101 Inspiring Startups

in Fisheries

National Institute of Agricultural Extension Management (MANAGE)
(An Organisation of Ministry of Agriculture & Farmers Welfare, Govt. of India)
Rajendranagar, Hyderabad – 500 030, T.G., INDIA
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The case studies and information presented in this publication have been compiled from a range of credible and publicly accessible sources, including official websites, startup portals, and verified social media platforms of the featured enterprises. Significant references have also been drawn from leading research and development institutions such as the ICAR institutes, along with other relevant fisheries institutes and organizations.

These sources have provided valuable insights into the innovations, business models, and field-level impacts of fisheries startups across the country. The compilation of this document has benefited from the diverse information available through digital platforms and institutional resources, which collectively reflect the dynamic and evolving nature of the fisheries startup ecosystem in India.

Dr. Abhilaksh Likhi, IAS
Secretary
डॉ. अभिलक्ष लिखी, भा.प्र.से.
सचिव

सत्यमेव जयते

भारत सरकार
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय
मत्स्यपालन विभाग
कृषि भवन, नई दिल्ली–110001
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Ministry of Fisheries,
Animal Husbandry & Dairying
Department of Fisheries
Krishi Bhawan, New Delhi-110001

Foreword

India's fisheries and aquaculture sector has evolved from a traditional livelihood activity into a key contributor to food and nutritional security, employment generation, and economic growth. As the sector advances, it is increasingly embracing technology, sustainability, and innovation, paving the way for a new era of Blue Revolution 2.0.

A key driver of this transformation is the emergence of a vibrant startup ecosystem. Through innovative business models and cutting-edge technologies, fisheries startups are addressing critical challenges across the value chain, enhancing productivity, improving market access, and promoting sustainable growth.

The compendium, *'101 Inspiring Startups in Fisheries,'* captures this dynamic transformation by showcasing entrepreneurial success stories from across the country. These experiences demonstrate how innovation and enterprise are unlocking new opportunities and strengthening India's Blue Economy.

This publication offers valuable insights for policymakers, researchers, entrepreneurs, and other stakeholders committed to the sustainable development of the fisheries sector. I appreciate the efforts of the authors in bringing out this important compilation and am confident it will inspire many more innovators and entrepreneurs in the years ahead.

(Dr. Abhilaksh Likhi)

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सागर मेहरा
SAGAR MEHRA

सत्यमेव जयते

संयुक्त सचिव
मत्स्यपालन विभाग
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय
भारत सरकार
कृषि भवन, नई दिल्ली–110001
Joint Secretary
Department of Fisheries
Ministry of Fisheries,
Animal Husbandry & Dairying
Government of India
Krishi Bhawan, New Delhi-110001

Message

India's fisheries sector is rapidly transforming into a vibrant and technology-driven domain, contributing significantly to rural livelihoods, employment generation, and economic development. With flagship initiatives such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and the Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PMMKSSY), the sector is witnessing accelerated growth through innovation, entrepreneurship, and strengthened institutional support.

In this evolving landscape, fisheries startups are emerging as key catalysts of change. By leveraging advanced technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), biotechnology, and digital platforms, these enterprises are enhancing productivity, ensuring traceability, and building efficient and resilient value chains. Their contributions are strengthening linkages from production systems to markets, thereby improving overall sectoral efficiency.

The compendium on "101 Inspiring Startups in Fisheries" is a commendable effort that showcases the journeys, innovations, and impact of such enterprises across diverse domains, including precision aquaculture, seaweed-based ventures, supply chain innovations, and value addition. These stories demonstrate how innovation and entrepreneurship can transform the fisheries sector into a sustainable and profitable enterprise.

This publication will serve as a valuable source of inspiration and guidance for aspiring entrepreneurs, students, and stakeholders. I congratulate the authors for their meaningful contribution and hope this work encourages further innovation in the fisheries startup ecosystem.

(Sagar Mehra)

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Preface

Dr. Saravanan Raj
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Rajendranagar, Hyderabad – 500030
Telangana, India

The fisheries sector in India is undergoing a remarkable transformation, driven by innovation, entrepreneurship, and the increasing participation of startups. Across the country, emerging enterprises are redefining traditional practices by integrating technology, sustainability, and market-oriented approaches.

As an institution committed to promoting agri-entrepreneurship and capacity building, MANAGE recognizes the importance of documenting and disseminating these startup success stories. These real-world experiences not only inspire but also provide practical insights into building scalable, sustainable, and technology-driven enterprises in the fisheries sector.

The book "101 Inspiring Startups in Fisheries" brings together diverse innovations and entrepreneurial journeys from across India. It highlights how startups are addressing sectoral challenges while creating new opportunities for growth, employment, and value addition.

This publication is expected to serve as a valuable resource for aspiring entrepreneurs, students, researchers, and stakeholders interested in understanding and engaging with the fisheries startup ecosystem.

(Saravanan Raj)

Contents

Seaweed related Startups

The Indian seaweed startup ecosystem is currently defined by a diverse range of enterprises that leverage marine macroalgae to drive the national Blue Economy and address global environmental challenges. These ten key organizations Aquaagri Processing, Sea6 Energy, Zerocircle, ClimaCrew, Oceanic Seaweeds, Seaweedz Energy, Zaara Biotech, Zcorp Organic Private Limited ,Marine Hydrocolloids (Meron), and Raftech Solutions Private Limited demonstrate the immense scope of the sector, ranging from high-tech mechanized ocean cultivation to the development of sophisticated biorefineries. Their collective activities include the production of carbon-neutral biofuels, organic agricultural biostimulants, home-compostable packaging, and nutrient-dense functional foods. By integrating advanced technologies such as satellite-based spatial intelligence with community-led contract farming models, these startups are creating sustainable value chains that empower coastal communities while promoting industrial circularity and marine ecosystem restoration.

Seaweed Related Startups

The seaweed sector is shifting from artisanal harvesting to industrial biorefining. Key innovations focus on high-value derivatives such as biostimulants, hydrocolloids, and carbon-neutral packaging to solve global agricultural and environmental crises.

Table 1: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
Aquaagri Processing	Seaweed Biorefining	Patented CSMCRI bio-refinery for 99% pure seaweed extracts	Sagarika biostimulants, Carrageenan, Animal feed	Vertical integration with 100% buy-back guarantee via SHG clusters
Sea6 Energy	Zero-Waste Biorefinery	SeaCombine mechanized harvester and Hydrothermal Liquefaction (HTL)	Green Biocrude (Biofuels), AGROGAIN, Bioplastics	CAPEX-intensive industrial offshore scaling; B2B energy & agri-supply
Zerocircle	Sustainable Packaging	Proprietary seaweed biorefining for marine-safe polymers	Home-compostable packaging films and resin pellets	B2B material science provider for global FMCG brands
Climacrew	Restorative Aquaculture	Marine Spatial Intelligence (GIS) for habitat mapping	ClimaZyme biostimulants, ClimaFeed, ClimaColloid	Full-stack platform-as-a-service with end-to-end traceability
Oceanic Seaweeds	Industrial Cultivation	Scaled fixed-off-bottom and floating long-line farming	Carrageenan, Alginates, Agar, Biofertilizers	B2B industrial raw material supplier for hydrocolloid manufacturing
Seaweedz Energy	Sustainable production and processing systems for tropical seaweeds	Innovative technologies enabling large-scale, mechanized, and eco-friendly farming of sea-plants.	Seaweed products and Blue Carbon solutions.	A circular economy model focusing on innovation and sustainability to address global challenges like climate change and food security.
Zaara Biotech	Micro-algae Innovation	Algal-seaweed functional food processing	B-Lite Spirulina cookies, Obelia photobioreactors	FMCG-led growth with bio-architectural industrial service vertical
Zcorp Organic	Bio-FMCG	Proprietary processing to eliminate seaweed odor while retaining nutrients	Smile & Take seaweed-infused snacks, Seaweed Manure	D2C brand-building with B2B white-labeling and R&D services
Marine Hydrocolloids	Hydrocolloid Extraction	Bacteriological & Pharma grade Agar-Agar and Wondergel	Meron stabilizers, Agarose, Spreadable Agar	Global B2B ingredient supplier for pharma and food science
Raftech Solutions	Blue Biotechnology	Deep-processing for precision agriculture	Liquid biostimulants, solid granules, raw biomass	Satellite farming model with coastal SHG-led micro-entrepreneurship

Table 2: Sector Feature Matrix

Startup Name	Bio-refining	Agricultural Biostimulants	Biofuels/Bioplastic	Community Contract Farming
Aquaagri Processing	√	√		√
Sea6 Energy	√	√	√	
Zerocircle	√		√	
Climacrew	√	√		√
Oceanic Seaweeds		√		
Seaweedz Energy			√	
Zaara Biotech	√		√	
Zcorp Organic	√			
Marine Hydrocolloids	√			
Raftech Solutions	√	√		√

Aquaagri Processing Private Limited 1

Founder	Abhiram Seth
Established year	2007
Location	New Delhi (Cooperate office), Tamil Nadu (Processing Plants)

Company Overview

It is a pioneering social enterprise and biotechnology company focused on the commercial cultivation and processing of seaweed (*Kappaphycus alverezii*). Since 2017, it has been a Joint Venture with IFFCO, which holds a 50% stake in the company. This startup utilizes patented technology licensed from the CSIR-Central Salt and Marine Chemical Research Institute (CSMCRI) to produce organic, seaweed-based products. It works at the nexus of sustainable agriculture and the Blue Economy, seeking to build a strong value chain that offers eco-friendly solutions for the food and agri-input industries and alternative livelihoods to coastal communities. In contrast to conventional chemical-intensive businesses, Aquaagri extracts valuable nutrients and hydrocolloids from seaweed using a bio-refinery method.

Core offerings and business model

1. Sustainable ocean farming

Aquagri operates through a community-based contract farming model that provides an alternative livelihood for coastal communities, particularly women's Self-Help Groups (SHGs).

The innovation:

They use a Bamboo Raft or Long Line cultivation method in the sea. This requires zero freshwater, zero fertilizer and zero land.

Impact: The company provides the seeds and technology and offers a 100% buy-back guarantee, ensuring financial security for over 1,500 coastal families.

2. Seaweed-Based Biostimulants (Sagarika)

The innovation: Aquagri utilizes patented Bio-refinery technology to process fresh seaweed (*Kappaphycus alverezii*) into diverse organic inputs, including concentrated liquid extracts, powders, gels, and flakes. These products improve crop metabolic efficiency and stress tolerance,

Impact and model: These biostimulants reduce dependency on chemical fertilizers by 25%. Through the IFFCO partnership, the Sagarika brand is distributed at scale to millions of farmers across India.

3. Carrageenan and Industrial Derivatives

Innovation: At its Tamil Nadu plant, Aquagri extracts Carrageenan from the solid biomass remaining after sap extraction. This natural hydrocolloid is a critical stabilizer used in the global food, pharmaceutical, and cosmetic industries.

Business Model: Operates as a B2B supplier, offering a domestic alternative to expensive imported seaweed derivatives for Fast-Moving Consumer Goods (FMCG) manufacturers.

4. Animal Feed Supplements

Innovation: It manufactures natural seaweed-based supplements rich in bio-available minerals, vitamins, and amino acids. These are designated to optimize the gut health, immunity, and productivity of poultry, dairy, and fish.

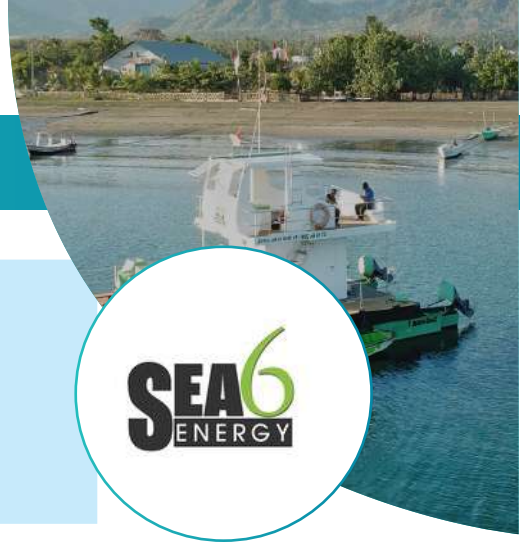
Business Model: B2B sales to large-scale livestock integrators and feed manufacturers.

Challenges & Opportunities:

Challenges: The company faces increasing crop vulnerability due to rising sea temperatures (Ice-Ice disease) and logistical hurdles in processing highly perishable wet biomass across remote coastal locations with limited infrastructure.

Opportunities: Aquaagri is positioned to lead the Blue Carbon credit market in India and expand its portfolio into high-value methane-reducing cattle feed and premium, import-substitute carrageenan for the global FMCG sector.

2 Sea6 Energy Private Limited



Founder	Shrikumar Suryanarayan, Nelson Vadassery, Sowmya Balendiran, and Sri Sailaja Nori
Established year	2010
Location	Bangalore (Headquarters); Tuticorin, Tamil Nadu (Refining plant); Bali, Indonesia (Seaweed Processing and farming)

Company Overview

Sea6 Energy is a pioneering biotechnology company that operates as a Zero-Waste Ocean Biorefinery. The mission is to harness the ocean to provide sustainable alternatives to fossil-fuel based products. They have developed a scalable, mechanized ecosystem for cultivating and processing tropical red seaweed, moving beyond traditional labour-intensive manual methods to a high-tech, industrial approach.

Core offerings and business model

1. Mechanized Ocean Farming (The SeaCombine)

The company developed the SeaCombine, a proprietary, automated harvesting and seeding catamaran. By automating the process of sowing nets and gathering seaweed, this tractor of the sea enables to expand into deeper, more profitable offshore areas. Automation significantly reduces biomass production costs and increases scalability, enabling the massive biomass generation require for large-volume applications like biofuels.

2. Advanced Agricultural Biostimulants (AGROGAIN)

Using a patented bio-refining process, it extracts bioactive compounds to create AGROGAIN, a high-performance biostimulant. Unlike simple extracts, AGROGAIN is scientifically engineered to improve nutrient uptake, root proliferation, and crop stress tolerance.

3. Proprietary Preservation Technology

Fresh seaweed typically spoils within 48 hours. It developed a patented preservation process that extends the shelf life of fresh biomass to 60 days without losing nutrient quality. This technology is the backbone of their global supply chain, allowing them to farm in ideal tropical environments and transport fresh material to high-tech processing units in India.

4. Renewable Bio-crude and Bioplastics

The company utilizes Hydrothermal Liquefaction (HTL) to convert seaweed into Green Biocrude, a carbon-neutral replacement for fossil fuel in aviation and maritime sectors. They also produce seaweed-based bioplastics (films, coatings, and straws) that are 100% compostable and marine safe.

5. Seaweed Based feed supplements

It manufactures seaweed-based feed supplements for Poultry, dairy, and shrimp to improve gut health and immunity. These supplements can reduce methane emissions in livestock by over 30%, contributing to climate-positive livestock farming.

Challenges & Opportunities:

Challenges: High capital expenditure for deep-sea mechanization and the SeaCombine fleet, alongside the technical difficulty of maintaining automated hardware in corrosive, high-energy offshore environments.

Opportunities: Massive potential in the Aviation and Maritime Biofuel sectors using carbon-neutral biocrude, and the global leadership in Sustainable Bioplastics as nations ban single-use petroleum-based plastics.

Zerocircle 3

Founder	Neha Jain
Established year	2020
Location	Gurugram, Haryana (Head quarters), Operations (Mumbai)

Company Overview

It is a deep-tech biotechnology startup that creates bio-based, carbon-neutral, and home-compostable packaging materials using seaweed as the primary feedstock. The company aims to solve the global plastic crisis by pioneering a circular economy model where packaging is made from a regenerative ocean resource that requires no land, freshwater or fertilizers to grow.

Core offerings and business model

1. Regenerative seaweed biorefining

The innovation: Zerocircle uses a proprietary biorefining process to extract and engineer natural compounds from various seaweed species into pellets and films.

Sustainability Impact: Seaweed acts as a massive carbon sink, absorbing CO2 from the ocean during its growth. By using this ocean-positive resource, the company ensures that its raw material is inherently low-impact and regenerative.

2. 100% Home-Compostable Packaging Films

The Innovation: They have developed flexible packaging films that look and feel like plastic but are made entirely from seaweed. These films are home-compostable, meaning they break down into organic matter in a typical garden compost bin within weeks, leaving behind zero microplastics.

Business Model: Zerocircle operates as a B2B material science provider, supplying these films to FMCG companies and global brands looking to eliminate hard-to-recycle flexible plastic packaging from their supply chains.

3. Bio-Based Pellets for Industry

Beyond films, the company produces seaweed-based resin pellets that can be used with existing plastic manufacturing machinery (like blown film lines) with minimal adjustments.

Challenges & Opportunities:

Challenges: Achieving cost parity remains a hurdle, with seaweed materials currently at a premium compared to fossil-based plastics, alongside the technical difficulty of matching the moisture-barrier performance of traditional synthetic coatings.

Opportunities: Zerocircle is uniquely positioned to lead the global shift toward PFAS-free and forever chemical-free packaging, while also expanding into tree-free paper products derived from seaweed like Sargassum.

4 Climacrew Private Limited

Founder	Ms. Devleena Bhattacharjee: Founder & Director, ClimaCrew Pvt Ltd (and Founder of Numer8 Analytics), Dr. Susanta Kundu: Director (COO, Excel Innovation Center) & Mr. Rahul Mehta: Director (Founder, Mentorcap Pvt Ltd).
Established year	2022
Location	Corporate Head Office: Parel, Mumbai, Maharashtra, Registered Office: Navrangpura, Ahmedabad, Gujarat.

Company Overview

ClimaCrew is a deep-tech marine biotechnology startup that operates as a full-stack seaweed technology platform. The company's mission is to scale seaweed production in India by integrating data science, satellite intelligence, and social science. They focus on Restorative Aquaculture, utilizing seaweed to sequester carbon and restore marine ecosystems while creating sustainable, climate-resilient livelihoods for coastal fishing communities.

Core offerings and business model

1. Marine Spatial Intelligence (GIS Platform)

The Technology: ClimaCrew utilizes a proprietary GIS-based intelligence module that analyzes multi-source satellite data (ocean temperature, tides, and weather) for habitat mapping and site suitability analysis. This technology allows for the identification of optimal sites for seaweed cultivation across the Indian subcontinent, ensuring high-yield growth and environmental sustainability.

2. Full-Stack Seaweed Platform

Business Model: The company manages the entire seaweed value chain, from automated cultivation and processing to connecting suppliers with global buyers through a digital marketplace.

Traceability: Their platform provides complete visibility and a quality guarantee for seaweed products, tracking them from the sea to the doorstep.

3. B2B Product Verticals

Agri-Inputs (ClimaZyme): They produce specialized liquid seaweed extracts and granules (e.g., ClimaZyme S+ and K+) that act as high-performance biostimulants, improving crop yields and reducing dependency on synthetic fertilizers.

Animal Health (ClimaFeed): Seaweed-based feed supplements designed to improve growth, immunity, and productivity in livestock and aquaculture. Their cattle supplements are specifically noted for reducing methane emissions.

Hydrocolloids (ClimaColloid): They manufacture refined seaweed-derived products like Carrageenan powder for use in the food, pharmaceutical, and textile industries.

Challenges & Opportunities:

Challenges: Navigating the seasonal risks of monsoons and Red-Tide events (harmful algal blooms), while overcoming the fragmented regulatory landscape that governs the leasing of coastal waters for aquaculture.

Opportunities: ClimaCrew is poised to transition its platform into a SaaS (Software as a Service) model for global fisheries and lead the emerging Blue Carbon Credit market by quantifying ocean-based carbon sequestration.

Oceanic Seaweeds Private Limited 5

Founder	Hemantkumar Vithaldas Joshi, Falguni Nilesh Joshi and Ishan Nileshkumar Joshi
Established year	2017
Location	Rajkot, Gujarat

Company Overview

Oceanic Seaweeds is an active agri-tech startup operating within the framework of India's national Seaweed Mission and the PMMSY scheme to commercialize marine cultivation. The company focuses on the primary production and processing of commercially vital seaweed species (such as *Kappaphycus alvarezii*) along the Gujarat coast to produce industrial-grade hydrocolloids and organic bio-fertilizers for B2B industrial supply chains.

Core offerings and business model

1. Industrial Seaweed Cultivation

The Innovation: The company utilizes advanced cultivation techniques, including the fixed-off-bottom method and floating long-lines, to farm commercially vital species such as *Kappaphycus alvarezii* and *Sargassum spp.*.

Impact: By scaling local production, they address the high cost of raw material imports and ensure a consistent supply of biomass for the Indian hydrocolloid industry.

2. Value-Added Seaweed Processing (Hydrocolloids)

The Innovation: Oceanic Seaweeds processes raw biomass into high-demand industrial extracts, specifically Carrageenan (from red seaweed) and Alginates/Agar.

Market: These products serve as essential stabilizers, thickeners, and gelling agents in the food, pharmaceutical, and cosmetic sectors.

3. Agricultural Biofertilizers & Supplements

They produce specialized seaweed-based biofertilizers and biostimulants designed to enhance nutrient uptake and crop resilience. The company also supplies allied agricultural products, including vitamins and plant nutrient supplements, to provide a comprehensive suite of inputs for horticulture and market gardening.

4. B2B Producer and Supplier Model

Business Model: Operating primarily as a B2B provider, the company supplies intermediate seaweed products to larger industrial manufacturers.

Location Advantage: Being based in Gujarat provides proximity to the proposed Mega Seaweed Processing Park, facilitating optimized logistics and industrial scaling

Challenges & Opportunities:

Challenges: Cultivation is highly susceptible to seasonal monsoons and turbulent sea conditions in the Arabian Sea, while a lack of mechanized harvesting technology in the region often limits large-scale commercial output.

Opportunities: There is a significant opening to lead in the import substitution of hydrocolloids for India's food processing industry and to benefit from the Gujarat Government's subsidies aimed at establishing integrated seaweed clusters.

6 Seaweedz Energy

Founder	Hari Ramaraju Bommidi (CEO), Dhana Kumari Malladi, Sampath Kumar Ganta, and Shiva Ponnaganti.
Established year	2023
Location	Hyderabad, Telangana.

Company Overview

Seaweedz Energy Private Limited is a Startup India-recognized marine agri-tech and climate-tech startup that is pioneering sustainable production and processing systems for tropical seaweeds, primarily through Integrated Multi-Trophic Aquaculture (IMTA). They are dedicated to harnessing the power of the ocean by combining shrimp and seaweed farming in a symbiotic relationship where seaweed acts as a natural biofilter to improve water quality and recycle nutrients. The company's mission involves creating blue carbon solutions to mitigate climate change while converting seaweed biomass into diverse value-added products such as roasted seaweed snacks, sushi ingredients, biofuels, and sustainable animal feed.

Core offerings

1. Integrated Multi-Trophic Aquaculture (IMTA)

A closed-loop farming system where seaweed and shrimp coexist, allowing seaweed to absorb waste nutrients, which reduces environmental pollution and enhances ecosystem health.

2. Blue Carbon Solutions

Efforts focused on managing seaweed detritus and maximizing biomass growth to contribute to carbon sequestration and ocean restoration.

3. Premium Seaweed Food Products

Production of high-quality consumer goods including roasted seaweed sheets, seaweed snacks, and ingredients for sushi.

4. Sustainable Bio-products

Research and development into transforming seaweed biomass into industrial-scale solutions like biofuels, bioplastics, and nutrient-rich animal feed.

5. Technology Transfer:

Engagement with institutions like the ICAR-Central Institute of Fisheries Technology (CIFT) for technology transfer and professional services in the fisheries sector.

Challenges & Opportunities:

Challenges: Navigating the technical complexity of maintaining biological balance in shrimp-seaweed co-culture systems and overcoming the consumer perception gap in India regarding seaweed as a mainstream food ingredient.

Opportunities: Scaling up through the Seaweed Park initiatives under the PMMSY scheme and tapping into the surging global demand for clean-label, vegan snack alternatives and biodegradable packaging pellets.

Zaara Biotech Private Limited 7

Founder	Najeeb Bin Haneef
Established year	2016 (Founded as a student startup); Incorporated in 2019
Location	Kochi and Thrissur, Kerala, India

Company Overview

Zaara Biotech is a deep-tech biotechnology startup that specializes in micro-algae and seaweed-based innovations to solve global food, energy, and environmental crises. Originally founded as a college project at Sahrdaya College of Engineering and Technology, the company has evolved into a multi-domain ecosystem that uses proprietary algal-seaweed technology to manufacture high-nutrition FMCG products, such as their flagship B-Lite Spirulina cookies, while also developing smart bio-architectural systems that use microalgae for indoor air purification and industrial carbon capture.

Core offerings

1. B-Lite Functional Foods

The Innovation: India's first algal-seaweed food line developed in collaboration with ICAR-CIFT.

Products: Their flagship B-Lite cookies and mousse use Spirulina and seaweed extracts to provide a complete meal-replacement profile rich in vegan proteins, fiber, and micronutrients.

2. Obelia Bio-architecture

The Innovation: A smart photobioreactor system integrated into urban infrastructure.

Impact: These units use microalgae to capture CO_2 and release oxygen through photosynthesis, effectively acting as liquid trees for offices and cities while providing real-time air quality data via IoT.

3. Zaara Product School

The Model: An integrated education platform that bridges the gap between biotechnology research and entrepreneurship.

Impact: It provides industrial mentorship and R&D exposure to students, helping them develop and commercialize their own bio-based consumer brands in the food and cosmetics sectors.

4. Industrial Bio-Services

Diversification: The company designs and supplies customized photobioreactors (PBRs) and provides R&D consulting for other startups in the fields of cosmetics, bio-fertilizers, and sustainable aviation fuel.

Global Expansion: Through subsidiaries like Zaara Biotech International (UAE) and Zaara Biotech USA, the company is scaling its manufacturing facilities to meet international demand for sustainable marine biotech.

Challenges & Opportunities:

Challenges: Scaling the production of short-shelf-life bio-cosmetics remains a logistical hurdle, alongside the high capital investment required to deploy large-scale urban installations in cost-sensitive markets.

Opportunities: The company has massive potential for global expansion through its UAE and USA subsidiaries, tapping into the global Spirulina market.

8 Zcorp Organic Private Limited

Founder	Sundar Raj R.
Established year	2018
Location	Headquartered in Thrissur, Kerala, with processing facilities in Kochi.

Company Overview

Zcorp Organic is a pioneering Indian Bio-FMCG startup dedicated to transforming marine bio-resources into functional consumer goods. By focusing on the nutritional potential of underutilized seaweeds, the company aims to combat modern lifestyle diseases and malnutrition. Zcorp stands out for its deep institutional roots, having been nurtured by the Kerala Startup Mission (KSUM) and the ICAR-Central Institute of Fisheries Technology (ICAR-CIFT). Their flagship brand, Smile & Take, delivers a scientifically validated range of seaweed-infused snacks, proving that healthy and tasty can coexist through biotechnology.

Sector/Domain: Biotechnology, FMCG (Food & Beverages), and Nutraceuticals.

Core Innovation: Seaweed Bio-Integration

The company's primary innovation lies in its proprietary processing techniques that eliminate the characteristic fishy odor of seaweed while retaining its rich profile of antioxidants, vitamins, and minerals.

Nutri-Snacking Technology: Developed in partnership with ICAR-CIFT, this technology allows seaweed to be blended into bakery products at precise ratios, providing a balanced protein and fiber diet for all age groups.

Vertical Integration: Zcorp manages a complete value chain, from exclusive partnerships in seaweed and moringa farming to advanced white-label R&D services for other global brands.

Bio-Architecture: A radical extension of their work into Blue Technology, developing algae-based photobioreactors for indoor air purification. These systems capture CO2 and pollutants, releasing oxygen while generating biomass for fertilizers.

Core Offerings and Business Model:

1. Smile & Take Functional Foods

Products: Organic Seaweed Cookies in Almond Butter and Natural Dark Chocolate variants. These are 100%vegetarian, trans-fat-free, and cholesterol-free snacks.

Other FMCG: Seaweed-based energy bars, herbal tea bags (Detox/Immunity), and baked seaweed chips.

2. Agri-Inputs & Industrial Supply

Products: 99% pure Seaweed Extract Powder and Seaweed Granular Manure for organic farming.

Bulk Supply: Sourcing dried seaweed (*Gracilaria*, *Sargassum*) and sodium alginate for pharmaceutical and cosmetic grades.

Revenue Model:

B2C/D2C Retail: Sales through major e-commerce platforms like BigBasket and IndiaMART.

B2B White-Labeling: Partnering with international brands to formulate and manufacture seaweed-based nutraceuticals and personal care products.

Challenges & Opportunities:

Challenges: Shifting Indian consumer perception to accept seaweed as a mainstream food ingredient; and maintaining organic-grade consistency in a raw material supply chain.

Opportunities: Scaling their carbon capture systems for corporate offices to tap into the ESG (Environmental, Social, and Governance) market; and expanding the export of Smile & Take to the GCC (Gulf Cooperation Council) region.

Marine Hydrocolloids (Meron) 9

Founder	Mr. Kurian Jose Sr. (Managing Partner)
Established year	1982
Location	Headquartered in Kochi, Kerala, India

Company Overview

Marine Hydrocolloids is a global pioneer and India's leading manufacturer and exporter of high-grade seaweed extracts and hydrocolloids. Operating under the renowned brand name Meron, the company has spent over four decades perfecting the extraction of Agar Agar and other stabilizers from marine sources. What began as a local manufacturing unit for food-grade China Grass has evolved into a sophisticated biotech enterprise serving over 50 countries. Meron is a key supplier to multinational corporations in the food, pharmaceutical, and plant tissue culture sectors, recognized for its unwavering commitment to quality and research-driven innovation.

Sector/Domain: Food Science, Biotechnology, Pharmaceutical Ingredients, and Specialty Chemicals.

Core Innovation & Quality Assurance

Meron's strength lies in its Legacy of R&D and specialized processing capabilities that meet international pharmacopeia standards:

1. Microbiological & Pharma Excellence: One of the few global players to master the production of Bacteriological and Pharmaceutical grade Agar Agar, essential for laboratory culture media and drug formulations.

2. Wondergel (Spreadable Agar): A proprietary innovation that provides a soft, spreadable texture to Agar Agar, making it a versatile vegan alternative to gelatin in dairy and confectionery products.

Core Product Portfolio:

Meron offers an extensive range of hydrocolloids and stabilizers categorized by industry application:

1. Agar Agar & Derivatives:

Grades: Food Grade (Strip, Powder, Flakes), Bacteriological, Pharmaceutical, and Plant Tissue Culture.

Agarose & Sealife: Specialized biopolymers used in electrophoresis and molecular biology research.

2. Specialized Stabilizers (Value-Added):

Crèmedelite: Texture enhancers and stabilizers specifically for ice creams.

Glazemate: Cold glaze stabilizers for bakery and confectionery toppings.

Drink Stabilizers: Custom blends for flavored milk, milkshakes, and suspension drinks.

3. Marine Colloids:

Carrageenan: Semi-refined and Refined for meat processing and dairy consistency.

Sodium Alginate: High-purity grades for food and industrial applications.

Comprehensive Gum Range: Xanthan Gum, Gellan Gum, Locust Bean Gum, Guar Gum, Pectin, CMC, and Konjac.

Business Model & Global Reach:

- B2B Global Supply: Meron operates as a primary raw material supplier (Ingredients) for MNCs and commercial laboratories across South America, Europe, CIS/Russia, the Middle East, and the USA.
- E-commerce & Retail: The company has successfully expanded into the digital space, making premium culinary ingredients accessible to retail consumers and small businesses.
- Technical Consultancy: Providing tailored formulations for plant-based meat alternatives and dairy-free solutions to meet the evolving global demand for vegan products.

Awards and Recognitions:

Marine Hydrocolloids has been consistently recognized for its excellence in exports and innovation:

i. FI India Award: For Innovation in Food Ingredients.

ii. Export Excellence Awards: Multiple recognitions from CAPEXIL and SEAI (Seafood Exporters Association of India) for being a leading merchant exporter.

iii. MSME National Award: Awarded for outstanding performance in the manufacturing sector.

iv. CII Award: For Food Safety and quality standards.

Challenges & Opportunities:

Challenges: Navigating the fluctuating costs and availability of raw seaweed due to climate-related ocean changes, and the high technical barrier of maintaining Bacteriological Grade purity consistently for global pharma markets.

Opportunities: Capturing the surging global Vegan & Clean Label market through their gelatin-alternative innovations and expanding their Molecular Biology portfolio with high-purity Agarose for diagnostic research.

Raftech Solutions Private Limited 10

Founder	Akshay Jadhav and Prachi Sable (Co-founder)
Established year	2023
Location	Headquartered in Palghar/Mumbai, Maharashtra, India.

Company Overview

Raftech Solutions is an emerging Blue-Economy startup focused on the commercial cultivation and deep-processing of seaweed. Based along the Maharashtra coastline, the company addresses the twin challenges of marine resource depletion and the need for sustainable agricultural inputs. Raftech operates as a vertically integrated entity, managing everything from open-sea seaweed farming to the manufacturing of high-value bio-stimulants. They are particularly noted for their field trials in the Palghar district, where they work closely with coastal communities to establish seaweed farming as a viable alternative livelihood.

Sector/Domain: Blue Biotechnology, Seaweed Cultivation, Bio-fertilizers, and Marine Agritech.

Core Innovation & Technology

Raftech Solutions leverages marine biotechnology to convert Sea Timber (Seaweed) into precision agricultural products:

- Commercial Seaweed Cultivation: Utilization of indigenous and commercially viable species (such as *Kappaphycus alvarezii* or *Sargassum*) using bamboo raft or long-line methods along the Maharashtra coast.
- Biorefinery Processing: The company has developed processes to extract liquid bio-stimulants and solid granules from raw seaweed. These products are rich in growth hormones (auxins, cytokinins), micronutrients, and amino acids.
- Carbon Sequestration: By scaling seaweed farms, Raftech contributes to Blue Carbon capture, as seaweed grows rapidly and absorbs significantly more CO2 than terrestrial forests per unit area.

Core Offerings & Products

- Seaweed-Based Fertilizers: Liquid and granular organic fertilizers that improve soil health, enhance crop resistance to abiotic stress (drought/salinity), and increase yields without chemical runoff.
- Raw Seaweed Supply (B2B): Supply of dried seaweed biomass to the hydrocolloid industry for the extraction of Agar, Alginate, and Carrageenan.
- Coastal Livelihood Programs: Providing training, seed material, and buy-back guarantees to coastal fishers and women's self-help groups (SHGs) to foster a decentralized production model.

Business Model & Operations

- Integrated Model: Raftech combines its own experimental farming sites with a Satellite Farming approach, where they empower local coastal communities to act as primary producers while Raftech handles the high-tech processing and branding.
- Strategic Location: Proximity to the Mumbai/ Palghar coastal belt allows for efficient logistics from sea-harvest to processing units and quick distribution to the agricultural heartlands of Maharashtra.
- Revenue Streams: Generated from the sale of branded bio-fertilizers to farmers, bulk biomass sales to industrial processors, and consultancy for marine plantation projects.

Challenges & Opportunities:

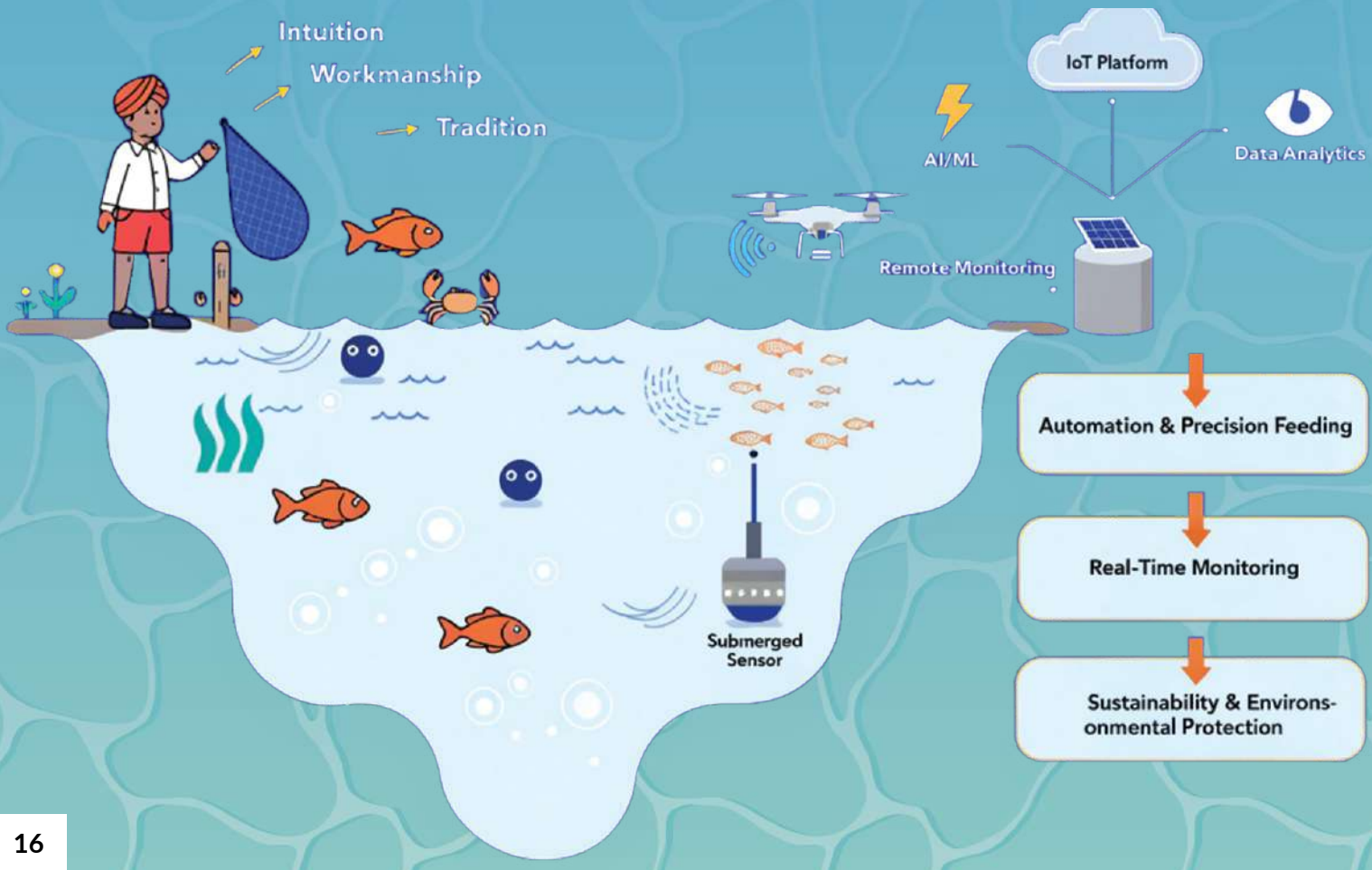
Challenges: Navigating the seasonal impact of monsoons on open-sea plantations; and the regulatory complexity of leasing coastal waters for commercial sea-foresting.

Opportunities: Nutraceuticals & Food: Expanding into seaweed-based protein supplements and vegan food additives; Blue Carbon Credits: Monetizing the environmental impact of seaweed farming through global carbon markets.

Precision Aquaculture & IoT

The Indian Precision Aquaculture & IoT ecosystem is currently undergoing a technology-driven transition from traditional, intuition-based practices to a data-centric Smart Farming era. Fifteen pioneering organizations Aquaconnect, AquaExchange, Kisanaqua, Eruvaka Technologies, SenseSemi Technologies, Ambro IOT Services, Bariflo Cybernetics, Aquapulse Innovations, Decapods Aquaculture Technologies, Budmore, Miledeep Works, ThinkRaw India, Kings Infra Ventures, Byangoma India, NatureDots, and Bluetechfins are at the forefront of this shift, demonstrating the critical role of the Internet of Things (IoT), Artificial Intelligence (AI), and satellite remote sensing in modernizing the fisheries value chain.

Their collective innovations include real-time water quality monitoring, automated demand-feeding systems that optimize resources and minimize waste, and precision aeration technologies designed to maintain stable aquatic environments. By integrating Phygital models which combine physical retail networks with sophisticated geospatial data, these startups are effectively bridging information gaps, reducing operational risks, and providing financial inclusion to farmers through data-backed credit scoring. Through this transition from manual labour to a precision-driven industrial process, these enterprises are ensuring the long-term traceability, profitability, and sustainability of the Indian aquaculture industry.



Precision Aquaculture & IoT

This sector leverages the Internet of Things (IoT), Artificial Intelligence (AI), and satellite remote sensing to replace subjective farm management with data-driven precision.

Table 3: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/Services	Business Approach
Aquaconnect	Full-stack Digital Platform	Phygital model utilizing satellite geospatial data	FarmMOJO (AI advisor), AquaSat (remote sensing) Aquapartner stores, Aquacred, Aquabazaar and Blutik	Transaction commissions and de-risked fintech facilitation fees
AquaExchange	IoT & Fintech	Patented PowerMon (HaaS) and AquaBot solar feeder	PowerMon, AquaBot, AquaX Marketplace, AquaX Fintech and NextFarm app	Hardware-as-a-Service (HaaS) with embedded fintech credit scoring
Kisanaqua	Digital Value Chain	AI-powered image recognition for disease diagnostics feed calculator and water quality tracker	AI diagnostics, E-marketplace, 24hr settlements	Tiered SaaS subscription with transaction-based margins
Eruvaka Technologies	Intensive Automation	ShrimpTalk™ (Acoustic-based feeding) and PondMother™	PondMother, PondGuard Neo, PondLogs Cloud	CAPEX hardware sales with integrated SaaS OpEx for automation
SenseSemi Technologies	Semiconductor Design	SenseSoC (AI-on-edge) and Aqua Intelligent Power Modules	SenseSoC chip, AIPM hardware cores	B2B semiconductor sales and edge-firmware licensing
Ambro IOT Services	Hatchery/ Farm Digitization	Deep learning imaging for precision seed/ biomass counting	BluHatch, BluBay, BluEye visual analytics	SaaS subscription and hardware sales for hatchery traceability
Bariflo Cybernetics	Water Body Management	Fluid dynamics and Hypolimnetic Aeration (bottom-up)	Aqua-Bot (sensing), Climate-Sync AI, Floating Ag	B2B industrial projects and Robotics-as-a-Service (RaaS)
Aquapulse Innovations	Pre/Post-Harvest Support	Patented Ice Slurry chilling and AI expert systems	Aquapulse360, Supply chain facilitation	Hybrid digital advisory and export-led logistics margin model
Decapods Aquaculture	Virtual Production	AI-enabled Virtual Large-Scale Farm aggregation	Smart Management System, IoT tracking hardware	Production aggregation and B2B sales with de-risked lending data
Budmore	Plasma Biotechnology	Nano-plasma disinfection (chemical-free pathogen control)	AC-FA100 Controller, Plasma reactors	CAPEX hardware sales and recurring OpEx for FMS SaaS

ThinkRaw India	Solar Robotics	Dhivara Mitra solar-powered floating vessel	Dhivara Mitra robot, Krishi Dhanu dispenser	Product sales and solar equipment rental for marginal farmers
Kings Infra Ventures	BlueTech Infrastructure	SISTA360 Symbiotic Protocol (antibiotic-free)	Kings Maritech Eco Park, Kings Bento RTE	B2B international trading, retail, and tech-infrastructure consulting
Byangoma India	Precision Infusion	Ultra-Fine Infusion (UFIT) for nanobubble oxygenation	Byangoma Vital System (infusion unit)	Precision hardware manufacturing and B2B technical installation
NatureDots	Ecological Intelligence	AI-powered Digital Twins for predictive water health	AquaNurch suite, Twingills Twinity & Twinsfera	Digital-Twin-as-a-Service (DiTaaS) for de-risking water assets
Bluetechfins	AI-powered IoT	BlueTechSense automated remote farm management	BlueTechSense sensors, Aqua AI engine	Hardware sales with SaaS subscription for Biofloc/RAS management

Table 4: Sector Feature Matrix

Startup Name	Real-time Water Monitoring	AI/ML Analytics	Automated Feeding/ Aeration	Fintech/Credit Scoring
Aquaconnect	√	√		√
AquaExchange	√	√	√	√
Kisanaqua	√	√		√
Eruvaka Technologies	√	√	√	
SenseSemi Technol-ogies	√	√		
Ambro IOT Services	√	√		
Bariflo Cybernetics	√	√	√	
Aquapulse Innova-tions	√			
Decapods Aquacul-ture	√	√		√
Budmore	√	√	√	
ThinkRaw India	√		√	
Kings Infra Ventures	√	√		
Byangoma India	√			
NatureDots	√	√		
Bluetechfins	√	√	√	

Aqua connect 11

Founder	Rajamanohar Somasundaram
Established year	2017
Location	Chennai, Tamil Nadu, India

Company Overview

Aquaconnect is South Asia's largest full-stack aquaculture technology platform, operating as an integrated seafood company that digitizes the entire aquaculture value chain. The startup employs a Phygital (Physical+digital) strategy, combining boots on the ground through a physical retail network with eyes in the sky via sophisticated geospatial data. Its goal is to transform the opaque, data poor, and fragmented aquaculture business into a traceable, efficient and data driven ecosystem that connects farmers to high-quality inputs, formal loans and global markets.

Core offerings and business model

1. FarmMOJO

It is an AI-Driven mobile app that acts as a digital farm advisor. It offers real time recommendations on water quality, feed optimization and animal health to improve yield predictability by using farm-level data and Artificial intelligence algorithms. It charges farmers a recurring fee and serves as the primary data collection tool for the entire ecosystem.

2. AquaSat

This platform uses satellite remote sensing and deep learning algorithms to create large-scale predictive information for aquaculture operations. The tool maps pond borders, calculates Days of Culture (DoC), anticipates input requirements, and predicts harvest supply across areas. It allows better planning, demand forecasting and supply chain efficiency for all stakeholders.

3. Aquapartner Stores

These are physical retail outlets maintained by local partners. These stores provide a wide range of high-quality, multibrand aquaculture inputs along with expert guidance. It earns a profit margin on the sale of multi-brand aquaculture products.

4. Aquacred

It is a fintech platform that links aquaculture stakeholders to traditional financial institutions. It facilitates loans to Aquapartners(retailers) and seafood purchasers, allowing them to meet their working capital and expand their business. It uses digital farm data and transaction records to provide data driven risk assessment, thereby improving credit accessibility within the sector. It earns a facilitation fee from banks for providing de-risked, data-backed lending.

5. Aquabazaar

It is a digital marketplace that facilitates direct linkages between farmers and seafood processors. By integrating harvest supply with buyer demand, the platform fosters transparent price discovery while reducing dependency on the middlemen. It charges a commission on the total value of seafood traded.

6. Blu Tik

It is a next generation quality control tool that aims to ensure transparency and trust in seafood trade. It delivers tamper-proof inspection and quality evaluation reports, specifically tailored to the needs of international buyers. It charges for quality certification that helps farmers get premium export prices.

Challenges & Opportunities:

Challenges: Navigating high operational costs in the last-mile delivery to remote coastal regions and the technical difficulty of capturing high-resolution satellite data over small, fragmented ponds during heavy tropical cloud cover.

Opportunities: Scaling the Aquacred model into a primary revenue driver by tapping into India's aquaculture market and expanding the SaaS platform to other top seafood-producing nations.

12 AquaExchange

Founder	Pavan Kosaraju, Hemaundar Dhavili, Kiran Kumar BN, Kareemullah Mohammod
Established year	2020
Location	Vijayawada, Andhra Pradesh

Company Overview

It is a full-stack aquaculture technology and fintech platform dedicated to building a transparent and efficient ecosystem for shrimp and fish farmers. Founded by IITians, the startup uses a data-first approach through proprietary, patented IoT hardware to solve inefficiencies in the aqua sector.

Core offerings and Business Model:

1. PowerMon (Patented Aeration IoT)

Power Mon is the world's first patented technology for comprehensive farm power monitoring and remote aeration control.

The innovation: Unlike reactive sensors, it monitors the electrical health of aerators. It uses machine learning to alert farmers to motor failures, phase drops, or power outages via a mobile app. It features an Automatic Power Factor Controller that optmizes electrical usage, typically reducing power bills by 10% to 40%.

Business Model: It uses a subscription-based model called Hardware -as-a Service (HaaS). Instead of forcing a farmer to pay a large amount of money upfront to buy expensive machinery, they provide the IoT devices for a small, recurring monthly fee.

2. AquaBot (Moving Auto-Feeder)

The industry's first solar-powered, self-crusing automatic feeder deployed at scale.

Innovation: While traditional feeders are stationary, it travels across the pond surface and distribute feed uniformly in a 30 meter radius. It features slot-based, continuous, or day-night modes manageable via a smartphone. It achieves a 10% reduction in Feed Conversion Ratio (FCR) and ensures every shrimp receives equal nutrition, leading to more uniform harvest sizes.

3. AquaX Marketplace (E-Commerce)

A digital marketplace that connects farmers directly with top manufacturers of aquaculture inputs.

The innovation: The app features a full-fledged store where farmers can buy feed, seeds, and healthcare products (like vibrio kits and probiotics. It includes a feedback system where farmers can see reviews from others in the community.

Business Model: Earns a margin on the scale of products while ensuring transparent pricing and Farm-to-Gate delivery

4. AquaX Fintech (Embedded Finance)

A specialized vertical that leverages farm-level data to provide financial inclusion to farmers.

The innovation: Aqua Exchange uses real-time data from IoT devices (areation history and feeding patterns) to create a proprietary credit score for farmers who lack traditional collateral.

Partnerships: Partnered with State Bank of India (SBI), NABARD, and APGB to facilitate low-interest crop loans, using its technology to de-risk the lending process

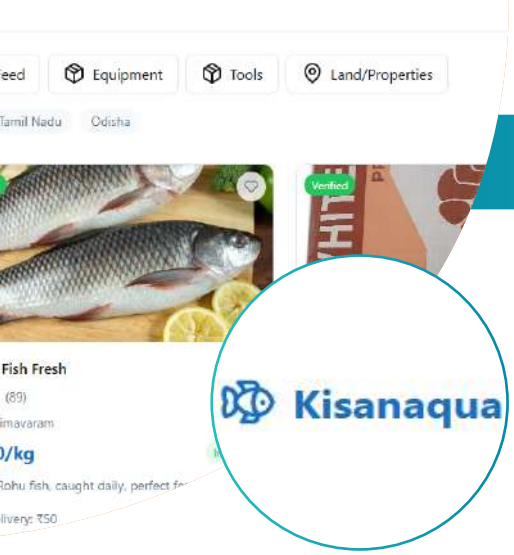
5. NextFarm App

It is their comprehensive farm management application designed to help aquaculture and shrimp farmers digitize operations, track crops, and monitor their IoT farm devices in real-time.

Challenges & Opportunities:

Challenges: Scaling the hardware-heavy HaaS model requires significant working capital and a robust maintenance network to service IoT devices in the highly corrosive, saline environments of coastal shrimp farms.

Opportunities: Massive potential for international expansion and the ability to lead the global Seafood Traceability market by providing tamper-proof data from hatcheries to processing plants.



Founder	Vamsi Krishna (Co-founder & Full-Stack Developer)
Established year	2023
Location	Bhimavaram & Nellore, Andhra Pradesh, India

Company Overview

Kisanaqua is a digital-first smart aquaculture platform that aims to digitize the entire seafood value chain for Indian farmers. It operates as an integrated ecosystem that provides farmers with a single-window solution for farm management, market intelligence, and commerce. By combining AI-powered precision farming tools with a transparent e-marketplace, Kisanaqua addresses the chronic issues of price volatility, high input costs, and middleman dependency. Its goal is to create a sustainable, tech-enabled environment where aqua-farmers can achieve higher yields and guaranteed financial security through instant settlements.

Core Offerings and Business Model

1. Smart Farming Suite (AI & Data Tools)

A comprehensive digital toolbox featuring a Feed Calculator, Water Parameter Tracker, and AI Disease Detection.Farmers log pond data (pH, salinity, DO) and upload images of their crop. The AI-driven algorithms provide instant corrective actions, while the feed calculator optimizes daily rations to lower FCR (Feed Conversion Ratio).

Who it serves: Aqua farmers (Shrimp and Fish).

Technology used: AI, Deep Learning for image recognition, and predictive analytics.

Revenue model: SaaS / Subscription. Offers a tiered model: Free (basic tracking), premium and enterprise

2. Kisanaqua Marketplace

A full-stack e-commerce platform for selling harvest produce and buying inputs (feed, seed, and equipment).It connects farmers directly to verified bulk buyers and exporters. The platform provides best price guarantees and real-time price trends from major hubs like Nellore and Bhimavaram.

Who it serves: Farmers, exporters, and input manufacturers.

Technology used: Digital marketplace platform with real-time price synchronization.

Revenue model: Transaction Commission. The startup earns a margin on the total value of seafood traded and a commission on input sales (feed/machinery).

3. 24-Hour Settlement & Fintech Services

A financial reliability service ensuring farmers receive payments almost immediately after harvest. By bypassing traditional payment cycles, Kisanaqua provides Instant 24-hour payment settlements once the produce is picked up and verified, improving the farmer's working capital.

Who it serves: Farmers and Traders.

Technology used: Secure digital payment gateway and transaction ledger.

Revenue model: Facilitation Fee. Integrated into the marketplace margin and potential future interest-based credit services.

4. Cold-Chain Logistics (Transport & ICE)

A managed logistics service that provides free transportation and ice for harvest lots.

Once an order is booked (12-24 hours in advance), Kisanaqua deploys temperature-controlled trucks and technicians to the farm site for sample collection and immediate transport to the buyer.

Who it serves: Farmers and Processors.

Technology used: Logistics optimization and tracking software.

Revenue model: Operational Margin. Costs are bundled into the marketplace trade to ensure high-quality, traceable produce for buyers.

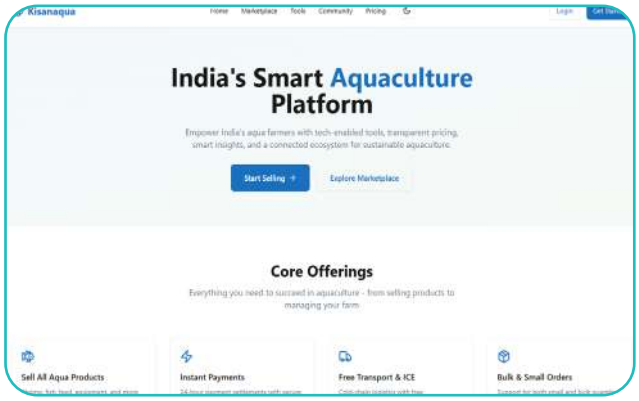
5. Farm Diary & Traceability

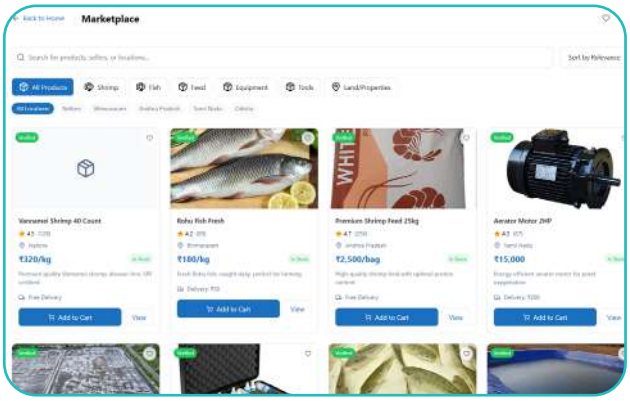
A digital record-keeping system for every activity in the pond's lifecycle.Farmers maintain a digital log of stocking, feeding, and water treatments. This creates a traceability report that buyers can use to verify the quality and sustainability of the seafood.

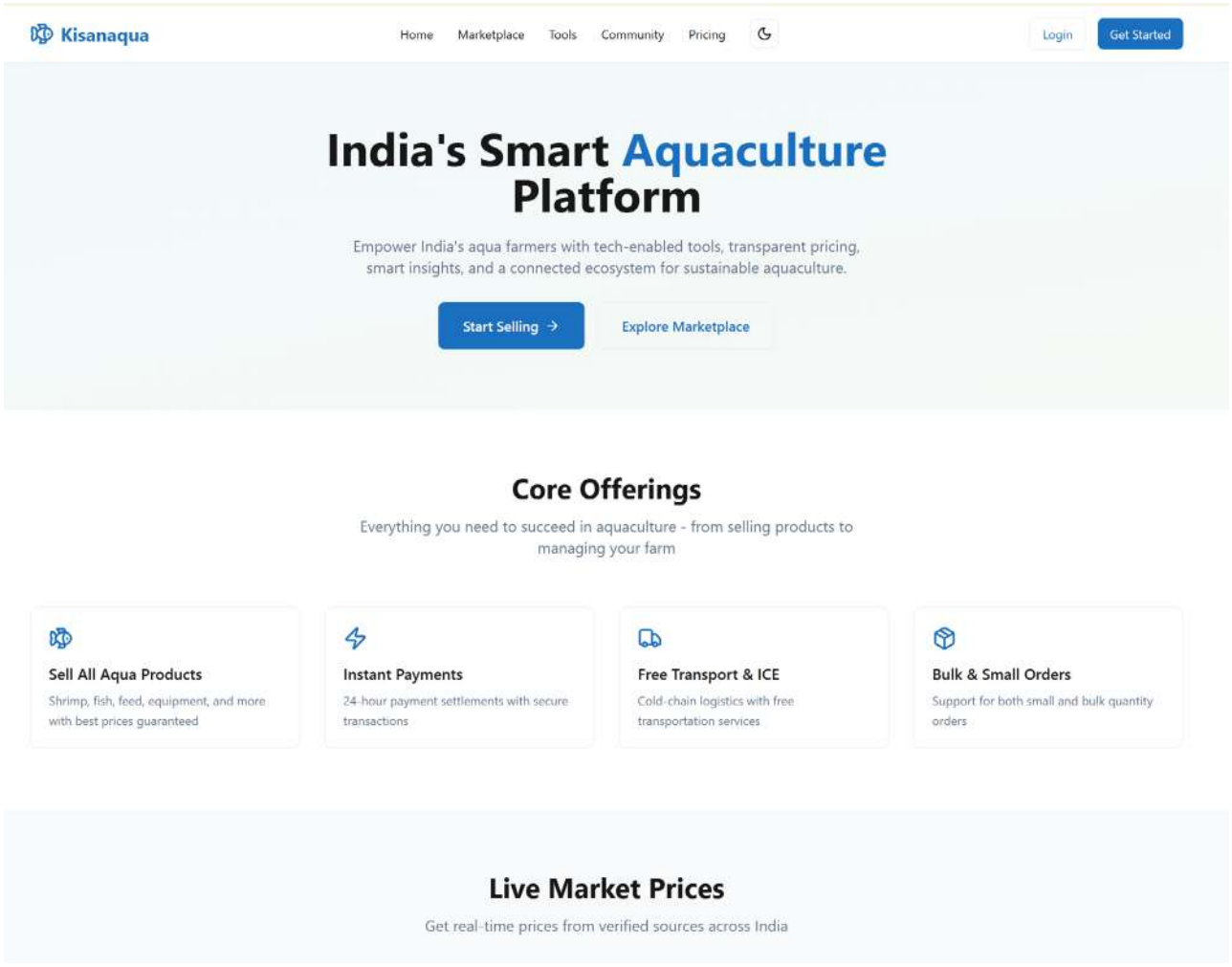
Who it serves: Farmers and International Exporters.

Technology used: Cloud-based data storage and automated report generation.

Revenue model: Service Fee. Included in the Premium/ Enterprise subscription plans.







Eruvaka Technologies 14

Founder	Sreeram Raavi (Founder), Mallikarjuna Rao Para (Co-founder), and Kunal Choudhary (CEO)
Established year	2012
Location	Hyderabad, Telangana, India (Registered Office & HQ); Vijayawada, Andhra Pradesh (Branch Office & R&D); Tangutur (Assembly Plant)

Core Problem

It addresses the guesswork in traditional farming specifically unpredictable water conditions, overfeeding (which accounts for 60% of costs), and high mortality rates due to sudden dissolved oxygen drops.

Company Overview

Eruvaka Technologies is a global leader in providing AI and Internet of Things (IoT) solutions for high-density aquaculture, with a primary focus on sustainable shrimp farming. The startup's mission is to transform aquaculture globally by helping farmers increase productivity, manage risk, and improve sustainability through full-scale digitalization and automation.Eruvaka has automated over 45,000 hectares of shrimp farms in 12+ countries (including major hubs in Latin America and Asia).

Key Technologies: AI-based Acoustic Analysis, IoT sensors, Cloud Computing, and Solar-powered hardware. Eruvaka fits in this category by replacing conventional, manual farm labor with a Phygital ecosystem. It utilizes hardware (sensors and auto-feeders) that communicates with a software layer (PondLogs) to make autonomous biological decisions based on real-time data rather than human intuition.

Core Offerings and Business Model

1. ShrimpTalk™ (Acoustic-Based Feeding)

It is an advanced AI-powered demand-feeding system.

It uses underwater hydrophones to listen to the sounds of shrimp feeding. Proprietary AI algorithms translate these sounds into appetite intensity, signaling the feeder to dispense food only when the shrimp are actively hungry.

Who it serves: Medium to large-scale intensive shrimp farmers.

Technology used: Underwater Acoustics, Deep Learning, and AI.

Revenue model: Subscription (SaaS). Farmers pay a recurring fee for the AI service that manages the feeding logic.

2. PondMother™ (Automated Feeder) A solar-powered, smart automatic feeder.

It dispenses small, precise amounts of feed at high frequencies throughout the day. This promotes faster growth and ensures a cleaner pond bottom by preventing feed from decaying.

Who it serves: Shrimp and Fish farmers.

Technology used: IoT-enabled mechanical dispensing and Solar power.

Revenue model: Direct Hardware Sales (CAPEX). Sold as a high-performance equipment asset.

3. PondGuard™ Neo (Water Quality Monitoring)

A modular IoT buoy for real-time pond diagnostics which uses optical sensors to monitor Dissolved Oxygen (DO) and temperature 24/7. It sends instant alerts to the farmer's mobile via the cloud if parameters fall below safe thresholds.

Who it serves: Aquaculture farmers globally.

Technology used: Optical sensing technology and Telemetry.

Revenue model: Hardware Sales + Optional Support Fees.

4. PondLogs™ (Cloud Management Platform)

A comprehensive farm management software which integrates data from all on-site Eruvaka devices into

a single interface. It provides geo-tagging, growth monitoring, alert history, and data analytics to predict harvest supply.

Who it serves: Farm owners, Managers, and Corporate aquaculture groups.

Technology used: Cloud Computing and Big Data Analytics.

Revenue model: SaaS / Licensing Fee. Integrated with the hardware or sold as a management tool.

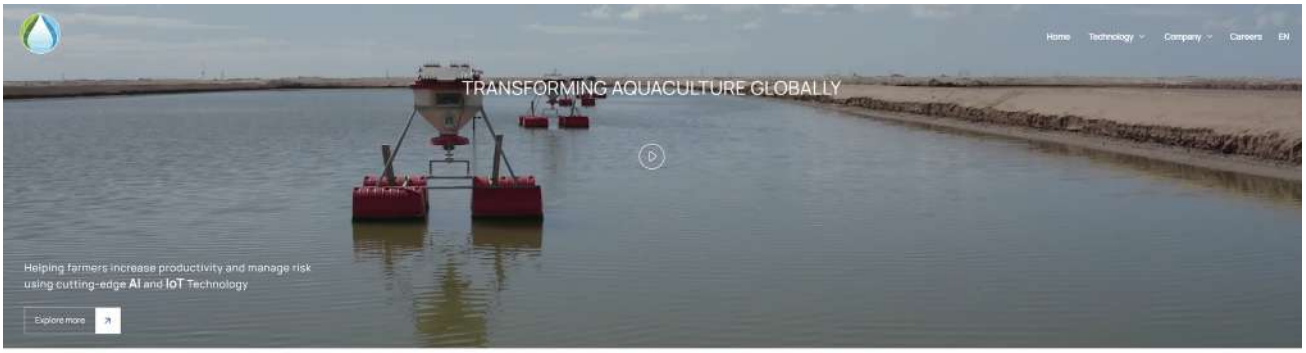
Impact and Future Strategy:

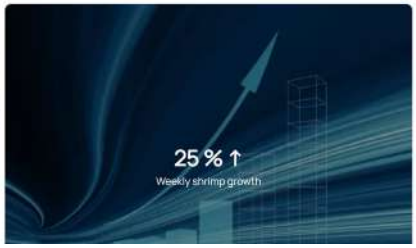
With over 50,000 devices deployed across 12 countries, Eruvaka has proven its ability to increase biomass harvest by 40% to 100% while reducing production costs by up to 26%. Following its integration with Nutreco, Eruvaka is now scaling its technology into the pisciculture (fish farming) market and developing global advisory services to offer data-backed insights to insurance and feed companies.

Challenges & Opportunities:

Challenges: High initial investment costs for smart aquaculture technologies, ensuring reliable sensor performance in diverse farm environments, and encouraging technology adoption among small-scale farmers.

Opportunities: Expanding AI- and IoT-driven solutions into global fish farming markets, strengthening predictive analytics and advisory services, and scaling sustainable precision aquaculture through international partnerships and digital transformation initiatives.





SenseSemi Technologies Private Limited 15

Founder	Vijay Muktamath (Founder & CEO), Namit Varma (Co-founder & VP, Engineering) and Vishweshwar (Vishy) M. (Chief Architect)
Established year	2014
Location	Headquarters: Bengaluru, Karnataka, India. Regional Presence: Mangalagiri (Andhra Pradesh) and Hyderabad (Telangana)

Company Overview

SenseSemi is a semiconductor design company specializing in high-performance, ultra-low-power System-on-a-Chip (SoC) solutions. While initially established to disrupt the healthcare sector (IoMT), the company has strategically expanded into precision agriculture and fisheries.

Key Technologies: SenseSoC (flagship chip), Edge AI (inferencing on-chip), Ultra-low power Analog Front Ends (AFEs), and integrated wireless interfaces (LoRa, Bluetooth, etc.).

SenseSemi fits this category by providing the foundational silicon that makes smart farming possible. By enabling AI at the edge, their chips allow sensors to analyze pond health and fish behavior locally, reducing the need for expensive cloud bandwidth and allowing for autonomous, real-time farm management.

Sector/Domain: Semiconductor Design, IoT, Precision Aquaculture, and Agri-tech.

Core Offerings and Business Model

1. SenseSoC (AI-Enabled System-on-a-Chip)

It is a highly integrated, ultra-low-power chip designed for IoT and IoMT devices. The chip combines a powerful microcontroller unit (MCU) with an AI Accelerator. It processes raw data from water sensors locally (Edge Inferencing), allowing for real-time decisions like oxygen level alerts or disease detection without needing to send all data to the cloud.

Who it serves: Aquaculture equipment manufacturers, IoT system integrators, and large-scale farm operators.

Technology used: 28nm/40nm CMOS process, Edge AI IPs, and Integrated Wireless Telemetry.

Revenue model: Direct Sales (B2B). Revenue is generated per chip or module sold to hardware developers.

2. Specialized Sensor Modules (AIPM - Aqua Intelligent Power Modules)

It is a Pre-integrated hardware modules combining SenseSoC with aquatic AFEs.

These modules are designed to interface directly with water quality probes (DO, pH, Salinity). They act as the smart core for any third-party sensor device, providing ready-to-use AI models for environmental monitoring.

Who it serves: Agri-tech startups and traditional equipment manufacturers looking to smart-ify their products.

Technology used: Integrated Analog Front Ends (AFE) and secure boot firmware.

Revenue model: Module Sales + Custom Engineering (NRE) Fees.

3. AI-as-a-Service (Edge Firmware Licensing)

Proprietary AI models and firmware optimized to run on SenseSemi hardware.

SenseSemi licenses its specialized software libraries—such as Predictive Disease Analytics or Optimized Feeding Schedules—to companies using their chips.

Who it serves: Corporate fisheries and tech-enabled farm management companies.

Technology used: Machine Learning (ML) workloads and embedded software.

Revenue model: SaaS / Licensing Fees. Recurring revenue based on the number of active deployments.

iv. SenseH & Consumer Solutions

A vertical focused on wearable health trackers and consumer IoT which adapts the same low-power SoC technology for biosignal monitoring, which can be extended to tracking the health of high-value aquatic species or monitoring vessel crew vitals.

Who it serves: Medical device companies and health-tech consumers.

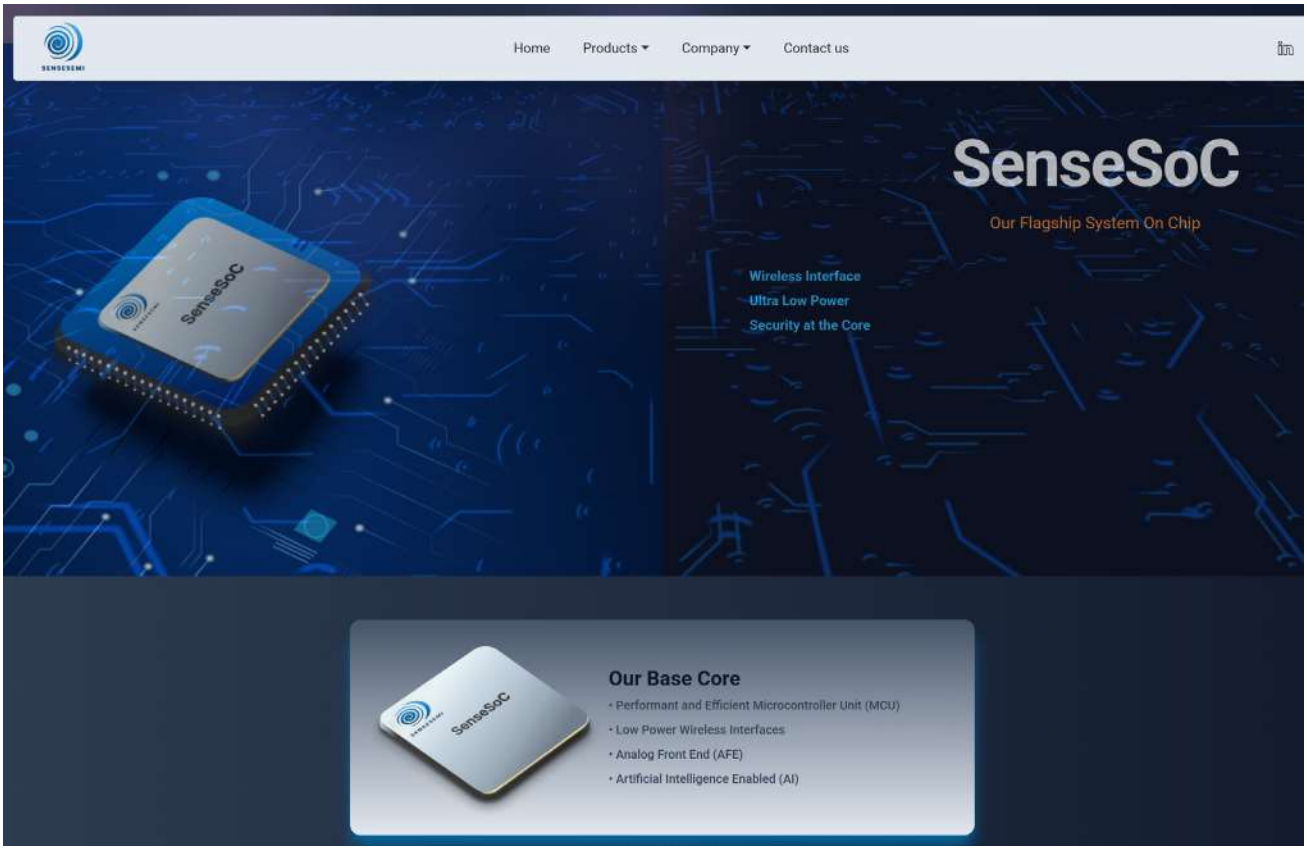
Technology used: Wearable sensor technology and IoMT protocols.

Revenue model: B2B Licensing and White-labeling.

Challenges & Opportunities:

Challenges: High R&D and semiconductor manufacturing costs, integration complexities across diverse aquaculture systems, and the need for widespread adoption of AI-enabled hardware in traditional farming environments

Opportunities: Expanding edge AI applications in precision aquaculture, enabling scalable real-time farm intelligence through low-power IoT devices, and strengthening partnerships with agri-tech and aquaculture equipment manufacturers globally.



Ambro IOT Services Private Limited 16

Founder	Vijaya Lakshmi
Established year	2018
Location	Headquarters: Banjara Hills, Hyderabad, Telangana, India.Registered Office: Ongole, Prakasam District, Andhra Pradesh, India

Company Overview

Ambrotechs is a Hyderabad-based agritech company focused on bringing a data revolution to the shrimp farming industry. Supported by the T-Hub incubator, the company bridges the gap between traditional aquaculture and modern digital traceability through an integrated ecosystem. The company solves the lack of transparency and high disease risk in the shrimp supply chain. By digitizing everything from seed quality (hatchery) to pond management (farm), they remove the guesswork and provide the data verification required by international seafood buyers. Key Technologies Used: Deep Learning (AI) for imaging, IoT Sensors for water quality, SaaS Platforms for enterprise management, and Cloud Analytics.

Sector/Domain: Aquaculture, Agri-tech, Seafood Traceability, and IoT.

Core Offerings and Business Model

1. BluHatch

A next-generation platform designed specifically to optimize and digitize hatchery operations. It tracks broodstock performance, water quality, and seed growth within the hatchery, providing increased traceability to the seed supply chain, the foundational step for a successful crop.

Who it serves: Hatchery operators and seed suppliers.

Technology used: Cloud-based SaaS and mobile interface.

Revenue model: Subscription (SaaS).

2. BluBay

It is an integrated farm management platform with a mobile application for real-time monitoring.

It allows farmers and workers to digitize daily records (feeding, health, water parameters) from stocking to harvest, creating a complete digital history for every pond.

Who it serves: Farmers, farm managers, and aquaculture enterprises.

Technology used: Mobile app and Cloud database.

Revenue model: SaaS Subscription.

3. AQU

It is an IoT-enabled water quality measurement system designed for affordability.

It allows farmers to measure critical water parameters at the pond site and syncs the data instantly to the digital platform, lowering the barrier to entry for precision water management.

Who it serves: Small to large-scale farmers.

Technology used: IoT sensors and telemetry.

Revenue model: Hardware Sales / Transactional.

4. BluEye

A solution focused on visual analysis for shrimp which utilizes deep learning and imaging technology for precision tasks such as seed counting, biomass estimation, and health monitoring, replacing manual, error-prone counting.

Who it serves: Hatcheries and Farmers.

Technology used: Computer Vision and Deep Learning.

Revenue model: Service-based or Licensing.

5. MarketConnect

It is a suite of digital utilities including a Harvest Calculator and Find Seed tool.

The Harvest Calculator helps farmers optimize harvest timing based on FCR and cost insights, while Find Seed identifies the real-time availability of quality-certified seed.

Who it serves: Farmers and Input suppliers.

Technology used: Data Analytics and Digital Marketplace tools.

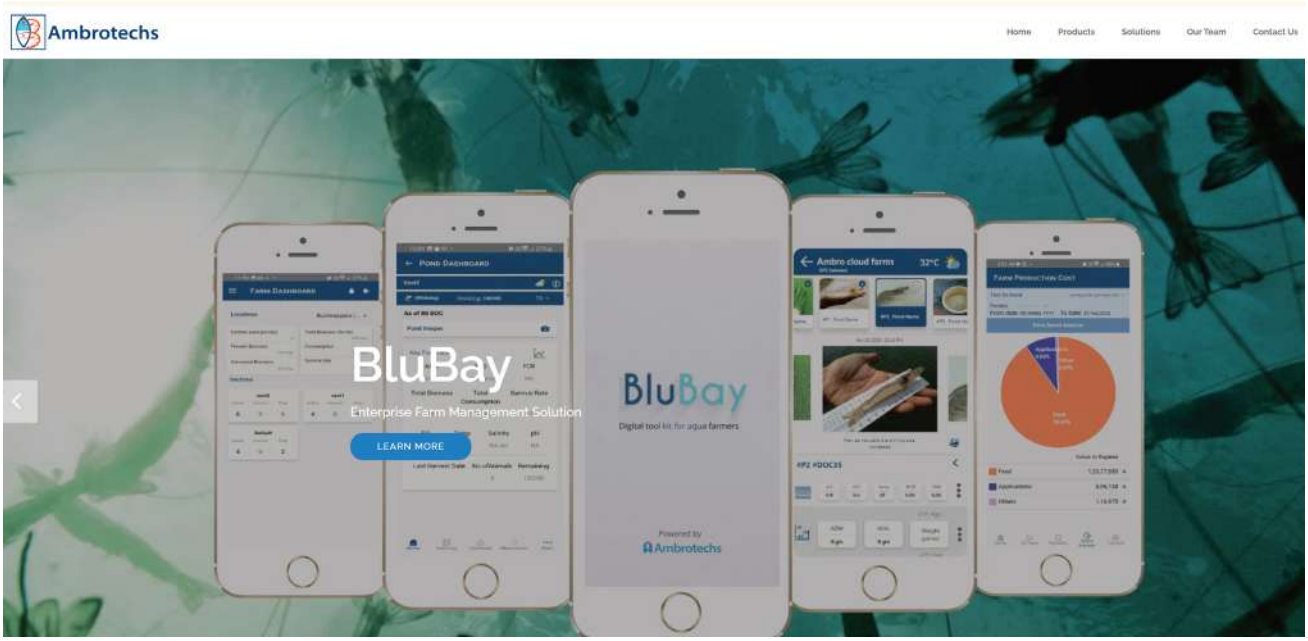
Revenue model: Facilitation Fee / Marketplace Commission.

technology for biosignal monitoring, which can be extended to tracking the health of high-value aquatic species or monitoring vessel crew vitals.

Who it serves: Medical device companies and health-tech consumers.

Technology used: Wearable sensor technology and IoMT protocols.

Revenue model: B2B Licensing and White-labeling.



Bariflo Cybernetics Private Limited 17

Founder	Mrutyunjaya Sahu (Founder & CEO), Anudhyan Mishra (Co-founder), and Sushanta Kumar Sahu (Co-founder)
Established year	2018
Location	Bhubaneswar, Odisha, India

Company Overview

Bariflo Cybernetics is an Industry 4.0 deep-tech startup specializing in water body management through fluid dynamics and cybernetics. Backed by premier incubators like MANAGE, KIIT-TBI and A-IDEA (ICAR-NAARM), the company bridges the gap between traditional aquaculture and automated, climate-resilient farming.

The startup addresses the critical challenges of high energy consumption, labor dependency, and environmental variability. Their solutions are backed by an extensive R&D portfolio, including 42 Patents Filed and 28 Granted, positioning them as a leader in global Blue Economy innovation.

BCPL fits this category by offering a specialized closed-loop ecosystem. They provide unique, patented hardware that manages the entire water column from sediment to surface across Outdoor, Indoor, Land-based, and Biofloc systems, reducing energy costs by up to 75% while ensuring 100% data traceability.

Core Offerings and Business Model

1. Outdoor Aqua (Open Water Body Management)
Designed for large ponds, lakes, and reservoirs, this system manages vast water volumes using robotic intervention and sediment-level intelligence.
Key Products: Aqua-Bot (Autonomous surface robot for mobile sensing) and Hypolimnetic Aerators (Targeted aeration at the pond bottom).
How it works: Sensors monitor deep-water respiration rates; AI then triggers bottom-up aeration and surface robotics to eliminate dead zones and harmful gases like methane.
Revenue Model: Integrated System Sales (B2B) and RaaS (Robotics-as-a-Service).

2. Indoor Aqua (Controlled Environment Aquaculture)
A solution for high-intensity, biosecure farming within greenhouses or warehouses, independent of external weather.
Key Products: Intelligent Indoor Controllers and Climate-Sync AI.
How it works: The system automates lighting, temperature, and 24/7 water chemistry. It utilizes fluid dynamics to maintain optimal nutrient circulation, reducing the risk of disease and crop loss.
Revenue Model: Turnkey Project Installation and SaaS Subscription for AI Monitoring.

3. Integrated Digital Intelligence (AI & Blockchain)
A full-stack software suite providing Intelligence from Farm to Processing.
Key Products: Aquaculture Intelligence Dashboard and Blockchain Traceability.
How it works: It captures real-time data from sensors and robots to provide predictive analytics on biomass and crop health. Blockchain ensures a tamper-proof record of the seafood's journey for international export compliance.
Revenue Model: SaaS / Recurring Data Subscription.

4. Post-Harvest & Processing Automation
Advanced industrial solutions to maintain quality and efficiency after the shrimp or fish are harvested.
Key Products: Hyperspectral Sorting Systems and Automated Peeling/Packaging.
How it works: Uses hyperspectral imaging to detect internal quality defects and automate grading at speeds impossible for manual labor.
Revenue Model: Equipment Sales and Maintenance Contracts.

5. Floating Agriculture (Polyculture Enrichment)
An environmental remediation solution that integrates crop farming with aquaculture.
Key Products: Organic Floating Platforms.
How it works: Platforms placed on open water bodies grow high-value vegetables. These plants absorb excess nitrates and phosphates from fish waste, purifying the water while providing the farmer with an additional 25-50% revenue stream.
Revenue Model: Direct Product Sales and Installation Fees.

18 Aquapulse Innovations Private Limited

Founder	Abhishek Dwivedy (Founder & CEO), Abhilash Dwivedy (Co-Founder & Chief Growth Officer), and Ananya Mohapatra (Co-Founder)
Established year	2023
Location	Bhubaneswar, Odisha, India.

Company Overview

Aquapulse is a technology-driven aquaculture startup dedicated to revolutionizing the seafood sector by integrating expert systems and artificial intelligence. The company acts as a full-stack enabler for a thriving Blue Food Economy, focusing on reducing post-harvest losses and connecting smallholder farmers to high-value domestic and international export markets.

The startup addresses the critical fragmentation in the aquaculture supply chain. By providing digital advisory services and advanced chilling technologies, Aquapulse empowers aquapreneurs and farmers to produce antibiotic-free, traceable seafood that meets stringent global regulatory standards.

Key Technologies: Artificial Intelligence (Expert Systems), IoT-based Environmental Monitoring, Patented Chilling Technology (Ice Slurry), and Blockchain-ready Traceability.

Aquapulse fits this category because it provides a comprehensive end-to-end digital and physical intervention model. It manages the pre-harvest phase through AI-driven virtual farming tools and dominates the post-harvest phase through specialized supply chain optimization and export facilitation.

Core Offerings and Business Model:

1. Aquapulse360 (Pre-Harvest Digital Advisory)

A comprehensive virtual farming and technical support platform that provides farmers with real-time data and remote management capabilities. It utilizes AI and Expert Advisory Systems to deliver scientific insights on pond health, weather-based alerts, and yield planning, allowing farmers to optimize their productivity and reduce operational risks.

Who it serves: 3,300+ Aquafarmers.

Technology used: AI, Mobile App, and Data Analytics.

Revenue model: Subscription/Service-based fees.

2. Supply Chain Optimization & Market Linkage

A full-stack logistics and export facilitation service that connects farmers directly with international markets in Asia, the UK, and the Middle East. It utilizes Patented Ice Slurry Technology to chill produce immediately after harvest, preserving the cold chain and minimizing value loss during transportation to ensure the seafood meets premium global standards.

Who it serves: Farmers, dealers, and international B2B buyers.

Technology used: Patented Chilling Systems and Logistics tracking software.

Revenue model: Commission on sales and export margins.

3. Environmental Monitoring & Management

An IoT-enabled monitoring system that utilizes advanced sensors to track critical farm parameters in real-time. The system ensures optimal growth conditions for fish and shrimp by providing continuous feedback on water quality and environmental shifts, enabling immediate corrective actions to prevent crop loss.

Who it serves: Farm operators and industrial aquaculture groups.

Technology used: IoT and Water Quality Sensors.

Revenue model: Hardware sales and data monitoring fees.

4. Regulatory Compliance & Farm Certification Support

A digital consultancy and verification service that assists farmers in adhering to legal and regulatory requirements. It guides farmers through the complex process of obtaining international certifications (such as BAP/ASC), ensuring that their produce is antibiotic-free and compliant with the food safety standards required for premium export pricing.

Who it serves: Farmers aiming for global market access.

Technology used: Digital compliance tracking tools.

Revenue model: Professional service fees.

5. Aquapreneur Development Program

An entrepreneurship enablement model designed to create a decentralized network of local technology hubs. By identifying and training rural youth and women as Aquapreneurs, the program scales the reach of Aquapulse's technology while facilitating market access and creating self-employment opportunities within rural coastal communities.

Who it serves: Unemployed youth and rural women (32+ active Aquapreneurs).

Technology used: Training modules and Digital Marketplace access.

Revenue model: Facilitation fees and ecosystem growth margins.

Challenges & Opportunities:

Challenges: Ensuring adoption of digital technologies among smallholder farmers, maintaining cold-chain efficiency across fragmented seafood supply networks, and meeting evolving international export compliance standards.

Opportunities: Expanding AI-driven advisory and traceability solutions, strengthening export-oriented antibiotic-free seafood ecosystems, and scaling inclusive aquapreneurship models through technology-enabled rural employment and market access initiatives.


THE TIMES OF INDIA

VARIETY

Championing seafood safety for exceptional quality at Aquapulse

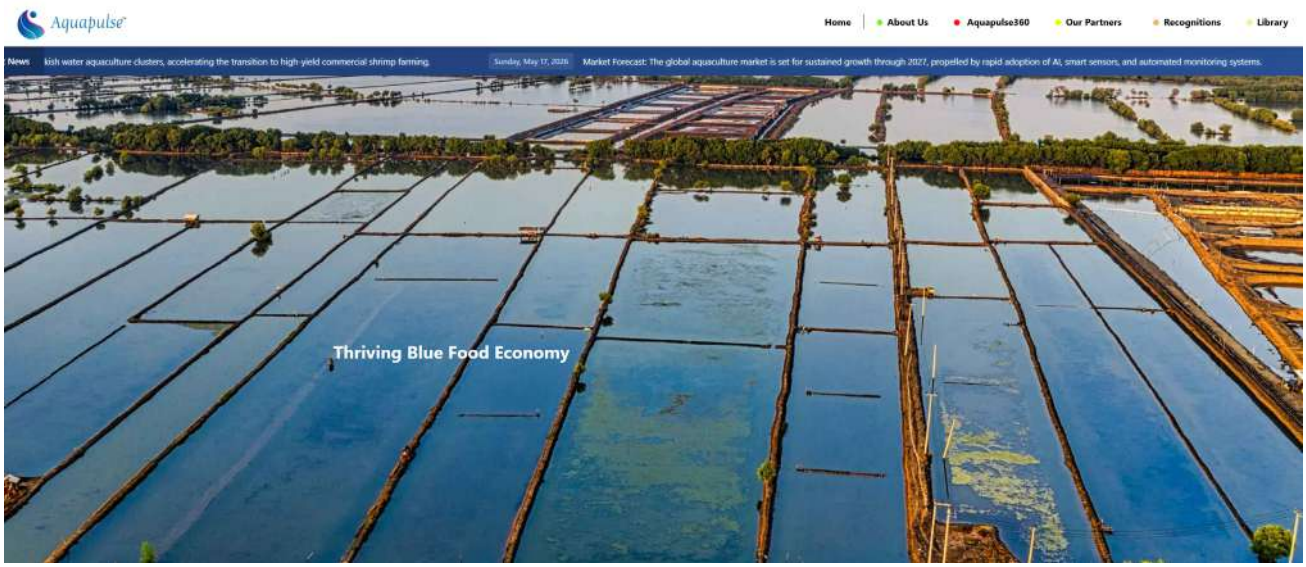
As the world observes World Food

processing, each step complies with global food safety protocols such as HACCP (Hazard Analysis and Critical Control Points) and ISO standards. Aquapulse partners exclusively

on international certifications like BAP (Best Aquaculture Practices) and ASC (Aquaculture Stewardship Council). Through training sessions, field demonstrations, and personalized mentoring, the company helps align farming practices with these benchmarks, promoting food safety alongside environmental and social responsibility. Digital traceability tools further enable tracking every product back to its origin, ensuring full accountability.

Aquapulse's food safety culture transcends compliance—it embodies care. The company invests in workforce training, empowers women-led processing units, and collaborates with aquafarmers and transporters to embed safety in every link of the value chain.

On this World Food Safety Day, Aquapulse reaffirms its conviction: safe seafood is not a feature but a foundation. Because when food is safe, communities thrive, trade flourishes, and trust endures.



19 Decapods Aquaculture Technologies Private Limited

Founder	Bharani Chedimala Lakshmi and Prasanna
Established year	2023
Location	Chennai, Tamil Nadu, India

Company Overview

Decapods is an AI-enabled technology platform and production integrator that operates with a tech-first approach to aggregate and manage decentralized aquaculture ponds. Unlike traditional firms, Decapods functions as a Virtual Large-Scale Farm, leveraging engineering and artificial intelligence to standardize production across diverse geographical locations. Its core mission is to scale the production of shrimp and fish with unprecedented consistency and predictability, providing B2B buyers with the traceability and supply reliability typically found only in massive, centrally-owned operations.

Sector/Domain: Agri-Tech, AI & IoT, and Aquaculture Production Integration

Core Offerings and Business Model:

Decapods Smart Management System: An AI-enabled platform that provides a continuous, unbiased digital record of pond health. It eliminates reliance on manual, subjective checks by centralizing data to ensure production standards remain consistent across all aggregated farms.

IoT Real-Time Tracking: Specialized underwater sensors monitor critical parameters like pH, salinity, Dissolved Oxygen (DO), TDS, and bloom levels. This real-time visibility allows the platform to maintain gold standard water quality across its entire network.

Predictive AI Platform: Harnesses real-time data to shift operations from reactive (treating disease) to proactive (preventing outbreaks). By predicting potential issues before they manifest, Decapods ensures significantly higher survival rates and predictable harvest schedules.

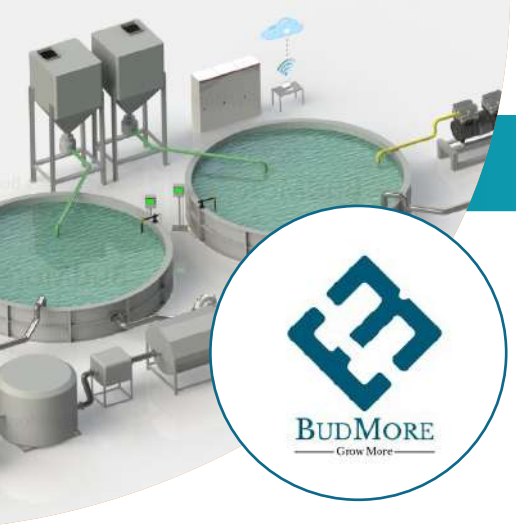
Production Engineering & Integration: Decapods designs and develops advanced electrical systems, piping, and soil quality trackers for partner farms. This vertical integration allows them to aggregate decentralized ponds and operate them with the efficiency of a single industrial unit.

B2B Product Sales & Finance: The company sells high-quality, completely traceable seafood produced through its network. Additionally, it uses its verifiable AI data to de-risk lending, facilitating lower-cost crop finance for farmers who traditionally lack collateral.

Challenges & Opportunities:

Challenges: Maintaining strict protocol adherence across decentralized farmer-owned ponds, the high capital cost of deploying IoT hardware at scale, and the need to calibrate AI models for different geographical soil and water types.

Opportunities: Commanding premium prices in the US, EU, and Japanese markets due to 100% traceability; monetizing real-time crop data for insurance and feed companies; and licensing the proprietary AI platform to international corporate farming groups.



Budmore 20

Founder	Syamlal Sasi (Co-Founder & CEO) and Karthika Prasad (Co-Founder)
Established year	Incorporated in 2018 (India) and 2020 (Australia)
Location	Operates globally with headquarters/R&D centers in Alappuzha (Kerala), India and Brisbane, Australia.

Company Overview

Budmore is a Deep-Tech aquaculture company that bridges the gap between industrial automation and ecological sustainability. Positioned as a Next-Gen tech provider, Budmore focuses on moving fish and shrimp farming away from labor-intensive, chemical-heavy traditional methods toward a fully autonomous, data-driven Smart Farming ecosystem. With R&D split between India (Smart Farming/IoT) and Australia (Plasma-Nano Technology), the company is a recognized innovator supported by the Kerala Startup Mission and incubated at MANAGE-CIA, Hyderabad.

Sector/Domain: Agri-Tech, IoT & Automation, and Plasma Biotechnology.

Core Innovation:

The Plasma-Nano Revolution Budmore's standout innovation is its chemical-free disinfection system, which leverages the fourth state of matter:

Plasma-Nano Disinfection: Unlike UV or Ozone alone, this proprietary tech uses a nano-plasma reactor to generate Reactive Oxygen and Nitrogen Species (RONS). These species physically attack the cell walls of pathogens (bacteria, viruses, parasites), deactivating them without leaving harmful chemical residues.

Organic Waste Decomposition: The plasma technology is also being researched for its ability to break down complex organic wastes like uneaten feed and fish faeces, helping maintain water quality.

Core Offerings and Business Model:

1. Hardware & IoT Ecosystem (B2B)

Automation: End-to-end controllers like the AC-FA100 and specialized units for aerators, filters, and water level management.

Sensors: Industrial-grade RS485/Modbus RTU digital probes for monitoring DO (Dissolved Oxygen), Ammonia, Salinity, and pH with high data integrity.

2. Cloud-Based SaaS Platforms

MAUGRO & COCKATOO: Proprietary Farm Management Systems (FMS) that provide real-time dashboards, predictive analytics, and automated machine scheduling.

Revenue Model:

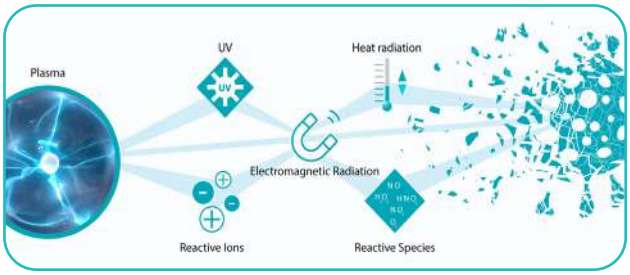
Capital Expenditure (CapEx): Upfront sales of IoT hardware and Plasma reactors.

Recurring Revenue (OpEx): Subscription fees for the FMS/Cloud platform and maintenance contracts.

Challenges & Opportunities:

Challenges: High technology adoption barriers for traditional, small-scale farmers due to the technical complexity and initial cost; and the industrial-scale validation of nano-plasma reactors in diverse, harsh pond environments.

Opportunities: First-mover advantage in Green Disinfection as global markets (EU/USA) enforce stricter antibiotic-free standards; and the potential to scale their SaaS revenue through AI-driven biomass estimation and yield prediction.



21 ThinkRaw India Pvt. Ltd

Founder	: Minushri Madhumita (Co-Founder), Amrita Jagatdeo (Co-Founder), and Gopal Singh (Founder/CEO).
Established year	2016
Location	Branch Office in New Delhi; Corporate Office and primary operations in Kalahandi, Odisha.

Company Overview

ThinkRaw is a multi-award-winning Indian agritech and cleantech startup that bridges the gap between renewable energy and precision farming. The company specializes in solar-powered, IoT-enabled robotics designed to solve critical inefficiencies in aquaculture and agriculture. ThinkRaw is widely recognized as a women-centric enterprise and is incubated by premier institutions like ICAR-CIFA and ICRISAT. By replacing fossil-fuel-dependent machinery with smart, solar-powered boats and dispensers, the company helps farmers—particularly women entrepreneurs—increase yields while reducing labor drudgery and environmental impact.

Sector/Domain: Agri-Tech, AI & IoT, and Aquaculture Production Integration

Core Innovation: Solar-Powered IoT Robotics The company's innovation focuses on navigable and portable solar devices that automate time-sensitive farm tasks.

Dhivara Mitra (The Pond Friend): A patented, solar-powered floating vessel for aquaculture. It autonomously navigates ponds to distribute feed uniformly and uses IoT sensors to monitor Dissolved Oxygen (DO) and pH levels in real-time. It is credited with reducing feed wastage by 20-30% and crop loss by up to 30%.

Krishi Dhanu (The Precision Dispenser): A solar-powered portable device for solid fertilizer application. It uses a smart moderator to control dispensing rates and an integrated IoT weighing scale to record usage data, replacing the manual broadcasting method which is often wasteful and labor-intensive.

IoT & Cloud Integration: Both devices feed data into mobile applications, allowing farmers to monitor their ponds or fields remotely and receive alerts before critical imbalances (like oxygen depletion) occur.

Core Offerings & Business Model:

1. Specialized Product Sales (B2B & B2F): Sells the Dhivara Mitra and Krishi Dhanu to large-scale farmers and Farmer Producer Organizations (FPOs).

2. Solar EPC Solutions: Designing and installing off-grid and on-grid solar systems, including solar water pumps and street lights for rural infrastructure projects.

3. Rental & Service Model: Offers IoT equipment on a rental basis (Power Purchase Agreement or daily/monthly models) to make high-tech solutions accessible to small-holder farmers.

4. Partnerships: Collaborates with NABARD and state fisheries departments to deploy units in remote regions across Odisha, Andhra Pradesh, and beyond.

Challenges & Opportunities:

Challenges: Scaling manufacturing capacity at their assembly unit to meet bulk orders; and overcoming the digital adoption curve for traditional farmers who may be wary of high-tech maintenance.

Opportunities: Expanding into Southeast Asian markets like Indonesia and Bangladesh; leveraging their granted patents for licensing; and developing new bio-fortified feed dispensing models to integrate health-management into their robotic platforms.

Kings Infra Ventures Limited 22

Founder	: Shaji Baby John (Chairman & Managing Director)
Established year	1987
Location	: Registered office in Kochi, Kerala; significant operations in Tuticorin (Tamil Nadu) and Andhra Pradesh.

Company Overview

Kings Infra Ventures has evolved from a family-run seafood exporter into a BlueTech powerhouse. The company manages the entire seafood value chain, from high-tech hatcheries and smart farming to international trading and domestic retail. It is globally recognized for breaking productivity records, such as harvesting jumbo-sized 80gm *L. Vannamei* shrimp (double the industry average) using antibiotic-free, sustainable methods.

Sector/Domain: Aquaculture Infrastructure, Seafood Processing, BlueTech, and Retail.

Core Innovation:

SISTA360 & AI-Driven Eco Parks Kings Infra's competitive edge lies in merging traditional pond farming with Industry 4.0 technologies.

SISTA360 (System for Integrated, Sustainable & Traceable Aquaculture): A proprietary symbiotic protocol that uses zero antibiotics and relies on probiotics and natural ingredients (curd, turmeric, garlic) to boost shrimp immunity. It integrates AI and IoT to ensure 100% traceability.

Kings Maritech Eco Park (KMEPL): A massive technology hub featuring plug-and-play RAS (Recirculating Aquaculture Systems). This facility uses AI-enabled and PLC-controlled indoor cultivation, allowing for biosecure, year-round production of multi-species like shrimp, tilapia, and seabass.

BlueTechOS: A proprietary AI operating system that integrates data from sensors and blockchain to provide a transparent farm-to-fork story for global buyers.

Core Offerings & Business Model:

1. B2B Export & Trading

Products: Premium, antibiotic-free frozen shrimp (Head-on Shell-on) and various fish species.

Reach: Exports to demanding markets like Japan, USA, China, and the EU.

2. Domestic Retail Brands

Kings Bento: A QSR (Quick Service Restaurant) brand offering ready-to-eat seafood meals in single-portion bento boxes, developed with ICAR-CIFT.

Kings Frigo: A rebranding of Kings Fresh, offering freshly frozen, high-quality seafood for institutional and retail consumers.

Revenue Model:

High-volume international trading, high-margin domestic retail & Technology and infrastructure consulting through its Eco Parks and SPEED (skill development) programs.

Challenges & Opportunities:

Challenges: High working capital intensity and the operational risk of managing large-scale indoor biological systems; navigating the price sensitivity of the domestic Indian market.

Opportunities: The company is well-positioned to leverage the India-EU FTA to bypass high tariffs while utilizing its significant land bank assets to fuel the expansion of its high-margin BlueTech infrastructure and retail brands.

23 Byangoma India Private Limited

Founder	Hanumant Singh (Founder & CEO) and Rajesh Janid
Established year	2022
Location	Registered Office at Beelwa, Tonk Road, Jaipur, Rajasthan, India.

Company Overview

Byangoma India is a deep-tech and precision instrument manufacturing startup recognized by iStart Rajasthan and the MNIT Innovation & Incubation Centre (MIIC). The company is built on the scientific application of Ultra-Fine Infusion Technology (UFIT). Byangoma's innovation focuses on harnessing the power of gases (primarily oxygen and ozone) to solve critical issues in high-density aquaculture, healthcare, and water treatment. By creating a self-cleaning aquatic environment through nanobubble technology, Byangoma enables farmers to achieve higher yields with significantly lower infrastructure and operational costs.

Sector/Domain: Agri-Tech, AI & IoT, and Aquaculture Production Integration

Core Offerings & Business Model:

Ultra-Fine Infusion Technology (UFIT): The core innovation that produces suspended micro/nanobubbles with near 100% gas transfer efficiency. Unlike traditional aeration, these bubbles remain in the water for extended periods, ensuring constant oxygen saturation even in high-density Biofloc or RAS setups.

Byangoma Vital System: A specialized, plug-and-play infusion unit that integrates with existing tank infrastructure. It allows for precision control of gas levels, enabling farmers to optimize metabolic rates and potentially squeeze an additional crop cycle into the same season.

Growth & Mortality Control: By providing a super-oxygenated and self-cleaning ecosystem, the system physically breaks down organic waste (sludge) and pathogens. This significantly reduces the risk of tank crashes and minimizes the need for chemical interventions.

Post-Harvest Preservation: The technology extends beyond the farm to food processing, where it can be used to infuse specialized gases into water or packaging to maintain the freshness and shelf life of seafood during transport.

B2B Revenue Model: The company generates revenue through the sale of precision hardware and technical installation services.

Challenges & Opportunities:

Challenges: High technical complexity requires specialized training for end-users; and the initial capital expenditure (CAPEX) compared to traditional paddle-wheel aerators.

Opportunities: Scaling the technology for Large-Scale Water Body Rejuvenation (Lakes and Drains) using ozone infusion; and expanding into the Medical Sector for hyperbaric and oxygen therapy instruments.

NatureDots Private Limited 24

Founder	Snehal Verma Co-Founders: Mohammad Aatish Khan (COO) and Ayush Prasad (CTO).
Established year	2019
Location	Headquartered in New Delhi, India.

Company Overview

NatureDots is a deep-tech, award-winning Climate-Tech startup that builds Nature Intelligence for water bodies. The company specializes in creating AI-powered Digital Twins of freshwater ecosystems to de-risk them from ecological and climate-related threats. By merging natural sciences with cutting-edge technology, NatureDots provides a Virtual Mirror of physical water bodies, allowing fish farmers, water utilities, and industrial users to predict and prevent disasters such as fish kills, contamination, and resource depletion. Recognized by the World Economic Forum (UpLink) and MIT Solve, the company is a global leader in establishing a climate-resilient New Nature Economy.

Sector/Domain: : Climate-Tech, AI & Digital Twins, Aquaculture Intelligence, and Water Resource Management.

Core Offerings & Business Model

AquaNurch Digital Twin® Suite (DiTaaS): It interprets complex ecosystem dynamics. It allows users to run what-if simulations and receive forecasts for water quality risks 7–90 days in advance.

Twingills (Aquaculture Intelligence): A functional layer of the Digital Twin specifically for fish and shrimp farming. It integrates biomass forecasting and disease intelligence to reduce fish mortality from 30–50% to below 5%, significantly boosting farm profitability.

Twinity & Twinsfera: Specialized modules for water utilities and ESG/Restoration projects. These tools monitor surface water contamination for smart cities and track biodiversity indicators to verify the impact of environmental restoration efforts.

AquaNurch Data Layer: A multilingual mobile app (supporting 13 languages) designed for ground-level farmers. It features AquaNurch Fish Doctor®, which uses computer vision to detect early-stage fish infections from uploaded photos.

Business Model: The company operates on a Subscription-based SaaS model. Revenue is generated through recurring fees for data insights and predictive alerts, with pricing customized based on the stakeholder (B2B for commercial growers vs. B2G for government utilities).

Challenges & Opportunities:

Challenges: Navigating the data-poor environments of rural India; and ensuring high-speed internet connectivity for real-time sensor-to-cloud data transfer.

Opportunities: Blue Carbon Credits: Using their monitoring data to help farmers participate in carbon markets; and integrating Twinorbix (AI-Sensors) to fully automate pond management.

25 Bluetechfins

Founder	Ashwin Donthi Radhakrishna
Established year	2017
Location	Headquartered in Mysore/Bengaluru, Karnataka

Company Overview

Bluetechfins is an advanced AgriTech brand under Vithamas Technologies that specializes in AI-powered IoT solutions for the aquaculture industry. The company bridge the gap between traditional fish farming and precision technology by providing real-time monitoring and automation systems. Their platform is designed to handle the complexities of high-density farming environments such as Biofloc and Recirculating Aquaculture Systems (RAS). By utilizing smart sensors and automated actuators, Bluetechfins helps farmers mitigate risks like sudden ammonia spikes or oxygen depletion, which are the leading causes of crop failure in intensive aquaculture.

Sector/Domain: Smart Aquaculture, IoT & Automation, AI-driven Precision Farming.

Core Offerings & Business Model:

Smart Aquaculture Ecosystem: A comprehensive Remote Farm Management loop where Plug-and-Play IoT Sensors (BlueTechSense) continuously track DO, pH, ammonia, and temperature. This data feeds into the Aqua AI engine, which acts as a virtual Fish AI Assistant to predict water quality trends and suggest preemptive actions.

Closed-Loop Automation: The system can automatically trigger aerators, feeders, or pumps based on pre-set sensor thresholds. This ensures a stable environment 24/7 and has been shown to reduce energy costs by up to 15% in commercial tilapia and shrimp farms.

Modular Product Suite:

BlueTechSense V1: A stationary unit for 24/7 large-pond monitoring.

BlueTechSense Insta V1: A portable handheld device for quick spot-checks across multiple sites.

Bluetechfins Mobile App: A central dashboard for visualization, risk alerts, and manual equipment override.

Freshvia: A integrated vertical focused on Farm-to-Fork transparency and direct seafood delivery, ensuring traceability for consumers.

Business Model: Revenue is generated through a mix of Hardware Sales (IoT units and automated equipment) and SaaS Subscriptions for advanced AI analytics, cloud data storage, and compliance reporting.

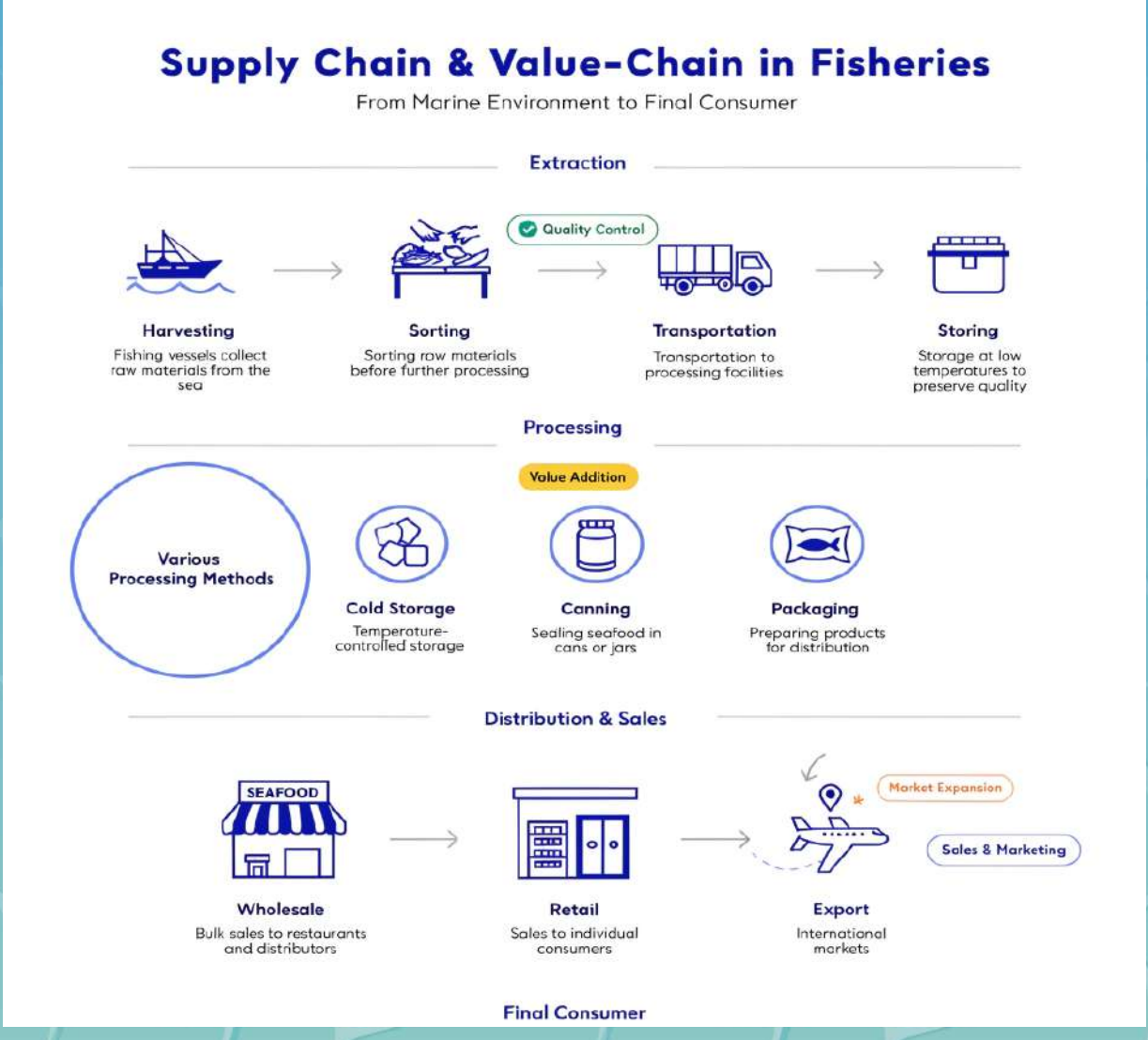
Challenges & Opportunities:

Challenges: The Corrosion Factor in saline shrimp ponds requires high-frequency maintenance of sensors; and the digital literacy gap among small-scale traditional farmers.

Opportunities: Export Documentation: Automating the data logs required for international certifications like Best Aquaculture Practices (BAP); and developing Solar-Powered IoT Hubs for remote farms with inconsistent electricity.

Supply Chain & Value-Chain

The Indian Fisheries Supply and Value Chain ecosystem is currently defined by a strategic shift from fragmented, traditional trading to tech-enabled, transparent, and cold-chain-integrated logistics. These fourteen key organizations Apex Frozen Foods Limited, Captain Fresh, Fishmongers, Miledeep Works, VTF (Vridhi Techno Farms), Epicure Innovative, BezgoFresh, Blucatch Fisheries, Zarin Gourmet, Almericus Blue Ventures, Jeelani Marine Products, Longshore Technologies, Freshma, and F3 Marine Foods demonstrate the critical importance of streamlining the pond-to-plate journey to reduce post-harvest losses and ensure global food safety standards. Their collective activities include the operation of state-of-the-art processing plants, the deployment of temperature-controlled moving cold chains using telemetry-monitored reefer transport, and the creation of digital B2B marketplaces that connect coastal producers directly with international retailers and domestic consumers. By integrating advanced traceability tools like the Trace UR Fish platform and rapid payment systems, these startups are eliminating inefficient middlemen, improving the shelf-life of perishable seafood, and securing higher margins for primary producers. Through this modernization of infrastructure and data transparency, these enterprises are strengthening India's position as a premier seafood exporter while delivering fresh, high-quality, and chemical-free protein to the growing domestic market.



Supply Chain & Value-Chain

Modernizing the "pond-to-plate" journey through cold-chain integrity, transparency, and the transformation of processing waste into industrial biopolymers.

Table 5: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
Apex Frozen Foods	Integrated Exporting	SPF seed breeding and MTPA processing	Bay Fresh/ Premium shrimp, Ready-to-Eat (RTE)	Vertically integrated industrial giant; Global B2B sales
Captain Fresh	B2B Marketplace	AI/ML Demand-Supply Matching and Fishgram App	Global aggregation, Value-added processing	Transactional revenue and growth through international M&A
Fishmongers	Live/Chilled Logistics	NeelVaahan Infinity, the world's first patented, high-volume live fish transport system	Live fish, Blufarmz SaaS, Phygital retail	Premium retail and wholesale distribution with 0% waste goal
Miledeep Works	Digital Supply Chain	AquaBrahma knowledge hub and AquaDeals	Marketplace, daily hub rate reports, AI calculators	Transaction margins and data-driven supply chain optimization
Vridhi Techno Farms	Traceable D2C	Trace UR Fish end-to-end transparency platform	Net-weight kitchen-ready seafood, marinations	Premium D2C e-commerce with certified safety standards
Epicure Innovative	Quick-Commerce	Vacuum Skin Packaging (VSP) to extend shelf life	Odor-free VSP fillets, B2B institutional supply	Q-Commerce fulfillment and premium B2C app-based sales
BezgoFresh	Hyper-local Delivery	45-minute last-mile cold-chain logistics	Aggregated fish/ meat vendor catalog	Transaction-based hyper-local model for urban protein
Blucatch Fisheries	Fair-Trade Traceability	Harbor-to-plate direct-sourcing for traditional fishers	Ethically sourced seafood, BluTrade app	Hybrid Wholesale and D2C; focus on de-commoditizing catch
Zarin Gourmet	Cold-water Fisheries	24hr Glacial Farm-to-Table delivery of Himalayan Trout	Trout, Trout Roe (Himalayan Caviar)	Niche gourmet B2B and D2C targeting luxury hospitality
Almericus Blue Ventures	Export Compliance	BlueChain QR-based traceability for BAP/ASC standards	Blue Carbon Credit monitoring, sourcing marketplace	Service-and-Marketplace model for export-ready compliance
Jeelani Marine Products	International Processing	1,000 kg/hr IQF lines and state-of-the-art cold chain	Silver Pomfret, Kingfish, Vannamei shrimp	High-volume B2B export for USA, EU, and Asian markets

Longshore Technologies	Circular Biorefinery	Shrimp shell biorefinery model (Waste-to-Value)	Chitosan, Chitin, Protein Hydrolysates	B2B industrial specialty chemical manufacturing and export
Freshma	Omnichannel Retail	Micro-Fulfillment Centers (Branded stores)	Chemical-free fish, Net Weight cleaning policy	B2C Omnichannel sales and regional micro-retail expansion
F3 Marine Foods	Frozen Seafood Export	Precision sub-zero freezing for cephalopods	Frozen Squid (Calamari), Cuttlefish, Finfish	B2B export-based distribution focused on global quality standards

Table 6: Sector Feature Matrix

Startup Name	Integrated Cold Chain	B2B Marketplace	IQF/Value-Added Processing	Traceability (QR/ Blockchain)
Apex Frozen Foods	√		√	√
Captain Fresh	√	√	√	√
Fishmongers	√			√
Miledeep Works		√		√
Vridhi Techno Farms	√		√	√
Epicure Innovative	√	√	√	
BezgoFresh	√			
Blucatch Fisheries	√	√		√
Zarin Gourmet	√		√	
Almericus Blue Ventures		√		√
Jeelani Marine Products	√		√	√
Longshore Technologies			√	
Freshma	√		√	√
F3 Marine Foods	√		√	

26 Apex Frozen Foods Limited

Founder	Karuturi Satyanarayana Murthy (Chairman & Managing Director) and Karuturi Subrahmanya Chowdary (Executive Director)
Established year	1995
Location	Kakinada, Andhra Pradesh, India

Company Overview

Apex Frozen Foods Limited is a vertically integrated producer, processor, and exporter of high-quality aquaculture products. Unlike many standalone tech startups, Apex operates as an Industrial Integrated Giant, controlling the entire value chain from hatcheries and farming to processing and global distribution.

The company addresses the trust and quality gap in the international seafood market by ensuring rigorous biosecurity and traceability. By moving from a merchant exporter to an integrated manufacturer with owned processing plants, they provide a farm-to-fork guarantee to global retail chains and food service companies.

Sector/Domain: Integrated Aquaculture, Food Processing, and International Trade.

Key Technologies Used: Specific Pathogen Free (SPF) seed breeding, State-of-the-art IQF (Individually Quick Frozen) processing, Cold Chain Logistics with reefer vehicles, and On-site Bio-security Labs.

Core Offerings and Business Model:

1. Integrated Hatchery & Farming (Seed to Harvest)

Apex manages the entire biological start of the shrimp lifecycle through its SPF hatcheries, which have a combined breeding capacity of 1.2 to 1.4 billion seeds. This ensures that the primary input is disease-free and genetically superior. These seeds are cultivated across 1,000+ acres of owned and leased farmland, where strict bio-security and on-site lab monitoring ensure high survival rates and uniform quality.

Who it serves: Captive farm requirements and external aqua-farmers.

Technology used: SPF Breeding and on-site diagnostic labs.

Revenue model: Cost-efficiency for captive use and direct seed sales.

2. Ready-to-Cook & Ready-to-Eat Processing

The company operates state-of-the-art processing plants with a total capacity of approximately 34,240 MTPA. They specialize in a variety of shrimp variants, including Headless Shell-On, Peeled & Deveined, and tail-on cooked shrimp. A significant strategic pivot includes their expansion into high-margin Ready-to-Eat (fully cooked) products, which accounted for roughly 16% of their portfolio by 2024.

Who it serves: Global retail chains (Walmart, etc.), restaurants, and food service distributors.

Technology used: Advanced IQF freezing and automated processing lines.

Revenue model: Global Export Sales (B2B).

3. Global Multi-Tier Branding (Bay Fresh, Bay Harvest, Bay Premium)

Apex markets its products under three distinct in-house brands while also operating as a massive white-label partner for global customers. This allows them to segment the market effectively, offering everything from standard frozen shrimp (Bay Fresh) to ultra-premium, certified export quality (Bay Premium).

Who it serves: International distributors and supermarket chains.

Technology used: Market-driven R&D and quality control analytics.

Revenue model: Branded sales margins and contractual white-labeling.

4. End-to-End Cold Chain & Compliance Logistics

To safeguard quality from pond to port, Apex maintains its own fleet of refrigerated and insulated vehicles equipped with freezing capabilities. This moving cold chain is critical for maintaining the integrity of the product during transit from remote farms to the processing hub, ensuring compliance with US FDA and EU health standards.

Who it serves: Internal logistics and export supply chain partners.

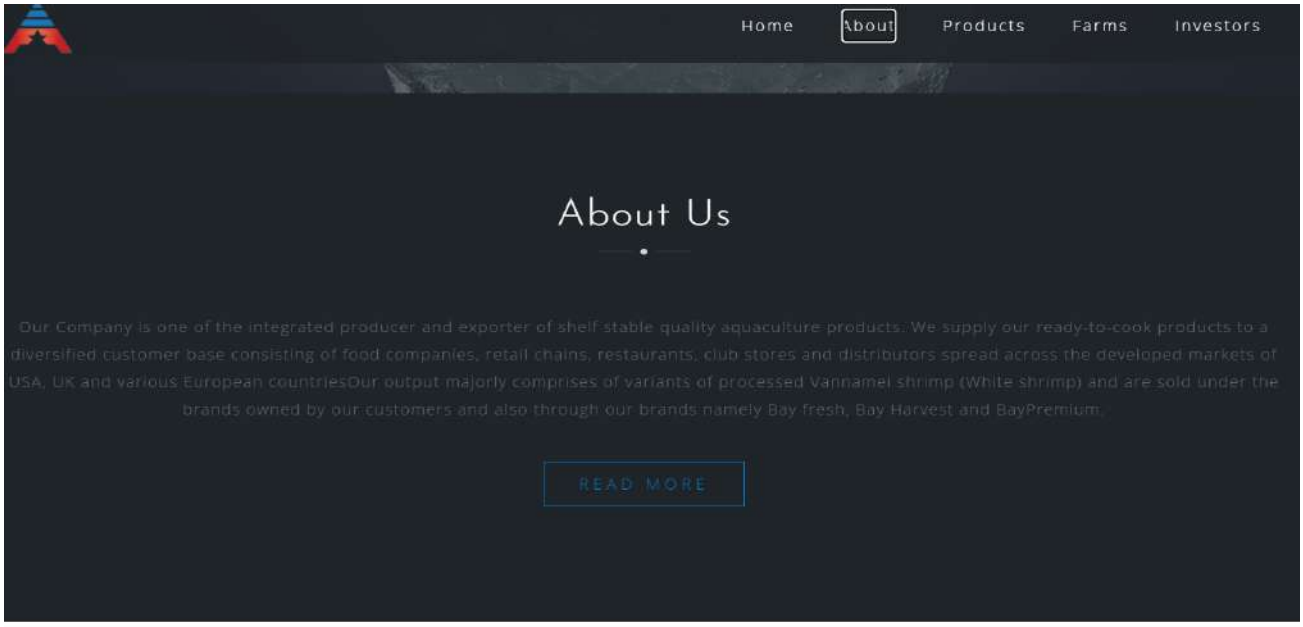
Technology used: Telemetry-monitored Reefer transport and cold storage (3,500 MT capacity).

Revenue model: Value preservation and operational cost-saving.

Challenges and Opportunities

Challenges: Apex faces high operational risks from fluctuating global trade policies and international import duties, alongside the difficulty of managing consistent raw material costs across its vast farming network.

Opportunities: The company is well-positioned to boost profit margins by expanding its high-value Ready-to-Eat product lines and leveraging new free-trade agreements to increase exports to Europe and other non-U.S. markets.



27 Captain Fresh

Founder	Utham Gowda
Established year	2019
Location	Bengaluru, Karnataka, India.

Company Overview

Captain Fresh is a leading B2B (business-to-business) animal protein marketplace. Its core mission is to empower the global fish and seafood value chain by streamlining operations, reducing waste, and ensuring quality from harvest to retail. The company has transformed from an Indian domestic distributor into a major international seafood exporter and aggregator by leveraging proprietary technology and data analytics.

Sector/Domain: B2B Seafood Marketplace, Supply Chain Technology, and International Trade.

Key Technologies Used:

AI/ML Demand-Supply Matching: Proprietary algorithms and a bid engine that use data analytics to match volatile fresh catch supply with immediate global demand .

Fishgram Super App: A digital platform used by fishermen for digital traceability from the point of harvest .

Digital Traceability & Quality Inspection: Systems that allow customers to verify the source and history of their seafood .

Operational Efficiency Tools: Technology designed to reduce reliance on manual processes in processing facilities, thereby lowering wastage rates .

Core Offerings and Business Model:

1. Global B2B Marketplace & Aggregation

Captain Fresh acts as a full-stack marketplace facilitator, connecting a fragmented supply of fresh catch from various regions (including India, Indonesia, and Vietnam) with large overseas brands and retail chains.

Who it serves: International retailers, global seafood brands, and domestic buyers.

Technology used: AI/ML bid engine and demand-supply matching algorithms .

Revenue model: Transactional revenue through percentage fees or commissions on seafood sold .

2. Integrated Global Supply Chain & Acquisitions

The company uses a strategic acquisition model to integrate global supply chains and secure distribution channels.

Who it serves: Global distribution networks and local market intelligence seekers.

Technology used: Integration of acquired operational protocols and tech platforms .

Revenue model: Realizing synergistic efficiencies and market expansion through M&A .

3. Value-Added Processing & Logistics

Captain Fresh focuses on quickly converting fresh inputs into frozen or value-added products with long shelf-lives (20-24 months) suitable for bulk export.

Who it serves: Suppliers needing logistics and buyers requiring processed, shelf-stable products

Technology used: Automated processing lines and digitized cold chain monitoring .

Revenue model: Service fees for specialized packaging, logistics, and quality assurance .

4. Traceability as a Service (Fishgram)

Through the Fishgram app, the company provides end-to-end transparency from the farm or boat to the final customer, ensuring quality and source verification .

Who it serves: Fishermen (for digital recording) and international buyers (for compliance and trust) .

Technology used: Fishgram mobile application and digital inspection systems .

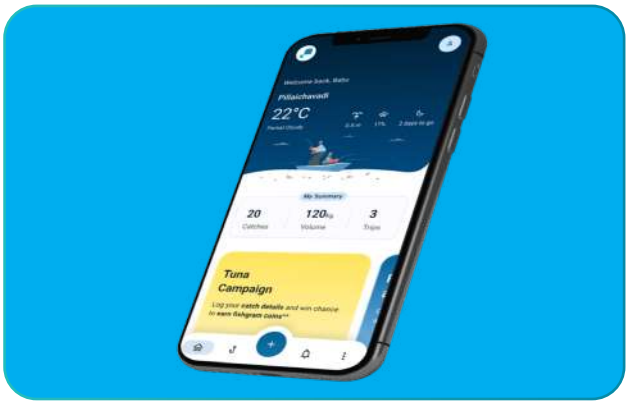
Revenue model: Value preservation and premium positioning through certified traceability

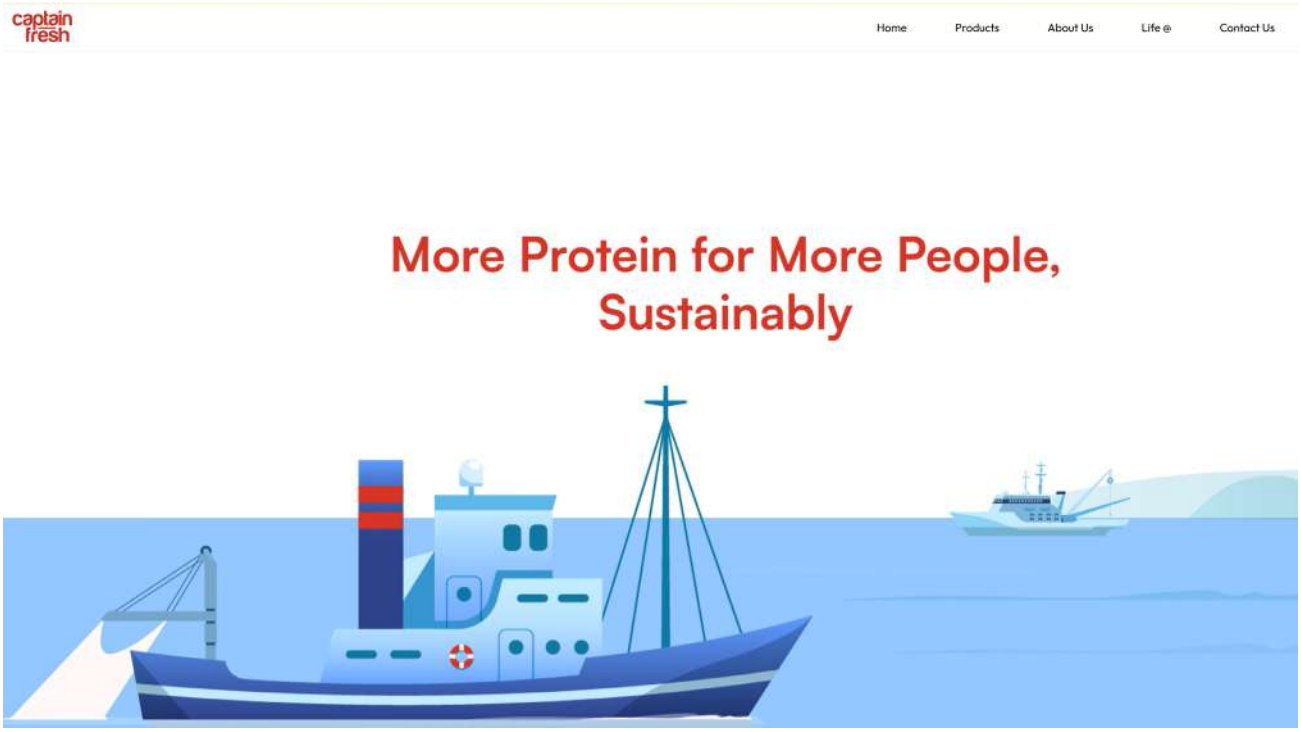
Challenges and Opportunities

Challenges: Managing the heavy operational complexity of a global supply chain that spans over 30 countries while navigating thin profit margins that

are highly sensitive to fluctuating international trade tariffs and global currency shifts.

Opportunities: Rapidly expanding global market share by integrating international acquisitions and leveraging a diverse multi-species portfolio to serve as a high-volume, reliable supplier for major retail chains in the US and Europe.





28 Fishmongers

Founder	Vivek Saha (Co-Founder & Managing Director/CBO) and Suvo Sircar (CEO & Co-Founder).
Established year	January 31, 2019
Location	Bengaluru, India; Registered Address: Pune, Maharashtra, India.

Company Overview

Fishmongers is an Indian tech-based supply chain platform that modernizes the procurement, logistics, and distribution of live and chilled fish. Operating under the legal entity Shuvoneel Ras System Private Limited, the company aims to disrupt the traditional, unorganized seafood supply chain by providing transparent, technology-driven solutions for B2B and retail customers. It focuses on maintaining high hygiene standards and addressing industry-wide challenges such as perishability and price volatility.

Sector/Domain: Aquaculture Technology, Live Fish Logistics, and Seafood Supply Chain.

Core Offerings & Business Model

Live Fish Sourcing and Supply: The core of the model focuses on maintaining living inventory using NeelVaahan Infinity. This specialized logistics system monitors pH, ammonia, and oxygen levels in real-time during transport, allowing Fishmongers to offer a premium product with a 100% freshness guarantee to high-end gourmet clients.

Chilled Seafood Distribution: Utilizing a robust managed cold chain, the company supplies whole, headed, or gutted chilled seafood. This Moving Cold Chain reduces post-harvest losses and ensures that urban consumers receive hygienic, brand-assured products through quick-commerce and retail outlets.

Supply Chain SaaS (Blufarmz): Nature-tech modeling that tracks disease risks and water quality 3–7 days in advance. While primarily used for internal operational efficiency, the company provides export services and digital traceability to verify the history and safety of every harvest for global buyers.

Hybrid Phygital Retail: Fishmongers operates a multi-tier retail strategy, uplifting traditional wet-market retailers with branded setups while managing direct-to-consumer outlets. This reduces intermediaries and allows for better price discovery for both farmers and consumers.

Business Model: Primarily Transaction-based, earning revenue from direct retail and wholesale distribution contracts. Additional value is generated through premium pricing for live inventory and operational savings achieved by a near-zero waste supply chain.

Challenges & Opportunities:

Challenges: Navigating the massive logistical complexity of transporting live inventory across long distances in varying Indian climates, and the high initial cost of deploying patented live tank hardware in a price-sensitive mass market.

Opportunities: Scaling the SaaS and Data Intelligence vertical to monetize their climate-smart AI models for other aquaculture firms, and leveraging their patents to become the technology backbone for India's expanding Blue Economy.

Miledeep Works Private Limited 29

Founder	Naga Satyapavan Kumar Mangalampalli, Devi Venkata Ramana Nimmakayala and Lakshmi Sarojini Gunnam (Director)
Established year	2017
Location	Kakinada, Andhra Pradesh, India.

Company Overview

Miledeep Works Private Limited is an Indian agritech startup focused on digitizing and optimizing the aquaculture and farming supply chain. Operating with a philosophy of an Inch Wide - Mile Deep understanding, the company aims to empower traditional aqua farmers by blending ancestral knowledge with modern technology and business practices. The primary goal is to deliver profitability, structure, and assistance throughout the entire crop cycle, transforming the sector toward sustainability and prosperity.

Sector/Domain: : Agritech, Digital Supply Chain, and Aquaculture E-commerce.

Core Offerings & Business Model

AquaBrahma (Knowledge & Community): A trusted digital hub where farmers access best practices, technical guides, and industry trends. The platform fosters a community of 100,000+ farmers who share real-time experiences and technical queries, supported by an expert AI-advisory team.

AquaDeals (E-commerce Marketplace): A specialized B2B marketplace that connects farmers directly with manufacturers for inputs like high-quality feed, seeds, and probiotics. This factory-to-farm model ensures product authenticity and reduces costs by bypassing traditional multi-layered distribution.

Market Linkage & Rate Reporting: The platform provides daily, verified price reports from major aquaculture hubs (like Nellore, Bhimavaram, and Surat). This transparency prevents middlemen from exploiting farmers during the high-stress harvest period.

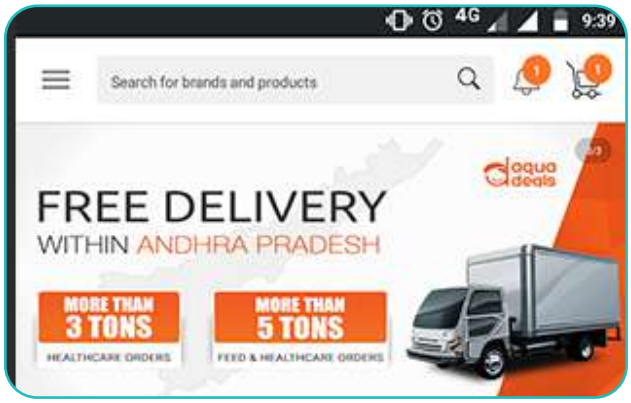
Precision Farming Tools: Integrated AI calculators that assist farmers in determining optimal feed ratios, shrimp count, and aeration requirements. These tools help in improving the Feed Conversion Ratio (FCR) and preventing over-feeding, which is the largest expense in aquaculture.

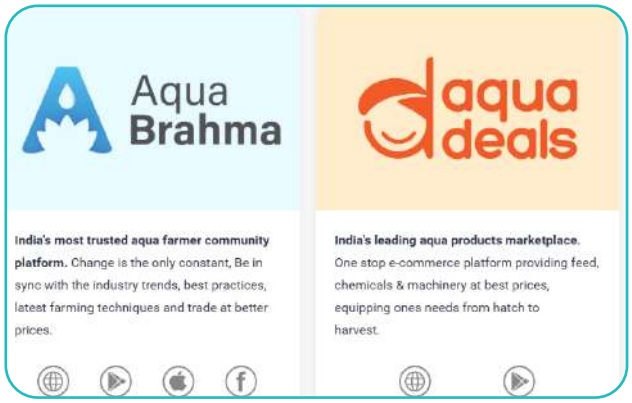
Business Model: Primarily Transaction-based, earning margins from AquaDeals sales and commissions on produce trades. The company also generates value through data insights and is exploring Embedded Finance to offer de-risked credit scores for formal bank lending.

Challenges & Opportunities:

Challenges: Navigating the deep-rooted credit-dependency of farmers on local money-lender middlemen and ensuring reliable last-mile logistics for heavy feed bags in remote, unpaved coastal areas.

Opportunities: Scaling their proprietary credit-scoring model to unlock massive formal lending opportunities and expanding their successful Andhra-model into burgeoning markets like West Bengal, Gujarat, and South-East Asia.





30 Vridhi Techno Farms Pvt Ltd

Founder	VasuKumar Nair.
Established year	2020
Location	Coimbatore, Tamil Nadu.

Company Overview

VTF is a direct-to-consumer (D2C) seafood brand and technology-enabled food chain company. Its core mission is to build a Transparent & Traceable Fish Food Chain by providing 100% safe, natural, and hygienic fish directly to customers. The company manages the entire process from farming in biosafe environments to processing with RO-purified water and doorstep delivery via a maintained cold chain.

Sector/Domain: D2C Seafood, Food Technology, and Vertically Integrated Supply Chain.

Core Offerings & Business Model

Direct-to-Consumer (D2C) Marketplace: VTF operates an integrated platform for urban households, specializing in kitchen-ready seafood. By using express logistics (targeting 60-minute delivery in specific zones), they ensure maximum freshness for health-conscious families.

Trace UR Fish (Traceability Platform): A proprietary digital system that allows customers to track their seafood back to its farm of origin. This end-to-end data trail builds brand loyalty by guaranteeing that the product is free from preservatives and chemicals.

Hygienic Value-Added Processing: Unlike traditional markets, VTF processes fish using RO-purified water and delivers products in net-weight portions (cleaned and sliced). Their catalog includes fresh steaks and regional pre-marinated variants (e.g., Kongu Spiced), catering to busy urban professionals.

Biosafe Sourcing & Cold Chain: The company maintains a Continuous Cold Chain from harvest to delivery. They partner with farms practicing biosafe methods in fresh, brackish, and sea water to ensure species-appropriate natural growth without artificial boosters.

Business Model: Primarily Direct Sales (B2C) through their e-commerce platform. Revenue is generated by commanding a premium price point over traditional markets, justified by certified safety, convenience, and superior hygiene standards.

Challenges & Opportunities:

Challenges: Managing the high operational costs of maintaining a specialized cold chain for express deliveries and overcoming the deeply ingrained consumer habit of buying from local, though unhygienic, wet markets.

Opportunities: Expanding their Trace UR Fish platform into a subscription-based safety certification for other suppliers and scaling their D2C model into other major South Indian urban clusters like Bengaluru and Chennai.

Epicure Innovative LLP 31

Founder	Mirzad Alinaparambil Ummar, Ismail Mohammed Shafi, and Hyder Alinaparambil Shias.
Established year	2022
Location	Kochi, Kerala.

Company Overview

Epicure Innovative LLP is a fresh seafood and meat processing enterprise that focuses on delivering high-quality, hygienic, and convenient products to consumers. The company's vision is to revolutionize the seafood industry through Quick Commerce (Q-Commerce) B2B services and B2C e-commerce platforms. They are committed to sourcing the finest catch directly from coastal fishermen in Kerala, ensuring authenticity, traceability, and freshness.

Sector/Domain: : Seafood and Meat Processing, Q-Commerce, and D2C (Direct-to-Consumer) E-commerce.

Key Technologies Used:

Vacuum Skin Packaging (VSP): A core technology that places cleaned fillets into specialized packaging and seals them tightly to remove air. This minimizes oxidation, extends shelf life, and enhances visual appeal while preventing physical damage.

State-of-the-art Processing Facility: Operations are supported by a high-tech facility designed to set new benchmarks in the retail fish market.

10-Step Quality Control Protocol: A standardized operational process that manages everything from procurement and inspection to VSP packaging and controlled cold storage (-4°C to 0°C).

Core Offerings & Business Model

B2B Channel (Quick Commerce): Epicure serves as a critical supply link for supermarkets, hotels, and high-end restaurants. By providing bulk, pre-processed seafood that is ready for immediate retail or cooking, they help institutional clients reduce labor costs and minimize biological waste.

Vacuum Skin Packaging (VSP) Technology: A standout feature where fillets are sealed tightly in specialized film to remove all air. This tech prevents freezer burn, stops oxidation, and extends the shelf life of fresh fish without the need for chemical preservatives.

B2C E-commerce Platform: Through a dedicated mobile app and website, the company delivers pre-cut, odor-free, and hygienically packed seafood directly to homes. This model targets premium consumers who prioritize food safety and kitchen-ready convenience.

Direct Sourcing Model: By procuring directly from Kerala's coastal fishing communities, the company maintains a transparent value chain. This ensures that the catch is processed within hours of landing, providing a significant freshness advantage over competitors who rely on multi-tier distributors.

Business Model: Primarily Sales-based, generating revenue through high-velocity institutional contracts (B2B) and premium-priced retail sales (B2C). Their vertical integration from boat to processing plant to doorstep allows them to capture higher margins by removing intermediaries.

Awards

It won Best Fisheries Startup at Coastal States Fisheries Meet 2025. To read more: https://www.icar.org.in/en/icar-cift-incubatee-epicure-innovative-llp-recognized-best-fisheries-startup-coastal-states

Challenges & Opportunities:

Challenges: Managing the high energy and equipment costs associated with VSP and cold-chain maintenance, while educating a mass market that is still accustomed to buying fish from open-air, unhygienic traditional stalls.

Opportunities: Expanding the Q-Commerce fulfillment network into major South Indian metros and scaling the B2B vertical by targeting high-end hospitality chains that require standardized, hygienic, and kitchen-ready seafood.

32 BezgoFresh

Founder	Muhammad Shafak and Rithik Krishna
Established year	2024
Location	Palakkad, Kerala, India (Primary operational area).

Company Overview

bezgoFresh is an Indian e-commerce platform and hyper-local delivery service specializing in the swift and hygienic delivery of fresh, raw meat and seafood. The company connects customers directly with quality-assured local butchers and fish vendors, bypassing the need for physical visits to crowded traditional markets. Their core goal is to provide reliable, convenient access to high-quality protein within a reported 40–50 minute delivery window.

Sector/Domain: E-commerce, Last-Mile Logistics, and Seafood/Meat Retail.

Core Offerings & Business Model

Hyper-Local Aggregator Platform: Acts as a digital storefront for local butchers and fish sellers. It solves the trust gap by vetting vendors and providing consumers with a seamless mobile app and website for ordering.

Cold-Chain Managed Delivery: Uses specialized delivery bags to maintain temperatures below 10°C during the last mile. This arrests bacterial growth and preserves the texture and aroma of fresh catch, which is vital in the tropical climate of Kerala.

Kitchen-Ready Preparation: All orders are cleaned and cut according to specific customer requirements by affiliated vendors before dispatch. This reduces meal preparation time for consumers and ensures zero waste at the household level.

Diverse Protein Portfolio: Offers a wide range of marine fish (Pomfret, Mackerel), shellfish, and freshwater species, alongside poultry and mutton, catering to both daily household needs and premium culinary requirements.

Business Model: Primarily Transaction-based, earning margins on product sales through its vendor network. Revenue is driven by high-frequency repeat orders from quality-conscious urban consumers who value the 45-minute convenience.

Challenges & Opportunities:

Challenges: Managing the thin margins of a hyper-local model while maintaining high logistics costs, and ensuring consistent quality control across multiple independent vendor partners.

Opportunities: Expanding the aggregator model into other Tier-2 cities in Kerala and Tamil Nadu, and utilizing accumulated consumer data to offer subscription-based weekly protein kits for households.

Blucatch Fisheries Private Limited 33

Founder	Ganesh Bhagwan Nakhawa (Founder) and Kameel Skanda Balasubramaniam (Co-founder & Director)
Established year	2017
Location	Nariman Point, Mumbai, Maharashtra

Company Overview

Blucatch Fisheries is a sustainability-focused, tech-driven enterprise that bridges the gap between traditional fishing communities and global seafood markets. Founded by a 7th-generation fisherman, the company operates with a mission to de-commoditize the fisheries sector by introducing digital traceability and fair-trade practices. By cutting out multiple layers of middlemen, Blucatch ensures that traditional Koli/Nakhawa fishers receive better value for their catch while providing ethically sourced, harbor-to-plate seafood to domestic and international buyers.

Sector/Domain: Sustainable Seafood, B2B/B2C Retail and Wholesale, and Fisheries Technology (AI-based solutions).

Core Offerings & Business Model

Direct-Sourcing Ecosystem: Eliminates intermediaries by partnering directly with local communities in Mumbai, Ratnagiri, and Karanja. This allows for 100% transparent pricing for fishermen and guaranteed freshness for HORECA (hotels, restaurants, catering) clients and urban retail consumers.

Fisheries Intelligence Suite: Provides fishers with real-time weather alerts and Potential Fishing Zone (PFZ) insights to reduce scouting time and fuel costs.

BluTrade: A data-driven procurement platform that optimizes supply to match demand, reducing the massive post-harvest waste common in the industry.

BluFinance: A specialized module that builds credit profiles for small-scale fishers, facilitating access to formal insurance and low-interest loans.

Sustainable Marine Portfolio: Promotes seasonal and under-utilized species (like Ribbon Fish and Mackerel) alongside popular items (Pomfret, Kingfish) to prevent overfishing and preserve marine biodiversity.

Business Model: A hybrid Wholesale & D2C model. Revenue is generated through high-volume bulk exports and domestic retail sales, complemented by consulting services for Fisheries Improvement Projects and traceability audits for other industry players.

Challenges & Opportunities:

Challenges: Managing the high risk of post-harvest loss estimated at nearly one-third of the global catch and overcoming the logistical difficulty of scaling a digital traceability system across thousands of decentralized, small-scale fishing vessels.

Opportunities: Expanding the reach of their AI-based intelligence tools to global coastal communities and capitalizing on the growing demand for ethically sourced, traceable seafood in international markets seeking fair-trade and sustainable certifications.

34 Zarin Gourmet Private Limited

Founder	Rifat Amin, Saurav Pachipulusu Satish, and Syed Faaiz Qadri
Established year	2022
Location	Srinagar, Jammu & Kashmir, India

Company Overview

Zarin Gourmet is a premium Kashmiri aquaculture startup specializing in the cultivation and nationwide distribution of Himalayan Rainbow Trout. The company utilizes the high-oxygen, pristine glacial waters of the Kashmir Valley to produce high-quality, sustainable cold-water fish. Zarin is a pioneer in professionalizing the cold-water fisheries supply chain in J&K, bridging the gap between remote Himalayan farms and urban Indian markets with a 24-hour farm-to-table delivery model.

Sector/Domain: Premium Aquaculture, Cold-Water Fisheries, and Integrated Supply Chain

Core Offerings & Business Model

Premium Fresh & Value-Added Trout: Offers whole gutted trout, steaks, and fillets. The 24-hour logistics model ensures that fish harvested in the mountains of Kashmir reach kitchens in Delhi or Mumbai with day-zero freshness, maintaining the low-mercury and high-protein quality of glacial fish.

Gourmet Delicacies (Trout Roe): Zarin is one of the few Indian players harvesting Trout Roe (fish eggs), a luxury product characterized by mild, briny flavors. This allows the brand to compete in the niche global gourmet market alongside high-end caviar.

B2B Commercial Supply: Acts as an aggregator for local Kashmiri farmers, providing them with a steady market while ensuring a consistent, year-round supply of trout for five-star hotels and premium supermarket chains like FreshToHome.

Social Sustainability: A core operational pillar that integrates local Kashmiri women into the workforce. This initiative focuses on high-precision tasks like cleaning and value-added processing, combining social impact with standardized production quality.

Business Model: A Hybrid D2C and B2B model. Revenue is driven by high-margin retail sales to premium consumers and bulk institutional contracts with the hospitality sector. They utilize strategic partnerships with major e-commerce players to scale their brand presence without heavy physical infrastructure.

Challenges & Opportunities:

Challenges: Navigating the logistical risks of the high-altitude Himalayan terrain, where landslides and extreme weather can disrupt the critical 24-hour cold-chain window required for fresh delivery.

Opportunities: Scaling the export of high-margin products like Trout Roe to international markets and leveraging the newly notified cold-water fisheries clusters in J&K to expand their aggregated farmer network and production volume.

Almericus Blue Ventures Pvt Ltd 35

Founder	Gurusamy Kumar (Founder & CEO) and Chellam Krishnapoorani (Co-Founder).
Established year	2022
Location	Headquarters: Anna Nagar, Chennai, Tamil Nadu, India.

Company Overview

Almericus Blue Ventures is an Agri-Tech ecosystem builder focused on establishing trust, transparency, and resilience in the aquaculture supply chain, specifically targeting high-value shrimp exports. Incubated at ICAR–CIBA (Central Institute of Brackishwater Aquaculture), the company bridges traditional farming with modern global compliance. Its mission is to deliver solutions that are scientifically validated, environmentally sustainable, and fully traceable to ensure food safety and consumer trust.

Sector/Domain: Agri-Tech, Aquaculture Infrastructure, and Seafood Export Compliance.

Core Offerings & Business Model

BlueChain Traceability & Compliance: A digital ecosystem that uses QR codes to log data across the shrimp lifecycle. This system automates compliance for international certifications like BAP (Best Aquaculture Practices) and ASC, making Indian shrimp export-ready for premium markets.

Integrated Sourcing & Input Marketplace: Connects farmers with certified genetic seed suppliers and biosecure inputs like probiotics and high-quality feed. This vertical ensures that the production process is scientifically managed and free from banned antibiotics.

Geospatial & Climate Intelligence: Utilizes advanced satellite mapping to identify climate-resilient farming sites, helping farmers and investors minimize environmental risks and optimize pond yields.

Blue Carbon Credit Monitoring: Tracks sustainable farming practices to generate verifiable Blue Carbon credits, creating an additional revenue stream for farmers while supporting global biodiversity and climate goals.

Business Model: A Service-and-Marketplace model. Revenue is generated through infrastructure fees for traceability tools, transactional margins on input sales, and facilitation fees for financial services like loans and insurance.

Challenges & Opportunities:

Challenges: Navigating a highly competitive landscape dominated by funded players and managing the steep compliance cost for small-scale farmers who may struggle to adopt expensive digital monitoring technologies.

Opportunities: Scaling the Blue Carbon vertical to capitalize on global ESG investments and expanding their Brood-to-Bowl model into non-US markets like China and the EU, which are increasingly demanding high-traceability standards.

36 Jeelani Marine Products

Founder	Mr. S. H. Aboobaker (Managing Director)
Established year	2011
Location	Ratnagiri, Maharashtra

Company Overview

Jeelani Marine Products is a premier Indian seafood processor and exporter. Based in the pristine coastal region of Ratnagiri, the company operates a state-of-the-art processing facility designed to meet the most stringent international hygiene and quality standards. By bridging the gap between local fishers/aquaculture farmers and the global plate, Jeelani Marine has become a trusted name for premium, sustainably sourced seafood. The company specializes in the processing of both sea-caught and farm-raised products, ensuring farm-to-fork traceability for clients in the USA, EU, Japan, and China.

Sector/Domain: Seafood Processing, Export Trading, and Cold Chain Logistics

Core Offerings & Business Model

State-of-the-Art IQF & Block Freezing: The company utilizes high-capacity Individually Quick Frozen (IQF) lines (1,000 kg/hr) and blast freezers to preserve the texture and nutritional value of high-value species like Silver Pomfret, Kingfish, and Vannamei Shrimp.

Global Compliance & Certification: Jeelani maintains a Gold Standard in food safety, holding certifications from USFDA, EU, BRC, BAP, and HACCP. This allows them to bypass technical barriers in highly regulated Western markets.

End-to-End Traceability: Every batch is tracked from the landing center or aquaculture farm gate to the final export container. This transparency is crucial for global retailers who demand farm-to-fork documentation to ensure antibiotic-free and legally caught seafood.

Strategic Infrastructure: Beyond processing, the company operates its own Block Ice and Flake Ice plants (300 MT combined daily capacity) and a fleet of 35 insulated vehicles, ensuring the cold chain is never broken from the moment the fish leaves the water.

Business Model: Primarily B2B International Export. Revenue is generated through high-volume contracts with global wholesalers and supermarket chains. The company also captures value-added margins by converting raw catch into graded, cleaned, and specialty-packed products ready for international retail.

Challenges & Opportunities:

Challenges: Managing the volatility of wild catch volumes which are subject to seasonal and climatic changes; and the constant evolution of international food safety laws regarding antibiotic residues in farmed shrimp.

Opportunities: Transitioning into Value-Added Products (Ready-to-Cook marinated seafood, portion-controlled fillets) to insulate the business from commodity price swings; and increasing the share of Certified Sustainable products (ASC/BAP) to cater to the growing eco-conscious consumer base in Europe and North America.

Longshore Technologies Private Limited 37

Founder	Amey Rajesh Naik (CEO) and Sangeeta Rajesh Naik.
Established year	2023
Location	Headquartered in Vasai Virar, Palghar, Maharashtra, India.

Company Overview

Longshore Technologies is a pioneering Indian agritech and industrial chemical manufacturer focused on the Blue Economy. The company made headlines by establishing India's first shrimp shell biorefinery, a project supported by a high-stakes technology transfer from the ICAR-Central Institute of Fisheries Technology (CIFT), Kochi. Longshore's primary mission is to convert the environmental liability of shrimp processing waste into high-value biopolymers and protein supplements. By processing approximately two tons of shrimp waste daily, the company promotes a circular economy, supplying high-purity derivatives to the global aquaculture, agriculture, and pharmaceutical industries.

Sector/Domain: Industrial Biotechnology, Circular Economy, and Specialty Chemicals.

Core Offerings & Business Model

Shrimp Shell Biorefinery (Waste-to-Value): The core innovation is a commercial-scale facility that extracts up to 80% of proteins from dry shrimp waste. This circular economy model addresses the critical environmental challenge of shrimp shell disposal while creating economically viable industrial products.

Chitosan & Chitin Production: Produces multiple grades of Chitosan (Food, Technical, and Bio-tech grade) and Chitin Flakes. These biopolymers serve as natural antimicrobial agents in food, flocculants in water treatment, and key ingredients in clean beauty cosmetics.

Protein Hydrolysates: Extracts Caroteno Protein Hydrolysate a highly digestible, eco-friendly protein source. This is a critical additive for the aquaculture feed industry, proven to improve the Feed Conversion Ratio (FCR) and promote healthier growth in farmed fish and shrimp.

Agricultural Solutions: Leverages marine extracts to produce Fish Amino Acid Fertilizers and Seaweed Extract Powders. These natural inputs enhance soil vitality and increase crop resilience against pests and climate stress.

Business Model: A B2B Industrial Manufacturing model. Revenue is generated through direct bulk sales to the pharmaceutical, agricultural, and animal feed sectors. The company also engages in global export trading, serving markets in the USA, Vietnam, and the Middle East.

Challenges & Opportunities:

Challenges: Navigating the seasonal volatility of raw shrimp shell supply; and the high technical requirement to maintain Pharmaceutical Grade purity for high-margin medical applications.

Opportunities: Expanding into the Bioplastics market by using Chitosan for biodegradable packaging; and scaling the biorefinery model to other seafood hubs through technology licensing.

38 Freshma

Founder	Rajesh Kumar R. (Managing Director) and Paranthaman G. (Group CEO).
Established year	Founded as a retail operation in 2016; pivoted to an integrated D2C/Omnichannel model in 2022.
Location	Chennai, Tamil Nadu.

Company Overview

Freshma is a fast-growing Direct-to-Consumer (D2C) seafood brand that aims to fix the broken traditional seafood supply chain in India. By focusing on an omnichannel strategy—blending physical retail stores with a robust digital app—Freshma provides 100% chemical-free, kitchen-ready seafood. The brand's philosophy centers on transparency and safety, ensuring that every piece of fish is sourced responsibly and delivered fresh. Their Net Weight policy (charging only for the meat after cleaning) has made them a trusted household name for urban consumers seeking quality and convenience.

Sector/Domain: Agri-Tech, D2C Food Retail, and Seafood Supply Chain.

Core Offerings & Business Model

Omnichannel Fulfillment: Freshma utilizes its branded physical stores as Micro-Fulfillment Centers. This hybrid model allows traditional customers to shop in person while simultaneously powering a 60-to-120-minute delivery window for online app users.

Chemical-Free Sourcing: The brand bypasses traditional wholesale markets often associated with formalin and ammonia preservation by sourcing directly from a trusted network of small-boat fishermen and certified aquaculture farms.

Precision Processing: All products pass through a centralized Quality Control (QC) hub in Chennai. Here, seafood is cleaned, precisely cut to customer specifications, and vacuum-packed under strict temperature controls before dispatch.

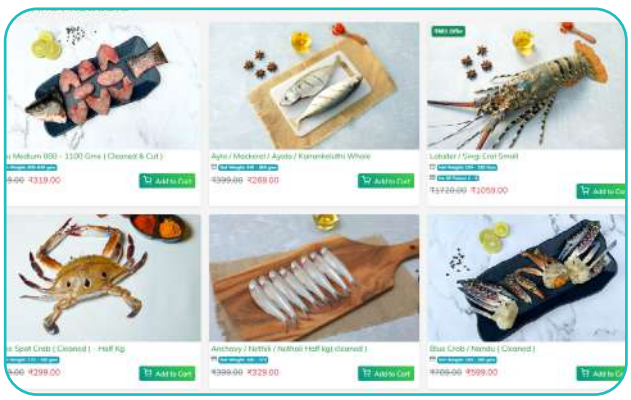
Diverse Product Portfolio: Offers a wide selection of marine fish (Seer Fish, Mackerel), freshwater varieties (Rohu, Catla), and premium shellfish (Crabs, Lobsters). Their Ready-to-Cook range focuses on pre-cleaned slices and fillets to eliminate the hassle of home preparation.

Business Model: Primarily B2C Sales. Revenue is generated through retail stores and digital platforms. The company uses a Premium Pricing Strategy, where higher costs compared to local markets are justified by the Net Weight value (no payment for waste) and guaranteed chemical-free safety.

Challenges & Opportunities:

Challenges: Maintaining a strict 2-hour cold chain while expanding into new metros like Bengaluru and Hyderabad; managing hybrid inventory to prevent spoilage across both physical and digital streams; and competing with heavily funded national players like Licious.

Opportunities: Scaling to 22 stores by 2025 to become a dominant regional player; expanding into high-margin Ready-to-Eat (RTE) marinades and value-added products; and introducing QR-code-based traceability to prove their chemical-free claims to health-conscious consumers.



F3 Marine Foods 39

Founder	Mushtaq Ahmed
Established year	2017
Location	Headquartered in Malpe, Udupi, Karnataka, India.

Company Overview

F3 Marine Foods is a premier seafood export house located in one of India's most prominent fishing hubs, Malpe. Since its inception in 2017, the company has established itself as a significant player in the global frozen seafood market. Driven by the vision of Mushtaq Ahmed, F3 Marine focuses on unmatched quality and global distribution, utilizing advanced freezing technology and streamlined workflows to ensure that the natural freshness, texture, and nutritional value are preserved.

Sector/Domain: Seafood Export, Frozen Food Processing, and Marine Supply Chain.

Core Offerings & Business Model

Cold Chain Excellence: Utilizes specialized freezing technology to maintain a strict sub-zero environment. This precision prevents cellular breakdown and drip loss, which is critical for maintaining the premium quality required by Japanese and European sushi and retail markets.

Specialized Cephalopod Processing: Known for high-quality Frozen Whole Squid (predominantly the Loligo species, trade name Calamari) and Cuttlefish. These are meticulously graded and packed in precision units to meet international standardized kitchen requirements.

Diverse Finfish Portfolio: Exports a wide variety of species, ranging from high-protein staples like Indian Mackerel (popular in Asian and African markets) to high-value predatory species such as White Tuna, Mahi Mahi, and Malabar Trevally.

Global Distribution Network: Operates an export-led model serving major markets in Asia (China, Thailand, Malaysia, Japan) and Western Markets (USA, Europe). The business acts as a reliable high-volume partner for international wholesalers and food service distributors.

Business Model: Primarily B2B Export-Based, generating revenue through high-volume transactional sales. The company leverages its proximity to the Malpe harbor to maintain lower logistics costs and higher freshness standards than inland competitors.

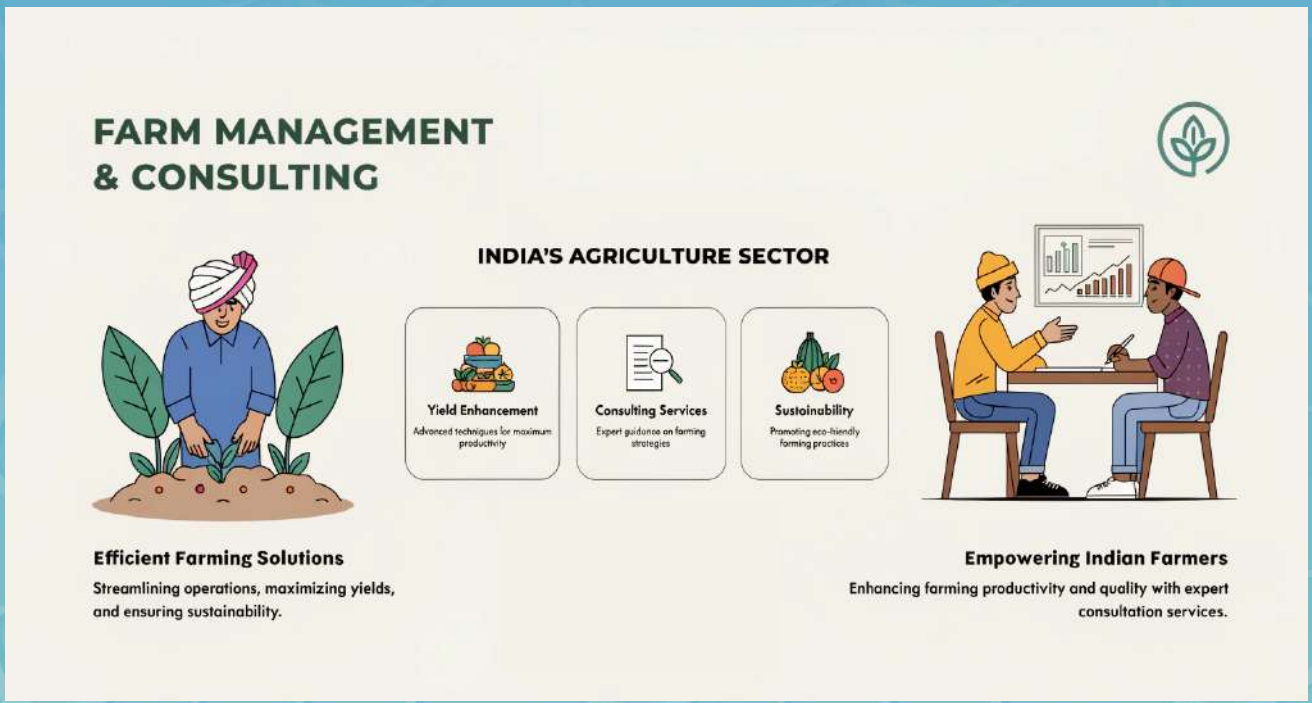
Challenges & Growth Opportunities:

Challenges: Navigating fluctuating global maritime freight costs and ensuring the integrity of the cold chain across long-distance transits to North America and Europe.

Opportunities: Technological Integration: Investing in even more advanced IQF (Individually Quick Frozen) technology to target the high-end retail segment; and Market Expansion: Deepening their presence in Middle Eastern and Australian markets.

Farm Management & Consulting

The Indian Fisheries Farm Management & Consulting sector is currently defined by a shift from traditional subsistence farming to professionalized, high-yield aquaculture through end-to-end technical support and advisory. These fifteen key organizations Jal Jeevika Infotech, Agrin Eco Farming (SmartAgrin), Aqua Tech Fishery (ATF), Hasiru Aqua Technology, Uday Aquaconnects, Bharat Fishmate, Dakh Biotech, Essential Aquatech, STEM Systems, Nagodas Fish Farming and Consultancy, AquaX, Blue Aqua Life Consultancy, IIFSA, Gramshree Agri Services, and Manjeera Aqua Technologies demonstrate the essential role of expert-led interventions in maximizing pond productivity and minimizing environmental impact. Their collective activities include the implementation of Recirculating Aquaculture Systems (RAS) and Biofloc technologies, the provision of high-quality seed and feed inputs, and the delivery of on-ground training to rural and tribal communities. By integrating specialized consultancy with digital platforms and climate-resilient farming models, these startups are addressing the lack of technical know-how at the grassroots level. Through this democratization of scientific farming practices, these enterprises are empowering small-scale farmers to transition into commercial entrepreneurs, ensuring a sustainable and standardized supply of fish for the national market.



Farm Management & Consulting

Professionalizing grassroots aquaculture through technical extension, biosecurity advisory, and turnkey intensive system design.

Table 7: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
Jal Jeevika Infotech	Rural Livelihood	Mini-RAS for land-constrained backyard farming	Aqua-Senso IoT, Mini-cages, Digital Advisory	Social enterprise with hybrid service and hardware revenue
Agrin Eco Farming	Scientific Consultancy	SmartAgrin intensive production blueprints	Turnkey BFT/RAS design, Field services	Service-led consulting contracts and project management
Aqua Tech Fishery	Technical Setup providing end-to-end technical guidance	650 GSM PVC high-tensile tank infrastructure	Turnkey Biofloc/RAS, equipment supply	Hybrid service-and-commerce for intensive farm entry
Hasiru Aqua	Managed Farming	MeenDoctru floating solar-powered IoT	Full-stack cultivation management (DFC model)	Service-and-Profit-Share model for smallholders
Uday Aquaconnects	Aqua Park Development	Circulatory Aquaculture Systems (CAS)	High-tech hatcheries, Seaweed commercialization	Integrated consultancy, R&D, and buy-back assurance
Bharat Fishmate	Umbrella Platform with access to climate-resilient seeds and expert technical guidance	Blockchain traceability	Fishmate Zones, Fishmate App, Aqua-inputs	Phygital marketplace and technical project installation
Dakh Biotech	Biosecurity	Nano-Silver virucide technology	Prime Shrimp, Probex-P, DB Immuno, D-Minplus, DB-Daksha, Db-Dhanva, AQUAVIN-C Plus and Aqua Rakshak	B2F technical advisory and biological input sales
Essential Aquatech	Climate-Resilience	AI disease-prediction for aquaculture ecosystems	ISO-certified health inputs, Biofloc setup	Hybrid input-and-service model with direct market linkage
STEM Systems	Intensive Management	Hanging Mud Crab Fattening for small footprints	STEM App, Aquamin salt, RAS/Biofloc	Knowledge-as-a-Service (KaaS) and technical consulting

Nagodas Fish Farming	Engineering Consultancy	Technical blueprints for five culture models	Turnkey RAS/Biofloc, specialized hardware	B2B and B2F turnkey contracts and professional training
AquaX	Managed Services	Cooperative Farming model for marginal holders	AquaCo-op management, AquaEco marketplace	Revenue-share and managed service partner for smallholders
Blue Aqua Life Consultancy	Microbial Management & Bioremediation	Diagnostic-led Consultation	Pathogen diagnostics, Spirulina-based larval feed	Consult-to-Product model for intensive shrimp farms
IIFSA	Extension Services	Virtual Aquaculture Advisory Service (VAAS)	Pond Health Locker, AOSS (Aquaculture One-Stop Solution physical centers)	Hybrid revenue from consultancy and proprietary inputs
Gramshree Agri	Professionalized Hubs	4T Framework (Training, Trading, Tech, Treatment)	Gramshree Mall, Krishak Pathshalas, Gramshree Kisan App	B2F Hub-and-Spoke model funded by VC/ Angel investment
Manjeera Aqua	Integrated Value Chain	IPACT (Intensive Pond Aqua Culture Technology)	Freshmaans retail, Aqua Academy training	Group-led vertical integration from construction to retail

Table 8: Sector Feature Matrix

Startup Name	*Training/Capacity Building*	Turnkey Project Setup	Digital Advisory/ SaaS	Market Linkage Services
Jal Jeevika Infotech	√	√	√	√
Agrin Eco Farming	√	√		
Aqua Tech Fishery	√	√		√
Hasiru Aqua		√	√	√
Uday Aquaconnects	√	√		√
Bharat Fishmate	√	√	√	√
Dakh Biotech			√	
Essential Aquatech		√	√	√
STEM Systems	√	√	√	√
Nagodas Fish Farming	√	√		
AquaX		√	√	√
Blue Aqua Life	√	√		
IIFSA	√	√	√	
Gramshree Agri	√		√	√
Manjeera Aqua	√	√		√

Jal Jeevika Infotech Private Limited 40

Founder	Neelkanth Mishra
Established year	2020
Location	Headquarters: Patiala, Punjab, India (Registered Office). Operational Base: Pune, Maharashtra, India.

Company Overview

Jal Jeevika Infotech is an Agri-Tech startup dedicated to democratizing aquaculture technology for small and marginal farmers. The company's mission is to harness the power of technology to create a sustainable aquaculture ecosystem. Unlike traditional equipment vendors, Jal Jeevika operates as a farmers' collaborative platform, focusing on three strategic pillars: integrating high-yield aquaculture models, building robust supply chains, and empowering rural micro-entrepreneurs. By lowering the barriers to entry, they transform capital-intensive fish farming into a viable, income-generating rural enterprise.

Sector/Domain: Agri-Tech, Sustainable Aquaculture, and Rural Livelihood Development.

Core Offerings & Business Model

MINI-RAS (Recirculating Aquaculture System): A compact, closed-loop unit designed for backyard farming. It filters and reuses 90% of its water, making it ideal for land-constrained farmers. This technology allows for high-density fish culture in controlled environments, protecting crops from external pollutants and climatic shifts.

Aqua-Senso IoT & Advisory: A sensor-based toolkit that monitors pH, Dissolved Oxygen (DO), and temperature. Crucially, it features offline data storage to accommodate poor rural connectivity, providing weather-based alerts and feeding schedules via a mobile app to reduce the production cycle by up to 33%.

Mini-Cage Aquaculture: Adaptable small-scale cages for farm ponds and community wetlands. These systems utilize solar-powered aeration to maintain water quality, enabling high-density farming in natural water bodies that were previously considered unproductive.

Value Chain Integration: The company aggregates produce from decentralized smallholders to create a consistent supply for B2B buyers like supermarkets. This Co-Creation model ensures fair pricing for farmers by eliminating predatory middlemen.

Business Model: A Hybrid Social Enterprise model. Revenue is generated through the sale of low-cost hardware kits, setup fees, and digital advisory subscriptions. They also earn transactional margins by linking rural clusters to premium urban markets.

Challenges & Opportunities

Challenges: Managing the high technical maintenance requirements of RAS systems in remote areas with limited access to skilled technical support and overcoming the initial capital entry barrier for marginal farmers who lack collateral for traditional loans.

Opportunities: Scaling their operations through government-backed rural development schemes that promote women's entrepreneurship in fisheries and leveraging national digital agriculture infrastructure to integrate their IoT data with broader financial and insurance ecosystems.

41 Agrin Eco Farming Pvt Ltd

Founder	Gopikrishna Ogirala, Vishnuvardhan Raj Panga, and Siddharth Pendem.
Established year	June 2, 2024
Location	Hayathnagar (Raja Rajeshwari Nagar), K.V. Rangareddy, Telangana, 501505.

Company Overview

Agrin Eco Farming Private Limited is a recently incorporated agri-tech startup specializing in aquaculture and related agricultural services. The company focuses on sustainable, technology-driven solutions for the fisheries sector, providing technical consultancy and support for intensive farming systems like shrimp culture. It aims to bridge the gap between traditional farming methods and modern scientific practices through direct field interventions and technical expertise.

Sector/Domain: Agri-Tech, Aquaculture Consultancy, and Animal Production Services.

Core Offerings & Business Model

Scientific Aquaculture Systems: Agrin specializes in designing personalized, high-intensity farming environments. Their expertise covers a wide range of modern techniques:

Biofloc Technology (BFT): Using microbial communities to convert waste into protein-rich feed.

Recirculatory Aquaculture Systems (RAS): Designing intensive systems with minimal water usage.

Integrated Multi-Trophic Aquaculture (IMTA): Symbiotic culture of fish, shrimp, and seaweed.

Specialized Breeding & Culture: Provides technical consultancy for high-value species, including Vannamei (White leg shrimp), Monosex Tilapia, Mud Crab fattening, and genetically improved varieties like Jayanti Rohu.

End-to-End Field Services: Operates on a contract or fee basis to provide support services such as field preparation, crop treatment, pest control, and induced breeding of carps.

Training & Capacity Building: Offers comprehensive training programs for farmers and professionals to upskill them in modern blue-food production.

Business Model: A Service-Led Consulting Model. Revenue is primarily generated through technical consultancy fees, project management contracts for farm setups, and service-based fees for specialized agricultural activities (spraying, transplanting, and harvesting).

Challenges & Opportunities

Challenges: Navigating the technical complexity and high initial power requirements of intensive systems like RAS in regions with inconsistent infrastructure, and establishing trust with traditional farmers wary of shifting from low-density ponds to high-tech intensive units.

Opportunities: Scaling their SmartAgrin platform to capitalize on the growing national focus on Blue Economy investments and expanding their footprint into the Eastern coastal belt (Odisha/Andhra Pradesh) where demand for scientific shrimp and crab farming is surging.

Aqua Tech Fishery 42

Founder	Pradnya Gaikwad (Managing Director) and Swapnil Kharat (CEO)
Established year	While the exact incorporation year is not specified
Location	Based in Maharashtra, India, with a presence in Ahmednagar, Jalna, Mumbai, Pune, and Sangli, and expanding into overseas markets.

Company Overview

Aqua Tech Fishery (ATF) is a professional fish farming consultancy and project management firm that positions itself as a specialized High-Tech Farming Enabler. The company aims to simplify the complexities of modern aquaculture such as Biofloc and Recirculating Aquaculture Systems (RAS) by providing end-to-end technical guidance, reliable setup materials, and market solutions.

Sector/Domain: Agri-Tech, Aquaculture Consultancy, and Equipment Supply.

Core Offerings & Business Model

High-Tech Project Consultancy: ATF provides end-to-end turnkey setup services for Biofloc and RAS systems. This includes critical site selection, project design (DPR) preparation for government subsidies, and full installation oversight to ensure biological stability in high-density tanks.

Specialized Infrastructure Supply: The company manufactures and supplies industrial-grade hardware required for intensive tanks, including 650 GSM PVC-coated tarpaulins, 4mm welded wire mesh for structural integrity, and high-performance 2 HP ring blowers for non-stop aeration.

Skill Development & Medicinal Training: Beyond hardware, ATF operates a training vertical that has upskilled over 100 farmers and students. The curriculum focuses on water chemistry management, disease diagnosis, and the medicinal protocols necessary for zero-mortality intensive farming.

Integrated Market Linkage: To ensure profitability, ATF connects its network of farmers directly to over 50 Nikaries (distributors) in urban markets like Mumbai and Pune. This bypasses local village middlemen, ensuring better price realization for the farmers' harvest.

Business Model: A Hybrid Service-and-Commerce model. Revenue is generated through high-margin project consultancy fees, transactional sales of specialized equipment, and structured fees from their technical training programs.

Challenges & Opportunities

Challenges: Managing the technical risk of biological system failure (e.g., ammonia spikes) across decentralized client farms and ensuring reliable 24/7 power backup for aeration systems in rural areas with frequent outages.

Opportunities: Expanding their overseas consulting footprint and leveraging the growing demand for backyard protein security models to scale their low-cost Biofloc kits across other Indian states like Karnataka and Gujarat.

43 Hasiru Aqua Technology Private Limited

Founder	Gopi Krishnappa Ajay (Founder & CEO) and Pranav Kay (Co-Founder & CPO).
Established year	Founded in 2019; Officially December 23, 2020.
Location	Headquarters: Bengaluru, Karnataka, India. (1670/4/1, Somannahalli, Kanakapura Road, Bangalore - 560082).

Company Overview

Hasiru Aqua is Distributed Fish Cultivation (DFC) company. It is an Agri-Tech startup that provides a full-stack, end-to-end service for fish farming, specifically designed to empower small and marginal farmers. The company was born out of the founder's personal experience with agricultural loss, leading to a mission to help a million farmers access modern technology. Hasiru Aqua transforms underutilized farm ponds (like the government-subsidized Krishi Honda) into high-yield, scientific aquaculture units by managing everything from pond preparation to harvest sales.

Sector/Domain: Agri-Tech, Aquaculture Infrastructure, and Managed Farming Services.

Core Offerings & Business Model

MeenDoctru (The Fish Doctor): A proprietary, floating, solar-powered IoT kit that monitors ponds 24/7. It tracks four critical water parameters (Temperature, pH, Dissolved Oxygen, and TDS) and sends real-time alerts to the farmer's mobile app, allowing for immediate intervention before disease or water quality issues can cause crop loss.

Full-Stack Cultivation Management: Hasiru Aqua handles the heavy lifting of the cultivation cycle. This includes Phase I (technical pond viability audits), Phase II (installing bird netting and IoT devices), Phase III (supplying fingerlings and scientific feed), and Phase IV (managing the final harvest and logistics).

Distributed Fish Cultivation (DFC) Model: Unlike centralized large-scale farms, Hasiru Aqua scales by managing hundreds of small, decentralized farm ponds. This model leverages existing infrastructure, allowing the company to ramp up production of multiple species like Basa, Murrel, and Tilapia based on market demand.

Integrated Market Linkages: The company connects harvested produce directly to major B2B distributors and operates its own live fish counter franchises, which move over one ton of fish per month per counter.

Business Model: A Service-and-Profit-Share model. Farmers pay for the full-stack service and retain the majority of the profits. The company also explores Contract Farming for a fixed fee and is developing a Time-Share model for retail investors to fund farm management.

Challenges & Opportunities

Challenges: Scaling the physical support required for decentralized ponds across vast rural geographies and ensuring consistent connectivity for IoT devices in shadow zones with poor 4G/5G reception.

Opportunities: Scaling their D2C franchise model across South India to capture higher retail margins and utilizing their massive datasets to offer customized insurance products for small-scale aquaculture, a segment currently underserved by traditional insurers.

Uday Aquaconnects Private Limited 44

Founder	Uday Kishan Cherukuneedi (Managing Director) and Hemalatha Cherukuneedi. The company is supported by a high-profile advisory board including Dr. Dilip Kumar (Chairman and former Director/ Vice-Chancellor of CIFE) and Dr. V. V. Sadamate (Former Adviser to the Planning Commission).
Established year	November 6, 2019.
Location	Registered in Hyderabad, Telangana, with a strong operational and R&D focus across both Telangana and Andhra Pradesh.

Company Overview

Uday Aquaconnects is an integrated aquaculture technology firm and Aqua Park developer. It specializes in providing end-to-end consulting, modern farm development, and research-backed solutions to maximize fisheries' performance. By blending commercial execution with R&D, the company aims to ensure food security and accelerate the growth of the fisheries industry through high-technology and sustainable practices.

Sector/Domain: Agri-Tech, Aquaculture Infrastructure, and Managed Farming Services.

Core Offerings & Business Model

High-Tech Intensive Systems: Expertise in the setup and management of Recirculating Aquaculture Systems (RAS) and Circulatory Aquaculture Systems (CAS). The CAS model specifically targets agricultural farmers, using irrigation water for fish farming before it flows to the fields, creating a symbiotic nitrogen-rich water source for crops.

Aqua Corridors & Knowledge Parks: Pioneered the development of Fresh Water Aqua Corridors (along NH-44) and Coastal Aqua Corridors (along NH-16). Their flagship project, the Dr. B.R. Ambedkar Aqua Knowledge Park, serves as a centralized hub for R&D, commercial demonstrations, and training.

R&D and Species Diversification: Operates a dedicated fish laboratory for scientific diagnostics. While focusing on staples like Carp and Shrimp (*Penaeus vannamei*), the company is a leader in Seaweed commercialization and Sea Bass culture, targeting high-value domestic and export markets.

Service Provider with Buyback Assurance: Provides a full-stack hatchery-to-market service. They guarantee market access for their network of 1,500+ farmers by offering a buyback assurance for harvested produce, significantly reducing the financial risk for new aqua-entrepreneurs.

Business Model: A hybrid Consultancy and Trading model. Revenue is generated through farm setup fees, sales of proprietary technology, and the trading of high-value aquatic products. They are currently expanding their footprint into UAE, USA, and Europe to leverage global demand for sustainable seafood.

Challenges & Opportunities

Challenges: Navigating the complex regulatory requirements for international seafood exports and managing the high capital intensity required for constructing large-scale regional Aqua Corridors.

Opportunities: Scaling the Seaweed vertical (valued for cosmetics and fertilizers) which requires zero feed costs, and capitalizing on their role as a Social Enterprise to secure further government partnerships for SC/ST and women entrepreneurship programs in rural India.

45 Bharat Fishmate Private Limited

Founder	Surajit Kashyapi (Founder & Managing Director) and Payel Kashyapi (Director).
Established year	June 22, 2024
Location	Registered in Barrackpore, West Bengal; Operational reach across India via a Phygital (Physical + Digital) model.

Company Overview

Bharat Fishmate is a rising Indian agritech startup that operates as a comprehensive Umbrella Platform for the aquaculture industry. Incubated under the Agri-Food Business Incubation Centre (AFBIC) at IIT Kharagpur, the company addresses the fragmentation of the Indian fisheries sector. By blending high-end technology such as blockchain-based traceability and genomics with a physical network of Fishmate Zones, the company ensures that small-scale fish farmers have access to climate-resilient seeds and expert technical guidance. Their Phygital marketplace focuses on improving farmer profitability by shortening the supply chain and ensuring the quality of inputs.

Sector/Domain: Agri-Tech, Aquaculture, and Supply Chain Management.

Core Innovation & Products: Bharat Fishmate's innovation lies in its ability to bring professional management and advanced science to traditional pond farming:

Blockchain Traceability: The company uses blockchain technology to provide full supply chain transparency. Farmers and buyers can track the genetic history and health of the fish seeds, leading to more predictable yields and healthier stocks.

Genetically Improved Seed Supply: Through its platform, it offers high-quality seeds for species like Rohu, Tilapia, Pangasius, and Common Carp, focusing on climate-resilient and fast-growing varieties.

AI-Powered Advisory: The Fishmate App acts as a digital consultant, offering real-time technical guides and hand-holding support for complex projects like Biofloc and RAS (Recirculating Aquaculture Systems).

Advanced Aqua-Inputs: A specialized shop featuring a wide range of bio-formulations, including growth promoters (Vridhdhi), probiotics (Matsya Amrit), and water conditioners (Soil Fresh) designed to maintain biosecurity without heavy chemical use.

Core Offerings and Business Model:

1. Phygital Marketplace (B2B & B2C)

Services: Connecting hatcheries with farmers via an integrated online shop and physical Fishmate Zones for direct input delivery.

Revenue Model: Direct transactional revenue from the sale of fish seeds, specialized medicines, and high-density farming equipment.

2. End-to-End Project Installation

Services: Technical design and commissioning of modern aquaculture setups, including crab fattening, seabass farming, and GIFT Tilapia production.

Revenue Model: Project implementation fees and technical consultancy services.

3. Supply Chain Optimization

Services: Creating a transparent link between input providers and farmers to eliminate middlemen, thereby increasing the farmer's share of the profit.

Revenue Model: Service fees for traceability and supply chain management.

Challenges & Opportunities:

Challenges: Navigating the logistics of transporting live fish seeds across varied geographies while maintaining low mortality; and the effort required to digitize traditional farming communities in rural West Bengal and beyond.

Opportunities: Scaling the Fishmate Zone hubs to other major maritime states; leveraging the IIT Kharagpur incubation to refine CRISPR-based genetic improvements; and potentially expanding into Fish-as-a-Service models where harvest buy-back is guaranteed.

Dakh Biotech Private Limited 46

Founder	Layam Venkatasubbaiah (CEO).
Established year	2022
Location	Headquartered in Nagole, Hyderabad, Telangana, India.

Company Overview

Dakh Biotech is a technology-driven Indian aquaculture company that serves as a One-Stop Solution for sustainable and antibiotic-free shrimp and fish farming. With an ISO 9001:2015 certification, the company addresses critical farming challenges such as disease outbreaks (White Gut, Vibrio) and environmental degradation. By utilizing a core team of senior biologists and microbiologists, Dakh Biotech has successfully scaled its reach to over 1,500 farms across India's coastal belts, providing high-purity biologicals and smart monitoring technologies that prioritize animal immunity and pond health over chemical disinfectants.

Sector/Domain: Aquaculture Biotechnology, Animal Health, and Smart Farming.

Core Offerings & Business Model

Nano-Silver Biosecurity (Aqua Rakshak): Their flagship innovation uses 10,000 ppm Nano-Silver technology. Unlike traditional chemicals, this acts as a broad-spectrum, residue-free virucide that prevents major outbreaks such as EMS (Early Mortality Syndrome) and RMS without harming the pond's beneficial microbial balance.

Probiotic & Bioremediation Excellence: Develops Bacillus-based formulations (e.g., Probex-P) that optimize the gut microbiome of shrimp and fish. These probiotics improve Feed Conversion Ratios (FCR) and accelerate growth, while specialized soil-acting microbes degrade organic waste and eliminate toxic ammonia from pond bottoms.

Immunity & Growth Boosters: Offers liquid protein supplements like DB Immuno and Max-Size, designed to enhance stress resilience during seasonal changes and increase the final harvest weight of the species.

Water & Soil Diagnostics: Provides on-ground technical support and lab testing for water quality and pathogen detection. Their product range includes D-Minplus (mineral mixtures for osmoregulation) and D-Oxyplus (oxygen tablets) to maintain critical dissolved oxygen levels.

Business Model: A B2F (Business-to-Farmer) Advisory Model. Revenue is generated through the sale of specialized bio-additives and mineral mixtures, alongside consultancy fees for farm-level technical vigilance and production optimization.

Challenges & Opportunities:

Challenges: Transitioning conservative farmers from low-cost chemical disinfectants to premium biological regimes; and maintaining the high load of 24/7 technical vigilance required for intensive systems like Biofloc.

Opportunities: Scaling their indigenous nano-silver formulations into global aquaculture hubs in Southeast Asia and Latin America; and further developing AI-driven disease prediction models for automated farm management.

47 Essential Aquatech Private Limited

Founder	Arka Prava Das (Co-Founder & CEO) and Subhadeep Mitra (Co-Founder & COO).
Established year	June 6, 2019.
Location	Headquartered in Jalpaiguri, West Bengal, India.

Company Overview

Essential Aquatech is an innovative Indian agritech startup focused on climate-resilient and technology-driven aquaculture. The company operates at the intersection of environmental sustainability and commercial fish farming, aiming to protect the livelihoods of small and mid-scale farmers against challenges like rising temperatures, water degradation, and disease outbreaks. Recognized as an unfunded success story with significant growth, they provide a 24/7 support ecosystem that integrates AI-based monitoring, ISO-certified health inputs, and direct market linkage.

Sector/Domain: Aquaculture Technology, Agri-Tech, and Climate-Smart Farming.

Core Offerings & Business Model

Climate-Smart Advisory & AI Tools: The core of their strategy is an app-based platform that uses predictive AI to integrate weather forecasts and water parameters. This allows for preventive maintenance, helping farmers diagnose potential disease outbreaks or water quality shifts before they become critical.

Aqua Health & Certified Inputs: They provide a specialized range of 22 ISO 9001:2015 certified products. This includes growth and immunity boosters like YEAST EA, and water conditioners like MEDISAN and AQUAMINA. By supplying disease-free fingerlings (starter stock) alongside these inputs, they ensure a data-backed growth plan for every pond.

Technological Field Services: Essential Aquatech provides the technical blueprint and setup for intensive systems including Biofloc, Recirculating Aquaculture Systems (RAS), and Aquaponics. Their on-site water testing and proactive pond management services bridge the gap between digital advice and physical implementation.

Direct Market Linkage: To break the cycle of high-interest credit from traditional traders, the company facilitates direct connections between farmers and wholesale buyers. This ensures fast harvest payments and fair market pricing for the producers.

Business Model: A Hybrid Input-and-Service Model. Revenue is generated through the sale of proprietary health products and high-quality fingerlings, as well as technical consultancy fees for modern system setups.

Challenges & Opportunities:

Challenges: Navigating the capital-intensive nature of scaling a bootstrapped startup; and the logistics of delivering 24/7 technical support to highly remote regions in Eastern India.

Opportunities: Scaling their proprietary AI disease-prediction model into a subscription service; and expanding their geographic footprint into the high-potential aquaculture markets of the North-Eastern states and neighboring Bangladesh.

STEM Systems Private Limited 48

Founder	Layam Venkatasubbaiah (CEO). Arundas Nenmalooth Hari Das (Managing Director) and Aswathy Thekkandathil (Co-founder & Director).
Established year	May 10, 2022
Location	Headquartered in Cherthala, Alappuzha, with core operations and incubation at KUFOS, Kochi, Kerala.

Company Overview

STEM Systems is a student-led, award-winning AgriTech startup that is modernizing the aquaculture landscape through a hybrid digital-physical ecosystem. By combining academic research with on-ground practical solutions, the company bridges the gap between traditional fishing and high-tech aquaculture. STEM Systems operates with a three-pronged mission: Knowledge (through structured learning), Consultation (technical farm support), and Market Access (a farm-to-fork marketplace). They have trained over 4,000 farmers, empowering them to transition from conventional methods to high-yield, sustainable technologies like RAS and Biofloc.

Sector/Domain: Agri-Tech, Aquaculture Consulting, and Biotechnology Manufacturing.

Core Innovations & Technologies:

The company's innovation is centered on making complex aquaculture systems accessible and space-efficient for small-scale entrepreneurs:

Hanging Mud Crab Fattening System: A proprietary, space-efficient solution that allows for commercial crab production in areas as small as 10 square feet, breaking the myth that crab farming requires vast land holdings.

Hybrid RAS for Shrimp: A Recirculating Aquaculture System that combines the benefits of Biofloc and traditional RAS to ensure high water quality and zero-waste farming.

Aquamin: A specialized brackish water salt solution developed for bucket crab farming and indoor aquaculture.

STEM App: An integrated platform where farmers can access structured training modules, request 24/7 expert consultations, and list their produce for direct sale to consumers.

Core Offerings and Business Model:

1. Knowledge-as-a-Service (KaaS)

Services: Certified online and hybrid training programs on mud crab fattening, shrimp farming, and sustainable aquaculture management.

Revenue Model: Training fees and certification charges.

2. Fisheries Consulting

Services: Professional guidance on farm design, species selection, disease control, and water chemistry management.

Revenue Model: Consulting fees for farm setup and ongoing technical support.

3. Farm-to-Fork Marketplace

Services: A digital bridge connecting STEM-trained farmers directly to bulk buyers and B2C consumers, ensuring premium pricing for sustainable seafood.

Revenue Model: Transactional margins and marketplace commissions.

Challenges & Opportunities:

Challenges: Maintaining high standards of cold-chain logistics as the farm-to-fork marketplace expands beyond Kerala; and competing with free government-led training programs by emphasizing their practical, results-oriented commercial success.

Opportunities: Scaling their Crab RAS technology globally to countries with high seafood demand but limited land; and integrating AI-driven pond sensors into the STEM App to provide automated real-time alerts to farmers.

49 Nagodas Fish Farming and Consultancy Private Limited

Founder	Sajan M. Gupta (Managing Director) and Prriya Gupta (Director).
Established year	September 12, 2020 (though some trade listings cite a legacy in the industry dating further back).
Location	Headquartered in Laxmi Nagar, Delhi, with project implementations and consulting services provided across India (including major hubs like Lucknow, Pune, and Jabalpur)

Company Overview

Nagodas is a leading aquaculture consultancy and technology integrator. The company specializes in modernizing the Indian fisheries sector by providing turnkey solutions for high-density, sustainable farming. Their primary goal is to bridge the technical gap for farmers who wish to transition from traditional earthen ponds to intensive systems like RAS and Biofloc. By offering a blend of engineering, biological expertise, and a robust equipment supply chain, Nagodas enables farmers to maximize fish protein production with minimal resource waste.

Sector/Domain: Agri-Tech, Aquaculture Engineering, and Fisheries Consulting.

Core Services & Technological Expertise:

Nagodas provides end-to-end design and implementation for five primary fish culture models:

Biofloc Technology: Utilizing microbial flakes to recycle nitrogenous waste into feed, significantly reducing water exchange and feed costs.

Recirculating Aquaculture Systems (RAS): High-tech indoor systems that use advanced filtration to reuse up to 90-95% of water, allowing for year-round production in controlled environments.

Integrated Aquaculture: Designing systems where fish farming is linked with horticulture or animal husbandry (e.g., Aquaponics) to create a zero-waste ecosystem.

Cage Culture: Implementing floating cages in open reservoirs and rivers to utilize existing water bodies for commercial production.

Modernized Pond Culture: Upgrading traditional ponds with high-efficiency aerators, liners, and biosecurity measures.

Business Model & Revenue Streams

Nagodas operates a diversified B2B and B2F (Business-to-Fisher) model:

1. Project Implementation: Turnkey contract fees for the construction of RAS and Biofloc facilities, including the installation of PVC tanks, pumps, and filtration units.

2. Technical Consulting: Revenue from feasibility studies, project reports for government subsidies (like PMMSY), and customized farm designs.

3. Input & Equipment Sales: Sale of specialized hardware (TDS meters, pH meters, aerators, air stones) and biological inputs (fish seeds like Rohu, Pangasius, and Magur, plus Biofloc inoculants).

4. Training & Education: Monetizing expertise through structured workshops and ongoing operational support for new farm owners.

Challenges & Opportunities:

Challenges: Navigating the high initial Capital Expenditure (CAPEX) for farmers, which often requires assistance with bank loans or government subsidies; and maintaining high technical standards across a vast, geographically dispersed network of projects.

Opportunities: Expanding into proprietary input manufacturing (like custom-formulated fish feed) and leveraging IoT-based monitoring to provide Remote Residency consulting, where Nagodas experts can monitor a farmer's water quality data in real-time via the cloud.

AquaX 50

Founder	Sujeet Kumar Chaudhary (CEO), Mohanish Singh (Chief of Strategy), and Vivek Singh (Chief Co-operative Officer).
Established year	2021
Location	Registered Office: Lucknow, Uttar Pradesh, India.

Company Overview:

AquaX is an agritech company that focuses on streamlining end-to-end aquaculture processes by incorporating scientific advancements and modern technology. Unlike purely digital platforms, AquaX follows a Cooperative Farming model, acting as a managed services partner for marginal farmers. They evangelize high-density culture techniques like Biofloc to double productivity per acre while providing a robust support ecosystem covering everything from seeds to final harvest.

The company addresses the low productivity trap of traditional Indian ponds (typically 3 tonnes/hectare) by utilizing cloud-connected monitoring and standardized operating procedures to reach levels as high as 6 tonnes/hectare. Their goal is to make every fish farmer self-reliant through a combination of tech-enabled production and direct market linkages.

Sector/Domain: Managed Aquaculture, Cooperative Farming, and Agri-Tech.

Key Technologies Used: Biofloc Systems, AI-based Water Sensing, Cloud-connected Remote Monitoring, and Data Mining for predictive farm advisory.

Core Offerings & Business Model

AquaCo-op (Cooperative Farming): This is the flagship managed-service model. AquaX provides complete handholding for marginal farmers, supplying high-quality seeds, scientific feed, and medicines. Member farms are linked to a Centralized Monitoring Center that ensures every pond adheres to standardized operating procedures (SOPs).

AquaEco Integrated Value Chain: A vernacular mobile app that functions as a one-stop-shop for input procurement and harvest distribution. It eliminates local middlemen by creating a direct link between the pond and premium buyers, ensuring transparent transactions for the farmers.

Biofloc & Remote Monitoring: AquaX evangelizes high-density Biofloc systems where nitrogenous waste is recycled into microbial protein (feed). These systems are equipped with IoT sensors that mine data on dissolved oxygen and pH, allowing the technical team to intervene remotely if parameters deviate.

Predictive Farm Advisory: Uses data mining from daily farmer inputs (feed and medicine logs) to generate AI-driven insights. This helps in early disease detection and growth optimization, localized in regional languages to ensure high adoption rates among rural users.

Business Model: A Revenue-Share or Managed Service model. AquaX earns through margins on the integrated supply chain (AquaEco) and a share of the increased profits generated by the higher yields in the cooperative (AquaCo-op).

Challenges & Opportunities:

Challenges: Managing the steep learning curve for traditional farmers transitioning to high-tech Biofloc and the high operational costs of maintaining consistent aeration and power backup in rural regions with frequent outages.

Opportunities: Expanding the cooperative model into inland saline regions where traditional agriculture is difficult but aquaculture thrives, and leveraging regional export hub initiatives to move high-yield, standardized produce into international markets.

51 Blue Aqua Life Consultancy

Founder	Dr. Kathiravan Velusamy (Ph.D. in Aquaculture Microbiology).
Location	Headquartered in Surat (Jhangirpura), Gujarat, India.

Company Overview

Blue Aqua Life Consultancy is a research-driven aquaculture service provider led by Dr. Kathiravan Velusamy, an expert with over 15 years of experience and a doctoral degree. The firm specializes in providing evidence-based solutions for the shrimp and fish farming industry. Unlike standard trading firms, Blue Aqua Life functions as a technical partner, focusing on the microbial health of ponds, species-specific nutritional programs, and environmental sustainability. Their mission is to transform traditional aquaculture into a precise, technology-led industry through continuous research and professional development.

Sector/Domain: Aquaculture Consultancy, Marine Biotechnology, Pathogen Diagnostics, and Specialty Feed Inputs.

Core Offerings & Service Portfolio

Microbial Management & Bioremediation: The firm specializes in creating Bio-Secure environments for intensive farming. They develop proprietary probiotics that manage the Nitrogen Cycle within ponds, effectively preventing toxic ammonia spikes that often lead to mass mortality.

Diagnostic-Led Consultation: The firm identifies specific pathogens (e.g., Vibrio, EHP) before recommending treatments. This scientific approach reduces the misuse of chemicals and antibiotics in the food chain.

Superfood Nutritional Programs: Pioneering the use of Live Spirulina as a high-nutrition superfood for shrimp larvae. They also explore the commercial viability of Inland Seaweed Farming utilizing saline groundwater in non-coastal regions.

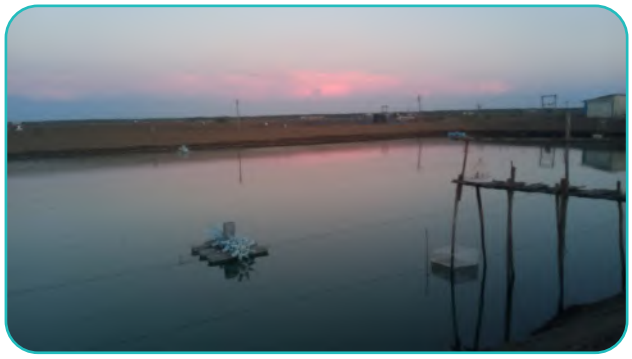
Turnkey Lab Setup: Assisting corporate and large-scale farms in establishing internal quality control and diagnostic laboratories, including PCR testing facilities for rapid pathogen detection.

Business Model: A Consult-to-Product model. Primary revenue is generated through B2B consultancy contracts. These scientific audits typically lead to the implementation of their validated health and nutrition products, such as bio-active feed supplements and sludge-reduction blends.

Challenges & Opportunities:

Challenges: Combating emerging viral diseases (like WSSV or EHP) in shrimp farming through better biosecurity; and convincing small-scale farmers to invest in diagnostic testing before treatment.

Opportunities: Expanding into Marine Bio-Refineries for seaweed extracts; and scaling their Lab-in-a-Box diagnostic concept to provide rapid, on-site testing for remote farming clusters.



IIFSA (Information and Inputs for Sustainable Aquaculture) 52

Founder	Akbar Ali Shaik (Founder & Managing Partner) and Santosh Kumar Gumma.
Established year	Incorporated as an LLP on May 02, 2019
Location	Headquartered in Nellore, Andhra Pradesh, India

Company Overview:

IIFSA is a pioneering technology-driven service provider dedicated to the modernization of the Indian aquaculture industry. Incubated by the NIAM Agri-Business Incubator (NABI), Jaipur, IIFSA acts as a One-Stop Solution for farmers, merging traditional field expertise with Information and Communication Technology (ICT). The company is designed to bridge the gap between scientific research and field-level application, focusing on reducing farm risks, improving production efficiency, and promoting sustainable natural resource utilization. With a massive footprint covering over 30,000 acres of water spread area, IIFSA is a critical technology partner for over 10,000 farmers.

Sector/Domain: Agri-Tech, Aquaculture Diagnostics, ICT Extension Services, and Farm Infrastructure.

Core Innovation & Digital Ecosystem: IIFSA's primary innovation is the digitization of the aquaculture extension model, moving away from slow, physical-only consultations to rapid, data-backed virtual support:

Virtual Aquaculture Advisory Service (VAAS): A proprietary web-enabled platform that allows farmers to submit requisitions and samples for clinical lab work-up, followed by virtual diagnosis and advice delivery via video or voice calls.

Pond Health Locker: A first-of-its-kind digital record system where farmers store historical pond data, water quality parameters, and health reports, enabling long-term trend analysis and predictive management.

AOSS Centers: Aquaculture One-Stop Solution physical centers that serve as the last-mile delivery points for sample collection, diagnostic results, and technical training.

Core Offerings & Service Portfolio: IIFSA provides end-to-end support across the entire aquaculture value chain:

1. Project Design & Consultancy:

Site Analysis: Scientific assessment of soil, water, ecology, and climate for new projects.

Engineering: Specialized farm design and construction oversight to ensure biological security.

2. Diagnostics & Lab Services:

Virtual Doc 24/7: Round-the-clock remote consultation for disease emergencies.

Comprehensive Testing: In-depth laboratory analysis of soil and water quality, including pathogen detection.

3. Specialized Inputs (Proprietary Products):

Nutritional & Health Products: Manufacturing and supply of e-feeds, e-min (minerals), and e-manures.

Farm Tools: Water testing kits and biological buffers designed for on-field precision.

4. Technical Training:

Conducting programs on Good Management Practices (GMP) and Aquaculture Production Efficiency Improvement (APEI) for both new entrepreneurs and seasoned farmers.

Business Model & Impact:

1. Hybrid Revenue Model: Generates income through consultancy fees, diagnostic service charges (VAAS), and the sale of proprietary pond inputs and health products.

2. Proven Scalability: Operates four working AOSS centers in Andhra Pradesh, providing a blueprint for national expansion.

3. Efficiency Metrics: Reported to have minimized mortality risks by over 80% and reduced parasitic disease incidents by over 70% through proactive monitoring and data-driven interventions.

Challenges & Opportunities:

Challenges: Overcoming digital literacy barriers among traditional small-scale farmers and maintaining a reliable cold chain for biological sample transport from remote ponds to labs.

Opportunities: Integrating AI and Machine Learning for predictive disease modeling; and expanding the AOSS model to other major aquaculture states like West Bengal, Odisha, and Gujarat.

53 Gramshree Agri Services Private Limited

Founder	Aastha Singh.
Established year	June 19, 2019.
Location	Headquartered in Patna, Bihar, India.

Company Overview

Gramshree Agri Services, operating under the brand Gramshree Kisan, is a high-impact AgriTech startup that serves as a One-Stop Solution for the livestock and fisheries sectors. Founded by Aastha Singh, an engineer and MBA with experience in both the corporate (OYO) and government (Bihar Fisheries Dept) sectors the company aims to professionalize traditional rural practices. Gramshree Kisan leverages a B2F (Business-to-Farmer) model, providing a full stack of services including training, high-quality input trading, veterinary tele-consultation, and market linkages. The company is notably funded by Inflection Point Ventures and is recognized for its work in empowering small-scale farmers, rural youth, and women in the Bihar region.

Sector/Domain: AgriTech, Animal Husbandry, Fisheries, and Rural Livelihood.

Core Offerings & Business Model

Gramshree Kisan operates on a unique 4T framework (Training, Trading, Technology, and Treatment) designed to handle the entire farming lifecycle:

Integrated Digital Platform (Gramshree Kisan App): At the heart of the business is a vernacular mobile app that democratizes access to expert veterinary advice and real-time information on government subsidies like PMMSY. The app features the Gramshree Mall, an e-commerce marketplace where farmers can purchase verified inputs directly.

Hub-and-Spoke Service Delivery: To bridge the rural infrastructure gap, a centralized Master Agri Business Centre in Patna supports a network of micro-entrepreneur-led centers at the village level. This physical infrastructure ensures the last mile delivery of medicines, supplements, and bulk feed.

Fisheries & Livestock Management: The company provides wholesale distribution of premium floating fish feed and disease-free seeds. Their consultancy services specialize in pond construction and Biofloc system setups. For animal husbandry, they assist in sourcing quality breeds for dairy and goatery, backed by 24/7 tele-medicine support via a dedicated call center.

Krishak Pathshalas (Farmer Schools): Gramshree operates physical training centers that provide certified workshops on modern scientific farming. This educational vertical ensures that farmers possess the technical skill to utilize high-tech inputs effectively.

Revenue Model: The company's financial growth is primarily driven by wholesale trading margins on agri-inputs (feed and supplements), structured training fees, and transaction commissions from the Gramshree Mall marketplace. The startup's scalability is supported by funding from Inflection Point Ventures (IPV).

Challenges & Opportunities:

Challenges: Overcoming the digital divide to ensure consistent app usage among older, traditional farmers; and managing heavy logistics for bulk feed distribution in rural Bihar.

Opportunities: Expanding into Agri-Fintech to provide credit-linked input purchasing; and scaling the Krishak Pathshala model into other eastern states like Jharkhand and Uttar Pradesh.

Manjeera Aqua Technologies Pvt. Ltd 54

Founder	Kovilapu Sankar Rao
Established year	2021
Location	Headquartered in Telangana, India.

Company Overview:

Manjeera Aqua Technologies is a transformative integrated farming and deep-tech aquaculture startup. Named after the Manjeera River to symbolize a flow of technology across states (Maharashtra to Telangana), the company focuses on empowering marginalized communities, small-scale farmers, and youth. Their mission is to convert barren or underutilized land into high-income assets using sustainable, high-density farming models. Manjeera is a rare example of a company that manages the entire value chain from constructing sophisticated Recirculating Aquaculture Systems (RAS) to running a retail farm-to-fork brand, Freshmaans.

Sector/Domain: Integrated Aquaculture (RAS/IPACT), Agri-Tech Consultancy, Farmer Capacity Building, and Seafood Retail.

Core Offerings & Business Model

The company operates through a multi-vertical Manjeera Group structure that integrates technology with commerce:

High-Tech Intensive Systems (RAS): Manjeera specializes in the construction of Recirculating Aquaculture Systems (RAS), which use 90% less water than traditional ponds. They also deploy Intensive Pond Aquaculture Technology above-ground tanks specifically designed for smallholders with limited land access to achieve high yields in small footprints.

Integrated Farming System (IFS): A Circular Economy model that integrates fish culture with poultry and organic vegetable farming. In this system, nutrient-rich effluent from fish tanks acts as a natural fertilizer for crops, reducing input costs and enabling farmers to transition to Certified Organic production.

Manjeera Aqua Solutions & Academy: This vertical supplies critical inputs like high-quality fish seed, performance feed, and specialized medicines. Complementing this is their Aqua Academy, which provides hands-on incubation and technical training to ensure farmers can operate high-tech systems independently.

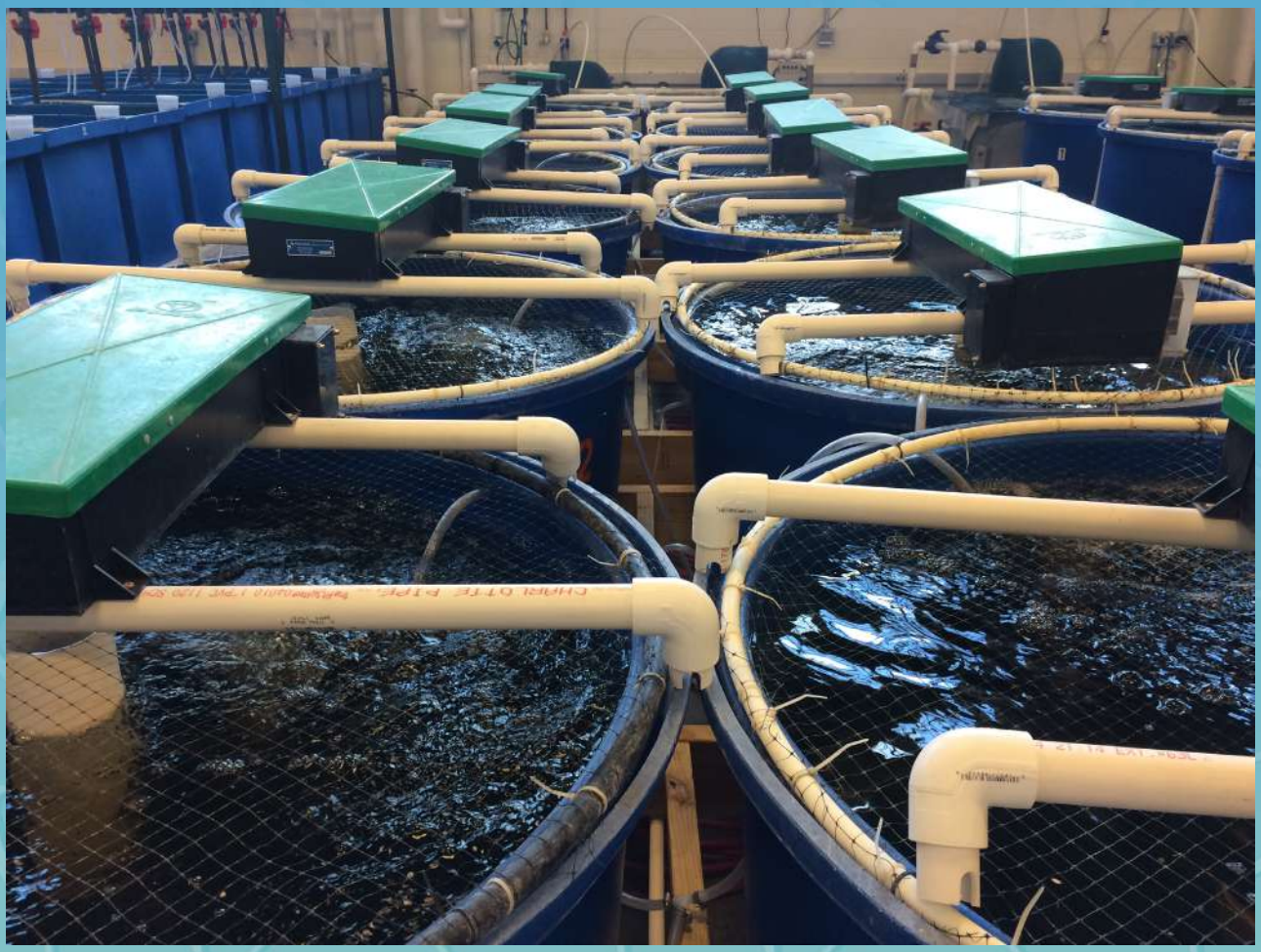
Challenges & Opportunities:

Challenges: High initial CAPEX for RAS setup; educating traditional farmers on transitioning from open pond to tech-pond mentalities.

Opportunities: Scaling the brand nationally; expanding RAS to high-value niche species; and pioneering the use of IoT-based monitoring for real-time farm management.

Intensive Production Systems

Modernized high-density, land-based farming across India is currently defined by a transition toward engineering-driven production that overcomes traditional geographical and environmental constraints. These twelve key organizations ECKlien4RAS, SNRAS Systems, King Fisheries Farms (KFF), JMS Fresh Root, Smart Green Aquaculture, Blue Wave Aquaculture, Canares Aquaculture, Pabhoi Fish Farm, Mountstribe Agritech, Mahabahu Fisheries, Mayank Aquaculture, and Vaidika Fisheries demonstrate the critical role of Recirculating Aquaculture Systems (RAS), Biofloc technology, and Aquaponics in achieving year-round, biosecure production. Their activities range from the commercial cultivation of premium species like Salmon and Rainbow Trout in tropical climates to the implementation of circular economy principles. By integrating patented water treatment technologies, such as Electro-Coagulation, with IoT-based monitoring and circular economy principles, these startups are drastically reducing water consumption and eliminating the need for antibiotics. Through this shift to controlled-environment agriculture, these enterprises are enabling sustainable, high-yield protein production closer to urban markets, ensuring total traceability and meeting the growing global demand for high-integrity seafood.



Intensive Production Systems

Engineering controlled environments to achieve high-density yields while minimizing resource consumption and maximizing biosecurity.

Table 9: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
ECKlien4RAS	Bio-safe Water Treatment	Patented Electro-Coagulation (EC) reactor for RAS	Chemical-free EC4RAS systems	Turnkey project sales focusing on ESG/ Biosecure shrimp
SNRAS Systems	Miniaturized RAS	Bluebox (Nano RAS)	Combofilter, Bluemax, Remote Dashboard	Consult-to-Manage model for urban/land-locked areas
King Fisheries Farms	Multi-System Integration	Five-Way Farming Model in a single location	RAS, Biofloc, Cage culture, Aqua Tourism Pond and Reservoir Culture	B2B production and high-margin leisure/education revenue
JMS Fresh Root	Large-scale Aquaponics	Asia's largest circular Aquaponics-Biofloc farm	Exotic greens, Salmon, Sea Bass	D2C and gourmet retail with scale-based efficiencies
SmartGreen Aquaculture	Tropical Cold-water RAS	Climate-controlled indoor production in tropical heat	Hyderabad-grown Rainbow Trout, Algal biomass	Vertically integrated D2C/ B2B and tech licensing
Blue Wave Aquaculture	Low-energy RAS	FREA-designed energy-efficient trout systems	Premium Rainbow Trout (antibiotic-free)	Pilot-to-scale production with 75% export target
Canares Aquaculture	Marine Seed Production	80 specialized rearing tanks for marine finfish	Asian Seabass (Barramundi) fingerlings	B2B technical seed supply and input distribution
Pabhoi Fish Farm	Sustainable Pisciculture	Scientific-Indigenous Hybrid Model and Brooder Exchange	Indigenous fish seeds, Fish-cum-Paddy culture	Regional knowledge hub and high-vitality seed production
Mountstribe Agritech	Himalayan Aquaponics	IoT-enabled cold-water aquaponics	Himalayan Trout, exotic organic greens	Social entrepreneurship focused on rural reverse migration
Mahabahu Fisheries	Integrated aquaculture enterprise in Assam	Reclamation of 100 acres of flood-prone wasteland	Amrit Catla seeds, in-house pelleted feed	Wholesale production and regional wasteland consultancy
Mayank Aquaculture	Integrated Shrimp Hub	Multiphase Nursery Concept on 200 hectares	Vivaline inputs, Zhingalala retail restaurant	Vertically integrated Pond-to-Plate group model
Vaidika Fisheries	Reservoir Industrialization	Vertical industrialization of 4,000 acres of water	Cage culture (Tilapia/Basa), Cold chain	Public-Private-Community partnership for large reservoirs

Table 10: Sector Feature Matrix

Startup Name	RAS (Recirculating)	Biofloc Technology	Aquaponics Integration	Zero Water Discharge
ECKlien4RAS	√			√
SNRAS Systems	√			
King Fisheries Farms	√	√		
JMS Fresh Root		√	√	√
SmartGreen Aquaculture	√			√
Blue Wave Aquaculture	√			√
Canares Aquaculture	√			
Pabhoi Fish Farm		√	√	
Mountstribe Agritech			√	√
Mahabahu Fisheries		√		
Mayank Aquaculture				
Vaidika Fisheries				

ECKlien4RAS LLP 55

Founder	Manimaran Baskaran.
Location	Based in Chennai, Tamil Nadu, India

Company Overview:

ECKlien4RAS LLP is a high-technology system provider that specializes in the manufacturing and supply of land-based RAS. The company's core mission is to transform the aquaculture landscape specifically the shrimp sector by utilizing innovative technologies to achieve global food security and high biosecurity. Their approach is deeply aligned with ESG (Environmental, Social, and Governance) goals, focusing on sustainable, chemical-free production.

Sector/Domain: Agri-Tech, Aquaculture Technology, and Sustainable Infrastructure.

Key Technology: The company's primary innovation is the integration of its patented Electro-Coagulation (EC) water treatment technology into the RAS loop.

How it Works: The system uses a single Electro-Coagulation reactor that utilizes REDOX (Reduction-Oxidation) reactions to continuously remove contaminants from culture tank water.

Key Advantages:

Chemical-Free: Requires negligible amounts of chemicals, drastically reducing operational costs and environmental impact.

Simplified Loop: Eliminates various components required in standard biological RAS loops, reducing complexity and potential points of failure.

High Efficiency: Results in less sludge production and maintains critical water quality parameters (Dissolved Oxygen, pH, TAN, etc.).

Increased Production: Can offer an increase in production capacity of more than 30% compared to traditional methods due to stable water parameters.

Core Offerings & Business Model

1. Turnkey Project Sales

Services: Delivery of complete, end-to-end, and interoperable EC4RAS systems, including manufacturing, installation, and commissioning.

Target: High-capital expenditure commercial projects globally.

2. Consulting and System Integration

Services: Supporting clients in designing and optimizing cost-effective production systems.

Revenue Model: Service fees and long-term consulting engagements focused on operational scaling.

3. ESG Investment Facilitation

Services: Providing traceable, biosecure production models supported by data-driven metrics to help clients attract impact investors.

4. Traceable Production Systems

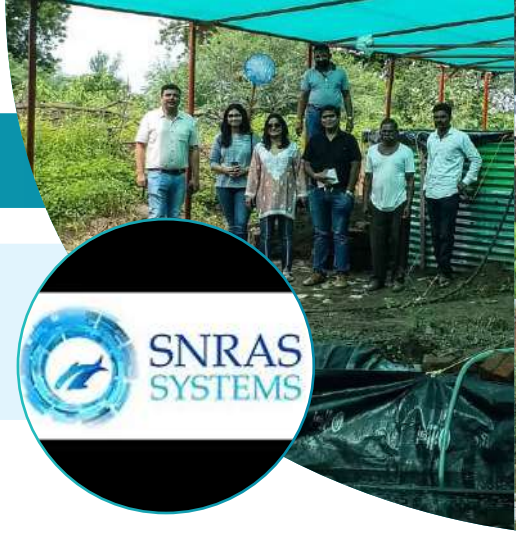
Impact: Enabling production units to be located closer to end-markets with high biosecurity, allowing for premium product positioning.

Challenges & Opportunities:

Challenges: Overcoming market skepticism toward Electro-Coagulation vs. traditional bio-filters, managing the cost of sacrificial electrode consumables, and ensuring energy efficiency in regions with high electricity prices.

Opportunities: Monetizing chemical-free sludge as fertilizer, dominating the biosecure shrimp market, and leveraging its zero-discharge model to secure global ESG capital.

56 SNRAS Systems Private Limited



Founder	Suvo Sircar (CEO), Vivek Saha, Kejal Thacker, Arindom Sanyal, and Ruchik Medhekar
Established year	2019
Location	Headquartered in Bengaluru and Pune, India

Company Overview

SNRAS Systems is an agritech company specializing in the miniaturization and optimization of Recirculatory Aquaculture Systems (RAS). The company's core mission is to transform traditional pond-based fish farming into a power-efficient, land-based, and high-density industrial process. By utilizing their proprietary nano technology, they enable farmers to produce high yields in minimal space, making aquaculture viable even in urban or land-locked regions.

Sector/Domain: Agri-Tech, Aquaculture Engineering, and Managed Farming.

Core Offerings & Business Model

SNRAS integrates advanced hardware with AI-driven monitoring to offer a turnkey farm-in-a-box solution:

The Bluebox (Nano RAS): Their flagship innovation is a self-contained unit occupying just 32 square feet. Despite its small footprint, it can produce up to 80 kg of fish per cubic meter, delivering up to 30x the yield of traditional ponds while reducing mortality rates by 4x.

Bluebox Ecosystem (Bluemax & Combofilter): The hardware includes specialized sub-systems like the Bluemax (for oxygenation) and Combofilter (for advanced mechanical and biological water treatment). These units are managed by AI & IoT sensors that provide real-time advisory alerts to farmers, allowing for preventive rather than reactive management.

Service & Monitoring Model: SNRAS operates a Consult-to-Manage model. This includes initial Site Feasibility Audits followed by a subscription-based Remote Dashboard service. SNRAS experts use this dashboard to perform Biological Troubleshooting, providing 24/7 technical guidance without needing to be physically on-site.

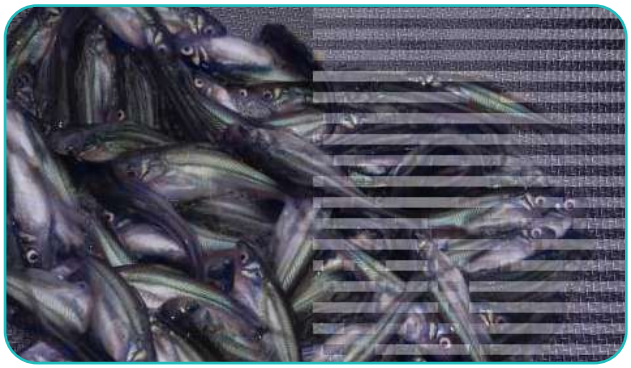
QA-Branded Market Linkages: Post-harvest, the company facilitates trading by providing a Quality-Assurance (QA) certification for fish grown in Bluebox units. This Controlled-Environment Grown branding allows farmers to command premium prices from urban retailers and export houses, effectively bypassing traditional wholesalers.

Revenue Model: A hybrid of high-ticket equipment sales (Bluebox units), recurring Annual Maintenance Contracts (AMCs), and commission-based trading fees from the harvest marketplace.

Challenges and Opportunities:

Challenges: The high initial capital requirement remains a barrier for small farmers, and the system's reliance on continuous power necessitates robust backup solutions in rural areas.

Opportunities: The Nano nature of Bluebox allows for urban farming and livelihood creation in non-traditional areas. There is also significant potential for IP Licensing to other developing countries facing land and water scarcity.



King Fisheries Farms 57

Founder	Nishant Kumar
Established year	2018
Location	Ratu, Ranchi, Jharkhand, India

Company Overview:

King Fisheries Farms (KFF) is a pioneering commercial aquaculture venture that integrates high-tech fish production with leisure and education. It is recognized as India's first commercial farm to successfully implement a Five-Way Farming Model in a single location. Founded by an MBA professional who pivoted from a corporate career to agri-entrepreneurship, KFF has become a landmark for sustainable aquaculture and Aqua Tourism, attracting attention from institutional bodies.

Sector/Domain: Agri-Tech, Aqua Tourism, and Intensive Fish Farming

Key Technological Innovation: The Five-Way Farming Model KFF's core strength is its diversified technological portfolio, which allows it to optimize production for different species and environments:

1. Automated IoT-based RAS: A precision-controlled Recirculating Aquaculture System that uses minimal land and recycles water via IoT sensors for year-round production.

2. Biofloc Culture: Uses microbial flocs to convert waste into protein, significantly reducing water changes and feed costs.

3. Cage Fish Culture (RFF): Deploys floating net cages in open water reservoirs to utilize natural resources efficiently.

4. Modern Pond Culture: Traditional pond farming optimized with advanced aeration and scientific management.

5. Reservoir Culture: Management of large, existing water bodies (approx. 98 acres) for large-scale, sustainable harvests.

Core Offerings & Business Model

1. High-Quality Fish Sales (B2B & B2C)

Services: Direct sale of fresh, hygienically farmed species like Pangasius and Carp.

Revenue Model: Transactional revenue from consistent, high-volume production enabled by RAS and Biofloc technologies.

2. Aqua Tourism & Leisure

Services: Operation of the Chotanagpur Fun Castle and Water Kingdom amusement parks adjacent to the farm.

Revenue Model: High-margin service revenue from park entry, recreational fishing, and educational tours.

3. Knowledge & Consulting (Aqua Farms)

Services: Providing structured training and advisory to new aqua-entrepreneurs and students.

Revenue Model: Fees from specialized training programs and professional consultancy.

Challenges & Opportunities:

Challenges: High operational costs for power-intensive IoT and RAS systems; the logistical hurdle of shipping fresh fish from landlocked Ranchi to coastal hubs.

Opportunities: Scaling the Aqua Tourism franchise model to other states; positioning their sustainably farmed fish as a Premium Traceable brand for upscale retail.

58 JMS Fresh Root

Founder	Shailly Thakkar (Founder) and Kevin Monteiro (COO)
Established year	March 23, 2021
Location	Bhuj (Kutch), Gujarat, India. (Registered office in Noida, UP distribution operations in Mumbai/Thane).

Company Overview

JMS Fresh Root is a dominant force in the Controlled Environment Agriculture (CEA) sector, operating what is cited as Asia's largest Aquaponics and Biofloc farm. Spanning over 70,000 square feet, the facility is located in the arid region of Kutch, Gujarat. Its core mission is to solve food security and nutritional gaps by supplying 100% organic, locally sourced fish and exotic greens. The company leverages a circular economy model to provide high-integrity produce to premium urban markets in India.

Sector/Domain: Agri-Tech, Aquaponics, and Organic Food Production.

Core Offerings & Business Model

JMS Fresh Root leverages massive-scale integration to drive down the per-unit cost of complex sustainable systems:

Integrated Circular System: The farm combines Aquaponics (using nitrogen-rich fish waste as natural fertilizer for plants) with Biofloc (using microbial protein flocs as supplemental fish nutrition). This closed-loop setup reduces water usage by up to 90% compared to traditional farming, with leftover water even repurposed to irrigate nearby mango orchards.

Premium Species & Exotic Greens: The facility successfully rears temperature-sensitive and high-value species like Salmon, Sea Bass, and Rainbow Trout alongside Tilapia. Simultaneously, it produces exotic greens daily, including Kale, Lollo Rossa and Oak Leaf Lettuce.

Direct-to-Consumer (D2C) & Gourmet Retail: The company operates a high-margin distribution network that connects the remote Kutch farm to metropolitan consumers. They maintain gourmet retail contracts and a farm-to-table delivery model to ensure maximum freshness for health-conscious urban buyers.

Scale Efficiency: By operating Asia's largest facility of its kind, JMS Fresh Root achieves the economies of scale necessary to make high-tech aquaponics commercially viable. The brand capitalizes on its 100% Organic and Pesticide-Free certifications to command premium pricing in the wellness market.

Revenue Model: Primarily driven by the daily sale of high-margin fresh produce (seafood and exotic vegetables) to B2B gourmet partners and D2C subscribers.

Challenges & Opportunities:

Challenges: Extremely high initial capital; high energy dependency for continuous aeration and climate control in the hot Kutch climate; and the need for highly specialized agronomists to manage complex water chemistry.

Opportunities: Expansion into internal cold-chain logistics to capture more value; R&D for proprietary seed/feed strains optimized for aquaponics; and potential technology licensing to other water-scarce regions globally.

SmartGreen Aquaculture Private Limited 59

Founder	Aditya Rithvik Narra (Founder & CEO).
Established year	August 20, 2019
Location	Hyderabad, Telangana, India.

Company Overview:

Smart Green Aquaculture (SGA) is a precision-engineered agritech startup that has pioneered the first successful commercial-scale farming of cold-water species, like Rainbow Trout, in a tropical climate. Based in Hyderabad, the company utilizes high-tech Recirculating Aquaculture Systems (RAS) to bypass geographical and climatic limitations. Their Zero Food-Mile initiative ensures that premium, traceable, and antibiotic-free seafood reaches urban consumers with maximum freshness, setting a new standard for sustainable protein production in non-coastal India.

Sector/Domain: Agri-Tech, Sustainable Aquaculture, and Biotechnology.

Core Offerings & Business Model

SmartGreen Aquaculture operates a vertically integrated model that covers everything from genetics to farm-to-fork retail:

Tropical Rainbow Trout Farming: SGA successfully maintains water temperatures between 12°C and 16°C in Hyderabad's tropical heat using climate-controlled indoor RAS. The facility features a 5-acre hatchery capable of producing 1.2 million fingerlings and a grow-out unit with 44 circular tanks targeting a total annual capacity of 1,200 metric tonnes.

Integrated Microalgae Biorefinery: A pioneering circular model where nutrient-rich wastewater from fish tanks is repurposed to cultivate microalgae. This biorefinery, converts waste into high-value biomass for aquafeed, nutraceuticals, and pharmaceuticals, effectively creating a zero-discharge system.

Premium D2C & B2B Seafood Sales: Through its proprietary online store and gourmet retail partnerships, SGA sells fresh Rainbow Trout and Salmon fillets/steaks. By harvesting daily for local markets, they offer a freshness guarantee that traditional frozen imports from the Himalayas or overseas cannot match.

Turnkey RAS & Technology Transfer: SGA provides technology licensing and consultancy for other entrepreneurs. They have also initiated technology transfer programs for small-scale farmers, allowing them to operate compact units under a buy-back arrangement, thereby creating a decentralized production network.

Revenue Model: Diversified income streams from premium seafood sales, technology licensing fees, and the upcoming commercialization of algal biomass products.

Challenges & Opportunities:

Challenges: Managing the high initial CAPEX of integrated biorefineries; maintaining absolute power reliability for temperature-sensitive species in rural power grids; and educating the domestic market on why RAS-farmed trout justifies a premium price.

Opportunities: Scaling the integrated inland trout farm model across other landlocked tropical regions; leveraging ESG and Carbon Credits through the CO_2-capturing properties of microalgae; and vertical expansion into branded, ready-to-cook seafood products.

60 Blue Wave Aquaculture Private Limited

Founder	Shaurya Agarwal (Co-Founder & Director) and Vatsal Agarwal (Co-Founder & Director).
Established year	December 26, 2024.
Location	Headquartered in Kolkata, West Bengal, India.

Company Overview

Blue Wave Aquaculture is a high-tech startup dedicated to establishing India's first large-scale, commercial Rainbow Trout RAS (Recirculating Aquaculture System) outside of traditional cold-water mountainous regions. Based in Kolkata, the company aims to disrupt the seafood industry by providing a predictable, year-round supply of premium, antibiotic-free fish. By partnering with Danish experts (FREA Solutions), they leverage energy-efficient technology designed for the Indian climate to ensure profitability even at a smaller pilot scale.

Sector/Domain: Agri-Tech, Intensive Aquaculture, and Sustainable Food Systems.

Key Technological Innovation: Precision-Controlled RAS Blue Wave's innovation focuses on a low-energy, highly replicable RAS model tailored for tropical climates:

1. Climate-Controlled Inland RAS: Utilizes advanced cooling and filtration to maintain a steady 16°C environment for Rainbow Trout in warm coastal/plains regions, effectively decoupling production from geography.

2. Energy-Efficient Design: Collaborating with FREA Solutions, their system is engineered to require significantly less electricity than traditional RAS, addressing a major cost barrier in the Indian market.

3. Zero-Waste Circularity: Waste and byproducts from the system are repurposed as organic fertilizer for nearby orchards, creating a zero-discharge, environmentally circular model.

4. High-Density Scaling: The initial 100-metric-ton (MT) facility is designed as a modular blueprint, intended to be scaled up to 400–500 MT through identical, verified production lines.

Core Offerings & Business Model

1. Premium Trout Production

Services: Farming of high-value, prize-grade Rainbow Trout targeted at high-end domestic and export markets.

Revenue Model: High-margin seafood sales, with a target of exporting roughly 75% of production to international buyers.

2. Traceable & Antibiotic-Free Fish

Services: Offering clean fish grown without harmful additives or pesticides, meeting global biosecurity standards.

Revenue Model: Transactional sales to health-conscious metropolitan consumers, luxury hotels, and high-end restaurants.

Challenges & Opportunities:

Challenges: Navigating the technical complexity of water temperature control in tropical Kolkata; the need for significant CAPEX for the initial build; and recruiting specialized technical talent to maintain complex biological filters.

Opportunities: Pioneering a Blue Wave of investment by proving RAS commercial viability; diversifying into high-value local species; and potential vertical expansion into branded retail for the Indian urban elite.

Canares Aquaculture LLP 61

Founder	Initiated by a group of fisheries graduates from the College of Fisheries, Mangaluru, including Sachin Venkatesh Savanthur, Karthik Gowda, Kaushik, Sukru Gajanana Harikantra, and Shubha Gajanan.
Established year	July 06, 2020
Location	Registered in Yeshwanthpur, Bangalore; Operational hatchery base in the Karwar region, Karnataka.

Company Overview

Canares Aquaculture LLP is a pioneering Indian startup specializing in the hatchery and seed production of high-value marine finfish. Notably, it established India's first private Asian Seabass (Barramundi) hatchery in Karnataka by retrofitting a defunct shrimp hatchery. Founded by technical experts and supported by angel investment, the firm addresses a critical bottleneck in the Indian aquaculture industry: the consistent supply of quality finfish seed. Their work has been recognized by the Central Institute of Brackishwater Aquaculture (CIBA) as a milestone in moving the sector beyond traditional shrimp farming toward high-value finfish diversification.

Sector/Domain: Hatchery Operations, Finfish Seed Production, and Aqua-Input Distribution.

Core Offerings & Business Model

The company utilizes a technical B2B model focused on the high-risk, high-reward phase of the aquaculture lifecycle:

Asian Seabass (Barramundi) Seed Production: Canares operates 80 specialized rearing tanks with an annual capacity to produce over 3 million seeds. They supply high-quality fingerlings to farmers across six maritime states and Lakshadweep, enabling them to transition into lucrative finfish farming.

Mastery of Live Feed Culture: A critical technical edge for Canares is their proficiency in producing live feed (Brine Shrimp/Artemia, Rotifers, and Bloodworms). Marine larvae cannot survive on dry pellets in early stages; the company's ability to mass-produce these living capsules of nutrition is what allows for high survival rates.

Infrastructure Retrofitting: By converting existing, non-operational shrimp hatcheries into modern finfish facilities, Canares significantly reduced the initial capital barrier. This approach serves as a model for resource optimization in India's coastal regions.

Input & Harvest Linkage: Beyond seeds, the firm distributes essential consumables like high-performance fish meal and veterinary medicines. They also act as a market facilitator, helping their client-farmers sell fresh harvest directly to retail and export markets to ensure better price realization.

Revenue Model: Primarily driven by the direct sale of juvenile fish (seeds), supplemented by transactional revenue from aqua-input distribution and commissions from market linkage services.

Challenges & Opportunities:

Challenges: The high technical risk associated with marine finfish larval rearing; sensitivity of hatchery profitability to market fluctuations in the grow-out sector; and competition with large government-backed hatcheries.

Opportunities: Diversifying seed production into other high-value species like Cobia or Groupers; and integrating Smart Automation (sensors and automated feeding) into hatchery loops through potential partnerships with automation firms to create a Tech-Backed Hatchery model.

https://hatcheryfm.com/news/latest-news/india-establishes-first-private-seabass-hatchery/

62 Pabhoi Fish Farm

Founder	Biren Bhagawati and Bhargav Kumar Bhagawati
Established year	With a legacy spanning over 25 years, the farm has evolved into a premier destination for scientific aquaculture in North East India
Location	Situated in Pabhoi, Biswanath Chariali, Sonitpur District, Assam

Company Overview

Pabhoi Fish Farm is a cornerstone of sustainable aquaculture in Assam, operating as a vital component of the larger Pabhoi Greens movement. Far more than a commercial hatchery, it functions as a living laboratory where scientific pisciculture meets traditional wisdom. The farm is celebrated for its commitment to the Blue Revolution, focusing on preserving the genetic purity of indigenous fish species while empowering thousands of rural households. Under the leadership of Bhargav Bhagawati, the farm has transitioned from a local seed producer to a regional knowledge hub, providing free learning and methodical demonstrations to help budding entrepreneurs achieve economic self-sufficiency.

Sector/Domain: Agri-Tech, Sustainable Aquaculture, and Integrated Farming.

Core Offerings & Business Model

The farm's success lies in its Scientific-Indigenous Hybrid Model, which maximizes productivity without chemical dependency:

1. Selective Brooder Management: Implementing a rigorous Brooder Exchange Program with other farms to prevent inbreeding and ensure the production of high-vitality, fast-growing fish seeds.

2. Integrated Fish-cum-Paddy Culture: Utilizing paddy fields as nurseries where fish excreta acts as a natural fertilizer for the rice, while fish feed on aquatic pests, creating a symbiotic, zero-waste ecosystem.

3. Diversified Species Focus: Promoting the culture of high-value indigenous species like *Ompok pabda* (Butter Catfish) and various carps, alongside exotic varieties, to cater to regional dietary preferences and market demand.

4. Modern Technology Propagation: While rooted in traditional ponds, the farm actively promotes and trains farmers in Bio-Floc Technology to maximize yields in small landholdings.

Products & Services:

1. Premium Fish Seeds: A leading producer of high-quality Spawn, Fry, and Fingerlings for species including Grass Carp, Silver Carp, Catla, and Common Carp.

2. Sustainable Table Fish: Marketing superlative quality indigenous and exotic food fish with high nutritional value to local markets and over 370 households per month.

3. Consultancy & Residential Training: Offering hands-on, residential workshops on Induced Breeding and pond management, documented for its high success rate in empowering hill fish farmers and local youth.

4. Agro-Tourism: Part of the Pabhoi Greens experience, the farm offers farm stays and educational tours, showcasing the aesthetic and functional harmony of an integrated farm.

Challenges & Opportunities:

Challenges: Mitigating the risks of climatic variations in the flood-prone North East; and ensuring the maintenance of genetic purity as seed demand scales across international borders.

Opportunities: Expanding into the ornamental fish market, leveraging Assam's rich biodiversity of indigenous species; and further developing Aqua-Knowledge Hubs across other districts through a franchise-based training model.

Mountstribe Agritech Private Limited 63

Founder	Kumar Ravi Bibhuty (Co-Founder & CEO) and Priya Rawat (Director)
Established year	Founded on July 24, 2019
Location	Registered in Dehradun, Uttarakhand, with deep operations across the Himalayan foothills.

Company Overview

Mountstribe Agritech is a social-impact agritech startup that brands itself as a Beyond Organics company. It was founded with the primary vision of reversing rural-to-urban migration in the Himalayan region specifically targeting Ghost Villages (empty settlements left behind by families seeking livelihoods elsewhere). By merging ancient Himalayan tradition with cutting-edge IoT-enabled Cold Water Aquaponics, Mountstribe creates localized, high-value economic opportunities. The company is notably incubated by MANAGE-CIA (Hyderabad) and focuses on a carbon-negative farming model that ensures food security while preserving the delicate mountain ecosystem.

Sector/Domain: Agri-Tech, Sustainable Aquaculture, Hydroponics, and Social Entrepreneurship.

Core Offerings & Business Model

Mountstribe operates a circular farming model that yields high-value protein and chemical-free horticulture:

Cold-Water Aquaponics Loop: The core system is a closed-loop symbiotic environment where fish waste provides natural nutrients for plants, and the plants act as a biological filter for the fish. A single 1,000-square-meter farm can yield approximately 10 tonnes of trout and 20 tonnes of greens annually.

IoT & Precision Monitoring: Designed specifically for remote, rugged terrain, the system uses IoT sensors to track water temperature, pH, and dissolved oxygen in real-time. This automation reduces the need for continuous manual supervision, a critical advantage for labor-scarce Ghost Villages.

Niche Mountain Produce: The company focuses on high-margin products like Himalayan Rainbow Trout (rich in Omega-3) and exotic, chemical-free greens such as Kale, Arugula, and Bok Choy. These are sold via a D2C (Direct-to-Consumer) subscription model and to luxury culinary establishments in urban centers.

Community-Centric Reverse Migration Model: Unlike purely commercial ventures, Mountstribe operates as a rural innovation platform. They upskill local youth and women as Tech-Farmers, enabling them to manage localized production units. This creates a reason for the local population to stay and thrive in their ancestral lands.

Revenue Model: Driven by premium produce sales, consultancy for modular farm setups, and unique experiential services. The company is backed by grants from BIRAC (BIG Grant) and RKVY-RAFTAAR.

Challenges & Opportunities:

Challenges: Navigating the logistics of the steep Himalayan terrain and the high initial CAPEX required for IoT sensors and greenhouse infrastructure in remote locations.

Opportunities: Expanding into Aquaponic Salad Cafés to create a circular economy from farm to fork; and monetizing their Carbon-Negative status through global ESG credits.

64 Mahabahu Fisheries Private Limited

Founder	Shri Anup Kumar Sarmah
Established year	October 24, 2016.
Location	Headquartered in Gohpur, Biswanath District, Assam

Company Overview

Mahabahu Fisheries is a pioneering integrated aquaculture enterprise in North-East India, recognized for its social and environmental impact. Under the leadership of first-generation entrepreneur Anup Sarmah, the company has successfully reclaimed over 100 acres (approx. 210 bighas) of flood-prone, underutilized wastelands in the Jakapara village area, transforming them into high-yield, scientific fish farms. The startup is a cornerstone of the regional Blue Revolution, providing livelihoods to dozens of local villagers and training thousands of farmers. It is an AAGL (Assam Agribusiness and Rural Transformation Project) enterprise and has been honored by the National Fisheries Development Board (NFDB) for its excellence in hilly and NE region aquaculture.

Sector/Domain: Aquaculture Production, Hatchery Management, Feed Manufacturing, and Rural Consultancy.

Core Offerings & Business Model

The company operates an integrated production cycle that minimizes dependency on inputs imported from outside the region:

- **Regional Seed Bank:** Mahabahu Fisheries operates a specialized seed bank providing healthy, acclimated fingerlings of high-yield varieties like Amrit Catla, Jayanti Rohu, and Rupchanda. These seeds are specifically resistant to the climatic fluctuations of the Brahmaputra valley.
- **In-House Feed Manufacturing:** To counter the high cost of logistics in the North-East, the company operates its own feed mill. They produce proprietary high-protein pelleted feed and animal supplements, ensuring that local farmers have access to affordable, quality nutrition for their stock.
- **Wasteland Transformation Consultancy:** Leveraging their success in reclaiming flood-vulnerable zones, the company provides technical consultancy on pond engineering and Pisces Project protocols. This helps other landowners convert unproductive marshes into high-yield assets.
- **Diversified Product Portfolio:** Beyond food fish like Carp and Tilapia, the company has a growing Ornamental Vertical, breeding species like Oranda Goldfish for the hobbyist market. They also cater to traditional palates by producing high-quality dry fish products.

Revenue Model: A high-volume Wholesale and Distribution model. Revenue is generated through the sale of fish seeds, in-house manufactured feed, and wholesale harvests. As an APART (Assam Agribusiness and Rural Transformation Project) enterprise, they also benefit from strategic government partnerships.

Challenges & Opportunities:

Challenges: Navigating extreme weather/monsoon floods that threaten pond infrastructure; and the high cost of logistics for transporting live seeds across hilly terrains.

Opportunities: Scaling the Amrit Catla seed production for export to neighboring states; and developing a Digital Advisory Platform to provide real-time water quality support to farmers via mobile.

Mayank Aquaculture Pvt. Ltd. 65

Founder	Dr. Manoj M. Sharma
Established year	Founded in 1996 (Incorporated as a Pvt. Ltd. in 2005).
Location	Headquartered in Surat, Gujarat, with its flagship facility in Dandi Village.

Company Overview

Mayank Aquaculture Pvt. Ltd. (MAPL) is a veteran leader in the Indian shrimp farming industry, operating a sophisticated, vertically integrated business model. For nearly 30 years, Dr. Manoj Sharma has transformed barren, salt-affected wastelands into highly productive aquaculture hubs. MAPL manages over 200 hectares of land, producing more than 1,000 metric tons of premium shrimp annually. The company is unique for its Pond-to-Plate strategy, which controls every stage of the lifecycle, from genetic seed quality to a direct-to-consumer restaurant brand, reducing the industry's typical reliance on volatile export markets.

Sector/Domain: Integrated Aquaculture, Shrimp Hatchery & Nursery, Distribution of Aqua-Inputs, and Seafood Retail/Dining.

Core Innovation: The Three-Pillar Vertical Integration MAPL's success is built on an integrated ecosystem that captures value across the entire supply chain:

1. Manorama Aquatics (Production & R&D): Specializes in shrimp rearing and operates one of West India's first CAA-approved, multi-species nursery facilities. This ensures biosecure, high-survival seed (Post Larvae) for the group.

2. Mayank Aqua Products (Inputs & Distribution): Distributes high-performance healthcare solutions and nutritional inputs. A key innovation is their VIVALINE healthcare range, developed in technical collaboration with HTS BIO France.

3. Zhingalala (Retail & Branding): A pioneering Pond-to-Plate restaurant and fresh-delivery concept designed to boost domestic shrimp consumption by offering traceable, farm-fresh produce directly to Indian consumers.

Core Offerings & Species:

1. Premium Shrimp Species: Large-scale cultivation of Pacific White Shrimp (*L. vannamei*) and Black Tiger Shrimp (*P. monodon*).

2. Technical Innovation: Implementation of the Multiphase Nursery Concept, which optimizes the early growth stages of shrimp, significantly increasing final harvest yields.

3. Biosecurity & Traceability: Chemical-free production utilizing precision water management and advanced biosecurity protocols to meet international standards.

4. Sustainable Inputs: Distribution of probiotics and specialized medicines to the broader Indian farming community to improve regional success rates.

Business Model & Socio-Economic Impact:

1. Community Leadership: Dr. Sharma founded the Surat Aquaculture Farmers Association (SAFA), which supports over 1,000 farmers and manages 3,000 hectares. This Satellite Farming model has created livelihoods for over 150,000 individuals in coastal Gujarat.

2. Domestic Focus: Actively works to rebrand shrimp from an export commodity to a local protein staple.

Challenges & Opportunities:

Challenges: Competition from tech-heavy, digital-first input platforms; and the logistical difficulty of scaling fresh farm-to-plate dining across all Tier-1 Indian cities.

Opportunities: Expanding the Zhingalala franchise nationally; and leveraging 30 years of data to launch a high-end aquaculture consultancy for industrial clients.

66 Vaidika Fisheries

Founder	Ketan K. Mane. (Managing Director)
Established year	Vaidika Group founded in 2004; Fisheries division expanded significantly in recent years.
Location	Headquartered in Pune, Maharashtra, with primary operatic the Hadshi Reservoir.

Company Overview

Vaidika Fisheries manages over 4,000 acres of captive freshwater reservoir area. Part of the diversified Vaidika Group, the fisheries division was established to modernize the fragmented Indian inland fishing industry. By blending large-scale commercial production with a Nature-First philosophy, the company utilizes the pristine catchment waters of the Western Ghats to produce high-quality protein. Vaidika is a model for Public-Private-Community Partnerships, transforming public reservoirs into high-yield, technologically advanced aquatic farms while simultaneously empowering local fisher-folk.

Sector/Domain: Large-Scale Inland Aquaculture, Cage Culture, Reservoir Management, and Skill Development.

Core Offerings & Business Model

Vaidika's primary innovation lies in the vertical industrialization of the reservoir water column:

Massive Cage Culture: Specializing in high-density floating cage systems, the company has scaled operations toward a target of 1,000 cages. This allows for intensive, controlled production of Tilapia and Basa (Pangasius) without disturbing the natural reservoir bed.

Bare Dam Polyculture (Vertical Water Management): A Vertical Farming approach that utilizes the entire depth of the reservoir:

Surface/Column: Nile Tilapia, Basa, and Indian Major Carps (Katla, Rohu).

Lake Bed: Large-scale freshwater Prawn and Shrimp cultivation.

Hadshi Training Node & R&D: The company operates a specialized facility that provides hands-on vocational training to marginal farmers and rural youth. It collaborates with the Ratnagiri College of Fisheries to document traditional knowledge and develop resilient, site-specific seed strains.

Pond-to-Plate Infrastructure: Vaidika is building an integrated cold chain, including in-house processing plants and a dedicated fleet of refrigerated (Reefer) vans. This ensures that the fresh harvest from the Western Ghats reaches urban markets in Pune and Mumbai with minimal nutrient loss.

Revenue Model: High-volume production and wholesale distribution of freshwater fish and prawns. Additionally, the group generates value through professional agro-consultancy services, which have expanded to international projects in Kenya, Australia, and Ethiopia.

Challenges & Opportunities:

Challenges: Navigating complex environmental regulations and long-term water lease agreements; and managing biological risks (diseases) inherent in high-density cage environments.

Opportunities: Branded Inland Seafood: Positioning Hadshi-grown fish as Source-Verified and Pristine Water produce for health-conscious urban consumers; and CSR Synergies: Leveraging their community training programs to secure government grants for rural livelihood development.

Digital Market places & Aqua-Inputs

The Indian Digital Marketplaces & Aqua-Inputs sector is currently defined by the integration of e-commerce platforms with specialized biotechnological solutions to modernize the procurement of essential farming resources. These sixteen key organizations Manjha, Aqua Blue Global, Fishy Farmers, Pureflow Biofloc Innovations, Ideal Biosciences, Corel Lifecare, Fin Ray Biotech, Marvels Fish Research and Solution, Aqua Doctor Solutions, Exflair Agritech (Oxyfeed), AquaBio Solutions, Nambikkai Fish Farmers' Group, Salt Crops THNK, Blue Zone Synthesis, Nurture, and Glaukos Algae Technologies demonstrate the critical importance of high-quality inputs in ensuring crop health and productivity. Their collective activities range from the digital distribution of premium fish seed and specialized shrimp feed to the development of sophisticated probiotics, water conditioners, and algae-based nutritional supplements. By bridging the gap between rural farmers and global research, these startups are eliminating substandard local inputs and providing data-driven recommendations for pond management. Through this shift toward transparent digital marketplaces and scientifically-backed aqua-inputs, these enterprises are reducing production costs and environmental risks, ultimately fostering a more resilient and sustainable aquaculture industry across the nation.

Digital Marketplaces & Aqua-Inputs

Bridging the gap between farmers and biotechnological research through transparent e-commerce and specialized bio-formulations.

Table 11: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
Manjha Technologies	Input E-commerce	Matsya Setu (ICAR-CIBA partnered feed brand)	Multibrand feed, Seed, 24/7 advisory	Transactional e-commerce with free doorstep delivery
Aqua Blue Global	Assamese Value Chain	Fishwaale Mart (integrated e-fish app)	Biosecure seeds, ABIS feed, IoT sensors	One-stop-shop aggregator and digital marketplace
Fishy Farmers	Filtration Technology	Auto-backwashing LPBF (Low Profile Bead Filter)	LPBF filters, Aquaponics/RAS systems	Farm-as-a-Service (FaaS) and infrastructure sales
Pureflow Biofloc	Aquatic Engineering	Plug-and-Play RAS Skids and automated RDFs	Rotary Drum Filters, Protein skimmers	Manufacturing and turnkey aquarium/ farm integration
Ideal Biosciences	Biological Prophylactics	Fermentation-based herbal-microbial inputs	BAN-V (Vibrio), SPOT SHIELD, EXPELLER	B2B manufacturing for antibiotic-free export markets
Corel Lifecare	Bioscience Accessibility	Immu-45 (5th-gen immune modulator)	PondTrust probiotics, SoilTrust, Immu-45	B2F sales with decentralized technical education partner network
Fin Ray Biotech	Molecular Design	Intelligent Molecules with nano-tech applications	ALGAFREE, BLOOMED PARACIDE, GELOMAX specialized Tonics	B2B distribution and WHO GMP-certified manufacturing
Marvels Fish Research	FRP Infrastructure	Antibacterial/ Antifungal food-grade FRP resin	FRP farming tanks, Retail fish kiosks	B2B manufacturing and government-backed retail setups
Aqua Doctor Solutions	e-commerce marketplace for farm inputs	One Shop-One Stop hub for 2,500+ trained farmers	Spawn Pro, Testing kits, Aqua Oxy Plus	Hybrid retail/ wholesale and technical skill development
Exflair Agritech	Nano-	Diatom-based oxygenation (Oxyfeed) technology	RAS systems, Oxyfeed Blue/Aqua liquids	System integrator and consultancy for water remediation
AquaBio Solutions	Aqua-Biologics	In-house fermentation of site-specific biologics	Photosynthetic Bacteria (PSB), Immuno-boosters	B2B sales and OEM contract manufacturing
Nambikkai Fish Group	Waste-to-Wealth	Fish Waste Hydrolysate (FWH) technology	CIBA-PlanktonPlus, CIBA-HortiPlus	SHG-led circular economy micro-entrepreneurship

Salt Crops THNK	Halophyte Agriculture	Salicornia-based biological green salt	Indian Green Salt, fresh Sea Asparagus	D2C and B2B healthy salt alternative functional foods
Blue Zone Synthesis	Synthetic Biology	Resurrection of Aquafarms (RAF) protocol	Oxyzone enhancer, Prozone booster	Manufacturing partnership for herbal-microbial synergy
Nurture	Herbal Healthcare	Ayurvedic integration for residue-free seafood	Nat Min-Pro, Act Livton (herbal hepatostimulant)	Global export and conscious sourcing for herbal health
Glaukos Algae	Marine Microalgae	Dunaliella salina mass cultivation technology	Glaukotene (Beta-Carotene powder), Chlorella	Niche biotech manufacturing for pharma/ nutraceuticals

Table 12: Sector Feature Matrix

Startup Name	Input E-commerce (Seed/Feed)	Probiotics/Water Conditioners	Biological/Waste-to-Wealth Products	Retail Market Access
Manjha Technologies	✓	✓		
Aqua Blue Global	✓	✓		✓
Fishy Farmers				✓
Pureflow Biofloc				
Ideal Biosciences		✓	✓	
Corel Lifecare		✓	✓	
Fin Ray Biotech		✓	✓	
Marvels Fish Research				✓
Aqua Doctor Solutions	✓	✓		
Exflair Agritech		✓	✓	✓
AquaBio Solutions		✓	✓	
Nambikkai Fish Group			✓	
Salt Crops THNK			✓	✓
Blue Zone Synthesis		✓	✓	
Nurture	✓	✓	✓	
Glaukos Algae	✓		✓	

67 Manjha Technologies Private Limited

Founder	Shobhit Aggarwal (CEO), Divyam Goel, and Sudhir. The team is also supported by Ajmer Singh Malik, a veteran fish farmer and co-founder/advisor.
Established year	January 18, 2022 (Marketplace operations began in August 2021).
Location	Headquartered in Hisar, Haryana, India.

Company Overview

Manjha positions itself as Matsya Kisano Ki Ek Nayee Udaan (A New Flight for Fish Farmers), operating as a dedicated e-commerce and advisory ecosystem for the aquaculture sector. The platform was born out of the personal challenges faced by its founders in sourcing quality inputs. Today, it serves over 15,000–16,500 fish farmers nationwide, providing a full-stack solution that includes a digital marketplace for inputs, expert consultancy, and market linkages.

Sector/Domain: Agri-Tech, E-commerce, and Aquaculture Supply Chain.

Core Innovations and Services:

1. Aggregated E-commerce Marketplace: A robust digital platform connecting farmers to high-quality Feed, Seed, Healthcare products, and Equipment from over 15+ top brands (e.g., Skretting, Abis, Tata Rallis).

2. Last-Mile Logistics: Solves rural accessibility by providing Free Doorstep Delivery across key states including Haryana, Punjab, UP, Rajasthan, Gujarat, and Bihar.

3. Matsya Setu (In-house Brand): In 2024, Manjha launched its own feed brand developed in partnership with ICAR-CIBA, reportedly reducing feed costs for farmers by up to 15%.

4. Matsya Charcha & Advisory: A community learning feature and 24/7 free call support that helps farmers move from guesswork to data-driven decision-making.

Business Model and Revenue Streams:

1. Input Sales Margins (Transactional)

Services: Sale of high-volume recurring inputs like feed and chemicals.

Revenue Model: Earning margins between wholesale procurement and discounted retail prices on the eStore.

2. Brand Tie-ups & Commissions

Services: Strategic placement and marketing for partner brands like Tata Rallis and Skretting.

Revenue Model: Commissions and exclusivity fees for providing brands access to their 15,000+ farmer network.

3. Marketplace Seller Fees

Services: Allowing third-party sellers to list specialized equipment (aerators, pumps) on the platform.

Revenue Model: Commissions or listing fees, enabling scale without holding heavy inventory.

4. Logistics Optimization

Strategy: Consolidating deliveries to transform a traditional cost center into an efficient, margin-saving operational model.

Challenges & Opportunities:

Challenges: Maintaining strict quality assurance for Seed (a high-risk input); the long-term challenge of monetizing the currently free 24/7 consultancy service.

Opportunities: Embedded Finance (Buy-Now-Pay-Later) using their vast transactional data; expansion into South Indian markets (Andhra Pradesh, Tamil Nadu); and leveraging AI for demand forecasting.

Aqua Blue Global Aquaculture Solutions Private Limited 68

Founder	RazaQul Islam (CEO & Director) and Farhana Tasneem (Director)
Established year	October 30, 2020.
Location	Marigaon (Morigaon), Assam, India. (Operating significantly in Jagiroad)

Company Overview

Aqua Blue Global is a comprehensive one-stop-shop for the aquaculture value chain in Northeast India. The company bridges the gap between traditional farming and modern commercial standards by providing end-to-end support—from fingerlings and feed to digital market access. Supported by the IIM Calcutta Innovation Park and the Assam Startup ecosystem, it serves small and medium-scale farmers with a focus on improving productivity through technology and high-quality inputs.

Sector/Domain: Agri-Tech, E-commerce, and Aquaculture Infrastructure.

Core Innovations and Products:

1. Integrated Digital Marketplace (Fishwaale Mart): Operates as India's first e-fish market app developed with the Assam Fisheries Department to eliminate middlemen. It offers a diverse retail range including:

Live Fish & Value-Added Products: Direct access to live fish and processed items like fish pickles and dried fish.

Frozen Seafood & Fish: A wide selection of frozen seafood and specialized frozen fish sourced from regions like Andhra, Kanpur, and even international Burmese imports.

2. AQUAMART: Full-Stack Input Supply Chain: Consolidates all essential biological and chemical inputs for farmers:

Biosecure Seeds: Quality seeds for Carp, Tilapia, and Pangasius.

Nutritionally Balanced Feeds: Partnerships with leading brands like ABIS to provide floating and sinking feed solutions.

Aquaculture Medicines: A dedicated range of healthcare products and supplements to maintain pond biosecurity.

3. AQUABASE: Specialized Live Fish Production: Focuses on high-demand commercial species at various growth stages:

Live Fish Carp (Big Size): Large-scale carp for immediate market consumption.

Local & Catfish Varieties: Specialized production of Catfish and local favorites such as Singi, Magur, and Pabda.

Table Size Fish: Standardized production of fish averaging 100gm for consistent retail supply.

4. Technical & Digital Services: Provides the infrastructure for modern, high-intensity farming:

IoT-Based Monitoring: Real-time tracking of critical water parameters including Dissolved Oxygen (DO), pH, and temperature.

Advanced System Consultancy: Professional design and setup services for Recirculating Aquaculture Systems (RAS) and Biofloc farming units.

Business Model and Revenue Streams:

1. B2B & B2C Input Sales

Services: Distribution of fish seeds, specialized floating feed, and veterinary medicines.

Revenue Model: Transactional revenue from bulk and retail sales to farmers and entrepreneurs.

2. Technology & Equipment Sales

Services: Supplying aerators, biofilters, and IoT sensors.

Revenue Model: High-ticket sales of farm infrastructure and precision monitoring tools.

3. Technical Consultancy & Training

Services: Paid workshops, disease diagnostics, and site selection consultancy.

Revenue Model: Service fees for technical hand-holding and capacity building.

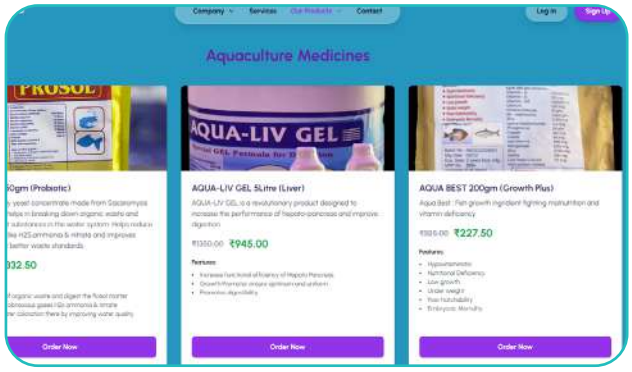
4. Franchise & Distributor Model

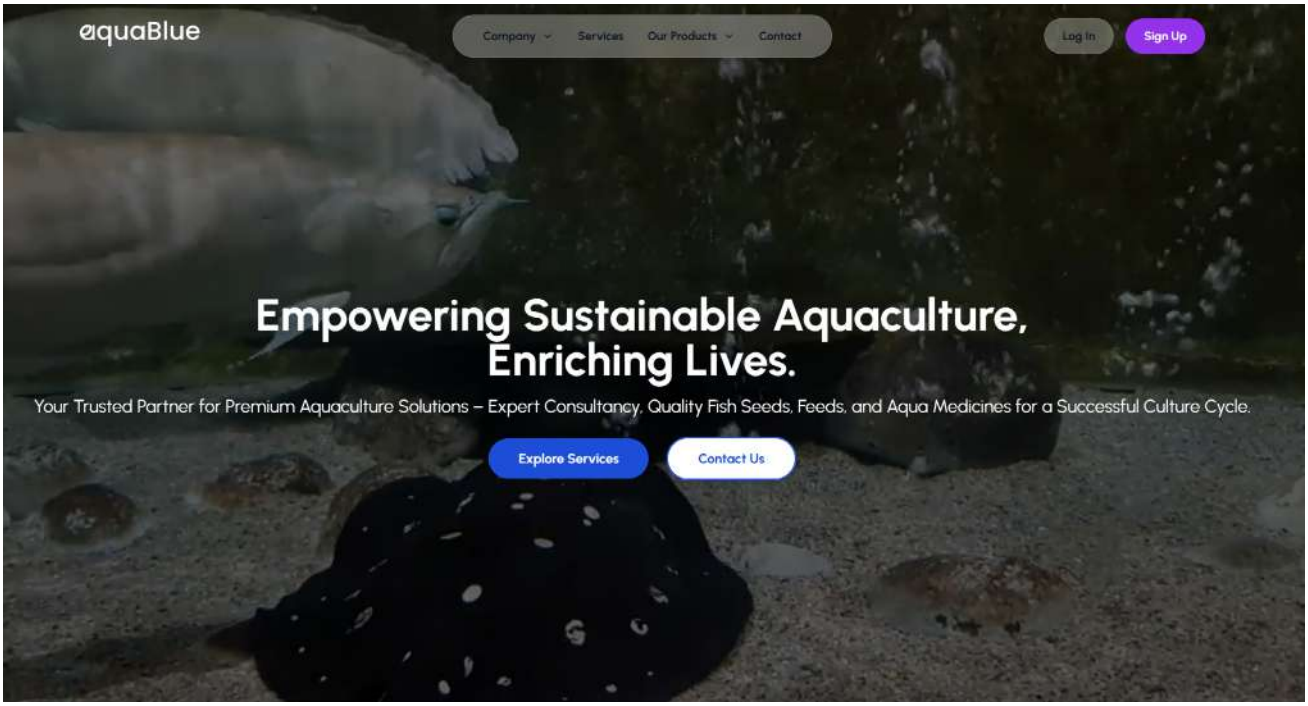
Strategy: Expanding reach through a network of local partners who act as regional distributors and service providers.

Challenges & Opportunities:

Challenges: Managing the logistics of transporting live seeds and heavy feed bags across the remote terrain of Northeast India; the capital intensity required to maintain diverse inventory and develop IoT hardware.

Opportunities: Scaling the Fishwaale platform to include credit facilitation and remote diagnostics; and geographical expansion into neighboring markets like Bangladesh and Bhutan where they already have initial footprints.





Fishy Farmers Private Limited

Founder	Saikrishna Teki (Managing Director) and Krishnaveni Teki
Established year	I June 17, 2018.
Location	Hyderabad, Telangana, India.

Company Overview

Fishy Farmers is an innovative Indian agritech startup specializing in high-density, technology-driven aquaculture and aquaponics. Based in Hyderabad, the company focuses on creating sustainable and circular farming ecosystems that mimic natural symbiotic relationships between fish and plants. By integrating advanced filtration with smart monitoring, Fishy Farmers enables year-round production of premium fish and crops, using significantly less water and land than traditional methods. The startup is supported by premier incubators including a-IDEA (NAARM) and the Centre for Innovation and Agripreneurship.

Sector/Domain: Agri-Tech, Aquaponics, and Precision Aquaculture

Core Innovations and Products:

1. Proprietary Aquaponics Systems: A circular farming model combining aquaculture and hydroponics that yields six times more produce per square foot while consuming 90% less water compared to traditional soil farming.

2. Low Profile Bead Filter (LPBF): Custom-designed, patented filters featuring auto-backwashing and superior biofiltration. They utilize airlift technology instead of high-energy pumps, resulting in up to 60% energy savings.

3. Precision Biofloc Tanks: Customized PVC and mesh-reinforced tarpaulin tanks designed for high-density culture, featuring specialized internal structures for optimal waste management.

4. Advanced Water Treatment Hardware: A suite of specialized components including Protein Skimmers to reduce organic load, UV Filters for chemical-free pathogen control, and high-pressure Oxygen Cones for consistent dissolved oxygen levels.

Core Offerings and Business Model:

1. Farm-as-a-Service (FaaS) & Management

Services: End-to-end management of aquaculture systems, including stocking, precision feeding, and health monitoring.

Revenue Model: Management fees and production-based profit-sharing models.

2. Aquaculture Infrastructure Sales

Services: Sale and installation of modular RAS (Recirculating Aquaculture Systems) and Biofloc systems of varying scales (Small to Large).

Revenue Model: Direct sales of proprietary filters, tanks, and monitoring equipment.

3. Consulting & Training

Services: Providing technical expertise on water chemistry, species selection (e.g., Tilapia, Seabass, Shrimp), and government subsidy navigation.

Revenue Model: Professional consultancy fees for turnkey project development.

4. Sustainable Produce Sales

Services: Direct-to-market supply of traceable, antibiotic-free fish and hydroponic vegetables.

Revenue Model: Transactional sales from farm harvests.

Challenges & Opportunities:

Challenges: Overcoming the high initial capital expenditure (CAPEX) required for large-scale RAS systems; managing technical complexity for traditional farmers; and maintaining 24/7 power reliability for high-density aeration.

Opportunities: Scaling urban farming units in metropolitan hubs like Hyderabad to reduce food miles; integrating AI-driven predictive analytics for disease detection; and expanding into the international aquaponics market.

70 Pureflow Biofloc Innovations

Founder	Harish Kumar Thakur (Managing Director)
Established year	Established as a proprietorship in 2024 (Operational since March 2024).
Location	Bengaluru, Karnataka (Nagarbhavi and Mysuru).

Company Overview

Pureflow Biofloc Innovations is a leading Indian manufacturer and system integrator specializing in advanced Life Support Systems (LSS) and Recirculating Aquaculture Systems (RAS). Based in Bengaluru, the company provides custom-engineered water filtration solutions for diverse environments, ranging from commercial intensive fish farms and hatcheries to large-scale public aquariums and oceanariums. By focusing on Made-in-India high-performance equipment, they serve as a critical technical partner for projects requiring complex MEP (Mechanical, Electrical, and Plumbing) logic and filtration design.

Sector/Domain: Agri-Tech, Aquatic Engineering, and Water Filtration Systems.

Core Innovations and Products:

1. Plug-and-Play RAS Skids: Turnkey filtration units that integrate mechanical, biological (MBBR), and chemical filtration (Ozone/UV) into a modular, low-footprint skid. These systems are hydro-tested and ready for immediate on-site commissioning.

2. Automated Rotary Drum Filters (RDF): Specialized mechanical filters made from industrial-grade Polypropylene (PP) that remove solid waste down to 50 microns, significantly reducing the biological load on the system.

3. Specialized Protein Skimmers: Innovative foam fractionators designed for both freshwater and saltwater, removing dissolved organic compounds before they convert into toxic ammonia.

4. Custom Life Support Systems (LSS): Comprehensive design and fabrication of aquatic environments for public exhibits, including Acrylic Tunnel Aquariums and interactive touch pools.

5. Advanced Monitoring Hardware: Includes automatic water temperature controllers and ozone generator systems to maintain biosecurity and optimal growth conditions.

Core Offerings and Business Model:

1. B2B Equipment Manufacturing

Services: Direct fabrication and supply of drum filters, protein skimmers, trickle filters, and PP tanks.

2. Turnkey Project Execution

Services: Concept-to-Commissioning for public aquariums and commercial RAS farms, including site assessment, 3D modeling, and installation.

Revenue Model: High-value contracts for infrastructure design and MEP installation services.

3. Operation & Maintenance Support

Services: Providing Annual Maintenance Contracts (AMC), on-site staff training, and troubleshooting for large-scale aquatic systems.

Revenue Model: Recurring service revenue from performance audits and system optimization.

Challenges & Opportunities:

Challenges: Navigating the high capital cost (CAPEX) barriers for small-scale Indian farmers; competing with high-end imported filtration technologies; and providing consistent technical support across remote geographical locations.

Opportunities: Expanding into IoT-driven automation (SaaS) for remote system monitoring; offering modular system rentals to lower entry barriers; and capturing the growing market for luxury residential Koi Pond filtration systems.

Ideal Biosciences Private Limited 71

Founder	Palanisamy Iyapparaj (Managing Director/Founder), Dr. T. Marudhupandi (Director R&D), S. Niroshan (Listed as CEO/Director), S. Sesuraj Divakar and T. Thirugnanasambantham Gayathrie
Established year	November 15, 2017.
Location	Headquartered in Tiruchirappalli (Trichy), Tamil Nadu, India.

Company Overview

Ideal Biosciences is a science-driven manufacturer specializing in biological and prophylactic solutions for the aquaculture industry. The company addresses the crisis of intensification, the disease and environmental stress caused by high-density shrimp and fish farming. By focusing on advanced microbial fermentation and herbal biotechnology, Ideal Biosciences provides farmers with a sustainable alternative to antibiotics, ensuring crop predictability and helping them meet the stringent clean seafood standards of global export markets.

Sector/Domain: Aqua-Biotechnology, Animal Health, and Bio-Inputs.

Core Innovations

Specialized Bio-Formulations The company's innovation lies in its targeted approach to common aquaculture pathologies through two main categories:

1. Dietary Supplementary Products (Nutraceuticals)

- BAN-V: A prophylactic supplement that uses antibacterial and antioxidant action to combat EMS (Early Mortality Syndrome) and Vibrio infections.
- MEDWHITE: A herbal-reinforced treatment designed to rejuvenate microvilli and treat White Gut and White Faecal Syndrome (WFS).
- SPOT SHIELD: A marine polysaccharide and antiviral herbal blend that inhibits viral multiplication to protect against WSSV (White Spot Syndrome Virus).
- PROBITIC-DS: A high-potency, multi-strain probiotic (2 billion cfu/g) including Bacillus and Lactobacillus to maintain gut health.
- MOULTOVITA & VRIDDHI: Specialized growth promoters; one focuses on stress-free moulting through chelated minerals, while the other uses exo-enzymes to enhance plant protein digestion.
- IDEAL-C: Pharma-grade Vitamin C (Ascorbic acid) optimized to reduce oxidative stress and improve SGR (Specific Growth Rate).

2. Water & Soil Management (Environmental Probiotics)

- EXPELLER: Employs chemolithotrophic bacteria (Nitrosomonas, Nitrobacter) to convert toxic ammonia into non-toxic forms.
- HYDRON WS: A consortium of beneficial microbes (Bacillus, Rhodococcus) that decomposes organic sludge and suppresses hydrogen sulfide gas.
- IDEAL PS: Contains photosynthetic bacteria (Rhodopseudomonas spp.) to treat anaerobic pond bottom layers and stabilize algal blooms.
- VSQUAD: Uses wild-strain probiotics to competitively exclude pathogenic Vibrio through quorum-sensing inhibition.

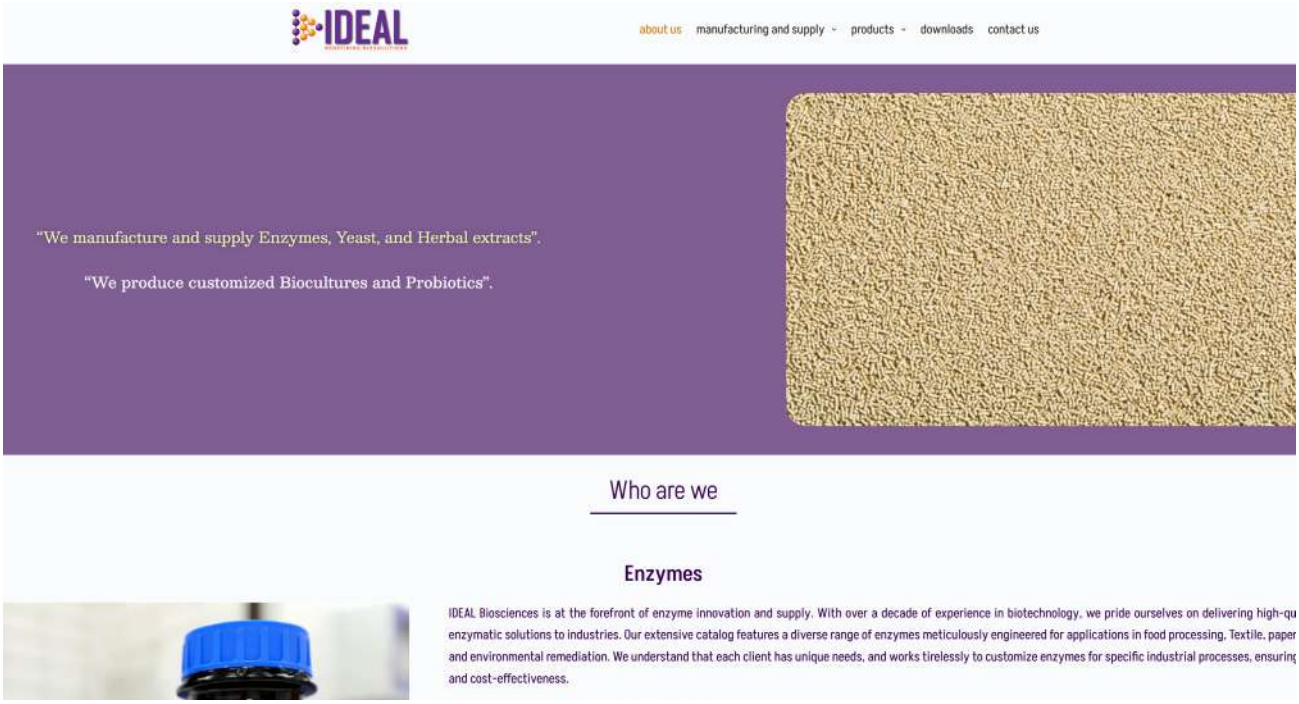
Business Model and Value Chain Impact:

- B2B Manufacturing & Distribution: Operates as a primary manufacturer, supplying high-potency biocultures and herbal extracts to a network of distributors and large-scale farming enterprises.
- Preventative Revenue Model: Focuses on recurring sales of prophylactic products that farmers use throughout the culture cycle, rather than one-time rescue chemicals.
- Export Enablement: By providing antibiotic-free inputs, the company acts as a gateway for Indian farmers to access premium, high-value markets in the EU and US.

Challenges & Opportunities:

Challenges: Overcoming traditional farmer skepticism regarding bio-solutions versus quick-fix chemicals; maintaining the viability of live microbial cultures during transport in harsh climates; and the capital-intensive nature of high-purity fermentation at scale.

Opportunities: Capitalizing on the global Antibiotic-Free Mandate; expanding into micro-algae-based feeds; and leveraging ESG-focused investing as the aquaculture industry shifts toward total sustainability.



Corel Lifecare 72

Founder	Abhijeet Naohate (CEO) and Nikhilesh Hajare (COO)
Established year	August 30, 2018
Location	Headquartered in Navi Mumbai (Rabale), Maharashtra, India.

Company Overview

Corel Lifecare is a Mumbai-based aquaculture innovation startup on a mission to Democratize Innovative Solutions by translating advanced biosciences into affordable, high-impact products for fish and shrimp farmers. Disturbed by the high cost of imported treatments, the founders built Corel to provide science-led bio-formulations that stabilize aquatic ecosystems. Recently featured on Shark Tank India and having secured a strategic R&D pact with The Aqua Consortium (Switzerland), the company is rapidly becoming a key player in the Blue Revolution, helping farmers transition away from chemical dependency toward sustainable, predictable farming.

Sector/Domain: Animal Health, Biotechnology, and Precision Aquaculture

Core Innovations & Products:

Corel Lifecare's philosophy centers on Clean Fishcare, focusing on the biological core of the pond rather than just symptom management:

1. Precision Probiotics & Enzymes: Flagship products like PondTrust use a high-potency blend of 7 Bacillus strains and 12 enzymes to digest organic sludge and out-compete pathogens.

2. Next-Gen Immune Modulators: Immu-45 is a 5th-generation feed supplement that consolidates five traditional additives into one, fortifying shrimp and fish against disease outbreaks.

3. Pond Bottom Engineering: SoilTrust utilize specialized Paracoccus probiotics to work anaerobically, eliminating toxic Hydrogen Sulfide and stabilizing the pond floor.

4. Advanced Minerals & Bind-Gels: Mintamix provides bioavailable essential minerals for healthy shrimp moulting, while Bindo Best serves as a starch-free gel to prevent supplement leaching in water.

5. AI-Powered Diagnostics: In collaboration with RYNAN Aquaculture, Corel is deploying AI imaging tools and low-cost bacterial culture kits to detect diseases like EHP and Vibrio via smartphone.

6. Advanced Minerals & Bind-Gels: Mintamix provides bioavailable essential minerals for healthy shrimp moulting, while Bindo Best serves as a starch-free gel to prevent supplement leaching in water.

7. AI-Powered Diagnostics: In collaboration with RYNAN Aquaculture, Corel is deploying AI imaging tools and low-cost bacterial culture kits to detect diseases like EHP and Vibrio via smartphone.

Business Model and Growth Strategy:

1. Vertically Integrated Manufacturing

Strategy: Managing everything from in-house R&D in Mumbai to a 120+ partner distribution network ensures quality control and keeps prices accessible.

Revenue Model: Direct transactional sales to a monthly base of 3,000+ farmers across seven major maritime states.

2. Farmer Connect Network

Impact: A decentralized support system of 120 channel partners providing last-mile technical education and workshops to ensure science reaches the pond level.

3. Global R&D Alliances

Strategy: Partnering with The Aqua Consortium to tackle Silent Killers like Sea Lice in Salmon and Argulus in Indian Carps, aiming to scale indigenous innovations for the global market.

Challenges & Opportunities:

Challenges: Shifting the mindset of conservative farmers away from quick-fix chemicals; competing with established global MNCs; and navigating the logistical hurdles of India's fragmented aquaculture hubs.

Opportunities: Capturing the massive shift toward antibiotic-free seafood exports; integrating IoT sensors for real-time water quality monitoring.

73 Fin Ray Biotech Private Limited

Founder	Partha Bandyopadhyay and Krishna Bandyopadhyay
Established year	March 22, 2022.
Location	Headquartered in Ahmedabad, Gujarat, with a significant East Zone Sales Office in West Bengal.

Company Overview

Fin Ray Biotech is a high-growth Indian biotechnology company specializing in the scientific design of molecules for the aquaculture, livestock, and agricultural sectors. The company operates with a dual focus on bioremediation (using beneficial microbes to clean environment) and nutritional security. Despite being a young company, it has achieved an extraordinary CAGR. Holding ISO 9001:2015 and WHO GMP certifications, Fin Ray positions itself as an entrepreneurial catalyst for sustainable farming, bridging the gap between high-science molecular design and practical, cost-effective field applications.

Sector/Domain: Animal Health, Aqua-Biotechnology, and Agri-Crop Nutrition

Core Innovations & Molecular Strategy:

Fin Ray Biotech's competitive edge lies in its Intelligent Molecules approach, moving beyond generic supplements to targeted chemical and biological designs:

1. Scientific Design of Products: The company focuses on the physiological and metabolic needs of specific species, utilizing nano-technological applications in crop nutrition and specialized hepatoprotectants in animal health.

- Bioremediation Technology: Developing microbial formulations that actively manage wastewater and pond ecosystems, converting organic waste into beneficial environmental drivers.
- R&D Infrastructure: The company claims a global research footprint, with a Research and Quality Control Laboratory located in the USA, supporting the development of what they term New Chemistry and Patent Molecules.

Core Offerings: Multi-Sector Product Portfolios

1. Aquaculture Health & Water Treatment:

ALGAFREE: A specialized biocide used to control fungal pathogens, protozoans, and algal attachments like Zoothamnium.

BLOOMED: An eco-friendly soil and water conditioner that stabilizes pH and promotes healthy planktonic blooms.

PARACIDE: A targeted formulation to counter EHP *(Enterocytozoon hepatopenaei)* and White Faecal Syndrome in shrimp.

GELOMAX: A high-quality feed binder enriched with Saccharomyces cerevisiae for optimal nutrient delivery.

2. Livestock & Poultry:

Finmin Complete: A trace mineral premix designed as a true fertility improver for cattle.

Finomed PV: A potent liver tonic for poultry and veterinary use.

Fedgest & Fedoliv: Specialized hepatoprotectants that normalize body conditions and stimulate appetite in high-stress phases.

3. Veterinary Pharma:

A broad range of WHO GMP-certified pharmaceutical capsules, injections, and drops addressing common livestock diseases and reproductive health (e.g., Finrop for uterine care).

4. Agri-Crop Nutrition:

Nano-fertilizers and plant growth stimulants (e.g., AGRIOS) aimed at optimizing yield while reducing environmental footprints.

Business Model and Operations:

- Wholesale & Distribution Strategy: The company operates primarily through a robust B2B trade and distribution network, acting as a bridge between scientific manufacturing and the end-user market.

- Quality-Centric Manufacturing: Utilizing WHO GMP-certified facilities allows them to maintain high standards across a diverse and complex product line, facilitating trust in highly regulated pharma and aqua sectors.
- Global Expansion: Fin Ray is actively seeking international strategic alliances and marketing assignments, leveraging their patent-focused portfolio to enter global animal health markets.

Challenges & Opportunities:

Challenges: Sustaining a triple-digit growth rate while managing a massive product diversity (ranging from pharma to industrial minerals); and protecting New Chemistry innovations in a competitive, price-sensitive market.

Opportunities: Leveraging their USA-based R&D link to export high-margin bio-molecules to Western markets; expanding into Information Technology services for digital crop protection; and leading the shift toward Eco-Labelled sustainable aquaculture inputs.

74 Marvels Fish Research and Solution LLP

Founder	Muripa Pendyala (Designated Partner) and Saritha Kumari Busi (Designated Partner).
Established year	July 1, 2022.
Location	Headquartered in Hyderabad, Telangana, with key operational sites in Cherlapally (IDA) and Keesara (Rampally Village).

Company Overview

Marvels Fish Research and Solution LLP is a pioneering enterprise dedicated to integrating technology with the aquaculture market to empower farmers and retailers. The company identifies as a women-owned business and specializes in the design and manufacturing of Fiber Reinforced Plastic (FRP) infrastructure. Their mission is to modernize the fisheries sector by providing hygienic, portable, and durable tank solutions that replace traditional, labor-intensive cement or net-based systems. They are particularly known for supporting government-backed initiatives like the FISH ANDHRA project, helping local vendors upgrade to professional retail kiosks.

Sector/Domain: Agri-Tech, Aquaculture Infrastructure, and Fisheries Research.

Core Innovations & Product Offerings:

The company's primary innovation is its use of Food-Grade FRP combined with antibacterial and antifungal resin coatings to create maintenance-free aquatic environments:

- Modern Farming Tanks: Self-standing FRP tanks in circular, rectangular, and raceway designs, specifically engineered for high-density Biofloc and Recirculating Aquaculture Systems (RAS).
- Hatching & Breeding Systems: Specialized tanks for sensitive life stages, including pearl farming and fish spawning, featuring inbuilt drainage and tapered bottoms for easy waste removal.
- Live Fish Retail & Display: Custom-built Live Fish Selling Tanks and seafood kiosks for markets and retail outlets, designed to enhance the visual appeal and hygiene of live fish sales.
- Transport Solutions: Lightweight, leak-proof, and portable dual-purpose tanks that minimize fish stress and mortality during movement from farms to markets.

Business Model & Operations:

- B2B & B2C Manufacturing: Operates as a direct manufacturer and service provider, offering custom fabrication without extra customization charges.
- Market Integration: Leverages a strong digital presence on platforms like IndiaMART and YouTube to educate farmers on the transition from traditional ponds to tank-based farming.
- Consulting & Support: Beyond hardware, they provide guidance on system setup for terrace fish farming and backyard aquaculture, catering to urban entrepreneurs and hobbyists.

Challenges & Opportunities:

Challenges: High logistical costs for transporting bulky fabricated tanks to remote rural areas; and price competition with lower-quality PVC or plastic-lined alternatives.

Opportunities: Scaling into fully integrated Plug-and-Play RAS systems that include automated filtration and aeration; and expanding regional distribution hubs to reduce shipping times across South India.

Aqua Doctor Solutions 75

Founder	Debtanu Barman
Established year	Founded in 2019 (Formally incorporated as an LLP on March 19, 2020).
Location	Headquartered in Jadavpur, Kolkata, West Bengal

Company Overview

Aqua Doctor Solutions is a leading Indian enterprise specializing in comprehensive solutions for the aquaculture and fisheries sector. Operating as a One Shop-One Stop hub, the company provides a critical bridge between advanced aquatic technology and ground-level farming. They are recognized for their multi-dimensional approach, combining a vast e-commerce marketplace for farm inputs with specialized consultancy, training, and laboratory services. With a heavy focus on Aquaprenuership, they have trained thousands of individuals across India to adopt modern, sustainable fish farming practices like Biofloc and intensive pond management.

Sector/Domain: Aquaculture Tech, Fisheries Consultancy, E-commerce, and Skill Development.

Core Products & Service Portfolio:

The company categorizes its offerings to cover the entire lifecycle of an aquatic ecosystem:

- **Aquaculture Inputs & Equipment:**

  Machinery: 1HP & 2HP Paddle Wheel Aerators (including solar options), Air Pumps, and Biofloc tanks.

  Nutrition: A wide range of floating feeds (1.5mm to 4.0mm) and specialty probiotics like Plankton Grow Plus.

  Health & Breeding: Fish breeding hormones (Spawn Pro, Ovatide), medicines (Aqua Oxy Plus), and Artemia Cysts for hatcheries.

- **Water Quality Management:**

  Testing Kits: Proprietary and branded kits for monitoring pH, Ammonia, Dissolved Oxygen (DO), and Hardness.

  Conditioners: Toxi Nil and Ammo-Nil for ammonia and toxin elimination in intensive culture systems.

- **Consultancy & Training:**

  E-Learning: Digital platforms providing masterclasses in fish farming essentials.

  Project Integration: End-to-end consultancy for government, semi-government, and private aquaculture projects.

  Skill Development: Conducted over 2,500+ training programs nationwide to promote fisheries-based livelihoods.

Business Model & Operational Strength:

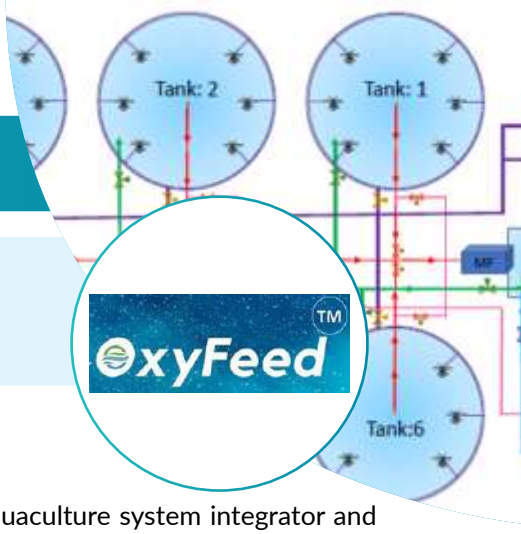
- Hybrid Distribution: Operates as a wholesaler, retailer, and trader, managing a massive inventory at their Kolkata hub to ensure rapid, tamper-proof delivery across India.
- Certifications & Trust: One of the few traders in the region holding a comprehensive suite of certifications, including ISO, GMP, FSSAI, and UDAYAM, ensuring pharmaceutical-grade standards for their supplements and medicines.
- Technical Support: Unlike traditional traders, they maintain a Knowledge Tank of experts who provide after-sales technical support, helping farmers interpret water test results and optimize feed conversion ratios (FCR).

Challenges & Opportunities:

Challenges: Bridging the digital gap for rural farmers to access their e-learning and e-commerce platforms; and maintaining price competitiveness against unorganized local suppliers.

Opportunities: Expanding into Marine Biotechnology products; and scaling their Aqua Clinic model localized diagnostic centers that provide real-time health checks for commercial fish ponds.

76 Exflair Agritech Private Limited



Founder	Chetan Kashyap (Director) and Raj Kanzariya (Director)
Established year	September 2, 2021
Location	Headquartered in Jabalpur, Madhya Pradesh, India

Company Overview

Exflair Agritech, operating under the flagship brand Oxyfeed, is a high-tech aquaculture system integrator and biotechnology firm. The company specializes in modernizing fish farming through the deployment of Recirculating Aquaculture Systems (RAS) and proprietary Nano-biotechnology. Their mission is to make high-density fish farming sustainable and profitable by eliminating the need for large land tracts and excessive water usage. Known for their World Jugaad philosophy, they engineer localized, budget-friendly versions of global technologies, allowing Indian entrepreneurs to farm fish in controlled, automated environments ranging from rural backyards to urban retail markets.

Sector/Domain: Agri-Tech, Biotechnology, RAS Engineering, and Water Remediation.

Core Innovation & Biotechnology

Exflair/Oxyfeed's primary innovation is a dual approach combining Advanced Engineering with Nano-nutrient Chemistry:

- Diatom-Based Oxygenation: Their proprietary Oxyfeed liquid uses nano-scale nutrients to stimulate Diatom Algae growth. These algae consume ammonia and nitrates, releasing molecular oxygen directly into the water, outcompeting harmful blue-green algae and reducing BOD/COD levels naturally.
- Automated RAS Ecosystem: Infrastructure package that includes tanks, high-efficiency filtration, and AI-driven sensors. This system recycles 90% of the water and uses automated monitoring to prevent crop loss.
- Bio-Dredging: The technology promotes aerobic conditions that naturally break down sludge and organic waste at the bottom of ponds and tanks without mechanical dredging.

Core Product Offerings: The company provides a full stack of biological inputs and hardware infrastructure:

- Oxyfeed Blue (Aquaculture): A CAA-certified nano-nutrient complex that boosts fish growth, reduces mortality, and maintains high dissolved oxygen (DO) levels in commercial ponds.
- Budget-Friendly RAS Systems: Turnkey high-density farming units designed for commercial production (Tilapia, Pangasius) with optimized Feed Conversion Ratios (FCR).
- Live Fish Retail RAS: Specialized display and holding tanks for metro-city retailers, enabling the sale of Live Catch which commands a 20-30% price premium over iced fish.
- Oxyfeed Waste Water: A heavy-duty variant for treating industrial drains, STPs, and ETPs, reducing foul odors (Methane/H2S) and meeting NGT environmental norms.
- Oxyfeed Aqua: A maintenance-free solution for home aquariums that keeps water crystal clear and oxygenated even during power outages.

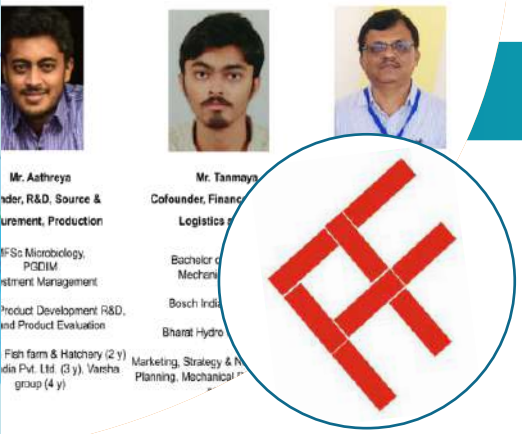
Business Model & Strategic Impact:

- B2B & B2G Solutions: Generates revenue through the sale of automated RAS infrastructure, long-term technical consultancy, and bulk supply of biotechnology for government pond rejuvenation projects.
- Sustainability Champion: Their systems make fish farming viable in water-scarce regions, using up to 90% less water than traditional earth ponds.
- Market Integration: By offering Live Fish Retail technology, they are disrupting the seafood supply chain, ensuring hygiene and freshness at the point of consumption.

Challenges & Opportunities:

Challenges: Managing high energy costs for 24/7 automation and overcoming the high-capex perception of RAS technology among traditional farmers.

Opportunities: Transitioning to Solar-Powered RAS for off-grid operation; and expanding their water remediation technology to clean large-scale urban rivers and lakes across India.



AquaBio Solutions LLP 77

	Founder	Hoskere Jagadeesh Aathreya and Tanmaya Hoskere Jagadeesha
	Established year	November 18, 2020.
	Location	Headquartered in Sagar, Shimoga District, Karnataka, India

Company Overview

AquaBio Solutions LLP is a specialized biotechnology startup dedicated to the Aqua-Pharma and Aqua-Biologics sector. Incubated by the Krishik Agri Business Incubator (Hubli-Dharwad), the company focuses on the R&D and manufacturing of high-quality biological inputs designed to address the core challenges of intensive fish and shrimp farming. By leveraging advanced microbiology, AquaBio Solutions provides sustainable alternatives to traditional chemicals, focusing on bioremediation and gut-health optimization. Their approach centers on Prevention over Cure, offering standardized probiotics and nutritional supplements that ensure environmental stability and improved farm profitability.

Sector/Domain: Biotechnology, Aqua-Pharma, Animal Health & Nutrition, and Agritech.

Core Innovation & Manufacturing Expertise

The firm's primary innovation lies in its In-house Fermentation and Formulation capabilities, allowing for the creation of site-specific biological solutions:

- **Microbial Bioremediation:** Specialization in Photosynthetic Bacteria (PSB) and specific Bacillus strains that actively break down organic sludge, ammonia, and hydrogen sulfide at the pond bottom, reducing the environmental load of intensive farming.
- **Gut-Health Optimization:** Development of prebiotics and probiotics that colonize the aquatic animal's gut, boosting natural immunity against devastating diseases like White Gut Syndrome (WGS).
- **Contract Manufacturing (OEM):** The company leverages its facility to provide Original PS and proprietary probiotic blends for other brands, functioning as a trusted manufacturing partner in the Indian biotech ecosystem.

Core Offerings & Product Portfolio:

AquaBio Solutions operates a focused catalog categorized by biological function:

- **Aqua Probiotics:**

  1.Original PS & Rhodobacter sp: High-concentration photosynthetic bacteria used for rapid water quality correction and sludge removal.

  2. Soil & Water Probiotics: Multi-strain blends designed to maintain a healthy microbial balance throughout the culture period.

- **Nutritional & Immunity Boosters:**

  1. Immuno-stimulants: Bio-active compounds that prime the immune systems of shrimp and fish to fight viral and bacterial pathogens.

  2. Mineral Mixtures: Highly bio-available essential minerals that aid in the molting process of shrimp and skeletal development in fish.

- **Specialized Chemicals:**

  Water Conditioners: Essential chemicals for adjusting pH, alkalinity, and hardness to maintain the comfort zone for aquatic life.

- Technical Consultancy:

  Bundling product supply with technical advice on dosage and application protocols tailored to specific farm conditions.

Business Model & Operational Reach:

B2B Manufacturing Model: Generates revenue through direct bulk sales to large-scale farm clusters, regional distributors, and through contract manufacturing services for private labels.

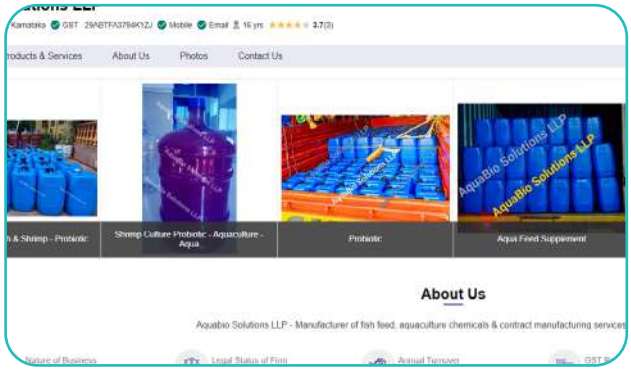
Digital & Physical Presence: Utilizes B2B e-commerce platforms and its WordPress-based knowledge hub to reach farmers across Karnataka and neighboring states.

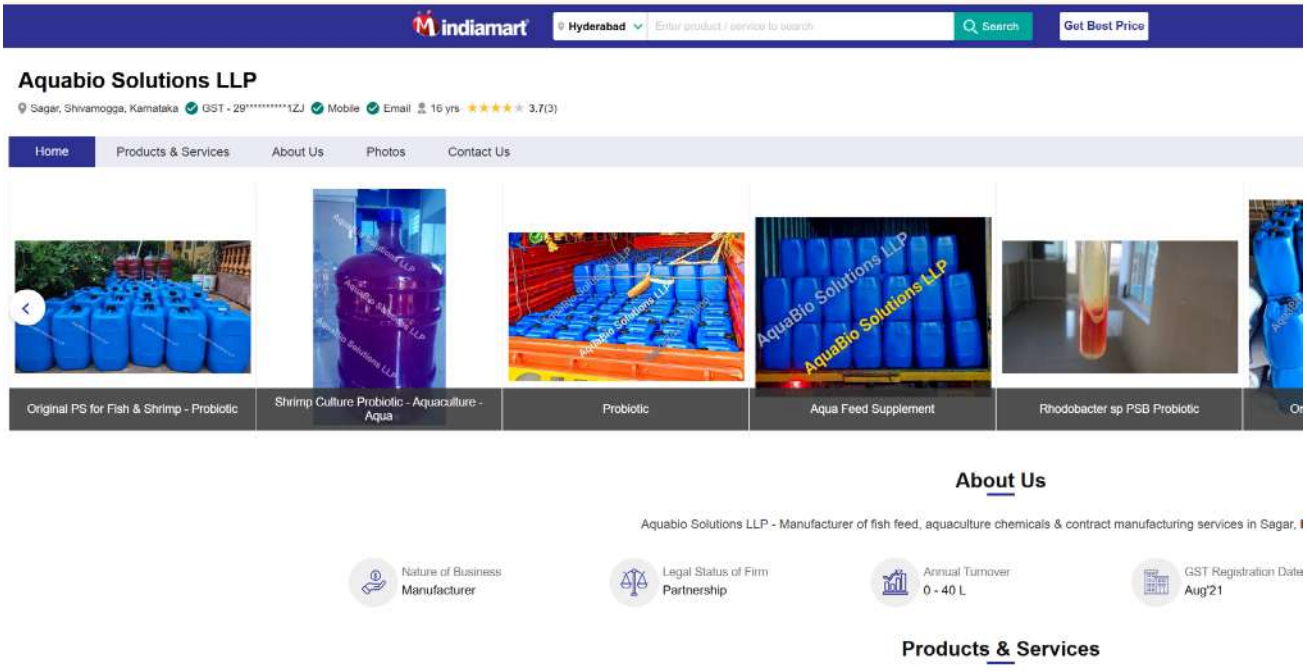
Incubation Support: Benefiting from the technical and networking resources of the Krishik Agri Business Incubator, facilitating growth from a regional manufacturer to a national player.

Challenges & Opportunities:

Challenges: Demonstrating the long-term Return on Investment (ROI) of biological treatments to traditional farmers; and navigating the competitive landscape dominated by large multinational aqua-pharma firms.

Opportunities: Expanding distribution into the high-value shrimp hubs of Andhra Pradesh and West Bengal; and developing Proprietary Microbial Strains that offer a distinct competitive edge through intellectual property (IP).





Nambikkai Fish Farmers' Group 78

Founder	Ms. K. Velankanni (Founder of V.S. Fish Waste Hydrolysate) and Shri T. Kennit Raj (Group Representative).
Established year	Startup unit established in 2019 (Group active since 2017-18).
Location	Nambikkai Nagar, Pattinapakkam, Chennai, Tamil Nadu, India.

Company Overview

Nambikkai Fish Farmers' Group is a multi-award-winning Self-Help Group (SHG) that has become a national model for Circular Economy and the Waste to Wealth concept in India. By partnering with the ICAR-Central Institute of Brackishwater Aquaculture (ICAR-CIBA), they successfully commercialized a technology that converts discarded fish market waste into high-value agricultural and aquaculture inputs. The name Nambikkai (Hope) reflects their mission to provide sustainable, alternative livelihoods while cleaning up the coastal environment.

Sector/Domain: Aqua-Biotechnology, Waste Management, Organic Fertilizers, and Social Entrepreneurship.

Core Innovation:

Waste to Wealth Technology The group's success is rooted in the adoption of Fish Waste Hydrolysate (FWH) technology transferred from ICAR-CIBA:

- The Process: The group collects 200–300 kg of fish trimmings and market waste daily, which was previously a major source of coastal pollution and foul odor.
- The Solution: Using a controlled fermentation/ proteolysis process, this organic waste is converted into liquid and powder forms rich in protein (45-55%), lipids, and essential amino acids.
- Environmental Impact: This initiative directly supports the Swachh Bharat Abhiyan by reducing the biological load on Chennai's beaches and preventing the pile-up of pathogens in fish markets.

Core Offerings & Product Portfolio:

The group produces and markets two flagship products under the ICAR-CIBA brand:

- CIBA-PlanktonPlus:

  Use: A liquid booster used in shrimp and fish ponds to stimulate the growth of beneficial phytoplankton and zooplankton.

  Benefit: Reduces the need for expensive chemical fertilizers, enhances survival rates, and improves the growth of *Penaeus vannamei* and *Penaeus monodon*.

- CIBA-HortiPlus:

  Use: An organic manure and growth promoter for horticulture, floriculture, and home gardens.

  Benefit: Rich in organic nitrogen and minerals, it acts as a sustainable alternative to urea and other chemical fertilizers.

- Scale of Production: The unit processes over 16 tonnes of these products annually, catering to farmers in Kerala, Andhra Pradesh, West Bengal, and Gujarat.

Awards & Recognition:

- In recognition of their work alignment with the central government's Swachh Bharat Abhiyan, the National Fisheries Development Board (NFDB) conferred the "Best Fisheries Self Help Group Award" to the group's leader, Shri T. Kennit Raj, at the World Fisheries Day event in New Delhi.

Challenges & Opportunities:

Challenges: Expanding the logistics network for liquid products; and maintaining a consistent supply of enzymes for the hydrolysis process.

Opportunities: Scaling the model into Fish Waste Collection Franchises along the Indian coastline; and diversifying into Specialized Pet Food ingredients derived from fish protein.

79 Salt Crops THNK LLP

Founder	Hamza Taher Burhani and Dr. Kathiravan Velusamy
Established year	October 13, 2023
Location	Headquartered in Surat, Gujarat, India

Company Overview

Salt Crops THNK LLP is a pioneering Indian Climate-Tech and Health-Tech startup that has introduced the country's first Salicornia-based salt, branded as Indian Green Salt. The company specializes in Halophyte (salt-tolerant plant) Agriculture, utilizing saline-affected coastal lands and saltwater irrigation to grow *Salicornia brachiata*. By transforming this sea asparagus into a gourmet seasoning, Salt Crops addresses two global crises: the health risks of high-sodium intake (hypertension and heart disease) and the agricultural challenge of soil salinity.

Sector/Domain: Saline Agriculture, Sustainable Food Systems, and Functional Foods.

Technological & Scientific Vertical

Salt Crops is not just a retail brand; it is a technology-led agricultural entity:

- Saline Agriculture Expertise: The company has commercialized high-biomass Salicornia cultivation technology developed in collaboration with CSIR-CSMCRI (Central Salt and Marine Chemicals Research Institute), Bhavnagar.
- Environmental Restoration: Their farming model turns barren, salt-crusted land into productive green ecosystems. Salicornia is a carbon-negative crop, sequestering more CO_2 than many terrestrial plants.
- Pioneering Green Mining: Classified under Other Mining and Quarrying, the company redefines mineral extraction by mining salt through biological cultivation rather than industrial evaporation.

Core Offerings & Market Reach:

- Indian Green Salt (Powder): The flagship D2C product sold as a heart-healthy alternative for daily cooking.
- Fresh Salicornia (Sea Asparagus): Marketed to high-end restaurants and gourmet chefs as a crunchy, salty vegetable accompaniment for seafood.
- Bulk Salicornia Powder (B2B): Supplied as a raw material for the Nutraceutical and animal feed industries, particularly for its antihypertensive and antioxidant properties.

Challenges & Opportunities:

Challenges: High cost of production compared to industrial table salt; and the need for massive consumer awareness to explain why green salt is a viable daily substitute.

Opportunities: Blue Carbon Credits: Potential to monetize the carbon sequestered by their coastal plantations; and Product Diversification: Developing Salicornia-derived seed oil, which is high in protein and healthy fats.

Blue Zone Synthesis Pvt. Ltd. 80

Founder	Palanisamy Arulselvam and Murugan
Established year	July 22, 2025
Location	Headquartered in Avinashi, Coimbatore, Tamil Nadu, India

Company Overview

Blue Zone Synthesis is a cutting-edge aquaculture biotechnology firm specializing in the Resurrection of Aquafarms (RAF). Working in strategic collaboration with Herbozone (an R&D leader in herbal formulations) and Sankalpa Prawn Farms, the company aims to modernize the shrimp farming sector. Their core mission, Mission G-BLUE, focuses on recreating the high-yield Golden Era of Indian aquaculture from the 1990s by using advanced synthetic biology and botanical extracts to solve modern disease and water quality challenges.

Sector/Domain: Biotechnology, Aqua-Pharma, Animal Health & Nutrition, and Agritech.

Core Innovation : The RAF Mission & G-BLUE Protocol

Blue Zone Synthesis utilizes a holistic Bottom-Up approach to pond health, ensuring both the soil and the water column are optimized:

- Bioremediation Tech: Uses multi-strain bacterial consortiums to naturally decompose organic sludge, reducing toxic gases like Ammonia and Hydrogen Sulfide.
- Nano-Technology Enzymes: Their liquid-form products use nano-scale enzyme manipulation to target and eliminate pathogenic bacteria with high specificity.
- Resurrection of Aquafarms (RAF): A technical framework designed to revitalize abandoned or low-yield ponds through intense soil conditioning and microbial balancing.

2. The G-BLUE Product Portfolio

- Oxyzone (Oxygen Enhancer): A revolutionary formula that provides stable, sustained-release oxygen, critical for preventing mass mortality during night-time oxygen dips.
- Neptune / Soil Pro (Probiotics): Advanced soil and water conditioners that optimize the pond bottom, improve nutrient availability, and establish a beneficial microbial ecosystem.
- Prozone (Proteinizer): A metabolic booster that enhances protein synthesis, leading to faster muscle development and better Feed Conversion Ratios (FCR).
- Immune Booster: A vitamin and enzyme consortium that strengthens the natural defense mechanisms of shrimp against the White Spot virus and other pathogens.
- Neutro (Stabilizer): A mineral-rich agent that maintains stable pH and water alkalinity, which is essential for the healthy molting process in Pacific White Shrimp (Vannamei).

3. Business Model & Operations

- Manufacturing & R&D: Blue Zone Synthesis acts as the manufacturing power-house for Herbozone's research-backed formulations, ensuring high-quality industrial-scale production.
- Market Integration: Products are marketed and distributed through Sankalpa Prawn Farms & Hatcheries, providing a direct feedback loop from the farms to the lab.
- Geographical Focus: Primarily serves the intensive aquaculture belts of Tamil Nadu and Andhra Pradesh, with plans to expand to the wider Southeast Asian market.

4. Challenges & Growth

Market Adoption: Overcoming the quick-fix chemical mindset of traditional farmers to promote long-term, probiotic-based pond management.

Expansion: Adapting the Resurrection protocol for high-density finfish cage farming (such as Seabass and Tilapia) in inland and coastal waters.

81 Nurture Aqua Technology Pvt. Ltd

Founder	Divya Kumar Gulati
Location	Headquartered in New Delhi, India.

Company Overview

Nurture is a global leader in herbal and natural animal healthcare, driven by a mission to sustainably redefine the quality of life for animal communities through the amalgamation of Ayurvedic herbal ingredients and modern scientific technologies. Under the leadership of Divya Kumar Gulati, a prominent figure in the global feed industry Nurture provides clinically proven, natural alternatives to synthetic chemicals in aquaculture. Their products are designed to improve farm profitability while ensuring that the aquatic environment remains intact, focusing heavily on sustainability and Conscious Sourcing.

Sector/Domain: Herbal Animal Healthcare, Aquaculture Nutrition, and Sustainable Bio-Biotechnology.

Core Offerings for Fisheries & Aquaculture

Nurture's product line for fisheries is built on a natural-first philosophy, using essential oils, plant extracts, and chelated minerals to boost pond productivity and fish health.

1. Hatchery & Early Life Nutrition

- LV Feed Series (Zoea, Mysis, PL): Specialized microparticulated nutrients designed for the specific developmental stages of larvae.
- Epilite Z/M/PL: Liquid hatchery feeds that ensure high survival rates and robust growth in the delicate early stages of fish and shrimp life.
- Nat Min-Pro: A blend of essential minerals and probiotics specifically formulated for hatchery applications to ensure skeletal strength and microbial balance.

2. Immunity & Growth Support

- DD Shrimp/Fish Tonic: A potent blend of multivitamins and amino acids that corrects nutritional deficiencies, supports faster molting in crustaceans, and reduces mortality during environmental stress.
- Inusap & Fensap: Herbal growth promoters that utilize plant extracts to enhance gut health and natural immunity, effectively acting as bio-stimulants for the fish's digestive system.

3. Liver & Renal Care

- Act Livton: A herbal hepatostimulant and hepatoprotective liquid. It stimulates liver function (the hepatopancreas in shrimp), aiding in better digestion and detoxification of waterborne toxins.

4. Environmental & Pond Management

- Nova Blue: An innovative Pond Sunscreen. This non-toxic colorant adds a blue tint to the water to reduce sunlight penetration, thereby blocking photosynthesis for harmful benthic algae while stabilizing pH and water temperature.
- Epicin Series (Ponds/3W/Hatchery): Biological pond treatments (probiotics) that decompose organic waste and eliminate ammonia, ensuring a clean environment that prevents the outbreak of diseases like EHP or WSSV.
- Natox Herbal: A toxin binder and mould inhibitor that protects fish from mycotoxins in feed while managing ammonia levels in the pond water.

Challenges & Opportunities:

Challenges: Building wider farmer confidence in herbal alternatives over conventional synthetic chemicals, maintaining consistent efficacy across varied aquaculture conditions, and navigating regulatory requirements for natural health products in global markets;

Opportunities: Expanding demand for residue-free and sustainable seafood production, strengthening eco-friendly aquaculture through Ayurvedic and biotechnology-based innovations, and growing international markets for natural aquatic health and nutrition solutions.

Glaukos Algae Technologies Private Ltd 82

Founder	Papudesi Jayaprakash Nalagampalle Director: Janardhana Busa
Established year	2019
Location	Headquartered in Nellore, Andhra Pradesh, India.

Company Overview

Glaukos Algae Technologies is a trailblazing biotech firm at the forefront of marine microalgal aquaculture. Founded with a vision to develop sustainable, scalable, and profitable green solutions, the company is a pioneer in India for establishing organic facility dedicated to the mass cultivation of *Dunaliella salina*. By leveraging the unique coastal environment of Nellore and 25 acres of dedicated salt pan land, Glaukos produces high-purity microalgal biomass that meets rigorous international standards. Their mission is to bridge the global gap in algal biomass production while pioneering carbon-neutral cultivation methods perfectly suited for tropical conditions.

Sector/Domain: Marine Biotechnology, Nutraceuticals, and Sustainable Aquaculture.

1. Core Innovation: The Saline Gold Technology

Glaukos focuses on *Dunaliella salina*, a highly halophilic (salt-loving) microalga known as the world's richest natural source of Beta-Carotene.

- Optimized Tropical Cultivation: The company has developed a proprietary, cost-effective technology specifically designed for Indian tropical conditions, overcoming the historical challenges of harvesting this resilient species.
- Automated Harvesting: Utilizing an automated cultivation and pasteurization process, the facility ensures a contaminant-free mother culture and high-yield biomass production.
- Renewable Energy Integration: To minimize environmental impact, the production facility uses solar energy for power, aligning with their goal of a carbon-neutral footprint and reducing operational costs.

2. Core Product Portfolio

The company's product line caters to the pharmaceutical, cosmetic, and food industries, offering natural alternatives to synthetic pigments and nutrients:

- Glaukotene® (*Dunaliella salina Powder*):

  Profile: A 100% organic, red marine microalgal powder standardized to a minimum of 5% Beta-Carotene.

  Benefits: A powerful antioxidant that supports eye health, skin protection (UV defense), and immune function.

  Applications: Dietary supplements, natural food coloring, and premium anti-aging cosmetics.

- Glaukopid® (Organic Chlorella Powder):

  Profile: A nutrient-dense biomass of *Chlorella salina*, rich in lipids (Omega-3s), proteins, and essential amino acids.

  Benefits: Acts as a natural detoxifier, aiding in the elimination of heavy metals and boosting overall metabolic vitality.

  Applications: Functional superfood blends, vegan nutritional supplements, and high-quality aquaculture feed.

3. Facility & R&D Excellence

- Location Advantage: The R&D and production facilities are located in East Gogulapalli (Allur), Nellore. This coastal site provides an ideal saline water source and a consistent sunlight profile for rapid microalgal growth.
- Scaling Capabilities: The facility features a 1 lakh liter raceway pond for large-scale biomass scaling and extraction of beta-Carotene.
- Quality Assurance: Glaukos adheres to stringent quality control measures, ensuring their products are non-GMO, gluten-free, and non-irradiated, backed by certifications from leading regulatory bodies.

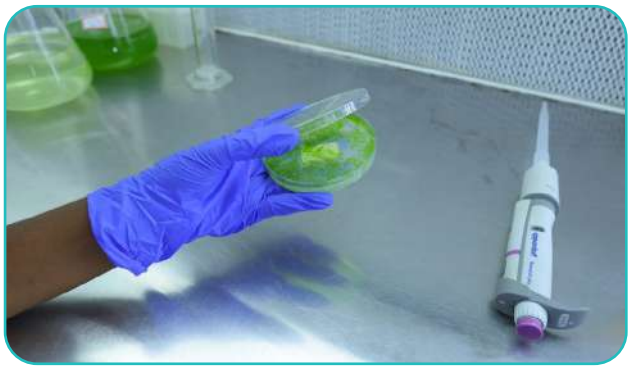
4. Business Model & Market Reach

- Niche Market Leadership: By focusing on high-value, scarce microalgal species, Glaukos commands premium pricing in a global market where demand for natural antioxidants is surging.
- Vertical Integration: From mother culture maintenance in optimized indoor environments to large-scale outdoor cultivation and final biomass processing, Glaukos manages the entire value chain.
- Target Segments: B2B supply to global pharmaceutical firms, cosmetic manufacturers, and the functional food industry, targeting the multi-billion dollar Beta-Carotene market.

Challenges & Opportunities:

Challenges: High capital and operational costs associated with large-scale microalgal cultivation, maintaining contamination-free biomass production under tropical outdoor conditions, and competing with synthetic alternatives in global nutraceutical markets.

Opportunities: Expanding demand for natural antioxidants and sustainable bio-based products, strengthening carbon-neutral marine biotechnology solutions, and scaling premium microalgal applications across pharmaceuticals, cosmetics, functional foods, and aquaculture feed industries.



Aquatic Nutrition & Feed Supplements

The advancement of Aquatic Nutrition & Feed Supplements in India is currently driven by a transition toward sustainable, high-protein alternative ingredients and specialized functional additives. These ten key organizations Rama Aquaculture, Loopworm, UltraNutri, Marsco Nutraceuticals, GreenGrahi Solutions, Sai Aqua Feeds, ZEWA Ecosystems, Nutrigene Biosciences, Pasupati Group, and Om Sai Aqua demonstrate the critical shift from traditional fishmeal-dependent diets to circular economy models and precision nutrition. Their collective activities include the pioneering of insect-based proteins using Black Soldier Fly Larvae (BSFL), the production of customized larval feeds, and the development of fortified supplements that enhance immunity and growth rates in shrimp and finfish. By integrating biotechnological innovations with sustainable waste-to-protein processes, these startups are addressing the rising costs of raw materials and the environmental impact of conventional aquaculture feed. Through this focus on nutrient-dense, eco-friendly formulations, these enterprises are ensuring better Feed Conversion Ratios (FCR) for farmers and fostering long-term resilience within the Indian aquaculture value chain.

Aquatic Nutrition & Feed Supplements

Developing sustainable protein alternatives and specialized nutraceuticals to optimize Feed Conversion Ratio (FCR) and metabolic health.

Table 13: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
Rama Aquaculture	Specialized Nutrition	Targeted species-specific metabolic boosters	Growth promoters, health additives	B2B technical supply for commercial aqua-feed
Loopworm	Protein Insect	Black Soldier Fly (BSF) bio-processing	BSF protein meal and oil	B2B industrial supply for sustainable feed ingredients
Ultra Nutri	Transform agricultural waste into high-quality protein using Black Soldier Fly (BSF) larvae	High-performance aquatic pellet processing	Extruded floating/ sinking pellets	Industrial manufacturing with precision nutrient profiling
Marsco Nutraceuticals	Gut-Health Specialty	Probiotic-enriched pharmaceutical feed additives	Marsco Tan 30 for plankton boosting, Oxyzen (dissolved oxygen tablets) and Ultra Zyme PFS (probiotics)	B2B pharma-grade supply for livestock and aqua
GreenGrahi Solutions	Waste-to-Feed	Circular bio-processing of organic waste via BSF	Insect protein, organic fertilizer	Circular economy manufacturing and industrial supply
Sai Aqua Feeds	Regional Production	Specialized feed for coastal aquaculture clusters	High-protein shrimp/fish feed	Regional wholesale and distribution focused on Andhra
ZEWA Ecosystems	Utilizes the Black Soldier Fly (BSF) to transform organic biowaste into high-value protein	Eco-friendly aquaculture nutrition ecosystems	Natural feed alternatives, bio-buffers	Circular sustainability model for aquatic health
Nutrigene Biosciences	Genetic Nutrition	Plant-Based Vitamin D3 for Shrimp Nutrition	Genetic health boosters, supplements	Research-driven B2B supply for breeding and health
Pasupati Group	Integrated Feed	Large-scale integrated aqua-feed processing	Floating aqua-feed pellets, livestock feed	Diversified industrial group with scaled production

Om Sai Aqua	Mineral Metabolism	Bioavailable trace mineral formulations	Trace mineral premixes, molting aids	B2F technical input sales for shrimp health

Table 14: Sector Feature Matrix

Startup Name	Insect-Based Protein	Mineral Mixtures	Gut-Health Optimization
Rama Aquaculture			✓
Loopworm	✓		
Ultra Nutri	✓		✓
Marsco Nutraceuticals			✓
GreenGrahi Solutions	✓		
Sai Aqua Feeds			✓
ZEWA Ecosystems	✓		
Nutrigene Biosciences			✓
Pasupati Group			✓
Om Sai Aqua		✓	

83 Rama Aquaculture

Founder	Rama Devi Nekkanti (CEO).
Established year	2005 (with significant operational expansion around 2017–2018).
Location	Hyderabad, Telangana, India.

Company Overview

Rama Aquaculture is a leading Indian manufacturer and supplier specializing in high-quality aquatic health products, minerals, and feed supplements. Unlike companies that manage the entire farm infrastructure, Rama Aquaculture focuses on the scientific inner loop of aquaculture: nutrition and water chemistry. By providing reliable, lab-tested supplements and chemical treatments, the company empowers farmers to optimize growth rates and maintain biosecurity in intensive farming environments like RAS and Biofloc.

Sector/Domain: Aqua-Nutrition, Animal Health Care, and Feed Supplements.

Technological Innovation:

Feed Formulation and Quality Control : The company's innovation is centered on precise chemical engineering and nutritional science to reduce the Feed Conversion Ratio (FCR):

- Scientific Supplementation: Developing specialized additives like Vitamin C, Yeast Plus, and Double Growth formulas that integrate essential amino acids and chelated minerals to maximize nutrient absorption.
- Water Chemistry Management: Innovative chemical solutions such as Odoact Gas Absorbent and BKC 80 to eliminate toxic gases (ammonia, hydrogen sulfide) and pathogenic bacteria, ensuring a stable environment for high-density stocking.
- Probiotic Integration: Utilizing a unique selection of probiotic strains (e.g., Rhodococcus, Nitrobnacter) that naturally decompose sludge and waste, significantly reducing the environmental footprint of land-based farms.
- Advanced Milling Technology: Leveraging state-of-the-art milling and lab-testing facilities to ensure every batch of feed supplement is traceable and consistent in its nutritional profile.

Core Offerings and Business Model:

- **High-Volume Supplement Sales**

  Services: Bulk supply of minerals, probiotics, and growth promoters tailored for shrimp, carp, and tilapia.

  Revenue Model: Transactional revenue driven by high-volume manufacturing and repeat demand from commercial farms.

- **Dealer & Distribution Network**

  Services: Maintaining a robust supply chain across Telangana and Andhra Pradesh to ensure local availability.

  Revenue Model: Channel-based revenue through established dealers who act as the primary point of contact for small-scale farmers.

- **Technical Advisory**

  Services: Providing feeding protocols and water management advice via their team of veterinary experts.

  Revenue Model: Value-added service to ensure product efficacy, driving long-term customer loyalty and brand trust.

Challenges & Opportunities:

Challenges: Managing high logistical costs for bulky mineral supplies and navigating extreme price volatility in global raw materials (e.g., vitamins and chemical base-stocks).

Opportunities: Launching a Sustainability Premium line of eco-friendly, carbon-neutral feed supplements; and introducing Embedded Finance options to help farmers manage the high upfront cost of nutritional inputs.

Loopworm Private Limited 84

Founder	Ankit Alok Bagaria (CEO) and Abhi Gawri (CTO).
Established year	2019
Location	Headquartered in Bengaluru, Karnataka, India

Company Overview

Loopworm is a deep-tech bioscience and biomanufacturing company pioneering the Multi-Species Insect Biorefinery. The company specializes in upcycling organic by-products, specifically spent silkworm pupae and food waste into high-value proteins, fats, and specialized biomolecules. By blending circular economy principles with advanced biotechnology, Loopworm addresses the global protein deficit while providing sustainable, antibiotic-free ingredients for the animal feed, pet nutrition, and biopharma sectors.

Sector/Domain: Agri-Tech, Biomanufacturing, and Circular Economy

Technological Innovation and Platform Strategy:

Loopworm's core innovation lies in its ability to treat insects as advanced biological processors rather than just bulk livestock:

- Multi-Species Biorefinery: Utilizing a dual-stream approach:
    1. Silkworms: Transforming waste from the silk-reeling industry into high-purity proteins and omega-rich oils.
    2. Black Soldier Flies (BSF): Converting organic waste from food processors into sustainable protein and frass (organic fertilizer).
- Silkworm Biofactories (Recombinant Protein Platform): A breakthrough technology using silkworms as mini-bioreactors. By leveraging viral vectors, Loopworm can produce complex recombinant proteins (growth factors, antigens) at a reported 40x lower cost than traditional cell-culture methods.
- Zero-Waste Extraction: Proprietary processing that extracts maximum value from every insect component, including protein meal, lipids, Chitin, Fibroin, and Sericin.

Core Offerings and Business Model:

- Animal Feed & Aquaculture (B2B)
    1. Products: LoopMeal Pro (65%+ protein) and Silkworm Pupae Oil.
    2. Revenue Model: Bulk transactional sales to feed manufacturers as a sustainable alternative to fishmeal and soy.
- Pet Nutrition & Specialty Biomaterials
    1. Products: LoopGrubs (snacks) and hypoallergenic protein isolates for the premium pet care and cosmetic industries (e.g., Sericin for skincare).
    2. Revenue Model: High-margin ingredient sales to global consumer brands.
3. Biopharma & CDMO Services

Services: Operating as a Contract Development and Manufacturing Organization (CDMO) for recombinant proteins used in vaccines and diagnostics.

Revenue Model: High-value service and platform fees for biotech production.

Decentralized Sourcing Model

Strategy: Partnering with smallholder silkworm reelers to source raw materials, creating a collaborative, scalable supply chain that empowers rural livelihoods.

Competitive Advantages & Market Position:

- Biotech Differentiation: Unlike competitors focusing solely on bulk feed, Loopworm's entry into biopharma via silkworm biofactories secures superior margins.
- Sustainability Metrics: Requires 170x less land

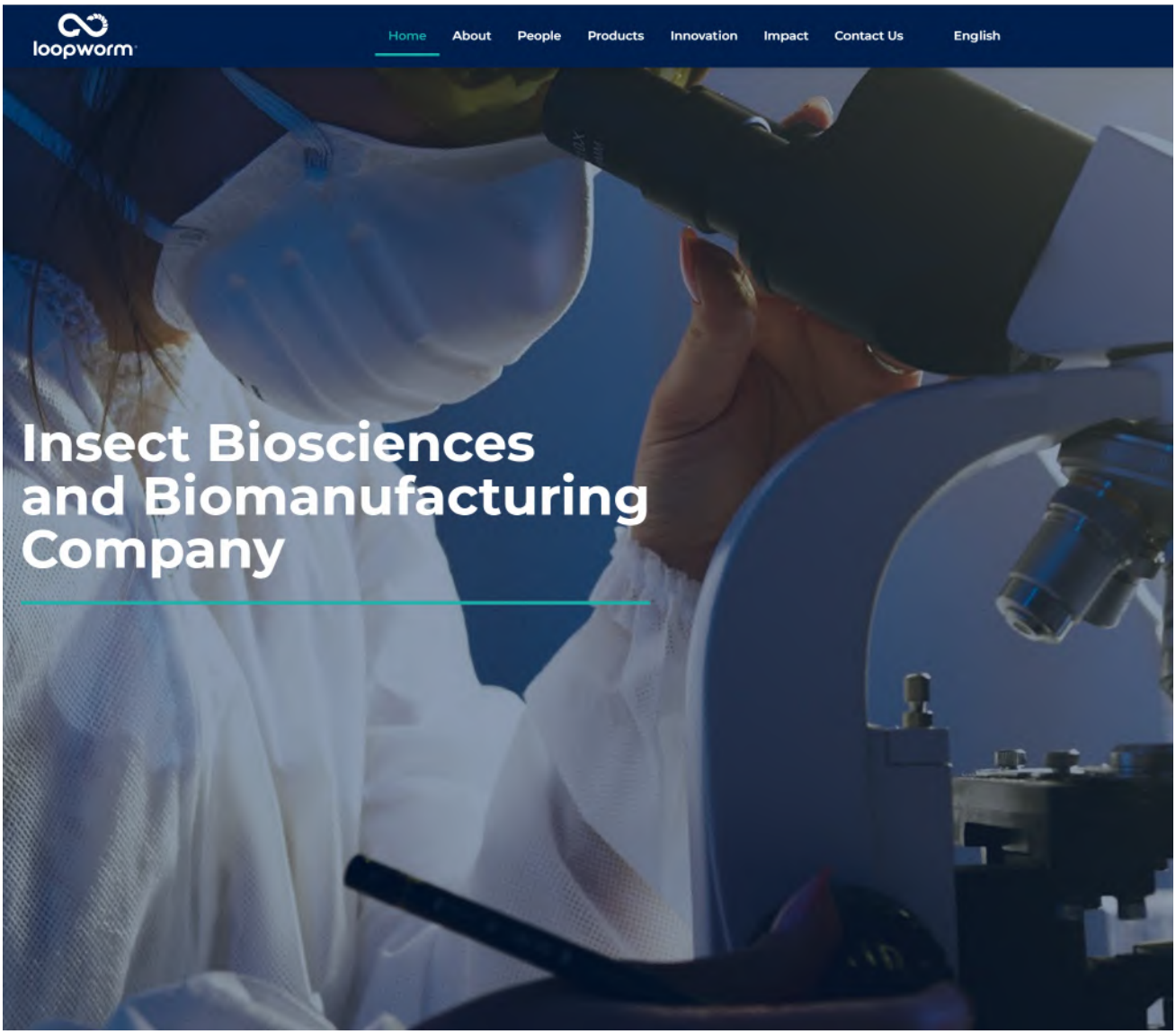
than soy protein, making it an ideal partner for global corporations aiming for ESG compliance.

- Global Certifications: Holds ISO 22000, HACCP, and GMP+ certifications, facilitating export to highly regulated markets like Europe and the US.

Challenges & Opportunities:

Challenges: Scaling the complex biomanufacturing platform for therapeutics; maintaining feedstock consistency across decentralized sourcing hubs; and navigating global regulatory landscapes for novel insect-based proteins.

Opportunities: Expanding the CDMO platform for animal vaccines; and establishing a global footprint as the primary provider of sustainable insect-derived biomolecules.



Ultra Nutri India Private Limited 85

Founder	Nitish Sathyanarayanan, Ramaswamy Subramanian, Robert Deschenes, Matheen Sait, and Ashok N. Vohra.
Established year	October 26, 2021.
Location	Headquartered in Bengaluru, Karnataka, India.

Company Overview

UltraNutri is a pioneering biotech startup operating at the intersection of agritech, waste management, and sustainable aquaculture. The company utilizes advanced biotechnology to transform agricultural waste into high-quality protein using Black Soldier Fly (BSF) larvae. Their primary goal is to provide a sustainable, antibiotic-free alternative to traditional fishmeal, specifically targeting the Indian shrimp farming sector. By leveraging BSF as bioreactors, UltraNutri addresses the dual global challenges of protein scarcity and antimicrobial resistance (AMR) in the food chain.

Sector/Domain: Agri-Biotech, Sustainable Feed, and Waste-to-Protein.

Innovative Technology: BSF Bioreactor & Waste Bioconversion

UltraNutri's core innovation is a proprietary circular economy model that converts inedible biomass into high-value functional feed:

- Indigestible Waste Conversion: The company has developed breakthrough scientific methods to process complex agri-waste such as sugarcane bagasse, rice stems, and corn cobs which are typically unutilizable by livestock and often burned.
- Functional Feed Engineering: Beyond basic protein, UltraNutri programs the BSF larvae to develop natural immunity and antimicrobial properties. When processed into feed, these benefits are transferred to the shrimp, boosting their resistance to common pathogens.
- Marine Preservation: By providing a direct replacement for wild-caught fishmeal, the technology helps reduce the output gap in global aquaculture, projected to reach 50 million tonnes by 2050.

Core Offerings and Business Model:

- B2B Functional Ingredient Supply

  Services: Manufacturing high-protein, lipid-rich insect meal for the aquaculture and animal rearing industries.

  Revenue Model: Supplying the processed BSF ingredient to major aquafeed manufacturers. They have a strategic partnership with The Waterbase Limited to integrate this protein into commercial shrimp feeds.

- Veterinary Biopharma Platform

  Services: Utilizing the BSF platform to express specific recombinant proteins for animal health solutions.

  Revenue Model: Developing high-margin veterinary biopharmaceutical applications that go beyond basic nutrition.

- Technology Licensing

  Strategy: Licensing proprietary feedstock conversion and bioreactor designs to international partners in other major aquaculture hubs like Vietnam or Ecuador.

Challenges & Opportunities:

Challenges: Scaling production to achieve price parity with traditional (but environmentally costly) fishmeal; ensuring a consistent year-round supply of specific agricultural waste types; and navigating the rigorous regulatory frameworks for novel insect-based feed.

Opportunities: Leading the global fight against Antimicrobial Resistance (AMR) by reducing antibiotic dependence in shrimp farming; diversifying into high-value biopharma; and leveraging the clean label demand from premium seafood importers in the EU and US.

86 Marsco Nutraceuticals Private Limited

Founder	Bolem Mahidhar (Managing Director) and Veera Venkata Sailaja Bolem (Director)
Established year	Founded in 2018 (January 15, 2018)
Location	Headquartered in Begumpet, Hyderabad, Telangana, India.

Company Overview

Marsco Nutraceuticals is a specialized agritech startup that functions as an integrated solutions provider for the aquaculture and animal healthcare sectors. Recognized by StartupIndia, the company combines high-quality feed supplement manufacturing with expert technical consulting. Marsco is incubated by prestigious institutions such as MANAGE (Agri Business Incubator) and SKUAST-Jammu. By focusing on scientific management and innovative bio-formulations, the company aims to enhance farmer productivity and profitability across its operational footprint in eight Indian states.

Sector/Domain: Animal Health & Nutrition, Aquaculture Consulting, and Agri-Biotech.

Core Innovation & Products:

The company's innovation lies in its Consult-to-Harvest model, integrating scientific advisory with proprietary nutraceuticals:

- Advanced Feed Supplements: Flagship products include the Shriinidhii brand of fortified floating feeds, Acidact-Lv (for White Fecal Syndrome), and Marsliv Gold (liver tonic).
- Aqua One Centres (AOC): Marsco operates registered nodal centers (e.g., in Balasore and Jagatsinghpur, Odisha) that provide lab services, disease diagnostics, and water/soil quality analysis to over 2,000 farmers.
- Specialized Formulations: Offers products like Oxyzen (dissolved oxygen tablets), Ultra Zyme PFS (probiotics), and Marsco Tan 30 for plankton boosting.
- Integrated Disease Management: Provides a holistic framework combining biosecurity, high-density system design, and customized nutritional protocols to minimize disease risk.

Core Offerings and Business Model:

- Technical Consulting & Project Management

  Services: Site analysis, feasibility studies, business plan development, and Expert Witness services for aquaculture insurance and legal cases.

  Revenue Model: Fee-based professional services for mid-to-large-scale projects.

- Manufacturing & Multi-State Distribution

  Services: Production of ISO 9001:2015, WHO-GMP, and HACCP certified nutraceuticals distributed across Telangana, AP, Odisha, WB, and other states.

  Revenue Model: Transactional sales of feed additives and medicines.

- Farmer Training & Digital Support

  Services: Capacity building through national webinars and on-ground training (over 2,650 farmers trained) alongside the Marsco App for farm management.

  Revenue Model: Value-added services that drive brand loyalty and product adoption.

Challenges & Opportunities:

Challenges: Competing with large, established multinational pharmaceutical companies; scaling specialized technical consulting across a vast eight-state network; and navigating fragmented regulatory landscapes for feed additives.

Opportunities: Expanding into international markets utilizing their WHO-GMP certifications; deepening digital engagement with AI/IoT-based predictive alerts on the Marsco App; and securing more patents for innovative aquatic health tonics.

GreenGrahi Solutions Private Limited 87

Founder	Siddharth Sharma (Co-Founder & CEO) and Shivali Sugand
Established year	February 5, 2021
Location	Registered in New Delhi, Pilot operations and Bio-factory established in Roorkee, Uttarakhand.

Company Overview

GreenGrahi is a pioneering Indian agri-biotechnology company that operates at the forefront of the circular bioeconomy. The company specializes in utilizing insect biotechnology specifically the Black Soldier Fly (BSF) to upcycle pre-consumer food waste and agricultural by-products into high-value protein meals, functional oils, and organic fertilizers. By replacing unsustainable feed sources like fishmeal and soy, GreenGrahi addresses global food security while significantly reducing the carbon footprint of the animal and plant nutrition industries.

Sector/Domain: Agri-Biotechnology, Clean-Tech, and Sustainable Animal Nutrition

Core Innovation: The BSF Biofactory Platform

The company's Circular Economy innovation is built on proprietary climate-controlled systems that optimize the biological life cycle of the Black Soldier Fly:

- Advanced Bioconversion: Using a specialized microbiome and insect-rearing technology, the company transforms 150 tonnes of daily feedstock into high-performance ingredients.
- Climate-Controlled Breeding: proprietary tech for consistent, year-round production of BSF larvae, regardless of external environmental conditions.
- Full-Stack Utilization: Every byproduct is captured larvae become protein and oil, while insect frass (droppings) is converted into nutrient-dense, bio-stimulant fertilizers.

Core Offerings:

- Animal Nutrition (ento Fins & enPlus):

  DF100 & DF150: High-digestibility protein supplements for fish and shrimp that improve Feed Conversion Ratios (FCR) and survival rates.

  enPlus Oil: A novel source of Lauric Acid (saturated fatty acid) that provides antimicrobial and antiviral benefits to pets and livestock.

- Plant Nutrition (enShakti & enGold):

  enShakti (N:P:K): A biological fertilizer consortium that enhances soil microbiota.

  enGold & GG Phos: Insect frass-based soil conditioners and phosphatic fertilizers that improve flowering, fruiting, and overall crop resilience.

- Specialty Pet Health:

  enMix DF 300: A 100% natural specialty protein for dogs and cats, particularly beneficial for pets with sensitive digestion or traditional meat allergies.

Business Model and Scaling Strategy:

- B2B Industrial Supply: Supplies insect-derived ingredients to large-scale aquafeed, poultry, and pet food manufacturers through long-term commercial contracts.
- Strategic Sourcing: Partners with FMCG and alcoholic beverage companies to divert pre-consumer waste from landfills, lowering feedstock costs.

Challenges & Opportunities:

Challenges: Navigating complex international food safety regulations for insect protein; achieving cost parity with subsidized soy/fishmeal; and overcoming public perception barriers regarding insect-derived pet food.

Opportunities: Expanding into bio-pesticides and pharmaceuticals using insect-derived bioactive compounds; and leveraging their status as a Minicorn to build India's largest BSF bio-factory.

88 Sai Aqua Feeds

Founder	Shri Vijay (Managing Director)
Established year	June 7, 2019.
Location	Headquartered in Bapatla (Guntur), with primary manufacturing units in Bapatla and Rajahmundry, Andhra Pradesh.

Company Overview

Sai Aqua Feeds is a prominent Indian aquaculture enterprise that has gained national recognition for its successful Public-Private Partnership (PPP) with the ICAR-Central Institute of Brackishwater Aquaculture (CIBA). The company was founded with the mission to break the monopoly of expensive, imported shrimp feed brands by commercializing indigenous institutional research. By producing Desi (local) high-performance feeds, Sai Aqua Feeds has become a key player in Andhra Pradesh the Shrimp Bowl of India helping thousands of small-scale farmers reduce production costs while maintaining global quality standards. In 2020, the company was honored with the Best Fisheries Enterprise Award - 2020 for its contribution to the sector.

Sector/Domain: Aquaculture Nutrition, Feed Manufacturing, and Institutional Technology Transfer.

Core Innovation & Products:

The company's primary differentiator is its Science-to-Farm technology bridge, developed in collaboration with CIBA scientists:

- Vannamei Plus Feed: A flagship indigenous feed formulation specifically optimized for *Litopenaeus vannamei* (Whiteleg shrimp) in Indian tropical conditions. It uses local ingredients to achieve a performance level comparable to premium multinational brands but at a significantly lower price point.
- Cost-Efficient FCR: By utilizing CIBA's proprietary formulas, the company focuses on improving the Feed Conversion Ratio (FCR), which typically accounts for 60-65% of a farmer's total production cost.
- Water & Soil Management: Alongside feed, they provide CIBA-developed Soil and Water Health Cards and diagnostic tools to help farmers practice scientific, evidence-based aquaculture.

Business Model and Operations:

- PPP & Technology Transfer Model

  Strategy: Sai Aqua Feeds pays a royalty to ICAR-CIBA for specialized formulations and technical hand-holding during the manufacturing process. This ensures institutional-grade quality in a commercial setting.

  Revenue Model: Direct sales of formulated feeds (Vannamei Plus) and aquatic health supplements to a vast network of coastal farmers.
- Hub-and-Spoke Distribution

  Strategy: Operating deep within the Guntur and East Godavari belts allows for low logistical costs and real-time technical feedback from farmers.
- Aquaculture Consultancy

  Services: Guidance on feed mill setup for local entrepreneurs, promoting a decentralized made by farmers, for farmers production ecosystem.

Challenges & Opportunities:

Challenges: Volatility in the global prices of raw materials like fishmeal and soy; and competing with the massive credit-line facilities offered by multinational feed giants to local dealers.

Opportunities: Scaling the newly developed EHP management technologies to tackle one of the industry's biggest disease threats; expanding their Desi feed model to other high-value species like Black Tiger Shrimp or Sea Bass; and potentially exporting their low-cost manufacturing model to other Southeast Asian nations.

ZEWA Ecosystems 89

Founder	Nikhildev Mulakkal (Founder & CEO) and Anusakh M. P. (Director).
Established year	2019
Location	Headquartered in Thalikkulam, Thrissur, Kerala, at the Rural Apparel Park

Company Overview

ZEWA Ecosystems is a pioneering agritech company that addresses two global crises waste management and protein scarcity through a single, circular economy solution. The company utilizes the Black Soldier Fly (BSF) to transform organic biowaste into high-value protein for animal and fish feed. Founded by Nikhildev Mulakkal, who returned from an engineering career in Australia to innovate India's food systems, ZEWA aims to replace unsustainable fishmeal and soy with insect-based nutrition. Their model reduces the carbon footprint of aquaculture while providing a nutrient-dense, chemical-free superfood for the livestock and pet industry.

Sector/Domain: Agri-Tech, Circular Economy, Novel Feed/Protein, and Waste Management

Core Innovation & BSF Model:

ZEWA's primary innovation is its Hybrid IoT-based Waste Management System, which optimizes the biological lifecycle of the Black Soldier Fly:

- Waste-to-Protein Conversion: BSF larvae consume organic waste at a rapid rate, converting it into biomass rich in protein and essential fatty acids. This prevents biowaste from reaching landfills where it would release methane.
- Biosecure Substrate R&D: After 50+ trials, ZEWA developed a proprietary substrate mix that ensures the larvae are free from heavy metals and microorganisms, resulting in consistent, high-quality feed.
- Zewapod: A modular, portable BSF cultivation unit designed for households or small-scale farms to convert their own food waste into protein-rich feed and organic manure.

Core Products & Services:

ZEWA's portfolio serves ornamental fish hobbyists, commercial farmers, and the broader agricultural community:

- Dried BSF Larvae: 100% natural, sun-dried larvae containing 42–50% protein. It is ideal for Arowana, Flowerhorn, Oscar, and other carnivorous ornamental fish, promoting color enhancement and immune health.
- Premium Feed Range:

  Zewa Guppy Bites: High-protein growth formula.

  Zewa Betta Bites: Natural color-enhancing pellets.
- BSF Frass Compost: A powerful High-NPK biofertilizer derived from larvae excrement, perfect for kitchen gardens and organic farming.
- Training & Consultancy: A dedicated BSF Training Program that teaches the methodology of insect farming to help entrepreneurs set up their own production environments.

Awards and Recognitions: ZEWA has been widely recognized for its contribution to climate action and biotechnology:

Winner (Second Prize) - Climathon 2022: Awarded by the Kerala Startup Mission (KSUM) in association with EY Global Delivery Services for their IoT-based waste-to-feed system.

Challenges & Opportunities:

Challenges: Navigating the price sensitivity of the Indian animal feed market; and standardizing waste collection to avoid contamination in the insect feedstock.

Opportunities: Expanding into Insect Oil extraction for high-energy feed mill additives; and penetrating the global sustainable pet food market as international regulations shift in favor of insect-based proteins.

90 Nutrigene Biosciences Pvt. Ltd.

Founder	Keerthi Vardhan Vadlamani, Dr. Vijay Kumar Katta, Tejash Vijay Shah, Raheel Dharmesh Shah, Trushit Pramodray Mehta
Established year	October 20, 2020.
Location	Headquartered in HITEC City, Hyderabad, Telangana, India

Company Overview

Nutrigene Biosciences is a cutting-edge biotechnology firm dedicated to the Natural Revolution in the nutraceutical, food, and feed industries. Based in India's biotech capital, the company utilizes advanced industrial fermentation and molecular extraction to produce high-value botanical compounds. Nutrigene has gained significant attention in the aquaculture sector for its pioneering work in replacing synthetic chemicals with bio-available, plant-derived alternatives. By bridging the gap between phytochemical research and industrial application, the company supports the Viksit Bharat vision of sustainable, technology-led growth.

Sector/Domain: Biotechnology, Phytochemistry, Aquaculture Nutrition, and Specialty Ingredients.

The Aquaculture Innovation:

Nutrigene's entry into the fisheries value chain is marked by its breakthrough in Plant-Based Vitamin D3 for Shrimp Nutrition:

- ICAR-CIBA Strategic Partnership: In July 2024, Nutrigene signed an MoU with the Central Institute of Brackishwater Aquaculture (CIBA) to evaluate the efficacy of botanical Vitamin D3 in shrimp diets.
- The Vegan Shrimp Feed: Moving away from traditional animal-derived or synthetic Vitamin D3, Nutrigene's botanical version offers a sustainable, organic-compliant alternative.
- Biological Benefits: The research focuses on improving calcium metabolism, exoskeleton (shell) health, and immunity in shrimp, addressing key mortality and growth issues in brackishwater farming.

Core Offerings & Bio-Ingredients:

Nutrigene operates a manufacturing model focusing on high-purity, standardized molecules:

- Vitamin D3 Glycosides (Plant-Based): Derived from botanical sources to support skeletal health and growth in both aquatic species and livestock.
- Algal Omega Acids (EPA & DHA): Sustainably produced fatty acids via fermentation, essential for heart and brain health, providing a fish-oil alternative for premium aquafeeds.
- Bakuchiol (99+% Purity): A world-class botanical extract used as a natural alternative to Retinol, offering anti-inflammatory benefits for both high-end cosmetics and therapeutic animal health.
- Reference Standards: Supplying high-purity phytochemical compounds for academic research and industrial validation laboratories.

Business Model & Operations:

- Research-Led B2B Manufacturing: Nutrigene operates as a vertically integrated supplier, handling everything from the molecular design to industrial-scale supercritical extraction.
- Public-Private Partnership (PPP): By validating its products through premier institutes like ICAR-CIBA, the company secures the scientific credibility required to penetrate the global feed market.
- Revenue Streams: Bulk B2B sales of specialized ingredients to international feed mills, nutraceutical brands, and biopharma companies.

Challenges & Opportunities:

Challenges: Proving that the superior bioavailability and green credentials of botanical extracts justify the price premium over cheaper synthetic versions in a cost-sensitive feed market.

Opportunities: Scaling into Phytogenic Feed Additives (PFAs) to replace antibiotics in fish farming; and producing high-value pigments like Astaxanthin through fermentation for the ornamental fish and premium seafood industries.

Pasupati Group 91

Founder	Prakash Kumar Rout
Established year	1992
Location	Cuttack, Odisha, India.

Company Overview

The Pasupati Group is a major conglomerate in the Indian agribusiness landscape, recognized for its pioneering role in animal nutrition. Its specialized Aqua Feed Division is a cornerstone of the group, dedicated to supporting India's status as a global leader in fish production. By integrating world-class manufacturing technology with local farming insights, Pasupati provides high-performance feeds that optimize the Feed Conversion Ratio (FCR) and promote sustainable pond management across the eastern coastal belt and beyond.

Sector/Domain: Animal Nutrition, Aqua-Feed Manufacturing, and Integrated Aquaculture.

Core Offerings in Aqua Feed

Pasupati's aqua division produces a comprehensive portfolio designed for the diverse species and climatic conditions found in Indian aquaculture:

Floating Fish Feed:

Features: Scientifically formulated to float on the water surface, allowing farmers to monitor fish consumption and minimize feed wastage.

Benefits: High water stability and balanced nutrition that promote uniform weight gain and high survival rates for species like Rohu, Catla, and Mrigal.

Shrimp Feed (Vannamei & Tiger Shrimp):

Technology: A new-generation, antibiotic-free feed manufactured using advanced infrastructure to ensure excellent water stability.

Nutrition: Formulated with high-quality ingredients that meet the up-to-date nutritional requirements of high-value shrimp, ensuring robust health and maximum profitability for farmers.

Sinking Fish Feed:

Application: Designed specifically for bottom-feeding species, ensuring that the nutrients reach the fish without disintegrating prematurely in the water column.

Ornamental Aquarium Fish Feed:

Innovation: Incorporates a combination of synbiotics and probiotics to enhance the immunity and gastrointestinal health of ornamental species.

Welfare: Features highly available phosphorus to prevent bone deformities and Plump Fish syndrome (excess fat deposition). It is suitable for a variety of species including Goldfish, Angel Fish, and Cichlids.

Infrastructure & Research

Manufacturing Hub: Operates a dedicated Aqua Feed Division plant in the New Industrial Estate, Jagatpur (Odisha).

Quality Control & R&D: The group maintains a sophisticated Research and Development division that works on diet optimization and professional supervision of nutritional standards.

Direct Farmer Support: Beyond selling feed, Pasupati provides technical advisory services to help farmers with pond management, aiming to increase overall farm yields.

Challenges & Opportunities:

Challenges: Rising raw material and feed ingredient costs, maintaining consistent feed quality across diverse aquaculture species, and adapting to increasing demand for sustainable and antibiotic-free aquaculture practices.

Opportunities: Expanding high-performance and specialty feed solutions, strengthening farmer productivity through technical advisory services, and supporting sustainable aquaculture growth with advanced nutrition and research-driven feed innovations.

92 Om Sai Aqua

Founder	Mr. B. Venkateswarlu
Location	Headquartered in Nellore, Andhra Pradesh, with research collaborations in Chennai.

Company Overview

Om Sai Aqua is a dynamic, technology-driven startup specializing in the development and supply of functional feed additives for the aquaculture industry. The company is particularly focused on harnessing the biological potential of Marine Protein Hydrolysates to solve modern nutritional challenges in shrimp farming. By partnering with premier research institutions like ICAR-CIBA, Om Sai Aqua bridges the gap between lab-scale biotechnology and field-level pond performance, aiming to improve the sustainability and economic competitiveness of the Indian aqua-feed sector.

Sector/Domain: Aqua-Biotechnology, Functional Feed Additives, and Marine Nutrition.

Core Innovation: Marine Protein Hydrolysate Research

The company's primary focus is the commercial application of marine-derived protein hydrolysates:

- Palatability Enhancement: The hydrolysates act as a potent attractant, encouraging faster feed intake in Pacific White Shrimp (Penaeus vannamei), which reduces feed leaching and improves the Feed Conversion Ratio (FCR).
- Immune Stimulation: Beyond basic nutrition, these additives are designed to act as natural immunostimulants, potentially reducing the dependence on synthetic chemicals and enhancing the survival rate of shrimp under intensive farming conditions.
- Scientific Validation: Through its MoU with ICAR-CIBA, the company is conducting rigorous scientific trials to evaluate the precise impact of these proteins on shrimp growth and vigor.

2. Core Offerings & Services

- Functional Feed Additives: Specialized supplements that can be coated onto or integrated into traditional shrimp feed to boost metabolic performance.
- Research Solutions: Providing customized formulations of marine protein hydrolysates tailored to different developmental stages of shrimp.
- Quality Input Supply: Distribution of high-quality aquaculture inputs, including water conditioners and bio-stimulants, specifically curated for the Andhra Pradesh and Tamil Nadu aquaculture belts.

3. Strategic Impact & Business Model

- **Collaboration-Led Growth: Om Sai Aqua** operates on a research-first model, ensuring that every product offered to farmers has been validated by national institutes.
- Sustainability & Economics: By improving survival rates and growth speed, the company helps farmers maximize their harvest within a shorter crop cycle, significantly improving the ROI of high-density shrimp ponds.
- Target Market: Primarily focused on the intensive shrimp farming regions of India, targeting hatcheries, feed millers, and commercial farmers.

Challenges & Opportunities:

Challenges: Scaling scientifically validated feed additive solutions for commercial adoption, ensuring consistent efficacy under varying farm conditions, and competing with conventional synthetic growth promoters in the aquaculture market.

Opportunities: Expanding demand for sustainable and functional aquaculture nutrition, strengthening industry–research collaborations for biotechnology-driven innovations, and improving shrimp farm productivity through natural immunostimulants and advanced feed enhancement solutions.

Maritime Intelligence & Sea Safety

The advancement of Maritime Intelligence & Sea Safety in India is currently driven by a transition from traditional, isolated fishing practices to a digitally connected and data-secure marine environment. These three key organizations Odaku Online Services, Blucatch Fisheries, and Numer8 (Numer8 Analytics) demonstrate the critical importance of integrating Fishing Net with Internet to ensure the safety of artisanal fishers and the transparency of seafood origins. Their collective activities include the deployment of mobile-based GIS gadgets for navigation, the use of satellite data to identify Potential Fishing Zones (PFZ), and the creation of QR-based traceability systems that track seafood from the point of catch. By providing real-time weather alerts, international border notifications, and emergency SOS services, these startups are de-risking the lives of those at sea while simultaneously empowering them with financial intelligence. Through this focus on Triple S framework—Safety, Sustainability, and Seafood Traceability—these enterprises are bridging the digital divide in coastal communities and ensuring that Indian seafood meets the high traceability standards required for global export markets.

Maritime Intelligence & Sea Safety

Harnessing satellite data and marine spatial mapping to optimize fuel efficiency and ensure crew safety in the deep-sea fishing sector.

Table 15: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/Services	Business Approach
Odaku	Vessel Connectivity	Smart satellite transponders and vessel tracking	Odaku mobile app, satellite hardware, Fishing Calendar	Subscription-based safety and communication service
PierSight Space	Maritime Surveillance & Ocean Intelligence	SAR + AIS satellite constellation for 24/7 all-weather vessel monitoring	MATSYA maritime analytics platform, SAR-AIS satellite services, Varuna mission engineering	Data-as-a-Service (DaaS) model for governments, coast guards, shipping and maritime intelligence sectors
Numer8	Maritime Analytics	Predictive marine spatial mapping and catch monitoring	Catch-monitoring SaaS, Finance profiling	SaaS-based data intelligence for de-risking finance

Table 16: Sector Feature Matrix

Startup Name	Satellite Mapping	Potential Fishing Zones (PFZ)	Vessel Tracking	Crew Safety/Weather Alerts
Odaku	✓		✓	✓
PierSight Space	✓		✓	✓
Numer8	✓	✓	✓	

Odaku Online Services Private Limited 93

Founder	Xavier Lawrance (Founder & Director) and Lawrence Jenison (Director).
Established year	October 28, 2015.
Location	Headquarters in Saligramam, Chennai; Registered office in Nagercoil, Kanyakumari, Tamil Nadu.

Company Overview

Odaku Online Services is a pioneering maritime technology startup that operates under the disruptive motto Fishing Net Meets Internet. The company is dedicated to the digital empowerment of traditional fishing communities, transforming a historically low-tech sector with smart, affordable mobile solutions. By focusing on the Triple S framework- Safety, Sustainability, and Seafood Traceability, Odaku acts as a central digital platform connecting fishers, vessel owners, managers, and consumers. The startup is notably supported by a-IDEA (Association of Innovation Development of Entrepreneurship in Agriculture), Hyderabad.

Sector/Domain: Agri-Tech, Fishery Technology (FisherTech), and Maps & Navigation.

Core Innovation & Product Suite

Odaku's primary innovation is the Odaku Marine GPS, an Android-based GIS Gadget that provides high-end navigational and safety features without requiring expensive, specialized hardware.

- Safety & Navigation: The app offers a Compass and Map View, unlimited waypoints, and critical Weather & Ship Accident Alerts. It features an International Border Alert to help fishers avoid straying into restricted waters and identifies hidden reefs (locally known as Odaku).
- Smart Fishing Tools: Includes a Fishing Calendar (Moon phases, Sunrise/Sunset) and identifying Potential Fishing Zones (PFZ) from INCOIS data to optimize fuel and catch efficiency.
- QR-Based Traceability: A scalable system that tags seafood at the point of catch. By scanning a QR code, consumers can trace the Who, When, and How of their fish, ensuring it is sustainably sourced and free from IUU (Illegal, Unreported, and Unregulated) fishing.

Business Model & Revenue Streams:

- B2F (Business-to-Fisher) Subscription:

  Model: Low-cost monthly or annual subscription fees for individual fishers to access premium GPS navigation and safety alerts.
- B2B & Government Licensing:

  Model: Licensing the vessel tracking and IUU detection platform to fishery ports, seafood exporters, and regulatory agencies for compliance monitoring.
- Traceability-as-a-Service:

  Model: Transaction-based fees charged to seafood brands and online retailers for utilizing the Odaku QR-traceability infrastructure.

Challenges & Opportunities:

Challenges: Navigating the Digital Divide in rural coastal areas where smartphone literacy may be low; ensuring data connectivity in deep-sea environments; and integrating data with fragmented local fishery departments for legal enforcement.

Opportunities: Tapping into the global demand for Sustainable Seafood certification; leveraging the India-EU trade agreements that demand high traceability; and potentially expanding into satellite-integrated services for deep-sea safety.

94 PierSight Space

Founder	Gaurav Seth (Ex-ISRO) and Vinit Bansal (Ex-National Instruments)
Established year	2023
Location	Ahmedabad, Gujarat (Headquarters)

Company Overview

PierSight Space is a deep-tech spacetech startup focused on providing persistent, real-time maritime surveillance. The company is building a constellation of Synthetic Aperture Radar (SAR) and Automatic Identification System (AIS) satellites to address the visibility gap in the world's oceans. Unlike traditional optical satellites that are limited by cloud cover and daylight, PierSight's technology provides 24/7 all-weather monitoring, aimed at tracking every human and industrial footprint at sea to protect the environment and secure maritime commerce.

Sector/Domain: SpaceTech, Earth Observation, Synthetic Aperture Radar (SAR), Maritime Surveillance, DefenseTech, DeepTech Analytics

Core Offerings and Business Model

1. Persistent SAR & AIS Satellite Constellation

The Innovation: PierSight is deploying a constellation of microsatellites (targeting 32 satellites by 2028) that combine radar imaging (SAR) with ship-tracking data (AIS). This allows for a 30-minute revisit time, providing near-continuous monitoring of any point on the ocean.

Technical Edge: SAR technology can see through clouds, fog, and darkness, detecting "dark vessels" that have intentionally turned off their AIS transponders to evade detection.

2. Dynamic Maritime Analytics (MATSYA)

The Innovation: Beyond raw data, the startup provides a maritime analytics platform (MATSYA) that fuses satellite imagery with AI-driven insights. This transforms complex radar data into actionable intelligence for tracking illegal, unreported, and unregulated (IUU) fishing.

Business Model: PierSight operates on a Data-as-a-Service (DaaS) model, providing sovereign SAR data backbones and surveillance analytics to governments, coast guards, and shipping corporations.

3. Rapid Prototyping and Mission Engineering (Varuna Mission)

The Innovation: Utilizing advanced simulation and digital mission engineering, the company built its first prototype satellite (Varuna) in just nine months significantly faster than the industry standard.

Strategic Impact: The company aims to reduce the maritime losses by providing cost-effective data that is a fraction of the price of current satellite imagery providers.

Challenges & Opportunities:

Challenges: Managing the high technical and operational risks associated with satellite deployment and space environments, while ensuring accurate real-time fusion of massive SAR and AIS datasets for reliable low-latency maritime intelligence and vessel tracking.

Opportunities: Expanding all-weather maritime surveillance solutions for environmental protection, illegal fishing detection, and EEZ monitoring, while strengthening global maritime analytics and trade intelligence services for governments, coast guards, shipping industries, and financial markets.

Founder	Devleena Bhattacharjee (Founder & CEO) and Nandhini Karthikeyan (CTO).
Established year	Founded in 2017, with the flagship OFish app launching in 2019
Location	Headquartered in Mumbai, Maharashtra, India, with operational reach across the Indian coastline, Sri Lanka, and the Philippines

Company Overview

Numer8 is a deep-tech data science company that bridges the gap between high-altitude satellite intelligence and the reality of the seafood industry. By analyzing geospatial data from Earth to Space, Numer8 provides actionable insights that help small-scale fishers and large aquaculture firms navigate the risks of climate change, overfishing, and fragmented supply chains. A significant turning point for the startup was its pivot from general disaster risk modeling to specialized marine analytics after participating in the European Space Agency's (ESA) Copernicus Masters program. Today, Numer8 is a global player, backed by the United Nations World Food Programme (WFP), focused on making seafood traceable, sustainable, and profitable.

Sector/Domain: Deep-Tech, Geospatial Analytics, Maritime & Aquaculture, and Supply Chain Traceability.

Core Innovation & Tech Stack:

Numer8's innovation lies in its ability to convert Raw Space Data into Fisherman-Friendly Guidance

- Predictive Geospatial Models: Analyzes Sea Surface Temperature (SST), chlorophyll concentrations, and ocean currents to identify Potential Fishing Zones (PFZs), reducing scouting time by up to 50%.
- Environmental Risk Forecasting: Uses satellite imagery to predict Toxic Algal Blooms and sudden water quality drops, acting as an early warning system for aquaculture farms.
- Blockchain-Powered Traceability: Integrates satellite tracking with digital ledgers to create a digital passport for seafood, verifying exactly where, when, and by whom a fish was caught.

Core Offerings: Products and Services:

- OFish (Ocean Fisheries Decision Support):

  Features: Provides hyperlocal weather alerts, tide data, and GPS-guided fishing routes to reduce fuel consumption.

  Impact: Onboarded over 2,000+ fisherfolk, significantly increasing their net daily catch and safety at sea.

- QresQ (Aquaculture & Traceability):

  Features: A B2B platform for farm management that offers site selection analytics and real-time environmental monitoring.

  Traceability: Uses QR codes to provide consumers and exporters with end-to-end visibility of the seafood supply chain.

- Market & Financial Linkages:

  Directly connects fishing cooperatives to B2B buyers to eliminate middleman margins and provides credit-scoring frameworks to help fishers access formal banking.

Business Model & Partnerships:

- B2B/B2G Model: Generates revenue through data subscription fees from commercial aquaculture firms and high-value service contracts with international NGOs (WFP, World Bank).
- Copernicus Masters Recognition: Winning the T-Systems Challenge in the Copernicus Masters provided the firm with exclusive access to ESA's satellite data and established its global technical credibility.
- Recent Diversification: Partnered with ClimaCrew and the MAVIM NGO to promote seaweed cultivation as a climate-resilient alternative livelihood for fisherwomen in Maharashtra.

Challenges & Opportunities:

Challenges: Ensuring real-time data delivery in low-connectivity marine environments; and the ground-truthing of satellite predictions across varying oceanic geographies.

Opportunities: Scaling its Climate Insurance wing, where satellite data serves as the primary verification tool for processing weather-related insurance claims for coastal communities.

Ornamental Fisheries & Aquatic Design

The Ornamental Fisheries & Aquatic Design sector is currently defined by a transition toward professionalized lifestyle aesthetics and the scientific management of aquatic life for both hobbyists and research. Six pioneering organizations Zolyt, Greenfin (The Pond Studio), Aquascaping®, Still Water Aquatics, Zebrafish India Research Solutions, and NatureMark Zoetech demonstrate the diverse potential of this niche, ranging from high-end biophilic design to the development of laboratory-grade aquatic environments. Their collective activities include the curation of rare ornamental species, the construction of sophisticated nature aquariums, and the supply of specialized equipment through pan-India digital platforms. By integrating advanced filtration technology with artistic aquascaping and research-driven husbandry, these startups are elevating the quality of the domestic aquarium trade while supporting the use of aquatic models in biomedical science. Through this sophisticated blend of design and biotechnology, these enterprises are establishing sustainable value chains in the ornamental sector, promoting aquatic conservation and the growing Blue Interior economy.

Ornamental Fisheries & Aquatic Design

Combining biotechnology, IoT, and high-end engineering to modernize the aesthetic and research-based aquatic sectors.

Table 17: Summary Table

Startup Name	Core Focus	Key Innovation	Major Products/ Services	Business Approach
Teraa International	Biotech-based Aquarium Nutrition	Insect-protein and probiotic-based ornamental fish nutrition	Organic fish feed, water treatments, probiotic supplements, aquatic care solutions	Premium D2C/ B2C brand and OEM manufacturing for global aquarium markets
Greenfin	Aquatic Landscaping	Precision ecosystem-based Koi pond design	Living pond ecosystems, bio-filters	High-end design, installation, and maintenance
Aquascaping®	Aesthetic Design	Specialized aquatic plant integration and hardscaping	Designer aquariums, custom scapes	Premium lifestyle design and artistic installation
Still Water Aquariums	Corporate Systems	High-capacity life support systems (LSS)	Marine/Freshwater display tanks	Institutional B2B installation and maintenance
Zebrafish India	Research Systems	Lab-standard automated breeding infrastructure	Zebrafish housing, lab automation	B2B scientific and pharmaceutical research supply
Naturemark Zoetech	Intelligent Systems	IoT and Automation-focused ornamental design	Smart sensors, automated maintenance kits	Technology-driven ornamental kits and smart systems

Table 18: Sector Feature Matrix

Startup Name	Aquatic Landscaping/ Design	FRP Tank Manufacturing	Live Fish Retail Displays	Automated Maintenance Systems
Teraa International	✓			✓
Greenfin	✓			✓
Aquascaping®	✓			
Still Water Aquariums			✓	✓
Zebrafish India				✓
Naturemark Zoetech				✓

Teraa International 96

Founder	Managed under Blue Vale Lifetech LLP (with global advisors Ulli Bauer, Janne Johansson, and Dirk Van)
Established year	2017
Location	Bengaluru, Karnataka

Company Overview

Teraa International is a premium biotechnology-driven aquarium brand that specializes in organic aquatic pet care and high-end nutritional solutions. Originally sourcing its innovations from Germany, the company transitioned to "Make in India" manufacturing in 2021. It operates at the intersection of microbiology and ornamental aquaculture, producing advanced fish food, water treatments, and supplements. The brand is ISO 9001:2015 certified and recognized for bringing German-standard Nature Aquarium expertise to the Indian and global markets.

Sector/Domain: Ornamental Fisheries, Blue Biotech, Alternative Proteins (Insect-based), Value-Added Aquatic Products, Organics & Probiotics

1. Insect Protein & Organic Nutrition

The Innovation: Teraa replaces traditional fishmeal with premium insect protein as a sustainable, nutrient-rich primary ingredient. Their formulas use organic materials that replicate the natural, wild habitats of fish and shrimp.

Sustainability Impact: By utilizing insect-based proteins, the company reduces reliance on overfished marine resources for fishmeal, promoting a more circular and eco-friendly supply chain for the ornamental industry.

2. Probiotic and Prebiotic Feed Technology

The Innovation: They incorporate advanced probiotic coatings and prebiotic fibers into their feeds (such as the Artemia and Spirulina paste series) to improve gut health, strengthen immunity, and enhance the vibrant coloration of aquatic species.

Patents & IP: The startup holds specific patents (e.g., Patent 202431033422 for Paste feed) for their unique soft-pellet and paste-feed formulations.

Business Model: Teraa operates as both a premium D2C/B2C brand and a high-capacity OEM manufacturer for established European aquarium brands, leveraging Indian manufacturing costs with German quality standards.

3. Specialized Invertebrate & Native Species Breeding

The Innovation: Beyond products, Teraa operates dedicated freshwater invertebrate and fish breeding units. They focus on the sustainable export of Indian native fishes and "inverts" (shrimp and snails) to the global market.

Precision Care: They offer a "comprehensive aquatic solution" including water treatments (conditioners, bacterial starters) and plant nutrition, ensuring that hobbyists can maintain complex, balanced ecosystems rather than just individual pets.

Challenges & Opportunities:

Challenges: Educating hobbyists about the long-term benefits of premium organic and insect-protein-based aquarium nutrition over low-cost conventional feeds, while ensuring consistent sourcing of high-quality organic raw materials and maintaining WHO-GMP standards across diverse product lines.

Opportunities: Expanding global exports through international partnerships and strengthening the premium ornamental aquarium market with biotech-driven nutrition, microbiology-based healthcare solutions, and specialized treatments for exotic aquatic species.

97 Greenfin - The Pond Studio

Founder	Payakkara Shoukkathali (Designated Partner) and Shamsudheer (Designated Partner).
Established year	Brand operations began in 2018; formally incorporated as Greenfin The Pond Studio LLP on October 13, 2025.
Location	Headquartered in Kozhikode (Calicut), Kerala, with a registered office at Thottilpeedika, Chevarambalam.

Company Overview

Greenfin - The Pond Studio is a specialized technical aquatic retailer and system integrator that has carved a niche in high-end pond management and commercial aquaculture. Unlike general pet stores, Greenfin focuses on the engineering side of water, providing the machinery and monitoring tools required for Biofloc farming and Koi Pond maintenance. The company serves as a vital bridge for Indian farmers and hobbyists to access international-standard equipment that is essential for maintaining delicate aquatic ecosystems at high densities.

Sector/Domain: Agri-Tech (Aquaculture), E-commerce (Niche Retail), and Water Management.

Core Specialization & Technical Offerings

Greenfin's inventory is strategically selected to support intensive aquaculture and luxury ponds, where water quality is the primary driver of success:

- Commercial Biofloc Systems: Supplies the complete hardware stack for Biofloc, including high-GSM Tarpaulins for tank construction, Airoxi Tubes, and Fine Bubble Disc diffusers for critical oxygenation.
- Advanced Water Engineering: Features high-flow DC Pumps (up to 30,000 L/H) and heavy-duty UV Clarifiers (UVC) to control algae and bacterial pathogens in large-scale outdoor setups.
- Bio-Filtration Media: Stockist for specialized media like Japanese Mats and MBBR (Moving Bed Biofilm Reactor) media, which provide the high surface area necessary for beneficial bacteria to neutralize ammonia.
- Scientific Monitoring: Provides professional API Master Test Kits for freshwater and pond chemistry, moving beyond basic strips to high-precision liquid titration tests.

Business Model & Operations:

- D2C & B2B E-commerce: Operates a pan-India online store that offers All India Free Shipping, making heavy industrial pumps and bulky filtration media accessible to remote farmers.
- Authorized Distribution: Acts as a trusted distributor for global brands like Fluval, SunSun, Biozym, and Hailea, ensuring that Indian buyers receive authentic, warranty-backed technical equipment.
- Consultancy Services: Offers free online consultations to help new farmers and pond owners select the right technical combo (pump-filter-UV) based on their specific water volume and fish density.

Challenges & Opportunities:

Challenges: Navigating the logistics of shipping fragile and bulky items (like UV quartz tubes and large filters) across long distances; and the Inactive status of previous filings which may require administrative regularization for future scaling.

Opportunities: The Blue Revolution (PMMSY) subsidies in India are driving thousands of new entrepreneurs into Biofloc; Greenfin is perfectly positioned to be their primary equipment vendor. There is also a significant opportunity to develop a proprietary line of pre-assembled Smart Pond kits that include IoT sensors for remote monitoring.

Aquascaping® 98

Founder	Kshitij Gupta
Established year	Online blog presence started in 2009; retail operations established as early as 2003
Location	Headquartered in Raipur, Chhattisgarh, India

Company Overview

Aquascaping® is a premier Indian destination for the high-end, artistic niche of Nature Aquariums and underwater gardening. What began as an educational blog by enthusiast Kshitij Gupta has grown into one of India's most trusted multi-channel retailers. The brand acts as a bridge between international high-tech aquarium standards and the Indian hobbyist. Known for its extensive Learn portal, Aquascaping® prioritizes hobbyist success over simple sales, providing deep technical expertise on CO2 systems, specialized LED lighting, and complex water chemistry to ensure thriving aquatic ecosystems.

Sector/Domain: E-commerce, Education, and Specialty Aquarium Technology.

Core Innovation & Educational Strategy

Aquascaping® distinguishes itself through a Knowledge-First retail model, ensuring customers are technically equipped to handle high-investment setups:

- The Learn Portal: A comprehensive digital library authored by Kshitij Gupta, covering critical topics such as the Nitrogen Cycle, Algae Management (Green Water/Hair Algae), and the Golden Ratio in layout design.
- Smart Tech Integration: Early adopters in bringing Bluetooth-controlled WRGB lighting and professional-grade CO2 automation to the Indian market, simplifying the maintenance of High-Tech planted tanks.
- Niche Hardscape Sourcing: Curating a standardized inventory of Hardscape materials (Seiryu Stones, Bogwood, Spider Wood) that were traditionally inconsistent in the unorganized Indian market.

Core Offerings & Service Portfolio:

- High-Tech Hardware:

  CO2 Systems: Complete pressurized CO2 kits, solenoid regulators, and Neo-special diffusers.

  Filtration & RO: High-capacity canister filters (e.g., Sicce, Fluval) and 4-stage RO systems for sensitive shrimp and plant species.

  Advanced Lighting: WRGB LED sets and T5 units designed specifically for photosynthesis.

- Aquascaping Consumables: Premium specialized substrates (Aquasoil), liquid fertilizers (Neo Conditioners), and high-quality fish/shrimp foods.
- Specialty Niches: Equipment and media for Koi Ponds, Paludariums, and Terrariums, including pond heaters and industrial-scale aerators.

Business Model & Global Reach:

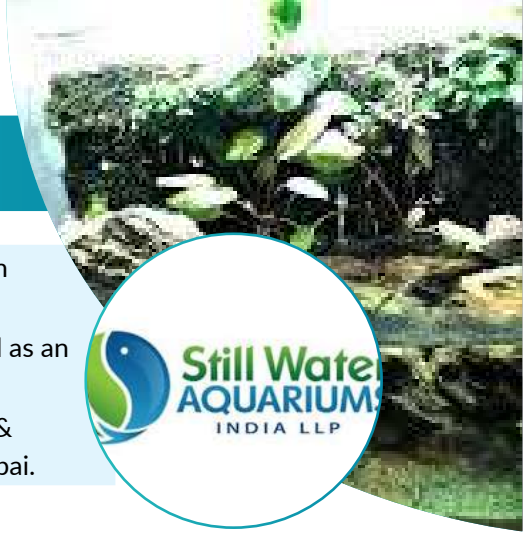
- Omnichannel Retail: Operates a flagship retail studio in Raipur and a robust e-commerce platform serving all of India.
- Logistics Value: Offers All India Free Shipping on orders above ₹1000, solving the problem of high shipping costs for heavy items like substrates and stones.

Challenges & Opportunities:

Challenges: Managing the high cost of imported equipment due to currency fluctuations and import duties; and the logistical risk of shipping fragile glassware and sensitive liquids.

Opportunities: Transitioning into private label manufacturing for hardscape and fertilizers to reduce costs; and expanding into B2B commercial installations for stress-relief environments in corporate offices and hospitals.

99 Still Water Aquariums India LLP



Founder	Naga Mayur Dev, Subin Saji Mathews, and Vaishali Subin Mathews.
Established year	Brand operations started in 2004; formally incorporated as an LLP on November 6, 2020.
Location	Headquartered in Bengaluru, Karnataka (Project Office & Gallery) with its registered office in Mulund West, Mumbai.

Company Overview

Still Water Aquariums India LLP, widely known by its brand Still Water Aquatics, is a premier name in high-end aquatic ecosystem design, engineering, and distribution. Since its inception in 2004, the firm has been a pioneer in bringing the Nature Aquarium philosophy to the Indian subcontinent. It operates as the exclusive distributor for Aqua Design Amano (ADA, Japan) across India, Nepal, Bangladesh, Sri Lanka, and the Maldives. The company is renowned for blending Japanese design sensibilities with rigorous biological engineering to create living art for luxury residences, corporate lobbies, and public spaces.

Sector/Domain: Aquatic Eco-System Design, Luxury Retail, and Wholesale Distribution.

Core Innovation & Design Philosophy

The company's differentiation lies in its Design-Led Engineering approach to complex aquatic systems:

- The Amano Legacy: Still Water is the primary guardian of Takashi Amano's Nature Aquarium concept in India, focusing on sustainable, biologically balanced setups that mimic natural landscapes.
- Large-Scale Engineering: Specialized in high-volume aquatic projects, having managed over 8.5 million liters of water across iconic installations in malls, hospitals, and hotels.
- Biosecure Maintenance: Developed proprietary operation and maintenance (O&M) protocols that ensure the long-term health of rare aquatic flora and fauna with minimal consumer effort.

Core Offerings & Business Model:

- B2B & B2C Project Delivery:

  Nature Aquarium Design: Bespoke, theme-based underwater landscapes for HNWIs (High Net-Worth Individuals) and corporate lobbies.

  Koi Ponds & Public Exhibits: End-to-end structural design, waterproofing, and life-support system (LSS) installation for large-scale water bodies.

- Premium Retail & Wholesale:

  Global Brand Distribution: Exclusive wholesale of ADA products to a network of certified retailers across South Asia.

  Aquatic Inputs: Retail of high-vitality exotic fish, rare water plants, and specialized Nature inputs (stones, driftwood, and specialized additives).

- Managed Services (AMC):

  Ecosystem Care: Recurring revenue through Annual Maintenance Contracts, providing expert-led health checks, pruning, and water quality optimization.

Challenges & Opportunities:

Challenges: Maintaining a highly specialized, certified workforce capable of executing Amano-style designs; and the logistical hurdle of distributing fragile glassware and live specimens across international borders in the subcontinent.

Opportunities: Expanding the E-commerce footprint to capture the growing home-office decor trend; and diversifying into proprietary R&D (e.g., specialized Fish Tummy Wash and indigenous supplements) to create high-margin, Made in India alternatives to global imports.

Zebrafish India Research Solutions 100

Founder	Rajat Gupta (Founder & CEO). The leadership team includes Omswaroop Gupta (Technical Head) and Shalu Yadav (Client Relations & Lab In-Charge).
Established year	Online blog presence started in 2009; retail operations established as early as 2003
Location	Headquartered in Navi Mumbai, Maharashtra, with strategic service hubs in Delhi, Kolkata, Raipur, and Mumbai.

Company Overview

Zebrafish India Research Solutions, branded as ZeBRAMATSYA BHARAT, is a pioneering biotechnology and research infrastructure firm dedicated to the Matsya-to-Medicine (Fish-to-Medicine) model. The company specializes in the design, manufacturing, and maintenance of indigenous zebrafish housing and research systems. By providing affordable, world-class alternatives to expensive imported equipment, Zebrafish India empowers Indian academic and industrial laboratories to conduct high-level genetic, toxicological, and neuroscientific research.

Sector/Domain: Bio-Tech, Research Infrastructure, Laboratory Automation, and Life Sciences.

Core Innovation & Research Tools

The company's primary innovation is the localization and optimization of the Recirculating Aquaculture System (RAS) for high-precision laboratory environments:

- Indigenous RAS Housing: Developing 4-tier, 40-tank standalone systems that feature automated filtration and environmental controls, specifically designed for Indian laboratory conditions.
- Neuro Zeb & Nutri Zeb: Specialized initiatives focused on neurobehavioral studies and Nutri Zeb feed, an indigenous, high-digestibility formulation that ensures water clarity and optimal fish health.
- Tech-Integration: Collaborating with global leaders like GENDANIO (Taiwan) for housing and Noldus IT (Netherlands) for AI-powered behavioral monitoring to offer a blended Global Tech, Local Price solution.

Core Offerings & Service Portfolio:

- Laboratory Hardware:

  Zebrafish Housing: Standalone and multi-tier RAS systems with built-in UV sterilization and carbon filtration.

  Microinjection Units: Precision tools for CRISPR/Cas9 genome editing and transgenic fish development.

- Biological & Genetic Resources:

  Standard & Mutant Strains: Supplying healthy, in-bred, and pathogen-free zebrafish lines (Wild Type, Transparent, etc.) for reproducible research.

  Reagents: Antibodies, ELISA kits, and molecular biology tools tailored for zebrafish studies.

- Advanced Monitoring:

  Imaging Systems: Stereo microscopes and behavioral tracking software for drug efficacy and toxicity screening.

- Capacity Building:

  Zeb Careers: Structured training programs and workshops for young scientists and lab technicians to bridge the talent gap in zebrafish husbandry.

Business Model & Impact:

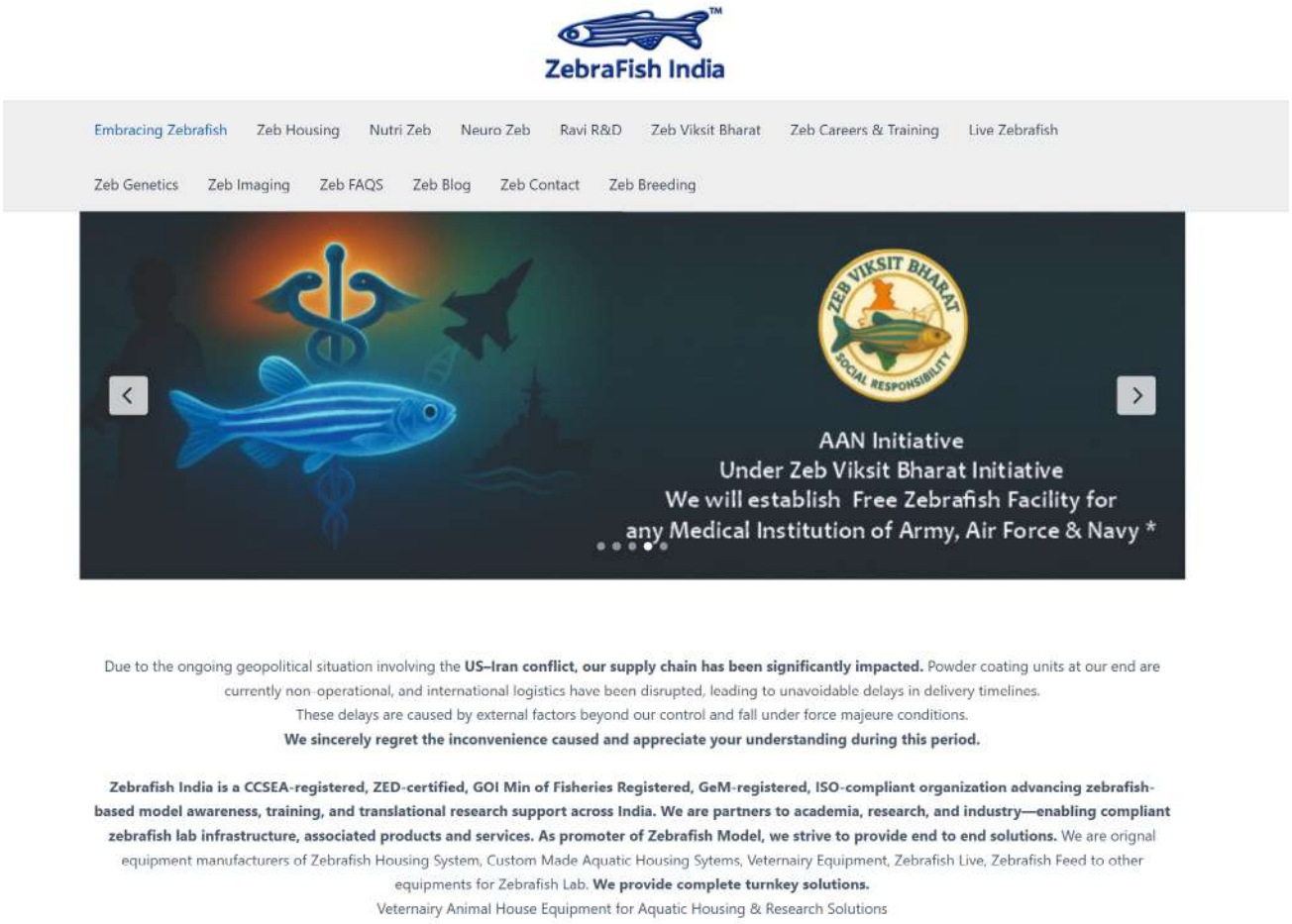
- B2G & B2B Partner: Acts as a trusted supplier on the Government e-Marketplace (GeM) and a strategic partner for Institutes of Eminence (IITs, IISERs, and Medical Colleges).
- Facility Development: The firm has successfully established over 12 zebrafish facilities across India, providing end-to-end support from blueprint design to ethical committee (IAEC) clearance guidance.

- Revenue Model: Diversified streams from hardware sales, annual maintenance contracts (AMC), supply of live biologicals, and specialized technical consultancy.

Challenges & Opportunities:

Challenges: Meeting the extreme precision required for micro-surgical research tools while maintaining affordability; and navigating the complex regulatory landscape of animal research transport.

Opportunities: Transitioning into a full-scale CRO (Contract Research Organization) for the pharmaceutical industry; and leveraging Make in India to export high-quality housing systems to research hubs in South East Asia and Africa.



Due to the ongoing geopolitical situation involving the **US–Iran conflict, our supply chain has been significantly impacted.** Powder coating units at our end are currently non-operational, and international logistics have been disrupted, leading to unavoidable delays in delivery timelines.
These delays are caused by external factors beyond our control and fall under force majeure conditions.
We sincerely regret the inconvenience caused and appreciate your understanding during this period.

Zebrafish India is a CCSEA-registered, ZED-certified, GOI Min of Fisheries Registered, GeM-registered, ISO-compliant organization advancing zebrafish-based model awareness, training, and translational research support across India. We are partners to academia, research, and industry—enabling compliant zebrafish lab infrastructure, associated products and services. As promoter of Zebrafish Model, we strive to provide end to end solutions. We are orignal equipment manufacturers of Zebrafish Housing System, Custom Made Aquatic Housing Sytems, Veternairy Equipment, Zebrafish Live, Zebrafish Feed to other equipments for Zebrafish Lab. **We provide complete turnkey solutions.**
Veternairy Animal House Equipment for Aquatic Housing & Research Solutions

Naturemark Zoetech Private Limited 101

Founder	Shiva Kiran Alva (Director) and Mohammed Saif Kadar Hasmani (Director). The board also includes Ali Abbas Jamal Asgar Khan, Deepak Sebastian Pinto, and Zenobia Aguiar.
Established year	March 27, 2025.
Location	Headquartered in Mangalore, Karnataka, with R&D operations based at the NITTE-GOK Center of Excellence in Aquamarine Innovation.

Company Overview

NatureMark Zoetech is an innovation-led deep-tech startup dedicated to the Smart Aquatic Care revolution. Incubated at the prestigious NITTE-GOK Center, the company leverages IoT (Internet of Things) and AI-driven analytics to modernize aquaculture and ornamental fisheries. Their mission is to eliminate the inefficiencies of manual feeding and environmental monitoring, which often lead to high mortality rates and feed wastage. By providing a Digital Nervous System for ponds and aquaria, NatureMark Zoetech helps farmers achieve higher yields with precision technology, aligning with the global shift toward sustainable and automated Smart Farming.

Sector/Domain: Agri-Tech, IoT (Internet of Things), Aquaculture Automation, and Smart Water Management.

Core Innovation & IoT Ecosystem

The company's competitive edge lies in its integrated hardware-software stack, which replaces guesswork with real-time data:

- Smart Feeding System: An IoT-enabled feeder that allows for species-specific, remote-controlled feeding cycles. It uses an app-based interface to adjust dosages, significantly reducing bottom-waste and ammonia spikes caused by overfeeding.
- Zoetech App Ecosystem: A centralized mobile dashboard that provides real-time alerts and historical growth logs, allowing users to manage multiple tanks or ponds from a single smartphone.
- Precision Dispersion: Unlike basic vibration feeders, their commercial-grade units feature adjustable dispersion ranges to ensure even feed distribution across large-scale shrimp or fish ponds.

Core Products & Solutions:

- Commercial Aquaculture Feeder: A high-capacity, ruggedized automated system designed for industrial-scale fish and shrimp farming.
- Smart Aquarium Feeder: A compact, aesthetically designed unit for home hobbyists and ornamental fish exporters, focusing on precision and ease of use.
- Water Quality IoT Hub: A multisensor probe system that tracks critical parameters such as Dissolved Oxygen (DO), pH, and Temperature, sending instant notifications to the user if levels deviate from the optimal range.
- Data Analytics: Provides actionable insights by correlating feeding patterns with environmental changes, helping farmers predict harvest windows more accurately.

Strategic Affiliations & Funding:

- NITTE-GOK Incubation: Backed by the Government of Karnataka's Center of Excellence in Aquamarine Innovation, providing the startup with access to high-end marine testing labs and academic expertise.
- Investment: Recently secured early-stage incubation funding to accelerate the transition from prototype to market-ready hardware.

Challenges & Opportunities:

Challenges: Ensuring ruggedized durability of electronic sensors in the high-salinity and humid environments of coastal shrimp farms; and overcoming the digital divide for rural farmers with limited internet connectivity.

Opportunities: Integrating Solar Power for 100% off-grid operation; and utilizing Computer Vision to track fish size and movement, creating a fully autonomous feeding loop based on actual hunger levels.

National Institute of Agricultural Extension Management (MANAGE)

The National Institute of Agricultural Extension Management (MANAGE), Hyderabad, is an autonomous organization under the Ministry of Agriculture and Farmers Welfare, Government of India. Established in 1987, MANAGE serves as a premier national institute dedicated to capacity building, policy advocacy, and strengthening agricultural extension systems in the country. The institute plays a pivotal role in developing human resources, promoting agri-entrepreneurship, market-led extension, and the integration of modern technologies in agriculture and allied sectors. Its core mandate is to build competencies among extension professionals, agripreneurs, and other stakeholders through need-based training, academic programs, and knowledge-sharing platforms. Through its various initiatives and partnerships, MANAGE contributes to improving farm productivity, enhancing farmers' income, strengthening the overall agricultural ecosystem, and advancing sustainable and inclusive growth in the sector.

www.manage.gov.in

101 Inspiring Startups in Fisheries

101 Inspiring Startups in Fisheries presents a curated collection of innovative and emerging startups that are transforming India's fisheries and aquaculture sector through entrepreneurship, technology, sustainability, and market-driven solutions. The book showcases startups working across diverse domains including Seaweed, Precision Aquaculture, Supply Chain & Value-Chain, Farm Management, Intensive Production Systems, Digital Marketplaces, Aquatic Feed Supplements, Maritime Intelligence and Ornamental Fisheries. As India continues to strengthen its blue economy, these startups demonstrate how innovation and enterprise are creating new opportunities for employment generation, value addition, productivity enhancement, and sustainable sectoral growth. The featured startup stories highlight unique business models, emerging technologies, and inspiring entrepreneurial journeys, making this compendium a valuable resource for students, researchers, entrepreneurs, incubators, policymakers, and stakeholders interested in the evolving fisheries startup ecosystem in India.

MANAGE - Fisheries Innovation and Startup Hub (MANAGE-FISHub)

MANAGE-Fisheries Innovation and Startup Hub (MANAGE-FISHub) is a national-level incubation platform hosted at the National Institute of Agricultural Extension Management (MANAGE). Established in 2025 with the support of the Department of Fisheries (DoF), Ministry of Fisheries, Animal Husbandry and Dairying (MoFAHD), Government of India, to strengthen the fisheries and aquaculture sector through entrepreneurship, technology adoption, and ecosystem development. The core objective of MANAGE-FISHub is to support aspiring aquapreneurs and startups by providing incubation, capacity building, mentoring, and facilitating access to technology, finance, and market linkages across the fisheries value chain. The initiative promotes technology-driven enterprises, strengthens the startup ecosystem, and enables sustainable and scalable aquaculture ventures. These efforts contribute to employment generation, value addition, and the overall growth of the fisheries startup ecosystem, while supporting the vision of the Blue Economy in the country. This publication presents success stories of fisheries startups emerging from such ecosystems, highlighting their role in driving innovation, entrepreneurship, and sustainable enterprise development in the fisheries sector. (https://www.manage.gov.in/managefishub/)

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