**Current Environment. 2022;2:19-21**
Fully Open Access International Journal
https://doi.org/10.54479/ce.02.2022.0104

Check for updates

SHORT COMMUNICATION

# Study of Anthropogenic Impacts on the Coast of Saint Martin's Island, Bangladesh

Munira Haque | Saydul Karim*

Department of Biotechnology, South Asian University, New Delhi-110021, India
*Corresponding author's email: sdkbcs10@gmail.com

**St. Martin's Island is one of the best biodiversity rich area of Bangladesh. As per current demand, this study survey the human created threats on the island's coastal ecosystem. Total 15 types of anthropogenic activities were recorded and found higher impacts in northwestern part (ST.1) and the middle part (ST.2) of the island. Daily outnumbered visitors and their activities, waste management and random plastic debris were counted as the most impacted threats for the coastal ecosystem of the island. Agricultural runoff, deforestation, and corals and shells collection found as comparatively less threats for the island. This study suggested the government authorities to take immediate steps for controlling outnumbered visitors first, to save the island from a future disaster. Finally, the report emphasized on eco-friendly tourism, awareness programs and further monitoring approach.**

**Keywords:** Human impacts, Coastal ecosystem, eco-friendly tourism, Island of Bangladesh.

Saint Martin's Island (SMI) of Bangladesh is recognized as the richest biodiversity hotspot and very popular recreation spot among the national and international visitors nowadays (1). The island is located approximately 9 km far away from the mainland of this country through the southernmost part (2). In other word, the island is placed about 9 km south of the Cox's Bazar-Teknaf peninsular tip, and almost 8 km west from the coastline of Myanmar. The surface area of the island is about 8 $km^2$ long, although the area is variable due to tidal activities and generally looks almost flat and dumb-bell shaped. The main island connected with some other small islands which remain separated during high tide from the main land. However, as like other islands of the world, its coastal ecosystem is also enriched with many natural resources (3,4,5).

The human created negative activities, also called anthropogenic impacts, nearby a coastal area must have significant roles and could pose threats for many organisms living within the ecosystem (6,7). These activities are considered as the most threatening stressors for coastal ecosystem in many regions nowadays. They may affect the water chemistry thus living organisms inhabiting there (8-10).

Though, SMI is one of the important biodiversity rich resources of Bangladesh, there are rarely found any reports on continuous monitoring of anthropogenic activities in the island. Therefore, this study aimed to evaluate the current ecosystem health of SMI by assessing the anthropogenic threats in the island as small scale for short period of times.

## MATERIALS AND METHODS

### Study Area

Geographically the SMI is located in 20°34′ to 20°39′N latitude, and 92°18′ to 92°21′E longitude. The island is positioned by the northeast of Bay of Bengal in Indian Ocean. The surveyed samplings were carried out through three stations namely, ST.1 (northwestern part), ST.2 (middle of the island) and ST.3 (southern part). Details of the study area were presented in Fig.1.

### Anthropogenic Impacts Study

Human impacts, their regular activities concerning coastal ecosystem, were identified during a participatory mapping exercise that took place with the authors, volunteers and eco-guards. A metric of fishing pressure, and related other pollution at each site were calculated following (11). The other anthropogenic activities were visually observed and estimated based on their comparative occurrence from the opinions of participants.

### Data Analysis

All data were processed and calculated in MS Excel 10 version. Comparative impacts of the anthropogenic activities were determined by the opinions of the participated observers during the study.

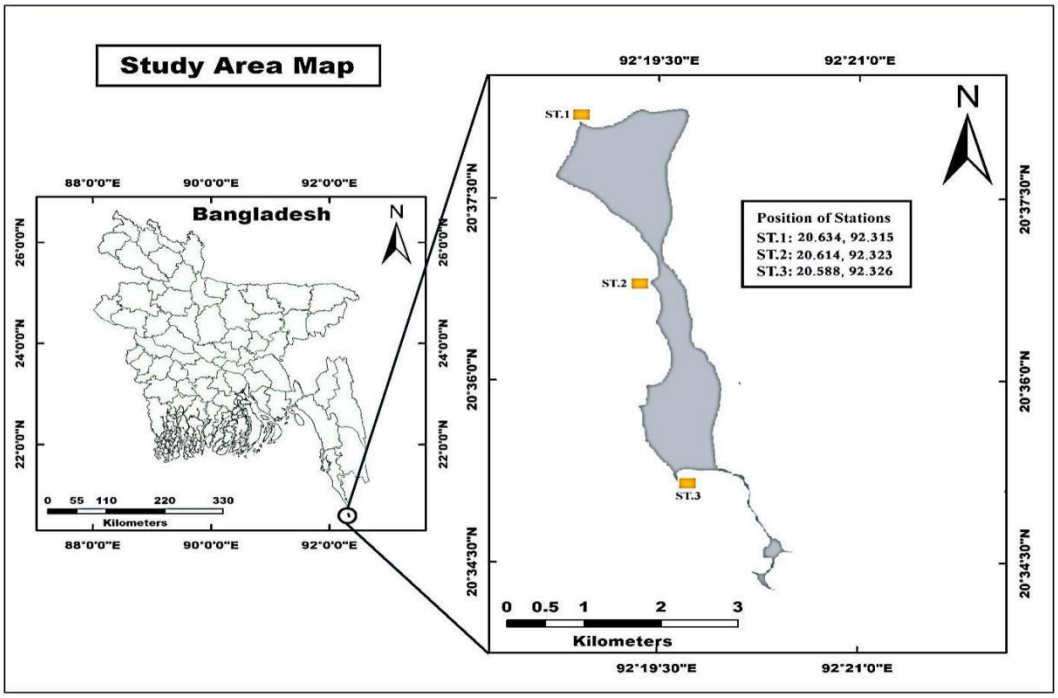


**Fig.1.** St. Martin's Island with sampling stations.

## RESULTS

From the field observations, there were recorded several anthropogenic activities with their comparative impacts that might be responsible for affect the coastal ecosystem of the island. These were categorized as 15 broad activities and recorded throughout the three stations (Table 1). Among them, overcrowded visitors, tourism activities, unplanned waste disposal from the nearby hotels and households, plastic bottles and derbies here and there, and destructive fishing techniques were mostly effective and common observed human activities in the island. Lighting hazards by hotels in the nearby beach area on the islands are very common tourism activity and the sound noise at night also counted as disturbing activities. Moreover, fish processing also produces a huge amount of waste and creates threats to island by making the water polluted. Furthermore, oil discharge from the water vehicles near coral reefs area is causing irreparable harm in the island. The observed events were more impacting in ST.1 and ST.2 area comparatively and only 7 activities were seen in ST.3 with low impacts.

## DISCUSSION

Among the anthropogenic activities, mass tourism leading pollution to the waters are creating heavy burden on the coastal ecosystem which may affect marine algae growth (12). Moreover, this island also observed destructive fishing technique and fish processing pollution that have impacts on the coastal ecosystem (13). A survey in 2015 said that more than half of the total produced waste comes from visitors directly or indirectly and this study also observed the similar patterns in 2020 (14).

**Table 1.** A list of major anthropogenic threats observed in St. Martin's Island in 2020.

| SL | Anthropogenic Threats Category | Impact in Station | | |
|---|---|---|---|---|
| | | 1 | 2 | 3 |
| 1 | Overcrowded visitors and tourism activities | *** | *** | * |
| 2 | Collection of living corals and shells | * | * | - |
| 3 | Uncontrolled waste disposal | *** | ** | - |
| 4 | Plastic bottles and derbies | *** | ** | * |
| 5 | Presence of antifouling agents | ** | * | - |
| 6 | Coastal water sedimentation | ** | ** | * |
| 7 | Fish offal's discarded on the beach | ** | *** | - |
| 8 | Destructive fishing techniques | ** | *** | * |
| 9 | Anchor damage | ** | ** | * |
| 10 | Small boat grounding | * | ** | - |
| 11 | Boulder removal from intertidal zones | - | * | * |
| 12 | Building constructions | ** | ** | - |
| 13 | Agricultural runoff | - | * | * |
| 14 | Deforestation nearby area | * | * | - |
| 15 | Release of pollutants from marine vehicles | ** | ** | * |
| Overall Impacts | | *** | *** | * |

**Note:** * indicates low impact, ** moderate impact, *** sever impact, '-'absence.

That meant there was not happened any significant improvement during the last 5 years. Lighting hazards and sound pollution by hotels in the nearby beach area might affect the nesting sea turtles which are very important part of ecosystem. On the other hand, southern part of the island observed less human impacts, even some cases the threats were absent. Collections of living corals and shells were abated surprisingly from the island due to government restrictions, which was very destructive activities earlier (5). The authors suggested that government should restrict the daily outnumbered visitors to the island and should start eco-friendly tourism activities. Moreover, it is necessary to begin some immediate cleaning as well as awareness programs to encourage people to keep the island all kinds of pollution free to protect the coastal ecosystems from anthropogenic threats. Therefore, to evaluate the health of the coastal ecosystems, anthropogenic activities should keep regular monitoring throughout the entire island.

## CONFLICT OF INTEREST

Authors declared there is no conflict of interest.

## ACKNOWLEDGEMENT

The authors would like to thank the participators and the volunteers in the experiment during data collections.

## REFERENCES

1. Upal NH. Environmental hazards and conservation approach to the biodiversity and ecosystem of the Saint Martin's Island in Bangladesh, Management of Natural Resources in a Changing Environment, (1st ed), Springer, Cham. 2015, pp.6-20.
2. Afrin S, Sultana N, Islam MT. Exploring the potentials of 'Culture-friendly' tourism: an empirical study in the Saint Martin's Island, American International Journal of Research in Humanities, Arts and Social Sciences. 2013;3(2):200-204.
3. Islam AKMN, Aziz A. Addition to the list of marine algae of St. Martin's Island, Bangladesh.III. Redalage (Rhodophyceae).Nova Hedwigia. 1987;45:211-222.
4. Aziz A, Towhid S, Alfasane MA. Sublittoral seaweed flora of the St. Martin's Island, Bangladesh. Bangladesh J. Bot. 2015;44(2):223-236.
5. Tomascik T. Management plan for coral resources of NarikelJinjira (St. Martin's Island). In: Final report, national conservation strategy implementation project-1, Ministry of Environment and Forest, Government of Bangladesh. 1997. pp 125.
6. Fabricius KE. Effects of terrestrial runoff on the ecology of corals and coral reefs: review and synthesis. Mar. Pollut. Bull. 2005;50(2):125–146.
7. Mumby PJ, Dahlgren CP, Harborne AR, Kappel CV, Micheli F, Brumbaugh DR, et al. Fishing, trophic cascades, and the process of grazing on coral reefs. Science (New York). 2006;311(5757):98–101.
8. Hossen R, Chakraborty S, Karmaker D, Das SK. Physico-chemical parameters and diversity of phytoplankton in Kirtankhola River, Bangladesh. Current World Environment. 2021;16(1):190-97. **[doi]**
9. Chakraborty S, Karmaker D, Rahman M A, Bali S C, Das S K, Hossen R. Impacts of pH and salinity on community composition, growth and cell morphology of three freshwater phytoplankton. Plant Science Today. 2021;8(3):655–661. **[doi]**
10. Chakraborty S, Afroz M, Hossen R. Effect of lowered pH on community composition, growth and cell morphology of freshwater phytoplankton. Current Environment. 2021;1:3-8. **[doi]**
11. West K, van Woesik R. Spatial and temporal variance of river discharge on Okinawa (Japan): inferring the temporal impact on adjacent coral reefs. Mar. Pollut. Bull. 2001;42(10):864–872.
12. Thompson PM, Islam MA. Environmental profile of St. Martin's Island. United Nations Development Programme, Dhaka. 2010. pp. 151.
13. Burke L, Reytar K, Spalding M, Perry A. Reefs at risk revisited. World Resources Institute, Washington, DC. 2011. pp. 114.
14. Alam O, Deng TL, Uddin MN, Alamgir M. Application of environmental ethics for sustainable development and conservation of Saint Martin's Island in Bangladesh. JESNR. 2015;8(1):19–27.

**ARTICLE HISTORY**

**Received:** 30 Dec 2021, **Revised:** 28 Feb 2022
**Accepted:** 10 Mar 2022, **Published:** 16 Apr 2022

**AUTHOR CONTRIBUTION**

The work plan, design, data analysis and the manuscript preparation, everything is done by the author solely.

**TO CITE THIS ARTICLE**

Haque M, Karim S. Study of Anthropogenic Impacts on the Coast of Saint Martin's Island, Bangladesh. Current Environment. 2022;2:19-21.