

Responses to Climate Change in Bangladesh

An Appraisal

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Abstract

Climate change is a global problem. The impacts of climate change are worldwide. It's not only detrimental for developing countries but also harmful for developed countries. Bangladesh is recognized as one of the countries most vulnerable to and affected by the impacts of climate change and global warming. This is due to its geographical location, geo-morphological conditions, low elevation from the sea, density of population, poverty, and remarkable dependence on nature, as well as its resources and services. As a developing country, Bangladesh is least responsible for the GHGs emission and an innocent victim of adverse impacts of climate change. This article explores the situation of climate change, its various causes and the impacts faced by the developing countries, in particular Bangladesh. The author aims to highlight how to reduce the causes of climate change for developing countries and the obligations of developed countries to combat the climate change under the existing international legal framework.

Keywords: climate change, adaptation, Bangladesh, impacts, vulnerability.

A Introduction

Climate change is a complex problem and a serious threat to our planet. It will affect all of us, but will have a disproportionate impact on millions of poor rural people. It puts more people at risk of hunger and makes it more difficult to reduce the proportion of people living in extreme poverty. For development work to be effective, we must help poor rural people cope with and mitigate the impact of climate change. Environment on the face of earth is affected by the growth of human species as human beings acquired excellent abilities in terms of physical sustenance, intellectual, moral, social and spiritual growth.¹ Civilization and growth of mankind on the face of the earth from ancient times to modern times have immensely changed climate and atmosphere of the earth through the advancement of science and technology. Modernization of industries, agriculture, housing colonies and infrastructure facilities has led to environmental destruc-

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1 A.J. McMichael, 'The Urban Environment and Health in a World of Increasing Globalization: Issues for Developing Countries', *Bulletin of the World Health Organization*, Vol. 78, No. 9, 2000, pp. 1117-1126.

tion that ultimately jeopardized the ecosystem.² The present environment has reached a critical state in which man has entangled himself with several hurdles to his own life, and the growth of civilization in the modern era is affecting other species for life, which are endangered by human activities. Illiteracy, poverty and uncontrolled swelling in population in many countries may be the real challenges for the world leaders for the 21st century, and the ability to reduce the chloro fluoro carbon (CFC) emissions may also become greatest task for planners and scientists alike.

Climate change is an emerging threat to global public health. It is also extremely inequitable, as the greatest risks are to the vulnerable peoples who have contributed least to greenhouse gas (GHG) emissions. The rapid economic development and the concurrent urbanization of poorer countries mean that cities in the developing countries will be both vulnerable to health hazards from climate change and, simultaneously, an increasing contributor to the problem.³ This article aims at analyzing the situation of climate change and different causes and impacts faced by the developing countries, especially Bangladesh, and highlighting the obligations of developed countries to combat the climate change under the current international legal framework.

B Sustainable Development after Millennium Development Goals: A New Goal to Protect Environment

The world leaders adopted the United Nations (UN) Millennium Declarations in 2000 aiming at a new global partnership to reduce extreme poverty among the nations that has expired in 2015 with many achievements towards reducing extreme poverty and improving the living standards of vulnerable people. After Millennium Development Goals (MDGs), the Sustainable Development Goals (SDGs), known as the global goals, are adopted by the UN development agency, *e.g.*, UNDP to work together to end poverty, protect the planet and ensure good governance that all people enjoy peace and prosperity. The SDGs have adopted for the last 15 years, which came into force in January 2016 and will expire in 2030 and are funded and policy supported by UNDP. UNDP is outstandingly working to implement the goals throughout 170 countries and territories.

The goals mainly focus on the key areas including poverty alleviation, democratic governance and peace building, climate change and disaster risk, and economic inequality around the world. UNDP is constantly working to keep up the governments to integrate the SDGs goals into their national development strategy, plans and policies. Most of the goals are already underway in accelerating progress of the MDGs. Achieving the SDGs requires the partnership of govern-

2 A.M. Verkey, 'Industrialization and Environmental Problems', *Cochin University Law Review*, Vol. III, 1984, p. 124.

3 McMichael 2000.

ments, private sector, civil society and citizens alike to make sure we leave a better planet for future generations.⁴

Climate change and global poverty is a burning issue in the modern world, and the international community has given attention to mitigating the issue with adoption of many international initiatives such as the MDGs and the SDGs. The new areas introduced in the SDGs are climate change, good governance and the like. Through these goals, the international community has agreed to work towards removing poverty, global warming and hunger among the nations, which will seriously affect the future health and prosperity of the planet.⁵ An effective attack on poverty and the ill effects of climate change requires taking comprehensive action that encompasses both issues. We cannot fight climate change without considering the rising energy needs of poor people and countries, nor can we effectively address global poverty without accounting for the impacts of climate change on agriculture, disease patterns and violent weather events, all of which particularly impact the poorest countries.⁶ Climate change presents substantial threats for the achievement of SDGs, especially those related to the eradication of extreme poverty and hunger and promoting environmental sustainability. An increasing body of evidence are pointing to the disproportionate negative impact climate change will have on the poorest countries who, ironically, have contributed least to the problem.⁷

Bangladesh is one of the most affected climatically vulnerable countries in the world and very recently the Prime Minister of Bangladesh ordered the ministry concerned to draft a strategy paper for achieving the targets of SDGs, particularly water, sanitation, climate change and illiteracy.⁸ The 17 goals of SDGs will have appeared as hindrances to achieving the target of Vision of 2021 in Bangladesh. Giving the highest priority to the issue, the Government of Bangladesh (GoB) has already formulated the Bangladesh Climate Change Strategy and Action Plan (BCCSAP). The BCCSAP has recognized six thematic areas, mainly, (1) food security, social protection and health, (2) comprehensive disaster management, (3) infrastructure, (4) research and knowledge management, (5) mitigation and low-carbon development and (6) capacity building and institutional strengthening.

Therefore, the government has already created the Climate Change Trust Fund for supporting the implementation of BCCSAP project. The purposes of these projects are to reduce the vulnerabilities caused by the adverse effects of climate change in the country. The Climate Change Trust Fund Act, 2010⁹ was enacted and set up institutional measures for the management of fund. The projects

4 Staff Correspondence, 'Bangladesh Successful in 5 MDGs, Behind 3', *Prothom Alo*, Dhaka, 8 September 2014.

5 End Poverty Millennium Campaign, 'Climate Change and Millennium Development Goals', Background, 2015.

6 Millennium Ecosystem Assessment, *Ecosystems and Human Well Being: Health Synthesis*, Geneva, World Health Organization 2005.

7 *Ibid.*

8 Staff Correspondence 2014.

9 The Climate Change Trust Fund Act, adopted by Government of Bangladesh, 12 October 2010.

have undertaken basically for the re-construction of embankments and river bank protective work, building of cyclone-resilient houses, excavation/re-excavation of canals, construction of water control infrastructures including regulators, sluice gates, waste management and drainage infrastructure, introduction and dissemination of stress-tolerant crop varieties and seeds, a forestation, installation of solar panels and so on. The GoB is dedicated to save the people from the natural hazards induced by climate change. To achieve this purpose, the government is occupying its earnest determinations in proper utilization of Climate Change Trust Fund as well as organizing finance from the outside.¹⁰

C The Impacts of Climate Change in Bangladesh: A Current Scenario

There are scientific consensus that the effect of climate change are aggravating many of the natural environmental hazard already faced by Bangladesh, including sudden-onset events such as flooding, cyclone, storms surges, water logging, salinity intrusion and riverbank erosion and slow-onset processes such as coastal erosion and land loss.¹¹ During the last century, the earth's average surface temperature rose by around 0.6°C due to climate change and global warming.

After the independence of Bangladesh, it has achieved some notable development amid major socio-economic and environmental challenges. Among others, its gross domestic product (GDP) has more than tripled in real value; food production has increased three times; child mortality has decreased substantially and the country is performing better than its neighbors in terms of ensuring gender parity in education.¹² Climate change is an important issue in the effort for global peace and prosperity. The global temperatures and sea levels are increasing day by day due to changing climate around the world. The whole world is apprehended about the unnatural changes occurring in global climate. The issue of global climate change that we are facing is more pressing than ever.¹³

Bangladesh has long been experiencing frequent changes in weather patterns because of its geographical pattern or location as well as its presence in the coastal region. The changing weather pattern may be happened in the form of floods, cyclones, heavy rains, droughts and river erosion and salinity intrusion due to climate change. Bangladesh is an overpopulated country, and its vulnerability to climate change mainly lies on the large part of low-lying coastal areas of the country. At present, Bangladesh has a population of 163 million people, and large population of a country will also impede general development of a country and causes climate change owing to destruction of forests and others natural

10 *Ibid.*

11 J. McAdam & B. Saul, 'Displacement with Dignity: International Law and Policy Responses to Climate Change Migration and Security in Bangladesh', University of South Wales year book 2010.

12 Bangladesh Climate Change Strategy and Action Plan (2009), Ministry of Environment and Forests, Government of Bangladesh.

13 *Ibid.*

resources.¹⁴ The main cause of climate change is the harmful industrialization and emission of GHGs by developed countries. Developing countries like Bangladesh suffers the most from the effects of increasing global warming, such as changes in the atmosphere, a rising sea level and natural disasters. Bangladesh is the most vulnerable country in the world to global warming, which threatens the agriculture of the country.¹⁵ Every year, natural disasters such as Sidr in 2007 Aila in 2009 and Nargis in 2008 and Mahashan in 2013 have been affecting Bangladesh, touching every corner of the country, especially affecting agriculture. Bangladesh is not in a position to ensure appropriate measure to mitigate the damage because of limited resources.¹⁶

Every year, Bangladesh experiences various natural disasters due to climate change or global warming. As a result, Bangladesh is losing ponds, lakes, dams, agricultural land, housing and forestry. The specialist opines that more than 54 varieties of fish have already been lost in Bangladesh because of climate change. Most of the people of Bangladesh are poor and illiterate. Many elements of both human society and the environment are sensitive to climate variability and change. Human health, agriculture, natural ecosystems, coastal areas and temperatures are all sensitive to changes in climate.¹⁷

According to German Watch's Global Climate Risk Index in 2011, a non-governmental organization working with environment and development issue made a survey on the basis of the impacts of major climate event happened around the world in the 20-year period since 1990. Ranking among 170 countries, Bangladesh's position is first as the nation of most vulnerable impacts to the climate change in the future decades.¹⁸

In Bangladesh, the climate change is affecting the human life and economic development, causing displacements of human being especially in the southern part of the country. Recently in 2007, the cyclone Sidr socked the Southwest part of Bangladesh, which caused an extensive damage to river embankment and agricultural land and also caused damage to housing, roads, bridges and other infrastructure. Electricity and communication were knocked out, and roads and waterways became impassable.¹⁹

Bangladesh is affected every year by similar natural disasters that causes a lot of damage and loss especially in lower lying areas of the country, and 30 districts have been categorized as "severely affected" and a further eight districts as 'moderately affected'.²⁰ An estimated 2.3 million households were affected by this cyclone, of which one million were seriously affected. The cyclone left 3,000 peo-

14 J.A. Akash, 'Climate Change and Bangladesh', 19 November 2009, available at: <www.eurobangla.org>.

15 *Ibid.*

16 U.A. Ahmed, *Climate Change: Bangladesh Is Facing Great Challenges*, 2nd edn, Dhaka, Center for Global Change 2008.

17 Millennium Ecosystem Assessment 2005.

18 See *Wikipedia*, accessed on 14 February 2015.

19 Bangladesh Government Report, *Cyclone Sidr in Bangladesh: Damage, Loss and Needs Assessment for Disaster Recovery and Reconstruction*, 30 April 2008.

20 *Ibid.*

ple dead and 150,000 physically injured.²¹ On 25 May 2009, another devastating cyclone called Aila knocked 14 districts out on the southwest region of Bangladesh. It was the second major blow for the region in less than two years, since many of these areas were still recovering from the effects of cyclone Sidr of 2007 when cyclone Aila struck. According to a report of UNICEF, the cyclone caused (a) 190 immediate deaths, (b) injuries to 7,103 people, (c) damage to 6,000 kilometers of roads, (d) more than 1,700 kilometers of embankments to collapse, (e) more than 500,000 people to become homeless, (f) complete destruction of 275 primary schools and damage to 1,942 schools. After the massive devastation of cyclone Aila, most of the people who were affected seriously have not got sufficient food, safe drinking water and shelter. One of the affected women said, "Every night we go to sleep in fear as our house is just on the edge of the dam and that may disappear with a surge of water anytime, especially in the monsoon."²²

So it is very painful for the people of Bangladesh to face natural disaster every year, which caused damage to one's everyday life. With a limited resource, the GoB is not able to recover the full damages brought on by the Aila, Nargis, Katrina and others. So the GoB requested the international community for a funding of 1 million USD to enable full recovery from the disasters but received only 1% of the resources from outside.²³ It is the responsibility of the developed countries to contribute and respond to such fatal disasters.

I Causes and Effects of Climate Change: An Environmental Approach

The protection of environment is a global concern, and it is not an isolated problem of any area or nation. The problem of environmental pollution is related to all nations irrespective of their size, level of development, or ideology. Climate change causes extensive damage to infrastructure, affecting the economy's productivity by eroding its productive capacity. It also reduces the security of livelihood assets for the poor and their access to such assets. Addressing climate change concerns has thus become urgent and a priority issue for continuing the country's development activities and sustaining gains in poverty reduction.

1 Weather

The weather is very important for growing crops, but due to global warming it is expected to heat up and winter and nighttime temperatures will tend to rise or fall owing to climate change. Bangladesh will generally be more humid as a result of more water evaporating from the Bay of Bengal and will increase rainfall. Water will also evaporate more rapidly from soil, causing it to dry out faster between rains. As warmer than before, winds blow harder resulting in cyclones, floods and super cyclones like Sidr and Aila every year.²⁴

21 Millennium Ecosystem Assessment 2005.

22 As reported by Saleha Begum, a local woman who was affected by the natural disaster in northern part of Bangladesh.

23 Oxfam International Report, Three Years after Cyclone Aila many Bangladeshis Are Still Struggling with Food and Water Shortages, 1 June 2012.

24 A. Rahman, 'Climate Change: Development Challenge for Bangladesh', Patuakhali Science and Technology University and Journalist Daily Prothom Alo, Blog scribd, 2007.

2 Agriculture

As a developing country, Bangladesh's economy is based on agriculture. Most of the people of Bangladesh are poor and engaged directly or indirectly on agricultural activities. Agriculture is one of those sectors that are most sensitive to climate change,²⁵ particularly changes in temperature, rainfall patterns, and increased likelihood of extreme events such as droughts and floods.²⁶ The overall implications of climate change on agriculture are negative. The other impacts of climate change such as extreme temperature, drought and salinity intrusion are also responsible for the declining crop produces in Bangladesh. The situation is applicable not only to Bangladesh but also to most of the countries around the world. Most part of the country have faced the problem similar to Southern Canada, for example, which may benefit from more rainfall and longer growing seasons. At the same time, the semiarid tropical farmlands in some parts of Africa may become further impoverished. Desert farm regions that bring in irrigation water from distant mountains may suffer if the winter snow pack, which functions as a natural reservoir, melts before the peak growing months. So climate change has a great impact on the agricultural land for producing more food to sustain lives.

3 Food Security

Current assessments of the impact of climate change indicate that some regions are likely to benefit from increased agricultural productivity while others may suffer reductions, according to their location and dependence on the agricultural sector. The Intergovernmental Panel on Climate Change (IPCC) has reviewed the results of many modeling experiments that project future changes in crop yields under climate change. Climate change may increase yields of cereal grains at high and mid-latitudes, but may decrease yields at lower latitudes. The world's food system may be able to accommodate such regional variations at the global level, with production levels, prices and the risk of hunger being relatively unaffected by the additional stress of climate change. However, populations in isolated areas with poor access to markets may still be vulnerable to locally important decreases or disruptions in food supply.²⁷

4 Water Security

GoB is going to frame a strategy paper through which Bangladesh could become a role model for the rest of the world for attaining SDG-6 of safe water and sanitation.²⁸ Water is more important and essential for human beings in their daily lives. In Bangladesh, water problem is severe because of flood every year, which increases the salinity of the water, posing major threats to human activities.

25 W.R. Cline, *Global Warming and Agriculture Impacts Estimated by Country*, Washington, Centre for Global Development and the Peterson Institute for International Economic 2007.

26 *Ibid.*

27 J.T. Houghton *et al.*, *The Science of Climate Change. Second Assessment Report of the Intergovernmental Panel on Climate Change*, 2nd edn, Cambridge, Cambridge University Press 1996.

28 UNB, Dhaka, 'Prime Minister for Strategy to Attain Water Sanitation SDG', *The Daily Star*, 21 November 2016.

Problems relating to availability of fresh water for drinking and sanitation will become acute. The National Adaptation Programme of Action (NAPA) focuses on the issue of water-related impacts of climate change, treating it to be among the most critical for Bangladesh, particularly in relation to riverine and coastal flooding, but also in relation to increased winter droughts in some areas.²⁹ More intense rains and more frequent flash floods during the monsoon season will result in a higher proportion of runoff and a reduction in the proportion of water for groundwater recharge.³⁰

5 *Ecosystem and Biodiversity*

Bangladesh has a large and diverse forest ecosystems including savannah, bamboo, swamp forest, mangroves etc.³¹ Biodiversity and ecosystem has a great importance in economic natural resources, for example, the Sundarbans mangrove forest in the south-west of Bangladesh is important for tourism, timber and others natural resources. Higher salinity in the coastal belts could alter the entire ecosystem of the Sundarbans and affect the rich biodiversity of the forest. A 25-centimeter rise in sea level is predicted to result in a 40% mangrove loss, and a 45-centimeter rise, combined with other forms of anthropogenic stress on the Sundarbans, could lead to the destruction of 75% of the mangroves.

The effects of climate change such as higher temperatures; lessened snow cover; rising sea levels and weather changes may influence not only human life but also the ecosystems of Bangladesh. As a result, agriculturists do not cultivate their land in due time because of changing weather. Similarly, the life patterns of people are changing due to climate vulnerability and displacement.

6 *Human Health*

Human health is directly affected by climate change in a warmer world. Scientists predict that more people will get sick and die from heat stress due to less hotter days that to warmer nights.³² The International Center for Diarrheal Disease Research Bangladesh expressed a big concern for raising diarrheal diseases in recent years. Climate change will also produce more rapid climate-sensitive diseases such as malaria and dengue.

Other diseases like avian flu, Nipah virus infections and unknown encephalitic diseases are also common phenomena in Bangladesh. The incidences of malaria have increased intensely in Bangladesh over the last 30 years, and it is now a major public health problem.³³

7 *Fisheries and Livestock*

The fisheries are also affected by the climate change in Bangladesh. Fisheries contribute to 3.5% of our GDP and mass people rely on fish products to make up the

29 S. Huq & J. Ayers, 'Climate Change Impacts and Response in Bangladesh', European Parliament's Temporary Committee on Climate Change 2008.

30 *Ibid.*

31 Rahman 2007.

32 *Ibid.*

33 *Ibid.*, p. 8.

majority of daily dietary protein requirements.³⁴ Climate change could lead to loss of fishing grounds and coastal island fisheries and changes in species composition. There will also be major loss of freshwater culture fisheries and adverse impacts on coastal shrimp culture. Climate change will disrupt river (estuary)-canal-floodplain fish production systems and cause changes in migratory routes for some species. Because of stormy weather, cyclones and tidal surge, fishing time will shrink causing loss of livelihood of fisher folk and disrupting fish trading. The livestock and poultry are also affected by the natural disasters because of higher temperatures, changing weather and floods. In changing climate scenarios, fodder production may decrease and disease and mortality rates may rise, which may threaten the viability of the livestock sub-sector.

8 Social Dislocation

Every year, a large number of people are displaced due to natural disaster in Bangladesh. According to United Nations High Commissioner for Refugees (UNHCR) in 2010, 42 million people were dislocated around the world due to natural disaster. The UNHCR report also stated that climate change is the most important factor contributing to natural disasters and that the international community must recognize this fact and do more to help the suffering humanity. The number of displaced people was about 42 million in 2010 around the world. This huge scale of displacement of people every year is very alarming for human life.³⁵ The growth in the number of refugees and displaced persons has increased markedly. Refugees represent a very vulnerable population with significant health problems. Large-scale migration is likely in response to flooding, drought and other natural disasters. Both the local ecological disturbance caused by the extreme event and the circumstances of population displacement and resettlement would affect the risk of infectious disease outbreaks. Even displacement due to long-term cumulative environmental deterioration, including sea level rise, is associated with such health impacts.³⁶

D International Response on Global Climate Change

The global response to climate change was initiated with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) at the 1992 Rio Earth Summit. The aim of the Climate Convention is to stabilize atmospheric concentration of GHGs at levels that will prevent human activities from interfering dangerously with global climate system. The convention itself does not set any mandatory limits on GHG emissions for individual countries and contains no enforcement mechanism. Instead, it has been done through protocols that set

34 *Ibid.*, p. 5.

35 I. Mahood & S. Ahmed, 'Impact of Climate Change in Bangladesh: The Role of Public Administration and Government's Integrity', *Journal of Ecology and Natural Environment*, Vol. 4, No. 8, 2002.

36 A.J. McMichael & A. Haines, 'Global Climate Change: The Potential Effects on Health', *British Medical Journal*, 1997, pp. 805-809.

mandatory emission limits. The principal protocol in this regard is the Kyoto Protocol.³⁷

Under this Convention, both developed and developing countries accept commitments to submit national communications, including GHG inventories. They agree to adopt national programs for mitigation and adaptation. Cooperation in technology transfer is another broad commitment. It is recognized that implementation of the above commitments by developing countries will depend on financial and technical assistance from the developed countries.³⁸

I Kyoto Protocol: Still Poses Uncertainty

The Kyoto Protocol is an agreement made under the UNFCCC. All parties to the Convention have an obligation to produce inventories and GHGs sources not controlled by the Montreal Convention and to formulate national and, where appropriate, regional programmes to reduce global warming to cooperate in preparing for adaptation to the impact of climate change and to promote scientific research. Countries that ratify this protocol commit to reduce their emissions of carbon dioxide and five other GHGs or engage in emission trading if they maintain or increase emissions of these gases.

The Kyoto Protocol was signed in 1997 and came into force in 2005. The Kyoto Protocol has ratified by 192 countries and one regional economic integration organization.³⁹ The United States is an unrivalled player, the world's biggest economy, and a larger emitter, but not a party to the Kyoto Protocol and is not obliged to comply with the quantitative emission-reduction commitments under that agreement.⁴⁰ All countries were not happy with the new commitment period, Russia and Japan being among them. As with Kyoto 1, the United States was not numbered among the signatories but among the larger emitters in the world. Presently, it does look like the United States may be prepared to sign up. The participating countries in the Protocol now account for only some 15% of global GHG emission. According to Heimann, "The non-inclusion of emerging economies remains an obstacle in the way of approval by many countries."⁴¹

E Climate Change: Responsibility of Developed Countries Is a Big Debate

Global warming is the result of the massive emission of CO₂ and other GHGs from the burning of fossil fuels throughout the industrial revolution from the 19th century. In attempting to address and solve global warming, many have asked whether developed nations, which led the industrial revolution and are

37 See <www.unfccc.int/resources/does/convkp.html>.

38 D. Campbell-Lendrum & C. Corvalán, Department of Public Health and Environment, World Health Organization, Geneva, Switzerland.

39 UNFCCC, Status of ratification as at 13 May 2008, available at: <http://unfccc.int/Kyoto_protocol/background/status_of_ratification/items/2613.php> at 11 June 2008.

40 The US signed the Kyoto Protocol on 12 November 1998, but did not ratify the agreement <http://unfccc/files/Kyoto_protocol/status_of_ratification/application/pdf/ratification.pdf> at 11 June 2008.

41 Available at: <<http://phys.org/news/2015-02-kyoto-protocol.html#jCp>>.

responsible for most of the GHGs now in the atmosphere, should bear a greater responsibility for combating climate change around the world.

After the signing of Kyoto Protocol in 1992, the debate of responsibility for emission of CO₂ has been a big voice because of exempting China and India as developing nations from the same emission-reduction obligations as developed countries. The underlying principle of Kyoto Protocol is known as 'common but differentiated responsibilities', which continues as a centerpiece principle for those calling on developed countries to assume a greater responsibility. China, India and other developing countries call for recognition of this principle, while many developed countries argue that the situation has been changed now. Developing countries like China and India are also responsible for causing GHGs through industrialization and pollute the environment more rapidly in recent years. Thereafter, responsibility goes to every state that causes emission of GHGs and pollute the environment, which results in climate change and displacement. The most powerful states in the world today are the United States, France, and the United Kingdom, and they will be able to take action in combating the climate change and their voice is very effective to gather the international community to work in the same platform.⁴²

The participation, cooperation and commitment of powerful nations such as the United States, France, the United Kingdom and other industrialized countries is necessary in order to lessen the GHGs. The reason is that developed countries are more obligated to combat climate change for several purposes because they consume more products and pollute more through carbon. For example, developed countries such as the United States, the United Kingdom, and Australia are producing more carbon emission than any other developing countries. As a result, strong policies as well as developed countries have a significantly higher role in motivating and combating the climate change than do developing countries.⁴³ So every state either developed or developing one, has to work together and commit to follow the international rules and regulations and also adopt national policy.

I Adaptation of Green Projects by Developed Countries

Adaptation of green projects has a positive impact on our environments, which help to save environment and lessen the cause of climate change. But developing countries in the world are not capable of adapting the green projects due to their limited resources, financial constraints and lack of awareness as to how to develop the green model for their societies to prevent or reduce global warming. Developed countries have a more responsibility to act first and set an example that developing countries can follow and adopt the green projects. In that case, China and India have played a greater role for adopting green projects in their development policy to prevent climate change. The developing countries' having greater poverty and instability have far less flexibility to tamper with their competitiveness with developed nations on the global economic stage. They will adopt

42 Available at: <www.ukessays.com/essays/politics/the-history-of-combat-climate-change-politics-essay.php#ixzz3RmxUCz1Q>.

43 F. Hasan, 'Bangladesh Drowning: A Reality or a Myth?', *Daily Star*, 1 November 2008.

green model projects if the developed world goes green first, assuring them that their competitiveness will not be jeopardized. In a position of greater economic flexibility, developed countries like the United States, France, the European Union and the United Kingdom must take the step or financing the developing countries to take green projects for saving the environment.⁴⁴

F Regional Policies for Combating Climate Change in Bangladesh

Bangladesh has taken many steps to deal with the climate change or displacement, such as the establishment of a 45-million-USD Climate Change Fund,⁴⁵ development of the NAPA in 2005 and development of the BCCSAP in 2009.

I *The National Adaptation Programme of Action 2005 (NAPA)*

The GoB has adopted the NAPA in 2005, prepared by the Ministry of Environment and Forests to comply with the requirement of the UNFCCC. The NAPA aimed at accumulating the understanding of the current state of affairs from discussions with appropriate stakeholders from four sub-national workshops and one national workshop.⁴⁶ The NAPA was prepared keeping in mind the sustainable development goals and objectives of Bangladesh, where the importance of addressing environmental issues and natural resource management with the participation of stakeholder in bargaining over resource use, allocation and distribution was recognized. The NAPA recognizes that Bangladesh will be one of the most adversely affected countries because of climate change, especially because of its low economic growth, inadequate infrastructure, insufficient social development, lack of institutional capacity and being highly dependent on natural resources.

II *The Climate Change Strategy and Action Plan 2009 (BCCSAP)*

The BCCSAP is the most and recent document formulated by the GoB, aiming to address the adaptation and mitigation to build up the capacity and reliance of the country's climate change for a decadal period of 2009-2018. The Plan was prepared in 2009 focusing on a 10-year programme to meet the prospective challenges and discrepancy condition.⁴⁷ The BCCSAP identifies all the climate-induced hazards, including flood, drought, salinity intrusion, cyclone and storm surge, and variations in temperature and rainfall, and their associated impacts on different sectors.

44 A. Revkin, 'Imagine Everyone Was Equal, in Emissions', *New York Times*, 15 February 2008.

45 R.W. Fatima & J. Anita, 'Human Rights, Climate Change, Environmental Degradation and Displacement: A New Paradigm Human Rights and Sovereignty Over Natural Resources', in M. Rahman (Ed.), *Empowerment Through Law of the Common People*, Dhaka, Human Rights Summer School Manual 2010.

46 See Report Ministry of Environment and Forests Government of the People Republic of Bangladesh (2005).

47 See Bangladesh Climate Change and Strategy and Action plan, Ministry of Environment and Forests, Government of the Peoples Republic of Bangladesh 2008.

III *Bangladesh Climate Change Trust Fund (BCCTF)*

The Bangladesh Climate Change Trust Fund (BCCTF) is a 'block budgetary allocation' of US\$ 100 million each year for 3 years (2009-2012). The Climate Change Act provides that an amount equivalent to 66% of the total fund is being spent for the implementation of BCCSAP while 34% will be maintained as a 'fixed deposit' for emergencies. The interest accrued on the 34% fixed deposit will also be spent on project implementation. Funds from the BCCTF can be used to finance public sector and 10% for non-government projects, and it is not mandatory to spend the total grant within a given financial year.⁴⁸

IV *Bangladesh Climate Change Resilience Fund (BCCRF)*

The GoB has created the Bangladesh Climate Resilience Fund (BCRF) for supporting the actions to address climate change. Moreover, the international development partners of Bangladesh are basically contributing to this fund. In April 2008, a UK-Bangladesh climate change conference was held in Dhaka. The development partners expressed their view for the urgency of establishing a 'financial mechanism' to assist Bangladesh in combating the impacts of climate change. Subsequently, the London Climate Change Conference was organized jointly by Bangladesh and the United Kingdom in September 2008.

However, finally in May 2010, the Bangladesh Development Forum (BDF) agreed to establish the BCCRF, which would be managed by the GoB, and the World Bank agreed to provide 'fiduciary' support to the BCCRF with an objective of handing it over to the GoB in the next 3 years. By this time, the BCCRF has received an estimated amount of about 200 million USD from different developed countries including the United Kingdom, the European Union, Denmark, Sweden and Australia. About 90% of the total amount would be spent by different ministries while the remaining 10% would be managed by the Palli Karma-Sahayak Foundation (PKSF) to support initiatives taken by NGOs and bilateral development partners.⁴⁹

V *Sectoral Adaptation Policies*

Since 1990, the GoB has developed a number of sectoral adaptation policies. Considering the fact that Bangladesh is highly susceptible to climate change, the government has adopted sector-wise policy to prevent the environmental damage caused by climate change.⁵⁰ The National Water Policy (NWP), formulated in 1999, considered firstly short-, medium- and long-term perspectives for water resources in Bangladesh. The NWP was followed by the National Water Management Plan (NWMP) in 2001. Though there is a huge effect of climate change on water resources in Bangladesh, the NWP does not mention the climate change issue at all. However, the NWMP identifies climate change as one of the future

48 Available at: <www.un.org/specialrep/ohrlls/ldc/ldc%20criteria.htm>, accessed on 10 February 2015.

49 M. Haque, *Climate Change: Issues for the Policy Makers of Bangladesh*, Dhaka, Environment and Development Alliance 1996, pp. 13-14.

50 McAdam 2010.

elements affecting supply and demand of water. The National Environmental Management Action Plan (NEMAP), which was published in 1995, does not illuminate climate change. Similar to NEMAP, the National Land Use Policy (NLUP) and the National Forest Policy (NFoP) does not make direct reference to climate change. Climate change was not addressed in the Poverty Reduction Strategy (PRS) Papers, too, until recently. The present PRS recognizes the threat of climate change and its adverse impacts on the development process. It understands the need for integration/mainstreaming climate change awareness. Mainstreaming climate change is a systematic process and comprehensive effort to reduce the negative impacts of climate change through integration into overall national development and planning process of the country.⁵¹

VI *Local Policies of Other Countries*

The UNFCCC 1992 stipulated that every members of the UN to adopt national policies limiting emissions of GHGs, to cooperate on research and technology and to protect and enhance GHG sinks and reservoirs activities that absorb GHGs, such as the planting and conservation of forest areas that absorb CO₂.⁵²

Most of developed countries are working and taking policies for reducing GHGs to combat climate change around the world. The European Union acceded to the UNFCC in 1994 and committed to reduce the GHGs, and the member countries have imposed heavy taxes on energy usage, designed partly to curb such emissions. Norway taxes industries according to the amount of carbon dioxide they emit. In the Netherlands, the government and industries have negotiated agreement aimed at increasing energy sufficiency, promoting alternative energy sources, and cutting down GHG output.

In the UN, the energy department, the environmental protection agency, product manufacturers, local utilities and retailers have collaborated to implement the Energy Star program. This voluntary program rates appliances for energy use and gives some money back to consumers who buy efficient machines.⁵³ The Canadian government has established the Fleet Wise Program to cut down CO₂ emissions from federal vehicles by reducing the number of vehicles it owns and by training drivers to use them more efficiently. By 2004, 75% of Canadian federal vehicles were to run on alternative fuels such as methanol and ethanol. Most of the governments in all over the world are also working against greenhouse emissions by conserving energy in buildings, modernizing their vehicles and advising the public and individual to take steps to reduce GHG emission.

51 See Report Climate Change and Bangladesh; Department of Environment and Climate Change Cell; Government People's Republic of Bangladesh and UNDP.

52 See Art. 4.2(a) (b) of United Nations Framework Convention on Climate Change (UNFCCC) 1992.

53 M. Loughry & J. McAdam, 'Kiribati relocation and adaptation', *Forced Migration Review*, Vol. 31, 2008.

G Response of International Law: Disquiet of Developing Countries

The burning question is as to how the international law responses to mitigating the problem of climate change. The initial point is Principle 21 of the Stockholm Declaration,⁵⁴ which forms the basis for international law to address climate change and captures the tension between sovereignty and environmental protection.⁵⁵ In accordance with the Charter of the UN and the principle of the international law, states have the sovereign right to exploit their own resources pursuant to their own environmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.⁵⁶

The concept of state responsibility has developed by the United Nations International Law Commission in its draft articles on state responsibility, under which responsibility does require fault that is a wrongful act or negligence.⁵⁷ There are at least five reasons why no-harm rule inserted in Principle 21 of the Stockholm Declaration⁵⁸ is, however, inadequate to address the climate change problem.

- Firstly, it is very difficult to trace out the sources and measures of climate change since they are widespread. As a result the responsibility has been allocated to among the states for combined activities to mitigate the climate change.
- Secondly, the Principle 21 of Stockholm Declaration aims at balancing the responsibility of a state to avoid harming of other nations with its right to exploit its environment and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.⁵⁹
- Thirdly, distribution of responsibility is well-nigh impossible because of the time lag between GHG emissions and their adverse effect.
- Fourth, many developing countries have the means to find alternatives to fossil fuels on which they are highly dependent. Thus, applying the principle of ‘common but differentiated responsibilities’ and intergenerational equity assumes a central role as we explore the means to respond to climate change.⁶⁰
- Finally, the monetary compensations are not obviously an adequate remedy once the damage or cause has been done.

There existed some international conventions, which emphasized on the protection of the environment in a fragmentary manner. These conventions were

54 Adopted Stockholm, 5-6 June 1972.

55 Stockholm Declaration of the UN Conference on the Human Environment, 16 June 1972 Principle 21 UN, Doc.

56 *Ibid.*

57 International Law Commission, Draft Articles on State Responsibility, 12 July 1996, Art. 1, Report of the ILC on the work of its Forty-Eight Session, UN, Doc.

58 Declaration of the United Nations Conference on the Human Environment, adopted 16 June 1972 at Stockholm.

59 See Principle 21 of the Stockholm Declaration, 1972.

60 Millennium Ecosystem Assessment 2005.

mainly confined to the control of pollution of the seas and rivers and contamination of the atmosphere through nuclear weapons. The most remarkable among these conventions are:

- a The International Convention for the Prevention of Pollution of the Sea by Oil, 1954, which made any contravention of the convention as an offence “punishable under the laws of the territory in which the ship is registered”.⁶¹ This convention was later replaced by the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL) and its protocol 1978, which also cover pollution caused by sewage and garbage, and by other noxious or harmful substance discharged from a ship as well as oil.⁶²
- b The 1958 Geneva Convention on the High Seas, which obliges states to prevent pollution of seas by oil discharges from ships and enjoins every states to take measures to prevent pollution of the seas from dumping of radioactive waste, taking into account any standards and regulations which may be formulated by the competent international organizations.⁶³
- c The 1963 Vienna Convention on Civil Liability for Nuclear Damage. The 1997 Convention on supplementary Compensation for Nuclear Damage increased the amount of compensation for nuclear damage.⁶⁴
- d The Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft, 1972.

H Suggestions and Recommendation

Global warming is a threat for a congenial atmosphere or environment in the world. The environment may be safer if remedial measures are taken to minimize the drought, heat waves, natural disaster etc. that will cause distress to poor people. To combat the situation, following recommendations may be appropriate to adopt:

- a Promoting better conservations of existing forests and their protection and bringing barren land into plantation.
- b Enhancing energy efficiency in relevant sector of the national economy.
- c Promoting sustainable forms of agriculture in light of climate change considerations.
- d Constructing riverbank and coastal embankments to protect vulnerable areas from monsoon flooding.
- e Organizing environmental awareness program or training in the society.
- f Reducing industrial emission using new technology and methods.
- g Using conventional agricultural methods for lesser dependence on fertilizers and pesticides.

61 See Art. 3.

62 12 ILM 1319 (1973), in force since 1983. There are 150 countries that are party to the agreement as of 31 December 2010, there are now six annexes to the Convention, ratified by requisite number of states.

63 For the text of Convention on the High Seas, see 52 AJIL 842 (1958).

64 See <www.iaea.org/publication/Documents/infrices> accessed on 12 February 2015.

- h Establishing peace, avoiding war and conflict, and not using nuclear weapon that damages the world environment.
- i Organizing workshop and seminars to make people aware of various environmental issues.
- j Providing financial assistance for poor countries to limit their emissions while safeguarding their right to development.
- k Providing additional aid for adaptation measures for dealing with climate change and transferring existing and new adaptation technology measures.

I Conclusion

Climate change poses a formidable challenge for all countries, but its major impact will be on developing countries, especially the least developed countries as they lack resources, capacity, logistics, and wherewithal they need to fulfill their mitigation obligations and to undertake adaptation activities. So the assistance of developed countries becomes imperative for the developing countries. International environment law and international human rights law can play a vital role as appropriate mechanisms are crafted to support developing countries in their response to the adverse impact of climate change. Since the responsibility for climate change rests primarily with the Western industrial nations, such as the United States, the United Kingdom, and France, they are especially responsible for those suffering environmental migration. Developing countries such as China and India also have the same responsibility to take measures for emission of GHGs, though the Kyoto Protocol lists them as developing countries. However, the countries from which environmental migrants originate also have great responsibility towards their citizens and are obliged to do their best to protect their lives. They must take preventive measures to adapt to the consequences of climate change and lessen their impact over both the short and long term.

Climate change presents the international community with great challenges, which can only be overcome if communities work together. Dealing with environmental migration is one of those challenges. If appropriate measures are to be taken, then it is vital to gather additional information about environmental migration. Research into this area should therefore be significantly intensified.