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Economic importance of ornamental fish exports in India: A decadal comparison

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ABSTRACT

Ornamental fish culture and trade represent an emerging component of India's fisheries economy, providing opportunities for entrepreneurship, employment generation, foreign-exchange earnings and livelihood diversification. Unlike food-fish production, ornamental fish are marketed primarily for aesthetic value, with price influenced by species, colour, body pattern, strain, rarity and quality. This article reviews the development of India's ornamental-fish export sector over approximately the last decade and discusses its domestic production and market structure. According to Marine Products Export Development Authority (MPEDA, 2026), India's ornamental-fish exports increased from 38.84 tonnes valued at US\$1.04 million in 2015–16 to 59.73 tonnes valued at US\$2.03 million in 2024–25. This represents an increase of approximately 53.8% in export quantity and 94.8% in export value. The average export value also increased from approximately US\$26.79 kg⁻¹ to US\$33.94 kg⁻¹. World Integrated Trade Solution (WITS, 2024), using UN Comtrade data, recorded India's live ornamental-fish exports at approximately US\$2.11 million in calendar year 2024. Important production and marketing centres include West Bengal, Tamil Nadu, Kerala, *Karnataka*, Maharashtra and northeastern India. Ornamental fish production also supports activities such as breeding, nursery rearing, grading, packing, transportation, wholesale and retail marketing. Government initiatives have further supported ornamental-fish production units across the country (Department of Fisheries, 2025). The future development of the sector will depend on captive breeding, quality broodstock, disease management, improved live-fish transportation, indigenous ornamental species, digital marketing and organised production clusters.

Keywords: Ornamental fish, Ornamental aquaculture, Export, Aquarium trade, Entrepreneurship, India, Fisheries economy, Livelihood

1. Introduction

Ornamental fish culture is a specialised branch of aquaculture involving the production, breeding, rearing and marketing of fish primarily for aesthetic, recreational and aquarium purposes. Unlike conventional food-fish aquaculture, ornamental fish are valued according to characteristics such as colour, body shape, fin development, pattern, rarity, species identity and breeding strain. Consequently, relatively small quantities of high-quality fish can generate considerable economic value.

The ornamental-fish trade has developed into an international business involving breeders, hatcheries, exporters, wholesalers, retailers, aquarium shops and hobbyists. Evers *et al.* (2019) [1] highlighted that the ornamental-fish trade involves a complex international supply chain in which fish may originate from captive-breeding facilities or natural populations and pass through several commercial intermediaries before reaching consumers.

In developing countries, ornamental fish culture can provide an alternative livelihood and entrepreneurship opportunity. Swain *et al.* (2021) [2] reported that ornamental aquaculture can serve as an alternative avenue for livelihood support because production can be undertaken on a relatively small scale and can generate income through breeding, nursery rearing and marketing.

India possesses considerable potential for ornamental-fish development because of its tropical climate, fresh-water resources, diverse indigenous fish fauna and expanding aquarium market. Several states have developed ornamental-fish production and marketing activities, particularly West Bengal, Tamil Nadu, Kerala, *Karnataka* and Maharashtra. MPEDA (2026) [3] lists ornamental-fish exporters and businesses operating in several of these states.

The sector has also received increasing attention from government development programmes. According to the Department of Fisheries (2025) [4], 2,465 ornamental fish rearing units and 207 integrated ornamental fish breeding and rearing units were approved during 2020–21 to 2024–25. Such infrastructure can contribute to employment generation, entrepreneurship and diversification of aquaculture activities.

Ornamental fish are therefore economically important not only because of their export value but also because the sector creates a broader value chain involving broodstock production, hatchery operations, feed

supply, aquarium equipment, transportation, wholesale trade, retail marketing and aquarium maintenance. The present article examines India's ornamental-fish export performance over approximately a decade and discusses the domestic market, economic importance, challenges and future opportunities.

2. Decadal growth in India's ornamental-fish exports

India's ornamental-fish export sector has shown growth in both physical quantity and monetary value during the last decade. According to MPEDA (2026) [5], ornamental-fish exports increased from 38.84 tonnes valued at US\$1.04 million in 2015–16 to 59.73 tonnes valued at US\$2.03 million in 2024–25.

Table 1. Decadal comparison of India's ornamental-fish exports

Parameter	2015–16	2024–25	Approximate change
Export quantity	38.84 tonnes	59.73 tonnes	+53.8%
Export value	US\$1.04 million	US\$2.03 million	+94.8%
Average export value	US\$26.79 kg ⁻¹	US\$33.94 kg ⁻¹	+26.7%
Quantity CAGR	—	—	~4.9%
Value CAGR	—	—	~7.7%

Source: Compiled from MPEDA (2026) [5].

The export quantity increased by approximately 53.8% during the period, while export value increased by approximately 94.8% (MPEDA, 2026) [5]. This difference is economically important because it indicates that export value increased more rapidly than physical quantity. The estimated average export value increased from approximately US\$26.79 kg⁻¹ in 2015–16 to approximately US\$33.94 kg⁻¹ in 2024–25 (MPEDA, 2026) [5]. This increase may be associated with changes in species composition, quality, breeding strains, market destinations and international demand.

However, average export value should not be interpreted as the actual farm-gate price received by ornamental-fish producers. Ornamental fish comprise a diverse group of species and varieties with substantial differences in market value. Export statistics also represent trade-level values rather than the net income of farmers.

The growth of export value therefore indicates increasing economic activity but should be interpreted together with production costs, mortality, transportation expenditure, exporter margins and market conditions.

3. India's position in international ornamental-fish trade

In addition to MPEDA's financial-year statistics, international trade databases provide information on India's position in the global ornamental-fish market. World Integrated Trade Solution (WITS), using UN Comtrade data, reported that India exported approximately 90,970 kg of live ornamental fish under HS 030110 during calendar year 2024, with an export value of approximately US\$2.107 million (World Bank/WITS, 2024) [6].

The same dataset indicates that India imported approximately 78,942 kg of live ornamental fish valued at about US\$2.383 million in 2024 (World Bank/WITS, 2024) [7].

Table 2. India's live ornamental-fish trade during 2024

Parameter	Exports	Imports
Quantity	90,970 kg	78,942 kg
Trade value	US\$2.107 million	US\$2.383 million
HS classification	030110	030110
Commodity	Live ornamental fish	Live ornamental fish

Source: World Bank/WITS based on UN Comtrade (2024) [6].

India's exports were directed to several international markets, including countries in Southeast and East Asia (World Bank/WITS, 2024) [6]. These markets are important because Asia represents a major region for ornamental-fish production, trade and aquarium consumption.

The import data also demonstrate the continued demand for ornamental species and strains that may not be sufficiently produced domestically. Thailand, Indonesia and Japan are among the important sources of ornamental fish entering the Indian market (World Bank/WITS, 2024) [7].

The MPEDA financial-year statistics and WITS calendar-year statistics should not be directly combined because they represent different reporting periods and statistical systems. Nevertheless, both datasets demonstrate India's active participation in international ornamental-fish trade.

4. Major ornamental-fish production and market centres in India

India's ornamental-fish industry is geographically distributed across several production and consumption centres. MPEDA (2026) [3] lists ornamental-fish exporters in states including Kerala, Tamil Nadu, Karnataka, Maharashtra and West Bengal.

4.1 West Bengal and Kolkata

West Bengal has historically been an important centre for ornamental-fish production and marketing. Kolkata and surrounding areas contain breeding, nursery, wholesale and retail activities.

The importance of West Bengal is also linked with small-scale ornamental-fish production. Sinha *et al.* (2020) [8] reported that ornamental-fish farming can provide livelihood opportunities for rural women in West Bengal. Such findings demonstrate that the sector can contribute not only to commercial fish trade but also to household-level livelihood diversification.

The concentration of producers and markets around Kolkata provides advantages in terms of access to broodstock, technical knowledge, transportation and consumers.

4.2 Chennai and Tamil Nadu

Tamil Nadu is another important region for ornamental-fish production and trade. Chennai has a large aquarium market, while several production centres supply fish to domestic consumers and commercial traders.

The combination of urban demand, transportation infrastructure and aquarium businesses creates favourable conditions for ornamental-fish entrepreneurship.

4.3 Kerala

Kerala has developed an important ornamental-fish production and export network. MPEDA (2026) [3] lists several ornamental-fish exporters from Kerala, including businesses associated with the Kochi–Aluva region.

Kerala's favourable climatic conditions and established fisheries infrastructure provide opportunities for both freshwater and marine ornamental-fish enterprises.

4.4 Karnataka and Bengaluru

Bengaluru is an important urban aquarium market and *Karnataka* has an established ornamental-fish business network. *MPEDA (2026)* [3] lists ornamental-fish exporters from *Karnataka*, demonstrating the state's participation in organised ornamental-fish trade.

The large urban consumer population provides demand for aquarium fish, aquatic plants, aquarium equipment and maintenance services.

4.5 Maharashtra and Mumbai

Maharashtra is particularly important because of the large consumer market associated with Mumbai and other urban centres. Mumbai functions as an important distribution and retail centre for ornamental fish.

Yadav et al. (2017) [9], in their assessment of ornamental-fish producers in Maharashtra, highlighted the socioeconomic importance of ornamental-fish production within the state. *Yadav et al. (2022)* [10] further examined gender participation in ornamental-fish production units in Maharashtra, indicating the sector's relevance for household-level employment and entrepreneurship.

Table 3. Major ornamental-fish centres and their economic functions

Region	Major economic functions
Kolkata–West Bengal	Breeding, production, wholesale and marketing
Chennai–Tamil Nadu	Production, aquarium trade and retail
Kochi–Aluva–Kerala	Production, trade and export
Mumbai–Maharashtra	Large consumer market, retail and distribution
Bengaluru–Karnataka	Production, retail and commercial trade
Assam/Northeast	Indigenous species and emerging ornamental-fish production

Sources: *MPEDA (2026)* [3]; *Sinha et al. (2020)* [8]; *Yadav et al. (2017)* [9]; *Yadav et al. (2022)* [10].

5. Economic importance of ornamental-fish exports

5.1 Foreign-exchange generation

The ornamental-fish export sector contributes to foreign-exchange earnings. *MPEDA (2026)* [5] recorded an increase in export value from approximately US\$1.04 million in 2015–16 to US\$2.03 million in 2024–25.

The increase is significant because ornamental fish are relatively high-value products compared with their physical volume. Improved breeding quality and the production of specialised varieties can potentially increase export earnings without requiring proportional increases in biomass production.

5.2 Employment generation

The ornamental-fish sector supports employment throughout the production and marketing chain. Activities include:

Broodstock management → Breeding → Larval/nursery rearing → Grading → Packing → Transportation → Wholesale → Retail → Aquarium maintenance

Swain et al. (2021) [2] identified ornamental aquaculture as an alternative livelihood-supporting activity, particularly because production can be undertaken at relatively small scales.

Employment can also be generated indirectly through aquarium construction, water-treatment equipment, feeds, packaging materials, transportation and fish-health services.

5.3 Small-scale entrepreneurship

One of the major advantages of ornamental fish culture is that many species can be produced in relatively small tanks and limited areas. Livebearers such as guppy, molly, platy and swordtail can be cultured

in small units, while species such as goldfish, koi and selected cichlids can be produced using larger systems.

This provides opportunities for small entrepreneurs, youth and women. *Sinha et al. (2020)* [8] demonstrated the livelihood potential of ornamental fish farming among rural women in West Bengal, while *Yadav et al. (2022)* [10] documented gender participation in ornamental-fish production units in Maharashtra.

5.4 Value addition

Value addition is particularly important in ornamental fish because the market value of fish is strongly influenced by appearance and genetic characteristics.

Selective breeding for colour, body pattern, fin shape, body form and other desirable traits can increase market value. Consequently, genetic improvement and broodstock management can be economically important components of ornamental-fish production.

6. Domestic market and export linkages

India's domestic aquarium market provides an important foundation for ornamental-fish production. Aquarium shops, hobbyists, offices, hotels, educational institutions and commercial establishments generate continuing demand.

Domestic and export markets are interconnected. Producers who cannot meet export specifications can potentially sell their fish in domestic markets, reducing the risk associated with production.

The ornamental-fish value chain can therefore be represented as:

Producer → Collection centre → Wholesaler → Domestic retailer/exporter → Consumer

For export-oriented production, an additional chain is involved:

Breeder → Export-oriented farm → Grading → Health inspection/handling → Oxygenated packing → Transport → Exporter → International importer → Retailer → Consumer

Evers et al. (2019) [1] emphasised the complexity of the international ornamental-fish supply chain and the importance of understanding sources, sustainability and movement of fish through the trade.

Transportation is particularly important because ornamental fish must remain alive throughout the distribution process. Poor oxygen supply, unsuitable temperature, overcrowding and excessive handling can increase mortality.

Jones (2022) [11] emphasised the importance of welfare monitoring in ornamental-fish trade, particularly because capture, handling, holding and transportation can expose fish to multiple stressors.

7. Importance of ornamental-fish production for Maharashtra

Maharashtra has considerable potential for development of ornamental-fish enterprises because of its large urban population, established fisheries sector and strong aquarium market.

Mumbai provides a major consumer and distribution market. At the same time, production units can be developed in peri-urban and rural areas where land and water resources are available.

Yadav et al. (2017) [9] documented the socioeconomic characteristics of ornamental-fish producers in Maharashtra, while *Yadav et al. (2022)* [10] highlighted gender dimensions within ornamental-fish production units.

The development of organised ornamental-fish clusters could further strengthen the sector. Such clusters could include:

- broodstock production units;
- hatcheries and breeding facilities;
- nursery units;
- ornamental-fish feed suppliers;
- aquarium equipment manufacturers;
- fish-health and diagnostic services;
- live-fish transport operators;
- wholesale markets;

- aquarium retailers; and
- online marketing enterprises.

MPEDA (2026) [3] also lists ornamental-fish exporters from Maharashtra, indicating the state's participation in organised export activity.

Small-scale systems such as backyard tanks, rooftop ornamental-fish units and recirculating aquaculture systems could further expand production where conventional land availability is limited.

8. Government support and infrastructure development

Government support has an important role in developing ornamental fisheries as a livelihood and entrepreneurship sector. According to the Department of Fisheries (2025) [4], 2,465 ornamental fish rearing units and 207 integrated ornamental fish breeding and rearing units were approved during 2020–21 to 2024–25.

Such infrastructure development can increase production capacity and provide opportunities for entrepreneurs to enter the ornamental-fish sector.

Government support is particularly important for small producers because major barriers include the initial cost of tanks, filtration, aeration, broodstock, water-quality equipment and transportation facilities.

Training and technical extension are also important. Producers require knowledge of breeding, larval rearing, stocking density, water quality, disease management, nutrition, grading and live-fish transportation.

9. Constraints in India's ornamental-fish sector

Despite increasing trade value, India's ornamental-fish sector faces several technical and economic constraints.

9.1 Poor-quality broodstock

Inadequate broodstock quality can result in inconsistent colour, body shape, growth and reproductive performance. Establishment of reliable broodstock banks and certified breeding stocks can improve production.

9.2 Disease and biosecurity

Disease outbreaks can cause considerable economic losses. Quarantine, hygienic management, water-quality monitoring and disease-free broodstock are essential.

Jones (2022) [11] also highlighted the importance of welfare and health considerations during the movement and trade of ornamental fish.

9.3 Transportation losses

Live transportation remains one of the major challenges. Fish can experience stress because of handling, crowding, temperature fluctuations and inadequate oxygenation.

Improved packaging technology, oxygen management, temperature control and faster transportation can reduce mortality.

9.4 Lack of standardisation

Small producers may use different breeding and production practices. Lack of standardisation can lead to variable quality and difficulty in maintaining consistent export specifications.

9.5 Fragmented marketing

Small producers often depend on intermediaries. Producer groups, co-operative marketing and digital platforms can improve market access and potentially increase producer margins.

9.6 Sustainability of wild collection

Evers *et al.* (2019) [1] highlighted sustainability concerns associated with ornamental-fish collection and trade. Greater dependence on captive breeding can reduce pressure on wild populations, particularly for species that are geographically restricted or vulnerable to excessive collection.

Maia *et al.* (2025) [12] further emphasised the importance of fish welfare, legislation and responsible practices within the ornamental-fish trade.

10. Future prospects

10.1 Captive breeding

Expansion of captive breeding can provide reliable supplies of ornamental fish while reducing dependence on wild collection. It can also allow breeders to develop improved colour strains and commercially valuable varieties.

10.2 Indigenous ornamental species

India possesses substantial freshwater fish diversity that can provide opportunities for development of indigenous ornamental species. Evers *et al.* (2019) [1] demonstrated the importance of species origin and sustainability in ornamental-fish trade, making captive propagation of indigenous species particularly relevant.

10.3 Genetic improvement

Selective breeding for colour, body pattern, fin development, growth and reproductive performance can improve commercial value.

10.4 Digital marketing

Online aquarium businesses and social-media marketing can connect producers directly with consumers. Digital platforms may be particularly useful for small producers who lack access to large wholesale markets.

10.5 Modern production systems

Recirculating aquaculture systems, biofiltration, automated feeding and real-time water-quality monitoring can improve production efficiency.

10.6 Production clusters

Cluster-based development around major production and market centres can improve access to broodstock, technical services, transport and markets.

The government-supported ornamental-fish units reported by the Department of Fisheries (2025) [4] provide a foundation for further expansion of this sector.

11. Discussion

The available trade statistics indicate that India's ornamental-fish sector has experienced substantial growth in export value during the last decade. According to MPEDA (2026) [5], export quantity increased by approximately 53.8%, whereas export value increased by approximately 94.8% between 2015–16 and 2024–25.

The faster growth of export value compared with quantity indicates the importance of value addition in ornamental-fish trade. Species composition, breeding strains, quality, market destinations and international demand can influence export value.

The findings are also consistent with the broader socioeconomic importance of ornamental aquaculture. Swain *et al.* (2021) [2] identified ornamental aquaculture as an alternative livelihood activity, while Sinha *et al.* (2020) [8] demonstrated its potential for rural women's livelihood development in West Bengal. In Maharashtra, Yadav *et al.* (2017) [9] documented the socioeconomic characteristics of ornamental-fish producers, and Yadav *et al.* (2022) [10] examined gender participation in production units.

The international trade data provide further evidence of India's participation in the global ornamental-fish economy. WITS/UN Comtrade data show that India exported approximately US\$2.11 million worth of live ornamental fish in calendar year 2024 (World Bank/WITS, 2024) [6]. However, the country also imported approximately US\$2.38 million worth of live ornamental fish during the same year.

This trade pattern indicates that India has both export opportunities and a domestic demand for imported species and strains. Developing competitive domestic breeding programmes could therefore serve two

purposes: increasing export potential and reducing dependence on imported ornamental varieties.

The sector's future competitiveness will depend not simply on increasing production but on improving quality, reliability, fish welfare, disease control and traceability. Evers *et al.* (2019) [1] highlighted sustainability issues in ornamental-fish trade, while Jones (2022) [11] and Maia *et al.* (2025) [12] emphasised the importance of welfare and responsible handling.

Thus, India's ornamental-fish sector should develop as a quality-oriented and sustainability-conscious component of aquaculture rather than focusing exclusively on increasing production volume.

12. Conclusion

India's ornamental-fish industry has become an increasingly important component of the country's diversified fisheries economy. MPEDA (2026) [5] data indicate that ornamental-fish exports increased from 38.84 tonnes valued at US\$1.04 million in 2015–16 to 59.73 tonnes valued at US\$2.03 million in 2024–25. The substantially faster increase in export value than quantity highlights the economic importance of quality and value addition.

The importance of ornamental fish extends beyond export earnings. The sector supports breeding, nursery production, grading, packing, transportation, wholesale and retail marketing, aquarium maintenance and equipment supply. Studies by Sinha *et al.* (2020) [8], Swain *et al.* (2021) [2], Yadav *et al.* (2017) [9] and Yadav *et al.* (2022) [10] demonstrate its relevance to livelihood diversification, rural entrepreneurship and socioeconomic participation.

Government support is also expanding ornamental-fish infrastructure, with thousands of ornamental-fish production units approved under fisheries-development programmes (Department of Fisheries, 2025) [4].

Future development should focus on captive breeding, quality broodstock, indigenous ornamental species, genetic improvement, biosecurity, fish welfare, efficient transportation, digital marketing and organised production clusters. Such measures can strengthen India's domestic ornamental-fish industry while improving its participation in international markets.

Overall, ornamental fish culture represents a **high-value, employment-generating and livelihood-diversifying opportunity within India's fisheries and aquaculture sector**, provided that future expansion is supported by scientific production, responsible trade and sustainable management.

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