



The rhetorical blue economy in Bangladesh: Analyzing the inborn regulatory bottlenecks

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Abstract

This study's overarching objective was to assess the suitability and applicability of the existing legal and institutional framework for managing the coastal and marine resources in Bangladesh. Together with, the fundamental challenges faced by the artisanal and small-scale fishers in Bangladesh were critically scrutinized. The study revealed that the regulatory framework in Bangladesh is characterized by jurisdictional overlapping followed by the conflict of interests among the public institutes, which originated from the aged and fragmented laws and ambiguous business allocation; consequently, the artisanal and small-scale fishers suffer a lot. The local government and community's right to resource management remains fuzzy. Bangladesh can enact new sectoral laws followed by business reallocation for the line ministries. The study will help policymakers identify the bottlenecks rooted in the existing regulatory and institutional framework.

Keywords: Coastal and Marine Resource; Jurisdictional Overlapping; Conflict of Interests; Marine Governance; Artisanal Fishers

1. Introduction

Bangladesh is located in the north-east corner of the Bay of Bengal and blessed with living and non-living resources (FAO, 2014). The Bay of Bengal's living resources comprised of fisheries, pearls, corals, mangroves, planktons, seaweeds, and other ecosystem services (Ahmed and Glaser, 2016; Islam and Shamsuddoha, 2018). The *Sundarbans* mangrove also supplies essential ecosystem services like fish, crabs, turtles, shrimp, honey, medicinal plants, *Nypa* palm leaf, wax, wood, white mangrove date palm, and fodder. Extraction, exploration, management, and conservation of both living and non-living resources of the Bay can contribute a lot to Bangladesh's economy (Hasan *et al.*, 2018). The Bay of Bengal can offer considerable opportunities to resolve the challenges originating from the climate changes in the coastal areas (Giménez *et al.*, 2014). Bangladesh confronts both incremental locals (Rahman *et al.*, 2009) and climatic stressors (Rahman 2020) to protect its natural resources. On the other hand, sustainable resource management may generate decent works and bring a tangible change to the people residing in the coastal zones and across the country (Ahmed and Rahman, 2020; Hussain *et al.*, 2017, 2018). The potential of the marine and coastal resources has not been identified so far.

Several studies found that the implementation level's institutional mechanisms are not adequately functional to flourish coastal and marine fisheries in Bangladesh (Islam, 2012; Alam *et al.*, 2021; Shamsuzzaman and Islam, 2018; Shamsuzzaman *et al.*, 2017a, b; Rahman *et al.* 2020; Rahman and

Alam 2020). Few old laws, especially inland laws, provide legal frameworks for fisheries management, which are not appropriately enforced for multiple reasons. The existing legal framework has led to "sector-by-sector" or "use-by-use" management practices. Diversely, the institutional mechanism, marine governance, stakeholder engagement, and coordination among different players are not clearly defined (Shamsuzzaman *et al.*, 2017a; Rahman *et al.*, 2020; Rahman and Alam 2020). Marine growth unquestionably depends on the connectivity among the terrestrial, freshwater, and marine realms. Therefore, a comprehensive study on coastal and marine resource management regulatory regimes in Bangladesh, considering both legal and institutional arrangements, has become indispensable. Thus, the study aims at analyzing the legal and institutional frameworks embedded with blue growth. This analysis will help in the identification of the knowledge gap and existing challenges. The study will immensely contribute to pinpointing the narrow and broad interfaces, constraints, and diffused connections among institutions from top to bottom.

The artisanal and small-scale fisheries face significant challenges that emerge from a policy implementation gap and weak law enforcement (Billah *et al.*, 2018). The proportion of artisanal and small-scale fishers show a declining trend decreasing at an alarming rate due to lack of an integrated and holistic regulatory and institutional framework, which propagate a distorted market chain, climate vulnerabilities, and hegemony of the commercial fishers (Alam *et al.*, 2021). This vulnerable group is becoming "left behind the group" by losing their income. The study also examined the fishers' challenges, notably artisanal and small-scale, to make policy interventions.

Bangladesh has taken several initiatives towards fortifying the institutional structures for harnessing the full utilization of marine-based potential resources eyeing on SDG 14 (Table 1).

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Table 1
List of the institutional initiatives for trapping coastal and marine resources in Bangladesh (Bdgv, 2020)

Institution	Initiatives
MOFA	Established a Maritime Affairs Unit (MAU) to prepare position papers to fix the maritime boundary with the neighboring countries
MOEF	Appointed a focal point of the blue economy
MOS	Prepared a long and midterm strategic action plan for the extraction of marine resources
MPEMR	Structured a "Blue Economy Cell" to explore and extract mineral resources from the "Bay of Bengal"
MOFL	Shaped a "Blue Economy Corner" to explore marine fisheries
Moedu/ AFD	Established BSMRMU that has started its voyage with the maxim of providing skilled and knowledgeable human resources soon
MOST	Established BORI that has started walking and limping with the underdeveloped legs
GED	Identified key the ministries/divisions in achieving SDG-14
MPEMR	Established SREDA to explore alternative sources of energy (renewable), including blue energy
PMO	Formed a national coordination committee of marine resource extraction and management in 2014 through a gazette notification and appointing the "Principal Secretary to the PMO as the chief coordinator to monitor the action plans taken by different ministries and divisions

MOFA= Ministry of Foreign Affairs; MOFL= Ministry of Fisheries and Livestock; MOS= Ministry of Shipping; MPEMR=Ministry of Power, Energy, and Minerals; MOEF= Ministry of Environment, Forest and Climate Change; GED=General Economic Division; Moedu= Ministry of Education; AFD= Armed Forces Division; MOST= Ministry of Science and Technology; PMO= Prime Minister's Office; BORI=Bangladesh Oceanographic Research Institute; SREDA= Sustainable and Renewable Energy Development Authority; BSMRMU=Bangabandhu Sheikh Mujibur Rahman Maritime University

2. Materials and Methods

The study collected both primary and secondary data for the period from November 2018 to April 2020. Secondary data regarding the relevant Acts, Ordinances, and Rules relating to Bangladesh's marine resource management and sustainability were analyzed to develop background information.

2.1. Primary data collection

The primary data collection followed a mixed approach, including workshops, case studies, personal and key informant interviews (KIs). The personal interview is considered the highest appreciated data collection approach in qualitative research (Gill *et al.*, 2008). The semi-structured interview has no strict guidelines, depending on how the interviewee responds to the researcher's questions. The interviewee is comfortable with semi-structured interviews compared to the structured interview (Stuckey, 2013). Despite having a set of questions, the interviewees' response gives the researcher the flexibility of asking more supplementary questions than the initially drafted questionnaire. For this reason, the scholar prefers semi-structured in-depth interviews for qualitative researchers (DiCicco-Bloom and Crabtree, 2006). Workshops, a research approach, cater a platform for a researcher in spotting, articulating, and scrutinizing poorly-defined or fuzzy challenges in the research domain (Ørngreen and Levinsen, 2017). KI technique helps the researcher who faces confusion in concluding and feels the need for experts' opinions (Ali *et al.*, 2013). On the other hand, a case study is considered an affordable technique to gain a big picture idea of a complicated situation and allows for new and unforeseen issues to emerge (Harrison *et al.*, 2017).

A national consultation workshop was held in Dhaka, incorporating ministries, research, training, educational institutes, and civil society. The participants were divided into two thematic groups: legal and institutional. The first group identified the fundamental laws along with their mottos and weaknesses. The second group found the line ministries and

divisions having stakes directly and indirectly in marine and environmental management. They also scrutinized the respective mandates from the "Rules of Business 1996" and overlapping jurisdictional areas. Two divisional workshops were held in *Khulna* and *Barishal*, where approximately 50-60 participants were present in each. The divisional workshops' purposes were to identify the causal factors of non-compliance with laws and conflict of interests. All of the groups were requested to come up with solutions for overcoming the challenges.

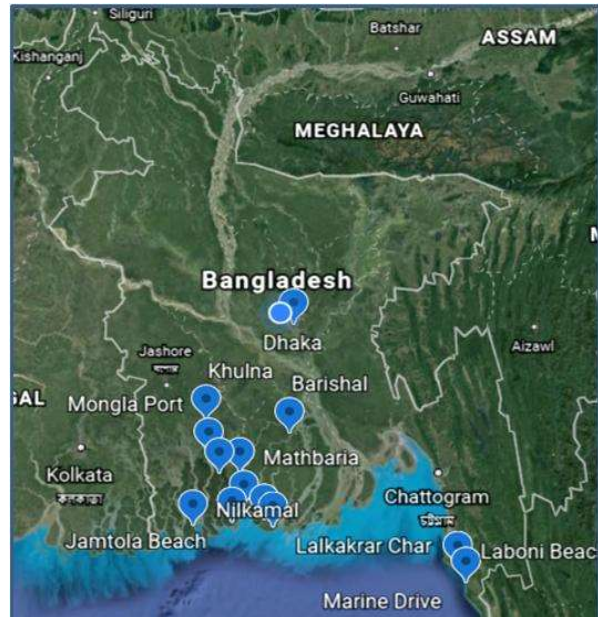


Figure 1: Google map showing the study areas

Three Focus Group Discussions (FGDs) were done at Bangladesh Oceanographic Research Institute, Marine Fisheries Academy, and Bangladesh Marine Academy, taking 5-8 respondents in each to understand the coordination mechanism among training and research institutes. In addition, seven case studies were done at *Andharmanik*, *Nilkamal*, *Jamtola Beach*, *Mongla Port*, *Lalkarar Char*, *Laboni beach*, and *Cox's Bazar-Teknaf Marine Drive* to generate an idea about the coordination mechanism and management practices at the operational level (Figure 1). A total number of 120 individuals were interviewed by using a semi-structured questionnaire at *Jhaliaghata* (*Patharghata* sub-district), *Boromasua* (*Mathbaria* sub-district), and *Mohipur* (*Kalapara* sub-district) to identify the critical challenges of the artisanal and small-scale fishers. The questionnaire was prepared in the Bengali language, and then it was translated into English. During the consultation, talking in the mother tongue helps establish trust (Zhang and Guttormsen, 2016). A total number of 20 key informants, including academicians and line experts, were interviewed to identify the potential resources.

2.2. Data analysis

The content analysis was done considering its uniqueness, which supports qualitative (Dooley, 2016) and quantitative research (Krippendorff, 2004; Neuendorf, 2002; Spencer *et al.*, 2003) in an inductive and deductive way. The collected data was coded into different categories and variables. The study preferred a manifest content analysis rather than a latent content analysis to reflect the respondents' total views avoiding biases (Berg, 2009). Four stages: de-contextualization,

re-contextualization, categorization, and compilation, were followed in the content analysis (Bengtsson, 2016).

3. Result and Discussion

3.1. The legal framework

The respondents identified a total number of 19 laws that support marine resource management and sustainability directly or indirectly (Table 2). Article 18 A of the Constitution, without keeping any specific provisions, upholds the aspiration of sustainability of natural resources. This section was included in the "Fundamental Principles of the State Policy," which is judicially non-enforceable. "Territorial Waters and Maritime Zones Act, 1974" zoned the Bay of Bengal, discounting the concept of marine governance and not accrediting any specific ministry or department as the custodian of this law, though *MOFA* serves the purpose. The drafted "Bangladesh Maritime Zones Act, 2018" is an amendment of the act mentioned above, approved by the cabinet but not ratified as a bill through the parliamentary process. This draft also underlines the determination of the maritime zones and control of criminal activities. Therefore, the concept of marine governance has not been flourished in Bangladesh.

Table 2

List of key laws identified by the respondents

SL	Name of the law
1	The Constitution of the People's Republic of Bangladesh
2	The Territorial Waters and Maritime Zones Act, 1974
3	Bangladesh Maritime Zones Act, 2018 (Draft)
4	The Marine Fisheries Ordinance, 1983
5	The Protection and Conservation of Fish Rules, 1985
6	The Bangladesh Shipping Corporation Act, 2017
7	The Bangladesh Merchant Shipping Ordinance, 1983
8	The Bangladesh Flag Vessels (Protection) Ordinance, 1982
9	The Bangladesh Ship Recycling Act, 2018
10	The Bangladesh Oceanographic Research Institute Act, 2015
11	The Bangladesh Oil, Gas and Mineral Corporation Ordinance, 1985
12	The Sustainable and Renewable Energy Development Authority Act, 2012
13	Weather Act 2018
14	The protected areas of tourism and special tourism zone Act 2010
15	Bangladesh Water Act 2013
16	State Acquisition and Tenancy Act 1950
17	Bangladesh Environment Conservation Act 1995
18	Wildlife (Conservation and Security) Act 2012
19	Ecologically Critical Area Management Rules 2016

"Bangladesh Merchant Shipping Ordinance, 1983" and "Bangladesh Flag Vessels (Protection) Ordinance 1982" and "Bangladesh Ship Recycling Act, 2018" entrusted *MOS* to administer maritime shipping and shipyard industry. Nonetheless, shipping-related laws are not accommodative with international conventions.

Marine Fisheries Ordinance, 1983" empowered *MOFL* to manage marine including high sea fisheries; in contrast, "Wildlife (Conservation and Security) Act, 2012" empowered the Ministry of Environment, Forest and Climate change (*MOEF*) to regulate the protected areas, including their resources. Interestingly, the "Bangladesh Merchant Shipping Ordinance, 1983" entitled *MOS* to register fishing vessels. Hence, Marine Fisheries are intersected by 03 ministries, which cause a conflict of interests and an obstacle in marine fisheries development in Bangladesh. "The Protection and Conservation of Fish Rules, 1985" underlines freshwater fisheries by downplaying the marine realm.

Similarly, *MOEF* also controls Marine tourism in the protected areas being empowered by the "Wildlife (Conservation and Security) Act, 2012". Contradictorily, the "State Acquisition and Tenancy Act 1950" authorized the Deputy Commissioner

(*DC*) of a district on behalf of the Ministry of Land (*Minland*) to maintain the rights in and over land and water. Hence, tourism in non-protected areas is managed by the district administration. "The protected areas of tourism and special tourism zone Act, 2010" authorized the Ministry of Civil Aviation and Tourism (*MOCAT*), the nodal institute, to regulate tourism. Likewise, this sector faces an onslaught of overlapping and underlapping jurisdictions and cannot move forward. Differently, "Ecologically Critical Area Management Rules, 2016" provided some authority to *MOEF* in land management, which has created a conflict of interest with *Minland*.

The "Bangladesh Oil, Gas and Mineral Corporation Ordinance, 1985" entrusted *MPEM* to explore, extract and sell crude oil, natural gas, and mineral resources. The "Sustainable and Renewable Energy Development Authority Act, 2012" entitled this ministry to explore non-traditional renewable energy sources. The study revealed that only the "Territorial Waters and Maritime Zones Act, 1974"; "Marine Fisheries Ordinance, 1983"; "Bangladesh Flag Vessels (Protection) Ordinance, 1982"; and "Bangladesh Oceanographic Research Institute Act, 2015" deals with few areas of the blue economy. Ironically, the provisions of the "United Nations Convention on the law of the sea (UNCLOS)" and the "International Convention for the Prevention of Pollution from Ships (MARPOL)" are overlooked in the existing laws. The "Bangladesh Biodiversity Act, 2017" and "Wildlife (Conservation and Security) Act, 2012" somehow cover the obligations of the "Convention on Biological Diversity (CBD)" and "Aichi Biodiversity Targets." But these laws were enacted for eyeing on terrestrial ecosystems. Bangladesh is a signatory country of approximately 45 international treaties for ensuring sustainability, nature conservation, and environmental justice (Rahman, 2021c). "Bangladesh Environment Court Act 2010" does not directly recognize ordinary people's rights, and the Court's jurisdiction is unclear (Rahman, 2021c).

3.2. Allocation of business at the Policy level

The respondents identified numerous actors having stakes in marine resource management (Table 3). The relevant businesses were scrutinized from the "Rules of Business, 1996" (Cabinet, 2017). The mandates of recently formed *MAU* have not been included in the business allocation of *MOFA*. *MOS* plays a crucial role in administering maritime transportation where its apical business is 'port,' a single word without further clarification that can denote various ports, including spaceport. The clear mandates of *MOFL* could not clear deadlock over fisheries management as its counterpart *MOEF* is entrusted with a highly ambiguous mandate. Environment and ecology can be applied to a broader range from benthic to avian ecology. Climate change is absent in the business of *MOEF* despite its presence in the nomenclature of this ministry.

Table 3

Allocations of business for the ministries/division related to marine resource management in Bangladesh (Cabinet, 2017)

M/D	Allocation of business
<i>MOFA</i>	Boundary and territorial treaties; piracies and crimes committed on the high seas, and administrative zonation
<i>MOFL</i>	Aquaculture including pearl culture, marine fisheries, deep-sea fisheries, and shrimp culture in the coastal areas
<i>MOS</i>	Ports, maritime shipping, navigation, controlling offense on high seas; marine pollution from ships and crafts; registration and safety administration of fishing vessels; marine search and rescue
<i>MPEM</i>	Energy, petroleum, natural gas, mineral resources, and geological survey
<i>MOEF</i>	Environment and ecology; environmental pollution; conservation of forests; protection of wild birds and animals; and establishment of sanctuaries

<i>MOCAT</i>	Legislation relating to tourism and registration of travel agencies
<i>ISD</i>	Internal and border security
<i>MOD</i>	Meteorological observations, hydrographic surveys, and preparation of navigational charts
<i>MOST</i>	Biotechnology and oceanographic science
<i>Mincom</i>	Matters related to export including treaties, agreements, protocols, and conventions bearing on trade with other countries
<i>MODMR</i>	Issues related to risk reduction, emergency response management, relief management, rehabilitation, safety net programs
<i>LGD</i>	Development of rural water supply, sanitation and sewerage system; taking poverty reduction program; and promoting entrepreneurship development
<i>MOA</i>	Regulating agricultural inputs
<i>Minland</i>	Issues related to rights in and over land and water
<i>Moind</i>	Matters related to the industry, salt industry
<i>GED</i>	Geographical Information System (GIS) platform; the national focal point of renewable sources of energy
<i>MSW</i>	Community development with particular emphasis on the disadvantaged segment of the society
<i>MOWR</i>	Land reclamation and estuary control; controlling salinity and desertification; hydrological survey
<i>Moedu</i>	Matters related to public universities

M/D= Ministry/ Division; *MODMR*= Ministry of Disaster Management and Relief; *MOWR*=Ministry of Water Resources; *ISD*=Internal Security Division; *Moind*= Ministry of Industries; *Mincom*=Ministry of Commerce; *MOA*=Ministry of Agriculture; *LGD*=Local Government Division; *MSW*=Ministry of Social Welfare

Instead, *MODMR* is entrusted with a transparent mandate like risk reduction, emergency response. The business allocation did not strengthen the footings of *MOCAT* in overseeing blue tourism as it is mandated to deal with tourism-centric legislatures. The *Mind* has been empowered to regulate the salt industry, a piece of the marine industry though it was supposed to be the nodal ministry of developing maritime industry. Being a focal point of renewable energy sources, *GED* has coincided its mandate with the parental *MOPMR* dealing with energy.

MOST deals with the matters associated with biotechnology and oceanographic science, but simultaneously, *Moedu* is mandated for technical education and research. On the other side of the coin, the "Bangladesh Oceanographic Research Institute Act 2015" enabled the "Bangladesh Oceanographic Research Institute" to control and coordinate all marine research. *Bangabandhu Sheikh Mujibur Rahman* Maritime University (*BSMRMU*), the only earmarked university, is administered by the *AFD*. Several public universities have marine-related faculties, departments, and disciplines which follow the guideline of *Moedu*. Bangladesh Marine Fisheries Academy, a *MOFL*-run training institute, was established to prepare graduates for marine fisheries that currently offer a bachelor's degree in nautical and marine engineering with higher interests. As *MOFL* is not entitled to issue a Continuous Discharge Certificate, the nautical science and marine engineering departments' cadets must collect *MOS* certificates. With this, Bangladesh Marine Academy's unique role, a subordinate of *MOS* in preparing mariners (nautical and engineering), has been fizzled out. Both these training institutes are affiliated with *BSMRMU* through sidestepping *Moedu* and *MOST*.

LGD, *MSW*, and *MODMR* work for the development of the coastal community without maintaining demarcated boundaries. Interestingly, the role of local government bodies in managing natural resources has been endorsed in its mandate. Hence, the participation of local government in marine and coastal resource management is in the darkness.

It is revealed that the fragmented legal framework and ambiguities in business allocation resulted in jurisdictional overlapping in almost all areas of resource management (Figure 2). Therefore, the institutional framework for coastal and marine resource management is characterized by a complex arrangement. The study found many public institutes in

Bangladesh regulate the blue economy and environmental protection, but their mandates are not clearly defined either in the legal or institutional framework.

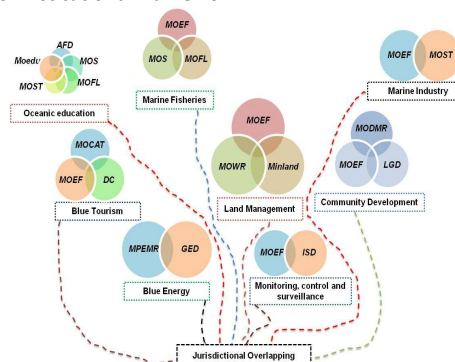


Figure 2: Areas of overlapping jurisdictions in Bangladesh

The jurisdictional overlapping leads to a conflict of interest, poor coordination, lack of cohesion, and even rivalry, which are the major pitfalls and bottlenecks in harnessing marine resources in Bangladesh (Figure 3). Very often, everybody's business turns into nobody's business.

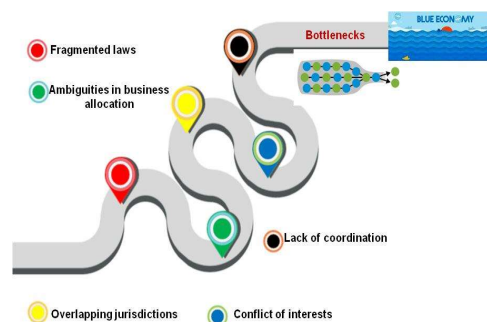


Figure 3: Bottlenecks in the blue economy of Bangladesh

It was argued that poor coordination and integration mechanisms exist among various stakeholders, neither from the policy level to the implementation level. There are few institutions established by the legal provisions for regulating the marine and coastal resources. The vagueness in the allocation of business in determining the authority created obstacles in developing effective coordination, hindering further blue growth. The absence of formal institutional mechanisms and poor coordination among public departments also caused marine living resources degradation (Rahman *et al.*, 2020; Rahman and Alam, 2020). The fisheries resources are managed by disconnected agencies, causing competition and conflict of interests among different departments (Hossain *et al.*, 2014; Alam *et al.*, 2021). The sectoral, temporal, and spatial marine governance is neither supported by the legal nor institutional framework resulting in poorly functional marine governance. Hussain *et al.* (2017) reported that lack of coordination between and among the players negatively impacted marine trade and commerce, blue tourism, exploration of minerals, marine industries, sustainable marine fisheries, conservation, and social welfare. The coastal and maritime tourism in Bangladesh faces enormous challenges due to poor coordination and integration among different sectors (Rahman, 2021b; Rahman 2020b). The multi-layered authorities generate miserable sufferings for the artisanal fishers (Alam *et al.*, 2021). Sarker *et al.* (2018) revealed that along with government functionaries, academic institutions, *NGOs*, and think tank organizations should be the critical stakeholders in marine regulation.

3.3. Governance at the implementation level

Andharmanik: *Andharmanik* (the ruby of the dark), a hidden treasure trove in the *Sundarbans* mangrove, is characterized by a fresh-brackish swamp and intercepted by four rivers: the *Shela*, *Kharma*, *Baleshwar*, and *Chechang*. This area is earmarked as a dolphin sanctuary that is lacking tourist amenities. The *Chandpai* range of Forest Department manages this tourist spot's diverse plant ecosystem and herds of wild spotted deer.

Nilkamal: Despite the absence of tourist facilities, abundant spotted deer, Bengal Tiger, Marsh Crocodile, Rhesus Monkey, Peacock Turtle, Red Junglefowl, and rare birds has heightened the natural beauty of *Nilkamal* (blue lotus), a highly famous tourist spot in Bangladesh. Similarly, it is regulated by the *Khulna* range of the Forest Department.

Jamtola Beach: *Jamtola* (under the blackberry tree) is located in the East Wildlife Sanctuary of the Sundarbans mangrove, an exciting tourist spot. The array of littoral vegetation has enriched this beach, an exact location for watching the realistic view of sunrise and sunset over the sea. A nearby watchtower is considered the only tourist facility for this beach controlled by the *Shoronkhola* range of the Forest Department.

Mongla Port: The port is managed by a port authority comprised of the Chairman (Chief Executive) and three members under *MOS's* control. The Standing Committee on Ministry of Shipping, lead by Members of Parliament, monitors the authority's activities simultaneously. The board is entitled to formulate a policy of the administration, operation, and development.

Lalkakrar Char: *Lalkakrar Char* (shoal of red crab) is about five km east from *Kuakata's* main beach point under *Patuakhali* districts, an attractive place for thousands of nature lovers. These little mermaids (red crabs) come out of the residing holes during low tide turning the beach into a red carpet. The *Tamarix* stands beside the beach makes a red-green nexus at that time. The conflict of interest is absent in this underdeveloped beach apart from tourism amenities.

Laboni beach: This is the part of the world's longest natural sandy beach (125 kilometers), the most popular tourist spot of Bangladesh, which remains crowded by thousands of visitors over the year. The restaurants, resorts, cottage, and lobster's market are managed by the private sector fragmentally. With the help of Bangladesh Tourist Police, the district administration, *Cox's Bazar* ensures safety for the tourists. There is a lack of specific authority empowered by the law responsible for spatial planning, day-to-day maintenance, development of tourist facilities, and sustainability.

Cox's Bazar-Teknaf Marine Drive: The longest marine drive road in the world is surrounded by a hilly evergreen forest on one side and blue marine water on another side. On an 80 KM long road, few substandard restaurants are available in *Inani* and *Himchhori* beach points; hence, it could not be ideal for tourists, notably foreigners. Bangladesh Army, Bangladesh Police, and Bangladesh Border Guards have checking points at intervals, and hence, it is quite tricky to find the actual authority of this drive.

The study reveals that the local government bodies play a perplexing role in marine and coastal resource management. On the other hand, the active participation of the community has not been embraced yet. Not only community-based ecotourism but also sustainable tourism is impoverished. Both the existing legislative and institutional mandates do not endorse the community's role in the decision-making and implementation processes. Due to centralized and bureaucratic management

systems (Giessen *et al.*, 2016), the Public Departments could not ensure the full participation of the community and other stakeholders in natural resource management (Millat-e-Mustafa, 2002; Rahman, 2021a).

3.4. Fishers' Challenges in Bangladesh

The fishers identified piracy as the greatest threat indicating futile legal and institutional arrangement, non-compliance with the laws, laxity in enforcement, and ineffective *MCS* (Figure 4). Due to a lack of high sea governance, foreign pirates frequently enjoy hegemony in the sea. The fish stock is declining in the estuary and territorial water for the commercial fishers' ascendancy and destructive fishing, albeit prohibited per "National Fisheries Policy 1998". Shamsuzzaman and Islam (2018) revealed that this policy is not implemented due to *DOF* laxity. Sometimes, the fishers suffer tremendous hassles, including red-tapism and bribery, at fishing vessel registration. The formal banking system does not offer the fishers' loans though it is the constitutional right to be treated equally as the country's permanent residence. It can be argued that *DOF* could not establish a coordination mechanism with the Financial Institutions; thus, the fishers depend on *Mahajan* (local moneylenders). They pay back a 100% interest rate, which propels vulnerability and poverty. This local credit system is notoriously known as *Dadan*.

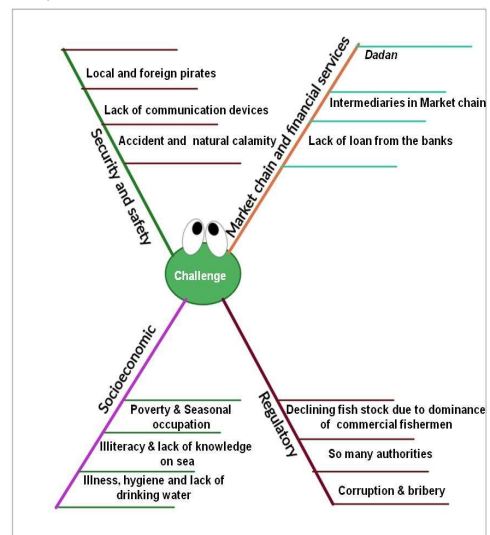


Figure 4: Spider diagram showing the challenges of artisanal and small scale fishers in Bangladesh

The fishers found seven groups of intermediaries in the fish market chain: collector, *majhi* (the Captain of the boat), *Chhoto Mahajan* (small moneylender), *Boro Mahajan* (big moneylender), *Aratdars* (a commission agent for stocking), wholesaler, and retailer (Figure 5). Jointly *Chhoto Mahajan* and *Boro Mahajan* make the highest profit, which is equal to more than 50% of the retail price, while the other groups make 25-30%. As the fishers cannot sell the harvested fish to the consumers directly, they are bound to be happy with 20-25% of retail prices. In Bangladesh, the agricultural market and supply chain are distorted and fragile, controlled by intermediaries (Alam *et al.*, 2021). Before going to the sea, fishers collect weather forecasts as there is no mobile phone network coverage there, while a segment depends on only radio.

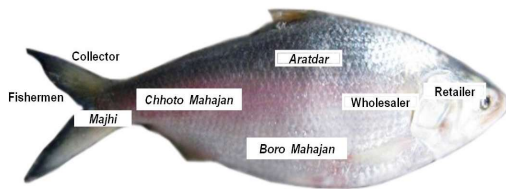


Figure 5: Intermediaries groups in the fish market chain of Bangladesh

4. Recommendations

4.1. Legal reforms

Bangladesh can enact sectoral laws to abolish jurisdictional overlapping and conflict of interests. Beforehand, a law commission can be formed to identify the conflicting issues in the segmented laws. The new laws should incorporate international commitments and obligations and the problems of sustainability and conservation.

4.2. Reallocation of business

After necessary legal reforms, the business for a few ministries and divisions should be reallocated to downsize the number of actors to ensure that anyone's business is not everyone's business.

M/D	Reallocation of business
MOFL	Marine and coastal fisheries including protected areas, mariculture, pearl culture, brackish shrimp culture
MOEF	Terrestrial forest resources, tackling climate change, the focal point of land-based pollutions
MOS	Sea ports, maritime shipping, navigation, rescue & safety, enforcement of sea laws, marine-based pollution
MoInd	Marine industries including shipyard, ship recycling, marine optical fiber and tourism
Mincom	Marine trade and commerce
MPEMR	Exploration and mining for minerals, blue energy
Moedu	Training, education and research
MOST	Biotechnology, sea weeds, the focal point of oceanographic science
MOFA	The focal point of high sea governance
LGD	The focal point of local governance
ISD	The focal point of monitoring, control and surveillance

Figure 6: Proposed business reallocation for key ministries/divisions of Bangladesh

By considering the chaotic conditions in living resource management, marine industries, blue energy, maritime security, coastal management, and local governance, mandates' reallocation has become inevitable. Hence, the study recommends revising the "Rules of Business, 1996" (Figure 6).

"The Maritime Affairs Unit (MAU)" working under the "Ministry of Foreign Affairs" can be graduated to a separate and independent ministry to establish effective coordination with other ministries. A national and sectoral statutory body, councils, and boards can be formulated. In addition, they will help different ministries in taking appropriate development projects and management schemes. A National Marine Education and Research Committee are highly warranted to integrate research works and coordinate among researchers. MOFA should be entitled to be the focal point of high sea governance following UNCLOS so that it can coordinate with other marine states shared by the Bay of Bengal. The Bangladesh Navy and Coast Guard's roles should be clearly defined to accelerate the Monitoring, control, and surveillance (MCS). LGD should be empowered to oversee the local governance for natural resource management.

4.3. Policy interventions

Bangladesh needs a comprehensive separate marine policy highlighting sectoral priority areas, coordination mechanism, and community welfare. Without the community's active participation and wholehearted support, it will be challenging to ensure any programs' sustainability. Either co-

management or ecosystem-based management can ensure participatory governance, conservation, and, finally, sustainability. The Department of Agricultural Extension achieved positive outcomes by forming Village-based organizations in the rural areas (Rahman and Akter, 2020). DOF can replicate this concept among artisanal fishers. The commercial fishers should be motivated to harvest pelagic fishes and introduce high sea fishing to establish artisanal and small-scale fisher's rights and protect further decline of fish stock in the estuary and territorial water. The Bangladesh coast guard's proactive role can control piracy and robbery in the sea and coastal areas. The marketing system can be modernized by clearing the intermediaries group from the market chain. DOF should coordinate with the formal banking system to disburse loans for the community people, which are warranted to stop the local lenders' (Mahajan) monopoly business and improve the socio-economic conditions. The departments, notably DOF, should be equipped with modern logistics and a sufficient workforce. Bangladesh Parjatan Corporation (BPC), a statutory board under the Ministry of Civil Aviation and Tourism, is tasked to promote the country's tourism industry. The policymakers should take initiatives to improve the quality of the restaurants and hotels of BPC to attract more tourists. Community-based tourism helps in employment generation and branding of local products and culture. Fish telemetry technology or community radio for fishers could be installed in the coastal area to forecast weather and provide fishing guidelines.

Strong cohesion of the public departments, researchers, academia, non-government organizations, private sectors, training institutes, research institutes, and the community can maximize the benefit without ecological degradation. The coordination among marine states is essential for conservation and tackling climate change. One country's conservation initiative may be jeopardized by the over-extraction and destructive activities of other countries. For optimizing the benefits, the marine stakeholders need to consider the undeniable role of the land managers.

Considering the environmental degradation caused by increased salinity (Rahman 2020a), Bangladesh should avoid brackish shrimp culture. The alternative income generations like crab caging, giant freshwater prawn (*Macrobrachium rosenbergii*) culture, mixed prawn-rice culture, *nypa*-shrimp-crab culture, multi-trophic aquaculture, apiculture, and small entrepreneurship development may be testified to solve employment centric problems. Rahman (2020a) revealed that agroforestry in the lower saline zone might be a good income generation option.

An integrated Marine Spatial Planning (MSP) in Bangladesh is compelling to achieve various long-term eco-marine growth objectives. A complete inventory of both living and non-living resources could be done for conservation and sustainable use beforehand. Multi-disciplinary sustainable marine resource management requires highly professional human resources and motivated researchers. The country should develop a large number of skilled and well equipped human resources in the field of marine science, marine fisheries, biotechnology, climate change, marine dynamics, marine engineering, ocean acidification, maritime trade, offshore mining, naval architectural engineering, marine geological aspect, marine environment, and ecosystem science, etc. Further research should be carried out on policy analysis, stock assessment, potential resources, ecosystem services, biodiversity conservation, ocean pollution, and climate change.

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