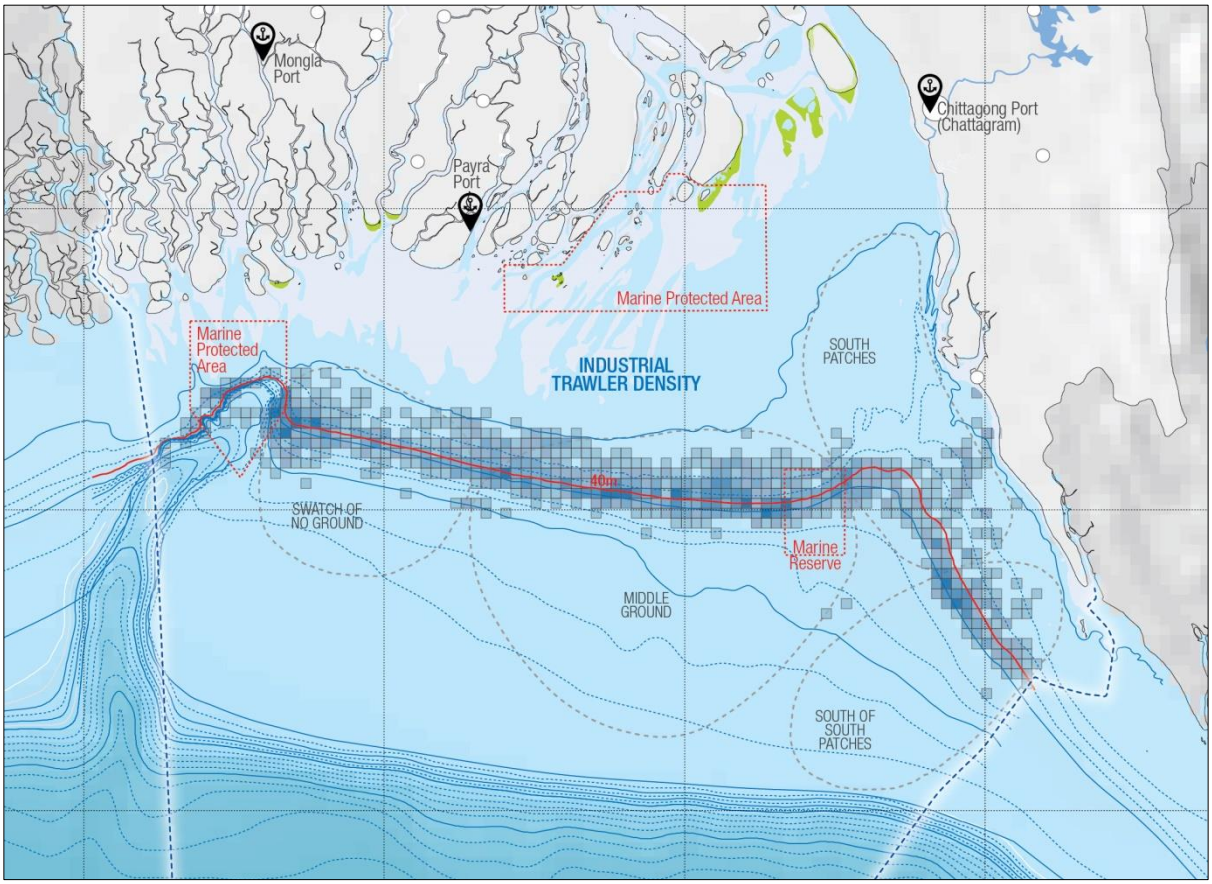
# Bangladesh Marine Fisheries Management Plan: Part 2- Artisanal

## Based on the Ecosystem Approach to Fisheries Management (EAFM)





**Department of Fisheries**
**Ministry of Fisheries and Livestock**



**December 2021**

## Abbreviations

| | |
|---|---|
| ABNJ | Area beyond National Jurisdiction |
| AIS | Automatic Identification System |
| BCG | Bangladesh Coast Guard |
| BFDC | Bangladesh Fisheries Development Corporation |
| BFRI | Bangladesh Fisheries Research Institute |
| BMFA | Bangladesh Marine Fisheries Association |
| BN | Bangladesh Navy |
| BOA | Boat Owners Association |
| WFTOA | White Fish Trawler Owners' Association |
| CMC | Co-Management Committee |
| CPA | Chittagong Port Authority |
| CPUE | Catch per Unit Effort |
| DoF | Department of Fisheries, Bangladesh |
| DoS | Department of Shipping |
| EAFM | Ecosystem Approach to Fisheries Management |
| ECDIS | Electronic Chart Display Information System |
| ECA | Ecologically Critical Area |
| EEZ | Exclusive Economic Zone |
| ESBN | Estuarine Set Bag Net |
| ETS | Endangered &Threatened Species |
| EU | European Union |
| FAB | Fisheries Advisory Body |
| FMP | Fisheries Management Plan |
| FPI | Fisheries Performance Indicator |
| GoB | Government of Bangladesh |
| HACCP | Hazard Analysis Critical Control Point |
| HCR | Harvest Control Rule |
| HFMP | Hilsa Fisheries Management Plan |
| IPOA | International Plan of Action |
| IUU | Illegal, Unreported and Unregulated |
| JMC | Joint Monitoring Centre |
| JMC-CC | Joint Monitoring Centre Coordination Committee |
| KPI | Key Performance Indicator |
| MCS | Monitoring, Control and Surveillance |
| MFO | Marine Fisheries Office |

| | |
|---|---|
| MFR | Marine Fisheries Rules |
| MFSC | Marine Fisheries Surveillance Check Post |
| MFSMU | Marine Fisheries Survey Management Unit of DoF |
| MMO | Mercantile Marine Office |
| MoFL | Ministry of Fisheries and Livestock |
| MPA | Marine Protected Area |
| MR | Marine Reserve |
| MSY | Maximum Sustainable Yield |
| NPOA | National Plan of Action |
| PSO | Principal Scientific Officer |
| SDG | Sustainable Development Goal |
| SOP | Standard Operating Procedure |
| SP | Sailing Permission |
| TAE | Total Allowable Effort |
| VMS | Vessel Monitoring System |

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# 1 SECTION A: Introduction and Background

## 1. The status of this document

This document presents the artisanal marine Fisheries Management Plan (FMP) based on the ecosystem approach to fisheries management (EAFM) for sustainable harvests of marine fisheries resources by both artisanal and mechanised fleets as defined in Marine Fisheries Act 2020.It is the second document of two, and other is the industrial marine Fisheries Management Plan. These two documents outline comprehensive fisheries management plans for all marine fisheries in Bangladesh for the period 2021 to 2025.

## 2. Vision and Overall Objectives

The marine fisheries of Bangladesh provide economic benefits and livelihoods through sustainable management of fisheries resources and conservation of ecosystem health. Management of marine fisheries under the ecosystem approach to fisheries management (EAFM) includes due consideration of human well-being, ecosystem health, and good governance through a comprehensive co-management planning process.

## 3. Marine capture fisheries overview

Although Bangladesh has over 118 thousand square kilometres of sea area in the Bay of Bengal to a depth of about 2200 meters, its known marine fisheries resources are presently limited to the shallow shelf-sea, to a depth of about 80 m, which constitutes only about 36% of the Exclusive Economic Zone (EEZ). Only about 14,600 $km^2$ (12%) are fishing grounds of commercial significance within the shelf sea area. Only a small fraction of the several hundred known species of fishes, shrimps, crabs and other animals caught in this multi-species fishery are of economic and fishery significance.

The Blue Economic Development aspiration of the nation mandates to achieve Sustainable Development Goal (SDG)-14 targets as stipulated by the United Nations' SDGs. Moreover, fulfilling other international obligations on one hand, and relatively small area and finite fisheries biomass on the other, striking a balance between fisheries resource economy and long-term marine fisheries sustainability will require carefully crafted fisheries policies, strategies and plans.

Report on research surveys by RV Meen Shandhani and stock status analysis in recent years (2016-2019) indicate that most of the commercially important marine fishes in Bangladesh have been overexploited and are currently depleted to varying degrees. None of the economically significant marine stocks appears to be capable of recovery under the current fishery regime. The overfishing situation could likely turn worse in a few years unless effective and restrictive fisheries management plans are enforced.

In the last five years, total annual marine fish catches from Bangladesh waters are 626-671 thousand MT. The majority (~83% recently) comes from the large number of artisanal vessels predominantly operating in shallow waters (<40 m). The catch of 220 active industrial trawlers (2019-2020), which are allowed to operate in waters beyond 40m depth contour, makes up the rest.

## 4. Specific fisheries management principles

The following specific management principles were recognised and promoted in developing and establishing the FMP. Management principles to support efficient fisheries management plans with high compliance and are reflective of and adaptable to the uncertainties in fisheries. These are:

- Good governance practises facilitating fisheries rules and regulations and adequate resources and arrangements for compliance and enforcement.
- Fish stocks and communities are finite; thus, their annual biological production limits their potential yield, which must be scientifically estimated annually for fish stock management purposes.
- The biological production of a fish stock depends on the size of the fish stocks and the ecological environment. Management functions must set target reference points through data collection and monitoring fisheries assessment and environmental impacts.
- A sense of “ownership” and a long-term stake in the resources for those (individuals, communities or groups) with access are most conducive to maintaining responsible fisheries. A system of adequate and appropriate access rights must be established and enforced.
- Active cooperation and coordination across government agencies to oversight and deter illegal marine fisheries activities;
- Adaptive management that embraces change through learning and adapting;
- The precautionary approach that does not delay action because of lack of information and manages the fisheries cautiously when uncertainty exists;
- Reorient sector performance towards "Volume to Value", reducing pressure on fishing;
- Effective participation in the management process by fully-informed users is consistent with the democratic principle, facilitates identification of better management systems and encourages compliance with laws and regulations through communication.
- Establish clear and rational key fisheries performance indicators (KFPI) for the fundamental fisheries management measures, regularly monitored and appraised.

The fisheries management plan (FMP 2 Artisanal) is a "living document" and will be biennially updated to guide fishery management and be responsive to policy adjustments.

## 5. Scope of the FMP

This plan outlines the current rules, regulations and management measures governing the artisanal fishery. It is intended to be used by stakeholders and explain the management measures necessary to conserve and regulate the artisanal fishery.

## 6. Implementation

Although this FMP covers the fishing years 2021-2022 to 2024-2025 inclusive, it may be reviewed biennially, based on the best scientific information available and the performance of the fishery achieving stipulated targets against indicators and benchmarks set in the plan. The plan will be amended as required, based on the biennial reviews. Department of Fisheries (DoF) and other concerned agencies from marine domain & stakeholders will implement the measures specified in the plan. Biennial reviews will be presented to stakeholders through the consultative process.

## 7. The National context of the FMP

The marine fisheries of Bangladesh consist of the industrial fleet of 262 large trawlers and the artisanal fleet of over 67,000 smaller vessels, of which at least half are mechanised to some degree. These two major marine fleets are managed separately; however, fisheries management recognises they share many resources and are interdependent. The Government of Bangladesh (GoB) has recognised the need to sustainably manage and conserve marine fisheries resources to achieve SDG-14 (life below water) targets and harness the potential from blue growth initiatives.

This FMP 2 applies to all marine capture fisheries conducted by the country's artisanal & mechanised fishing boats. This fishery is mostly limited to the 40 m depth contour area. The FMP covers the full range of all small and large pelagic species, demersal and shrimp species, along with non-target and dependent species (endangered and threatened) fished by artisanal fishers.

# 2 SECTION B: The Marine Fisheries Resources

## 1. The state of the marine resources

There are four significant fishing grounds identified in the marine water of Bangladesh, comprising a total area of 14,600 sq. km. (Figure 1). Species composition on the different grounds varies somewhat, as shown in Table 1.

**Table 1 Major species on marine fishing grounds (adopted/updated from Hussain, 1982)**

| Name | Location | Major commercial species |
|---|---|---|
| South Patches | 90°10' - 90°50'E<br>21°10' - 21°40'N | Indian salmon, Hilsa, Pomfret, Ribbon fish, Bombay duck, Eel, Croaker, Catfish |
| South of South Patches | 90°30' - 90°40'E<br>20°45' - 21°10'N | Pomfret, Red snapper, Croaker, Carangids, Grunter, Ribbon fish, Shrimp, Mackerel, Tuna |
| Middle Ground | 90°00' - 90°40'E<br>21°00' - 21°25'N | Hilsa, Snapper, Grouper, Croaker, Shrimp, Arius, Tuna |
| Swatch of No Ground | 89°00' - 89°50'E<br>21°00' - 21°40'N | Hilsa, Pomfret, Ribbon fish, Bombay duck, Croaker, Shrimp, Tuna |

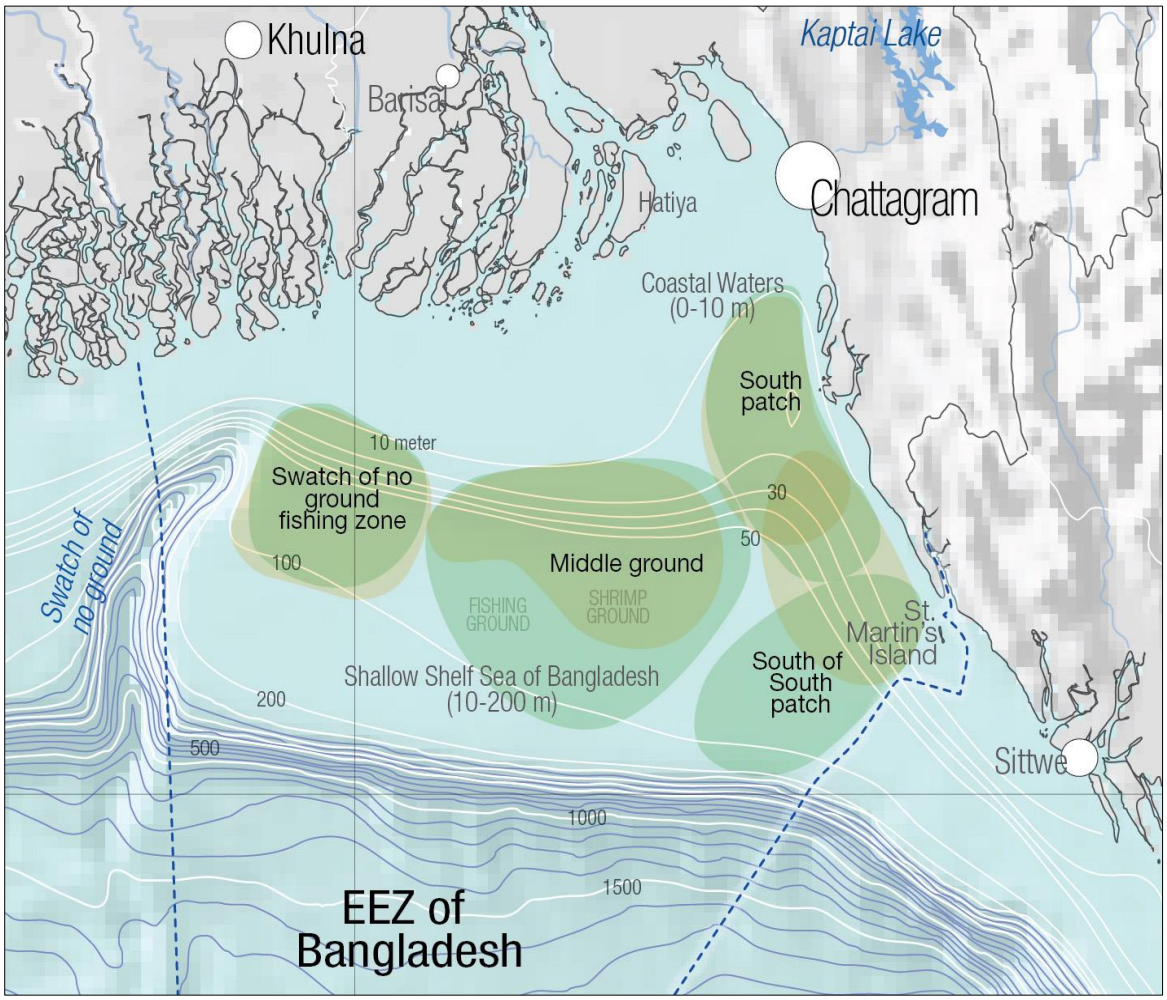


**Figure 1 Named fishing grounds on the Bangladesh continental shelf.**

The industrial sector may operate only in waters beyond 40 m depth contour and outside marine protected areas (MPA)/marine reserve (MR). Geographic waypoints define the 40 metres depth contour shown in figure 7. The artisanal fleet can fish all waters except marine protected areas/marine reserves.

## 2. Science-based fisheries management

Recent stock assessment analyses have indicated the state of the marine fisheries resources without specific quantitative estimates analyses due to research limitations. They provide solid and consistent indications that the marine fisheries are generally overfished. The present trend of increasing total landings is reducing economic value overall and is unsustainable in the long term. This advice is formulated under the new consensus that sustained fisheries are less prescriptive but more process-oriented and adaptive.

The analyses indicated mixed trends for different finfish groups, with increased catches of small pelagics, especially sardines, offsetting to some degree the depletion and overfishing of larger sized and more valued species groups. Mortality estimates for sardines suggest the group is being overexploited and is somewhat depleted. The increase in shrimp catches by the midwater trawlers reveals they are being operated on the bottom, negating the potential selectivity benefits of that gear type. The overall shrimp biomass trend has been consistently downward over 30 years. More detailed information on species mix in the industrial shrimp catches since 2005 show the catch rates for tiger shrimp (most valuable) and brown shrimp are declining steadily.

The overall observation from the most recent stock assessment work was that marine fisheries resources are heavily exploited, with some species severely depleted and in urgent need of rebuilding. The most heavily overexploited species groups include many larger and more valuable species, such as Indian salmon and large croakers. The results for Indian salmon (*Leptomelanosoma indicum*), the most valuable finfish species in Bangladesh, showed it was severely depleted, and overfishing was ongoing. Species in this condition are at significant risk of commercial extinction and could be extirpated without specific management protection.

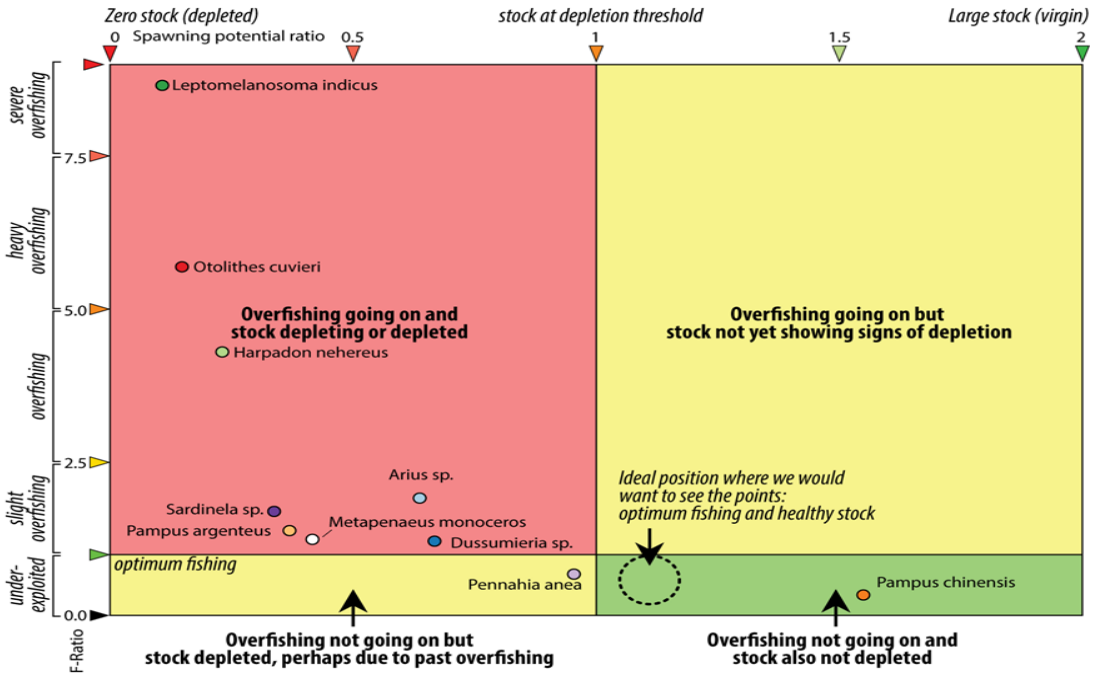


**Figure 2 Phase plot of the status 2019**

In the management considerations stemming from the stock assessment work, it was noted that the current management practice permits excessive and increasing fishing effort and recommend measures to stop artisanal fleet growth and responsibly begin reducing industrial fleet capacity are urgently required. Even decisive management intervention will require years of consistent and effective control to see the resulting benefits.

### 3. The ecosystem considerations

Over the last two decades, the increasing catches for the marine fisheries have seen substantial declines in catches of high valued and large demersal species such as jewfishes, grunters, snappers, pomfrets, and catfishes against increasing catches for less valuable small species such as sardines, Bombay duck, and threadfins. This pattern of serial depletion of high-value and slow-growing species has been described in many overfished ecosystems and is referred to as fishing down the food web (or food chain). As far back as 2008, this had been noted in Bangladesh fisheries (Huntington et al., 2008; reproduced in, the artisanal sector contributes over 80% of landed total catch value.[i])

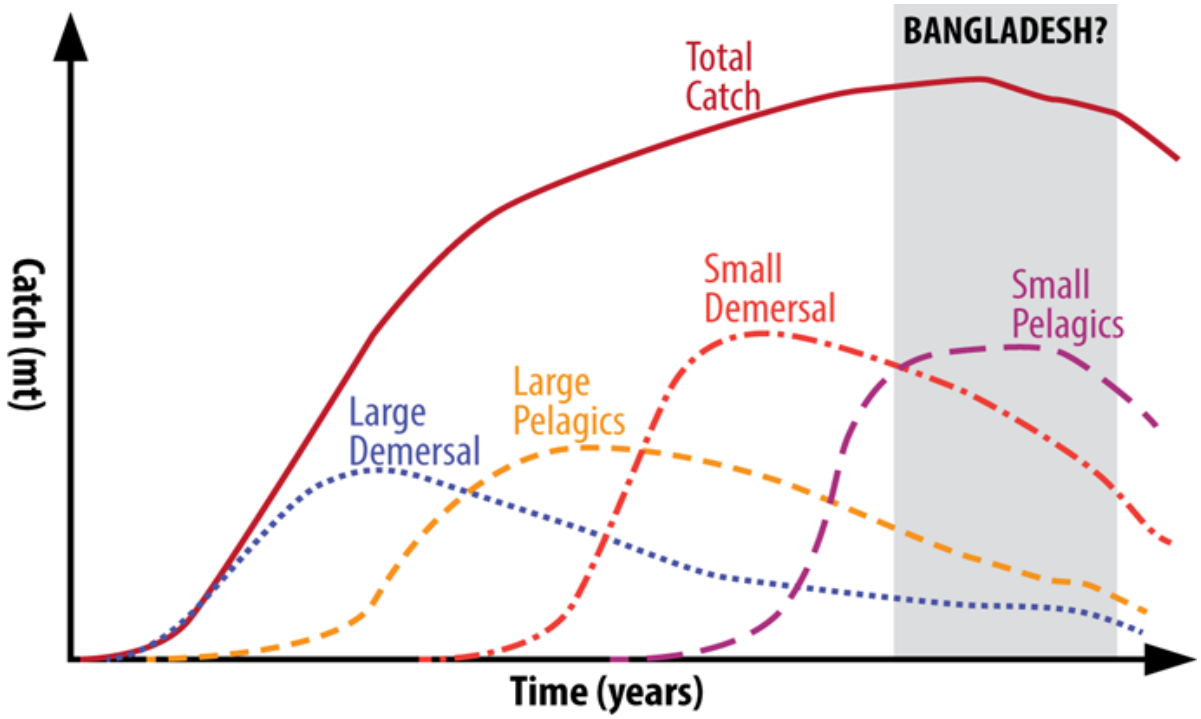


**Figure 3 Status of Bangladesh marine fisheries in food web dynamics indicates significant ecosystem change through "fishing down the food chain" (Huntington, 2008)**

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# 3 SECTION C: The Development of Artisanal Fisheries in Bangladesh

## 1. The development of marine fisheries in Bangladesh

The artisanal marine sector accounts for almost 83% of the marine fisheries production and about 13% of national fish production, as highlighted in Table 2 below.

**Table 2 Reported national and marine fisheries production in Bangladesh 2019-20**

| Fisheries Sector | Production (MT) | Percent of total production | Percent of marine production |
|---|---|---|---|
| Inland fisheries total (capture & culture) | 3,832,267 | 85.1% | |
| Industrial marine fisheries | 115354 | 2.56% | 17.19% |
| **Artisanal marine fisheries** | **555,750** | **12.34%** | **82.81%** |
| Marine fisheries total | 671,104 | 14.90% | |
| National total | 4,503,371 | | |

Source: *Yearbook of Fisheries Statistics of Bangladesh*, DoF, 2020

The fisheries sector's contribution to the national GDP, including aquaculture and inland and marine capture fisheries, is 3.69%, including the 0.45% contribution of the artisanal marine fisheries.

**Table 3 Marine fisheries production (MT) historical summary and recent trends in Bangladesh**

| Time frame | 1993-94 | 2003-04 | 2013-14 | 2015-16 | 2017-18 | 2018-19 | 2019-20 |
|---|---|---|---|---|---|---|---|
| Industrial | 12,454 | 32,606 | 76,885 | 105,348 | 120,087 | 107,236 | 115,354 |
| Artisanal | 240,590 | 422,601 | 518,500 | 521,180 | 534,600 | 552,675 | 555,750 |
| **Total** | **253,044** | **455,207** | **595,385** | **626,528** | **654,687** | **659,911** | **671,104** |

Source: *Yearbook of Fisheries Statistics of Bangladesh*, DoF, 2020

Although the gross production of marine capture fisheries continues to increase due to a decades-long expansion of the fishing fleet, it has slowed down, as shown in table 3 and figure 4. Recent fisheries research by DoF's MFSMU and stock assessment surveys carried out by RV Meen Sandhani from 2016 to 2019 reveals that two commercially valuable fish species are heavily overfished, one grossly overfished, four slightly overfished and only two in a healthy state[1].

The catch rates (catch per unit effort, CPUE) in table 4 show stable CPUE for the industrial and artisanal mechanised fleets but a severe decline for the non-mechanised vessels. This CPUE level for the industrial and the mechanised vessels is maintained by fishing down the food chain. The most heavily overexploited species groups include many larger and more valuable species such as Tiger shrimp, Indian salmon, and large croakers, replaced by lesser value species lower in the food chain.[2] The hilsa stock recovery has benefited the mechanised boats, which have increased their share in the total hilsa catch by 10% or from 80% to 88% in recent years.

[1] Ref. Almamun, A. et al. 2021. Stock Assessment for Seven Fish Species Using the LBB Method from the Northeaster on Bay of Bengal, Bangladesh.

[2] Ref. Marine Fisheries Survey Reports and Stock Assessment 2019, p. 2.

**Table 4 Annual average CPUE development by fleet groups 2015-16 to 2019-20 (MT)**

| Time Frame | 2015-16 | 2019-20 | Change |
|---|---|---|---|
| Industrial trawlers; annual average CPUE | 427 | 461 | 4.9% |
| Artisanal Mechanised Vessel; annual average CPUE | 14 | 15 | 7% |
| Artisanal Non-Mechanised Vessel; annual average CPUE | 8 | 2 | -81% |

Source: *Yearbook of Fisheries Statistics of Bangladesh, DoF, 2020*

Table 5 shows the average annual increase of the marine fishing fleet over almost a decade to be just over 5.7 % annually and the total fish catch grew annually by 2.5 %. The fleet growth is double the growth in catch volume. The figures show a tremendous fleet expansion over a relatively short period. Over the period, a new trawler was added to the fleet every month at an average.

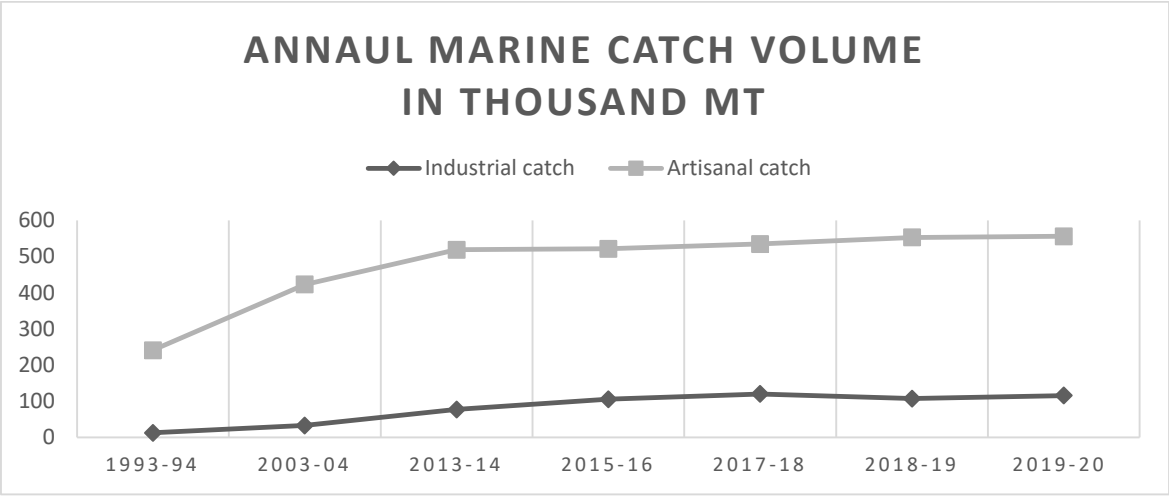
**Table 5 Numbers of artisanal boats and industrial fishing vessels in Bangladesh**

| Time Frame | 2010-11 | 2019-20 | Change |
|---|---|---|---|
| Industrial trawlers | 158 | 257 | 58% |
| Artisanal Mechanised Fishing Vessel | 21,726 | 32,859 | 51% |
| Artisanal Non-Mechanised Fishing Vessel | 23,651 | 34,810 | 47% |
| Fishing Vessels Total | 45,525 | 67,889 | 51% |
| **Total annual marine catch (MT)** | **546,283** | **671,104** | **23%** |

Source: *Yearbook of Fisheries Statistics of Bangladesh, DoF, 2020*

These figures in Tables 3, 4 and 5 indicate strong overfishing and overcapitalisation in the marine capture fisheries. They are in line with findings of recent scientific fisheries surveys conducted by DoF. The total annual catch for both artisanal and industrial fleets have stagnated despite the increased effort, as shown in figure 4. The lines show how the annual catch by fleet groups levels out after the 2013-14 fishing season despite the drastic fleet expansion.

**Figure 4 Total annual marine catch development 1993-94 to 2019-20**




Source: *Yearbook of Fisheries Statistics of Bangladesh, DoF, 2020*

## 2. Artisanal marine fisheries

The artisanal fishing fleet consists of almost 68 thousand mainly wooden-hulled vessels using mainly passive fishing gear like gillnets, trammel nets, longlines and set bag nets to catch fish. The fleet divides into almost two equally large groups; mechanised and non-mechanised fishing vessels, as shown in Table 5. The development of artisanal marine catch during the last decade is shown in Table 6.

**Table 6 Annual catch (MT) of Bangladesh artisanal fishing vessels by type**

| Annual Catch | 2010-11 | 2019-20 | Change |
|---|---|---|---|
| **Mechanised Vessels total** | **303,613** | **503,686** | **66%** |
| Hilsa | 182,152 | 269,900 | 48% |
| Shrimp | 6,946 | 30,885 | 345% |
| Other | 114,515 | 202,901 | 77% |
| **Non-Mechanised Vessels total** | **201,005** | **52,064** | **-74%** |
| Hilsa | 43,150 | 25,050 | -42% |
| Shrimp | 47,258 | 9,495 | -80% |
| Other | 110,647 | 17,519 | -84% |
| **Total Annual Atrisanal Catch MV + NMV** | **504,618** | **555,750** | **10%** |

Source: *Yearbook of Fisheries Statistics of Bangladesh, DoF*

In 2011 the fleet was 45,535 and had increased by 1,500 units in ten years. Since then, the fleet has grown by almost 50% and is now 67,669 units. Table 5 shows this development of fleet expansion. The trawler increases the most or 58%, but the artisanal mechanised and non-mechanised increase almost 50% in both categories.

The fleet expansion was not the only change. Table 6 illustrates how the mechanised vessels (MV) have significantly increased their share of the total annual marine catches since 2010-11 fishing years or almost 200 thousand tons. Over the same period, almost 35 thousand units, non-mechanised vessels (NMV) have lost two-thirds of the total annual marine catch share.

## 3. The fish catch

The marine annual fish catch by fleet groups is shown in Table 7. The table shows how the MFVs are the dominant group in marine fish catch production. They catch over 75% of the total volume, almost 90% of the hilsa and 72% of the shrimp catch. This group also generated the most landed catch value due to the high level of hilsa and shrimp in their catch, or close to 85% of the total annual marine catch value 2019-20.

**Table 7 Marine fish catch (MT) by species ad fleet group 2019-20**

| Species | Hilsa | Shrimp | Other | Total | % |
|---|---|---|---|---|---|
| Industrial fleet | 9,616 | 2,436 | 103,302 | **115,354** | 17 % |
| Mechanised Vessels | 269,900 | 30,885 | 202,901 | **503,686** | 75 % |
| Non-Mechanised Vessels | 25,050 | 9,495 | 17,519 | **52,064** | 8 % |
| **Total** | **304,566** | **42,816** | **323,722** | **671,104** | |

The MFVs are the main fleet in the marine fisheries, with the most of total catch and having an even higher share of the total annual landed catch value. The mechanised fleet also creates the most employment in the marine fisheries. The average number of crew on one boat is 20. Thus the MFV fleet employs hundreds of thousand fishers every year. The mechanised boats in the hilsa gillnet fishery are the most profitable fleet segment in the Bangladesh marine fisheries.

## 4. Challenges in artisanal fisheries

### 4.1. Overfishing and overcapacity

The state of the marine fish resources is unsatisfactory. The need to reduce the fishing pressure on the most valuable fish stocks is urgent. Signs are detected of fishing down the food chain, as higher value slow-growing fish species are substituted by small and lower value fish species in the fish catch. The challenge is balancing the future of the marine fish stocks and the lives in the coastal communities of fishers and families dependent on the fish resources. The present fishing pressure from these communities on the fish stocks must reduce to conserve the marine fish resources.

### 4.2. Post-harvest fish quality

A considerable post-harvest loss is evident in artisanal catch leading to economic and food quality loss and increased fishing pressure. Post-harvest fish quality is one of the areas in need of improvement. Fish catch handling on-board artisanal fishing vessels need to be improved to preserve the quality of the catch from the moment of catching to the offloading at the landing site. The objective is to ensure that all fish captured reach the market as safe, high-quality food products as possible. Improving the sector's economic performance is also essential if higher quality fish fetches better market prices.

### 4.3. Illegal, unreported, and unregulated (IUU) fishing

Illegal fishing is one of the major challenges of artisanal fleet. A number of unregistered artisanal fishing vessels threatening the fisheries governance. IUU fishing destroys the fisheries management regime's purpose by breaking the rules of responsible fishing practices and resource conservation objectives. When a group of fishers can repeatedly ignore and break the rules without proper consequences, law-abiding fishers feel the authorities have let them down. IUU fishing also includes banned fishing methods that can be destructive for the habitat.

### 4.4. Week fisheries management governance

Fisheries management governance for the past years has been weak due to a lack of adequate information for well-structured management decision making and inadequate human resources, knowledge and enforcement capability. The following are major causes of weak artisanal fisheries governance:

- Absence of co-management arrangement, except Hilsa fishery management, in managing shared resources,
- Less consultation and agreed decision among various marine fisheries associations for sustainability of resources,
- Insufficient institutional research and development activities in marine fisheries,
- Weak coordination among different marine domains for proper enforcement,
- Inadequate MCS for artisanal fisheries and data asymmetry,
- Insufficient human resources to enforce and oversight MCS.

A well-structured governance environment ensures that decision-making is transparent, informed (evidence-based), representative, and non-arbitrary. When such governance level is established, a sense of ownership and compliance with management decisions is higher, reaching management objectives is more likely, and controlling costs are lower.

### 4.5. Discards, pollution, and environmental considerations

Destructive and illegal fishing practices lead to excessive bycatches and discarding, as well as causing habitat damage. It imposes significant and wasteful mortalities on juveniles and endangered or threatened species and imposes major economic losses on fisheries. Water pollution particularly from fishing vessels also need to be minimized to acceptable level. The artisanal FMP envisaged increased environmental awareness in the Bangladesh marine fisheries. All fishers, other workers, and contributors in the fishing sector shall keep the marine environment clean and healthy. The challenge is that all fishing vessels should operate with the highest level of environmental standards.

### 4.6. Inadequate fisheries data and information

Fisheries data collection from Bangladesh marine waters meet some minimum requirements, which is based mainly on manual processes and is subject to delays and errors. Because of the manual aggregation of data, only a small part of the recorded data can be analysed. Comprehensive, near-real-time, and accurate fisheries data are required from industrial and artisanal fisheries to support MCS, provide scientific advice, and stakeholder involvement. Comprehensive data on marine fisheries, such as data on stock status, the quality of fish, biological data, catch and effort data, ex-vessel price of fish, prices at different stages in the value chain, costs of fishing, employment etc., are required to assess the stock and socioeconomic contributions of the fisheries as well.

## 5. Adaption to climate change

Climate change is pressing countries worldwide to mitigate the consequences of global warming. Forecasts predict a decline in food production worldwide due to climate change[3]. Many countries and organisations, i.e., the EU Climefish project and FAO, have begun studying the effects of climate change on fisheries and preparing action plans for the fisheries sectors to counter a new environmental reality by adapting to and mitigating the unavoidable change. The approach assesses risks to fishing and evaluates opportunities to adapt to the foreseeable and likely change. The focus is on the oceans, changing dynamics in the flow of currents, increased seawater temperature, higher acidity levels, more severe weather and changes in flora and fauna. Artisanal fishers' community are more vulnerable to climate change affecting their livelihood.

## 6. Employment and socioeconomic status in artisanal fishing communities

The fisheries sector, including aquaculture, employs over 17 million people, full time or part-time, including 1.4 million women. In the marine capture fisheries over half a million of fishers' are engaged in fishing, About 60% of the fishers' are between 20 to 30 years old, have medium family size, with limited formal education.[4] Fishing at sea is a challenging with high level of occupational hazards. The working days and hours are irregular and very dependent on weather and other natural conditions in the seas leading to uncertainty in terms of income.

[3] EU Clime fish Project. *https://climefish.eu/climate-changes/*

[4] Ref. Reza S. et al. Socio-economic status of Fisheries on the Old Brahmaputra River in Mymensingh Sadar Upazila, Bangladesh 2017.

In recent years, successive shift from non-mechanized to mechanized fishing vessels in the artisanal fisheries is a significant change for the fishers' and communities in the coastal areas. It might lead to fishers becoming increasingly employees instead of being self-employed fishers. The mechanized fishing vessels are larger, more expensive, need more fishing gear, require more working capital to operate and require more management skills. Low salaries propel overfishing and hinder fishers' social mobility. The Artisanal FMP-2 and the BSCMFP aim to strengthen the coastal areas and the fisher's communities by conserving the marine fisheries resources, increasing safety of life at sea, and strengthening the communities through a social support program including vocational training, access to finance and livelihood transformation to reduce fishing pressure. Moreover, DoF is continuing the registration of fishers' and issuing ID cards to ensure their access right to fishing.

# 4 SECTION D: The artisanal fisheries management plan 2021-2025

## 1. Implementation arrangement to the marine fisheries management

### 1.1. The Marine Fisheries Act 2020

Good fisheries management regimes balance environmental and socioeconomic objectives by technical, functional, reliable, and sustainable management measures. The beginning of the quest for such balance is creating fisheries law tailored to the local situation. The law encompasses all these issues and describes how they are defined, connected, and implemented. The law also institutes the authority to manage governmental institutions to carry out all necessary functions to achieve the objectives. The Marine Fisheries Act 2020 establishes the Bangladesh fisheries management regime on licensing fishing vessels, regulated fishing and conservation measures.

### 1.2. The Marine Fisheries Rules (MFR)

The MFRs translate the Marine Fisheries Act-2020 (MFA) into actions. It explain how the fisheries sector must comply with the FMP's objectives with adherence to the rules. The draft MFRs is currently under review of the Ministry of Fisheries and Livestock (MoFL). The rules be officially published in the GoB Gazette and formally in force from that date or any other date specified in the rules.

### 1.3. The Marine Fisheries Management Plan two for Artisanal (FMP2)

DoF develops the Fisheries Management Plan for the artisanal fisheries in consultation with stakeholders. It explains fish resources' status based on scientific research and subsequent fisheries harvesting- and management actions for the artisanal fisheries the following years. It is based on EAFM, a multi-species fisheries management approach to environmental, co-management and socioeconomic concerns in the ecosystem. EAFM also addresses non-targeted, endangered species, minimising waste and pollution, protecting biodiversity, and coastal communities' welfare. The FMP2 is an instrument describes the harvesting plan and other aspect of artisanal marine fisheries management that all fishers and others sector must abide.

### 1.4. Institutional framework

The DoF is the sole executive authority of FMP under MoFL. Other concern departments/institutions under the Ministry engaged in fisheries are the Bangladesh Fisheries Research Institute (BFRI), Bangladesh Fisheries Development Corporation (BFDC), and the Marine Fisheries Academy (MFA). DoF has the oversight and responsibility of executing the FMPs through Marine Fisheries Office (MFO), with coastal District and Sub-district (Upazila) Fisheries offices.

### 1.5. Enforcement and implementing agencies

The primary enforcement and implementing agencies of marine fisheries management include DoF, Bangladesh Navy (BN), Bangladesh Coast Guard (BCG), Bangladesh River Police, Mercantile Marine Office (MMO) Port Authorities, National Board of revenue (NBR) and many other concern marine domains. The coordination for improved enforcement and compliance to the fisheries rules be supported by Joint Monitoring Center (JMC) established by DoF.

# 2. Specific management objectives

## 2.1. Resource Conservation

The GoB objective is to ensure the conservation of all marine resources in Bangladesh, restore stocks in depletion conditions and protect the marine environment and its biodiversity for the generations to come. The main controlling measures are; effort control, gear and spatial restrictions, seasonal fishing moratorium, marine protected areas, marine reserves, access control through licensing of fishing vessels and enhanced compliance monitoring and surveillance.

## 2.2. Ecosystem Management approach

The FMP2 is based on the EAFM. IT includes holistically studying and monitoring marine ecosystems and the dynamic forces through productivity, biodiversity, and habitat. Moreover, the EAFM also includes a thorough dialogue with stakeholders and the broader community of higher levels than before, a consultation process throughout all policy and management planning levels.

## 2.3. Fisheries Performance Indicators

The EAFM is used to create the FMP2 for the artisanal marine fisheries considering specific environmental-economic and social parameters to shape the plan, set objectives and describe expected outputs resulting from the FMP2. A set of fisheries performance indicators (FPI), created to evaluate the effectiveness and objective of the plan. The plan's effectiveness is observed by monitoring these indicators and adjusting as required. The key indicator for the marine resources in the FMP2 artisanal is the CPUE for various marine fisheries resources. Lowering CPUE indicates overfishing and high fishing pressure, while higher CPUE indicate stronger, healthier fish stock. Many other specific FPI indicators will be developed through the BSCMFP to measure the FMP1 and FMP2. The FPI's are a method to assess the state of artisanal and industrial marine fisheries in terms of ecological, economic and social performance.

## 2.4. Resource harvesting

The artisanal FMP acknowledge the goals of the present GOB's National Fishery Policy 1998 and National Fisheries Strategy 2006. These are comprehensive policies for the whole fisheries sector, including aquaculture, inland fisheries, besides marine fisheries with specific policies for the different branches of fisheries. The overall objectives of the sector are as follows:

- Enhancement of the fisheries production.
- Poverty alleviation through creating self-employment for improving socioeconomic conditions of the fisheries
- Meet the demand for animal protein.
- Achieve economic growth through earning foreign currency by exporting fish and fisheries products.
- Maintain ecological balance, conserve biodiversity, ensure public health provide recreational facilities.[5]

[5] The National fisheries Policy 1998, Ministry of Fisheries and Livestock

### 2.5. Hilsa fisheries management

Hilsa is economically and culturally important fish in Bangladesh. The HFMP has been in effect since 2003, resulting in successful conservation of Hilsa while allowing a 100% increase in production over the last 16 years and supporting the livelihoods of over 0.5 million fishers. The main element of the strategy is spatial protection of four critical spawning grounds and five Hilsa and juvenile Hilsa or 'jatka' sanctuary areas/nursery grounds through seasonal fishing bans. A compensation package to affected fishers under a GoB safety net encourages high compliance. The successful implementation of the HFMP demonstrates the feasibility and effectiveness of this fisheries management plan, underpinned by scientific information, in establishing appropriate catch and effort limitations, preventing overfishing, and rebuilding the Hilsa stock.

### 2.6. Protected and endangered species

Protected and endangered species (PES) and non-targeted marine species can tangle in all types of fishing gear. It is the objective of FMP2 to protect PES species in Bangladesh waters. Catching and killing such species is forbidden and should be avoided in all instances. Devices for trawl gear and long lines to avoid catching and killing endangered and untargeted marine species shall always be used. Such species caught in gillnets must be released unharmed. GoB has adopted the Convention on International Trade in Endangered Species of Wild Fauna and Flora, known as CITES.

### 2.7. Marine pollution

Marine pollution caused by fisheries mainly consists of lost fishing gear, greenhouse gasses, general waste and, disposal of oil and other harmful liquids into the seawater. Bangladesh fisheries, in general, must minimise pollution from its activities. GoB aims to encourage pollution minimisation in fisheries through a regulatory framework, awareness campaigns and disposal facilities at landing sites.

### 2.8. Monitoring, control, and surveillance overview

The ultimate goal of fisheries management is to maximise the sustainable benefits and economic return from the country's territorial waters and exclusive economic zone. The success of the FMP depends on adequate information and sound decision-making and implementation through a cost-effective and robust Monitoring, Control and Surveillance (MCS) system. Such a system is an integrated information collation, rulemaking and enforcement system providing tools for implementing policies, strategies and frameworks for fisheries management plans and other aspects of ocean and environmental governance. MCS is critical for implementing a successful fisheries management strategy and plan that renders sustainable and effective fisheries management.

### 2.9. Community Co-management forums

A community-based fisheries management forum (CBFMF) is one of the steps GoB is taking to improve marine fisheries conservation and harvesting in Bangladesh. The CBFMF is a step towards the direct involvement of a broader range of stakeholders, the people in the fishing communities along the coast of Bangladesh. A forum beyond the current stakeholder's associations better connecting governmental fisheries management agencies and the fishing communities. A forum for the exchange of information, knowledge and expertise helping to guide the fisheries management actions to reach common goals of conservation and rational exploitation of the marine resources and improving the livelihood in the coastal communities. It is not a replacement for the current fisheries management structures and present stakeholders' involvement but rather an extension to a higher degree of community participation in adopting fisheries management plans and enforcing fisheries rules. The

CBFMF requires the implementation of democratically organised community representative structures and regular communication procedures between involved parties. A CBFMF program needs to be developed gradually through existing communication channels between involved parties in each fisheries district area and the BSCMFP.

# 3. Artisanal fisheries management measures 2021-2025

## 3.1. Science-based fisheries management

In marine fisheries management, the fisheries act, the management plan, the fisheries rules, and the government managing institutions come together and form a unified governmental controlling strategy to manage the marine fisheries. Incorporated are restrictions and limitations to the artisanal and industrial fisheries and an extensive institutional gathering of information on the marine resources and the development of the fishing activities. The data contributes to developing a science-based fisheries management regime, which will help the industry reach harvesting and conservation goals for Bangladesh's marine fisheries. It also contributes to decision making on management plans through participatory processes with stakeholders in forming a future fisheries policy. The data collection and analysis of it is vital for the success of the fisheries management regime and needs to be supported by all who participate in the fisheries sector.

### 3.1.1. Fisheries stock assessment and research

Fisheries research and fish stock assessment is the groundwork for the science-based fisheries management of Bangladesh marine resources. The research includes collecting and analysing fisheries data from sea landing site enumeration and stock assessment surveys. The fishing effort and catch data, systematically collected at all landing sites, is necessary for the artisanal fisheries FMP. The information obtained through the observation and enumeration work provides, through analyses by specialists, a good knowledge of the development of the fisheries and the status of fish stocks complemented with scientific stock surveys and evaluations by DoF scientists. The statistical information analysis helps scientists, fisheries managers, and politicians shape and develop the future science-based fisheries, manifested in the national FMP and the MCS strategy. The whole fishing sector must understand the importance of data collection and collaborate and contribute by reporting as required.

### 3.1.2. Scientific advice

Based on the outcomes of the fisheries research and stock assessment analyses, the DoF's scientists annually report on the state of the marine fisheries resources. These reports guide the conservation measures and harvesting levels for the artisanal and industrial FMP 2021-2025. These reports do not yet have specific quantitative estimates due to a lack of past research information gaps. However, they provide a consistent and reliable indication that the marine fisheries are overfished. The present trend of increasing total landings is reducing economic value overall and is unsustainable in the long term. This advice is formulated under the new consensus view that sustained fisheries are less prescriptive but more process-oriented and adaptive fisheries management

### 3.1.3. Fisheries control and restrictions

The management measures for the artisanal fisheries to reduce the fishing pressure on the marine resources are based on a multiple control approach. The fundamental change is the issuing licenses for all artisanal boats over 15 net tonnages in size and permits for artisanal boats under 15 net

tonnages in size. The fishing effort is controlled by limiting fishing time and the use of gear. Fishing area restrictions by establishing marine protected areas and seasonal restrictions by total fishing ban periods are established to protect spawning- and fish nursery grounds. Introduce fishing gear technical restrictions to protect juvenile fish and endangered species. The management measures aim to simultaneously conserve the marine resources and pave the way for their rational exploitation.

### 3.1.4. The Hilsa management plan

Hilsa is economically and culturally important in Bangladesh and supports a vital and closely managed freshwater fishery. The HFMP has been in effect since 2003, resulting in successful conservation of Hilsa while allowing a 100% increase in production over the last 16 years and supporting the livelihoods of around 0.5 million fishers. The main element of the strategy is spatial protection of four critical spawning grounds and five Hilsa and juvenile Hilsa or 'jatka' sanctuary areas/nursery grounds through seasonal fishing bans. A compensation package to affected fishers under a GoB safety net program encourages high compliance.

**Table 8 Fishing ban areas and periods specified under the Hilsa Fisheries Management Plan**

| Ban Area | Locality | Ban period |
|---|---|---|
| North East | Mayani Point, Mirsarai, Chittagong in the northeast (91°32.15' E and 22°42.59' N) | 4 days before and 17 days after the full moon, including the day of full moon, that is, total 22 days of the first full moon in the Bengali month of Ashwin each year |
| North West | Paschim Syed Awlia Point, Tajmuddin, Bhola in the northwest (90°40.58' E and 22°31.16' N) | |
| South East | North Kutubdia Point, Kutubdia, Cox's Bazar in the southeast (90°52.51' E and 21°55.19' N) | |
| South West | Lata Chapali Point, Kalapara, Patuakhali in the southeast (90°12.59' E and 21°47.56' N) | |

The successful implementation of the HFMP demonstrates the feasibility and effectiveness of this fisheries management plan, underpinned by scientific information, in establishing appropriate catch and effort limitations, preventing overfishing, and rebuilding the Hilsa stock. An unregulated expansion of Hilsa fishing in marine waters is underway, leading to the growing marine catch of Hilsa, particularly by midwater trawlers. It is critical to eliminate targeted industrial trawling for Hilsa to ensure continued successful management of the Hilsa based on the existing HFMP. Measures must ensure Hilsa bycatch is kept to the minimum possible level in the industrial sector.

### 3.1.5. MCS monitoring and surveillance

The ultimate goal of fisheries management is to maximise the sustainable benefits and economic return from the country's territorial waters and exclusive economic zone. The success of the FMP depends on adequate information and sound decision-making and implementation through a cost-effective and robust Monitoring, Control and Surveillance (MCS) system. Such a system is an integrated information collation, rulemaking and enforcement system providing tools for implementing policies, strategies and frameworks for fisheries management plans and other aspects of ocean and environmental governance. MCS is critical for implementing a successful fisheries management strategy and plan that renders sustainable and effective fisheries management.

Many of the MCS measures and regulations are not implemented effectively or comprehensively, primarily due to limited human and logistical resources within MFO. This plan is intended to implement several new capabilities and activities during the span of this plan.

- Establish a Joint Monitoring Centre (JMC) in the Chattogram port area interagency coordination in MCS under Standard Operating Procedures (SOP) to implement the Marine Fisheries Act and rules in the EEZ of Bangladesh.

- Establish an operational electronic fishing vessel licensing system including IT infrastructure, training, capacity building & reporting. All registered fishing vessels and artisanal boats are included in the electronic system.

- Establish infrastructure for data collection by at-sea observers with required mobile application, virtual server, database, and back-end data management software, with user manuals and training, to support monitoring fisheries activities and report to the competent authority.

- Establish new MFSC at strategic locations in coastal districts, including facilities for high-speed patrol vessels to conduct joint monitoring and surveillance program with maritime cooperating agencies.

- Establish a new AIS tracking system that requires registration as a license condition for all artisanal mechanised boats. The AIS will support recording and displaying vessel position and track data. AIS will integrate with the VMS tracking system for industrial vessels and establish a connection with JMC for strengthening MCS activities through communication & coordination with participating marine domains for inspection and enforcement. The AIS system will drastically enhance safety as the sea for artisanal fishers.

- Establish an electronic catch documentation scheme through e-reporting of catch and e-logbooks to increase the transparency of fish moving through the supply chain.

#### 3.1.5.1. MCS & JMC centre

The MCS and the JMC Centre are harmonised central management structures within MFO created to administer the three pillars of fisheries management, monitoring, control, and the fisheries' surveillance. Enforcement is the fourth pillar jointly operated by MCS, the coast Guard and the Navy. All three have their specific roles in the enforcement process. However, the JMC centre is a joint monitoring centre for AIS and VMS systems. The JMC centre operates 24/7 monitoring for the systems under specific rules on information sharing on individual vessels with the other parties.

### 3.1.6. Management cost recovery

Governing and managing the marine capture fisheries in Bangladesh is a sizeable and costly operation. DoF resumes the primary responsibility for the operation, besides the Coast Guard and other collaborating governmental agencies. The services are mostly free of charge. The marine capture fisheries in Bangladesh are substantial in volume and value. Thus, fees and levies which DoF could charge on the fishing sector to contribute in monetary terms to its expenses related to the governing of the fishery could be substantial. Such fees are collected in most countries. The costliest activity in fisheries management is usually enforcement. DoF will continue to charge fees for licences. Further cost recovery levies will be considered at a later stage.

# 5 SECTION E: Key concerns and management measures.

## 1. Core compliance considerations

**Challenge:** Compliance with rules and respect for the ecosystem in the artisanal fisheries need to improve. IUU fishing takes place by using illegal fishing gear, gillnets with undersized mesh are used and so forth. The following management measures and activities are intended to increase artisanal fishers' compliance with rules and enhance their respect for the ecosystem.

| **Long-term Objective: Improving compliance and respect for Acts, rules and the ecosystem.** | | |
|---|---|---|
| Target: Enhance the compliance to rules and regulations within artisanal fishing in five years. | | |
| **Compliance issues** | **Actions** | **Timeline** |
| Registration and licensing/permits of fishing vessels | Fishing vessels of over 15 net tonnages (NT) must be registered at MMO and receive a fishing license from DoF, and fishing vessels of 15 NT and below must have fishing permit from DoF.<br><br>Non-compliances will lead to penalties or imprisonment as stipulated in MFA 2020. | Feb 2023 onward |
| Legal fishing gear | Fishing gear used by artisanal vessels shall comply with the definition of such gear in the MFA 2020, Fish Protection and Conservation Act 1950, and subsequent rules. Gillnets and set bag nets with undersized meshes are forbidden. Such nets will be confiscated and destroyed. Size, mesh and number of gear monitored and regulated. | Persistent |
| Closed seasons | Fishing bans must be respected at all times. Fishing licenses or permits will be cancelled or withheld or penalties will be imposed for mechanized and artisanal vessels caught contravening fishing bans. | Persistent |
| Marine protected areas | Fishing in marine protected areas is a punishable crime. Fishing licenses or permits will be cancelled or withheld or penalties or imprisonment will be imposed for mechanized & artisanal vessels caught within marine protected areas. | Persistent |
| Reporting fish catch | It is mandatory reporting of all fish caught by vessels with a license or permit. Failure to report fish catch can lead to administrative penalties. | Persistent |
| Stop IUU fishing | IUU fishing is forbidden. Illegal fishing will lead to penalties or imprisonment as stipulated in MFA 2020. | Persistent |
| Enhanced monitoring and safety at sea by AIS equipment provided by GOB | AIS program for all mechanised artisanal vessels is for monitoring and safety of vessels and fishers. The AIS transponder and GPS data logger must be installed as specified by DoF. The equipment is the property of the DoF and shall | Dec 2022 |

| | | |
|---|---|---|
| | be well kept or protected. Any damage, tempering, or abuse is payable by the equipment holder or imprisonment can be imposed. | |
| Reduction of marine pollution | Fishers must bring all waste, used fishing gear, and harmful liquids to shore and dispose of at designated sites. Fishing vessels causing water or environmental pollution can lead to the cancellation of fishing licenses. | Dec 2022 |

## 2. Minimising overfishing and overcapacity

**Challenge: Overfishing and overcapacity**

Effort control and licencing management strategy (ECL) is required to minimise overfishing and overcapacity in the artisanal fisheries. The following specific measures and actions will implement the ECL management strategy.

| **Long-term Objective: Minimising or eliminating over-fishing and over-capacity** | | | |
|---|---|---|---|
| Target: Adjust fishing effort to fishing resource capacity in five years for artisanal fishing vessels | | | |
| **Management Measures** | **Actions** | **Timeline** | **Responsibility** |
| Registration requirements for artisanal boats >15 NT | Mechanised fishing vessels of >15 NT must be registered at MMO and have a valid Certificate of Seaworthiness to receive a fishing license from DoF. | Persistent | MMO, DoF, Fishers Association, Vessel owners |
| Enlisting requirements for artisanal boats <15NT | Fishing vessels of 15 NT or below must be enlisted by DoF and have a valid fishing permit. | Persistent<br><br>Dec 2022 | DoF, Fishers Association, Vessel owners |
| All fishing vessels registered, enlisted, licensed, and all relevant information available in the online licensing and registration database(s) | Enlistment of all mechanised & artisanal fishing vessels by DoF;<br>Data of all registered & enlisted fishing vessels incorporated in the electronic system.<br>Develop & commission a new electronic fishing license system for all FVs | Persistent<br><br>Dec 2022 | SCMFP, DoF MFO, DoF field offices |
| Maintain proper accounting of fishing vessels for licensing, fishing permit, sailing permit purpose | Complete inventory of mechanised and artisanal fishing boats- with all details with registered/enlisted, licensed/fishing permit;<br>Electronic database for fishing boats and gear fully populated. | Dec 2022 | MFO & Concerned Field Offices of DoF |
| Electronic licence awareness campaign program | Plan and implement an awareness campaign program for the electronic fishing license system. | Oct 2022 | DoF |
| Precautionary fishing licence and fishing permit provision | After all formally registered/enlisted fishing vessels compliant with the Marine Fisheries Act 2020 and Rules have received a legitimate fishing license/permit, any further issuing of new licences and permits will depend on developing the fish resources and the artisanal fishing effort. | June 2023 | DoF |

## 3. Enhancing catch quality and value

**Challenge: Loss of food quality and value of the landed catch**

Post-harvest losses, along with the ecosystem-level shifts in the availability of high-value species, combine to undercut the value of marine fish landings. Ensuring that all fish captured reach the market as safe, high-quality food products is essential to improving the sector's economic performance.

| **Objective: Good post-harvest practices and value addition, and reasonable prices for fishes** | | | |
|---|---|---|---|
| **Target:** 25% reduction in fish wastage and increase in the price of fish caught through improved onboard post-harvest measures by 2023 from the present level. | | | |
| **Management Measures** | **Actions** | **Timeline** | **Responsibility** |
| Strengthen onboard post-harvest practices to retain the catch quality to fetch more prices. | − Trained fishers onboard on post-harvest handling and preservation;<br>− Maintained cool chain with ice.<br>− Chilling the catch starts from retrieving the catch onboard; | March 2022 | SCMFP, DoF, MFO & Field Offices |
| Introduce plastic trays, baskets or other improved devices and preserve catch with ice. | − Introduced plastic trays, baskets or other appliances for improving the catch value chain;<br>− Keep sufficient ice in fish hold to lower temperature of fish in baskets or trays. | Dec 2022 | DoF, MFO & Field Offices; Vessel/boat owners association; individual owners/skippers |
| Establish a well-equipped fish landing centres with hygiene, sanitation, chilled room, potable water supply facilities | − Developed fish landing centres hygiene, sanitation, chilled room, potable water supply facilities;<br>− Trained workers and staff on hygiene, sanitation and good handling;<br>− Gender sensitive working environment be facilitated in landing centres; | June 2023 | DoF, BFDC, Associations, Local management authorities |
| Develop shore-based cold storage and processing facilities | − Established shore-based cold storage and processing units (Public-Private Initiative);<br>− Trained workers and staff on hygiene, sanitation and good handling; | June 2023 onward | DoF, BFDC, Potential investors |

## 4. Monitoring, controlling and surveillance (MCS)

**Challenge: IUU fishing**

The successful implementation of any fisheries management plan depends on a credible and effective MCS capability. The known ability of fisheries authorities to detect and stop illegal fishing practices is one of the most important factors leading to compliance by fishing fleets. In contrast, a lack of MCS capability completely disregards management restrictions.

| **Long-term Objective: Minimise level of IUU fishing through effective MCS** | | | |
|---|---|---|---|
| **Target:** Reduce IUU fishing to 50% of current levels by 2025 | | | |
| **Management Measures** | **Actions** | **Timeline** | |
| Implement NPOA to deter IUU fishing. | Execute the action plan defined in NPOA with coordinating partners | 2022 onward | DoF |
| Establish MoU amongst DoF, BN, BCG, CPA, MMO Customs and other marine domain to strengthen MCS and other FMP provisions. | MoU signed among concerned agencies and in force for interagency collaboration and information exchange. | Nov 2022 | MoFL, DoF |
| Establish Fisheries JMC for coordinated MCS measures. | Joint Monitoring Centre established and functional | December 2022 | MoFL, DoF |
| Create a fishery monitoring database integrating registry and license information with ID information on operators, skippers, crew, and fishery infringements. | – Fishing information database is developed;<br>– Capacity building to all parties related to MCS procedure. | January 2023 onward | DoF |
| Extend integrated database system with BN, BCG and DoF | Exchange of relevant information developed and functional. | Feb 2023 onward | DoF |
| Enhance the operational monitoring of fishing vessel operations, departures and arrivals. | Computerized recording and reporting on issuance of fishing permission/ permit with departure and arrival details | Dec 2023 | DoF |
| | MFSCs are established and effective. | June 2023 | SCMFP, DoF |
| | Patrol vessels perform at-sea inspections and checks of FVs. | September 2022 onward | DoF, MFO |
| Mandatory AIS on registered 1500 mechanised fishing vessels and GSM coverage of 8500 artisanal fishing vessels | – AIS coverage of Mechanised fishing vessels<br>– GSM coverage of Artisanal fishing vessels | June 2023 | SCMFP, DoF |
| | Vessel owners, operators and association members trained on AIS. | June 2023 | SCMFP, DoF |
| Stringent enforcement and legal prosecution | Effective enforcement and impose penalties as per Marine Fisheries Act, Rules and Regulation | Persistent | DoF, JMC entities |
| | – All non-compliances are | Persistent | DoF |

| | | | |
|---|---|---|---|
| | documented, prosecuted, and followed up.<br>– Strengthen community monitoring system on IUU fishing | | |
| Raise awareness, training and support for deterring IUU fishing among fishers' and boat owners | Effective awareness campaigns and necessary training designed and implemented. | Dec 2022 onward | DoF |

## 5. Fisheries management governance

**Challenge: Inadequate fisheries management capacity.**

| **Objective:** Strengthen marine fisheries good governance | | | |
|---|---|---|---|
| **Target:** An effective co-management process for fisheries management decision-making built by 2025 | | | |
| **Management Measures** | **Actions** | **Timeline** | **Responsibility** |
| Establish credible and comprehensive co-management processes for marine fisheries | Define the mandate for an inclusive Fisheries Advisory Body (FAB) and process with representation from all marine domain, including fisheries stakeholders, environmental and social NGOs, and scientific community. | June 2022 | DoF & related stakeholders in marine domain |
| | Take necessary action for establishing FAB. | Oct 2022 | DoF & related stakeholders in marine domain |
| | – A working manual will be developed for the effective functioning of FAB.<br>– FAB to conduct stakeholder consultations on draft FMPs developed and reviewed scientific and operational assessments of FMP performance.<br>– Regional co-management committee at Barisal, Chattogram and Khulna was formed to support FAB. | Feb 2023 | DoF & related stakeholders in marine domain |
| Build marine fisheries management planning capacity in DoF. | Train and deploy necessary human resources of DoF to develop fisheries management planning capacity & implement the co-management approach to FMP | June 2022-June 2023 | DoF |
| Develop human capacity in the artisanal fisheries sector for effective co- | Training, financial and logistic support to build awareness and capacity in the artisanal sector to participate in the co-management process. | June 2022-June 2023 | SCMFP, DoF |

| | | | |
|---|---|---|---|
| management participation | | | |
| Community Co-management Forums | DoF, under the framework of the BSCMFP, plans to establish Community Co-Management Forums to include a broader stakeholder's participation in fisheries management in Bangladesh | Dec 2022 | SCMFP, DoF |

## 6. Environmental and ecosystem considerations

**Challenge: Prevent destructive fishing practices, discard, pollution, and habitat degradation**
Destructive fishing practices lead to excessive bycatches and discarding, as well as causing habitat damage. It imposes significant and wasteful mortalities on juveniles, endangered or threatened species, and significant economic losses in fisheries. Moreover, pollution and habitat degradation adversely affect ecosystem health.

| **Objective: Reinforce good fishing practices and eliminate destructive fishing and pollution** | | | |
|---|---|---|---|
| **Target:** Reinforce good fishing practices<br>Reduce or eliminate discarding at sea and catches of endangered or threatened species<br>Reduce the proportion of under-sized (juvenile) caught below 50% of current levels by 2025<br>Reduce or eliminate fishing in sensitive habitats<br>Reduce pollution from fishing boats by bringing all waste onshore and disposing at designated site. | | | |
| **Management Measures** | **Actions** | **Timeline** | **Responsibility** |
| Prevent discarding of fish at sea | Discarding any kind of fish, including juveniles, undersized and less valuable fish eliminated through surveillance and enforcement. | Persistent | DoF, enforcing agencies |
| Regulate gillnets and set bag nets selectivity to reduce or eliminate the retention of under-size fish | Regulate the minimum mesh sizes in gillnets and set bag nets as prescribed in Marine Fisheries Rules. | Persistent | DoF, enforcing agencies |
| Regulate size, type and number of set bag nets allowed in each sector | Restrict the number of fishing vessels & gear, adhere to fishing gear specifications as stipulated in regulations. | Persistent | DoF, enforcing agencies |
| Specific regulation to control the destruction of Jatka (juvenile hilsa) in gillnet and set bag nets fisheries | Surveillance at sea enhanced by the joint effort of DoF, BCG and BN and impose stringent measures as per law-even suspension of fishing licenses/permits. | July 2022 onward | DoF, enforcing agencies |
| | Fishing closures: Time and area closures shall be introduced when specific areas are affected by high bycatches of Hilsa. | June 2023 onward | MoFL, DoF |

| | | | |
|---|---|---|---|
| Introduce more seasonal and spatial closures based on research on times and areas to protect juvenile nurseries and spawning stocks of important spp. | – Restrict/prohibit fishing in Marine Reserves and protected areas as per MFA, Rules & Marine Protected Area Management Plan.<br>– Increase seasonal and spatial closure based on research findings. | Persistent<br><br>June 2025 | MoFL, DoF, BFRI |
| Protect areas of unique or vulnerable habitat | Identify areas of unique or vulnerable habitat and protect them. | June 2025 onward | MoFL, DoF, BFRI |
| Prevent pollution from fishing vessels | Awareness building & training on waste management practices. | March 2022 onward | DoF |
| Ecosystem concern and protection measure | Control on non-selectivity fishing gears of bottom trawls and estuarine set bag nets (ESBN) and fishing damage to coral reef and sea grass ecosystems. | December 2022 onward | MoFL, DoF, DoE, FD |

## 7. Conflicts resolution processes

**Challenge: Conflicts between artisanal and industrial fishing operations**
The primary operational means of preventing conflict between industrial and artisanal sectors has been a spatial division based on the 40 m depth contour. However, this strategy is retained; the dividing line is now specified as a geographically defined line (geo-fence). Industrial vessels must fish on the seaward side of the geo-fence line. Co-management processes to engage both industrial and artisanal sectors are also implemented to address conflict areas.

| **Objective: Resolving conflicts between artisanal and industrial fishing operation** | | | |
|---|---|---|---|
| **Target:** Identify and minimise sources of artisanal-industrial sector conflicts. | | | |
| **Management Measures** | **Actions** | **Timeline** | **Responsibility** |
| Cross-sectorial fisheries co-management process in place for both industrial & artisanal fisheries | – Central Fisheries Co-Management Committee (CMC) i.e., FAB formed.<br>– Functional regional co-management committee at Barisal, Chattogram and Khulna to support FAB. | Oct 2022<br><br>Feb 2023 | MoFL, DoF |
| | CMC/FAB meeting at least once a year or more if required to review conflicting issues, co-management progress, and recommend implementation strategies to avoid inter-sectorial conflict. | Feb 2023 onward | MoFL, DoF |
| Establish geo-fence industrial fishing limit line to delimit fishing zone for industrial FVs. | Define geographical coordinates and clarify fishing rights and restrictions in each spatial zone. | Dec 2022 | MoFL, DoF |
| | Awareness-raising and training to vessel owners and skippers regarding spatial management system | June 2022 onward | DoF |
| Develop a VMS/AIS warning system to alert | VMS system working effectively and warning system developed. | December 2022 | DoF, JMC-CC |

| | | | |
|---|---|---|---|
| vessels and fisheries managers of entry into restricted geo-fenced fishing zones | Report to enforcement agencies to take action on non-compliance. | onward | |
| Establish Community Co-management Forums to widen the consultation process and form networking | DoF, under the framework of the BSCMFP, plans to establish Community Co-Management Forums to include a broader stakeholder's participation in fisheries management in Bangladesh | Dec 2022 | SCMFP, DoF |

## Fishing Zone Division Line

All artisanal mechanised boats and industrial vessels must carry and operate the Automatic Identification System (AIS) throughout entire fishing trips. From the start of the 2021-22 fishing season or when the legal provisions and infrastructure is ready, whichever is earlier, the industrial vessels must carry and operate Vessel Monitoring System (VMS) throughout the entire fishing trip and are required to fish beyond (seaward of) the inshore limit line defined by the coordinates given below

| Point | E Long (DMS) | N Lat (DMS) | E Long (DD) | N Lat (DD) |
|---|---|---|---|---|
| 1 | 89°13'30" | 21°11'00" | 89.225° | 21.183° |
| 2 | 89°32'00" | 21°25'00" | 89.533° | 21.417° |
| 3 | 89°40'00" | 21°25'00" | 89.667° | 21.417° |
| 4 | 89°40'00" | 21°18'00" | 89.667° | 21.300° |
| 5 | 90°30'00" | 21°06'00" | 90.500° | 21.100° |
| 6 | 91°16'30" | 21°00'00" | 91.275° | 21.000° |
| 7 | 91°32'00" | 21°06'00" | 91.533° | 21.100° |
| 8 | 91°45'00" | 21°06'00" | 91.750° | 21.100° |
| 9 | 92°09'00" | 20°25'30" | 92.150° | 20.425° |

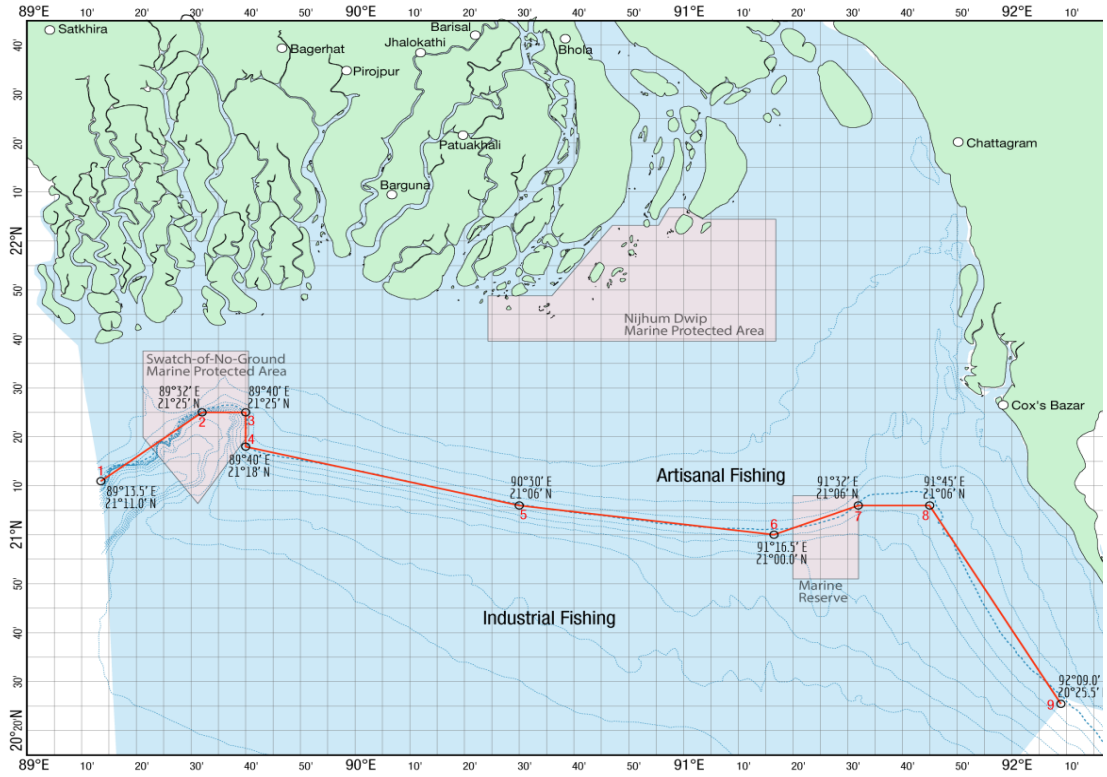



**Figure 4 Spatial restrictions for industrial trawling**

## 8. Fisheries data improvement

**Challenge: Asymmetry and inadequate fisheries data and information**
Comprehensive data on marine fisheries, such as data on catch and effort, at sea sampling data, data on the quality of fish, the ex-vessel price of fish, prices at different stages in the value chain, costs of fishing, employment etc., are needed to assess the stock status, economic and social contributions of the fisheries.

| **Objective: Improving fisheries data and information** | | | |
|---|---|---|---|
| **Target:** Improve data collection and information dissemination systems to a level that it can be used to monitor the performance of this FMP by 2025 | | | |
| **Management Measures** | **Actions** | **Timeline** | **Responsibility** |
| Establish portal, database and applications system that links different sources of data for use in stock assessment, fisheries management and stakeholder information | An integrated database system is operational and Web-portal accessing is operational. | Dec 2022 | SCMFP, DoF |
| Establish data quality assurance by cross-validation of data from different sources. | Automated data validation systems are in place and functional. | Dec 2022 | DoF |
| Establish biological sampling databases such as species composition, size composition | Database and application developed and integrated into a fisheries information portal. | Dec 2022 | SCMFP, DoF |
| | At-sea sampling operational by observers or inspectors | December 2022 | DoF |
| | Shore-based sampling operational and data available online. | December 2022 | SCMFP, DoF |
| Establish economic and employment data collection for marine fisheries | Monitor market prices at landing centres, export permits and wholesale/retail distribution | December 2022 | DoF |
| Key fisheries management information of marine fisheries publicly accessible | Stakeholder Web-portal information access is operational. | December 2022 | DoF |
| | FMP1-Industrial and FMP2-Artisanal available online and status of specific limits and regulations updated regularly | November 2021 & June 2022 | DoF |
| | Documentation of fisheries management information prepared and published at regular intervals. | June 2022 onward | DoF |

## 9. Review and Update of FMP

The FMP-2 Artisanal recognises the importance of generating better data and information to support management and policy decision-making and proposes research, studies, and adaptive changes in future management measures. Regular review and adaptation of the FMP will be based on progress against the objectives as measured by scientific and management information on fisheries performance indicators, stock assessment and biomass estimation of important marine fishes, and results of survey cruises carried out by RV Meen Shandhani. The revised measures are finalised after broader stakeholder consultations.

Biennial reviews of the FMP will take a more in-depth consideration of the FMP to identify limitations or lessons learned which need to be considered for revision of the FMP. A committee of selected academics, DoF officials, scientists, researchers, and concerned stakeholders will evaluate management measures and prepare biennial reviews to address new issues, revise strategic goals, objectives and actions. Proposals for revised FMP and strategies are finalised after broader stakeholder consultations.

**Biennial Review and Adaptation Plan**

| Sl. No | Activity | TimeLine | Responsibility |
|---|---|---|---|
| 1. | Compilation and analysis of latest available Catch & Effort data and other relevant data. | March | MFO, MFSMU, SCMFP, DoF |
| 2. | Review of progress in objectives, fisheries performance, stock assessment, biomass estimation & results of survey cruises (RV MS). | April | Review Committee of DoF* |
| 3. | Stakeholder consultations and meetings with FAB | May | DoF |
| 4. | Update and adaptation of FMP in consultation with MoFL | June | DoF, FAB & MoFL |
| | | | |

*Note: DG, DoF will form an FMP 2-Artisanal Review Committee

# Annexes

## Organisations and Stakeholders Associations

| Fisheries Administration | |
|---|---|
| Ministry of Fisheries and Livestock (MoFL) | The administrative Ministry with oversight and policy-making responsibility for fisheries through its' various departments and agencies.<br><br>MoFL is responsible for the policy regulations for managing and conserving fisheries resources in Bangladesh. It has the authority to frame fisheries policy, strategies, Acts, Rules and regulations for administering the sector. |
| Department of Fisheries (DoF) | DoF is the principal agency of MoFL, responsible for managing Bangladesh's fisheries resources. The Marine Fisheries Office, based in Chattogram, is responsible for licensing, fishing operation regulations, catch certification, and monitoring, control and enforcement (MCS) activities.<br><br>DoF has the responsibility to draft fisheries policy, Acts, strategies, rules and regulations, for approval from MoFL. |
| Marine Fisheries Office (MFO) | The Director/Marine is responsible for implementing the management, conservation, exploitation and development of marine fisheries. It includes making rules covering issuing a license, catch reporting, implementation of FAO/CCRF, and MCS in industrial, marine fisheries. |
| Department of Shipping (DoS) | DoS is a regulatory agency under the Ministry of Shipping, mandated as maritime safety administration of Bangladesh responsible for formulating and implementing the national policies and legislation to ensure the safety of life and ships at sea, coastal and inland waters.<br><br>To ensure the safety of the inland, coastal and ocean-going vessels, including FVs, the department of shipping performs the approval of the ship's design, oversees the construction of the vessels, conducts regular surveys, and register the ships. The Department of Shipping performs ship safety duty in accordance with the two main laws: The Merchant Shipping ordinance (MSO) 1983. |
| Mercantile Marine Office (MMO) | MMD, based in Chattogram, is a subordinate office of the Department of Shipping under the Ministry of Shipping. In addition to merchant shipping responsibilities concerning fishing vessels.<br><br>MMD is primarily responsible for registration, survey and inspection of coastal fishing vessels; issuing Safety Equipment certificates and Seaworthiness certificates |
| | |

| Fisheries Administration | |
|---|---|
| Bangladesh Fisheries Development Corporation (BFDC) | BFDC is responsible for supporting processing, fisheries product development, and distribution by harvesting fishery resources and developing marketing facilities. |
| Bangladesh Coast Guard (BCG) | BCG of the Ministry of Home Affairs is mandated to enforce Maritime law in the EEZ; conduct surveillance; Protect fishery and other non-living resources from illegal exploitation. |
| Bangladesh Navy (BN) | BN of the Ministry of Defence is mandated to safeguard national maritime interests in the EEZ. |
| | |

| Fisheries Institutions and associations | |
|---|---|
| Marine Fisheries Academy (MFA) | Government training institution under MoFL for training personnel for fishing vessels and provides four-year training programs leads to graduation on Navigation, Engineering and Fish Processing. |
| Bangladesh Fisheries Research Institute (BFRI) | BFRI under MoFL is the primary fishery, aquatic resource and aquaculture research agency of the GoB. It conducts and coordinates nationwide research efforts, standardising techniques to maximise production and improve resource management. The institute also provides courses to disseminate new skills and technologies within the fishery sector. |
| Technical Universities | Currently, twelve universities in Bangladesh are providing honours Bachelor and Master's degrees in the field of marine science and fisheries, oceanography, aquaculture, marine biology and other allied fields relevant to the fisheries sector. |
| Bangladesh Marine Fisheries Association (BMFA) | BMFA represents the interests of the freezer-equipped, steel-hulled industrial fishing fleet |
| White Fish Trawlers' Association (WFTA) | BWFTA represents the interests of the non-freezer, wooden-hulled industrial fishing fleet. |
| Boat Owners Associations (BOA) | Artisanal vessel owners are represented through the Mechanized Boats Owners' Association or the Traditional Boats Owners' Association, depending on size, engine power, and degree of mechanisation. |
| | |

## References


1. DoF, 2018 National Fish Week Compendium (in Bangla). Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh. 148p.

2. DoF, 2020. Yearbook of Fisheries Statistics of Bangladesh, 2019-2020. Fisheries Resources Survey System (FRSS), Department of Fisheries, Bangladesh. Ministry of Fisheries and Livestock. Volume 37: 141p.

3. Fanning L.P., Chowdhury S.R., Uddin M.S. and Al-Mamun M.A. (Eds. Uddin M.S. and Chowdhury S.R.). Marine fisheries survey reports and stock assessment 2019. Department of Fisheries, Government of Bangladesh. 2019. 224 pp.

4. FAO, 1995 Code of Conduct for Responsible Fisheries. Food and Agriculture Organization of the United Nations. Rome, Italy .41p.

5. Huntington, T., M.G.Khan, S. Islam, M. Van Brakel and A. Millar 2008. Towards sustainable coastal and marine fisheries in Bangladesh: Initiating a precautionary approach. Report submitted by the WorldFish Centre –Bangladesh Office to the Ministry of Fisheries and Livestock, GoB. 86 p.

6. Hussain, M.M., 1971. Commercial fishes of the Bay of Bengal. Marine fisheries and oceanographic laboratory, East Pakistan Fisheries Development Corporation, Fish Harbour, Chittagong. Project Publication. No. 1. UNDP Project PAK. pp. 60.

7. Lamboeuf, M. 1987. Demersal Fish Resources of the Continental Shelf, Bangladesh R/V Anusandhani trawling Survey Results September 1984-June 1986. A report prepared for the FAO/UNDP Project. 26p.

8. Olsen, E., Al-Mamun, M.A., Chowdhury, S.R., Ostrowski, M., Bernardes, I., Cervantes, D., Uddin, M.S. 2018. Survey of fishery resources and ecosystems of the Bay of Bengal: Part. Bangladesh, 2-17 August 2028. NORAD-FAO Programme GCP/GLO/690/NOR, Cruise Reports Dr. Fridtjof Nansen, EAF-Nansen/CR/2020/10.

9. Saetre, R. 1981. Surveys on the Marine Fisheries Resources of Bangladesh-Nov-Dec 1979 and May 2080.Report on surveys with the RV Dr Fridtjof Nansen. Institute of Marine Research, Bergen: 54pp.