

FAITT Transforming the Cage Fish Farming in Bor Dharan Tiger Reservoir through Innovation, Nagpur, Maharashtra

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Introduction

As part of a pilot project aimed at increasing freshwater fish production in Maharashtra, many entrepreneurs have embraced cage fish farming under the Govt. of India (GOI) subsidized scheme. Many entrepreneurs operate in the Bor Dharan reservoir, a man-made Tiger Reserve forest reservoir. This project aims to encourage diversification into aquaculture, particularly cage farming, among IT software, Engineer, and

MBA graduates in Maharashtra, which aligns with the state's Reservoir Fishery Policy.

The cages, which are of different dimensions and shapes, are enclosed spaces with intricate net walls that allow the exchange of fresh water. An opening on the top allows for feeding and maintaining the fish stock.





Maharashtra (MH) Cage culture

Maharashtra (MH) has one of India's highest fish consumption populations. The per capita fish consumption in the state was 4.72 kg in 2020-2021. 2021 -2022, MH produced 1.57 lakh metric tonnes of freshwater fish. However, the state imports freshwater fish from Andhra Pradesh to meet the demand for consumption. Experts say that the gap between supply and demand can be bridged with the cage culture technique for fish production. Cage farming has the potential to ensure the production of 20-40 kg of fish/per cubic meter, which can significantly contribute to meeting the demand and supply. In a reservoir-based cage culture, the minimum production in terms of biomass is at least 20-30 times more. Even the quality of fish is better because of the flowing water, compared to ponds where the water is stagnant.

At present, freshwater aquaculture in the state is very low pond-based. However, there are limitations to growth in pond-based aquaculture. "There are often conflicting cross-sectoral demands for water and land, and there is a huge capital investment required for pond-based aquaculture but without the adequate returns," Dr. Balaji, a fisheries and aquaculture specialist in India and lead of FAITT, a non-profit focused on sustainable aquaculture and fisheries. FAITT provides technical expertise to new entrepreneurs who have a passion for



Aquaculture. FAITT Experts and authorities envision cage aquaculture as a way to promote entrepreneurship in aquaculture and create job opportunities for local youth.

Young Entrepreneurs

MH's new initiative is considered investor-friendly, environmentally sound, and socially equitable, and it can be taken up by private entrepreneurs with FAITT partnerships. Expressions of Interest were invited from interested farmers and entrepreneurs to avail themselves of short/long-term leases of cages at Bor.

Bor is the bottomless freshwater reservoir, and we have seen that this tremendous freshwater resource has been lying unutilized," said Mr. G. Nanda, an entrepreneur who started cage culture farming with his partners. "A few years ago, when the government of MH started cage culture in a public-private partnership model, we had been following it up for results. And as the results were positive, we took up this opportunity." Mr. G. Nanda was the first entrepreneur to bring seed stock varieties. Together, they have four different blocks. One block can house 18 rectangular cages. The partners invested their hard-earned money for each block without expecting a subsidy.

Each block has a cage surface area of 1728 sq m and can accommodate a maximum of 18 rectangular cages of 6 m length x 4 m width x 4 m depth dimension cages of 16 m diameter. A target of around 4,000 - 5000 kg of fish can be harvested in a rectangular cage. After a one-time investment, however, there are monthly expenditures too. For instance, salaries for three farm members, including an aquaculture expert (FAITT), feed for nearly two lakhs (3,00,000) fish, fuel charges to ferry the boat, and other maintenance costs. The duo, however, is hopeful of returns. "This is the beginning for us," Mr. G. Nanda said. "But we have closely studied and researched cage culture. FAITT has supported it, and We have even visited other states where it has already been implemented to understand the results. Because this is a part of the food industry, a demand will always be to meet, ensuring sales and profit."

In their rectangular cages divided as nurseries (for fingerlings with more density) and grow-outs (for matured fish with less number per cage), they are growing the exotic *Pangasius* catfish (*Pangasius sutchi*) and tilapia variety of fish. Hardly 100 mts away from their cages, another young entrepreneur has invested in cages in 18 nos. His cages are the only ones that cultured *Pangasius* for two to three years but have not yet been harvested profitably due to improper management, improper feeding, and not having technical capability, skill, and knowledge.

These private entrepreneurs are leasing cage fish farming, completed for 6 months. Those entrepreneurs approached FAITT to support and transfer the technology of cage culture and target harvests of 150 to 160 tons of *Pangasius* with a 12-month culture period. FAITT is expecting a complete harvest before December 2024. Only then can they gauge profitability."

Encounters In front of FAITT

With a considerable investment, the new technology continues to face challenges in terms of market linkage, sustainability, disease outbreaks, poaching, and other input logistics. Cage culture, for now, relies on specific species that are not majorly found in local markets (Fig.1). "There is a need to create a market locally for these species," Dr. Balaji said. "They are in demand in neighboring states where we can eventually export the fish, but that also adds to transportation cost." He has yet to harvest his first batch of fish, and the lack of processing units also poses a challenge.

The entrepreneurs depend on neighboring states like Andhra Pradesh and West Bengal for inputs like feeds or seeds. "There is a lack of good quality feed for these species here in MH," Sarada added. "So, we rely on feed from Andhra Pradesh. But this also allows us to diversify into fish feed to cater to the local market."



In the Nursery period, Mr. G. Nanda lost 30% of their fingerlings to overfeeding. "Initially, due to a lack of proper awareness, we overfed the seeds in the nursery, losing 30% of our stock. We hired an FAITT expert to check any disease outbreak and control the mortality due to internal or external factors," Mr. G. Nanda said.



FAITT Successfully Transferred Technology.

- Easier handling, less maintenance, and successful harvesting of fish
- Better control of fish, faster growth, and higher production in less time.
- Protection from predators and competitors.

Simple observation and sampling of fish.

- Efficient use of feed and feed formulation support and own manufacturing
- High stocking density in the Nursery and planned the grow-out
- Feed technology - nutritionally complete and produce fresh and use
- Less Manpower requirement plan growing the fish Minimize the supervision during feeding
- Total harvesting and immediate return on investment.
- Simplified Harvesting Techniques
- Observation and sampling of fish is simplified.
- Effective and maximum utilization of cages
- Water Quality challenges were monitored with easy measurement techniques.
- Fouling of net cage and cleaning procedures and intervals
- The incidence of disease can be high, and diseases may spread rapidly, which is well-managed
- Vandalism or poaching is a potential problem when managed
- Navigation issues and threads of cyclones and waves were managed during and after feeding
- Unused feed and excreta can pollute and eutrophicate water sources well. A Balanced diet
- Conflicts in the local community.
- Predation from aquatic animals and birds.
- Regularly inspect nets for toning and escape.
- Creating professional opportunities for unemployed youth