



# **TAPPING THE BLUE REVOLUTION: UNLOCKING NORTHEAST INDIA'S AQUAPRENEURSHIP POTENTIAL THROUGH VALUE CHAIN OPTIMIZATION**

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# ABSTRACT

The Northeastern region of India, renowned for its diverse cultures and natural riches, boasts abundant water resources that have long been intertwined with the lives and livelihoods of local communities. With an estimated 95% of the population being fish consumers, the demand for fish remains high in this region. However, the region currently utilizes less than 30% of its potential area for inland fish production, leading to a significant reliance on imports to meet the rising demand. States like Manipur spend over Rs. 300 crore annually on fish imports, highlighting the untapped opportunities for local entrepreneurship in aquaculture and fish-based farming. The article highlights government initiatives like Pradhan Mantri Matsya Sampada Yojana and regional schemes catalyzing aquapreneurship. Success stories showcased modern techniques generating 6-8.5 tons/hectare, integrated ornamental fish farms, biofloc farming systems, and the multi-million dollar potential of the fermented fish industry. Strategic solutions are proposed to address infrastructure gaps, regulatory compliance hurdles, and skills development needs – paving the way for Northeast India's "Blue Revolution" that meets the region's high fish consumption demand through local entrepreneurship.



# INTRODUCTION

The fertile waters of Northeast India hold a wealth of opportunity for aspiring entrepreneurs in the realm of aquaculture and fish-based farming. This picturesque region, blessed with abundant water resources and a rich tapestry of cultures, presents a canvas for fostering sustainable livelihoods, ensuring food security, and driving economic growth through the development of innovative aquaculture ventures.

In a world where the demand for fresh fish continues to rise, and concerns over environmental sustainability grow, the potential of aquaculture as a viable business avenue cannot be overstated. Recognizing this potential, the Indian government has placed a concerted emphasis on the development of the fisheries sector, particularly in the Northeastern states, through initiatives like the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and the Regional Aquaculture Mission.

This article explores the entrepreneurial opportunities that abound within the aquaculture and fish-based farming sectors of Northeast India, through the lens of the value chain approach. By examining each stage of the value chain, from primary production to processing, marketing, and distribution, we uncover the myriad possibilities for innovation, value addition, and sustainable business growth.

# SETTING THE STAGE: NORTHEAST INDIA'S AQUACULTURE POTENTIAL

Northeast India's abundant natural resources, favorable climate, and diverse topography make it an ideal location for aquaculture and fishery-based farming activities. The region boasts a wealth of water bodies, including rivers, canals, reservoirs, ponds, tanks, beels, oxbow lakes, and derelict water bodies, accounting for a significant portion of India's total water resources. According to the Handbook of Fishery Statistics (2020), the region accounts for 16.91% of the country's rivers and canals, 0.15% of small reservoirs, 0.69% of medium and large reservoirs, 1.63% of ponds and tanks, 38.16% of beels/oxbow lakes/derelict water bodies, and 55.09% of other water bodies.

These abundant water bodies, coupled with the warm and humid climate, provide

ample opportunities for inland aquaculture ventures catering to diverse market segments and consumer preferences. However, it is disconcerting to note that the region has not yet fully utilized even 30% of its potential area for inland fish production, underscoring the untapped potential waiting to be harnessed by enterprising individuals and businesses.

Further, it is disconcerting to note that despite the abundant resources, a significant portion of the region's fish demand is currently met through imports from other states and neighboring countries. According to reports, states like Manipur, Tripura, and Meghalaya allocate substantial funds annually for fish imports. For instance, Manipur's annual expenditure on fish imports exceeds Rs. 300 crore, while Tripura allocates Rs. 100 crore



annually for fish imports from various regions across the country and Bangladesh. Meghalaya imports over 21,000 MT of fish, and Assam daily imports 25 to 35 MT of fish from Andhra Pradesh, West Bengal, and Uttar Pradesh. This reliance on external supplies not only strains the region's economy but also raises concerns over food safety, quality control, and the introduction of transboundary pathogens and formalin adulterated fish. The potential for local production to meet domestic demand highlights the untapped opportunities waiting to be harnessed by enterprising individuals and businesses.



## THE AQUACULTURE VALUE CHAIN: A BLUEPRINT FOR SUCCESS

The fish and fishery products value chain encompasses a series of interconnected activities that transform raw materials into final products for consumption. By analyzing and optimizing each stage of the value chain, entrepreneurs can identify opportunities, address bottlenecks, and create sustainable, profitable businesses.

### **1. Primary Production: Aquaculture or Fish Farming**

The primary production stage, which involves the cultivation and harvesting of aquatic organisms, forms the foundation of the aquaculture value chain. Northeast India offers numerous opportunities for entrepreneurs to establish and operate successful aquaculture farms, ranging from small-scale backyard operations to large-scale commercial ventures.

Potential areas for entrepreneurship in aquaculture encompass a variety of lucrative avenues. These include fish breeding and quality seed production, table fish production, ornamental fish farming, integrated aquaculture, aquaponics, organic fish farming, and biofloc fish farming.

Each of these avenues offers distinct opportunities to serve diverse market segments, capitalize on the region's natural resources, and embrace sustainable practices.

According to a model project analysis (Table 1), a one-hectare fish pond can yield a net benefit of Rs. 302500/- with a benefit-cost ratio of 1.8, showcasing the profitability potential of aquaculture ventures in the region.

Particulars	Unit Rate (Rs.)	Quantity	Amount (Rs.)
Capital cost			
1. Land			Own
2. Site development (pond construction, bund making, inlet, outlet making etc)	LS		100000.00
3. Store room	LS		15000.00
4. Diesel pump set (3HP)	LS		20000.00
5. Nets and other implements	LS		10000.00
6. Miscellaneous	LS		5000.00
Total (A)			200000.00
Working capital (one production cycle)			
1. Fish seed	2	10000	20000.00
2. Fish feed	30	10000	300000.00
3. Lime	15	500	7500.00
4. Inorganic fertilizers	10	1000	10000.00
5. Cattle manure	1	10000	10000.00
6. Security, watch and ward, etc			25000.00
Total (B)			372500.00
Total cost of the project (A+B)			572500.00
Income (C)			
Table fish (90% survival)	4500 kg	150	675000.00
Net benefit (C-B)			302500.00
Benefit-cost ratio (C/B)			1.8

In the context of organic farming, Northeast India boasts many areas that are organic by default. This presents excellent prospects for organic fish farming, offering greater income potential to entrepreneurs.

## 2. Processing and Packaging

The processing and packaging stage plays a crucial role in adding value to fish and fishery products, enhancing their shelf life, and facilitating efficient transportation and distribution. Processing units employ various techniques, such as filleting, freezing, canning, smoking, and packaging, to enhance the products' appearance, taste, texture, and nutritional value, thereby increasing their appeal and marketability.

Maintaining stringent quality standards and obtaining relevant certifications, such as Hazard Analysis and Critical Control Points (HACCP), Good Manufacturing Practices (GMP), and organic certifications, is paramount in the fish processing sector. Compliance with these certifications instills consumer confidence, enables market differentiation, and facilitates access to premium markets.



**Value added fish product development under ABI project in ICAR NEH, Meghalaya**

### **3. Marketing and Distribution**

Effective marketing and robust distribution channels are critical for entrepreneurial success, ensuring fish and fishery products reach end consumers efficiently while maximizing profitability. This stage offers opportunities for innovation and strategic thinking, such as branding and product differentiation, direct marketing, export promotion, and leveraging e-commerce platforms.

An efficient distribution network, comprising traditional markets, modern retail channels, export channels, and robust cold chain infrastructure, is key to ensuring timely delivery of fresh, quality products to markets. Collaborating with farmer producer organizations (FPOs), logistics providers, and marketers ensures better resource pooling, economies of scale, and stronger market linkages for entrepreneurs.



# GOVERNMENT SUPPORT AND INITIATIVES

Recognizing the immense potential of the fisheries and aquaculture sectors for economic growth, employment generation, and nutritional security, the Indian government has prioritized their development through various initiatives, policies, and financial support schemes.

The Pradhan Mantri Matsya Sampada Yojana (PMMSY) aims to bring about a second blue revolution through sustainable and responsible development of the fisheries sector, providing support for aquaculture entrepreneurs through subsidies, pilot projects, and investments in processing, value addition, branding, and marketing. Very recently, the government approved the 'Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY)', a Central Sector Sub-scheme under the PMMSY for formalization

of the fisheries sector and supporting fisheries micro and small enterprises.

Additionally, regional initiatives like the Regional Aquaculture Mission and state government programs offer subsidies, training opportunities, and support for infrastructure development, further fostering entrepreneurship in the aquaculture value chain. Several NE states have schemes offering subsidies for fish seeds, fish feeds, training, machinery, and working capital for fish farmers and entrepreneurs. For example, Chief Minister's Swarojgar Pariwar Yojana (CMSPY), Chief Ministers' Swanirbhar Parivar Yojana (CMSPY) in Tripura, Meghalaya State Aquaculture Mission (MSAM), Mega Mission called Chief Minister Samagra Gramya Unnayan Yojana (CMSGUY) in Assam, among others.



# CHALLENGES AND SOLUTIONS

Despite the immense potential and government support, several roadblocks impede entrepreneurship development in the aquaculture and fisheries sector across Northeast India. These challenges include infrastructure and logistics hurdles, limited market linkages, quality and regulatory compliance issues, skill gaps, sustainable resource management concerns, and a lack of critical inputs like seeds and feed. Addressing these multifaceted challenges

requires a collaborative, multi-stakeholder approach involving the government, private sector, research institutions, and local communities. Proposed solutions include infrastructural upgradation through public-private partnerships (PPPs), strengthening of FPOs, establishment of a robust market intelligence system, streamlining of regulatory processes, promoting industry-academia collaborations, incentivizing sustainable practices, and fostering an enabling policy environment.





# SUCCESS STORIES: BEACONS OF INSPIRATION

Amidst the challenges, numerous success stories have emerged from the aquaculture and fisheries sector in Northeast India, showcasing the resilience, innovation, and entrepreneurial spirit of individuals and communities. These inspiring tales serve as beacons of hope and motivation for aspiring entrepreneurs.

The remarkable transformation of Jokapura village near Gohpur town in Assam, where Anup Sarmah's visionary fish farming

initiative has empowered local families and catered to 20% of the fish consumption needs of the Gohpur sub-division, which has a population of about five lakh people, exemplifies the transformative power of community engagement and perseverance.

Similarly, Yarangjang Imchen's ornamental fish breeding venture in Nagaland and Shri Salam Rohendro Singh's successful fish farming venture in Manipur, yielding 6 to 8.5 tons per hectare in a seven-month period,



Fermented fish products (Photo taken in Tripura by Mr. P. Mahanta, ICAR NEH)

showcase the potential for innovation and the adoption of modern aquaculture techniques in transforming rural livelihoods.

Mr. Abul Basar's biofloc farming venture in Tripura serves as a testament to the transformative power of innovative techniques. As the first person to demonstrate the possibility of carp culture in a biofloc system, Mr. Basar has not only found success in cultivating high-value fish species but has also paved the way for others

to explore this sustainable approach.

The fermented fish industry of Northeast India, renowned for products like Shidal and Nonalish, presents a lucrative entrepreneurship opportunity, leveraging the region's rich culinary heritage and the growing demand for unique, high-value products. Despite the challenges posed by the pandemic, the surge in demand for Shidal during the lockdown period highlighted its potential as a resilient and marketable product.

## CONCLUSION

The fishery sectors in Northeast India hold immense potential for entrepreneurship development, contributing to economic growth, food security, and sustainable livelihoods. Adopting a value chain approach can help entrepreneurs identify opportunities, address bottlenecks, and create sustainable businesses by optimizing activities from production to marketing and distribution.

As demand for sustainable and ethically-sourced aquaculture products grows, entrepreneurs can capitalize on emerging trends by adopting best practices, obtaining relevant certifications, and exploring innovative approaches like aquaponics and integrated multi-trophic aquaculture. Furthermore, the region's rich culinary heritage, such as the fermented fish industry, presents an opportunity for entrepreneurs to develop unique, high-value products catering to global markets. By leveraging the region's biodiversity and traditional knowledge, entrepreneurs can create a niche for themselves while preserving and promoting the cultural identity of Northeast

India.

Ultimately, fostering an entrepreneurial culture in the aquaculture and fish-based farming sectors of Northeast India requires a supportive ecosystem, access to resources, and an enabling policy environment through multi-stakeholder collaboration. By embracing the value chain approach and leveraging the region's rich potential, aspiring entrepreneurs can unlock a world of opportunities, driving sustainable growth, and contributing to the region's overall economic and social progress.

The road ahead may be challenging, but the success stories that have emerged from the region serve as inspiration and a testament to the resilience and determination of the people of Northeast India. With the right support, innovation, and commitment to sustainable practices, the aquaculture and fish-based farming sectors can pave the way for a prosperous and self-reliant future, ensuring food security and sustainable livelihoods for generations to come.