

The Challenges of Global Warming and Climate Change on Socio-Economic Environment in Bangladesh

Md. Abdul Alim

Professor, Department of Law, University of Rajshahi, Rajshahi 6205, Bangladesh
E-mail : alimlaw05@gmail.com

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Abstract: Climate change is predicted to have an extremely destructive concern on Bangladesh. Natural disasters may take place even more frequently and be greater in magnitude. A rise in sea levels could submerge a considerable proportion of the country. The legal regulations per specific aspects of maritime law are the priority of lawyers as natural risks like rising sea levels, storm surges, or tsunami waves, the pollution of the marine environment represents a severe threat to coastal inhabitants. Global climate change will thus not only cause environmental demolition, but will drive massive social changes as innumerable people migrate from devastated areas. This might further overstretch inadequate infrastructure and governance mechanisms, and will lead both to a collapse in living standards and a rise in social disorder. Thus, the proposed article would contribute to the expansion of the current regime of the bay water used for cooling purposes of atomic energy plant preventing its use for fish farming purposes, an oil spill on the high seas polluting beaches that are essential for tourism within the coastal zone and the way of such activities destroys on our natural climate and it changes water level, ocean acidification, ocean stratification, coral bleaching, changing species distributions and other biological change to sea.

1.1. Introduction

Bangladesh is susceptible to sea-level rise, like within the case of the Maldives, but other effects like drought, cyclone, lightning and river erosion have made this country more defenseless. In this modern time increased use of maritime space for various purposes may create problems concerning conservation and management of marine life. Though principles, objectives and approaches concerning management and conservation differ and maintaining generic diversity is not properly addressed by the Convention on the Law of the Sea. Scientists who have dealt with the ecological aspects of the conflicted use of the seas have warned rather than legal and political people on a long-term deterioration of the marine environment. Recent time economists have initiated to contemplate marine environment a scarce resource.

Over 60 million inhabitants are directly dependent on aquatic resources in Bangladesh. One million people are full time fisher folk and 11 million have

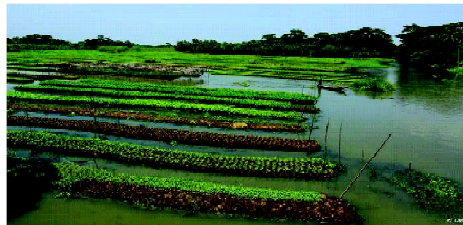
taken to part time fishing in the country (BBS, 2010). The fishery sector contributes about 3.4 percent of the total export revenue and employs 5 percent of the country's total work force. The agriculture sector provides 64.5 percent of the country's employment and contributing 24 percent of the GDP (BBS, 2010). The *Sundarbans* alone supply livelihood and employment to a predictable 112,000 people (Khan, 2001). *Sundarbans* also is the biggest mangrove forest in the world consisting 6200 square kilometers of forest and revering areas lies there. It has been listed as World Heritage site and is the most important ecosystem and protective natural barrier against the calamities like tidal surge and cyclone. This contribution of nature would simply be submerged by the rising sea.¹

In past absence of law and sovereignty a growing number of cross-exploitation conflicts that may include the following: negligent navigation that damages or destroys communication cables, the warming of the sea water used for cooling functions of a nuclear power plant preventing its use for fish farming purposes, an oil spill on the high seas polluting beaches that are essential for tourism in the coastal zone. Such activities destroys on our natural climate and it changes sea level, ocean acidification, ocean stratification, coral bleaching, changing species distributions and other biological change to sea. A conservationist *William Laurance* of James Cook University said, "There's been a lot of discussion about how global climate change affects ocean acidification, and now there's emerging evidence that the even greater threat is reduced oxygen levels."²

1.2. Background of the Development of Hypothesis

Climate change effect is global warning for the low-lying sea facing over populated countries like Bangladesh. The tropical monsoon climate is characterized by high temperatures (about 8 months of the year), high summer rainfall, high humidity and relatively low temperature ranges.³ Extreme weather events there have already been inflicting havoc on the life of general people. It is the reason also causing a shift in migration and poverty patterns. The cyclones strike mostly on April-May from the Bay of Bengal bringing heavy rains, and are frequently followed by tidal waves, which are particularly destructive in the coastal regions of the country. River flows diversely with the season, the peak occurring during July/September. The tidal levels vary considerably in the river delta, and high-low water range variations between various localities depend on the relations between tidal range and river discharge. A Professor of Dhaka

University said, “In Bangladesh, we have already conducted research on salinity-resilient crops. We’re now doing research on diversification of food in coastal areas”⁴. Due to rapid climate change, the Bay of Bengal, a north and extended arm of the Indian Ocean often becomes unruly and brutal cyclone sweeps over the costal belt. Sidr was the strongest cyclone to punch Bangladesh since the cyclone of 1991. After Sidr, Aila brushed away over the coastal region of the country on May 25, 2009. The storm hit the coastal district in Bangladesh.



Floating Farms: Bangladesh Builds Floating Gardens to fight against Climate Change



Boat School

1.3. Marine Pollution in Bangladesh

Marine pollution is the degradation of water quality, as measured by biological, chemical on physical criteria that can make water unsuitable for desired uses such as bathing, drinking or fishing, and can have severe effects on the health of humans and animals through contact or ingestion.⁵ Economic Commission for Europe of the United Nations (UNECE) is define water as being polluted when the condition of the water is directly or indirectly modified. So that is a

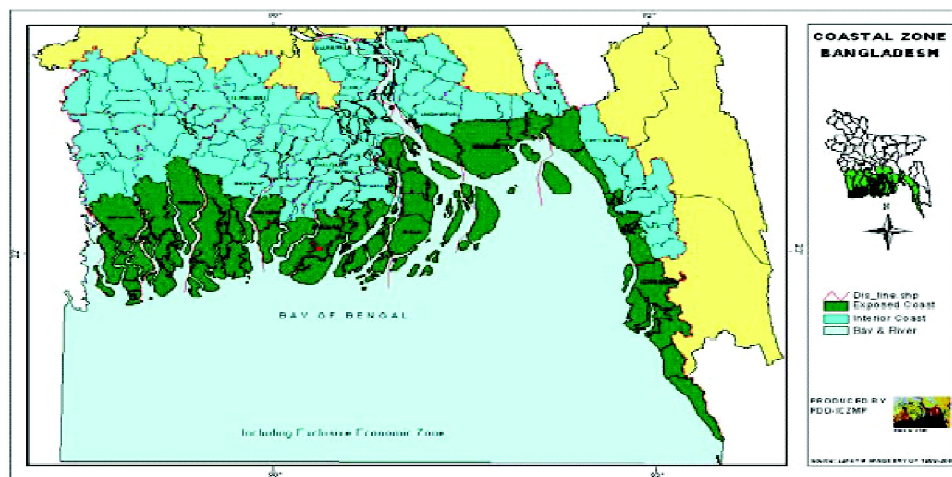


Figure 1: Map of the land part of the coastal zone of Bangladesh, ICZMP, 2004

consequence of the activities of man to such an extent these waters less to be used in their natural position.⁶ The toxic chemicals and pesticides are threats to both coastal and marine environment as well as public health.

Pollution is often categorized as point source or nonpoint source pollution. Point source pollution takes place when there is a single, identifiable, localized source of the pollution. An example is directly discharging sewage and industrial waste into the ocean. Pollution such as this occurs particularly in developing nations. Nonpoint source pollution occurs when the pollution comes from ill-defined and diffuse sources. These can be difficult to standardize. Agricultural run-off and windblown debris are prime examples. Under climate change projection scenarios low rainfall in the waterless season will be further diminished. As a result winter and pre-monsoon temperature will increase significantly and thus drought intensity will be further amplified. It will cause a sharp decline in river flow. Salinity will break through inland that will ultimately restrict choice for the most preferred crops. High and moderate level water demanding plants and organisms will go extinct locally.

Polluting materials penetrate the marine ecosystem via a number of pathways, in particular:

- riverine runoff mainly land based pollution from sewage, garbage, fertilizers, pesticides and industrial pollution
- atmospheric deposition basically pollution from ships by oil, noxious liquid substances in bulk, harmful substances carried in packaged form, sewage, garbage, air pollution, greenhouse gas emissions from ships and harmful aquatic organisms carried by ballast water and introduced by bio-fouling.
- direct discharges from land and that is offshore hydrocarbon exploration and mining (prospecting, drilling, and transport);
- activities at sea such as unsustainable use and overexploitation of marine resources



Sometimes illegal, unreported and unregulated (IUU) fishing causes marine pollution. The waste of all the industries particularly tannery, textiles, pulp and paper and fertilizer, ship breaking, etc are may be significantly responsible for coastal pollution of Bangladesh.⁷ Bangladesh National Programme of Action has identified fifteen⁸ major issues/problems as the main sources of coastal and marine pollution. The issues are as follows:

- Industrial waste (including ship Break yards)
- Sewage disposal
- Solid waste management
- Agrochemicals and PoPs
- Deforestation
- Salinity intrusion
- Rapid urbanization
- Erosion in the coastal zone
- Extraction of coastal resources
- Gas oil and mineral resources
- Shrimp farming
- Coastal fishing and fish processing
- Coastal tourism
- Land use change
- Climate change

1.3.1 Direct Discharge from River to Sea

One common path of entry by contaminants to the sea is river. Pollutants enter rivers and the sea directly from urban sewerage and industrial waste discharges, Bangladesh has many rivers, water bodies and lakes etc. The sources of inland water are under stress because of its large population, poverty, urbanization and less economic growth. Through the country is blessed with natural water sources, water quality remains a key issue. Sources of contamination and changes in water quality can be mainly characterized as point sources, non point sources and natural sources which may be point and non point. In fact, most of these industries are situated in the two major coastal districts, Chittagong (in 8 industrial zones) and Khulna (in 3 industrial zones). Urban runoff and runoff from the construction of roads, buildings, ports, channels, and harbours, can bring soil

and particles laden with carbon, nitrogen, phosphorus, and minerals. A survey by the Marine Science Institute of Chittagong University indicated that the water of the coast of *Shitakunda* contains high concentrations of several heavy metals such as mercury, cadmium, lead, chromium, iron etc.⁹ Harmful algal blooms¹⁰ have been a cause of species of fish, turtles, dolphins, and shrimp to die and cause harmful effects on humans who swim in the water.

1.3.2. Pollution from Ships

Ships can contaminate waterways and oceans in numerous ways. Oil spills can have devastating effects. While being contaminated to marine life, polycyclic aromatic hydrocarbons (PAHs), found in crude oil, are very difficult to clean up, and last for years in the sediment and marine environment. Oil spillages from ships as a result of illegal discharges of oil residues or caused by an accident are another matter of apprehension. The same is true for oil spills originating from offshore activities. However, it is significant to note that land based sources are by far the largest contributor to oil inputs. *Karnaphuli* River is heavily contaminated in areas close to Chittagong port channel due to expulsion of oil and chemical waste leaked from ships. The speedy and unplanned boost in shrimp culture is also becoming a anxiety. The use of antibiotics and other chemicals used in shrimp fields is causing pollution in the water, which may harm other aquatic lives. Shrimp culture in Cox's Bazar uses 620 tons of urea annually. It also generates 15 tons of waste daily, which comes into the sea.¹¹

1.3.3. Plastic Debris

Plastic bottles and other plastic products are most common forms of debris in the coastal water. Marine debris is mainly discarded human garbage which floats on, or is suspended in the ocean. Eighty percent of marine fragments is plastic – a module that has been rapidly accumulating since the end of World War II. In the ocean present threats are formed of plastic materials which conclude the life to wildlife and fisheries. Floating plastic particles photo degrade down to zooplankton sizes, jellyfish attempt to consume them, and in this way the plastic enters into the ocean food chain. Aquatic life can be threatened through entanglement, suffocation, and ingestion. Fishing nets, frequently made of plastic, can be left or lost in the ocean by fishermen. Known as ghost nets, these entangle fish, dolphins, sea turtles, sharks, dugongs, crocodiles, seabirds, crabs, and other living things, restricting movement, causing starvation, laceration, infection, and, in those that need to return to the surface to breathe, suffocation.¹²

Research Questions

In this situation why pollution is continuing and how prevention can be taken? If compensation issues arise, who shall pay? Who can be identified as the responsible person? How can claims be enforced? Have we complied with this duty to protect marine environment and obligation to take measures to prevent and control the marine pollution of the Bay of Bengal (BoB) region?

1.4. Protecting Marine Pollution: Legal Perspective

Ecology is its encompassing and artificial view of nature. Bangladesh owns a diverse set of eco-systems abundant with innumerable life forms despite its relatively small geographical area. This rich biodiversity is contributes significantly to the county's economy and to diversified livelihood sources of her people. Human rubbish, including synthetics and plastics, in the oceans and on beaches is called marine debris. It is one of the world's most ubiquitous contaminant affecting the oceans. In Bangladesh, only a portion of the solid waste generated is collected. It is anticipated that about 9,000 metric tons of human waste are released along the coast from Chittagong and Khulna. It was mentioned that approximately 3.5 million tons of crude and refined oil are imported by Bangladesh, which contributes around six thousand tons of oil to the four hundred thousand tons of annual oil pollution in the Bay of Bengal.¹³ Approximately 1,800 tons of pesticides penetrate the Bay annually. The web based publication 'World Casualty Statistics' 2011, by IHS Fairplay explain the largest five ship recycling countries in the world are India, China, Bangladesh, Pakistan, Turkey which recycle 97% to 98% of the world's tonnage.¹⁴ Interestingly, of the top three biggest ships recycling countries, India and Bangladesh are surrounded by the BoB. It was reported that about 250 kg of polychlorinated biphenyl (PCB) are released from each ship in the ship breaking yard of Chittagong area. If toxic throw away continues, it will certainly demolish important habitat and biodiversity; compel many wildlife species near to extinction; destroy mangrove forests; cause the whole ecosystem to become unbalanced and obstruct sustainable development. The Ministry of Environment and Forest of the Government of Bangladesh has developed Environment Policy 1992, formulated and enacted Environment Conservation Act 1995, Environment Conservation Rules 1997 and Environment Court Act 2000. The other national laws are

- Ports Act, 1908,
- Territorial Water and Maritime Zones Act 1974

- *Coast Guard Ain* 1994 (The Coast Guard Act 1994)
- The Merchant Shipping Ordinance 1983
- Chittagong Port Authority Ordinance 1976
 - Merchant Shipping Ordinance 1983: Umbrella law regulating shipping and water transport in Bangladesh. This ordinance characterizes the 'Bangladesh Ship' and make necessary provisions for surveying and registration of Bangladesh ship and also details provisions relating to seaworthiness of vessels. This ordinance does not contain any provision relating to marine environment.
 - Territorial Water and Maritime Zones Act 1974: Section 8 of this Act empowers government to take such measure, as it deems proper for preventing and controlling marine pollution and preserving the quality and ecological stability in the marine environment in high seas adjacent to the territorial waters.

Bangladesh signed lot of Convention adopted by UN and IMO is an international legal regime respecting pollution damage caused by ships. It consists of four international conventions dealing with pollution from oil and hazardous and noxious substances including:

- the International Convention on Civil Liability for Oil Pollution Damage, 1992,
- the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992,
- the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996,
- the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001.

1.5. Ecological Aspects of Water Management

Ecological aspects cover biodiversity of the utilized areas as habitats, maintaining ecosystem services such as habitat, regulating and services provided by various participants in such ecosystems. There are three types of diversity species, genetic and ecosystem and they have different gen, habitat and functions on ecosystem. Species is a group of genetically discrete organisms that can have offspring. In a species gen can vary regarding color, size and type. In most ecosystems, there

are a considerable number of interlocking food chains or webs. In order to know the exposure of any specific part of the ecosystem, it is necessary to measure the movement of the chemical through the food chain.

The environmental scientists who are dealing with the ecological aspects of the seas have deplored that their warnings of a long-term deterioration of the marine environment have had little effect in political and legal arenas. Economists have started to believe the marine environment a scarce resource, and as a consequence, economic theories on the efficient use of scarce resources are becoming relevant to the exploitation of the seas. The legal regulations pertaining to specific aspects of maritime law have been the concern of lawyers for many years. In fact, maritime law conventions focusing on single issues such as collisions at sea were already being negotiated more than 100 years ago.

- natural risks such as rising sea levels, storm surges, or tsunami waves, the pollution of the marine environment represents a serious threat to coastal inhabitants. However, opposite to the first factors mentioned, pollution does not present a direct danger to human life. Societies have recently started to become responsive of marine pollution.
- pollution of the sea damages the marine ecosystem irreversibly over long time scales, endangering a broad spectrum of resources, from seafood to recreational spaces. The struggle against marine pollution involves environmental knowledge within the society, political resolve, and money. Industrial nations, which are also the biggest polluters, are meeting these criteria to some extent, but among them there is no uniform position on marine pollution and is a matter of great loss.

1.6. Maritime Environmental Protection and Implementation

Marine pollution was an apprehension during several United Nations Conventions on the Law of the Sea beginning in the 1950s. In the late 1950s and early 1960s, there have been several controversies about dumping radioactive materials off the coasts of the United States by companies licensed by the Atomic Energy Commission, into the Irish Sea from the British reprocessing facility at Windscale. Marine pollution made further international headlines after the 1967 crash of the oil tanker *Torrey Canyon*, and after the 1969 Santa Barbara oil spill off the coast of California.

Marine pollution was a major area of discussion during the 1972 United Nations Conference on the Human Environment, held in Stockholm. In this

year London Convention was taken by the signing of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. The London Convention did not ban marine pollution, but it established black and gray lists for substances to be banned (black) or regulated by national authorities (gray).

1.6.1. Maritime Safety

Transport of hazardous goods by sea is regulated to avoid human injury or damage to ships and their cargo. The International Convention for the Safety of Life at Sea (SOLAS), 1974 deals various aspects of maritime safety and contains in part A of chapter VII mandatory provisions governing the transport of dangerous goods in packaged form or in solid form in bulk. Regulation VII/1.3 prohibits transport of dangerous goods excluding in accordance with the provisions of chapter VII part A, which are enlarged by the International Maritime Dangerous Goods (IMDG) Code.

1.6.2. Marine Environment

Marpol Convention¹⁵ is subject to achieve complete elimination of international pollution by oil and other harmful substance and minimize of accidental discharge of such substances.¹⁶ Its requirements, regardless of their navigation and member nations are accountable for vessels registered on their national ship registry. MARPOL is divided into Annexes according to various categories of pollutants, each of which compacts with the regulation of a particular group of ship emissions.

List of the MARPOL 73/78 Annexes

<i>Annex</i>	<i>Title</i>	<i>Entry into force</i>	<i>Objectives</i>
Annex I	Prevention of pollution by oil & oily water	2 October 1983	It specifies tanker design features that are intended to minimize oil discharge into the ocean during ship operations and in case of accidents. It provides regulations with regard to treatment of engine room bilge water (OWS) for all large commercial vessels and ballast and tank cleaning waste
Annex II	Control of pollution by noxious liquid substances in bulk	6 April 1987	It divides substances into and introduces detailed operational standards and measures. The discharge of pollutants is allowed only to reception facilities with certain concentrations and conditions. No matter what, no discharge of residues containing pollutants is permitted within 12 miles of the nearest land.

contd. list

<i>Annex</i>	<i>Title</i>	<i>Entry into force</i>	<i>Objectives</i>
Annex III	Prevention of pollution by harmful substances carried by sea in packaged form	1 July 1992	It contains general requirements for the standards on packing, marking, labeling, documentation, stowage, quantity subtraction, division and notifications for preventing pollution by harmful substances.
Annex IV	Pollution by sewage from ships	27 September 2003	It introduces requirements to control pollution of the sea by sewage from ships.
Annex V ¹⁶	Pollution by garbage from ships	31 December 1988	It specifies the distances from land in which materials may be disposed of and subdivides different types of garbage and marine debris. The requirements are much stricter in a number of "special areas" but also the most prominent part of the Annex is the complete ban of dumping plastic into the ocean.
Annex VI ¹⁷	Prevention of air pollution from ships	19 May 2005	It introduces requirements to regulate the air pollution being emitted by ships, including the emission of ozone-depleting substances, Nitrogen Oxides (NO _x), Sulphur Oxides (SO _x), Volatile Organic Compounds (VOCs) and shipboard incineration.

All six Annexes have been ratified by the requisite number of nations; and Annex VI, which took effect in May 2005 and has been amended and lastly came into force on 1 July 2010. The country where a ship is registered named as Flag State is responsible for certifying the ship's compliance with MARPOL's pollution prevention standards. Flag State is accountable for enacting domestic laws to execute the convention and promises to comply with the convention, annexes, and related laws of other nations.¹⁷ One of the difficulties in implementing MARPOL arises from the international nature of maritime shipping. When they find noncompliance with international standards and in according with MARPOL the country refers cases to flag states. It was seen by UN report documented that the response rate from flag states has been very poor.¹⁸

According to MARPOL directives the SECA (Sulphur Emission Controlled Areas) zone is increased day by day and includes the North Sea, Scandinavia, and parts of the English Channel. All of Western Europe's weakness is to the MARPOL directive which proven controversial for shipping and ferry operators across Europe. It is a great concern on environmental damage with larger ferry operators that ship substantial amounts of freight and passenger traffic via these routes affected by IMO standards.¹⁹

1.6.3. Marine Endangered Species of Fauna and Flora

Climate change will continue to threaten species around the world. The CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants doesn't threaten their survival. The resolution was approved in 1963 with a draft at a meeting of members of the International Union for Conservation of Nature (IUCN).²⁰

The Convention entered into force on 1 July 1975. Bangladesh ratified the convention in November 1981. The parties state of the CITES has been binding towards it. It regulates the international trade in specimens of selected species to a specific mechanism. All import, export, re-export, and introduction from the sea of species covered by the Convention have to be authorized through a licensing system. Each State party to the Convention is required to delegate one or more Management Authorities responsible of controlling that licensing system. The term "import" means to land on, bring into, or introduce into or attempt to land on, bring into, or introduce into, anywhere subject to the jurisdiction of the States. Moreover, it included whether or not such landing, bringing, or introduction constitutes an importation within the meaning of the customs laws of the States.

Throughout the world, habitats are being devastated at an alarming rate, locating many wildlife species in threat of extinction. Threatened and endangered wildlife live around the globe and we're likely to search out some in our own backyard. Critically Endangered species are Cross River Gorilla, Black Rhino, Orangutan, Hawksbill Turtle, Amur Leopard etc.. Some are endangered listed as like Blue Whale, Asian Elephant, Chimpanzee, Galápagos Penguin, Ganges River Dolphin, Green Turtle, Indus River Dolphin, Red Panda, Sea Lions, Whale Shark. Vulnerable species are Gaint Panda, Dugong, Black Spider Monkey, Hippopotamus, Polar Bear etc. and some are near threatened or least concern.

To defend endangered animals, think both globally and locally. Be familiar with the wild fauna and flora in their many attractive and various forms are an irreplaceable part of the natural systems of the earth which must be protected for this and therefore the generation to come back. We'd like to watch out of the ever-growing value of wild fauna and flora from aesthetic, scientific, cultural, recreational, and economic points of view. We the people and therefore the State mechanism should be the best protectors of their own wild fauna and flora. In this regard, international co-operation is crucial for the protection of certain species of wild fauna and flora against over-exploitation through

international trade. Bangladesh Government is incredibly much convinced on taking appropriate measures to the current end.

If any dispute arises between two or more Parties with relevancy to the interpretation or function of the provisions of the present Convention shall be subject to negotiation between the parties involved within the dispute. If the dispute cannot be resolved in accordance with paragraph 1 of this Article, the Parties may, by mutual consent, submit the dispute to arbitration, in particular that of the Permanent Court of Arbitration at The Hague, and the Parties submitting the dispute shall be bound by the arbitral decision.²¹

The purpose of the Endangered Species Act in US is defined as following,

- a) To provide ecosystems upon which endangered and threatened species depend may be conserved.
- b) To provide a program for the conservation of such species as declared by the Endangered Species Act.

The Endangered Species Act was enacted to provide for the conservation of domestic and endangered species of wildlife through domestic action and through cooperation with state endangered species conservation programs consistent with the domestic law. Moreover, the US Congress in enacting the Endangered Species Act, intended endangered species to be afforded the highest of priorities because the question of the existence of endangered species threatens is great issues. The objective of the Endangered Species Act is to enable listed species not merely to survive but to recover from their endangered or threatened status.²²

In Bangladesh, with the line of international framework it makes illegal to import into or export from Bangladesh any listed species of fish or wildlife; possess, sell, deliver, carry, transport, or ship any listed species taken in violation; deliver, receive, carry, transport, or ship any listed species in interstate or foreign commerce, or by any means whatsoever in the course of commercial activity; sell or offer for sale in interstate or foreign commerce any listed species; or, violate any regulation promulgated pursuant to the authority. It is unlawful for any person to make or submit any false record, account, or any false identification of, any fish, wildlife, or plant which intended to be imported, exported, transported, sold, purchased, or received from any foreign country; or transported in interstate or foreign commerce.

1.7. Conclusion

Biodiversity plays an important role in ecosystem services to maintain and improve human quality of life.²³ Pollution will never be totally eliminated;

compensation for pollution damage is an important form of protection the marine environment. Compensation is necessary for environmental restitution, and thus, has a precautionary consequence. The polluter-pays-principle²⁴, a main concept in environmental law, embodies the concept of compensation. Bangladesh Government has approved the 'Coastal Zone Policy' 2005. This is the time on proper utilization of water resources and prevention pollution. State must take comprehensive development policy for the coastal and marine areas of Bangladesh. The policy could focus on the following broad areas:

- Economic development in the coastal areas
- Livelihood uplifting
- Mitigation of risks
- Sustainable management of coastal resources
- Proper land utilization planning
- Taking measures against salinity intrusion

Agriculture

To achieve sustainable development in agricultural livelihood, the management activities strengthen education, training and awareness of the local people to appropriate supervision of agricultural production systems; diversification of cropping systems, agro-forestry and proper application and utilization of agro-chemicals.

Fisheries

To achieve sustainable livelihood, management activities in the fisheries sector would include education, training and awareness of the neighboring people to concepts of sustainable harvesting, integrated mangrove-aquaculture shrimp farming, proper application and utilization of chemicals etc.

We need a detail scientific study in urgent to assess the impact of climate change on the country's biological resource in a specific way. Prominent areas may be developed above the expected sea water level to make available food and shelter and other environmental requirements to animals living in the sea level rise prone areas particularly in the *Sundarbans*. The government of Bangladesh, NGOs and international organizations should come forward to provide support to conduct the ecosystem assessment survey to prepare plan and programmes for the subsequent situation. The Management Authorities

in Bangladesh are – Chief Conservator of Forest, Forest Department, Ministry of Environment and Forest; Chief Controller of Import and Export, Ministry of Commerce. The Enforcement Authority in Bangladesh is the Chief Conservator of Forest, Forest Department, Ministry of Environment and Forest. The Scientific Authority in Bangladesh is the Bangladesh Wild Life Advisory Board, Ministry of Environment and Forest. Though enforcement mechanisms aren't enough rather more awareness is required within the rural areas and our civil organization groups for the important conservation issues. Nonetheless, the hopeful thing is young generations are coming forward.

Notes

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