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Marine Product Export From India - Trends And Challenges

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Abstract: ***India, with its extensive coastline of over 8,100 kilometres and a large network of rivers, estuaries, and backwaters, has emerged as a significant player in the global seafood trade. The country offers a diverse range of marine and freshwater species, which are in high demand in global markets. Marine product export plays a crucial role in India's economy by***

- ✓ ***Contributing to foreign exchange earnings***
- ✓ ***Creating livelihoods for millions, especially in coastal regions***
- ✓ ***Enhancing food security and nutrition through protein-rich exports***

The Marine Products Export Development Authority (MPEDA) under the Ministry of Commerce and Industry is responsible for the promotion and regulation of marine exports. Over the past few decades, India has moved from traditional fishing to a more industrialized and aquaculture-driven model, particularly for shrimp, the most lucrative marine export.

India has emerged as one of the world's leading exporters of marine products, driven primarily by the rapid growth of aquaculture and a vast coastal ecosystem. Frozen shrimp remains the cornerstone of exports, with key markets including the United States, China, and the European Union. Strategic interventions, including market diversification, improved disease control, digital traceability, and sustainable aquaculture practices, are essential to unlocking the full potential of India's marine export economy.

I. INTRODUCTION

India is one of the leading exporters of marine products in the world, thanks to its extensive coastline, rich marine biodiversity, and growing aquaculture sector. Marine product exports contribute significantly to the country's foreign exchange earnings and rural employment. The sector includes shrimp, fish, squid, cuttlefish, and crab exports to various global markets, including the USA, EU, China, Japan, and Southeast Asia.

OBJECTIVES OF THE STUDY

- ✓ *To analyze the export trends* of marine products from India over recent financial years, focusing on volume, value, and product mix.
- ✓ *To examine regional contributions* in terms of state-wise marine production and export capabilities.
- ✓ *To identify key drivers* behind India's emergence as a top global seafood exporter.
- ✓ To assess challenges and threats affecting the sustainability and competitiveness of the marine export sector.

II. METHODOLOGY

To analyze the trends and challenges associated with marine products export from India, a *mixed-method approachqualitative* data collection was employed. The methodology followed these key steps:

Extensive secondary research was conducted using the following sources:

GOVERNMENT DATABASES

- ✓ Marine Products Export Development Authority (*MPEDA*) reports
- ✓ Ministry of Commerce & Industry (Export-Import data)
- ✓ Department of Fisheries (Annual reports and policy documents)

INTERNATIONAL TRADE DATABASES

- ✓ UN COMTRADE
- ✓ Food and Agriculture Organization (*FAO*)
- ✓ World Trade Organization *(WTO*) statistics

RESEARCH PUBLICATIONS AND JOURNALS

- ✓ Articles from peer-reviewed journals on aquaculture, marine trade, and fisheries economics
- ✓ Reports from organizations such as ICAR-CIFE, NABARD, and World Bank

SECTOR ALERT REVIEWS

India's marine product export sector has drawn increasing scholarly attention due to its dynamic evolution, economic significance, and emerging sustainability concerns. The literature reveals a strong correlation between the rise in aquaculture and the exponential growth in marine exports.

Sharma (2014) focused on the marketing challenges and strategies relevant to the fish export sector. He underscored the role of cold chain infrastructure, branding, and packaging in determining product success in international markets.

Gupta and Acosta (2004) traced the evolution of aquaculture in Asia, with special emphasis on India's transition from wild-caught fisheries to aquaculture-led exports. They highlighted innovations in broodstock development, disease control, and feed optimization that transformed India into a leading shrimp exporter.

Gopakumar (2002) provided a foundational understanding of fish processing technologies and the export standards essential for maintaining product integrity in global markets. His work highlighted the technological gaps that initially hindered India's competitiveness but also laid the groundwork for quality enhancements.

Recent institutional reports from *MPEDA*, *FAO*, *ICAR*, and *World Bank* reinforce these findings, providing updated insights into trade volumes, compliance challenges, and emerging market opportunities. These sources collectively point to the critical role of policy support, quality assurance, and digital innovations in strengthening India's marine export ecosystem.

EXPORT TRENDS (RECENT YEARS)

India's marine product export sector has shown a steady and significant upward trajectory in recent years, despite disruptions from global events like the COVID-19 pandemic and trade tensions. Let's break this section down into key components.

GROWTH STATISTICS

- ✓ In FY 2022–23, India exported 13.69 lakh metric tonnes (LMT) of marine products, earning USD 8.09 billion.
- ✓ This marked a growth of approximately 4.3% in value terms over the previous year (USD 7.76 billion in FY 2021–22).
- ✓ India has consistently remained one of the top five global seafood exporters, with frozen shrimp as its crown jewel.

This growth is supported by increased aquaculture production, strong global demand, and improved compliance with international food safety standards.

PRODUCT-WISE DISTRIBUTION

India exports a wide variety of marine items. The major categories include:

Product	Contribution to Export Value
Frozen Shrimp	~70%
Frozen Fish	~12–14%
Cephalopods	~6–8%
Dried Items, Surimi	~5%
Others	~3%

- ✓ Frozen Shrimp remains the most sought-after product, especially the vannamei species.
- ✓ Cephalopods like squid and cuttlefish are primarily exported to Mediterranean countries and East Asia.
- ✓ Live and chilled items have seen niche growth due to demand from gourmet markets.

REGION-WISE EXPORT

Marine product exports from India are concentrated in specific states with rich aquatic resources and infrastructure:

State	Key Products
Andhra Pradesh	Frozen shrimp, especially aquaculture-based
Gujarat	Cephalopods, fish
Tamil Nadu	Cuttlefish, squid, frozen fish
Kerala	Sardines, cephalopods
Odisha & WB	Shrimp (aquaculture and wild-caught)

These states have invested in cold chains, hatcheries, feed plants, and port logistics which help them lead in exports.

MAJOR IMPORTING COUNTRIES

India exports to over **120 countries**, but the following dominate the demand:

Country	Import Share	Main Products Imported
USA	~39%	Frozen shrimp
China	~15%	Frozen fish, shrimp (reprocessing)
Japan	~6–8%	Cephalopods, shrimp
Vietnam	~6–7%	Raw shrimp for reprocessing
EU Nations	~10–12%	High-value seafood, niche items

The USA continues to be the *largest market* for Indian shrimp, while China and Vietnam serve as both consumers and re-exporter

III. KEY DRIVERS OF GROWTH

India's robust marine export growth has not occurred by chance. Several strategic, infrastructural, and technological factors have contributed to the rise in marine product exports. These drivers have helped India improve both the *quantity and quality* of its seafood offerings on the global stage.

AQUACULTURE BOOM

- ✓ The rise of shrimp farming, especially in states like Andhra Pradesh, West Bengal, and Odisha, has been a game-changer.
- ✓ Focus has shifted from wild catch to scientific aquaculture, increasing yields and predictability.
- ✓ Dominance of the Pacific white shrimp (Litopenaeusvannamei), which grows faster and is in high demand globally.

GOVERNMENT SUPPORT AND POLICY REFORMS

- ✓ Launch of Pradhan Mantri Matsya Sampada Yojana (PMMSY) aimed at:
- ✓ Increasing marine production and exports
- ✓ Modernizing fisheries infrastructure
- ✓ Promoting entrepreneurship among fishers
- ✓ Simplification of licensing and subsidy mechanisms for cold chains, hatcheries, and exporters.

IMPROVED QUALITY ASSURANCE AND TRACEABILITY

- ✓ Strengthened role of MPEDA (Marine Products Export Development Authority):
- ✓ Enforces quality standards
- ✓ Supports traceability, testing, and certification for export compliance
- ✓ Training programs for farmers on antibiotic-free farming and sustainable practices
- ✓ Adoption of blockchain and QR code tracking systems in some pilot projects to boost transparency

INFRASTRUCTURE DEVELOPMENT

- ✓ Establishment of modern processing plants, cold storages, and pre-processing centers in coastal states
- ✓ Investment in dedicated seafood export hubs, including integrated coastal economic zones
- ✓ Better port connectivity, container availability, and cold-chain logistics

FAVORABLE GLOBAL DEMAND

- ✓ Increasing global consumption of seafood, especially in USA, Europe, and East Asia, driven by:
- ✓ Health awareness (low-fat, high-protein diet)
- ✓ Lifestyle shifts favoring ready-to-cook/ready-to-eat seafood
- ✓ Growing preference for aquaculture-based shrimp due to consistency and traceability

DIVERSIFICATION OF EXPORT PRODUCTS

- ✓ Shift from commodity exports to value-added products:
- ✓ Marinated, ready-to-fry, and microwaveable seafood
- ✓ IQF (Individually Quick Frozen) products for retail chains
- ✓ Emerging focus on high-value niche items like ornamental fish, seaweed, and nutraceuticals

These growth drivers have propelled India to the forefront of global marine exports. However, sustaining this momentum depends on how well the sector navigates the next set of challenges.

IV. CHALLENGES FACING THE MARINE EXPORT SECTOR

Despite India's commendable rise as a global seafood exporter, the sector faces several persistent and emerging challenges. These range from *external trade policies* and *quality concerns* to *internal inefficiencies* and *environmental threats*. Let's explore them one-by-one:

A. REGULATORY AND TRADE BARRIERS

a. STRINGENT FOOD SAFETY REQUIREMENTS

- ✓ Importing countries, especially the European Union, USA, and Japan, enforce strict food safety norms related to:
- ✓ Antibiotic residues
- ✓ Heavy metals
- ✓ Microbial contamination (Salmonella, Vibrio)
- ✓ Indian exporters must constantly upgrade testing capabilities, follow HACCP (Hazard Analysis and Critical Control Point) protocols, and comply with documentation and batch traceability.

b. RISK OF TRADE BANS

✓ India has been under the European Union's enhanced scrutiny, and a ban was narrowly avoided in 2018 due to repeated violations.
✓ There is always a looming risk of port rejections, shipment holds, or blacklisting of processing units due to non-compliance.

c. NON-TARIFF BARRIERS (NTBS)

✓ Complex and often changing regulations related to packaging, labeling, and certification.
✓ Delays in customs clearance at destination ports due to documentation mismatches.
✓ Impact: Increased compliance cost, shipment delays, and financial risk, especially for small and medium exporters.

B. ENVIRONMENTAL AND SUSTAINABILITY ISSUES

a. OVERFISHING AND MARINE DEGRADATION

✓ Traditional fishing in certain regions has led to depletion of fish stock, reducing future availability.
✓ Indiscriminate trawling damages sea beds and marine biodiversity.
✓ Juvenile fishing continues despite regulations, affecting future generations of species.

b. COASTAL ECOSYSTEM PRESSURE

✓ Destruction of mangroves, coral reefs, and estuaries (essential fish breeding zones) due to:
✓ Real estate development
✓ Industrial pollution
✓ Shrimp pond encroachments

c. CLIMATE CHANGE EFFECTS

✓ Sea surface temperature rise alters breeding cycles and fish migration patterns.
✓ Cyclones, floods, and salinity shifts damage aquaculture farms and coastal infrastructure.
✓ Unpredictable rainfall affects brackish water shrimp farms, reducing crop reliability.

Impact: Reduced productivity, long-term environmental risks, and income vulnerability for coastal communities.

C. LOGISTICS AND INFRASTRUCTURE CONSTRAINTS

a. INADEQUATE COLD CHAIN AND STORAGE

✓ Many coastal villages lack access to cold storage and ice plants, leading to spoilage of catch.
✓ Delay in reaching processing centers results in quality deterioration.

b. PORT AND TRANSPORT BOTTLENECKS

✓ Congested seaports like Chennai and Kochi can delay seafood shipments, risking shipment quality and customer satisfaction.
✓ Lack of dedicated seafood export terminals or fast-track customs clearance at ports.

c. FRAGMENTED SUPPLY CHAIN

✓ Weak coordination between fishermen, processors, and logistics providers.
✓ Dependency on middlemen reduces profitability for primary producers.

Impact: Reduced competitiveness due to delays, quality issues, and increased costs.

D. DISEASE OUTBREAKS IN AQUACULTURE

a. SHRIMP DISEASE VULNERABILITY

✓ India's aquaculture is dominated by Litopenaeusvannamei (whiteleg shrimp), which is highly sensitive to:
✓ White Spot Syndrome Virus (WSSV)
✓ Early Mortality Syndrome (EMS)
✓ Infectious Myonecrosis Virus (IMNV)

b. LACK OF BIOSECURITY AND DIAGNOSTIC SUPPORT

✓ Many small farmers lack training in biosecure pond design, water quality management, and disease prevention.
✓ Inadequate access to veterinary labs and certified brood stock.

c. CROP FAILURES AND ABANDONMENT

✓ Entire ponds often need to be discarded after infection, leading to large-scale losses and sometimes complete withdrawal from shrimp farming.

Impact: Financial losses, unstable supply for exporters, and increased production costs due to treatment and preventive measures.

E. PRICE VOLATILITY AND MARKET DEPENDENCE

a. OVER-RELIANCE ON A FEW COUNTRIES

✓ The USA alone accounts for nearly 40% of India's marine export value.
✓ Any change in US trade policy, anti-dumping investigations, or economic slowdown can significantly impact Indian exporters.

b. GLOBAL PRICE FLUCTUATIONS

- ✓ Shrimp and fish prices are affected by:
- ✓ Seasonal production in competitor countries (e.g., Ecuador, Vietnam, Indonesia)
- ✓ Currency exchange volatility.
- ✓ Changes in consumer demand patterns post-COVID

c. FREIGHT AND INPUT COST SURGES

- ✓ Increasing container and shipping costs after the pandemic.
- ✓ Rising costs of feed, seed, fuel, and electricity for aquaculture farms

Impact: Unpredictable profit margins, pressure on small-scale exporters, and the risk of India losing its price advantage in the global market.

SUMMARY OF CHALLENGES

Challenge Category	Core Issues
Regulatory & Trade	Food safety, NTBs, port rejections
Environmental & Sustainability	Overfishing, habitat loss, climate change
Infrastructure & Logistics	Cold chain gaps, port congestion, fragmented transport
Disease in Aquaculture	Shrimp virus outbreaks, poor diagnostics, lack of biosecurity
Price Volatility & Market Risk	Overdependence on US, freight costs, global price dips

V. GOVERNMENT INITIATIVES

Recognizing the economic and strategic importance of the marine sector, the Government of India has introduced a variety of policies, programs, and institutional mechanisms to support *sustainable growth*, *export competitiveness*, and *farmer empowerment*. These initiatives address infrastructure gaps, boost production, improve quality control, and help Indian seafood reach global markets with confidence.

A. MPEDA – MARINE PRODUCTS EXPORT DEVELOPMENT AUTHORITY

Established in 1972 under the Ministry of Commerce and Industry, MPEDA is the apex body for the promotion and regulation of marine product exports from India.

Key Functions of MPEDA

- ✓ Export Promotion: Organizing trade delegations, international seafood expos, and marketing Indian seafood globally.
- ✓ Quality Control:
- ✓ Registering processing plants, exporters, and aquaculture farms.
- ✓ Assisting in the implementation of traceability and HACCP (Hazard Analysis and Critical Control Points).
- ✓ Certification Services: Offering pre-export inspection and residue monitoring.
- ✓ Training & Capacity Building: Programs for fishers and farmers on sustainable fishing practices, hygiene, and compliance.

Infrastructure Support

- ✓ Funding for cold storages, ice plants, peeling sheds, and seafood processing units.
- ✓ Promotion of eco-labeling and organic seafood certification.

Result: MPEDA acts as a bridge between Indian exporters and global standards, ensuring compliance and reputation protection.

B. PMMSY – PRADHAN MANTRI MATSYA SAMPADA YOJANA

Launched in *May 2020, PMMSY is a comprehensive national flagship scheme* to double marine and inland fisheries production and promote sustainable practices.

OBJECTIVES

- ✓ Enhance fish production by 7 million tonnes by 2024–25
- ✓ Double export earnings to INR 1 lakh crore
- ✓ Generate 55 lakh employment opportunities in the fisheries sector.

KEY FOCUS AREAS

Infrastructure Development

- ✓ Fishing harbors, landing centers, hatcheries
- ✓ Cold chains, ice plants, and processing units.

Aquaculture Expansion

- ✓ Promoting inland and marine aquaculture, including biofloc and cage farming.

Fish Farmer Welfare

- ✓ Subsidized insurance, access to formal credit, and marketing support.

Innovation and R&D

- ✓ Disease diagnostics, broodstock development, and nutritional feed support.

Impact: PMMSY supports the creation of an integrated value chain from seed to export, helping reduce post-harvest losses and boosting productivity.

C. DIGITALIZATION AND EASE OF DOING BUSINESS

The government has introduced digital platforms and policy simplification to streamline export processes and make it easier for stakeholders to do business:

- ✓ E-Sanchit: Paperless documentation for customs clearance
- ✓ Online Registration: For exporters, aquaculture farms, and processing units via MPEDA portals
- ✓ Simplified Inspection & Testing: Self-certification for trusted exporters and priority clearance at ports

These efforts *reduce bureaucratic delays* and make India's seafood exports more agile and responsive to global markets.

D. INTERNATIONAL TRADE ENGAGEMENT

The Indian government engages in *bilateral and multilateral trade negotiations* to:

- ✓ Reduce tariffs and non-tariff barriers (NTBs)
- ✓ Resolve trade disputes (e.g., antibiotic thresholds with the EU)
- ✓ Promote Geographical Indications (GI) for native species like:
  - Indian white shrimp
  - Kerala lobster
  - Odisha dried fish

Outcome: Greater access to high-value markets with lower friction.

E. SUPPORT FOR VALUE-ADDED EXPORTS

- ✓ MPEDA and state fisheries departments are actively promoting value-added seafood processing through:
  - Financial aid for new product development (ready-to-eat/cook formats)
  - Packaging and branding support
- ✓ Exporters are encouraged to move beyond raw commodities to:
  - Microwaveable seafood packs
  - Skewered or marinated shrimp/fish
  - Frozen surimi and IQF fillets

Goal: To boost margins and position India as a supplier of premium seafood products, not just bulk raw items.

F. INSTITUTIONAL COLLABORATIONS AND SKILL DEVELOPMENT

- ✓ Collaboration with ICAR institutions (e.g., CIFE, CIBA) to develop:
  - Disease-resistant breeds
  - Nutrient-rich aquafeeds
  - Sustainable aquaculture practices
- ✓ Fisheries Skill Development Councils (FSDCs) are training fishers and processors in:
  - Best aquaculture practices
  - HACCP and export documentation
  - Boat safety and net optimization

G. SEAWEED AND ORNAMENTAL FISH PROMOTION

- ✓ The government has launched *pilot projects* in states like Tamil Nadu, Gujarat, and Andhra Pradesh to promote:
  - *Seaweed farming* for exports, nutraceuticals, and biofuels
  - *Ornamental fish rearing*, especially in Kerala and West Bengal

These niche markets offer *high return on small investment* and help small-scale farmers diversify income.

Summary of Government Initiatives

Initiative	Purpose
MPEDA	Export promotion, quality control, traceability
PMMSY	Infrastructure, production boost, employment
E-Sanchit & Online Tools	Ease of doing business
Trade Agreements	Market access, reduce NTBs
Value-Added Export Aid	High-margin seafood products
Institutional R&D	Sustainable innovation, feed, disease control
Seaweed/Ornamental Focus	Emerging segments for small farmers

VI. OPPORTUNITIES AHEAD

India's marine export sector holds tremendous untapped potential. By leveraging its long coastline, skilled labor, favorable climate, and increasing global demand for healthy protein sources, India can consolidate its position as a global seafood hub. The following are key opportunity areas:

A. EXPANDING INTO NEW MARKETS

- ✓ Current dependence on the USA and China makes India vulnerable to trade policy shifts.
- ✓ Emerging markets such as the Middle East, South Korea, Russia, Latin America, and Africa present growing demand with less stringent barriers.
- ✓ Trade diplomacy can help India diversify its export basket and reduce risks.

B. VALUE-ADDED PRODUCTS

- ✓ Global consumers are moving toward convenient, ready-to-eat (RTE) and ready-to-cook (RTC) formats.
  - ✓ India has scope to export:
  - Breaded and battered shrimp
  - Cooked and marinated seafood
  - IQF (Individually Quick Frozen) portions
  - Microwavable fish curries and snacks
- ✓ Higher value realization from the same raw material helps boost *profitability and farmer income*.

C. CERTIFICATION AND BRANDING OF INDIAN SEAFOOD

- ✓ Indian products often sell as *bulk commodities* without brand identity.

- ✓ Adoption of eco-labels, organic certification, and sustainability tags (like ASC or BAP) can fetch premium prices.
- ✓ Promotion of "Brand India Seafood" globally can improve perception and build loyalty.

D. DIGITALIZATION AND SMART TRACEABILITY

- ✓ Use of *blockchain*, QR codes, and cloud databases can help:
  - Enhance traceability from pond to port
  - Improve recall mechanisms and buyer confidence
- ✓ Digital tools can streamline *supply chain logistics*, boost efficiency, and ensure transparency.

E. SUSTAINABLE AND RESPONSIBLE AQUACULTURE

- ✓ With wild catch stagnating, sustainable aquaculture is the future.
- ✓ Investment in:
  - Biofloc technology
  - Recirculating Aquaculture Systems (RAS)
  - Low-salinity farming in non-coastal regions
- ✓ Opportunity to become a *global benchmark* for green aquaculture

F. EMERGING SEGMENTS: SEAWEED, ORNAMENTAL FISH, NUTRACEUTICALS

- ✓ *Seaweed cultivation* (for food, biofuel, cosmetics) is an underexplored goldmine.
- ✓ *Ornamental fish exports* (e.g., from Kerala, Tamil Nadu) cater to hobbyists and aquariums globally.
- ✓ Demand for *omega-3 rich fish oil, collagen, and protein supplements* is growing in nutraceutical markets.
- ✓ With targeted investments, India can *move up the value chain*, reduce waste, improve profitability, and build a resilient marine export ecosystem.

VII. FINDINGS

- ✓ India exported 13.69 LMT of marine products worth USD 8.09 billion in FY 2022–23, with frozen shrimp making up ~70% of export value.
- ✓ Andhra Pradesh, Gujarat, and Tamil Nadu lead in exports due to strong aquaculture and infrastructure.
- ✓ The USA is the largest importer (~39%), indicating overdependence on limited markets.
- ✓ Sector faces issues like disease outbreaks in aquaculture, environmental degradation, non-tariff trade barriers, and cold chain gaps.
- ✓ PMMSY and MPEDA have strengthened infrastructure, quality control, and digital traceability.
- ✓ Seaweed farming, ornamental fish trade, and value-added ready-to-eat seafood are gaining traction.
- ✓ Blockchain and QR-based traceability pilot programs are boosting transparency and compliance.
- ✓ Overfishing, climate-induced crop losses, and destruction of coastal ecosystems pose long-term risks.

VIII. CONCLUSION

India's marine product export sector stands at a strategic inflection point — *rich in potential but challenged by complexities*. With global demand for healthy, traceable, and sustainable seafood rising, India's large coastline, diverse aquatic resources, and expanding aquaculture capacity give it a strong competitive advantage.

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