture, seed bank, Aqua Park and Fish on wheel
Species	(IMC) and Pangasius
Annual turnover	₹ 2.35 crores
Annual production	375 tonnes
Employment generated	66

Trout Farming Transforms Village

Name	Jaypal Singh Negi
District	Uttarkashi
State	Uttarakhand
Education	8th Standard
Category	ST
Occupation	Agriculture farmer
Mobile number	9456145390
Firm's name	Himalayan Trout Fish Farm
Year of establishment	2020
Position	Owner
Activity	Raceways culture
Species	Trout
Annual turnover	₹ 8 lakhs
Annual fish production	1-1.20 tonnes
Employment generated	2

Mr Jaypal Singh Negi is a resident of Bhatwari Village in Uttarkashi District, Uttarakhand, and is a member of Harshil Matsya Jivi Utpadan Sahkari Samiti. He was doing apple farming for twenty years, but it wasn't enough for him to make ends meet. So, he thought of trying for a government job. Meanwhile, he visited the State Fisheries Department and came to know about trout farming. They suggested Mr Negi to start trout farming along with apple farming, so that it improves his socioeconomic status.

Under the guidance and support of the State Fisheries Department officials, he applied for the "trout farming" project under Blue Revolution Scheme during FY 2019–20. Under this scheme, he constructed 3 units of trout raceways with a capacity of 50 cubic meters each, with a total capital cost of ₹ 9 lakhs. The operational cost for the 3 units was ₹ 7.50 lakhs. The Government provided a 40% subsidy, another ₹ 2 lakhs was availed through MNREGA, and the rest was invested by Mr Negi himself.

He practices harvesting one unit at a time and stocks the same unit with fish seed just after harvesting. This way, he is able to sustain the production throughout the year. By doing trout farming, he could utilize the available water resources and barren land of the district. Since he has more land and water resources available to construct other units, there is a high potential for him to develop trout farming on a large scale. Currently, he is spending ₹ 250 per kg on production and selling it for ₹ 850 per kg with a profit margin of ₹ 500 per kg. He is effectively selling his harvest at "Uttara Fish Market", Dehradun, at good price. This project has a positive impact on other villagers as they are motivated to follow the footsteps of Mr Negi to improve their livelihood. Also, with the trout farming practices, the tourist attraction of the locality is increasing day by day.

Anmol Feed : Amazing Feed

Anmol Feeds Limited is an ISO 9001:2015 company, started by Mr Amit Saraogi in the year 2000 with a foray into the animal feed industry in Muzaffarpur, Bihar. Since then, it has traversed two decades in the business establishing its corporate office in Kolkata with manufacturing units in Bihar, Haryana, Uttar Pradesh, and West Bengal. In the last 20 years, the organization has manufactured and sold poultry feed in the Eastern, Northern, and North-Eastern and Southern parts of the country covering more than 20 states. Recently it staerted catering to the international markets of Bangladesh, Nepal and Bhutan. They ventured into the fish feed manufacturing segment in 2017. They supply a wide range of fish feeds under the brand name of "Matsya Bandhu" which includes floating fish feed and sinking fish feed, catering to 10,000 fish farmers across the country. Currently, they have 7 state-of-the-art feed mills across five states viz. Bihar, Jharkhand, West Bengal, Uttar Pradesh, and Jammu & Kashmir. They entered the shrimp feed business in 2019 to meet the growing demand for quality shrimp feed. The company now supplies "Latis Gold Shrimp Feed" of various pellet sizes according to the size and stage of the shrimp life cycle.

The company maintains stringent quality standards at all levels of production and distribution. The finished product is analyzed for set parameters before it is dispatched to the farmers through distributors. They have been helping farmers to feed their fish with scientifically formulated feeds which keeps fish well-nourished and maintains the water quality, thereby minimizing the risk of disease outbreaks, etc. The company has conducted 9 awareness programs, organized 22 exposure visits to farmers, and participated in various seminars and workshops during the last three years.

The company bagged several awards in various national and international fora. They intend to increase their market share of compound feed by delivering nutritionally rich and value-for-money products which will in turn result in higher profits for all its stakeholders.

Name	Amit Saraogi
District	North 24 Parganas
State	West Bengal
Education	B.E.
Category	General
Occupation	Entrepreneur
Mobile number	7978624153/ 7504292573
Firm's name	Anmol Feeds Private Limited
Year of establishment	2000
Position	Co-Founder and Managing Director
Activity	Livestock feed manufacturing
Annual turnover	₹ 487.79 crores
Annual fish feed production	36,000 tonnes
Employment generated	300 direct and 300 indirect

Small Leap to Significant Livelihood

Name	Ramen Kapat
District	Paschim Medinipur
State	West Bengal
Education	9th Standard
Category	SC
Occupation	Farmer
Mobile number	9382649905
Year of establishment	1990
Position	Partner
Activity	Fish culture
Species	IMC and exotic carps
Annual turnover	₹ 1.50 lakhs
Annual fish production	1 tonne
Employment generated	30

Mr Ramen Kapat is a resident of Saora village of Paschim Medinipur district, West Bengal. He was a lower-middle-class agricultural farmer with an ancestral pond of more than one ha established in 1990. Initially, he was doing agriculture farming but due to fluctuating market rates and unpredictable weather, he could not gain any stable income. So he shifted to fish farming. He started fish culture without much knowledge which resulted in improper feeding, lack of aeration, and poor maintenance of water quality parameters. As he has no funds to continue the fish culture, he partnered with one of his friends, and in the year 2017, he again started the fish culture, mainly Indian Major Carps (IMC) and some exotic carps in his ancestral pond in a traditional way only.

In January 2021, he attended Training, Awareness, and Capacity Building Programmes to Scheduled Caste Fishermen/ Farmers/ Youth/ Women organized by Rural Eco-Development Centre- REDC (REDC-AOC), a 5-days program supported by MANAGE and NFDB. It was organized to train the Jungle Mahal area youth in West Bengal in advanced fish culture and climate resilient fishing techniques using optimum water level for sustainable growth and livelihood.

After that, he got motivated and planned to adopt semi-intensive farming of IMC along with freshwater prawns. He gained knowledge of various best aquaculture practices from the training, which helped him to produce good quality fish at affordable cost. Nowadays he is getting significant profit.

Mass Seedling Production of Elkhorn Sea Moss through Tissue Culture Technique

The seaweed *Kappaphycus alvarezii* (elkhorn sea moss) has high commercial value because of its excellent quality of gelling, emulsification and reducing and stabilizing effect, which are extensively used in the fields of food, pharmaceutical, biomedical, and cosmetic industries. The major value added product produced from this seaweed is carrageenan. It was introduced in India from Philippines in 1996-97 and the commercial cultivation of *K. alvarezii* is successfully done for the last two decades. There is huge demand for seed material for continuing the cultivation. The CSIR-Central Salt and Marine Chemicals Research Institute (CSIR-CSMCRI) came to fill this gap by developing tissue culture technique for mass seedling production and NFDB funded their project for "Mass seedling production of *Kappaphycus alvarezii* through tissue culture technique and supply of tissue culture seedlings to the farmers of Ramanathapuram District of Tamil Nadu".

Under the project, seedling production of *Kappaphycus alvarezii* through tissue culture technique was developed for the first time in India and a tissue culture lab was established at Mandapam centre of CSIR-CSMCRI. The SOP of the *Kappaphycus alvarezii* elite seedling production technique was prepared by the project team. The produced tissue culture seedlings were distributed to 230 sea weed 3 districts of Tamil Nadu (Ramanathapuram, Pudukottai and Tuticorin districts). The farmers produced 30 tonnes of *Kappaphycus alvarezii* in 2 cycles.

The tissue cultured seedlings were robust and were not grazed compared to conventional seaweed. They showed 20-30% higher growth rate. The carraganeen produced from tissue cultured plants exhibited higher yield and higher quality. The project is successfully completed in January, 2022. The seedling production technique developed would be highly useful for commercial scale production by the stakeholders.

Technological intervention	**CSIR- CSMCRI**
Financial intervention	**NFDB**
Activity	Seaweed seedling production and tissue culture lab
Total project cost	₹ 96.40 lakhs
State	Tamil Nadu

Matsya Setu : The Digital Eco-System for the Aquafarmers

Technological intervention	**ICAR-CIFA**
Financial intervention	**NFDB**
Activity	Matsya Setu digital platform
Year of launching	2021

Capacity building is one of the vital parts of the technology-led aquaculture development in India. However, during the Covid-19 pandemic period, our fish farmers could not attend physical training in the research institutes to update their knowledge and skills. To overcome this specific problem, with the funding support of NFDB, scientists from ICAR-CIFA developed the Matsya Setu digital platform. The app was launched by Shri Giriraj Singh, the Hon'ble Former Union Minister for Fisheries, Animal Husbandry and Dairying on 06.07.21.

Matsya Setu app has a bouquet of virtual learning courses, a market platform called Aqua Bazar, a chatbot named Meenu and the NFDB's Fish Market Price Information System (FMPIS) to help the farmers. The app has species-wise/ subject-wise self-learning online course modules in video form, where renowned aquaculture experts explain the basic concepts and practical demonstrations on breeding, seed production and grow-out culture of commercially important fishes, Better Management Practices (BMP) to be followed in maintaining the soil and water quality, feed and health management in aquaculture etc. The quiz/ test options are provided for self-assessment. Upon successful completion of each module, an e-certificate can be auto-generated. Farmers can ask their questions through the app and get specific advisories from experts. The video modules are now available in English and Hindi. The regional language versions are under preparation.

Through "Aqua Bazar", another powerful feature in the app, any registered vendor can list their items under "fish seed, input material, services, jobs and table fish" categories. The feature allows the fish farmers indicate the date of availability of the produce and the price offer. The listed items will be displayed in the market place as per geographical proximity of the app user. The needy stakeholders may contact the vendors and fulfil their procurements. The app also has artificial intelligence powered chatbot named "Meenu". The chatbot answers the queries of the users using the predefined information flow, learns from the user chat sessions and improves its answers in future. Another feature of Matsya Setu app, "FMPIS" has the wholesale and retail price of majority of the marine and freshwater fishes across the markets on a pre-determined time that can be updated by farmers and stakeholders themselves. The app will certainly help the farmers/ fish venders to receive more business enquiry from buyers/ buyer agents who procure fish, paving the way for increased awareness about the market situation and better price realization of farmers' produce.

Mariculture Revolution by Sea Cage Culture

The National Fisheries Development Board (NFDB), Hyderabad proposed to implement "Mariculture: Open water cage" farming all along the territorial waters of coastal states as an alternate livelihood program for the coastal fishers to enhance their economic wellbeing. The envisaged objective was to demonstrate the sea cage farming technology in 100 numbers of HDPE cages (6 m diameter) through participatory mode. The total budget outlay of the project to set up 100 cages was ₹ 515 lakhs. The project was implemented with the help of ICAR-CMFRI to demonstrate sea cage farming.

The beneficiaries under this demonstration program received HDPE cages, which will have a minimum lifecycle of 10 years, resulting in low maintenance cost. A total of 60 cages (6 x 4 x 4 m^3) along with the advanced fingerlings of cobia, Asian sea bass and spiny lobsters were supplied to the beneficiaries. The demonstration of sea cage farming was completed in two phases in the period of three years.

The total harvest quantity in the span of 2 years was 124.31 tonnes. About ₹ 400.73 lakhs were realized from the sale of these farmed fish. These capacity building programs on sea cage farming improved livelihoods of about 520 fishers (i.e. 60 households directly and 200 households indirectly) in Palk Bay and Gulf of Mannar region.

Technological intervention	**ICAR-CMFRI**
Financial intervention	**NFDB**
States	Kerala, Tamil Nadu
Fisheries activity	Sea cage culture
Species	Asian sea bass, and cobia
Period	2018-21

NFDB Joins Hands with ICAR-CMFRI for the Establishment of Marine Finfish Brood banks



Technological intervention	**ICAR-CMFRI**
Financial intervention	**NFDB**
States	Kerala, Tamil Nadu
Fisheries activity	Brood bank establishment
Species	Silver pompano and cobia
Period	2017-21

National Fisheries Development Board (NFDB) has been supporting several Technology Upgradation projects financially to infuse the science and technology which is a lacking factor in fisheries sector to provide qualitative and quantitative marine fish seed to the farming community. One such initiative is the establishment of marine brood banks. NFDB has joined hands with ICAR-CMFRI to extend financial assistance for the establishment of brood banks to enhance the production of silver pompano and cobia. Projects were proposed at the Regional Centre of ICAR-CMFRI, Vizhinjam, Kerala and at the Regional Centre of ICAR-CMFRI, Mandapam, Tamil Nadu with the project cost of ₹ 5.64 crores and ₹ 3.24 crores respectively.

The Recirculatory Aquaculture Systems (RAS) were established for holding brooders at both the Regional Centre of ICAR-CMFRI, Vizhinjam and the Regional Centre of ICAR-CMFRI, Mandapam. Currently, the Regional Centre of ICAR-CMFRI, Vizhinjam has 100 pairs of silver pompano (*Trachinotus blochii*) brood stock and 40 pairs of Indian pompano (*Trachinotus mookalee*) brood stock in RAS. The center has achieved the production capacity of 50 million yolk-sac larvae per year with the seed production capacity of 0.7 to 1 million per year. More than 80 million yolk-sac larvae have been produced here, used for seed production and distributed to farmers, hatcheries and research institutions. In addition, the daily egg production is more than 1 million. ICAR-CMFRI has entered an MoU with four hatchery units for egg/ yolk-sac and advanced larval supply. The seed were supplied to 6 maritime States and the Union Territory of Lakshadweep. Till date, this center has imparted training to more than 500 beneficiaries including officials of various departments and organizations. The facility at the Regional Centre of ICAR-CMFRI, Mandapam has produced about 30.86 million yolk-sac larvae and 1 million advanced fingerlings of cobia and silver pompano. These were supplied across the country for farming in cages and ponds.

Fish Sperm Cryopreservation Technique to Prevent Inbreeding

In Indian carp aquaculture, the loss due to fish inbreeding is large and is thought to be bigger than that of illnesses. Inbreeding is hurting the seed quality because the genetic control of brooders is rarely practiced due to the lack of knowledge and resources. This is due to the persistent use of the same stock for seed production over many generations, which results in homozygosity and lower genetic fitness. High-quality seed is a basic requirement for any culture method. Thus, it is critical to implement proper brood husbandry techniques and replenish the broodstock at regular intervals to preserve the quality of fish seed. However, replenishing brooders is a difficult process since it requires transporting the animals from a long distance, which may result in substantial mortalities and greater expenditures. Another option would be to employ cryopreserved sperm from unrelated healthy stock to create a cryobank and promote exchanges across the hatcheries for quality seed production. To realize this and to make a noticeable effect, ICAR-NBFGR collaborated with NFDB to develop fish milt cryopreservation technology to develop a practical method for field validation of sperm cryopreservation.

Through training and demonstration by ICAR-NBFGR, 370 hatchery professionals and farmers from 20 states in India were made aware of this technology. The frozen sperms of Indian main carps were delivered to 38 chosen state government hatcheries, commercial hatcheries, and entrepreneurs in 11 Indian states, and the outbreeding were proven. During these demonstrations, around 1.26 crores of spawn were produced. The hatcheries are rearing the seed individually in order to create broodstock for future generations. These outbred seed outperforms the hatcheries' inbred seed, with farmers reporting 20-30% extra growth. The field validation of fish sperm cryopreservation was completed with the assistance of 38 partner hatcheries from 11 Indian states. These hatcheries now use to application for broodstock development and excellent quality seed production. Many of them have created brooders and will soon begin generating high-quality seed for farmers. This field-validated approach is now accessible for adoption by the state fisheries agencies, groups of hatcheries, or an individual hatchery, depending on the situation.

ICAR-NBFGR developed a farmer-friendly kit in this regard so that even a farmer with little technical understanding can utilize this strategy to their advantage. Farmers will profit from these genetically diverse brooders, which will be employed for superior seed production. Early and late breeding are also other possibilities with cryo-milt. Cryo-banks will eventually become a mechanism of dissemination for wild-type and enhanced varieties.

Technological intervention	**ICAR-NBFGR**
Financial Intervention	**NFDB**
Fisheries activity	Cryopreservation of fish milt
Species	IMC

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