COUNTRY PAPER: BANGLADESH

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1. INTRODUCTION

Bangladesh is endowed with vast aquatic resources. The total area of inland waters is 43 380 km^2, and the total marine area is 48 365 square nautical miles (165 887 km^2). The United Nations Convention on the Law of the Sea (UNCLOS), adopted in 1982, laid the foundation for more responsible management of fisheries resources by extending coastal state jurisdiction to 200 nautical miles. The marine water is calculated on the basis of this Convention. The total fish production of the country is about 1.3 million t, of which inland waters contribute 988 000 t (78.56%) and the marine sector contributes 270 000 t (21.44%). Fish and fishery are very important to the economy, both directly and as a source of nutrition, employment generation and export earnings. About 1.2 million people earn their livelihood directly from fish and fisheries activities, 60% of animal protein is supplied from fish, and 8% of total export earnings come from fish and fish products. The sector's contribution to GDP is about 5%. From all these statistics, the importance of fishery in the country is clear.

2. MARINE FISHERIES MANAGEMENT

Marine fisheries management includes conservation and development to ensure that the fisheries resources are exploited in a long-term sustainable manner. Thus the management of marine fisheries is a very complex system, as can be realized from the data given in Table 1.

Table I Breakdown of Bangladesh marine area

Administrative category	Area (km^2)
Baseline water area	25 151
Water area excluding baseline (to 40 m depth)	85 153
Territorial water (baseline - 12 nautical miles)	9 065
EEZ area	140 915
Sundarban Reserved Forest coastal area	1 603
Estuarine area	1 874
Total	263 761

3. FISH AND FISHERIES RESOURCES

- Number of fish species: 475.
- Number of shrimp species: 25.
- Important commercial fish species: *Hilsa filigera; H. kanagurta* (ilish); *Polynemus indicus* (lakha); *Pampus* spp. (rup chanda); *Lepturacanthus savala* (churi); *Protonibea* spp.; *Pomadasys* spp. (datina); *Otolithes argenteus* (rupa poa); *Tachysurus thalassinus* (kata); *Harpodon nehereus* (lotia).
- Important commercial shrimps: *Penaeus monodon* (bagda); *P. indicus* (chaka); *P. merguiensis* (baga chama); *Metapenaeus monoceros* (harina); *M. brevicornis* (lolia); *Parapenaeopsis stylifera* (ruda).

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4. TRAWL FISHING

The management of the trawl fishery includes limiting the number of trawlers and the number of fishing days, based on resources, regulating mesh size of gear and regulating landing of white fish, etc. Rules have been framed to regulate fishing periods to protect the safe breeding of shrimps. Restrictions have also been imposed on industrial fishing within the 40 m depth contour. Rules have also been promulgated to compel use of turtle excluder devices in the trawl net, but these rules have yet to be enforced because of litigation. Only 73 trawlers are allowed to fish in the marine water of Bangladesh, of which currently 45 shrimp trawlers and 15 fish trawlers are in operation. Annual catch from these trawler is only 4.4% (some 11 600 t) of the total marine catch.

5. ESTUARINE SET BAG NET

The estuarine set bag net (ESBN) fishery is very destructive as it catches a high percentage of juvenile fish and shrimp. Estuarine and offshore fishing is controlled by the regulation of mesh size of net, but this is not satisfactorily effective. It has been suggested to ban the use of ESBN gradually to save the offshore and estuarine fisheries. This would imply the creation of alternative job opportunities for the displaced fishers, who would otherwise be destitute.

6. PUSHNET

This gear is used exclusively for collecting shrimp seed. Shrimp farming in the country is largely dependent on natural seed sources. Approximately 2 000 million shrimp seed are collected annually from natural sources. Unfortunately a lot of seed of other fish and aquatic fauna are destroyed in the process of collecting the target shrimp seed.

Initiatives have been taken to improve collection techniques for shrimp seed without hampering other aquatic fauna. The community involved in this activity are being trained and motivated. The Government has taken steps to establish shrimp hatcheries to adequately meet the national shrimp seed requirement.

7. BOTTOM LONGLINE

The bottom longline fishery for jewfishes is considered healthy and there seems to be room to accommodate additional fishermen, such as displaced ESBN fisherfolk. No legislation on management of this fishery exists, but hook size is restricted to avoid catching small fish.

8. MARINE SET BAG NET FISHERY

The marine set bag net fishery is considered a good fishery in terms of conservation and management. This gear is used to catch adult and pre-adult fish and shrimp.

9. TRAMMEL NET

This gear is not widely used, but it might be considered a good option for replacing the ESBN.

10. GILL NET

The gill-net fishery contributes more than half of total marine catch, despite their generally low catch. There are no survey data available on effort range of the gill net fishery, but it is believed that the gill net fishery is beyond the sustainable level and that steps must be taken to minimize the fishing effort substantially. As there is a lack of scientific data and information to enumerate the stock size of pelagic fishes, particularly *Hilsa* spp., the measures necessary for better management cannot be taken. Adequate scientific information and database information management system must be generated through research and surveys.

11. CONFLICT AMONG DIFFERENT FISHERIES

Although legislation bans trawl fishing within the 40 m depth contour, trawlers still fish in the shallow waters. This creates conflict among the trawl fishery, gill net fishery, ESBN fishery, marine set bag net fishery, bottom longline fishery, etc. Legal provisions need to be enforced so that these conflicts are minimized, thus helping to ensure effective management and conservation of fisheries resources.

12. MARINE PARKS AND RESERVES

Provision has been made in the *Marine Fisheries Ordinance*, 1983, to establish marine parks in any area of the Bangladesh fisheries waters, together with adjacent or surrounding land. So far, no marine park has been established. There are many ornamental fishes in and around St. Martin island. This island could be developed as a marine park.

13. LEGAL ASPECTS OF MCS

Bangladesh signed the 1982 United Nations Convention on the Law of the Sea and immediately felt the responsibility of management and conservation of the living and non-living marine resources within the area of the 140 915 km^2 of its EEZ. Sustainable exploitation of resources was also one of its goals. The Government of Bangladesh formulated the *Marine Fisheries Ordinance* in 1983 for the management and conservation of marine fisheries resources. Under the provisions of the Ordinance, the government framed the *Marine Fisheries Rules*. The Ordinance and Rules are the main legal framework for controlling fishing activities for management, conservation and development of fisheries resources. Under the Ordinance, the government appoints a Director, who is entrusted with management, conservation and development of marine fisheries resources. Any officer from the Bangladesh Navy, Customs, Coast Guard or any other government organization may be appointed as an authorized officer for the said purpose. The main regulatory features of the *Marine Fisheries Ordinance* and *Rules* are:

- Control of fishing effort by limiting fishing units.
- Management of fishing effort by licensing systems, mesh size regulation, designated fishing areas, and restriction of fishing period.
- Protection of fish stocks by brood-protecting restriction of fishing during the breeding season(s) and catch size restriction.
- Environmental protection.
- Determining the total allowable number of trawlers is the responsibility of the highest body of the country (Council of Ministers).

14. INFORMATION SYSTEM FOR MCS

There is a lack of adequate information for MCS in marine fisheries. The only available data are fish production statistics and resource assessments.

14.1 Fish production statistics

Annual fish production from marine fisheries is estimated by the Fisheries Resources Survey Service (FRSS) of the Department of Fisheries (DOF) and the Marine Fisheries Office, DOF. The Marine Fisheries Office is responsible for collection of industrial fish and shrimp catch statistics and for regulating fishing activities. The trawler fleets are required to submit daily fishing logs after returning from each fishing trip, which are compiled to calculate the total annual fish and shrimp production. Records regarding effort, processed shrimp production and fishing area are provided in these logs. The logs are verified by random inspection of vessels. The export data of fish and shrimp of the trawlers are also compiled after collecting invoices from the trawler companies.

The Resources Survey Office compiles fish production data on artisanal fisheries. However, sufficient survey personnel are not available to collect the required samples from the marine sector. The representative sample used as the basis for enumerating total production is very low, with potentially a high percentage of error. The collection of data is also difficult because the fishermen are not aware of the need for record keeping and reluctant to cooperate with the enumerators. As a result, enumerators have to rely on visual estimation in many cases. The frame survey on which the estimation of total production is based has not been updated. Computing facilities are inadequate.

14.2 Resources

The Marine Fisheries Survey and Management Unit is responsible for resource survey and stock monitoring. The unit has two research vessels for this purpose. The fish and shrimp stock in the EEZ of Bangladesh was estimated in the early 1980s though a development project, but has not been systematically updated. The research vessels conduct surveys from between 10 and 200 m depth, but a large portion of sea falls within the 10 m contour. Fisheries resources in this area have not been assessed. The Unit also collects effort data from mechanized fishing boats.

Major problems identified and needing to be addressed include obtaining information on the rate of compliance and non-compliance with rules; percentages of error in reporting; attitudes towards MCS; and effects of regulation on the resources as well as on the community.

15. INSPECTION PROCEDURES ASHORE AND AT SEA

Inspection procedures are well developed in the industrial fisheries sector. The Inspectors of the Marine Fisheries Office can inspect any trawler as required. Inspection is usually carried out when the trawlers return from the sea after fishing. Verification of nets and mandatory landing of shrimp and fish is usually undertaken during inspection. The inspectors inspect the vessels before each sailing permission; it ensures that the trawlers fulfil all the requirements for fishing, including fishing log, fishing area and period of fishing.

Mechanized fishing boats are inspected at the check post to see if they have a licence and approved fishing gears. The Bangladesh Navy and the Coast Guard organization are entrusted

with ensuring smooth fishing activity in the EEZ of Bangladesh. They also protect against piracy by foreign fishing vessels. The Bangladesh Navy also inspect trawlers and mechanized boats at sea to verify legal documents and fishing gears.

16.COMMUNITY-BASED FISHERIES MANAGEMENT AND APPLICATION OF MCS IN COASTAL FISHERIES

Community-based fisheries management (CBFM) is a new concept in the marine fisheries of Bangladesh, and has still to be implemented. The marine fisherfolk community is the largest fishing community in the country. In this community, the ESBN community has been studied for the application of CBFM. The Bay of Bengal Programme (BOBP) Phase 3 has targeted the ESBN community in order to initiate CBFM. The *Coastal Fisheries Management in the Bay of Bengal* project has as its objective the creation of awareness among all stakeholders, particularly fisherfolk, in order to involve them in fisheries management. To reach the objective of participatory management, all stakeholders have been identified and dialogue has been initiated.

The government has launched another small project which will undertake awareness building activities in coastal areas, in order to bring the community under CBFM. For extensive propagation of CBFM along the entire coastal belt, expatriate technical assistance and financial assistance will be required.

17. PRACTICAL EXPERIENCE OF MCS IN BANGLADESH

Although most of the fisheries in the marine sector are not under the MCS process, the industrial fishery is regulated more or less by MCS concepts. Entry into the trawl fishery controlled. Since 1985, the government has restricted the number of trawlers to 73. Each trawler has to obtain a licence annually and no fishing operation can be conducted without prior permission from the Marine Fisheries Office. Trawler operators also have to provide the Marine Fisheries Office with fishing data. There are restrictions on the type of gear, fishing area and the amount of fish and shrimp to be landed. These trawlers are regularly inspected to ensure compliance. Thus the trawler fishery is under MCS. However, there are some constraints to implementing MCS because of litigation.

In the artisanal fisheries sector, application of MCS is very difficult. The lack of sufficient trained personnel is the main constraint. The sector consists of more than 7 000 registered mechanized boats and 15 000 non-registered non-mechanized country boats. Only about 2 200 mechanized boats have obtained a fishing licence from the Marine Fisheries Office. No up-to-date census data is available on fishing boats, fishing gears and the number of fishermen in the marine sector. The data available is based on a 1984-85 frame survey. Because of the lack of sufficient staff and other resources, no proper MCS system for scrutinizing the activities of these numerous fishing boats, gear and fishermen the MCS has been implemented.

The main constraints for practical application of MCS in Bangladesh include:

- Lack of accurate statistics in the artisanal sector, which contributes 96% of the total marine fish production.
- Lack of a scientific information system.
- Inadequate trained manpower at both management and operational levels.
- Lack of awareness at the community level of the need for MCS.
- A large number of inaccessible landing places along the coast.
- Inadequate funding for MCS.

18. MONITORING SYSTEM

The monitoring system for marine fisheries in the country is based on catch and effort data collection from the industrial fishing fleet through prescribed forms supplied by DOF for production and fisheries trend monitoring.

Resources monitoring is carried out with the help of two DOF research vessels. The research vessels collect data and analyse it in order to monitor exploitation level, species composition, seasonal abundance, etc., and to advise on future trends in fisheries. The artisanal-sector data generated by the collection of landing statistics is inadequate.

19. ECONOMIC AND FINANCIAL ASPECTS OF MCS

As the industrial fishery is functioning in compliance with MCS concepts, this fishery is still profitable. The control of the number of trawlers results in a good economic return per unit.

The government is extending MCS in the coastal zone through the implementation of a project during next five years. The entire artisanal fishing fleet should come under a licensing system. With the help of this system, DOF will be able to enforce and monitor the management and conservation regulations, which will consequently facilitate resource monitoring.

MCS helps the fishery of the country remain industrially, economically and environmentally viable, but there is ample scope to strengthen the MCS system in the marine fisheries sector. It needs further technical and financial assistance in this field from experienced organizations and developed countries.