



The Impact of Environmental Degradation and Climate Change in Bangladesh

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ABSTRACT

Climate change is a worldwide concerned issue for developing countries like Bangladesh. Although, Bangladesh is a low carbon emitting country, it is facing adverse impacts of climate change. Climate change is destroying the food chain for variety of organisms present in different ecosystems. Studies disclosed that rise of sea level, increasing of temperature and frequent natural disasters may become the causes of suffering for million people. Bangladesh government has taken a number of strategies and policies to ensure safe environment and danger free biodiversity. However, all these programs of government have often failed to mitigate the impacts of climate change on environment and biodiversity. This study has conducted by reviewing literatures on climate change and focusing on its effects on environment and biodiversity in Bangladesh; to identify the barriers responsible for poor implementation of government policies and to recommend policy options to speed up national actions in terms of adopting environmental and biodiversity mechanisms. The study has provided suggestions to formulate more effective policy in decision making, enforcement of environmental laws, strengthening institutional capacity and increasing public awareness for protecting the environment and biodiversity.

Keywords: *Climate Change Impact, Environment, Biodiversity, Environmental Governance, Policy Implementation, Suggestions*

INTRODUCTION

Bangladesh is one of the most climate vulnerable countries in the world (General Economics Division (GED), 2009, p. 25) and more than 70 million people would be affected by climate change impact (Chowdhury, Banu, & Ph.D, 2012, p. 113). Statistics disclosed that by the year 2050, 45 cm rise of sea level may submerge 10-15% of the land displacing more than 35 million people from the coastal regions (MoEF, 2009, p. xvii). Climate change through increased air and ocean temperature has direct or indirect effects on environment and biodiversity. Climate change impact has caused multiple shifts in the distribution of some species like amphibians, butterflies, grasses and migratory birds. A broad variety of amphibians, birds, crustaceans, mammals, reptiles, will face extinction in Bangladesh for the destroying impact of climate change. As environment is the sum total of all surroundings of a living organism, including natural forces and biodiversity is the degree of variation of life which measure the variety of organisms present in different ecosystems, we have to ensure the safety of environment and biodiversity for our own security. However, observe the impacts of climate change on environment and biodiversity a long term research and monitoring is necessary along with developing climate change response activities to identify the specific threats to ecosystem.

CLIMATE

In simple sense, climate is defined as the "average weather". It is the statistical description of relevant quantities (such as temperature, precipitation, and wind) over a period of time. The statistical description is given in terms of mean and variability. World Meteorological Organization (WMO) assumes 3 decades as the classical period. In the broad sense, climate is the state of the climate system along with a statistical

description (EPA, 2013) Atmosphere, hydrosphere, lithosphere, and biosphere are the components of climate system (IPCC, 2007).

ENVIRONMENT

The term 'environment' is a vast one: ranging from microbe action to the size of world population (Nasreen M., 2000). Environment has been defined as "the aggregate of all the external conditions and influences affecting the life and development of an organism" (The Webster's New Collegiate Dictionary).

CLIMATE CHANGE

The change in the state of the climate system that lasts for an extended period is denoted by the climate change. This change is identified by the changes in the mean and the variability. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods' (IPCC, 2007).

ENVIRONMENTAL DEGRADATION

Environmental degradation is the deterioration of the environment through depletion of resources such as quality of air, water and soil; the destruction of ecosystems; habitat destruction; the extinction of wildlife; and pollution. It is defined as any change or disturbance to the environment perceived to be deleterious or undesirable environmental concerns can be defined as the negative effects of any human activity on the environment. The biological as well as the physical features of the environment are included. Some of the primary environmental challenges that are causing great worry are air pollution, water pollution, natural environment pollution, rubbish pollution, and so on

BIODIVERSITY

Biodiversity denotes to the diversified ecosystems and living organisms i.e. animals, plants, their habitats and their genes on earth (IUCN, 2010). Biodiversity also denotes to lots of diversified ecosystems where different species form their distinctive communities and interact with one another and also with the air, soil and water (Swingland, 2001).

METHODOLOGY

Climate change is destroying the food chain for selection of organisms present in different ecosystems and the rise of sea level will result in the submergence of coastal areas. Bangladesh government has taken multiple strategies to ensure safe environment and biodiversity; however, all these programs of government have often failed to mitigate the impacts of climate change on environment and biodiversity. A number of studies have been conducted on the issue of climate change, but these studies have some limitations in term of identifying the cause of weak policy implementation. It encourages me to conduct a study on Impact of Environmental Degradation and Climate Change in Bangladesh.

OBJECTIVES

The objectives of the study are to observe the impacts of climate change on ecosystems and biodiversity; to identify the barriers responsible for poor implementation of government policies; to recommend policy options to speed up national actions in terms of adopting environment and biodiversity mechanisms.

DATA COLLECTION

This study has conducted by reviewing literatures on climate change and focusing on its effects on environment and biodiversity in Bangladesh. Data have collected by using articles, books, documents, dailies journals, and reports. The report is presented in a descriptive pattern with some statistical analysis.

SIGNIFICANCE

The significance of the study is to provide suggestions to formulate more effective policy (in decision making, enforcement of environmental laws, strengthening institutional capacity and increasing public awareness) options in the battle against climate change for protecting the environment and biodiversity.

IMPACT OF CLIMATE CHANGE IN BANGLADESH

Bangladesh is a deltaic which shares common border with India and Myanmar. The Bay of Bengal is situated in the south. The average annual rainfall varies from 1400 mm to 4500 mm and annual mean temperature over Bangladesh is likely to increase by 0.22 degree C and 0.41 degree C by 2050 and 2100 years respectively (MoEF, 2007). Bangladesh is endowed with rich and diverse genetic resources of flora and fauna because of its bio-climatic environment and its location at the complex interface of the Himayalan and the Southeast Asian bio-geographic regions. The forests cover about 17% of the total land area. The Sundarbans, the largest mangrove forest in the world is located in the south-western part of the country. A few hundred species and sub species of birds including many migratory and seasonal birds are found in the country.



Source: (<http://www.bhcanberra.com/tourism.php>, 2014)

CLIMATE CHANGE IMPACT ON ENVIRONMENT

Bangladesh is facing serious environmental degradation due to climate change and its reflections on environment are discussed below:

CYCLONES

The tropical cyclones in 1970 and 1991 are estimated to have killed 500,000 and 140,000 people respectively (MoEF, 2009). Devastating cyclone also hit in 2007 and 2009 in the coastal area of Bangladesh.

FLOODS

The country experienced 30 damaging floods between 1954 and 1998, of which 12 were severe and 5 were catastrophic. Flood in 2004 caused inundation of 38% land, damages 6.6 billion dollar, affected nearly 3.8 million people with 700 deaths (MoEF, 2005). Flood in 2007 inundated 320,000 Sq. K. land and almost 1 million houses damaged with 649 deaths (Government of Bangladesh, 2007).

DROUGHTS AND DRYNESS

Land degradation due to dryness and loss of crops due to drought may have caused more human sufferings than any other environmental problems in Bangladesh. Because of rainfall variation in the pre and the post monsoon periods, northwestern part of Bangladesh is prone to drought primarily. Inadequate pre-monsoon showers, a delay in the onset of the rainy season or an early departure of the monsoon may create drought conditions in Bangladesh, and adversely affect crop output (Karim & Iqbal, 2001).

Table 1: Summary of Drought Severity Areas in Bangladesh by Crop Season

Drought Class	Rabi	Pre-Kharif	Kharif
Very Severe	0.446	0.403	0.344
Severe	1.71	1.15	0.74
Moderate	2.95	4.76	3.17
Slight	4.21	4.09	2.90
No Drought	3.17	2.09	0.68

Source: (Karim & Iqbal, 2001)

SALINITY AND SEE LEVEL RISE

About 53% of the coastal areas are affected by salinity because of sea level rise and sea water intrusion due to climate change (Mahmood, 2012). Climate change is drastically affecting the natural ecosystem of world's largest mangrove forest Sundarbans. In winter months the saline front begins to penetrate inland, and the affected areas rise sharply from 10 percent in the monsoon to over 40 percent in the dry season (Management, 2012).

DESERTIFICATION

Choudhury has described the world Bank's report that, the ratio of cultivable land to rural population (acre/person) has decreased in the northwestern area by 23.2% as compared to a decreased ratio of 17.2% in the whole of the country (Choudhury, 2006). Some geographers and ecologists claims that there is evidence of desertification from the very dry soil conditions in the Barind Tract region and the white reflectance of the soil surface on air photos and satellite imageries.



Source: www.wateraid.com

CLIMATE CHANGE IMPACT ON BIODIVERSITY

Climate change is affecting the biodiversity both directly and indirectly. It could play a major role in the extinction a quarter of land animals and plants in the near future. It has resulted in numerous rearrangements in the worldwide distribution and abundance of species (such as amphibians, grasses, migratory birds and butterflies) over the last 30 years (MoEF, p. 2). The adverse impacts of human interventions, fragmentation of habitats, etc. on the biodiversity will be furthered by the impacts of climate change (MoEF, 2009, p. 28). Natural forest includes hill forests (tropical wet evergreen and semi-evergreen forest), sal forest (moist deciduous forestry), mangrove forest (tidal forest), and village forestry (Baten & Ahammad, 2008).

Salinity increase has replaced the tree species offering dense canopy cover with non-woody shrubs and bushes and consequently decreased forest productivity and deteriorated wildlife's habitat quality in the Sunderbans (Baten & Ahammad, 2008). The rich diversity of the forest flora and fauna of the Sundarbans ecosystem may experience a gradual depletion by the degradation of forest quality (Arefin, 2011, p. 7) (MoEF, 2009, p. 28). At present, Royal Bengal tiger, salt water crocodile, the leatherback sea turtle, python, spotted deer, rhesus monkey, dolphins, sea eagle, vulture, forest eagle, owl, swamp partridge, brown wing kingfisher, ring lizard, green frog and other species living in the Sundarbans are in danger (Arefin, 2011, p. 8).

Increased rainfall has accelerated soil erosion which is liable for leaching of nutrient, destruction of micro-organisms and reduction of overall quality in the hill forests of Chittagong, Chittagong Hill Tracts (CHTs), Sylhet, and Cox's Bazar. Furthermore, village forests have also been affected as frequent and prolonged flood has triggered the mortality of home-garden species (Baten & Ahammad, 2008). Sal forest ecosystem would be affected by increased moisture stress caused by enhanced evapo-transpiration during the winter (MoEF, 2009, p. 28).

GOVERNMENT TO ADDRESSE CLIMATE CHANGE

The following national policy documents developed by the Government of Bangladesh have addressed the issues of Climate Change Including Adaptation:

ENVIRONMENTAL STRATEGIES

The 'Ministry of Environment and Forest (MoEF)' of Bangladesh is first and foremost accountable for environmental protection. The MoEF steps to minimize climate change impact are noted below:

- a) National Capacity Self-Assessment (NCSA): The project was implemented by MoEF with the technical support of The World Conservation Union (IUCN), Bangladesh Country Office and financial support of the United Nations Development Program (UNDP), Bangladesh; to assess the capacity needs and prepare a capacity development action plan for sustainable environmental governance.
- b) National Adaptation Programs of Action (NAPA): The National Adaptation Programs of Action (NAPA) for Bangladesh has been prepared by MoEF as a response to the decision of the COP 7 of the UNFCCC. The project has identified 15 priority activities including general awareness raising, technical capacity building and execution of projects in different vulnerable areas, with a budget of US\$ 73.70 million (MoEF, 2007).
- c) Climate Change Cell: The Climate Change Cell was established at the Department of Environment (DoE) in 2004 under the Comprehensive Disaster Management Program (CDMP) of the Government as a response to the recognition that Bangladesh is particularly vulnerable to the effects of climate change.
- d) Knowledge Enrichment Program: Environmental education program has been incorporated in primary and higher education. Many universities have introduced various curriculum and projects on environmental issue. Government organizations as well as NGOs present meetings and seminars to raise public awareness on the environmental issue.

DEVELOPMENT STRATEGIES

The Government has shown itself, able to recognize delivery weaknesses and marshal resources to ensure overall development as follows:

- a) Planning for Development: “Five Years Plan” has given emphasis on poverty alleviation, increased self-reliance and meeting the basic needs of the people with particular focus on human resources development, women in development and environmental sustainability.

Plan size and actual expenditure (in million Taka) and GDP growth rate of past plans are shown below:

Table-2: National Five-Year Plans and Their Growth Rate

Plan	Plan Size (Million BDT)	Actual Expenditure (Million BDT)	Growth Target (%)	Realized Growth (%)
1st Five Year Plan	44,550	20,740	5.50	4.00
Two Year Plan	38,610	33,590	5.60	3.50
2nd Five Year Plan	172,000	152,970	5.40	3.80
3rd Five Year Plan	386,000	270,110	5.40	3.80
4th Five Year Plan	620,000	598,480	5.00	4.15
5th Five Year Plan	1969,521	1717,878	7.00	5.21

Source: (Five Year Plan)

- b) **Climate Change Trust Fund (CCTF):** Climate Change Trust Fund has established under the MoEF and budget for CCTF with 100 million dollar for FY2009-2010 and 100 million for FY2010-2011 has been allocated from Government’s own resources (Rabbi & Ahmed, 2012). Government also allocated same amount of money for the current financial year.
- c) **National Agenda-21:** Bangladesh has recently formulated its National Agenda-21 program in line with UNCED Agenda-21. The Agenda 21 calls for implementing integrated resource management programs in the ecologically sensitive areas, integrating desertification combating policies in the national development plans, expanding watershed conservation activities with people's participation. and continuing forest management.

STATUS OF POLICY IMPLEMENTATION

The Government is concerned about environmental issues in general and the concern is reflected in the different policy initiatives that have taken by the government. The major policy initiatives and strategies emphasized environment and natural resource management, land management, and forest development with a view to achieve sustainability in resource conservation and utilization.

The core policy, strategy, and action thrusts have been outlined in the Outline Perspective Plan, National Adaptation Program of Action (NAPA), Bangladesh Climate Change Strategy and Action Plan, adopted in July 2008 and amended in 2009 (Arefin A. B., 2011). Adaptation to the impacts is the main focus of these plans.

FINDINGS OF THE STUDY

Climate change impact in Bangladesh is acute and it is destroying the natural environment and ecosystem. Along with international organizations, the government of Bangladesh has taken multiple steps to manage climate change impact through implementation of numerous projects and plans. However, a number of factors are involved in weak implementation which includes lack of good governance and political institution, corruption, unplanned use of natural resources, defective industrialization and urbanization process, social disparity, exploitation, inequality etc. Developed countries emit carbon and GHGs more than that of developing countries, but they are always silent in times of mitigating climate change impact. Sometimes the western development model does not suit with the environment of our country and most of the times donor agencies set obligatory bindings in the implementation of a project for their own interest and it affects in the resultants.

RECOMMENDATION

Along with government policies some other steps may also be taken to improve the environmental degradation:

1. Environmental technologies and methods might be used for integrated policy formulation, decision making, and monitoring of environment.

2. A comprehensive environmental database may be made and the environmental planners might have the access for environmental up gradation, planning and management.
3. Formal and informal methods of education might be adopted through local media, seminars, celebrations, workshops, walks and student competitions to aware the people regarding the impact of climate change.
4. The industries might be given both technical and financial support for introducing mitigation measures, promoting green technologies, using less pollution technologies and recycling the waste.
5. Environmental Conservation Rules and environmental laws might be enforced further to punish the violation of the emission limits.
6. Government must strengthen vehicle emission standards, complete the emission inventory and conduct an investigation on the emission control measures.
7. The national and international action in terms of funding and adopting sustainable development mechanisms should speed up.

CONCLUSION

In fine, it can be said that Bangladesh is one of the most vulnerable countries to Climate change and climate change impacts will be enormous in the coming near future. Environmental problems occur mainly due to population growth, urbanization, industrialization, rapid rise in transportation, inadequate and improper traffic management, poor sanitation systems and inefficient solid waste management. Environmental issues need to be dealt with the participation of all concerned, with the government and citizens at the relevant levels. In Bangladesh, we have adopted western development model in the context of disaster management, poverty reduction, population control and sustainable resource management. But this kind of development models has failed to reduce poverty, population growth as well as environmental sustainability in a meaningful way. There is a need for comprehensive strategy to maintain sustainable resources as a means to reduce degradation and to ensure overall development through lessening climate change impact.

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