

CLIMATE CHANGE AND NATIONAL RESPONSE: BANGLADESH PERSPECTIVE

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INTRODUCTION

Climate change is one of the most critical challenges facing the humanity today. It is increasingly becoming an environmental and intergenerational concern that challenges development and human progress all over the world. However, few regions have taken a more severe toll than South Asia and particularly Bangladesh. Although, Bangladesh is one of the least contributors to the annual load of carbon-dioxide (CO₂) and other greenhouse gases to the atmosphere, because of her geographical location, widespread poverty, weak infrastructure, high population density, heavy reliance on climate-sensitive sectors such as rural agriculture and fisheries, Bangladesh is one of the worst sufferers of this natural phenomenon. The consequence of climate change on Bangladesh is multifaceted affecting the country's economic systems, ecological networks and even social relationships. More specifically, there are increasing risks to food security, energy security, water security, livelihood security, health security, and habitat security. As a whole, climate change would heavily undermine the capacity of Bangladesh to provide the opportunities and services that help people to sustain their livelihoods. Hence, the issue of climate change has turned out to be a national concern for Bangladesh warranting an immediate response.

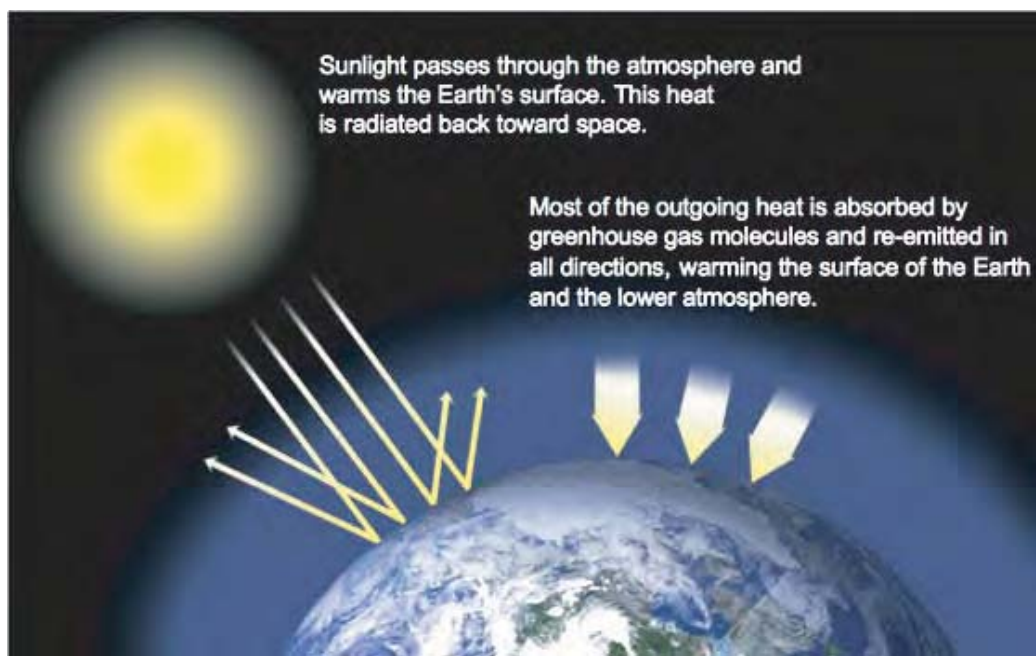
Understanding Climate Change

The World Meteorological Organization (WMO) defines climate change as, "A statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer)."¹ However, Article 1 of United Nations Framework Convention on Climate Change (UNFCCC) defines the term 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."² This definition makes a distinction between climate change attributable to human activities and climate variability attributable to natural causes. Climate change attributable to human activities broadly refers to persisting change in the earth's atmospheric state due to emission of greenhouse

1. William Burroughs, (ed.), *Climate into the 21st Century*, Cambridge, UK: Cambridge University Press, 2003, p. 223.
2. http://unfccc.int/essential_background/convention/background/items/2536.php, accessed on 18 April 2012.

gases (GHG). The aforesaid definitions indicate two broad causes of climate change: natural and human induced. The natural causes of climate change may include volcanic eruptions, ocean current and earth orbital changes. However, it is now almost a universal agreement that natural causes are rather less significant while global warming over the last century has largely been contributed by human activity, i.e. emission of GHG. The following figure explains the mechanics of greenhouse effects.³

Figure 1: Mechanics of Greenhouse Effects



Source: Internet

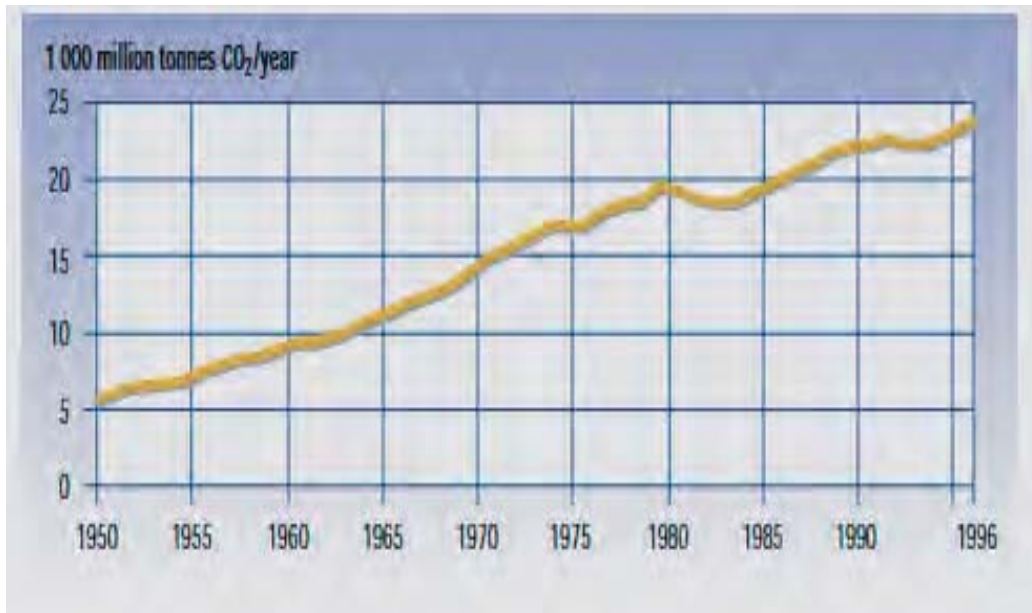
Human activity in emission of GHG in the atmosphere could be in three different ways, first being the burning of fossil fuels. People burn fossil fuels like coal, oil and gas to create energy and when fossil fuels are burned, they release GHG. Cutting down forests faster than they are replaced (deforestation) is another cause of carbon emission. Deforestation makes a huge contribution to carbon emissions because trees absorb CO₂ as they grow. Thirdly, changes in land use pattern, land clearing, agriculture, and other activities like livestock, oil drilling, coal mining all led to a rise in the emission of CO₂ and methane.⁴ Over the years rise in global CO₂ emission is depicted in the following figure.⁵

3. <http://climate.nasa.gov/causes> , accessed on 19 April 2012.

4. http://www.direct.gov.uk/en/environmentandgreenerliving/thewiderenvironment/climatechange/DG_072920, accessed on 19 April 2012.

5. UNEP, *Global Environmental Outlook 2000*, Nairobi, UNEP, 1999, p. 4.

Figure 2: Rise of Global CO₂ Emission

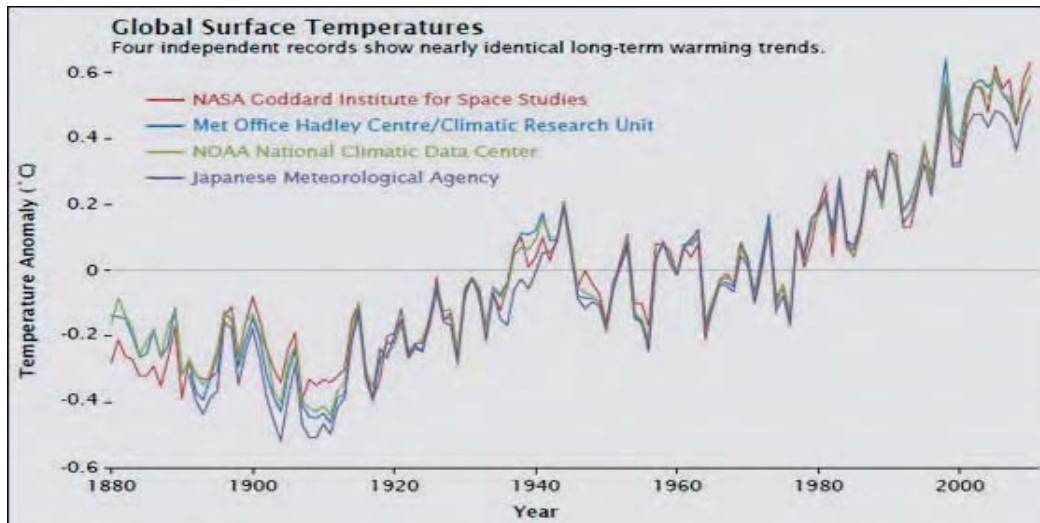


Source: Author

Climate Change: A Brief Look at the Global Scenario

A key effect of climate change is the rise in global surface temperature. During the period of 1969-2003, the heat content of the upper 700 meter of the ocean has witnessed an increase by more than 50%. In the case of Indian Ocean, each 1°C of global temperature rise has boosted sea surface temperature by 1.5°C during the past few decades. It is important to note that ocean temperature plays a contributory role in global sea level rise (SLR), which has multiple consequences, as explained later.⁶

6. Office of the US Secretary of Defence, *Trends and Implications of Climate Change for National and International Security*, 2011, p. 24.

Figure 3: Global Increase in Surface Temperature

Source: Climate Research Unit, NASA

Rising trend in global surface temperature has caused glaciers and snow cover to melt, resulting in near-term flood followed by scarcity of water. Importantly, glaciers and snow covers reflect the solar radiation into the atmosphere. As such, reduction of snow surface adds to further global warming besides being responsible for 80% of global SLR. Compared to the average rate between 1980-1999, the melting of glacier has been doubled since 2000. Recent studies show that the average winter ice thickness in Arctic Ocean has reduced to 1.9 meter in 2008 compared to 3.6 meter in 1980. It is predicted that global warming will cause the Arctic Ocean to be free of summer ice sometime in between 2030 to 2080, further adding to the effects of global warming.⁷

As mentioned before, a major concern of climate change is the global SLR, with multifaceted adverse effects. Global SLR has been noted at an average rate of 1.8 ± 0.5 mm/year during the period 1961-2003. However, the rate showed rising trend of 3.2 mm/year during the period 1993-2006 and in the recent years the average rate of increase is around 3 mm/year.⁸ The consequence of possible population displacement because of the SLR is significant, since almost two-thirds of the world's population lives within 100 kilometers of the coast and 30 of the world's 50 largest cities are located along or near the coast.⁹

7. *Ibid.* Pp. 26-29.

8. *Ibid.* p. 40.

9. Graeme Hugo, "Environmental Concerns and International Migration," *International Migration Review*, Spring, 1996, p. 119.

Alongside various physical effects of climate change as noted above, a major concern is the second order effect on water resources. In Asia, freshwater availability in Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease, which along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by 2050. It is also projected that crop yields could decrease up to 30% in Central and South Asia by the mid-21st century. On the other side of the globe, some 75 to 250 million people in Africa are projected to be exposed to increase water stress by 2020 due to climate change.¹⁰

Effects of Climate Change on Bangladesh

According to Climate Change Vulnerability Index (CCVI) 2011, Bangladesh is ranked as the most vulnerable country and considered in the ‘extreme risk’ category among 170 countries over next 30 years.¹¹ Bangladesh’s vulnerability to climate change is largely due to her geographic location and geo-morphological conditions. With Himalayas to the north and the Bay of Bengal to the south, Bangladesh is located at the junction of two diverse environments, which not only causes heavy monsoon downpour but also brings about catastrophic natural disasters. Moreover, about 10% of the country is hardly one meter above the mean sea level¹² risking it to be submerged under sea water due to SLR. World Bank’s study on the impact of SLR in Bangladesh reveals that 100 cm SLR within next 100 years is likely to inundate 15% to 17% of country’s land area i.e. 22135 to 26562 square kilometers.¹³ It is vital to note that the compounding effects of SLR on coastal area of Bangladesh will have severe consequence. There will be increasing risk of coastal salinity of both soil and surface water causing loss of cultivable land and scarcity of saline free drinking water.

A recent study, as shown in Figure 4, depicts that saline water could penetrate about 40 km inland in case of SLR by 88 cm affecting most of Khulna, Jessore, Barisal, Patuakhali and Noakhali districts and parts of Faridpur and Comilla districts.¹⁴ It is further predicted that one million coastal people of Bangladesh could be climate refugee by 2050 due to SLR.¹⁵ Even at present, around 31

10. IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability*. 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Cambridge, Cambridge University, p. 13.

11. Transparency International Bangladesh, *Challenges in Climate Finance Governance and the Way Out*, Dhaka, 2012, p.5.

12. Dept of Environment, *Climate Change and Bangladesh*, Dhaka, Climate Change Cell, 2007, p. 4.

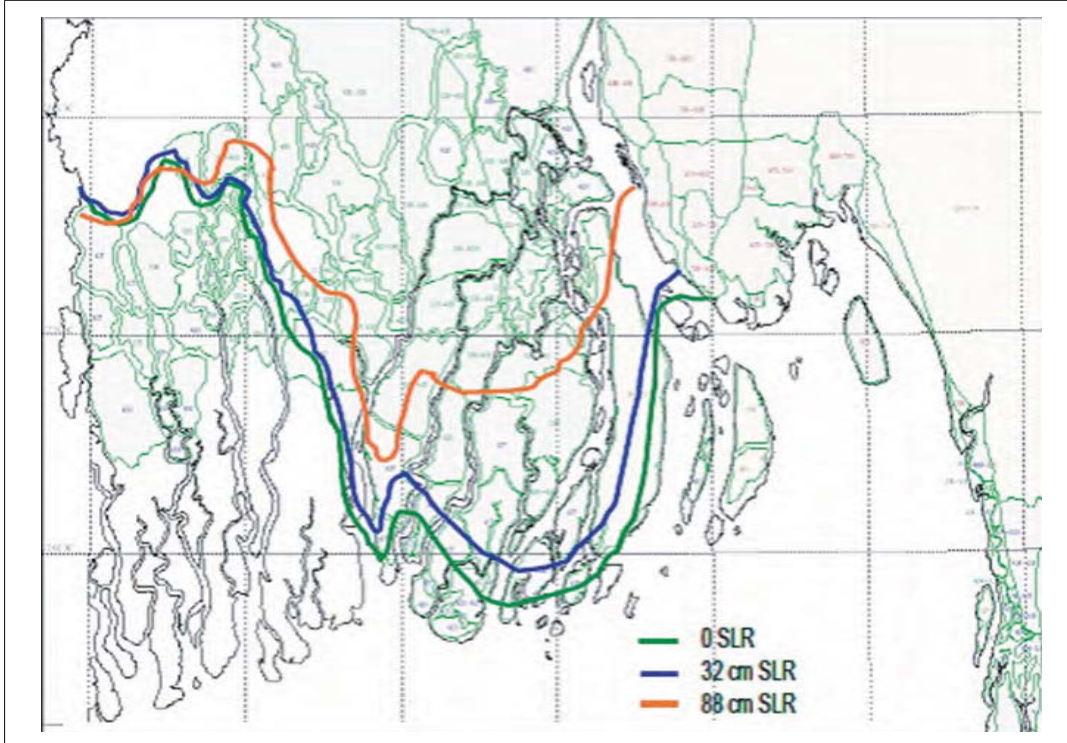
13. Shamsuddoha, Md and Rezaul Karim Chowdhury, *Climate change impact and disaster vulnerabilities in the coastal areas of Bangladesh*, Dhaka, COAST Trust, 2007, p. 8.

14. Dept of Environment, *Bangladesh Climate Change Impacts and Vulnerability: A Synthesis*, Dhaka, Climate Change Cell, 2006, p. 24.

15. *Challenges in Climate Finance Governance and the Way Out*, *op.cit.*, p.5.

upazillas of Jessore, Satkhira, Khulna, Narail, Bagerhat and Gopalganj districts are already facing severe salinity problem, which has resulted in marked change in agricultural activities.¹⁶

Figure 4: Line of Equal Salinity for Different SLR During Dry Seasons



Source: Internet

Bangladesh's further vulnerability to climate change is due to the fact that she is among the least developed countries (LDCs) in the world with high population density. Although Bangladesh has witnessed sustained gross domestic product (GDP) growth for last couple of years, higher population density increases her vulnerability because more people are exposed to risk, and opportunities for internal relocation or migration are limited. Moreover, given the fact that 25% of the country's GDP comes from agriculture sector¹⁷ and 48% of the labor force is still dependent on agriculture for income and livelihood,¹⁸ the agro production loss due to climate change would certainly pose a serious threat to the national economy, human security, and as a whole impede national development.

16. *Ibid.* p. 13.

17. Dept of Environment, *Climate Change and Bangladesh*, Dhaka, Climate Change Cell, 2007, p. 4.

18. Dept of Environment, *Adaptive Crop Agriculture Including Innovative Farming Practices in the Coastal Zone of Bangladesh*, Dhaka, Climate Change Cell, 2009, p. 1.

In addition to the impact on agricultural sector, changes to water resources and hydrology due to climate change will have a major effect on Bangladesh, as the people of this soil heavily rely on water for irrigation, fishery, navigation, and industrial and domestic purposes. Moreover, under general climate variability, mostly in the dry season, the annual per capita water availability in 2025 will become 7,670 cubic meters as against 12,162 cubic meters in 1991.¹⁹ What it means is that availability of freshwater will be reduced by increased salinity intrusion into fresh water sources affecting irrigation and constricting availability of drinking water against the rising demand. Alarming, there is a possibility of gradual extinct of the Sundarbans, the largest single block mangrove forest of the world. According to Intergovernmental Panel on Climate Change (IPCC)²⁰ prediction, about 84% of the Sundarbans area could be deeply inundated due to 32 cm SLR, while the entire Sundarbans could be lost in case of 88 cm SLR.²¹

Various environmental effects of climate change and its subsequent impacts on various sectors like agriculture, water resource, forestry etc would undoubtedly affect people's livelihood in terms of employment, income and consumption. Moreover, recurring floods would create major problems of livelihood and macroeconomic dislocations, slowing growth and pushing people down the poverty line. Another major concern for national development of Bangladesh because of SLR is the ever increasing number of victims who seek refuge to other places due to loss of their homes and land. A study indicates that if sea level rises up to one meter this century, approximately 30-35 million Bangladeshis could become climate refugees²² with severe economic and social consequences.

An Overview of Bangladesh's Response to Climate Change

Government of Bangladesh has entrusted the Ministry of Environment and Forest (MoEF) in general and Department of Environment (DoE) in particular with the responsibility to address issues related to climate change. A Climate Change Cell (CCC) has been formed under the DoE with a view to making an integrated approach to climate change risk management at national and local levels. CCC is the technical arm of the national focal point, which undertakes a range of activities relating to climate change. Since its inception in 2004, the CCC has been engaged in establishing links among the sectoral agencies and preparing a common knowledge base for non-governmental organizations (NGO) efforts on climate change related issues.²³

19. Bangladesh Climate Change Impacts and Vulnerability: A Synthesis, *op.cit.*, p. 13.

20. The IPCC is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.

21. Dept of Environment, *Impact Assessment of Climate Change and Sea Level Rise on Monsoon Flooding*, Dhaka, Climate Change Cell, 2009, p. 7.

22. Shamsuddoha, *op.cit.*, p. 13.

23. Author's interview with Md Kamurzzaman, Research Fellow, CCC, on 12 April 2012.

Till date, two strategy documents, i.e. National Adaptation Programmes of Action (NAPA) and Bangladesh Climate Change Strategy and Action Plan (BCCSAP), are in place. NAPA, which was first published in 2005 and later reviewed in 2009, provides information on potential adverse impacts of climate change on water resources, coastal zones, crop agriculture and food security, fisheries and livestock, forestry and biodiversity, human health, and industry and infrastructure. NAPA also includes 38 identified adaptation measures categorized into eight thematic areas like research and knowledge management, agriculture, health, disaster management, fisheries and livestock, livelihood, biodiversity; and policy and institutional capacity building. However, policy makers in Bangladesh soon realized that the NAPA was an inadequate plan, which did not address the magnitude of the climate change problem in the country. The government then undertook a more comprehensive planning process, with its own financial and intellectual resources. The BCCSAP, a much more comprehensive strategy document consisting of two major parts, was completed and presented to the Cabinet of Bangladesh in 2009. The first part provides a contextual background, highlights the climate hazards in Bangladesh, elaborates on the impacts of climate change, and discusses briefly about adaptation and mitigation. The second part of the document includes the details of 'Climate Change Action Plan'. The 'Climate Change Action Plan' is a 10-year (2009-2018) programme prepared with a view to augment capacity building and resilience of the country and the people to face the challenges of climate change. For the 1st five year period, i.e. 2009-2013, the programmes are built on six pillars, namely (i) Food security, social protection and health, (ii) Comprehensive disaster management, (iii) Infrastructure, (iv) Research and knowledge management, (v) Mitigation and low carbon development and (vi) Capacity building and institutional strengthening.²⁴

The Government of Bangladesh also felt that immediate action on the BCCSAP was crucial and that the country should initiate action with national funds, rather than wait for finance from the international community. However, since the costs involved are far greater than the government could provide on its own, appeal was made to the international community for assistance and donations. This resulted in the creation of two separate funds: the Bangladesh Climate Change Trust Fund (BCCTF), and the Bangladesh Climate Change Resilience Fund (BCCRF). The two funds have differing governance and management arrangements, but both are meant to support the implementation of the BCCSAP. The BCCTF is resourced entirely from the government's own budget. In 2011, US\$ 95.36 million has been allocated for 62 projects mainly

24. Ministry of Environment and Forest (MOEF), *Bangladesh Climate Change Strategy and Action Plan*, Dhaka, MOEF, 2009, Pp. 27-29.

related to agricultural research, mitigation, adaptation, disaster risk reduction, and non-government projects relating to research and knowledge generation. The BCCRF, on the other hand, consists of funds pledged and provided by developed countries or groups (such as the United Kingdom, Sweden and the European Union).²⁵ Till date, BCCRF has received \$170 million from donor agencies and countries, out of which BCCRF has approved \$153 million for six projects in the fields of coastal forestation, adaptation in agriculture and infrastructure development.²⁶

On overall count, the Government of Bangladesh has performed better in undertaking various measures to deal with climate change risks when compared to many LDCs. However, considering the magnitude of the problem affecting Bangladesh, more prudent measures are essential.

Countering the Risks: Way Ahead

For Bangladesh, climate change is not only an environmental or geo-climatic issue, but certainly a multifaceted problem affecting her development prospect in numerous ways. As such, a single track approach is not likely to be successful in dealing with the challenges posed by it. Rather a multidimensional approach with multi actor involvement is essential to effectively address the ill consequences of climate change.²⁷ Besides, it is also essential to ensure that various measures taken in this connection are well coordinated and integrated. In this regard, some prudent measures that are expected to bring about a worthwhile result for Bangladesh are illustrated in the succeeding paragraphs.

Raising awareness among vulnerable communities, agencies, professionals and practitioners at different levels of activity is undoubtedly an important step towards meeting the challenges posed by climate change. At the most basic level, there is a need for increased awareness of the general public regarding climate change, its causes, the risks it poses to life and property, measures for reducing the risks, and the benefits of different courses of action. Populations that are particularly vulnerable need an understanding of the contributing factors that make them susceptible to the climate change risks. As a long term option, climate related issues need to be included in the education system and as part of the routine curricula of academic institutions. Building awareness among children and young adult is likely to be an effective process since they are often

25. International Institute for Environment and Development (IIED), *The Bangladesh National Climate Funds*, Dhaka, IIED, 2011, Pp.3-5.

26. www.bdnews24.com/details.php?cid=2&id=226286, accessed on 29 August 2012.

27. Interview with Dr. M Aslam Alam, Secretary, Disaster Management and Relief Division on 14 May 2012.

more open to change and can influence their families. Moreover, continued education on relevant aspects of climate change issues is likely to develop a pool of experts, who in turn would provide critical services to the nation in years to come.²⁸ Moreover, as part of awareness building programme, ICT applications in creating a platform for information dissemination and channeling services can be of great significance.²⁹

Besides awareness-raising at local levels, it is also important to involve policymakers so as to ensure integration of climate change risks into national development policies. It is equally vital that policy making takes local knowledge into account to ensure appropriate adaptation³⁰ actions. Local coping strategies and traditional knowledge need to be used in synergy with government policy and actions. Moreover, on climate change related issues, Bangladesh has a number of functional NGOs, some reputed experts and institutions. For the efficient management of climate change risks, Government should formalize having their input into the policy formulation, training, project mobilization and fund facilitation processes by developing functional Government – NGO collaboration systems.³¹ Due to the cross-sectoral and comprehensive nature of many of the impacts of climate change, greater intercommunication between ministries and government agencies is also critical.³² Importantly, there is a crucial need to bring synergy among different policies for better management of climate change risks. Planning Commission as central policy making institution of the country may assume the prime role in initiating policy review toward incorporation of climate change issues in the sectoral policies, programmes and project development. Besides, Planning Commission may initiate a process of regular review of policies, strategies and action plans in the context of climate change.³³

28. Church of Bangladesh, *Climate Change, Its Impacts and Possible Community Based Responses in Bangladesh (2nd Ed)*, Dhaka, 2010, p.58.

29. Presentation by Dr Jamilur Reza Choudhury, on “Science and Technology and ICT Environment”, at National Defence College on 29 August 2012, Dhaka.

30. Adaptation entails measures and efforts to deal or cope with the unavoidable impacts of climate change. It is the long term response to anticipated effects of climate change and more pertinent for the poor and vulnerable countries because certain impacts of climate change are inevitable even though all mitigation measures are taken.

31. UNDP Human Development Report, *Risks, Vulnerability and Adaptation in Bangladesh*, Dhaka, Bangladesh Centre for Advanced Studies (BCAS), 2007, p.83.

32. Interview with Fahmida Khatun, PhD, Research Director, Centre for Policy Dialogue, Dhaka, on 16 May 2012.

33. General Economics Division (Planning Commission), *The Probable Impacts of Climate Change on Poverty and Economic Growth and the Options of Coping with Adverse Effect of Climate Change in Bangladesh*, Dhaka, UNDP, 2009, p.99.

It has increasingly been recognized that adaptation efforts would be needed to reduce some of the risks associated with climate change impacts. Adaptation is primarily a local process; as such, it is crucial to involve local communities in adaptation to climate change.³⁴ Many of us may be unaware that there is vast knowledge and experience within local communities regarding coping with climatic variability and extreme weather events. A key to developing sound adaptation strategies is, therefore, identifying communities' own priorities and needs, and valuing their knowledge alongside scientific knowledge. In this regard, considerable investments and long-term engagement are required to facilitate adaptation locally.³⁵ Hence, it is important to realize that community based adaptation approach at times depends heavily on foreign aid donors. As such, there must be an effective mechanism in place to oversee how international adaptation funds are disbursed and spent to ensure that they achieve the objective of enabling adaptation.³⁶ Also critical for adaptation is the capacity building³⁷ of the administration so that there is an adequate preparedness of Bangladesh-specific impacts on various sectors.³⁸ Although the people of Bangladesh have for long shown their resilience in fighting environmental disasters, peacetime preparation of the state mechanism, at times, does not appear to be adequate.³⁹ Therefore, capacity building of all tiers of administration is a key requirement.

It is also important to understand that adaptation needs coordination between central and local levels of management. Government endeavours will be more relevant, sustainable and ultimately strengthened if local government organizations are provided with a more central role in activities. In this regard, the experience of Nepal can be a relevant lesson for Bangladesh. In 2010, Nepal developed the Local Adaptation Plans of Action (LAPA).⁴⁰ LAPA entails an approach of integrating top-down planning with an institutionalized bottom-up feedback process, which aims at identifying local adaptation needs focusing on

34. Action Aid Bangladesh, *Understanding climate change from below, addressing barriers from above: Practical experience and learning from a community-based adaptation project in Bangladesh*, Dhaka, 2010, p. 11.

35. Interview with M Abu Sumon, National Coordinator, Community Based Adaptation to Climate Change in Bangladesh, UNDP, Dhaka on 19 April 2012.

36. <http://www.equitybd.org/campaigns/economicjustice/budgetdiscussion/climate-adaptation-must-be-a-integrated-part-of-national-budget>, accessed on 14 July 2012.

37. Capacity-building is the process and means through which national Governments and local communities develop the necessary skills and expertise to manage their environment and natural resources in a sustainable manner within their daily activities.

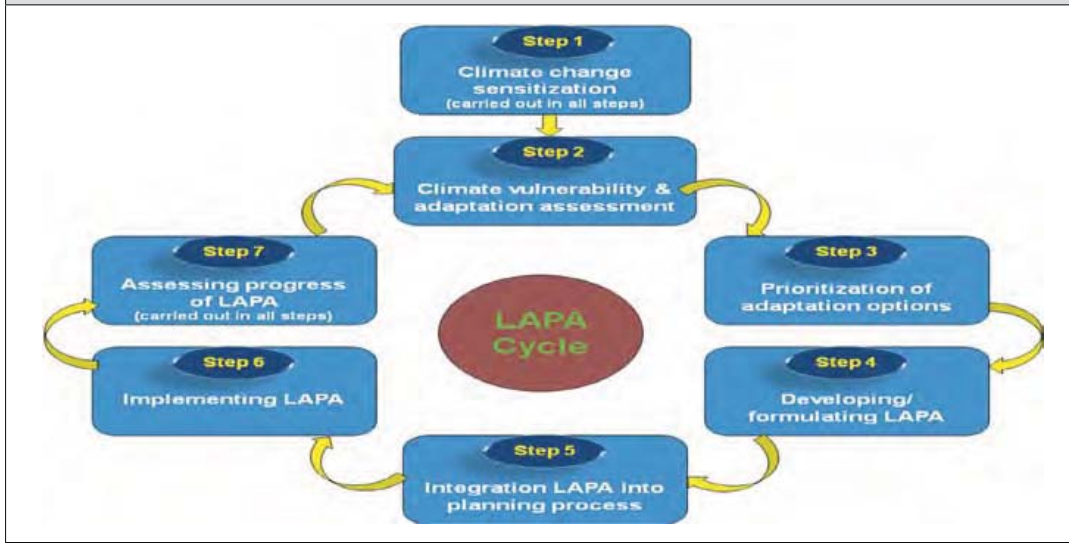
38. Scoping Assessment on Climate Change Adaptation in Bangladesh, *op.cit.*, p. 22.

39. Interview with Dr. Hussain Zillur Rahman, Executive Chairman, Power and Participation Research Centre, Dhaka on 11 April 2012.

40. <http://www.napanepal.gov.np/.../Local%20Adaptation%20Plan%20of%20>, accessed on 15 May 2012.

reducing local risks and vulnerabilities, and increasing resilience.⁴¹ Through its pioneering framework of LAPA, Nepal has decided to dedicate at least 80% of the country's climate change adaptation funding to projects at the local level.⁴² Based on principles like decentralized and bottom up planning, multi actor involvement, local level ownership, decentralized financial flow and implementation etc,⁴³ LAPA process uses a seven-steps approach as shown in the following figure.⁴⁴

Figure 5: LAPA Process



Source: Author

Bangladesh can derive benefit out of LAPA framework as it is designed to integrate national and top-down assessments of climatic risks with bottom-up planning, options and priorities. The LAPA framework is suitable for Bangladesh in the sense that it would encourage people's participation and make adaptation strategy more meaningful. Taking planning to the local level is crucial in order to understand, enable and respond to what people of Bangladesh would actually do in response to the opportunities and constraints they face in the context of climate change. Customizing the LAPA framework in the context of Bangladesh would offer a way to bridge the apparent gap between adaptation 'by the people' and adaptation 'for the people'.⁴⁵

41. <http://www.idsnepal.org/nseu/knowledge%20products/NAPA%20TO%20LAPA.pdf>, accessed on 15 May 2012.

42. ActionAid Bangladesh (AAB), *Ensuring Access for the Climate Vulnerable in Bangladesh: Financing Local Adaptation*, Dhaka, AAB, 2012, p.27.

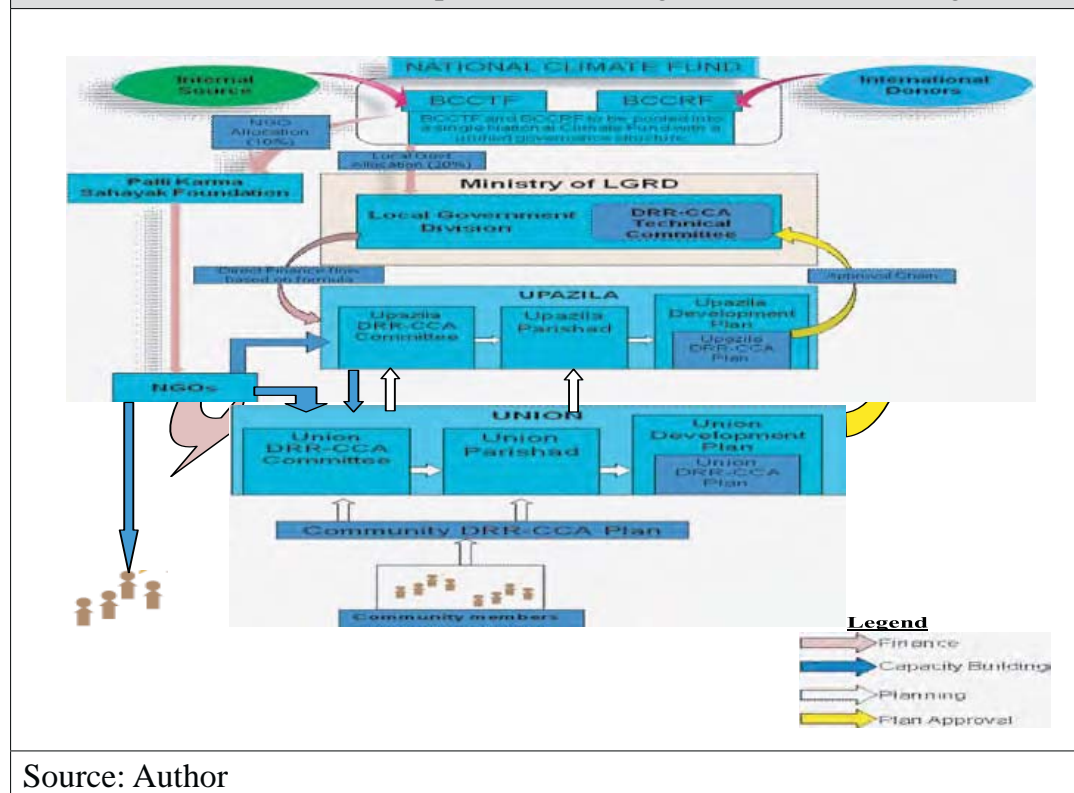
43. <http://www.napanepal.gov.np/.../Local%20Adaptation%20Plan%20of%20>, accessed on 15 May 2012.

44. <http://www.idsnepal.org/nseu/knowledge%20products/NAPA%20TO%20LAPA.pdf>, accessed on 15 May 2012.

45. <http://www.ids.ac.uk/files/dmfile/LHcasestudy03-NepalLAPA.pdf>, accessed on 30 August 2012.

Since the costs involved in materializing various programmes and projects for adaptation are far greater than the Government of Bangladesh can afford, it is important for Bangladesh to consider as to how to attract and leverage different types of climate change investment, including that from international community and private sources. However, there are indications of resource misappropriation of National Climate Fund at implementation and project formulation stages.⁴⁶ Therefore, alongside prudent diplomacy and expert negotiation to attract foreign funds in combating climate change, ensuring transparency and accountability remains a core issue that would help building confidence among the donor countries and organizations, and create opportunities for more funding to address adaptation projects and programmes. In this connection, a step could be the involvement of local government institutions (LGI). LGIs like Upazila Parishads (UZPs) and Union Parishads (UPs) could provide a gateway for vulnerable communities to gain increased access to climate adaptation finance. A model for financing mechanism involving the LGIs could be as shown below.⁴⁷

Figure 6: Model of Local Adaptation Financing Mechanism for Bangladesh



46. Staff Correspondent, "Climate Change-Fund Use Must be Transparent", *The Daily Star*, Dhaka, 10 April 2012.

47. Ensuring Access for the Climate Vulnerable in Bangladesh: Financing Local Adaptation, *op.cit.*, p.87.

As depicted in Figure-6, it is suggested that the BCCTF and BCCRF should be pooled into a single National Climate Fund with a unified governance structure and procedures to ensure close coordination for disbursing money and thereby reducing the number of parallel funding streams. In the case of fund allocation for the local government, instead of fund allotment on a project-by-project basis, a consistent and predictable level of funding should flow to LGIs on an annual basis. Initially, a set percentage (e.g. 20%) of the available funding could be allocated to a local government, just like the current practice of 10% of the BCCRF has been allocated for utilization by civil society/NGO. A starting allocation of 20% would make substantial fund available to LGIs and over time this percentage could be increased if LGIs collectively demonstrate good performance.⁴⁸

Within each tier, funding would be allocated among LGIs on the basis of a set formula drawn from several relevant indicators developed in consultation with experts. These indicators should be clear and transparent and could include climate change vulnerability, poverty level, population and size of area. Use of a set formula is intended to reduce the possible political influence over the allocation of funds. The funds for the LGIs would be initially transferred to the Local Government Division (LGD), in order to take advantage of its experience in managing fund transfers to UPs and UZPs. In order to qualify for receiving funds, LGIs would have to meet certain criteria like having an approved Disaster Risk Reduction and Climate Change Adaptation plan (DRR-CCA plan) and a functioning committee capable of supervising disaster and climate adaptation issues.⁴⁹ As far as adaptation planning is concerned, as depicted in the model above, it should stem out from the local communities. The community DRR-CCA plan should be routed through the Union DRR-CCA committee to be included in the Union DRR-CCA plan. The Union DRR-CCA plan should then be channeled to the DRR-CCA technical committee under the LGD for technical scrutiny and labeling priority. Similar mechanism may also be followed for the Upazila DRR-CCA plan.

As noted before, Bangladesh being one of the worst sufferers of climate change, it is vital for her to seek and attract international support to implement adaptation measures. In this connection, a comprehensive strategy is needed for participating in international negotiations with a team of trained negotiators, backed up by a national pool of experts drawn only from related sectors. Here, it is imperative that the government negotiators should maintain continuity of participation in various international forums to derive the best possible output from international discussions/negotiation as well as to contribute to the in-house skill development and policy formulation keeping in mind the long-term consequence.

48. *Ibid.* p. 86.

49. *Ibid.*

Besides all possible national efforts, a regional approach is of crucial importance. Although the South Asian countries have contributed very little to the causes leading to climate change, regrettably they stand to lose much from its adverse effects. Such a grim situation inevitably demands a firm based regional response to climate change. Although there have been some recent regional initiatives in this area, most of these remained in the area of collaborative research, with rather limited actions on ground.⁵⁰ Therefore, the South Asian Association for Regional Cooperation (SAARC) countries need to explore the inter-linked issues of climate change and share knowledge, good practices and achievements within the region. This will facilitate cross-learning from one another's experiences, and pool resources and expertise to develop appropriate adaptive capacities. SAARC countries may also work together to protect and enhance their collective common interests in international climate change negotiations.

Conclusion

An increasing number of evidences for years have clearly established the fact that anthropogenic climate change is a reality, which in the recent years has been recognized as the greatest long term threat facing the humanity. Since the mid 20th century, human caused GHG emission in the earth's atmosphere is considered to be the key reason of global warming and consequent climate change. The major impacts of climate change, include melting of glaciers, global SLR with consequent effects on water resources, changes in the frequency, intensity and location of storms, displacement of population etc.

Climate change warrants special attention for a country like Bangladesh since she is recognized as one of the most vulnerable countries of the world. Geography coupled with low level of economic development and corresponding low investment capacity, inadequate infrastructure, lack of institutional capacity, and a high dependency on the natural resource base make the country highly vulnerable to climate change. The physical effects of climate change and its subsequent impacts on various sectors like agriculture, water resource, infrastructure, forestry etc pose an unprecedented threat to people of Bangladesh who are already struggling to sustain their livelihoods.

50. Fourth South Asia Economic Summit (SAES IV), *Global Recovery, New Risks and Sustainable Growth Repositioning South Asia*, Dhaka, Centre for Policy Dialogue (CPD), 2011, p.8.

Burdened with a number of socio-economic problems, Bangladesh is caught in a vicious circle of poverty and faces an array of challenges in improving the livelihood of her citizens in a sustainable manner. The problem is further compounded by her severe vulnerability to climate change. On all account, the multidimensional effects of climate change are likely to undermine the development prospects of Bangladesh. Thus, climate change has turned out to be a serious national concern. Only a comprehensive national approach, which includes prudent measures like raising mass awareness, capacity building, wide-range integration with the involvement of local people in planning adaptation measures, empowering local government with local adaptation financing, regional collective approach etc can provide practical leverage in facing the challenge successfully.

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