

# 16. Regulatory and Institutional Framework for the Conservation of Coral Reefs in Bangladesh: A Critical Review

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**Abstract:** The coral reefs' crisis increases with the combined effects of natural and anthropogenic disturbances. It is predicted that coral reefs could extinct soon from the world. Bangladesh has only one coral Island named Saint Martin, locally known as 'Narikel Jinjira.' This is one of the most popular tourist spots in Bangladesh, entertaining thousands of tourists per year due to its unique landscape, blue water, and coral colonies' presence. This Island lost most of the coral in recent times. The coral reef ecosystem management needs to focus on reforming the legal and institutional frameworks for enhancing the local administration's capabilities to address the adverse effects of the stressors and promote ecosystem services by improving resilience. The study aims at analyzing the existing institutional and legal frameworks for conserving the coral reefs. Fieldwork was conducted at Saint Martin Island and Teknaf Upazila to collect data. The related literature on legal documents was reviewed critically. It is found that despite having legal mechanisms and institutional frameworks, non-compliances with laws and poor coordination among different sectors are widespread, resulting in severe degradation of coral resources. In most of the laws, robust institutional arrangements were ignored. The study recommends integrating the legal and institutional frameworks governing the environment, tourism, and fisheries sectors. Effective marine governance, increasing coordination among different sectors, amending some existing rules, and activating MCS (monitoring, control, surveillance) system can improve the scenario.

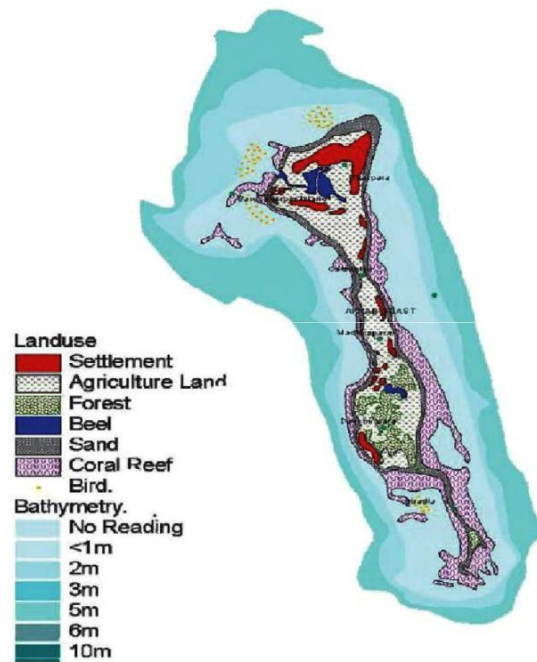
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## **Introduction**

The coral reefs' crisis across the globe is increasing (Edmunds et al. 2019, Hughes et al. 2017, Spalding & Grenfell 1997) due to the combined effects of natural and anthropogenic disturbances (Bruno et al. 2019, Doney et al. 2009, Gupta et al. 2007). The planet has lost her underwater rainforests (tropical reefs) over the last 30-40 years (Szmant 2002, Burke et al. 2011, Bruno & Selig 2007, De'ath et al. 2012 Bruno et al. 2019, Leingang & Dixson 2019, De'ath et al. 2012, Gardner et al. 2003, Hughes et al. 2018, Hoegh-Guldberg et al. 2007, Jackson et al. 2014, Schutte et al. 2010). The coral reefs provide numerous ecosystem services like food (Burke et al. 2011); economic benefits from fisheries and tourism (Spalding et al. 2017); and coastal defense (Ferrario et al. 2014, Spalding & Grenfell 1997, Harris et al. 2018). An immediate and direct threat is posed by coastal development, fishing practices, pollution, and tourism for 60% of the existing global coral reefs (Burke et al., 2011). It is predicted that coral reefs could become extinct soon from the world (Hoegh-Guldberg et al., 2007). The coral reefs are subject to multiple stressors originating from a rapidly changing environment and social dynamics (Mitchell et al., 2015). These stressors act simultaneously, degrading the diversity and ecosystem functions and services of the coral reefs (Burke et al. 2011, Brown et al. 2014, Côté & Darling 2010, Gilby et al. 2016, Saunders et al. 2014, Welle et al. 2017). Local pressures like pollution, sedimentation, extraction, habitat destruction and nutrition input originate from the lands, while global pressures like ocean acidification, global warming, and sea-level rise from climate change (Mitchel et al. 2015). The global problems exacerbate the local pressures (Burke et al. 2011, Gupta et al. 2007, Hoegh-Guldberg et al. 2017, Rahman & Vacik 2014, Rahman & Vacik 2015, Rahman & Vacik 2016). Biodiversity conservation plays a crucial role in ensuring the ecosystem services at all levels of hierarchy (Georgina et al. 2012, Rahman et al. 2007, Rahman & Vacik 2009, Rahman et al., 2009, Rahman 2009, Rahman & Vacik 2010, Rahman et al. 2010).

Bangladesh has only one coral Island named Saint Martin, which is locally familiar as Narikel Jinjira (Coconut Island). It is situated in the northeast part of the Bay of Bengal, about 9 km south of Cox's Bazar-Teknaf peninsula (Rajasuriya et al. 2000). Contrary, it is about 8 km west of the northwest coast of Myanmar, and the area of this dumb-bell-shaped Island is only eight km<sup>2</sup> (Alam et al. 2015). A neighboring small island called 'Chhera Dwip' is connected during low tide and isolated in the high tide. That Island is considered as part of Saint Martin Island. This is one of the most popular

tourist spots in Bangladesh, attracting thousands of tourists per year due to its unique landscape, blue water, and coral community presence (Islam 2002). This Island is highly rich in biodiversity (Billah et al. 2018, Hossain and Islam, 2006) and is also the habitat of a few globally threatened marine turtles and many migratory birds (Moudud 2010). In 2002, the coral communities in Saint Martin comprised 66 coral species, sea fans, sea whips, and 86 species of reef fishes (Rajasuriya et al. 2000), wherein 1980's the number of coral species 141 (English et al. 1997). In 2016 the number of coral species declined to only 41 (Ahammed et al. 2016) though it was declared as an Ecologically Critical Area (ECA) in 1999 (Hasan 2009). Ahammed et al. (2016) predicted that by 2045, all coral species would be extinct from this Island.



**Figure 1:** Map of coral reefs at Saint Martin's Island (Feeroz 2009)

The coral reef ecosystem management in Bangladesh should focus on developing the legal and institutional frameworks for enhancing the capacity of mitigation and promotion of the ecosystem services through resilient initiatives. Ineffective implementation of public policy seems to be associated with the existing institutional and legal arrangements (White et al. 2002). Consequently, they affect social and ecological sustainability to a greater extent. The inadequate regulatory framework leads to poor sectoral governance, where institutional loopholes obstruct public policies' implementation (Mattos &

Wojciechowski 2019, Shamsuzzaman & Islam 2018, Islam et al. 2016). There is no specific law on the coral reef; it is managed by different acts, rules, and policies of the Ministry of Environment, Forest and Climate Change, and the Department of Fisheries. Bangladesh has committed to achieving Sustainable Development Goal 14 by 2030. This study aimed to analyze and evaluate the existing national legal and institutional framework to identify the loopholes for reef conservation. The study recommended integrating the legal and institutional frameworks governing the environment, tourism, and fisheries sectors.

## **Methodology**

To carry out this study, both primary and secondary data were collected from Saint Martin Island and Teknaf Upazila of Cox's Bazar district. Primary data was collected to identify the threats of conservation and know the perceptions of different stakeholders about the effectiveness of existing regulatory and institutional arrangements. The primary data collection methods followed individual interviews, focus group discussion (FGD), and stakeholder analyses during December 2018. A total of 30 respondents from the community were interviewed purposively using a semi-structured questionnaire. They covered different types of occupations, including public representation. They were also selected through purposive sampling. The questionnaire consisted of different kinds of questions aligning with legal and institutional arrangements, conservation, tourism, waste management, and socio-economic conditions. A focused group discussion was held at Upazilla Nirbahi Officer, Teknaf, including heads of all departments at the local level. Secondary data on relevant Acts, Ordinances, Rules, Policies, and Strategies relating to marine conservation were collected from the concerned Ministries, Divisions, and Department websites. Content analysis was done based on the collected primary data from different tools (Elo et al. 2008, Hsieh & Shannon 2005, Spencer et al., 2003, Neuendorf 2002, Krippendorf 2004).

## **Results**

### ***Legal arrangements***

Many laws are in operation for the conservation of critical areas in Bangladesh. Still, only the 'Ecologically Critical Area Management Rules, 2016' partially regulates Saint Martin Coral Island's conservation activities. Even the People's Republic of Bangladesh's Constitution guaranteed the conservation of natural

resources and wetlands for the present and future generations. The conservation elements of the critical laws and the empowered authorities are described below:

- ***The Constitution of the People's Republic of Bangladesh***

Article 18 A of the Constitution guarantees to safeguard the natural habitats, biodiversity, wetlands, wildlife, and forests for both present and future citizens.

- ***Bangladesh Biodiversity Act, 2017 (Act No. II)***

This act focuses on achieving three goals of the Convention on Biological Diversity (CBD). The act describes conservation and illegal activities; formation of different committees and their functions; management, action plan, strategy, anthropogenic disturbances, fundraising, criminal activities, prosecution, and punishment. Activities of various committees were described, but no specific business was allocated to any department. This act excluded Maritime Affairs Unit and Bangladesh Tourism Board.

- ***Bangladesh Environment Conservation Act, 1995***

The act covers the conservation of biodiversity through ecosystem management and controlling pollution. There is a provision of declaring an ecologically critical area (ECA) in this act. The Department of Environment was established under this act. It has created the post of a Director-General of that Department. The authority or department is empowered to measure against the emission of smoke harmful to the environment and take appropriate steps to protect against environmental degradation. The department issues Environmental Clearance Certificate.

- ***The Bangladesh Environment Conservation (Amendment) Act, 2010***

This act is the amendment of The Bangladesh Environment Conservation Act, 1995, which clearly defined hazardous waste, ecosystem, ecologically critical area, waste management, and wetland. This act did not clarify the mono-centric authority. The punishments for the non-compliances described in the 'Bangladesh Environment Conservation Act, 1995' have been increased in this amendment.

- ***Bangladesh Environment Court Act, 2010***

This act was enacted to ensure justice against any environmental and social damage. There is a provision of establishing one or more Environment Court in each Division and appointing an officer from the judicial service of the rank of Joint District Judge. There is also a provision of establishing one or more 'Special Magistrate Court' in each district and appointing an officer from the judicial service of First Class Judicial Magistrate' or any Metropolitan Magistrate. The Director-General of the Department of Environment can authorize a subordinate officer as a prosecuting and inspecting officer.

- ***Wildlife (Conservation and Security) Act, 2012***

The act covers different elements of forest biodiversity and conservation. Provisions are defining, declaring, and managing different types of protected areas for enhancing biodiversity conservation. There is a provision of constituting a board comprising a chairperson and necessary experts to preserve biodiversity. Through this act, the Forest Department has been empowered to conserve and manage the country's biodiversity. This act has defined wetland and ecotourism or nature tourism.

- ***Territorial Waters and Maritime Zones Act, 1974***

There is a provision of establishing marine conservation zones adjacent to the territorial waters and taking conservation measures to protect the sea's living resources from over-exploitation or destruction. The government may take proper steps to prevent and control marine pollution and maintain the high seas' ecological balance closer to the territorial water zone. In this act, the government was defined as an authority. Institutional arrangements are absent in this act. St. Martin Island has not been established as a conservation zone until now.

- ***Marine Fisheries Ordinance, 1983***

Part VIII of this ordinance provides provisions of establishing marine reserves through official gazette notifications to protect aquatic habitat where flora and fauna are endangered or face a risk of being extinct. This part has forbidden attempting to fish, discharge waste or pollutants, dredge, alter or destroy

natural breeding grounds or habitats, and construct infrastructures on or over any reserve land or water bodies.

- ***Protection and Conservation of Fish Rules (1985)***

The Rules were framed to fulfill the 'Protection and Conservation of Fish Act's overall objectives, 1950'. Section-5 has forbidden making any attempt to destroy or catch any fish using ammunition, guns, arrow, bow, and any sorts of explosives neither in freshwaters nor coastal waters. Additionally, section-6 has strictly prohibited making any attempt to destroy fishes by applying poisons to water and depleting fisheries through pollution. These rules were framed to protect freshwater fishing and fishing in the estuaries.

- ***The State Acquisition and Tenancy Act, 1950 (East Bengal Act)***

The section-90 under chapter XIII of this Act imposed restrictions on the non-bonafide cultivators to purchase lands. They cannot buy grounds for commercial or industrial purposes and charitable or religious purposes without the prior written permission of the prescribed Revenue Authority. Here revenue authority means Collector or Deputy Commissioner of a district.

- ***Bangladesh Water Act, 2013***

This act was enacted for effective and efficient usage and conservation of water resources of the country. This law gave all water sources ownership like sub-surface, marine, rainfall, and atmosphere to the government.

- ***Protected areas of tourism and particular tourism zone Act - 2010***

This act was enacted to identify the critical areas where tourism will be restricted for sustainability. The government may declare any crucial area for conservation, and any developmental activity shall not be carried without prior permission of the government.

- ***Ecologically Critical Area Management Rules, 2016***

The Rules were framed in line with the fulfillment of the overall objectives of Bangladesh. These rules formed various committees, starting from national to

grass root levels incorporating diverse stakeholders. These rules restrict all activities against biodiversity conservation, pollution, and exploitation of natural resources in the Ecologically Critical Areas (ECA). Without prior permission of the Forest Department, none can change the land category based on the usage. Co-management was encouraged in these rules.

There are different prohibitions in the conservation-related legislation that are not implemented properly due to the following reasons (Table-1). According to the local community's perception, there are many reasons for non-compliance with the laws and mismanagement. The penalties incorporated into legislation are not imposed due to lack of monitoring, surveillance, and absence of the Department of Environment and Forest staff. One inhabitant states that only *Upazilla Nirbahi* Officer has been trying to save this Island, engaging the Union Parishad. *Upazila* Fisheries Office, *Teknaf* argued the implementation of laws could not be ensured due to lack of logistic support.

On the other hand, it was also noted from interviews that the existing regulation does not work correctly due to corruption. Weak enforcement of laws created the perception among the community that violation of laws will punish them rarely. Moreover, concerned officials rarely inspect the Island for a breach of laws. One farmer said that they have been applying chemical fertilizers and pesticides for a long time like the mainlanders to increase agricultural productivity. Nobody forbids such types of chemical usages. Few respondents reported that the outsiders purchased the lands for commercial purposes and used agricultural lands for tourism purposes without prior permission from the Collector (Deputy Commissioner, *Cox's Bazar*). The tour operators and the owners of the hotels and restaurants discharge or dump the tourist's waste in the open place. The absenteeism of the Department of Environment staff poses a significant threat to compliance with the existing laws. A staff of a non-government organization involved in turtle conservation said, "Most of the laws are backdated and not clear; time-bound legislation is required to save Saint Martin Island and the unique coral communities." The existing regulatory frameworks embrace only fisheries and some aspects of the Mangrove, Sundarbans. Neither a specific act was enacted to conserve the coral reef, nor any part of any act focused on this issue. No laws address the newly emerged global problems like ocean acidification, global warming, and sea-level rise.



**Table 1:** Ranks of causal factors for non-compliance of the laws based on personal interviews

<b>Causal Factors</b>	<b>Rank</b>	<b>Causal Factors</b>	<b>Rank</b>
Seasonal employment	1st	High living cost	8th
Poverty	2nd	Insufficient aids during the ban system	9th
<i>Dadan</i> (local credit system)	3rd	The limited scope of alternative income generation activities	10th
Unemployment during monsoon	4th	Negligence/ corruption of public departments	11th
Intermediaries in the market chain	5th	Unawareness	12th
Unavailability of a loan from the banking systems	6th	Habit	13th
Disrupted communication with the mainland	7th	Greed	14th

### ***Institutional arrangements***

The conservation of coral reefs is characterized by complex governance, regulatory and institutional issues, involving a mix of formal and informal institutions, public departments, non-government organizations, private sectors, and community. Under the existing laws, the Department of Environment is responsible for controlling and managing pollution, waste, and chemicals. According to the provision of the Bangladesh Environment Conservation Act 1995, the Department of the Environment tackles water pollution problems. It maintains water quality in the fishing grounds through developing coordination with the Department of Fisheries. Both the Department of Environment and the Department of Agricultural Extension have responsibilities of banning chemical fertilizer and pesticide in the crop fields. Department of Fisheries (DoF) has overall responsibility to restrict the over-extraction of fishes from the coral community. They are mandated for the conservation of marine aquaculture. 'Bangladesh Biodiversity Act 2017' has delegated power to the Forest Department to preserve and manage its biodiversity and wildlife. According to Ecologically Critical Area Management Rules, 2016, no citizen can even change the land category based on the usage

without the Forest Department's prior permission. Along with Bangladesh Tourism Board, the Department of Forest will ensure ecotourism or restrict tourism in critical areas. In these rules, co-management or community-based conservation has been encouraged. The *Upazilla* and District Administration are the authorities of land management. Deputy Commissioner is the chairperson of 'Ecologically Critical Areas (ECA) Management Committee,' where *Upazilla Nirbahi* Officer at *Upazila* level. In 'Bangladesh Biodiversity Act 2017', Deputy Commissioner chairs the District Biodiversity Management Committee, where *Upazilla Nirbahi* Officer (UNO) chairs the *Upazila* Committee. Therefore, Deputy Commissioner, Cox's Bazar and *Upazila Nirbahi* Officer, and *Teknaf* are highly responsible for conserving coral reefs at Saint Martin.

Similarly, the Union Parishad Chairman chairs the Union Committee. He/she is empowered to protect and manage the coral community. The chairman can form Village Conservation Forum (VCF) to monitor this Island following 'Ecologically Critical Area Management Rules, 2016'. There are no institutional arrangements for coping with emerging global issues like ocean acidification, global warming, and sea-level rise. It is found that no coordination mechanism exists among various stakeholders, neither at the policy level nor at the implementation level.

### **Discussion**

Hossain & Islam (2006) reported that over-harvesting of fisheries from the reefs, extraction of corals, removal of coastal vegetation, and destructive fishing practices like the use of rock-added gill nets on the inshore soft reefs and unplanned tourism poses a significant threat to the existence of the biodiversity of Saint Martin. The free waste disposal negatively impacts the ecosystem; an increased load of solid waste; the increased presence of antifouling agents introduced by resorts, hotels, and tour operations on the Island; the release of pollutants from supply sources and boats; and the release of chemicals from various sources (Tomascik 1997). Small boat grounding and anchoring are causing physical damages to the corals, where chemical fertilizer and pesticide are causing eutrophication (Hossain & Islam 2006). To prevent the extinction of coral reefs from Bangladesh and achieve SDG 14, it is highly essential to reform the legal and policy instruments. Shamsuzzaman & Islam (2018) revealed that in Bangladesh, the acts and rules governing marine living resources are old and cannot keep pace with the changing situations. The current regulatory framework seems ineffective and non-functional in addressing the rapid socio-economic and environmental changes (Islam et al.,

2017). An update of the marine regulatory framework is inevitable for conserving the coral reefs and achieving SDG-14 (Shamsuzzaman & Islam 2018). Shamsuzzaman & Islam (2018) correlated the laxity in enforcement of the law to the violators, the local politicians, and law enforcers' corruption. It is very much essential to analyze the causes of non-compliance with the existing regulatory framework. An integrated legal framework is required for coral reef management, along with addressing the causes of non-compliance. There are few institutions established by the legal provisions involved in biodiversity conservation. Every institution is assigned with a specific mandate, but the legal position's vagueness in determining the authority over the protection creates obstacles in developing effective coordination (Ehsanul 1999). The institutional arrangements are very complex without defining specific responsibilities. The absence or poor coordination; lack of staffs and logistic supports; bribery; negligence of duties and responsibilities; political influences, lack of monitoring, control, and surveillance; and conflict of interests have led to an inefficient and ineffective or a non-functional institutional framework (Islam et al. 2017, Shamsuzzaman & Islam 2018, Islam et al. 2016). No institutions are responsible for counteracting emerging global challenges like sea acidification.

### **Recommendations**

To overcome the challenges to conserve the existing coral reefs of Bangladesh, this study recommends:

- Accurate demarcation of the coral area and identification of the present species
- Prohibits boating in the route between Saint Martin Island and 'Chhera Dip'
- Banning the use of chemical fertilizers and insecticides in the agricultural lands in the Coral Island
- Creating alternative income generative activities for the people who are extracting threatened reef resources for their livelihoods
- Restricting or limiting tourism and waste disposal
- Making all tourism industries liable for waste management following 3R (Reduce, Reuse and Recycle) and paying coral tax
- Updating national regulatory frameworks addressing newly emerged global challenges

- Immediate enforcement of all rules mentioned in Ecologically Critical Area Management Rules, 2016
- Developing proper monitoring, control, and surveillance mechanism
- Identifying and abolishing overlapping jurisdictions and establishing new administrative as well as research institutions for coral conservation and for facing the newly emerged global challenges
- Formulation of a standing order for coral protection, clearly spelling out roles and responsibilities of Local (District and Upazilla) Administration, Department of Environment, Department of Fisheries, Department of Forest and Wildlife, Tourism Board, Wildlife Advisory Board, Bangladesh Marine Fisheries Academy, Bangladesh Coast Guard (East Zone), Tourist Police (Cox's Bazar), Bangladesh Oceanographic Research Institute, Cox's Bazar, Chittagong Port Authority and Union Parishad, Saint Martin

### **Conclusions**

Bangladesh is highly committed to achieving SDG-14, despite having limitations in the regulatory and institutional framework. The conservation of the coral reefs is an integral part of attaining SDG-14. The integration of regulatory and institutional arrangements and updating the existing structures are required for sustainable marine resource management and developing the blue economy. In the 15<sup>th</sup> Amendment, Article 18A was included in the Constitution in 2011 to show sustainable development commitment. This article of the Constitution calls for the conservation of biodiversity. Any development activity, including tourism, should not accept sacrificing environmental protection. The causes of non-compliance with the laws should be diagnosed and be appropriately addressed. Bangladesh should prepare herself to tackle emerging global challenges like sea acidification. Effective networking among different research institutes and universities is highly essential to cope with the upcoming challenges.

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