

Aquatic (Blue) Food Systems and Blue Economy of Bangladesh: World Fish Initiatives

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Approach for Healthy People and Planet

Aquatic foods, often called blue foods, whether caught in oceans, lakes and rivers or sustainably farmed, release less carbon than land-based crops and livestock. They are packed with vitamins, minerals and healthy fats. Aquatic foods are healthy for people and the planet. It has been a time-demanding approach to turning attention towards the sustainable use of vast aquatic systems for harvesting (capture) and growing (culture) the various types of aquatic foods, both from animal and plant origin.

The victorious wins with having entitlement of sovereignty over 1,18,813 sq. km of the Bay of Bengal have opened up a new opportunity for Bangladesh to achieve sustainable economic growth through resources exploitation and ocean-based activities. The declaration of "Blue Economy" has become a national dream

of the people of Bangladesh. There are two major sectors in the new concept (i) Established sector - comprised of Fisheries both (artisanal and industrial), Aquaculture (coastal & mariculture), Fish processing (mainly of shrimp), Ports and warehousing, Marine transport, Shipbuilding and repair, Coastal tourism, Oil and gas and Salt production; and (ii) Emerging sector - Coastal and environmental protection, Off-shore wind energy, Ocean energy, Desalination, Biotechnology and Carbon sequestration.

About 68,000 artisanal fishing boats of different capacities and sizes are involved in fishing in the earmarked 40m depth zones in the coastal waters and significantly contribute to the total marine catch. Around 255 industrial trawlers are supposed to fish in the waters beyond 40m. A vast area of the deeper ocean remains untapped due to the lack of capacity. Marine catch contributes only 15% of the total fish production, where

85% of the total marine catch comes from the artisanal fisheries and the rest from the commercial fleets. It is high time for Bangladesh to pursue growth by capturing fisheries through science-based management and to rebuild depleted stocks.

The coastal aquaculture of Bangladesh is mainly comprised of tiger shrimp farming. This farming system grew unplanned and the farming practices, mostly traditional extensive seriously hit by environmental deterioration and the onset of various viral diseases. The mud crab (*Scylla Serrata*) farming in saline-affected rice fields in the Southwest region has been successful and extended to 27,000ha with a production of 13,000 metric tons.

In the true sense, mariculture has not yet started in this country and is still in its infancy. There are opportunities for mariculture of nontraditional marine animals like various types of shellfish (edible oysters, pearl oysters, green mussel, clam, abalone, and sea snails), sea snails urchin and sea cucumber.

Economic Values

The market price of marine fish varies widely from BDT 100/kg (US\$ 1.2/kg) to BDT 1000/kg (US\$ 11.6/kg), depending on species and size. The average price could be BDT 500/kg (US\$ 5.8/kg), so the approximate economic value of 6,71,104 tons of marine fish would be about BDT 33,555 Crores (US\$ 3.9 billion) per annum (Exchange rate, US\$1 = BDT 86).

The retail market price of Hilsa largely varies from BDT 400/kg (US\$ 4.7/kg) to BDT 1,200/kg (US\$ 14/kg) with an average of BDT800/kg (US\$9.3/kg) of fresh fish. Based on that, the direct economic value of 0.55 million metric tons of Hilsa is worth about BDT 44,000 Crores (US\$ 5.2 billion) per annum.

Shrimp is an essential export-oriented marine resource, and its annual production reached 42,816 tons from marine sources. The annual export value from shrimp and shrimp products is about BDT 2,949 Crores (US\$ 3.4 million) through exporting 30,036 tons of shrimp commodities (including cultured shrimp and prawns). Besides, Bangladesh exported about 12,686 metric tons of mud crab and earned 25.37 million USD in 2017.

WorldFish's Blue Economy Initiative

The USAID funded Enhanced Coastal Fisheries (ECOFISH Activity) of World Fish Bangladesh has taken following comprehensive actions towards biodiversity conservation and producing aquatic foods, including fish and other food organisms, popularly called blue foods, through the improvement of artisanal fisheries and coastal mariculture:

i) Blue Guards for Cleaner Environment & Healthier Ocean

ECOFISH II activity involved youth fishers as "Blue Guards" to keep the coastal waters clean. ECOFISH II has trained and inspired youths to get voluntarily involved in collecting plastics, abandoned nets and garbage from the beaches, coastal waters, and fishing boats to reduce pollution and make the marine environment habitat healthier for the beach users and biodiversity.

ii) Boat Skippers as Citizen Scientists

The boat skippers (Majhee) are responsible for the fishing boats' safe and efficient operation, including its safety and security, navigation, team management and legal compliance. Aiming to sensitize the boat skippers, ECOFISH has started countrywide training on various aspects of biodiversity conservation and responsible fishing. These specially trained boat skippers equipped with mobile phones act

as "Citizen Scientists". Half of them work in the coastal rivers to cover only the hilsa fishery and the other half covers the marine artisanal fisheries.

iii) Marine Protected Area (MPA) & Hilsa Sanctuary

Marine Protected Area (MPA) can enhance ecosystem resilience, conserve biodiversity, enhance fisheries and secure human well-being, thus contributing to the blue economy. ECOFISH and the Department of Fisheries, in collaboration with IUCN and WCS, delineated a total of 3,188 sq. km area of Nijhum Dwip seascape for declaring an MPA. The Ministry of Fisheries and Livestock declared the MPA under the Marine Fisheries Ordinance, 1983, in 2019.

The ECOFISH activity, in collaboration with the Department of Fisheries (DOF) and Bangladesh Fisheries Research Institute (BFRI), delineated and declared the sixth Hilsa sanctuary (82 km) in an important hilsa nursery grounds in Hizla and Mehendiganj in Barishal. The compliance of both brood hilsa fishing and Jatka fishing bans is implemented in this sanctuary, contributing to the higher recruitment of juveniles and higher production of Hilsa.

iv) Hilsa Fishery Revival through Co-management

ECOFISH introduced adaptive co-management in 2016. Co-management is an approach where government and stakeholders jointly prepare action plans and implement them for better compliance. ECOFISH with DoF created a revolving fund "Hilsa Conservation and Development Fund (HCDFY amounting to US\$ 0.43 billion as seed money to use the interest for the co-management committees.

As a synergistic impact of the general management activities and science-based

co-management through the ECOFISH project, the Hilsa catch increased from 5% to 11%. The fish size has also improved. The success of the Hilsa fishery management approach in Bangladesh has been adopted in the neighbouring countries and has become a role model for the small-scale capture fisheries.

v) Stock Assessment of Major Marine Fish

Since 2020, the ECOFISH project has focused on stock assessment of 10 major commercial species (Hilsa shad, Mackerel tuna, Indo-pacific king mackerel, Silver Pomfret, Black Pomfret, Threadfin, Indian salmon and Reeve's croaker) chosen from the artisanal fish catches. As part of the biodiversity conservation and assessment, the ECOFISH team also monitors the catch of megafauna.

vi) Assessment of the IUU Fishing at the Artisanal Fisheries Level

WorldFish/ ECOFISH assessed the status of IUU fishing by the artisanal fishers in the major coastal regions of the country. The IUU survey revealed that industrial trawlers caught 37,532 tons of marine fish illegally in waters below 40-metre depth and inside marine protected areas. Interviews with fisheries officers revealed that, on average, 24% of the landed fish are of illegal origin and caught through fishing operations contravening fisheries regulations in Bangladesh.

vii) Seaweeds Farming for Alternative Livelihood & Reducing Fishing Pressure

Aiming to create a new opportunity for an alternative livelihood and economic empowerment of fishers' women of Cox's Bazaar ECOFISH has taken initiatives to promote environmentally friendly mariculture of seaweeds along the coastal inshore marine waters. Seaweeds farming could create numerous employment

opportunities, especially to support the fishing households during 65 days of the marine fishing ban period, which will reduce illegal fishing and help conserve biodiversity, Seaweed farming requires no significant investment or expensive infrastructure. It does not require additional feed and still can convey lucrative returns within a short period. Seaweed farming is a climate-friendly production system that sequesters 'blue carbon' and thus reduces carbon footprints.

viii) Green Mussel Farming - A Potential Door to Blue Economy

The coastal waters of Cox's Bazar are ideal sites for green mussel farming because of the favourable environmental conditions, nutrient-rich waters and the natural abundance of green mussel spats. World Fish Bangladesh has been promoting green mussel farming for the economic empowerment of 200 fishing families, particularly fisherwomen and youths. Green mussel farming is a low investment activity; it requires only a few infrastructures and does not require additional feed inputs. This new mariculture dimension will provide a viable alternative livelihood approach for small-scale coastal fisherfolks during the fishing ban.

ix) Women-led Safe and Hygienic Dried Fish & Fish Powder Production

ECOFISH activity has taken the initiative to produce safe and hygienic dried fish and fish powder from the nutrient-rich marine pelagic small fish to revert the consumers' suspicion of taking dried fish into their daily diet. Until now, 1000 fisherwomen have already received the

complete package of training, low-cost infrastructures and necessary raw materials, including a regular supply of fresh marine fish. They follow the standard protocols of safe post-harvest handling from boat to drying platform.

Way Forward

The following actions are recommended for achieving Blue economic growth and for the marine resource conservation:

- > Need adoption of new legislation on "ecosystem-based fisheries management"
- > Introduce MCS as a tool for the management and conservation of marine resources
- > Assess the MSY of major commercial fish species and stock status of demersal and pelagic fishes and Tuna stock
- > Modernize the major fish landing centres and improve cold chain and post-harvest value chains
- > Introduce mariculture of high-value fishes, seaweeds and mollusks
- > Develop value-added products from marine bycatch and small pelagic fish
- > Derive pharma and nutraceuticals from marine algae and seaweeds to contribute to economic prosperity

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