

Saving the coral biodiversity of St. Martin's island

DR. MD M MARUF HOSSAIN

St. Martin's, a small continental island in the Bay of Bengal, is located on the southern most tip of Bangladesh separated from the mainland by a channel which is about 9 km wide. The distance between the island and Teknaf (the head of mainland) is about 34 km. It is said that in 1926, the District Collector of the British government Mr. Martin brought this island under settlement record following which the island was named "St. Martin's Island". Local people call this island "NARIKEL JINJIRA" because of large production of coconut in the island. The north portion of the island is called "Cheradia Dwip", because during high tide, this portion of the island is separated from the other and also considered as the last southern landmark of Bangladesh (Fig 1) 0002E.

Bio-geographic and scientific significance

St. Martin's island is endowed with vast marine and land resources having a global biodiversity significance. The island is a good example of co-occurrence of corals, algae, sea weeds, grasses and mangroves. The island contains some of the most unique, but thus far not

studied, benthic community association in Bangladesh, in fact not found anywhere else in the south Asia region.

It has been known from a study by Canadian coral biologist Dr. T. Tomasik in 1997 that notably the rocky sub-tidal habitat from the seaward margin to about 1000m offshore supports a diverse coral community represented by approximately 66 Scleractinian coral species, of which 19 are fossil corals, 36 are living corals and the rest are under families of subclass Octocorallia (11 species of soft corals).

A total of 234 species of fish have been recorded from the coastal water of St. Martin's Island, of which 16 are fresh water species. Among the fish species, 89 are coral associated. The most abundant coral or reef associated fish are Damsel, Parrot, Surgeon, Groupers, Snappers, Emperors and Butterfly fish. The mollusk on the St. Martin's is the largest and most beautiful in Bangladesh. 186 species of mollusk & oyster, 7 species of crab, 9 species of echinoderms, 4 species of sea urchin, 1 species of sea cucumber & some brittle stars were reported. A number of colourful nudibranch and Bryozoans were reported in adjacent area of the island.

There are confirmed records of 5 species of marine mammals in the sea surrounding the St. Martin's Island as well as Bay of Bengal which are globally threatened according to the IUCN Red data book. The island has its fame as an important nesting ground for 3 marine turtles, including Olive ridley, all of them are consid-



Photo 6:



Photo 7:



Photo 9:

Underwater coral associated fish in St. Martin's



Photo 8:



Photo 10:

Underwater coral associated fish in St. Martin's

Control of pollution, sustainable and controlled tourism, alternative livelihood for the local people, and further research should be immediately undertaken for sustainable utilization and to save rich biodiversity of this only coral island of Bangladesh. Still there may be time to save the biodiversity and fish resources of this island, otherwise it may be too late.



Photo 2:

Hard Coral of St. Martin's

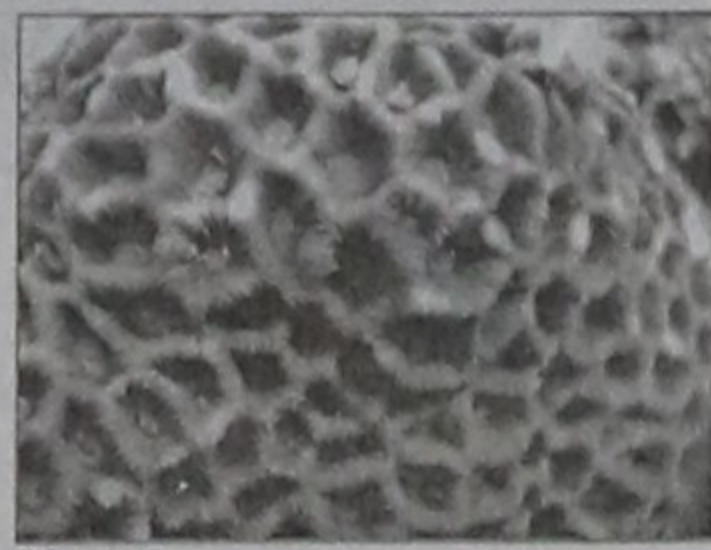


Photo 3:

Soft Coral of St. Martin's



Photo 4:

Soft Coral of St. Martin's

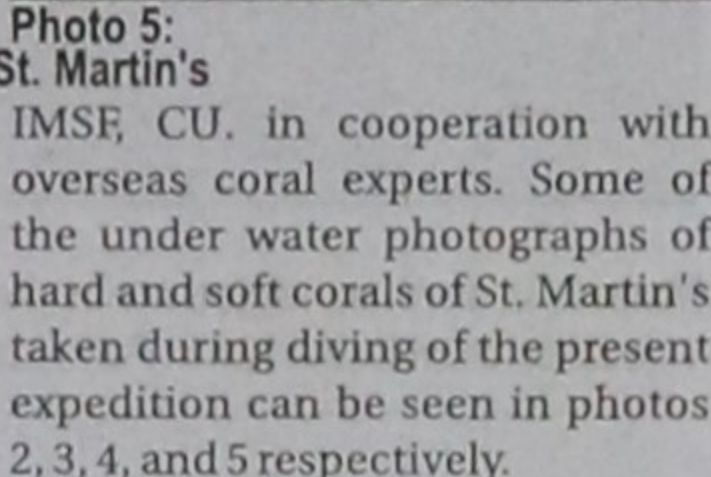


Photo 5:

Soft Coral of St. Martin's

ered as globally endangered by IUCN. So far, 14 species of algae have been recorded from the St. Martin's Island. There is an estimated amount of 1500 MT red sea weed available around St. Martin's Island. 29 reptilian species have been recorded from the island, of them 11 are locally threatened. 120 species of birds have been reported from the island of which 67 species are resident and 53 migratory, many of them are in threatened list of IUCN. The economy of the local people of the island is based mainly on fishery. It is estimated that 1650 MT of fish are caught annually from the waters adjacent to this island.

Present status

At present there is a research in progress on St. Martin's coral biodiversity and its associated fish fauna under DelPHE High Education partnership (UK-BD & PK). Under that programme, there was an expedition held from 3-11th January, 2008 to St. Martin's island by DelPHE research team.

During that expedition a total of 34 hard corals and 6 soft corals were collected from different places. Still work is going on for their cleaning, drying, preservation, identification, taxonomy, confirmation of identification upto species level etc. in the lab of

Impact of uncontrolled tourism

There are nearly 7000 people on this small island of 12 sq. km. area. In tourist season (Nov.-Feb.) average 3000 people visit this island daily, which is beyond the holding capacity of this small marine island.

Besides this, there is regular big ferry services and engine boat, used for transportation of tourist, to the island (photograph 11). For this reason, a huge amount of crude oil, plastic and other non-biodegradable waste are discharged in the marine water adjacent to the island. In addition huge amounts of untreated mar-



Photo 11: Big ferry service and concrete structure - jetty - threats for marine biodiversity of St. Martin's.

ket and domestic wastes, which include sewage matters (only 5% of the local people have sanitary latrine facilities) from the local people and tourists, are discharged into the adjacent coastal water. Thus the quality of coastal water is degrading gradually.

Coral, algae, different species of shells, star fish are collected by the tourists regularly. Local people also collect stone and rock daily for lime making and construction works, which is a threat for the existence of the island. Construction of multi-storied concrete building, hotel, motel, jetty etc. for the last few years are also posing a threat for this special type of island and its sensitive biodiversity, though that type development activities and construction have been stopped now by the government.

In addition to above factors, cyclones, storm surges, heavy fresh water run off during monsoon as well as other anthropogenic activities like over exploitation of coastal fishery resources, harmful boat anchoring practices instead of mooring buoy and uses of destructive fishing gear, mainly the use of rock weighted gill nets over the inshore boulder reefs is a prime aggravation and one of the main causes of death of the endangered rare turtle species, who came to lay their eggs considering this island as ideal nesting ground after

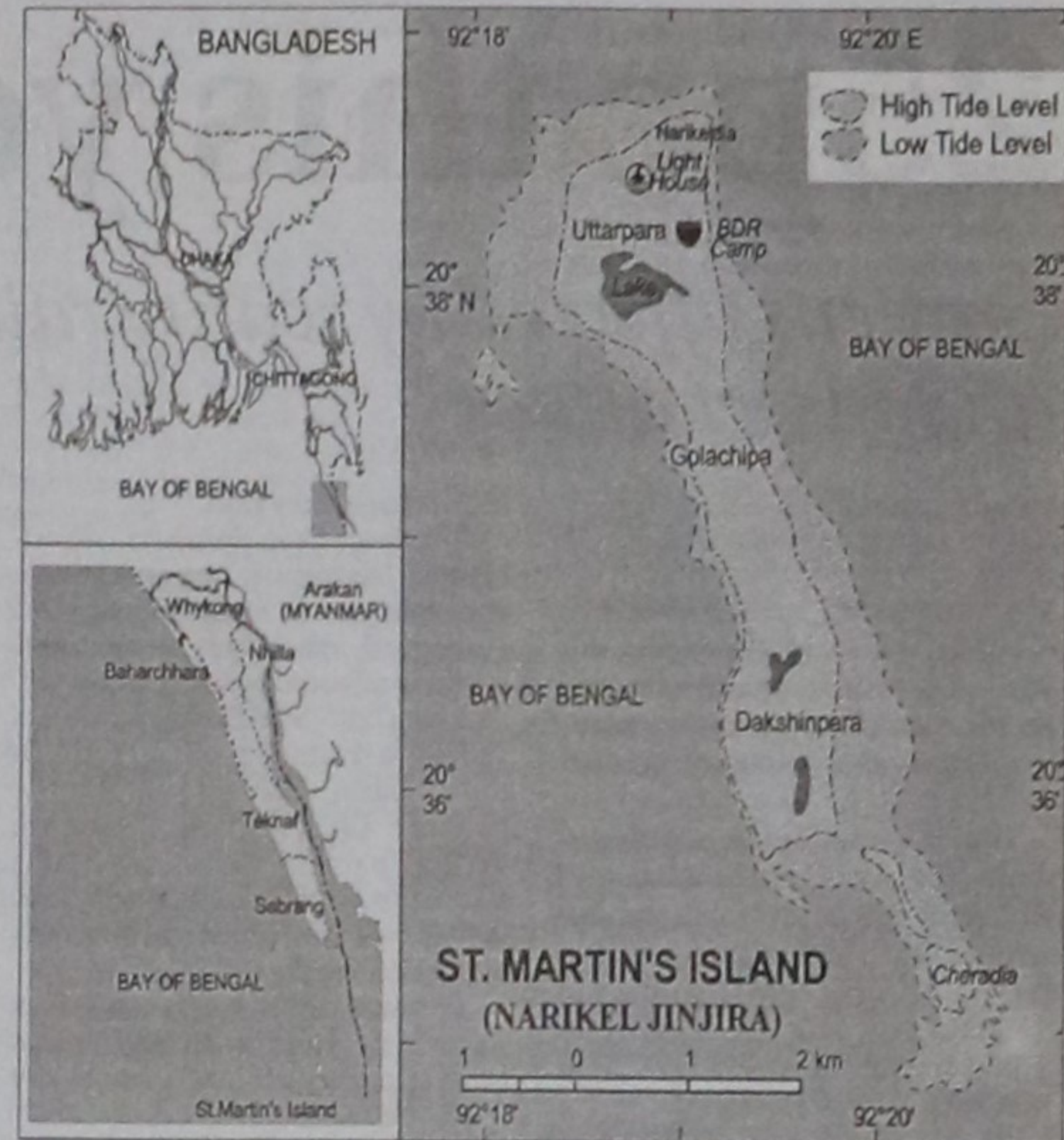


Fig 1: Location of St. Martin's Island

crossing many hundred miles. Nearly everyday one/two big turtles are found dead by human activities in the coastal water of St. Martin's island (Photo-13)

At present, there is not much data or information on the present status of corals and associated flora and fauna in St. Martin's. No one is using currently available state of the art technology and no 'Coastal Zone Management Unit' exists in this island. So, proper implementation of the rules and regulations for 'Ecologically Critical Areas (ECA's)', declaration and implementation of 'Marine Protected Area (MPA)' as



Photo 13: Dead turtle in the coastal water of St. Martin's.

suggested by Tomasik (1997) and other experts in 'Eco-tourism -- St. Martin's Island' by MoEF (GoB) (2004), control of pollution, sustainable and controlled tourism, alternative livelihood for the local people, and further research should be immediately undertaken for sustainable utilization and to save rich biodiversity of this only coral island of Bangladesh. Still there may be time to save the biodiversity and fish resources of this island, otherwise it may be too late. So, all the stakeholders including government policy makers should come forward to save the marine biodiversity of this important island and the livelihood of the local people.

Dr Md M Maruf Hossain is a freelance contributor. Photo 2, 13 are of DelPHE research programme. Use of those pictures by any means (copy or otherwise) will be considered as illegal.

Accentuating environmental degradation: Impact on development

DR. SHAMSUL ALAM MOHAN and OFOH PRISCILLA IFEOMA

Bangladesh faces a number of environmental problems due to its geographical location and setting, high density of population, poor socio-economic development, inefficient resource management and institutional framework. A study on Bangladesh state of environmental has been able to identify five environmental issues on a priority basis as points of national concern. On the basis of the methodology used by the Organization for Economic Cooperation and Development which is termed Pressure-State-Impact-Response (P-S-I-R) framework analysis, these key environmental issues have been critically analyzed. Some appropriate and necessary responses with regards to policies/programmes will be proposed so as to alleviate further environmental deterioration, thereby enhancing and modifying the environmental conditions positively, as well as improving the environmental quality of life in Bangladesh.

In identifying the basic environmental issues of Bangladesh, two major criteria were kept in mind. First, the severity of the present environmental degradation, and the anticipated future trends that have critical implications for attaining sustainable development and the quality of life. Second, the priority, ability and willingness of the country to minimize the degradation processes, and to take protection measures against them. With these in mind, five environmental issues have been selected to be evaluated using the P-S-I-R framework. The identified key issues include land degradation (with impact on ecology and quality of life), water pollution and scarcity (impact on ecology and quality of life), air pollution (impact on environment and health), biodiversity (impact on ecology, development and quality of life) and natural disaster (impact on

environment, development and quality of life).

The P-S-I-R framework adopted in this analysis can be defined as follows: Pressures are termed as any fundamental, natural and manmade forces that influence the state of the environment. State refers to the prevailing conditions of the environment resulting from the pressures, which might lead to various impacts that can influence human health and well being, as well as the socio-economic conditions of the society, with an adverse effect on the ecological balance. Finally, response defines an attempt to mitigate the impacts, through formulation, enactments, and enforcement of necessary laws and regulations by the government, through its relevant agencies.

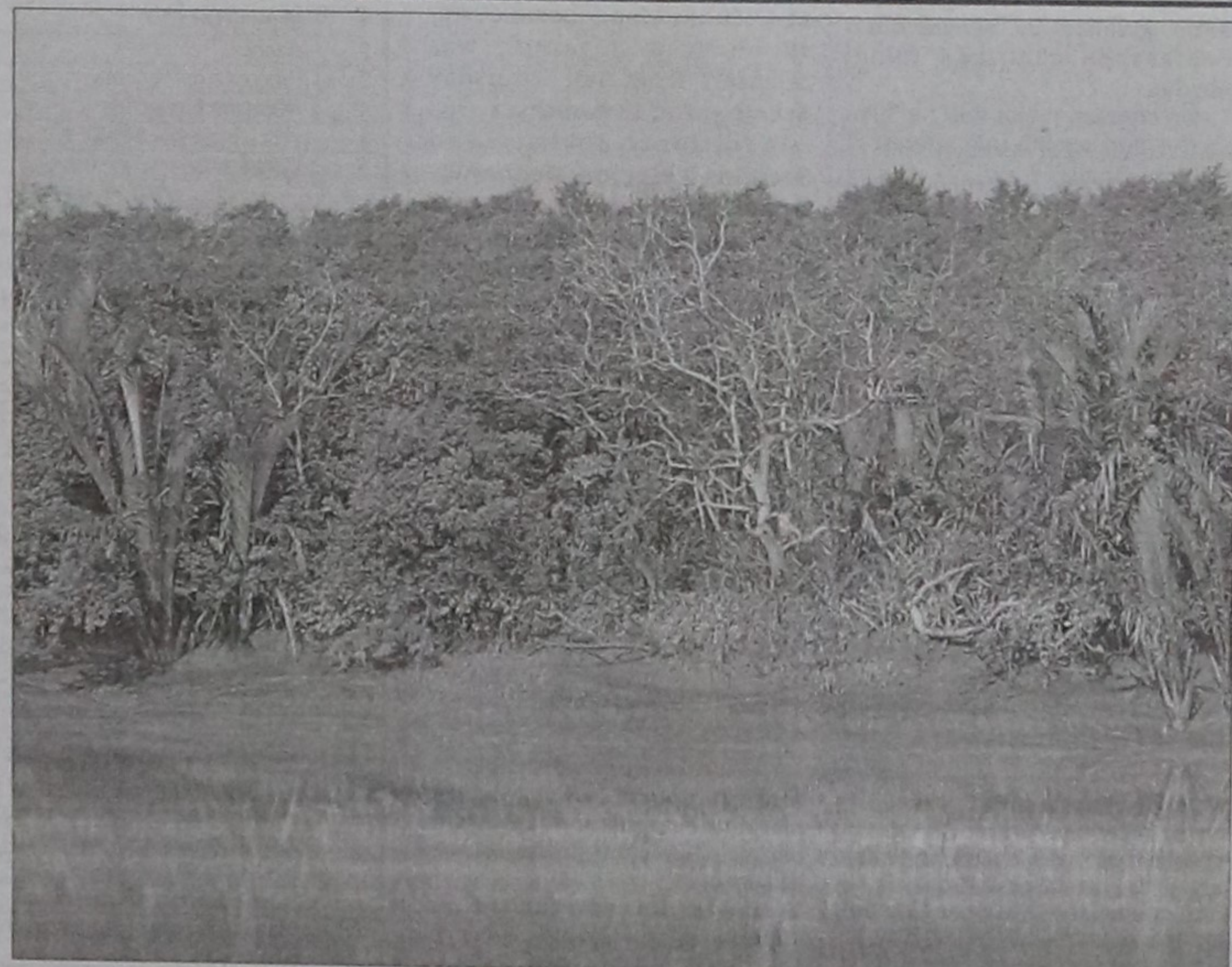
The five key environmental issues:

Land degradation

The rapid population growth coupled with poverty, lack of proper land use and other driving forces, have led to over-exploitation of natural resources like land in Bangladesh.

Land degradation varies according to regions, seasons and years due to the diverse nature of the driving forces and their subsequent causes. Land degradation in the flood plains is chiefly attributable to improper use of fertilizer and pesticides. In the coastal areas it is partly due to the nature of shrimp culture which requires letting in saline water into empoldered shrimp beds. Erosion of topsoils in the hilly districts has increased. Excessive irrigation of agricultural lands may also contribute to soil degradation. For example, it was observed in Chandpur irrigation project area that deficiency of zinc content in the soil had occurred through leaching. The deficiency was corrected simply by injecting zinc into the soil of the affected areas. Soil resources development institute (SRDI) has found that nitrogen deficiency is a common phenom-

The status of the key environmental issues in Bangladesh shows that the environmental condition of the resource base is degrading, despite several policy measures undertaken by the different branches of the government. Rapid population growth, improper use of land, poor resource management and uncontrolled discharge of pollutants from industries and vehicles are major causes of deterioration.



The unique mangrove eco-system of the Sundarbans must be saved from any further degradation.

enon in the country.

Water pollution and scarcity

The seasonal/regional availability and the quality of surface and ground water, highly influence the environmental as well as the economic growth and development of Bangladesh. Spatial and seasonal availability of surface and ground water is highly responsive to the monsoon climate and physiography of the country. Upstream withdrawal for consumptive and non-consumptive uses also influences availability. The surface water quality is affected by untreated industrial

effluents, municipal waste water and run off from the surface of the agricultural lands treated with pesticides and chemical fertilizers. Pollution problems in the rivers close to the industrial areas are exceedingly high. For example: The dissolved oxygen (DO) level in the Buriganga has been found to be very low, and hence toxic. The Sitalakha, Turag and Balu are also highly polluted.

The water quality in Dhaka is so poor that the Environment Department of Bangladesh in a report said that "the water from surrounding rivers can no longer be considered as a supply source for human consumption. The

aquatic environment for living organisms can be affected and bioaccumulation of harmful substances in the water-dependent food chain can occur. Excessive abstraction under pressures of increasingly larger population may further lower the ground water table and expose certain areas to serious scarcity and even land subsidence". Furthermore, the level of arsenic contents in the ground water is of major concern in Bangladesh.

Air pollution

In urban areas particularly in Dhaka and Chittagong the air quality has deteriorated. Two

major sources of air pollution are vehicular emissions and industrial emissions. Emissions include odour, smoke, carbon monoxide, lead, un-burn carbon, nitrogen oxides and sulphur dioxide. A study on the presence of the suspended air particulate mass (APM) revealed that the concentration of APM in these two cities exceeds the threshold limits set by the Department of Environment. Department of Environment Report. Scientific Studies say that the density of lead in the air of Dhaka city in the dry season reaches 463 nanograms (one nanogram is one billionth of a gram) per cubic metre, the highest in the world. The lead concentration in the polluted air of Mexico City is 383 nanograms and Mumbai, it is 360 nanograms per cubic metre.

Recently, a number of measures have been put in place by Bangladesh government to control air pollution in the major urban centres. Some of these measures include; banning the use of two stroke engine vehicles, introduction and promotion of increased use of compressed natural gas (CNG) in vehicles in place of gasoline and the supply of only unleaded petrol since the leaded gasoline is one of the major air pollutants.

Biodiversity

Bio diversity in Bangladesh is significant. Rivers and inland water bodies support over 200 indigenous fish species and 150 species of birds. The marine water bodies harbour about 442 species of fish and 36 species of shrimps as well as significant number of crabs and turtles. The Sundarbans, one of the largest mangrove forests in the world, supports 300 species of plants, 400 species of fish and over

200 species of birds. It also serves as the feeding area of migratory birds during winter.

However like other sectors of Bangladesh ecology, the diverse biological resources are also threatened by human intervention through destruction and degradation of land, denuded forest and aquatic habitats. The threat is most visible in the fisheries and forestry sectors. Forest areas already small as a proportion of the total land area, is being depleted by the combined pressure from timber extraction, encroachment by expanded agricultural activities and by the land grabbers. The forest area like Madhupur, which used to be the home of many species of flora and fauna, has thinned out significantly in recent years.

Shrimp culture, owing to the method, has an adverse effect on soil condition, vegetation and crop production in the area. These are mainly due to intrusion of saline water into the shrimp beds and deposition of suspended silt that comes along with the saline water. Overfishing under conditions of population pressures has depleted the fish resources. Despite the presence of a law prohibiting the catch of fish below certain specified size, large quantities of Hilsa fry (Jhatka) are caught every year and find their way into small markets.

Bangladesh is a signatory to the Rio convention on bio-diversity and as such is bound by the international guidelines for conservation of plants and animal lives. A focus on biodiversity has been emphasized on forest and environment. There is a great potential in Bangladesh for biodiversity based sustainable development. In line with this, the Bangladesh National Biodiversity Strategy and Action Plan is under preparation as a part of the World Convention on Biological Diversity. In spite of all these, there is need to formulate and apply a wise and sustainable yield and harvest methodology as well as management plan that will be applied on the field, so

that these biological resources are not over-exploited.

Natural disasters

Bangladesh is widely known as a land of natural disasters. On average, there are 6.14 natural disasters per year. Quick onset disasters are pretty regular. In 2007, there was a landslide in Chittagong, which killed around 150 people, two cyclones that made land fall, a tornado in the south-west, and many small earthquakes. Slow onset-events like river flooding, complement the quick disasters. Bangladesh has not the resources to cope with these problems, and as such many people die than would in other places. Thus, the situation necessitates huge resource requirements for disaster management, including mitigation, recovery and preparedness. A timely and accurate alert system regarding impending disasters will help reduce the loss of life and property.

Conclusion

The status of the five key environmental issues in Bangladesh shows that the environmental condition of the resource base is degrading, despite several policy measures undertaken by the different branches of the government. Rapid population growth, improper use of land, poor resource management and uncontrolled discharge of pollutants from industries and vehicles are major causes of deterioration. Main underlying reasons includes lack of institutional capabilities, untrained human resources, lack of awareness, low community participation in resource management and a paucity of research for enabling policy makers to take proper environmental decisions. Addressing these deficiencies only will enable these countries most especially Bangladesh in its progress towards attaining sustainable environment and development.

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