

Marine Ornamental Fish Culture: A Sustainable Alternative to Wild Collection in Andaman

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ABSTRACT

The Andaman and Nicobar Islands are well known around the world for their exceptional marine biodiversity and spectacular coral reef ecosystems. Marine ornamental fishes are one of these resources that are imperative to the global aquarium commerce. They support livelihoods but also raise concerns about reef impairment as a result of careless wild collection. Marine ornamental fish culture, which involves the controlled breeding and raising of ornamentals, provides a sustainable alternative that strikes a balance between economic development and conservation. The scope, methods, recompenses, and difficulties of Andaman marine ornamental fish culture, emphasizing its potential as a sustainable source of income for coastal communities while preserving delicate reef habitats.

INTRODUCTION

One of India's most pristine marine habitats, with vast coral reefs, seagrass meadows, and mangrove

forests, may be found on the Andaman and Nicobar Islands. A great variety of vibrant reef-associated species, including clownfish,

damselfish, wrasses, angelfish, and butterflyfish, are supported by these habitats. Many of these fish are highly prized in the international marine aquarium trade. Fish populations and coral health have historically been threatened by the damaging methods used to meet the demand for these fishes through wild collection (Bruckner, 2005; Rhyne *et al.*, 2012). Sustainable alternatives have been more popular in recent years due to worries about habitat degradation, dwindling fish stocks, and biodiversity loss. A potential remedy is marine ornamental fish production, sometimes referred to as aquaculture of ornamentals or captive breeding. This strategy is extremely important for island ecosystems like Andaman, where livelihoods and conservation must coexist.

Importance of Marine Ornamental Fishes in Andaman

Marine ornamental fishes have ecological significance in addition to being aesthetically pleasing (Sale, 2002). They are indispensable for maintaining coral health, controlling algae, and cycling nutrients in reefs. Reef resilience and general ecosystem stability are enhanced by the symbiotic interactions that many ornamental plants have with corals and other invertebrates. Marine ornamental fishes are a high-value, low-volume commodity from an economic standpoint. In contrast to food fish, ornamental species are particularly well-suited for island ecosystems with limited resources since they produce significant revenue without requiring extensive biomass harvest (Wabnitz *et al.*, 2003). For small-scale fishermen, young people, and female entrepreneurs, a single ornamental fish can fetch prices several times greater than those of edible species. Marine ornamental fisheries are strategically significant in the Andaman Islands for expanding sources of income beyond tourism and capture fishing. In addition to generating jobs in hatcheries, live-feed production, tank maintenance, packaging, and transportation,

culture-based ornamental production might lessen reliance on reef fishing. Additionally, captive-bred ornamental fish improve India's reputation as a sustainable and ethical provider in the global aquarium sector (Tlusty *et al.*, 2013). However, uncontrolled wild collection may result in physical harm to coral reefs, overharvesting of particular species, and disruption of breeding populations (Bruckner, 2005). Such effects can persist a long time for an environment as delicate as the Andaman. Therefore, it is essential to prioritize marine ornamental fish cultivation over extractive methods in order to balance economic growth, livelihood security, and conservation.

Potential of Marine Ornamental Fish Culture Over Wild Collection

Particularly in ecologically delicate areas like the Andaman and Nicobar Islands, marine ornamental fish production has significant promise over conformist wild collection methods. Andaman coral reef ecosystems are hotspots for biodiversity, yet they are extremely delicate and take a long time to recover from natural disruptions. When ornamental fish are collected indiscriminately in the wild, habitat is frequently harmed, breeding adults are removed, and ecological relationships are disturbed. According to Bruckner (2005), culture-based production greatly lessens the direct strain on natural reefs, enabling the long-term conservation of fish populations linked to coral and preserving the equilibrium of the ecosystem. The conservation of biodiversity is one of the most significant benefits of marine ornamental fish cultivation. Numerous attractive species that are targeted by the aquarium commerce have restricted home ranges and particular ecological needs. Loss of genetic diversity and localized population decreases may result from the ongoing removal of such animals from the wild. By diverting demand from reef exploitation and promoting the recovery of natural populations, captive breeding

contributes to the conservation of wild stocks. Preserving beautiful fish diversity offers numerous ecological and economic advantages in the Andaman Islands, where reefs also sustain tourism, fishing, and coastal defense. Captive-bred ornamental fishes are better than wild-caught ones from the standpoint of animal health and commerce. Fish raised in hatcheries are less vulnerable to stress during transportation and stocking because they are used to handling, artificial diets, and captive circumstances. According to studies, fish raised in captivity have stronger disease resistance, higher survival rates, and greater adaptation in aquarium settings than fish raised in the wild (Tlusty, 2002). As a result, there is a considerable decrease in mortality throughout the transportation and post-sale stages, which boosts merchants' profits and end users' happiness. Additionally, marine ornamental fish culture guarantees supply consistency and dependability. Seasonal weather, legal limitations, marine protected areas, and varying population availability are some of the factors that frequently limit wild gathering. On the other hand, year-round availability of specific ornamental species with consistent size and quality is made possible via hatchery-based production. In order to satisfy the demands of the global market, where consumers expect consistent supply of certified, sustainably farmed ornamental fish, this dependability is especially crucial. Culture-based production might help Andaman overcome the logistical obstacles posed by the island's topography and boost its competitiveness in the market.

Role of Institutions and Government Support

The Andaman Islands' marine ornamental fish culture is greatly aided by institutions and governmental organizations. Ornamental aquaculture receives technical advice, training, and research support from the ICAR-Central Island Agricultural Research Institute (CIARI)

and local fisheries departments (ICAR-CIARI, 2020). In order to help local people successfully implement culture-based methods, they hold seminars on broodstock management, larval rearing, water quality monitoring, live-feed production, and disease management (Rajan *et al.*, 2013). Small-scale business owners can receive financial assistance, infrastructure development, and training through government programs under the Blue Economy Mission, National Fisheries Development Board (NFDB), and Skill India initiatives (GoI, 2021). By lowering the initial investment burden and encouraging self-employment prospects, these programs assist in the establishment of hatcheries, nursery units, and community-based culture systems. Additionally, government-facilitated certification and quality control procedures guarantee that captive-bred ornamental fishes satisfy both domestic and international market standards, increasing their marketability (Tlusty *et al.*, 2013). Research dissemination and the uptake of cutting-edge technologies are strengthened when academic institutions, non-governmental organizations, and private players work together (Olivotto *et al.*, 2011). Model hatcheries, extension initiatives, and demonstration projects increase public understanding of conservation ethics and sustainable practices. Institutions and government organizations make it possible for the Andaman Islands to develop into a centre for environmentally responsible ornamental fish culture while preserving delicate coral reef ecosystems by combining policy support, scientific advice, and community involvement.

CONCLUSION

In the Andaman Islands, marine ornamental fish farming provides a feasible and sustainable substitute for wild fish harvest. This strategy preserves biodiversity, ecological balance, and lessens the strain on delicate coral reef ecosystems by encouraging captive breeding and culture-based production. It

ensures improved survival and adaptability of cultured fish while offering a steady, year-round supply of premium ornamental fishes that satisfy both home and foreign market demands. Additionally, in island communities, marine ornamental aquaculture fosters women's and youth entrepreneurship, skill development, and stable incomes. By offering technical advice, training, infrastructure, and market connections, ICAR-CIARI's institutional assistance, government initiatives, and partnerships with NGOs and academic institutions fortify the industry. All things considered, a comprehensive approach to striking a balance between economic growth, livelihood security, and environmental stewardship in the Andaman Islands is presented by combining sustainable ornamental fish cultivation with reef conservation and governmental assistance.

REFERENCES

- Bruckner, A. W. (2005). The importance of the marine ornamental reef fish trade in the wider Caribbean. *Reviews in Fish Biology and Fisheries*, 15(4), 405–417.
- Food and Agriculture Organization. (2020). *The state of world fisheries and aquaculture 2020: Sustainability in action*. FAO.
- Government of India. (2021). *Blue Economy Mission: Policy and Implementation*. Ministry of Fisheries, Animal Husbandry & Dairying.
- ICAR-CIARI. (2020). *Annual report 2020: Ornamental fish culture and mariculture research*. ICAR-Central Island Agricultural Research Institute.
- Olivotto, I., Planas, M., Simões, N., Holt, G. J., Avella, M. A., & Calado, R. (2011). Advances in breeding and rearing marine ornamental fishes. *Journal of the World Aquaculture Society*, 42(2), 135–166.
- Rajan, P. T., Sreeraj, C. R., & Immanuel, T. (2013). Fishes of Andaman and Nicobar Islands: A checklist. *Journal of the Andaman Science Association*, 18(1), 47–87.
- Rhyne, A. L., Tlusty, M. F., Szczebak, J. T., & Holmberg, R. J. (2012). Expanding our understanding of the trade in marine aquarium animals. *PLoS ONE*, 7(5), e35808.
- Sale, P. F. (2002). *Coral reef fishes: Dynamics and diversity in a complex ecosystem*. Academic Press.
- Tlusty, M. (2002). The benefits and risks of aquacultural production for the aquarium trade. *Aquaculture*, 205(3–4), 203–219.
- Tlusty, M. F., Rhyne, A. L., Kaufman, L., Hutchins, M., Reid, G. M., Andrews, C., Boyle, Hemdal, J., McGilvray, F., & Dowd, S. (2013). Opportunities for public aquariums to increase the sustainability of the aquatic animal trade.).
- Wabnitz, C., Taylor, M., Green, E., & Razak, T. (2003). *From ocean to aquarium: The global trade in marine ornamental species*. UNEP-WCMC.