

Hotter, Wetter, Saltier

The unique geography of Bangladesh makes it extremely vulnerable to climate change and warrants appropriate tools and strategies to combat and mitigate negative impacts

Bangladesh has been one of the countries most affected by climate change in the last 15 years. It is the seventh most vulnerable country on the Climate Risk Index 2020, according to a recent Germanwatch report.

Bangladesh is geographically unique and is home to one of the world's largest deltas formed by the Ganges-Brahmaputra-Meghna (GBM) river system. The GBM basin and the coast of the Bay of Bengal is characterized as a semi-enclosed tropical basin. Most of Bangladesh is less than 10 m above sea level. This makes the country extremely vulnerable to climate change, especially around the coastal areas, which are susceptible to cyclones, floods and other extreme weather events. This vulnerability is not only due to biophysical and geographical factors, but also due to the socioeconomic standing of Bangladesh in terms of its dependency on agriculture and fisheries, and its high population density. Poverty further exacerbates the situation.

An analysis in 2009 identified Bangladesh as one of top four Asian countries which is climate-vulnerable (besides Cambodia, Pakistan and Yemen), especially due to the importance of fisheries to the nation's economy and diet, and because Bangladesh has limited capacity to face the potential impacts of climate change. As of 2018, the total fish production of Bangladesh was 4.3 mn tonnes. The sector contributed to 3.57 per cent of the country's gross domestic product (GDP) and accounts for 60 per cent of the total animal protein intake of the country.

Bangladesh's vulnerability to the effects of climate change mainly comes from the country's dependence on agriculture. The rise in sea level is leading to the intrusion of saltwater

into the land. This increases soil salinity and creates poor conditions for crop cultivation, apart from decreasing the availability of natural freshwater for consumption and production. Climate-change effects such as floods, riverbank erosion, cyclones and storm surges, continue to cause losses of life, livelihoods and essential infrastructure; if this trend continues, fishers in Bangladesh may have to halt their practices. With sea-level rise and increased salinity of freshwater bodies, aquaculture, fish species distribution and biodiversity in the coastal areas

... vulnerability is not only due to biophysical and geographical factors, but also due to the socioeconomic standing of Bangladesh...

continue to be under threat. Saltwater intrusion has caused many fish farmers to end their usual practices, pushing them to adapt to the changes. Many are now using saline-tolerant species such as tilapia (*Oreochromis niloticus* and other genetically improved strains) and *parsa*. The case of hilsa (*Tenualosa ilisha*), which accounts for 13-14 per cent of the total fish production of Bangladesh, provides a good insight into the challenges faced by the country's fisheries.

Threefold increase

Hilsa production from inland waters has declined by about 20 per cent over the last 20 years, whereas the marine catch increased threefold. The major hilsa catch has gradually shifted from inland to marine waters, revealing that the availability of the prized fish is gradually declining in the Padma and Meghna river catchment areas.

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Effects of climate change	Impact of climate change on aquaculture and fisheries
Flood and river bank erosion	<ul style="list-style-type: none"> • High floods affect aquaculture—floods inundate and damage ponds, and release the fish, causing loss to fish farmers. Floods pollute pond waters and cause disease in fish. Siltation also occurs at the pond bottom due to silt being carried out by flood waters • River bed siltation by river bank erosion affects fish migration, breeding, production and the livelihoods of fishermen and women. Inland capture fisheries benefit from increased water
Cyclone and storm surge	<ul style="list-style-type: none"> • Loss of coastal fisher’s lives and assets (homes, nets and boats) • Damage to fish markets and disruptions in the value chain • Damage to aquaculture infrastructure (embankments, sluice gates), hatcheries and nurseries, and loss of shrimp and fish • Loss of coastal aquaculture production and damage to aquaculture infrastructure, affecting farmers’ incomes and livelihoods • Reduced employment opportunities and increased poverty
Sea level rise	<ul style="list-style-type: none"> • Salinity intrusion and increase of saline water area facilitates brackish water aquaculture • Increase of saline water area by inundation of low-lying coastal area will increase brackish water fish/shrimp production • Change in oceanographic parameters may affect marine fish stock, fish migration and biodiversity
Salinity intrusion	<ul style="list-style-type: none"> • Decrease in inland open water area, affecting freshwater fish production and livelihoods • Positive impact on coastal shrimp culture • Changes in aquaculture and fishing technology
Erratic rainfall	<ul style="list-style-type: none"> • Insufficient/irregular rainfall adversely affects the natural spawning of fish, and ultimately the production of fish and the livelihoods of fishers and fishworkers
Temperature rise and variation	<ul style="list-style-type: none"> • Affects breeding performance of fish and fish production in natural water bodies and fish/shrimp hatcheries • Changes in health of coral reefs and of aquatic biodiversity

For the GBM basin in winter, an expected reduction in the area covered by water bodies may cause favorable fish habitats to dry out, especially in the open-water bodies situated in the basin. This increases the fish death rate, and challenges the survival of open-water fishes due to the loss of their natural habitats. The anticipated rise in rainfall due to climate change will also result in increased river runoff, which is expected to extend the breeding ground for freshwater fish with higher nutrient availability. On the contrary, increased water runoff may cause floods and destroy aquaculture infrastructure. In

the table, these climate-change effects and their impacts on aquaculture and fisheries are summarized, based on Bangladesh’s Third National Communication to the United Nations Framework Convention on Climate Change (UNFCCC).

Recommendations

To address the challenges posed by climate change to coastal and riparian fishing communities in Bangladesh, we have a number of recommendations, based on the key findings of our review of literature. First, more research is needed to accurately anticipate the



A fisher with his nets in Moheshkhali, Cox's Bazar. Hilsa, which accounts for 13-14 per cent of the total fish production of Bangladesh, has declined by about 20 per cent from inland waters, whereas the marine catch has increased threefold

impacts of climate change on fish populations, and to identify salinity-tolerant species in coastal areas, and freshwater species in inland areas. This knowledge should be disseminated through channels appropriate for coastal fishing and fish-farming communities. Non-governmental organizations (NGOs) and civil society organizations (CSOs) can collect and disseminate a range of information on community mobilization, training, extension and credit disbursement so that the coastal community can adapt according to their needs.

Plans for long-term research on the impacts of climate change on marine and inland fishery resources in the Asia-Pacific region should be made a priority as the lack of continuous and updated data prevents effective policy and action. Geo-spatial mapping and planning should be improved by monitoring the formation of new shoreline areas and new mangrove areas. Additionally, early detection

methods for shifts in salinity should be identified and zones delineated to make appropriate adjustments to aquaculture practices.

Finally, the government can mobilize greater financial support and develop suitable projects for the sector. It should create a beneficial environment for climate-friendly investments (through taxing polluting industries and incentivizing 'green' production). It should enhance the business environment to attract more foreign investments to implement mitigation and adaptation processes that can benefit coastal areas and communities in Bangladesh.

Conclusion

Regardless of its low contribution to the global greenhouse gas (GHG) emissions, Bangladesh is extremely vulnerable to the adverse impacts of climate change. This vulnerability is amplified as the country's economy is dependent on the fisheries and aquaculture sector (12 per

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Floods in Jamalpur, along the Brahmaputra in Bangladesh. An analysis in 2009 identified Bangladesh as one of top four Asian countries vulnerable to climate change (besides Cambodia, Pakistan and Yemen)

cent of Bangladesh’s population relies on the sector for their livelihoods), and in terms of foreign exchange earnings from exports. Climate change could cause food insecurity and elevate poverty. If adaptive measures are taken, it could create more opportunities for improved fish-production practices and greater economic development.

In this respect, the government of Bangladesh needs to prioritize the challenges posed by climate change and coastal development. This can be achieved through researching and developing tools and strategies to combat and mitigate negative impacts. A co-ordinated long-term research study should be conducted on the impact of climate change on marine resources in the Asia-Pacific region. Assistance from the international community -- both technical and financial -- could result in better planning and implementation of sound policy measures. If effective implementation of such policies can be ensured, Bangladesh can be proactive in combating climate change and

ensuring the sustainability of its aquatic ecosystems and the development of its fishing communities.

For more

Climate Change and Fisheries: Perspectives from Small-scale Fishing Communities in India on Measures to Protect Life and Livelihood

http://www.icsf.net/images/monographs/pdf/english/issue_121/121_Climate_Change_17May12_3_53PM.pdf

Impacts of climate change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options

<https://www.fao.org/3/I9705EN/i9705en.pdf>

A Large Ocean State Seeks Change

https://www.icsf.net/images/samudra/pdf/english/issue_84/4484_art_Sam_84_art03_Kiribati_%20Aurlie_Delisle.pdf

Increasingly Vulnerable

A study has come up with specific recommendations for the development and welfare of the fisheries sector and its small-scale fisher communities in Bangladesh, the 'Land of Rivers'

With 230 rivers coursing through the country, Bangladesh is called the 'Land of Rivers'. It also has the world's largest flooded wetland. Rivers and water resources have made Bangladesh one of the world's leading fish-producing countries with a total production of 4.27 mn metric tonnes (MT) in 2017-18. The fisheries sector contributes 3.57 per cent to the national gross domestic product (GDP), 25.30 per cent to the agricultural GDP, and provides a 60 per cent share of animal protein. About 18.5 mn people are directly involved in this sector, of whom about 10-12 per cent are women.

A study was recently carried out with the backing of the International Collective in Support of Fishworkers (ICSF). Titled 'Bangladesh: Social

districts, namely, Bhola, Cox's Bazar and Bagerhat. The COAST Trust, a national-level non-governmental organization (NGO), supported the study.

Bangladesh has made significant progress in eradicating poverty. In this regard, there are a number of initiatives and projects, including extensive social safety-net programmes. It is, however, rare to have a separate scheme for fishers. Poverty remains a major challenge for Bangladesh fishers, despite the benefits from a number of poverty-eradication initiatives. According to this study, the country's fishing communities are still suffering from various forms of poverty.

Both the field data and secondary information show the unfortunate condition of the Bangladeshi fishermen in terms of almost all the indicators used in the study. The average annual income of the fishing communities was found to vary from US\$235 to US\$1,174, while the annual national income for Bangladesh is US\$2,064. The difference is very obvious. The data shows that the fisheries sector has, on average, more landless and homeless people than in other sectors, and fewer with access to electricity. The number of people under extreme poverty is higher. Though data shows fishing families have more access to drinking water and sanitation, in several areas they have to travel far to collect water. The sanitation quality is not up to the mark.

The survey showed that about 90 per cent of the houses are made of bamboo, tin and wood. The houses are small and congested, being between one to 50 years old. The houses are not safe, especially in the coastal region, which is susceptible to storm surges.

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Development and Sustainable Fisheries', its objective was to discuss the overall fisheries sector of Bangladesh, bringing out some social-development issues of the country's fishers' communities, focusing on small-scale and marginalized fishers. The study identifies some evidence-based situations, analyses the data and offers some specific recommendations. It uses both primary and secondary data and information. To fathom the socioeconomic conditions of the coastal fishing communities of Bangladesh, a survey was carried out to gather data, while interviews provided information from three coastal

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Creating jobs

Bangladesh has unique policies and initiatives in place to create jobs for all of its people. The government is introducing a number of measures to combat unemployment. There are special stimulus programmes for the manufacturing sector as well as for small and medium businesses and agriculture. The fisheries sector is given special attention. The Draft National Job Policy 2019 calls for assistance in the production of fish, because employment in this field comes under 'green jobs'. The policy also recognizes the importance of fisheries as one of the main rural industries.

Bangladesh has some specific policies and provisions in place to ensure that the labour sector as a whole has a decent working environment. But, in many cases, the reality lags behind the International Labour Organization (ILO) standard. The fisheries sector receives little attention in many cases. The study finds that small-scale fishers and fishworkers face a severe lack of decent working conditions.

The country's constitution gives the country an 'inclusive' character as it legally guarantees equal rights and opportunities for all. However, there are gaps and discriminations in several aspects of society, and in some cases there is a tendency to narrow the differences and to discriminate between sections of the population. The study did not find discrimination towards fisher groups for being fishers. In numerous cases, however, they face discrimination as disadvantaged and oppressed communities.

The State's policy is to ensure health services for all. It has a strong occupational health and safety policy. The public health programmes of the government are vast, reaching the village level with community hospitals. But the sector suffers from severe corruption and mismanagement. Though several sectors are trying to ensure occupational health and safety, the fisheries sector is yet to benefit much from such efforts. This study found that no support for occupational safety reached fishers during the COVID-19 pandemic.

Education is recognized as a fundamental right in the country's

constitution under Article 15. Primary education is compulsory. Girls get special scholarships and free education until class 10. Fishing communities also benefit from these measures, but the study found that fishers lag behind in terms of education and literacy, compared to the national situation.

The citizen's right to shelter is guaranteed in the constitution and there are various housing programmes in the country. Though there is no special housing exclusively for fishers, they do benefit from projects and programmes for the poor and the marginalized. Coastal fishers get support as people vulnerable to climate vagaries.

Bangladesh has special policies and programmes on water, sanitation and energy. There are schemes for the poor that encompass fishers. The study found almost all the fishing communities have access to drinking water and sanitation. The source of water in many areas is a bit far to access, and the quality of the sanitation is yet to improve.

...women members of fishing families still lag in terms of empowerment and other socioeconomic indicators.

Bangladesh is a pioneer in creating a national strategic plan and policies and programmes to fight the negative impacts of climate change. Fishers of Bangladesh are among the most vulnerable communities in this regard. While government policies and programmes do benefit fishers, the study shows that the suffering of these communities is increasing and their vulnerabilities are getting more severe.

A range of policies and strong measures protects women in Bangladesh. The country has some remarkable accomplishments with respect to gender equality. But, according to the report, women members of fishing families still lag in terms of empowerment and other socioeconomic indicators.

Access to justice

Multiple policies and processes are in place to ensure access to justice

DRUVO DASH



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Fisher's house, Pathrghata, Barguna, Bangladesh. The data shows that the fisheries sector has, on average, more landless and homeless people than in other sectors, and fewer with access to electricity

for the oppressed and marginalized. Yet, according to the study, fishers are unaware about government programmes and thus fail, in many cases, to obtain timely justice. Poverty and lack of information, networking and negotiating skills create barriers to the provision of proper facilities for fishers from various organizations.

The study has also come up with some specific recommendations for the development of the fisheries sector and for the welfare of the small-scale fisher communities. These include: legal recognition of small-scale fishers; special safety nets for the fishing communities; ensuring access to the open-water bodies, and protection of resources; access to credit and market for small-scale fish producers; measures to provide health services such as floating medical centres at sea; education facilities for children; and safety-at-sea measures. Gender-segregated data is a must to recognize the contribution of women. Also necessary are special

income-generating activity (IGA) support for the women members of the fishing communities; initiatives to ensure the sustainability of water bodies; insurance for fishers; provision of decent work; and measures for occupational safety. 3

For more

A Voice for the Coast

https://www.icsf.net/images/samudra/pdf/english/issue_63/3798_art_Sam63_E_art05.pdf

Making women in fishing visible

https://www.icsf.net/images/yemaya/pdf/english/issue_62/2401_art_Yemaya_62_Art1_Bangladesh_Mujibul.pdf

80pc marine fishers don't have enough safety equipment

<https://www.thedailystar.net/city/news/80pc-marine-fishers-dont-have-enough-safety-equipment-2074025>

The Coastal Association for Social Transformation Trust

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A Voice for the Coast

A countrywide consultation was held in Dhaka, Bangladesh, on the proposed FAO International Guidelines on Small-scale Fisheries

A national consultation process on the International Guidelines for Small-scale Fisheries (IGSSF) of the Food and Agriculture Organization of the United Nations (FAO) was recently organized in Dhaka, Bangladesh. The Coastal Association for Social Transformation Trust (COAST) organized the consultation to gather recommendations from stakeholders on the proposed guidelines. The International Fund for Agricultural Development (IFAD) provided financial support, while the International Collective in Support of Fishworkers (ICSF) rendered various resource services.

The consultation was the first of its kind to be held in Bangladesh. National-level programmes on fisheries, especially on small-scale fisheries, with the participation of members of the fisher community, are rare. There are few effective local or national platforms that fishers can use to raise their voices, which is why the Dhaka consultation process was taken as an opportunity to highlight the challenges facing small-scale fishers in the country.

They depend mainly on ponds, *beels* (small water bodies), lakes, canals, rivers and estuaries, which together cover 4.57 mn ha and employ 1.4 mn people. Bangladesh has a coastal area of 2.3 mn ha and a coastline of 714 km along the Bay of Bengal, which is also a great source of fish. About 296 fresh- and brackish-water fish species (including freshwater prawns) and 511 marine species (including shrimp) are available in the waters of Bangladesh. Most of the members of the country's fishing communities are illiterate and poor.

They enjoy few basic civic facilities, are not organized, and are not even aware of their rights as a result of which they are often exploited by moneylenders, musclemen and politicians.

In Bangladesh fishing has traditionally been the occupation of members of the Hindu Jaladas caste. Given the low social status associated with fishing, these communities historically occupied the lower rungs of the social hierarchy in rural communities. Even within the

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country's Muslim society, where caste is not recognized, groups traditionally involved in fisheries have been generally accorded a low social status. The problems facing fishing communities in Bangladesh include:

- natural disasters like floods, cyclones, tidal surges and droughts that damage crops and assets;
- social problems like dowry, polygamy, divorce, sexual harassment and land disputes;
- health problems that erode incomes due to unexpected medical expenses for the main wage earners; and
- financial problems resulting from high-interest loans from informal sources of credit, theft of assets like fishing gear and harvest, accidents, death of wage earners,

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A first-of-its-kind national consultation on the FAO IGSSF was recently held at the CIRDAP Auditorium, Dhaka, Bangladesh

lack of alternative employment opportunities, legal expenses for dispute settlement, and so on.

In recent years, the impact of climate change has been increasingly felt on the small-scale fisheries sector. Fishers are more vulnerable to natural disasters than others of the coastal area as they are the ones who depend primarily on rivers, estuaries and littoral waters for their livelihoods. Coastal fishers contribute to between 22 and 25 per cent of the total fish production of the country, although they are the first victims of natural disasters. Each cyclone or tidal surge kills hundreds of fishers (as happened in 2007 with the super-cyclone Sidr), and force many others to seek out the coasts of foreign countries, where they often face harassment and even imprisonment.

The effects of climate change can be seen in the coastal areas of Bangladesh in the form of sea-level rise (which can destroy mangrove forests and fish nurseries), a reduction of freshwater availability due to salinity intrusion, and an increase in the frequency of cyclones. Increasing salinity affects freshwater fish production, while rising sea temperatures may affect the distribution patterns of some fish species. These days Bangladesh's fishers find it increasingly difficult to fish near the shore, and have to venture into deeper waters.

In the face of natural disasters like storms and cyclones, many small-scale fishermen in Bangladesh have had to abandon their fishing trips in order to safeguard their lives, often losing their fishing nets and boats in the process. A successfully completed fishing trip generally requires about 14 days. If a 'potentially dangerous' Level 3 signal is sent out from a fishing port to warn of extremely rough sea conditions, the fishers, who normally spend 14 days at sea for a complete fishing trip, return to shore and take shelter. In 2007, around 22 warnings indicating a disaster intensity above Level 3 were issued.

Fishing trips that are abandoned during the peak seasons cause a significant erosion of incomes, and drastically affects the livelihoods of fishing communities. Yet there is little support from the Bangladesh government to help the small-scale fishers in crisis. On the contrary, some of its recent policies have been designed to support the large-scale sector, with water bodies being leased out to influential persons rather than bona fide fishermen.

It was in this context that the Dhaka consultation sought to:

- bring together under one roof all government agencies, non-governmental organizations (NGOs) and private-sector parties involved in small-scale fisheries;
- develop co-ordination among the groups working with the small-scale fisher community;
- ensure interaction with national-level policymakers on IGSSF, and engage in advocacy for the betterment of the lives and livelihoods of the small-scale fishers of Bangladesh; and
- prepare recommendations on IGSSF and also on how to engage in greater networking and advocacy for sustainable small-scale fisheries in Bangladesh.

Ensuring participation

To realize these objectives and to generate maximum and effective participation of fishers and related stakeholders, COAST organized the

Dhaka consultation in a different manner. To ensure participation from all possible regions of the country, COAST selected five sample regions of fisher communities—one from the coastal area, three from the riverine area (one sweet-water, one mixed-water and one saline-water) and one from a *haor* (a large water body) area.

In each area, two focus-group discussions (FGDs) were arranged with 15 participants in each FGD. Regional workshops were also arranged in each area to validate the FGD findings and to make a wider assessment. To complete the regional-level FGDs and workshops, a national-level workshop was organized in Dhaka with representatives from all the five regions, followed by a seminar to sum up the grass-roots consultations and presentations for the benefit of national policymakers.

A two-day orientation programme was held for the field resource persons in which 25 participants from five regions participated. Of the five from each region, three were small-scale fishermen community leaders and two were NGO officials who led the FGDs and district-level workshops. The regions represented were Bhola, Cox's Bazar, Khulna, Bogra and Sunamganj.

A total of 500 persons participated in the Dhaka consultation—300 fishers, 17 government officials, 19 political leaders, 35 journalists, 26 NGO workers, 40 businessmen, 34 academicians and 29 representing other professions.

One of the key objectives of the consultation was to create an effective platform for the marginalized fishers of Bangladesh and to identify who small-scale fishers are and what comprises small-scale fisheries. The participants defined small-scale fishers as those who earn their living and ensure their livelihoods by capturing fish from rivers and the sea. Other characteristics of small-scale fishers are: social and economic marginalization; the use of small fishing gear and vessels; nearshore (not deep-sea) fishing operations; reliance on open water bodies;

manufacture of vessels and nets on a small scale; and culture and processing of fish with investments of under 40,000 Bangladesh taka (BDT) or around US\$490.

The major problem identified by the participants at the consultation was the lack of legal recognition of fishers or fishworkers in the policies or laws related to the fisheries sector of the country. That was the reason for one of the key recommendations of the consultation—to provide identity cards for small-scale fishers. It was strongly suggested that fisher community members themselves should be asked to prepare the list of bona fide small-scale fishers.

Another major recommendation of the consultation was to search for alternative livelihood or income-generating options, considering that fishing is often seasonal. Financial support should also be provided

The major problem identified by the participants at the consultation was the lack of legal recognition of fishers or fishworkers...

during official fishing embargoes. A social-security net in terms of special quotas for the fisher community members was also demanded. Female members of the community should be trained for employment in fish culture and poultry farming.

Inadequate healthcare services for the fishers was pointed out as a severe problem. Demands were expressed for community clinics and mobile health centres on the rivers and the sea so that fishermen in distress can get free emergency treatment and medicines.

Educational demands

In the sphere of education, demands were made for primary schools in embankment areas, free educational material for the children of fishing communities, and special scholarships to help eliminate child labour.



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A local Member of Parliament from Sathkhira, Bangladesh, speaking at the regional workshop held to discuss the FAO IGSSF

There are various anomalies in the distribution of *khas* (government land) among the poor. At the consultation, fishers, who are mostly landless, demanded proper distribution of *khas* land.

Considering the power exercised by middlemen and moneylenders on the community, participants also recommended easy access to credit for fisher community members, which would help them access markets better.

Fishers in Bangladesh do not enjoy any health insurance or emergency medical aid schemes. In this context, demands were made for potable water supply, ambulance services and free health insurance.

Cancellation of the leases on open water bodies was strongly recommended to make sure that small-scale fishers enjoyed continuing access to fisheries resources.

Perhaps the most important outcome of the Dhaka consultation was the creation of an organization for the fisher community of Bangladesh, the National Fisher Folk Solidarity Forum. COAST will provide the secretarial and technical support

for the Forum, which is expected to become an effective community-based platform that fishers can use to make their voices heard locally and nationally.

For more

www.coastbd.org

The Coastal Association for Social Transformation Trust

www.coastbd.org/images/stories/events/seminer18102012/English_Press_release.doc

Press Release about the Workshop

www.fisheries.gov.bd

**Department of Fisheries,
Government of Bangladesh**