Shrimp farming in India: A Blue Finance opportunity

A strategic financing playbook for sustainable aquaculture investment

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Abstract

The Blue Finance playbook, developed through extensive research and collaboration with industry leaders, outlines a strategic pathway for sustainable and profitable shrimp aquaculture in India. It leverages Blue Finance mechanisms to address critical challenges, unlocking the sector's full potential while advancing environmental stewardship and economic prosperity.

The opportunity

India is the world's second-largest aquaculture producer, with annual shrimp production exceeding one million metric tons and export values of over $4.9 billion (Marine Products Export Development Authority, 2024). The livelihoods of hundreds of thousands of people, as well as the stability of local economies, depend on this sector. Despite its impressive scale, the sector faces deep structural challenges. These include heavy reliance on informal credit; environmental risks; supply chain inefficiency; price volatility; and persistent export dependence on a small range of markets, especially the United States.

1 MILLION+
METRIC TONS
India's annual shrimp aquaculture production

$4.9 BILLION
Total export value in 2024

70%
Eastern states' share of national output

Andhra Pradesh is India's shrimp powerhouse, producing 815,745 metric tons in 2022–23 from 108,000 hectares (ha) under cultivation, closely followed by Odisha (18,000 ha) and West Bengal (95,000 metric tons) (Table 1). Together, these three eastern states generate over 70% of national output (Statista, 2024).

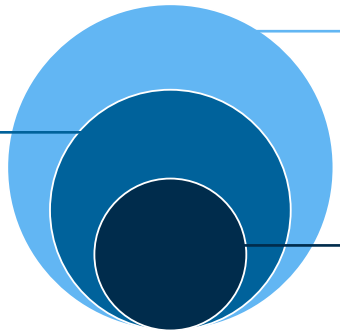
Table 1. Shrimp production in eastern India, by state (2022–23).

State	Production (metric tons)	Area (ha)
Andhra Pradesh	815,745	108,000
Odisha	Not available	18,000
West Bengal	95,000	Not available

Blue Finance: driving sustainable aquaculture

- Opportunities for lenders: Forge strategic partnerships with farmers and industry leaders to drive innovation and scale sustainable aquaculture practices. Investments can unlock new growth opportunities while ensuring long-term financial and environmental returns.
- Opportunities for farmers: Embrace eco-friendly technologies and responsible farming methods to build resilience, protect resources, and meet the rising demand for sustainable seafood.
- Benefits for both: Strategic investments in market access and value chain optimization will open doors to India's expanding domestic markets and lucrative export opportunities, creating shared value for all stakeholders.

Recent regulatory, ecological, and market shifts—including the imposition of a 50% U.S. tariff in August 2025—have resulted in an estimated 15–18% decline in India's shrimp export volumes. This highlights the vulnerability of an export-dependent system and underscores the urgent need for diversification, innovation, and resilient financial mechanisms (S&P Global Commodity Insights, 2025).



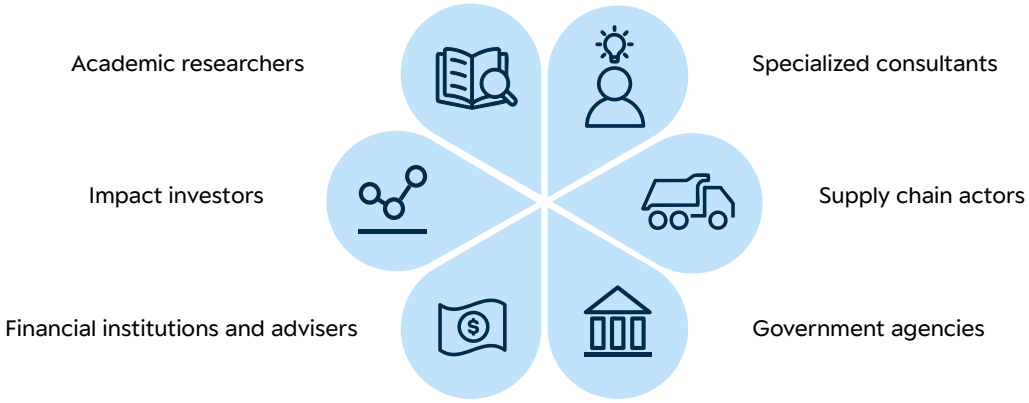
MARKET EXPANSION
Ensuring broad market access for all products

CORE OPERATIONS
Sustainable technology, responsible farming, and strategic partnerships

VALUE CHAIN GROWTH
Fostering growth throughout the entire value chain process

Stakeholder ecosystem and partnership framework

Addressing the critical financial inclusion challenges within India's shrimp sector requires a robust multi-stakeholder ecosystem. It hinges on collaboration among diverse entities, including primary partners such as supply chain actors, academic researchers, sustainable finance institutions and advisers, and supply chain advisers who bring specialist expertise. Government regulatory agencies, such as the Marine Products Export Development Authority and the Department of Fisheries, play a crucial role in policy and oversight. On the financial front, the landscape is shaped by non-banking financial companies, commercial banks, insurance companies, development finance institutions, and impact investors. Additionally, strategic advisory firms provide guidance on market dynamics and operational efficiency, while international bodies contribute through development initiatives, funding, and global best practices, all working toward enhancing financial access and sustainability.



Operational and market risks

The Indian shrimp sector presents a complex landscape of strengths and risks, which simultaneously define its investment opportunities. Smallholder farmers are disproportionately reliant on informal credit extended by feed dealers and other supply chain actors. This cycle of dependency may limit their access to optimal inputs, lead to less favorable contract terms, and impact market competitiveness. However, it also presents an opportunity for the financial sector to address the consolidated demand from smallholder farmers.

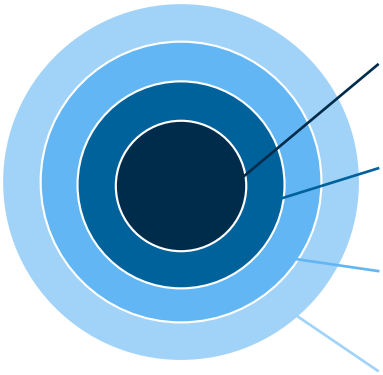
Photo 1. Shrimp trading in action. Photo: Amey Bane / iStock.com.

HIGH OPERATIONAL RISKS:

- Outbreaks of shrimp diseases such as White Spot Syndrome Virus and others present the greatest threat to farmer livelihoods due to additional costs for disease management in the ponds, early harvesting of shrimp, or mortality of entire shrimp stock (Mandal and Duyari, 2024).
- The push for higher yields may lead to unsustainable chemical usage, increasing costs and environmental risks.
- Weak farm-level governance, alongside fragmented, small-scale, and inconsistent record-keeping, create challenges for financial planning and access to premium export markets.

COMPELLING INVESTMENT OPPORTUNITIES:

Addressing structural barriers can unlock significant economic value while improving livelihoods and building sustainable food systems. Technology platforms enabling digital transactions, 'Internet of Things' (IoT)-based monitoring for water and crop health, and insurance products tailored to smallholder realities all have high potential for reducing risks and increasing sustainable production.



DIGITAL PLATFORMS
Enabling e-wallets and secure digital transactions

IOT MONITORING
Utilizing sensors for real-time data collection

TAILORED INSURANCE
Providing customized protection against business risks

CLIMATE ADAPTATION
Focusing on renewable energy and sustainability

Blended finance—combining public guarantees, concessional funding, and private investments—has emerged as an accelerator, especially for clusters and Farmer Producer Organizations, who otherwise struggle to access formal credit. Multi-stakeholder partnerships are necessary not only for funding but also for building data infrastructure, traceability, and educational resources for both farmers and lenders.

Strategic objectives and value creation

The Blue Finance Playbook approach is built around four interconnected objectives:

01

CAPITAL ACCESS ENHANCEMENT
Moving beyond collateral-based lending, the focus is on activity- and group-based lending with innovative underwriting models. This leverages operational, digital, and cluster-level data to expand the reach of formal credit, especially for farmers on leased land or lacking formal tenure.

02

INSTITUTIONAL CAPACITY BUILDING
Both farmers and financiers benefit from comprehensive training and new digital tools. For farmers, this means business management, financial literacy, and verification of sustainable farming practices. For lenders, capacity building is about integrating aquaculture-specific risk assessment and performance tracking into their credit offerings.

03

SUSTAINABILITY INTEGRATION
Sustainability is embedded in the approach, with finance terms tied to verified environmental and social outcomes. Preferential credit and insurance rates are offered for demonstrated compliance with biosecurity, reduced chemical usage, and traceable adoption of better management practices.

04

MARKET DEVELOPMENT
Expansion of accessible, group-level verification and assurances (through platforms like Monterey Bay Aquarium's Verification Platform at seafoodwatch.org/our-projects/verification-platform) enables market differentiation.

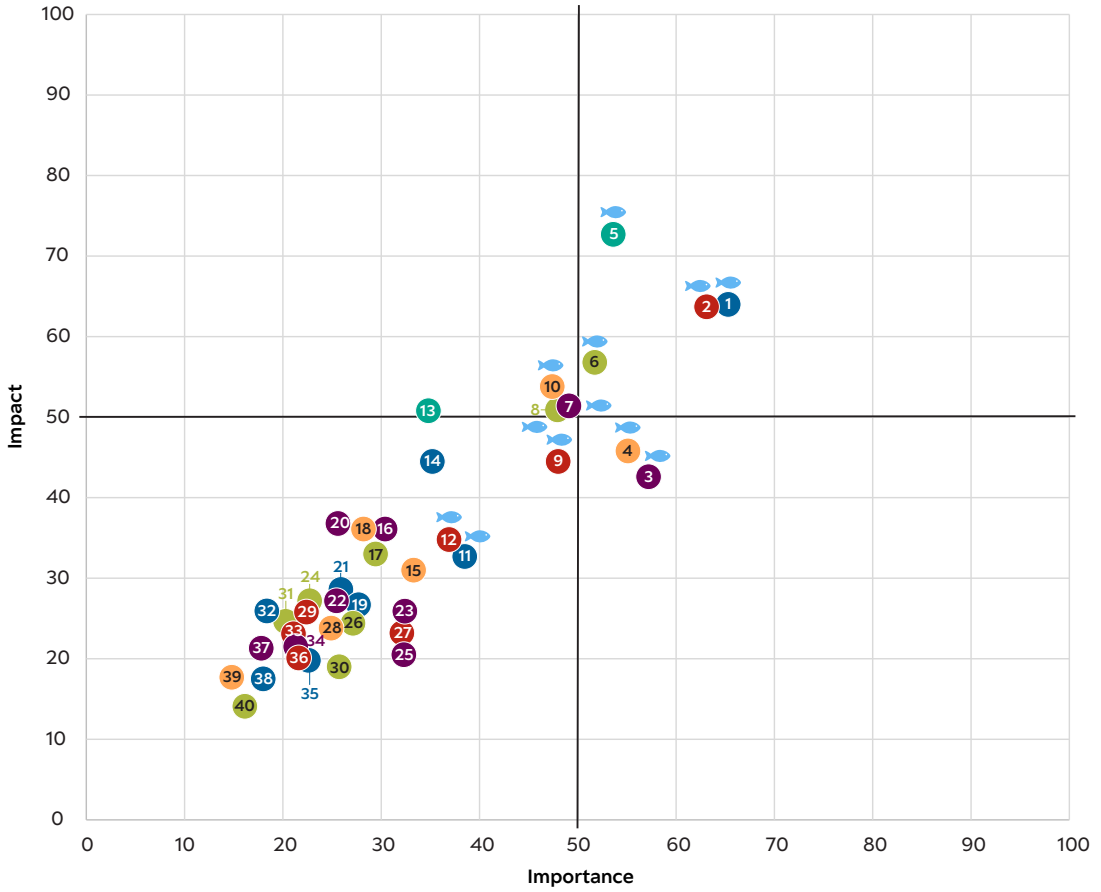
Integration of digital record-keeping and transparency empowers clusters and Farmer Producer Organizations to capture value from premium buyers and participate in international sustainable seafood supply chains.

Blue Finance performance framework

In 2025, Monterey Bay Aquarium carried out a materiality assessment to define the sector's core metrics—those that are most important for lenders, investors, and compliance agencies. These are mapped in the materiality assessment matrix below, and include:

- **Economic:** true net farmer income, profitability after costs and debt service, and access to affordable inputs
- **Environmental:** water quality, effluent and waste management, biodiversity indices, and compliance with pollution standards
- **Social:** labor audits, gender inclusion, worker health and safety, and community benefit
- **Production:** survival and mortality rates by pond type, productivity per hectare, disease outbreak response, and benchmarked record-keeping

Core performance metrics: materiality assessment matrix



Cross-cutting items
Economic metrics
Environmental metrics
Farm health & animal welfare
Management metrics
Social metrics

1 True farmer income
2 Labor rights and modern slavery prevention
3 Environmental permit compliance
4 Mortality and survival rates
5 Ocean health
6 Biodiversity conservation and ecosystem protection
7 Social and environmental impact
8 Water quality and effluent management
9 Worker safety and fair conditions
10 Animal welfare and husbandry practices
11 Production costs
12 Labor protection compliance
13 Renewable energy access
14 Farm financial returns
15 Disease prevention protocols
16 Full traceability systems
17 Chemical and antibiotic usage
18 Biosecurity protocol compliance
19 Financial system access
20 Certification standards (ASC/BAP)
21 Yield and productivity metrics
22 Smallholder certification
23 Food safety
24 Energy consumption
25 Food safety certification maintenance
26 Nitrogen/phosphorous discharge
27 Safety incident rates
28 Feed storage and handling losses
29 Access to reliable electricity
30 Responsible sourcing and use of feed and other inputs to reduce environmental footprint
31 Prevention of escapes
32 Production efficiency
33 Women's workforce participation
34 Confirmation of verification
35 Feed Conversion Ratio (FCR)
36 Support for freedom of association and positive engagement with local communities
37 Stakeholder engagement effectiveness
38 Market premiums for certified products
39 Technology adoption rate
40 Carbon footprint

Financial instruments

Financial innovation can support the sector's transformative ambitions, giving priority to making capital accessible and affordable to high-risk, underserved farmers. Key financial instruments include:

- **Alternative lending instruments:** Activity-based models, contracts, digital transaction histories, and Farmer Producer Organizations' social collateral serve as proxies for the land- or activity-based collateral required by traditional lending models.
- **Loans:** Loans can cover working capital, pond preparation, seed and feed investment, and technology upgrades (e.g. remote sensors, purification).
- **Sustainability-linked loans:** The interest rates of these loans are indexed to environmental and social performance (e.g. greenhouse gas reduction, certified production, improvements in water quality).
- **Trade finance:** Export and supply chain contracts form the basis of seasonal working capital.
- **Parametric and disease insurance:** These products provide rapid risk payout linked to disease incidence, rainfall, temperature, or flooding events.
- **Blended finance:** Public or concessional guarantees and risk pooling unlock private capital.

Instrument	Description	Key features
Loans	Blue/green/social loans	Pond prep, biosecurity, tech and feed upgrades
Bonds	Blue/green/social bonds	For large-scale projects: e.g. developing sustainable fishing fleets, building marine protected areas, mangrove protection/restoration, or funding large-scale aquaculture infrastructure with clear environmental benefits
Sustainability-linked loans	Products linked to sustainability performance targets and metrics	Incentives include lower rates linked to sustainability performance such as greenhouse gas reduction and water quality improvements
Trade finance	Short-term financing, including supply chain financing and receivables-based lending for exporters	Seasonal contracts, export supply
Parametric insurance	Provides rapid, automatic payouts based on predefined triggers, such as cyclones of certain intensity or specific drops in water quality. Helps farmers recover quickly from disasters without lengthy claims processes	Rapid payouts, climate-linked triggers

Instrument	Description	Key features
Blended finance	Public/concessional funding combined with private funds de-risks private capital	Concessional funds, guarantees, risk pooling
Digital and mobile lending instruments	Mobile banking, electronic Know Your Customer, and digital payment histories make it easier for leaseholder farmers and Farmer Producer Organizations to verify their economic activity, build a credit profile, and obtain funds quickly	Lower barriers to access allows farmers to improve credit standing, access digital payment schemes, and enter into more formal lending and insurance arrangements
Group-level lending	Lending through platforms where clusters can collectively secure financial products and spread financial risk across the pool	Aggregation of demand can lead to greater access to more financial services

Blue Bonds sustainable use of proceeds

Blue Bonds "use of proceeds" criteria are aligned with International Capital Market Association Green Bond Principles and should be aligned with the United Nations Environment Programme Blue Finance Principles. All disbursed capital must demonstrate direct, measurable impact against a set of eligible activities in the following categories:

RENEWABLE ENERGY
Financing for solar energy solutions in aquaculture, including incentives for solar-powered aerators and pumps, and support for village-level solar or renewable energy solutions with battery storage systems, to enhance social and environmental resilience.

WATER QUALITY/BIODIVERSITY
Effluent treatments, habitat restoration, biological filtration systems.

TECHNOLOGY
High-efficiency feed, disease diagnostics, IoT traceability, cold chain and storage improvement.

LABOR/SOCIAL IMPACT
Initiatives that empower women, improve working and safety conditions, and build capacity among local populations.

CLIMATE ADAPTATION
Projects and schemes, including insurance products, that improve resilience to flooding, heatwaves, and extreme weather events.

Use of proceeds is tracked and reported. Third-party assurance ensures compliance and eligibility for green/blue/social finance incentives, such as reduced interest rates or more favorable lending conditions.

Blue Finance Decision Scorecard: measuring impact and performance

To ensure accountability and drive sustainable outcomes, an actionable scorecard framework is essential. The Blue Finance Decision Scorecard outlines **key performance indicators** and **sustainability performance targets** across economic, environmental, social, and production excellence categories, providing a clear mechanism for tracking progress and ensuring compliance with Blue Finance principles.

TRUE FARM INCOME

Category: Economic

Measures actual profitability and financial health of the shrimp farming operation for small-scale farmers.

Outcome: Pass

OCEAN HEALTH

Category: Environmental

Assesses the impact of farming/feed activities on the surrounding marine ecosystem, focusing on long-term ecological balance.

Outcome: Pass

PROFITABILITY

Category: Economic

Direct measure of the financial gain from the operation, critical for investor confidence and operational sustainability.

Outcome: Pass

MORTALITY RATE

Category: Production excellence

Key indicator for biosecurity and farm management efficiency, directly impacting yield and profitability.

Outcome: Pass

BIODIVERSITY CONSERVATION

Category: Environmental

Evaluates efforts to protect and enhance local biodiversity within and around farm sites.

Outcome: Pass

WATER QUALITY

Category: Environmental

Monitors critical parameters (e.g. pH, dissolved oxygen, ammonia) to ensure healthy aquatic environments and minimize pollution.

Outcome: Pass

BIOSECURITY

Category: Production excellence

Measures the implementation of practices designed to prevent the introduction and spread of diseases on the farm, neighboring farms, local communities, and jurisdiction.

Outcome: Pass

LABOR STANDARDS

Category: Social

Ensures fair and ethical treatment of workers, covering wages, working conditions, safety, and prohibition of child labor and any form of modern slavery.

Outcome: Pass

ENVIRONMENTAL PERMITS AND COMPLIANCE

Category: Environmental

Verifies adherence to all local, national, and international environmental regulations and permit requirements.

Outcome: Pass

Each metric is assessed against predefined benchmarks and sustainability performance targets to determine a “Pass” or “Fail” outcome, guiding continuous improvement and responsible investment decisions.

Detailed criteria for key performance indicators

MORTALITY RATE TARGETS

- Unfed and non-permanently aerated ponds: **≤75% mortality**
- Fed but non-permanently aerated ponds: **≤55% mortality**
- Fed and permanently aerated ponds: **≤35% mortality**

LABOR STANDARDS (DEFINED BY THE MARINE PRODUCTS EXPORT DEVELOPMENT AUTHORITY'S BETTER MANAGEMENT PRACTICES)

- Employment of local workers with fair wages (in accordance with national laws)
- Provision of essential facilities (accommodation, toilets, safe drinking water)
- Adequate training in implementation of better management practices
- Strict prohibition of child labor

Alignment with international standards

India's Blue Finance sector aligns with the following international sustainability frameworks:

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (SDG)

SDG 2: Zero hunger
SDG 6: Clean water and sanitation
SDG 8: Decent work and economic growth
SDG 14: Life below water
SDG 17: Partnerships for the goals

INTERNATIONAL FINANCE CORPORATION PERFORMANCE STANDARDS

Compliance with environmental and social safeguards and monitoring

INTERNATIONAL CAPITAL MARKET ASSOCIATION GREEN/BLUE BOND PRINCIPLES

Projects meet international standards for eligibility, disclosure, and reporting

SECURITIES AND EXCHANGE BOARD OF INDIA ENVIRONMENTAL, SOCIAL AND GOVERNANCE FRAMEWORKS

Transparent reporting under new Indian regulations enables global capital flow

ASIAN DEVELOPMENT BANK (ADB) OCEAN FINANCE FRAMEWORK

Investments under ADB's Healthy Oceans Action Plan, including ADB's support for ocean projects

Photo 2. Aerial view of an aquaculture pond surrounded by other bodies of water.
Photo: ebin francis / iStock.com.

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Cover image: Shrimp in hand, freshly harvested.
Photo by Biswa1992 via iStock.com.

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