PROMOTION OF ORNAMENTAL FISHERIES UNDER PMMSY

Government of India
Ministry of Fisheries, Animal Husbandry & Dairying
Department of Fisheries
Ornamental Fisheries: Global Status

- 2nd most popular hobby: 100 million hobbyists in the world.
- Important economic activity in 125 countries
- Global trade ≈ US$ 18-20 billion
- Over 2500 fish species (60% freshwater & 40% marine)
- Main sps. Neon tetras, Aangels, Gold fish, Danios and Discus
- Guppy and Zebra danio contributing to > 14% trade
- Sri Lanka occupy the 6th position in the world

- India’s share to global ornamental fish export = 0.4%
- India’s rank is 31st in exporting countries

Singapore The top exporting country in the world

European Union the largest market for ornamental fish

United States Single largest importing country

Global ornamental fish export, 2017

Global ornamental fish import, 2017
Indian Scenario: **Domestic Aquarium trade**

- **Indian Ornamental fish** has great demand in the International market.
- **High biodiversity** ≈ 374 indigenous freshwater fish species.
- **About 700 indigenous and >300 exotic marine fish species**.
- **80% trade from Freshwater; 20% from brackish & marine water**.
- **Domestic ornamental fish trade about Rs. 500 crore**.
- **Export trade Rs. 8.40 Cr (2017-18)** with **11.6% per year growth**.
- **5,000 production units**, in West Bengal (55%), Tamil Nadu (30%), Kerala (5%), Maharashtra and others (7%), North East and Island (3%).

**Increasing per capita income**

**Increasing middle-income group**

**Increasing nuclear families in metro cities**

**Urban population will rise to 42.5% (547 million peoples), in 2025-26.**
Indian Scenario: overseas trade

Indian Ornamental fish trade

Despite its great potential, India ranks very low amongst Asian countries that export ornamental fish to the world. Major fish exported from India are of wild varieties collected from rivers of North-east and southern states.

0.4% (US$ 1.4 million) of the total world.

35 MPEDA authorized Ornamental Fish Exporters

Ornamental fish export (quantity) during the period 2004 to 2011 (Dominic et. al., 2013)

Major Destinations for India’s Ornamental Fish Export during 2003-2009 (NFDB, 2017)

Quantity-wise Ornamental Fish Export from India during 2010-2016 (NFDB, 2017)
Freshwater ornamental fisheries

Most of fish **exported from India** are of **wild varieties** collected from rivers of the Northeast and Southern States.

India possesses rich resources viz., rivers, streams, the lagoons and coral reefs with highly attractive and varied species of ornamental fishes.

- **Wild collection**
- **Culture**

155 ornamental fish species present
117 are endemic to **Western Ghats**

**Main varieties:** barbs, rasboras, killifishes, glass fishes, catfishes, catopra, hill trouts, and danios.

- **Majority fish breeders in India** breed **Exotic fishes**, very few breed indigenous fishes.
- About **13** indigenous freshwater ornamental fish species successfully bred, mostly from **backyard breeding** and **rearing units, small size & cluster based production units**.
- **Goldfish**: highest preference among hobbyists and most **dominant species** in India.

<table>
<thead>
<tr>
<th>Major Breeding Centres (MPEDA authorized)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerala</td>
</tr>
<tr>
<td>Tamil Nadu</td>
</tr>
<tr>
<td>Mathya Pradesh</td>
</tr>
<tr>
<td>Himachel Pradesh</td>
</tr>
<tr>
<td>West Bengal</td>
</tr>
<tr>
<td>Maharastra</td>
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<tr>
<td>Rajasthan</td>
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<tr>
<td>Karnataka</td>
</tr>
<tr>
<td>Total</td>
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</tbody>
</table>

(Inland & Marine)
Major indigenous ornamental fish species in India

<table>
<thead>
<tr>
<th>Indigenous Freshwater Ornamental Fishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puntius arulius</td>
</tr>
<tr>
<td>Puntius filamentosus</td>
</tr>
<tr>
<td>Aplocheilus panchax</td>
</tr>
<tr>
<td>Amblyp HQYJYgOJqQPA oJqQPA mola</td>
</tr>
<tr>
<td>Channa orientalis</td>
</tr>
<tr>
<td>Garra gotyla gotyla</td>
</tr>
<tr>
<td>Gonoproktopterus curmuca</td>
</tr>
<tr>
<td>Macrognathus aral</td>
</tr>
<tr>
<td>Nandus nandus</td>
</tr>
<tr>
<td>Notopterus notopterus</td>
</tr>
<tr>
<td>Horabagus brachysoma</td>
</tr>
<tr>
<td>Mystus vittatus</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Indigenous Marine Ornamental Fishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pomacentrus caeruleus</td>
</tr>
<tr>
<td>Ostracanthus cubicus</td>
</tr>
<tr>
<td>Scarus ghobban</td>
</tr>
<tr>
<td>Odonus niger</td>
</tr>
<tr>
<td>Narcine timlei</td>
</tr>
<tr>
<td>Chelonodon maya</td>
</tr>
<tr>
<td>Thalassoma lunare</td>
</tr>
<tr>
<td>Abudefuf saxatilis</td>
</tr>
</tbody>
</table>
The culture of freshwater ornamental fishes is mainly limited to the states of West Bengal, Tamilnadu, Kerala, Maharashtra and recently Karnataka.

A few units of freshwater ornamental fish production are also established in inland states of Rajasthan and Madhya Pradesh during the last decade.

**West Bengal**: Largest ornamental fish producer in India. A large number of villages in districts of 24 pargana, Howrah, Hooghly and Nadia are major centres of ornamental fish culture in the state of West Bengal.

**Tamilnadu**: is the second largest ornamental fish producer in the country after West Bengal. The village of Kolathur near Chennai is the epicentre of ornamental fish production of large varieties. The similar trend is being followed in Madurai, another major business city in Tamilnadu.

**Mumbai (Maharashtra)** was known for culture ornamental fishes about two-decade backs but now it is mainly popular for high value fishes specifically Discus only.

**Kerala**: is fast becoming popular for ornamental fish culture as many villagers in the districts of Thiruvanthapuram, Ernakulum, Thrissur, Allapuzha and Kottayam has set up backyard ornamental fish production units.
Breeding of Freshwater Ornamental Fishes

- Puntius denisonii
- Rasbora daniconius
- Colisa lalia
- Mystus gulio
- Puntius conchonius
- Puntius sophore
- Nandus nandus
- Danio rerio
- Etroplus suratensis
- Danio devario
- Labeo gonius
- Mastacembelus panchalus
- Macrognathus aculeatus
The ornamental fish production practices in country are characterized by:

- **Low-input: Low-output concepts** and developed in a cluster.

- The production system is based on **excess input in terms of labour but less in terms of money, material and management**.

- The **cost of labour is usually not calculated and given much importance** in backyard production units hence the **total cost of the marketable fish is less**.

- The breeding and culture of only low (**Guppy, Platy, Molly, Widow tetra, Rosy barb, Koi carps**) and medium value (**Gold fish, Gouramies, Angels, etc.**) fishes is commonly practiced in the country.

- The breeding of high and premium value fish is performed by few breeders only and that to in limited quantity.

- It is because of the lack of technical expertise, small size of the production units as well as limited market demand of high and premium value fishes.
India possesses rich marine ornamental fishes in lagoons and coral reefs of **Lakshadweep, Andaman and Nicobar Islands, Gulf of Kutch, Coast of Kerala, Gulf of Mannar** and **Palk Bay**.

113 finfish species in Gulf of Mannar,
150 species in Andaman and Nicobar Islands
300 species in Lakshadweep Islands
Hatchery technology developed for **14 species** by CMFRI
Breeding of Marine ornamental fish

Amphiprion percula
A. sandaracinos
Premnas biaculeatus
A. ocellaris
D. aruanus
A. Sebae
D. trimaculatus
N. filamentosus
C. unimaculata
Neopomacentrus nemurus
Chromis viridis
P. pavo
Pseudochromis dlectus
Pomacentrus caeruleus
The Central Marine Fisheries Research Institute (ICAR-CMFRI) is the leader in Research and development in captive breeding of marine ornamental fishes in India.

Research made in this effect in CMFRI hatcheries has resulted in the development of hatchery technology for more than 20 species and cross-breds of marine ornamental fishes so far.

During 2018-19:
- Percula clown
- Tomato clown
- Skunk clown
- Maroon clown
- Maroon clown percula cross-breds
- Picasso platinum
- Snow flake
- Ocellaris cross-breds
- Black ocellaris damsels

In order to boost the ornamental fish industry, a National Network Research Project with CMFRI in the lead has been launched with seven collaborating fisheries Institutes on ornamental fish breeding and seed production.

Training and capacity building programs on Marine Ornamental Fish Culture were carried out at selected villages of Tamil Nadu.

Green certification of marine ornamental fish has also been initiated.

‘Varsha’ series of freshwater ornamental fish feed refined for commercial production.

‘Varna’ series of marine ornamental feed production and sale touched an all-time high

Revenue generation was to the tune of Rs. 2.297 lakhs through the sale of marine ornamental fish.
Recent Initiatives towards Ornamental Fisheries Development in India

**NFDB**
- Provided financial assistance towards development of ornamental fisheries in the country for establishment of
  - Backyard rearing units,
  - Medium scale rearing units,
  - Integrated (breeding-cum-rearing) units,
  - Aquarium fabrication units and
  - Ornamental fish markets

**CMFRI**
- Initiated preparing a document on green certification of marine ornamental fish.
- Breeding and seed production techniques standardized for variety of Marine ornamental fishes and supply of fingerlings to farmers.
- Production of Varsha series of ornamental fish feeds in commercial extruders.

**MPEDA**
- Organizing Domestic Fairs at various locations over the country to disseminate the vast potential of the fisheries, aquaculture and ornamental fish sectors.
- Conducting skill development programmes in ornamental fish farming.
- Introduced a scheme to award incentives on export of ornamental fishes.
Strategies for Developing Ornamental Fisheries Sector in the Country

- Development of Freshwater Ornamental Fish Culture
- Development of Marine Ornamental Fish Culture
- Capacity Building Programme
- Establishment of Orna-Fish Broodbank
- "ATMNIRBHAR BHARAT" in Aquarium Fabrication & Accessories
- Establishment of Wholesale Orna-Fish Markets
- Establishment of Ornamental Aquatic Plant Units
- Public Promotion of Ornamental Fisheries
- Promoting National/International Aquaria Shows
- Capacity Building Programme
**Action Plan for Development of Ornamental Fisheries in India: AQUARAINBOW VISION- 2030**

**VISION**
- Entrepreneurship & livelihood generation through development of ornamental fisheries and improvement in quality of life through promoting the hobby aquarium keeping
- The hobby of aquarium keeping becomes a highly popular hobby both in urban and rural house-holds.
- India becomes a leading producer and exporter of both freshwater and marine ornamental fishes and allied products.

**MISSION**
- To support the income of farmers and generate livelihood earning opportunities in rural India through introduction of ornamental fisheries activities.
- To provide self-employment and entrepreneurship development opportunities to rural and urban youth in the field of ornamental fisheries and allied sectors.
- To empower & encourage women, SCs, STs, other economically weaker sections of the society to substantiate their earnings.
- To promote private sector investment, augment export of ornamental fish from country and achieve a leading position in global ornamental fish trade.
- To promote the hobby of aquarium keeping, help the people of country to live a stress-free healthy life and improve the quality of life.
Financial Resources: Ornamental Fisheries

- Rs. 576 Crore investment: Under Pradhan Mantri Matsya Sampada Yojana (PMMSY)
- Rs. 500 Crore additional investments proposed under World Bank Scheme, that would catalyse about Rs.2500 Cr
- Marketing infrastructure under FIDF
- Government investments catalyse the growth of Private sector on its own to about Rs.10,000 Cr
<table>
<thead>
<tr>
<th>Name of activities</th>
<th>Approx. Unit Cost (Rs. In lakh)</th>
<th>Approximate Physical Quantities</th>
<th>Total Cost (Rs. in Crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Ornamental and Recreational Fisheries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backyard Ornamental fish Rearing unit (both Marine and Fresh water)</td>
<td>3</td>
<td>1010</td>
<td>30.30</td>
</tr>
<tr>
<td>Medium Scale Ornamental fish Rearing Unit (Marine and Freshwater Fish)</td>
<td>8</td>
<td>707</td>
<td>56.56</td>
</tr>
<tr>
<td>Integrated Ornamental fish unit (breeding &amp; rearing for freshwater fish)</td>
<td>25</td>
<td>404</td>
<td>101.00</td>
</tr>
<tr>
<td>Integrated Ornamental fish unit (breeding and rearing for marine fish)</td>
<td>30</td>
<td>303</td>
<td>90.90</td>
</tr>
<tr>
<td>Establishment of Fresh water Ornamental Fish Brood Bank</td>
<td>100</td>
<td>10</td>
<td>10.00</td>
</tr>
<tr>
<td>Promotion of Recreational Fisheries</td>
<td>DPR</td>
<td>DPR</td>
<td>25.00</td>
</tr>
<tr>
<td><strong>Sub Total (A)</strong></td>
<td></td>
<td></td>
<td><strong>313.76</strong></td>
</tr>
<tr>
<td>Name of activities</td>
<td>Approx. Unit Cost (Rs. In lakh)</td>
<td>Approximate Physical Quantities</td>
<td>Total Cost (Rs. in Crore)</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>Technology infusion and adaptation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establishment of large RAS (with 8 tanks of minimum 90 m³/tank capacity 40 ton/crop)</td>
<td>50</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Establishment of Medium RAS (with 6 tank)</td>
<td>25</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Establishment of small RAS</td>
<td>7.5</td>
<td>200</td>
<td>15</td>
</tr>
<tr>
<td>Establishment of Backyard mini RAS units</td>
<td>0.5</td>
<td>200</td>
<td>1</td>
</tr>
<tr>
<td>Live fish vending Centres</td>
<td>20</td>
<td>110</td>
<td>22</td>
</tr>
<tr>
<td>Fish Feed Mills (mini)</td>
<td>15</td>
<td>50</td>
<td>3</td>
</tr>
<tr>
<td><strong>Markets and marketing infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction of fish retail markets including ornamental fish/aquarium markets.</td>
<td>100</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Construction of fish kiosks including kiosks of aquarium/ornamental fish</td>
<td>10</td>
<td>200</td>
<td>20</td>
</tr>
<tr>
<td>E-platform for e-trading and e-marketing of ornamental fish</td>
<td>Proposal/DPR based</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Innovative activities, Start-ups etc (10 lakh Gold fish for girl child)</td>
<td>DPR</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Genetic improvement</td>
<td>DPR</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Aquapark + Aquarium</td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Total (B)</strong></td>
<td></td>
<td></td>
<td>261</td>
</tr>
<tr>
<td><strong>Grand Total (A+B)</strong></td>
<td></td>
<td></td>
<td>576</td>
</tr>
</tbody>
</table>
Activities

- **Group A**: Activities related to production of ornamental fish (Setting up of production units including renovation).
- **Group B**: Activities related to Aquarium Fabrication, trade and marketing.
- **Group C**: Activities for promotion of ornamental fisheries sector through demonstration, establishment of public aquariums and organizing aquaria shows.
- **Group D**: Skill development and capacity building Programmes.
Potential for establishing aquaria in educational institutions

Number of Recognized Educational Institutions (EDUCATIONAL STATISTICS AT A GLANCE, MHRD-2018)

<table>
<thead>
<tr>
<th>Level/Year</th>
<th>Primary</th>
<th>Upper Primary</th>
<th>Secondary</th>
<th>Senior Secondary</th>
<th>College</th>
<th>University</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-16*</td>
<td>8405</td>
<td>4296</td>
<td>1395</td>
<td>1126</td>
<td>39071</td>
<td>799</td>
</tr>
</tbody>
</table>

Total number of schools: 15,22,200

Total number of colleges: 39,071

Proposed expenditure (10% School): Rs: 152.22 crore

Proposed Expenditure: Rs. 39.07 crore

*(Considering an Average unit cost for establishing a medium sized aquarium: Approximately Rs. 10,000)
Thank You