

A Perpetual Struggle

The shocks from climate change have reduced incomes and adversely affected the livelihoods of fisher communities in Bangladesh

Often called the Land of Rivers, Bangladesh boasts a remarkable riverine landscape that has nurtured a flourishing fisheries sector. With about 230 rivers crisscrossing it, the country is one of the world's largest deltas along with the world's largest flooded wetland. The fisheries industry is a vital pillar

both industrial (trawler) and artisanal fisheries using wooden boats.

Historically, inland capture fisheries dominated fish production in Bangladesh. In 1983-84, they contributed a substantial 62.59 per cent to the country's total fish production; inland culture fisheries made up 15.53 per cent. There has been a notable shift, however, with inland capture fisheries contributing only 28.45 per cent in 2017-18, while inland culture fisheries account for a more substantial 56.24 per cent; marine fisheries constituted 16 per cent.

The sector faces a multitude of challenges, with the adverse effects of climate change standing out as a primary concern. Despite its relatively low carbon emissions, Bangladesh faces considerable challenges from climate change, making it one of the most vulnerable countries in the world. In 2018, the per capita carbon dioxide (CO₂) emissions for Bangladesh were a mere 0.56 tonnes, while countries like Saudi Arabia and the United States emitted 18.48 and 16.92 tonnes per capita, respectively.

A World Bank report projects that by 2050, Bangladesh's annual average temperature is set to rise by 1°-1.5°Celsius, affecting approximately 134 million people and incurring an estimated loss of US \$167 billion. Moreover, the life expectancy of the population may decrease by 6.8 per cent by 2050. The international NGO Germanwatch ranks Bangladesh as the ninth most affected country by climate change.

Bangladesh's susceptibility to the effects of climate change is

of the national economy, contributing 3.57 per cent to the gross domestic product (GDP) and an impressive 25.30 per cent to the agricultural GDP. Beyond economic contributions, fisheries play a pivotal role in ensuring food security, providing approximately 60 per cent of the nation's animal protein. This sector engages an estimated 18.5 million people directly, with women constituting 10-12 per cent of the workforce.

The national fisheries sector can be categorized into two primary groups: inland and marine fisheries. The former further divides into inland capture and inland culture fisheries, encompassing diverse aquatic ecosystems such as rivers, estuaries, beels (wetlands), floodplains, the Sundarbans, and the Kaptai Lake. The latter includes ponds, seasonal cultured water bodies, baors (oxbow lakes), shrimp/prawn farms, crab farming, pen culture, and cage culture. Marine fisheries consist of

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Small-scale fishers cast their nets near the shore, an age-old dance between man and the sea unfolds against the backdrop of the coastal horizon, Kutubdia, Cox's Bazar, Bangladesh

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compounded by its population density and socio-economic environment, as recognized by the Sustainable Development Goals (SDGs) progress report in 2020. The country faces increased occurrences of unpredictable rainfall, intensified floods, droughts, extreme temperatures, and other natural hazards, as reflected in Bangladesh's disaster-related statistics. A staggering 70 per cent of the landmass in Bangladesh is susceptible to flooding.

Climate change severely threatens the country's food security, affecting crop production, particularly rice. Water scarcity for pre-monsoon irrigation is already hampering the production of high-yielding variety rice that accounts for about 36 per cent of the total rice production. Saline intrusion threatens to reduce crop yields significantly. Additionally, water-related hazards, including floods, cyclones and storm surges, as well as

salinity in surface and groundwater, are hitting communities. Access to safe drinking water, proper sanitation and hygiene practices are persistent challenges, especially in coastal and char areas (lands surrounded by water), with fears of severe health consequences.

According to the Food and Agriculture Organization of the United Nations (FAO), extreme temperatures, erratic rainfall, floods, droughts, tropical cyclones, rising sea levels, tidal surges, salinity intrusion and ocean acidification are causing profound adverse effects on the lives and livelihoods of millions of people in Bangladesh. This onslaught of climate-related challenges threatens to undermine the socio-economic development achieved over the past three decades.

With approximately 40 per cent of its population living in poverty, the variable and unpredictable climate

adds another layer of complexity, significantly limiting livelihood options for the most vulnerable segments of Bangladesh's society.

Climate change

The unmistakable and distressing effects of climate change in Bangladesh manifest clearly in the case of river erosion on two crucial islands: Manpura and Kutubdia. Both these islands are inhabited by fisher communities grappling with the imminent threat of losing their homes and fishing grounds. The changing climate exacerbates the severity of river erosion, compounding the challenges these vulnerable communities face.

means of sustenance. Take Kutubdia, for example. Located in the Bay of Bengal, it functions as a upazila (sub-district) within the Cox's Bazar district. A majority of the island's inhabitants subsist primarily on farming and fishing. Over the past century, from 1880 to 1980, Kutubdia has lost a substantial portion of its landmass—about 65 per cent. What once expanded across 250 sq km has dwindled to a mere 59.56 sq km). Unrelenting erosion has forced more than 60 per cent of the population to seek refuge in urban areas.

Manpura Island, also a sub-district 80 km from Bhola district town (itself an island district), hosts a population of 125,000. Fishing is their livelihood. Over a 37-year period, from 1973 to 2010, the total land area of Manpura has steadily decreased from 148 sq km to 114 sq km.

This article draws from a series of focus group discussions (FGDs) with fishers. Conducted as part of a study sponsored by the International Collective in Support of Fishworkers (ICSF), these discussions took place in the coastal districts of Bhola, Cox's Bazar and Bagerhat. The insights shared by the fishers provide first-hand perspectives on the impacts of climate change, corroborated by previous studies and literature.

The fisher communities here have an up-close understanding of the tangible and often distressing consequences of climate change, given the stark shifts they have witnessed. The primary manifestation is the increasing frequency of cyclones and adverse weather. These disrupt fishing activities, preventing fishers from completing their trips successfully. In many instances, fishing expeditions are abandoned due to depressions or cyclones, leading to the loss of fishing nets and boats in the turbulent waters.

Residents of Cox's Bazar have been grappling with flash floods and waterlogging, previously uncommon. These present significant obstacles to aquaculture and fish capture. In Bhola,

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In Bangladesh, fisher families are perpetually struggling to save their homes, primarily because they reside in close proximity to rivers and coastal regions. The relentless forces of riverbank erosion are a never-ending threat, displacing thousands. A staggering 283 locations, encompassing 85 towns and growth centres along with a substantial 2,400 km of riverbank, remain exposed to unforgiving erosive forces. The major rivers, including the Padma, the Jamuna and the Meghna, persistently encroach fertile floodplains, rendering countless individuals landless and homeless each year. The results, often termed 'Internally Displaced Population' (IDP), reinforce a multitude of inescapable challenges for the affected population at various stages of displacement.

In the country's islands, many people rely on fishing. Here, river erosion compounds the already formidable challenges. The eroding riverbanks claim not only the houses of numerous fishers but also disrupt their

the rise in river erosion has compelled fishers to migrate in search of alternative livelihoods. Fishers in both Cox's Bazar and Bhola have noticed shifts in fish stocks, resulting in diminished catch; they believe fishes have changed their habitats. About 45 per cent of fishers have associated climate change, especially adverse weather conditions, with increased domestic violence, as uncertain weather conditions often leave fishermen without work, escalating family conflicts.

In the district of Bagerhat, fishers encounter reduced access to freshwater due to heightened saline intrusion. This leads to a declining stocks of freshwater fisheries. Flash floods wreak havoc on shrimp farms. Fishers engaged in pond and closed water body aquaculture have witnessed unusual diseases and fish mortality. They attribute these fish kills to the effects of climate change, such as unexpected winter rains that were historically rare in Bangladesh.

Frequent and heavy rainfall, even in winter, can disrupt ecosystems and impact fish populations.

The fishers' experiences and observations are supported by the findings of Hussain and Hoq (2018). Their research underscores the impact of climate change on fish reproduction, migration patterns and survival rates. Climate-induced floods, erosion and salinization of coastal lands further imperil both agricultural and freshwater fish habitat. Physical factors like temperature, rainfall and hydrology directly and indirectly influence fish reproduction, growth and migration.

The Ministry of Forest Environment and Climate Change's findings validate the Bagerhat fishers' concerns over saline water ingress. They emphasize the rise in sea levels, leading to saltwater intrusion. This, in turn, results in increased soil salinity, impacting crop cultivation and diminishing access to freshwater for

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A Small-scale fisherman carry fresh catch to the local market, weaving through the hustle with basket brimming with ocean treasures in Kutubdia, Cox's Bazar, Bangladesh

For more

Impacts of Climate Change on Coastal and Marine Fisheries Resources in Bangladesh by Hussain and Hoq (2018)

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Climate change and marine fisheries: Least developed countries top global index of vulnerability by Robert Blasiak et al. (2017)

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Knowledge and perception about climate change and human health: findings from a baseline survey among vulnerable communities in Bangladesh by Md Iqbal Kabir et al. (2016)

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Climate Change and Its Impact on Fisheries Resources in Bangladesh by Chowdhury et al. (2010)

https://www.researchgate.net/publication/280621080_Climate_Change_and_Its_Impact_on_Fisheries_Resources_in_Bangladesh

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Climate change impacts on a tropical fishery ecosystem: Implications and societal responses by Islam et al. (2020)

<https://www.mdpi.com/2071-1050/12/19/7970>

Extreme Climate Events and Fish Production in Bangladesh by Haque et al. (2019)

https://www.researchgate.net/publication/329707051_Extreme_Climate_Events_and_Fish_Production_in_Bangladesh

Social Development and Sustainable Fisheries: Bangladesh by Md. Mujibul Haque Munir (2023)

<https://www.icsf.net/resources/icsf-social-development-bangladesh/>

consumption and production. Climate change-related events such as floods, riverbank erosion, cyclones and storm surges disrupt infrastructure and fisheries practices, compelling fishers to adapt. Many have switched to cultivating saline-tolerant species like tilapia and porsa.

Chowdhury *et al* (2010) align with the perception of Bhola fishers engaged in closed water body aquaculture. They emphasize how increased evapotranspiration and reduced water bodies adversely affect fish habitat, leading to higher fish mortality due to habitat loss. Anticipated increased rainfall, driven by climate change, extends breeding grounds for freshwater fish but also raises the risk of flooding and damage to aquaculture infrastructure.

The ministry has identified multiple impacts of climate change on the fisheries sector, including alterations in fish breeding patterns, changes in species composition and distribution, and increased risks of disease outbreaks. These disrupt the aquaculture industry, affecting both major culture species and organic culture. Climate change-induced disasters damage fishery infrastructure and further imperil habitats, leading to changes in patterns of fish migration and distribution.

The study by Blasiak *et al* (2017) ranks Bangladesh as the 18th most vulnerable nation in terms of the impacts of climate change on marine fisheries, highlighting the heightened vulnerability of fishing communities living close to the coast and reliant on climate-sensitive fisheries resources.

Islam *et al* (2020) reveal the fishers' coping strategies. Migration to alternative areas and professions has become a necessity for many; they rely on cautionary signals of extreme weather from radio and text messages on mobile phones. Cyclone shelters, often provided by the government, serve as critical facilities during adverse climatic conditions. However, access to health services during disasters remains limited for some, posing a challenge to their well-being.

Haque *et al.* (2019) have assessed the economic losses suffered by the fisheries sector due to climate change. They vary across regions; the southern part of the country is the most vulnerable. Floods have particularly devastating effects on the fisheries sector. Kabir *et al* (2016) note the dire consequences of climate change, such as the influx of saline water, leading to fish mortality and crop damage. Mostafa A.R. Hossain underscores the severe losses experienced across aquaculture, agriculture and biodiversity due to climate change. Changes in temperature, habitat quality and migration patterns, along with increased disaster events, impact the livelihoods of grassroots stakeholders.

Host of challenges

Azad and Wadood (2017) emphasize the intertwined nature of poverty and climate change on fishing communities. Vulnerability to climate change-induced shocks has intensified for those heavily dependent on fisheries and aquaculture. These shifts in fishing patterns, growth and distribution have made the fishery-associated population more vulnerable, leading to income reductions and a host of socio-economic challenges.