

# Blue Economy: Opportunities, Technical Constraints and Future Needs of Offshore Mariculture in Bangladesh

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The development of a blue economy is firmly embedded in the development plans of Bangladesh. Advances in freshwater aquaculture have promoted Bangladesh to the fifth largest fish producer in the world. However, the marine resource base of Bangladesh, which is now even greater following the settling of disputes regarding maritime boundaries with neighboring countries, lends itself to the development of marine aquaculture - known as mariculture. Offshore mariculture in Bangladesh's waters presents both opportunities and challenges. Here are some key points

regarding the opportunities, technical constraints, and future needs of offshore mariculture in Bangladesh:

## **Opportunities**

**Abundant Marine Resources.** Bangladesh has a vast coastal and marine area and access to the Bay of Bengal, which is rich in marine biodiversity. The marine waters of the country extend to 1,18,813 km<sup>2</sup>. This offers significant opportunities for mariculture, which include various fish species e.g., hilsa shad (*Tenualosa ilisha*), seabass (*Lates calcarifer*) and grey mullet (*Mugil cephalus*), shrimp

e.g., black tiger shrimp (*Penaeus monodon*), brown shrimp (*Metapenaeus monoceros*), indian white shrimp (*Penaeus indicus*) and mud crab (*Scylla serata*), and other seafood. Some non-traditional marine species like seaweed, microalgae, shellfish (e.g., mussel, oyster), and sea cucumber also offer considerable potential.

**Increasing Demand.** The demand for seafood is rising globally, and Bangladesh is no exception. In the past decade, there have been a lot of changes in the food consumption habits of the people of Bangladesh, which can also be observed in the case of fish. As well as fish such as rui, catla, and hilsa, there is also an increased tendency among consumers to consume dried or frozen seafood. Today, people are also consuming marine fish such as rup chanda (*Pampus argenteus*), loitta (*Harpadon nehereus*), cuttlefish (*Sepia officinalis*), lakkha (*Eleutheronema tetradactylum*), red snapper (*Lutjanus johnii*), and tuna (*Thunnus* sp.). Especially in the coastal areas of Cox's Bazar, Chattogram, St. Martin's Island, and Kuakata, the consumption of various types of seafood, including crab, shrimp, lobster, and squid, has increased due to the increase in tourism. In addition, due to the development of various seafood restaurants in Dhaka and Chattogram, people's demand for seafood consumption is being met. As the overall consumption of seafood is increasing among the people of the country, the availability of freshwater and marine fish has also increased in the big supermarkets and fish markets of big cities. This is a positive aspect

for the country's fisheries sector. Offshore mariculture can help meet this increasing demand for high-quality seafood products, both domestically and for export.

**Economic Growth.** Mariculture can contribute significantly to economic growth and employment opportunities in coastal areas of Bangladesh, helping alleviate poverty in several ways:

- **Income Generation:** Mariculture operations, such as fish and shrimp farming, generate income for local communities. This income can be a vital source of financial stability for coastal residents who may rely on seasonal or unreliable sources of income from traditional fishing.
- **Employment Opportunities:** Mariculture requires a range of skilled and unskilled labor, including farm workers, technicians, and processing plant employees. This demand for labor can create jobs in the coastal areas, reducing unemployment rates.
- **Value Addition:** Mariculture often involves processing and value-addition activities such as filleting, freezing, and packaging seafood products. These activities create employment opportunities in processing plants, benefiting the local workforce.
- **Diversification of Income:** Coastal communities

traditionally rely on fishing, which can be subject to unpredictable catches and market prices. Mariculture provides an alternative and complementary source of income, reducing the vulnerability of these communities to fluctuations in fish stocks and prices.

- **Strengthening Local Supply Chains:** The development of mariculture can stimulate the growth of ancillary industries such as feed production, boat building, and equipment manufacturing. This strengthens the local supply chain, creating more employment opportunities.
- **Export Potential:** High-quality seafood products from mariculture operations can be exported, contributing to foreign exchange earnings for the country. This can bolster the national economy and provide additional income opportunities for coastal communities.
- **Technology Transfer and Training:** Mariculture development often involves technology transfer and training programs for local farmers. This knowledge transfer not only enhances their skill set but also opens doors to better employment opportunities within the sector.
- **Community Engagement:** Engaging local communities in mariculture projects can lead to cooperative efforts and

community-based enterprises. This can empower coastal communities to take ownership of their economic development.

- **Infrastructure Development:** The establishment of mariculture facilities, including hatcheries, processing plants, and transportation infrastructure, can improve overall infrastructure in coastal areas, benefiting both mariculture and other local industries.
- **Poverty Alleviation:** By providing a stable source of income, reducing unemployment, and enhancing the overall economic activity in coastal regions, mariculture can help lift communities out of poverty and improve their standard of living.

However, it's crucial to emphasize that the success of mariculture in poverty alleviation depends on sustainable and responsible practices. Overexploitation, environmental degradation, and improper management can have negative consequences. Therefore, it's essential to implement regulations, conservation measures, and community engagement to ensure that mariculture benefits both the economy and the environment while alleviating poverty in coastal areas of Bangladesh.

**Diversification of Income.** For coastal communities, mariculture can provide an additional source of income, reducing their dependence on

traditional, often unsustainable, fishing practices.

**Environmental Benefits.** Sustainable mariculture practices can have a lower environmental impact compared to some traditional fishing methods. It can also contribute to the restoration of degraded coastal ecosystems.

### Technical Constraints

**Infrastructure.** Developing the necessary infrastructure for offshore mariculture, including offshore cages or pens, processing facilities, and transportation, can be expensive and technically challenging.

**Environmental Factors.** Bangladesh's coastal areas are prone to extreme weather events such as cyclones and flooding. These can damage mariculture facilities and impact the health of cultured species.

**Water Quality.** Maintaining good water quality is essential for successful mariculture. Pollution, siltation, and eutrophication from industrial and agricultural runoff can pose significant challenges.

**Disease Management.** Disease outbreaks can devastate mariculture operations. Effective disease management strategies are essential to prevent and control diseases in cultured species.

### Future Needs

**Research and Development.** Investing in research and development to identify more suitable species for mariculture in Bangladesh's waters,

improve breeding techniques, and develop disease-resistant strains is essential.

**Infrastructure Development.** Building the necessary infrastructure for offshore mariculture, including floating platforms, hatcheries, and processing facilities, is a priority.

**Environmental Monitoring.** Implementing effective environmental monitoring programs to assess water quality and ecosystem health is necessary to mitigate environmental impacts.

**Capacity Building.** Providing training and capacity-building programs for local communities and mariculture operators to ensure they have the necessary skills and knowledge for successful operations.

**Collaboration.** Encouraging collaboration between government agencies, research institutions, and the private sector to promote sustainable mariculture practices and address technical challenges.

**Regulatory Framework.** Developing and enforcing a clear regulatory framework that promotes sustainable mariculture while safeguarding the environment and the interests of local communities.

**Risk Management.** Implementing risk management strategies, including insurance and disaster preparedness plans, to mitigate the impact of extreme weather events and disease outbreaks.

To conclude, offshore mariculture has the potential to boost the blue economy of Bangladesh by providing food security and export opportunities. However, it also faces significant technical and environmental challenges that need to be overcome. This will require a collaborative approach among government agencies, the private sector, and

research institutions to formulate and implement effective strategies for sustainable and responsible development of the industry.

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