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Editorial: Hilsa shad: progress in science and management

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Editorial on the Research Topic

[Hilsa Shad: progress in science and management](#)

Conservation of aquatic resources and species stands one of the top global challenges with increasing anthropogenic pressure on ecosystems under the changing climate. It has been well documented that freshwater fish species particularly those with anadromous migratory behaviour are declining at a faster rate, mostly due to the large number of river barriers, reduced river discharges, river siltation, pollution, overfishing, and climate change. Hilsa shad, *Tenualosa ilisha*, a regional anadromous migratory fish, is widely distributed in the Bay of Bengal (BoB) and Arabian Sea and significantly supports the livelihoods of more than 250 million people from Bangladesh, India, and Myanmar. Due to its cultural, social, nutritional, and commercial significance, the species is known as the national fish of Bangladesh, contributing 12% to the total fish production and >1% to Bangladesh's GDP; it is also regarded as the state fish of West Bengal, India.

Over the last 120 years, research efforts on the species biology, ecology, and aquaculture/domestication practices have been made in different regional countries at different periods of time. Since the 1940s, Indian scientists from Central Inland Fisheries Research Institutes (CIFRI) have made significant contributions on the food and feeding, migration, and reproductive biology of hilsa, while during the mid-1980s, researchers from Bangladesh contributed immensely toward the breeding and biology of the species. After the 1980s, it was recorded that the population of the species is slowly declining due to various factors including dams/barrages, river flows, and climate change. During 2012, a brainstorming workshop on "Hilsa: Status of Fishery and Potential for Aquaculture" held at WorldFish, Dhaka, felt that a regional collaboration is needed among the neighbouring countries of the Bay of Bengal (BoB), i.e., India, Bangladesh, and Myanmar, to conserve the hilsa population through different management approaches including the standardization of aquaculture practices. Furthermore, the Bay of Bengal Programme (BOBP) has been instrumental in developing the stock management of the marine fish species and has contributed significantly to hilsa fishery. Since 2020, the Government of India under the National Mission programme on Clean Ganga (NMCG) and National Agricultural Science Fund (NASF) initiated re-establishing hilsa fishery in the River Ganga and standardizing the hilsa culture. Due to innovative approaches and holistic management practices including the initiation of cage culture, adult fish ranching, artificial breeding, and river ranching of hilsa juveniles, the functional operation of fish locks in Farakka Barrage have



FIGURE 1
Recent developments in cage culture of hilsa in the river Ganga, Farakka, India (Courtesy: B.K.Das, ICAR-CIFRI).

resulted in re-establishing the lost hilsa fishery in river Ganga, India, after 43 years (Figure 1). These recent developments on hilsa fishery in India could be a lesson for other countries toward re-establishing the anadromous shad in other countries. Similarly, in Bangladesh, the contribution of United States Agency for International Development (USAID) Eco-fish Project (2014–2019) has resulted in the revival of hilsa fishery in the Gangetic River systems which is very encouraging and showing the effectiveness of the Government of Bangladesh's conservation and management measures. Efforts on hilsa fishery research in Myanmar by WorldFish have also been notable.

Since last decade much scientific information on the hilsa biology and management have been generated from Bangladesh, India, and Myanmar. Realizing the importance of the species and its management, this Research Topic on “*Hilsa Shad: progress in science and management*” attracted contributions from Bangladesh, India, and Myanmar on: i) *Climate change adaptation strategies for small scale fisheries in the coastal area of Bangladesh: social, economic, and ecological perspectives* by Mozumder et al.; ii) *Understanding the breeding phenology of anadromous fish *Tenualosa ilisha* in relation to climatic variables in Brahmaputra river, India*, by Borah et al.; and iii) *Research for development: evidence-based hilsa management improvements in Myanmar* by Akester et al. All these articles centre toward hilsa

fisheries and climatic variables and adaptation strategies. In fact, climate change has been one of the major factors affecting the river discharge, rainfall, water temperature, and salinity, directly impacting the breeding physiology and migration patterns of hilsa.

Therefore, in the present context, this Research Topic provides the latest scientific knowledge and management practices and policies on hilsa fisheries. This transboundary species needs to be scientifically managed among the neighbouring countries that share this common stock. Furthermore, a holistic and regional research and management effort on Hish fisheries is the need of the hour. We believe all the hilsa researchers of this South Asian region will join hands together for sustainable production of this most important single fish species through improved conservation, management, and aquaculture. We express our gratitude to all authors, co-authors, and reviewers from different regions for their significant contributions and meticulously reviewing the manuscripts. Our special thanks to the team at Frontiers in Marine Science for raising this Research Topic, which is the first of its kind.

Author contributions

AS: Writing – original draft, review, editing. MW: Editing and Validation.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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