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Climate Change and Bangladesh: Policy and Institutional Development to reduce vulnerability

By Saleemul Huq and Golam Rabbani

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Abstract

Bangladesh is predicted to be adversely affected by climate change and climate variability. A number of climate induced hazards are already affecting many people especially in the coastal zone, low-lying areas and north-west part of the country. The government has taken a number of policy and institutional initiatives to adapt with the impacts of climate change. About 300 Million USD has been allocated for three year (June 2009-June 2012) to implement adaptation and mitigation actions recommended by Bangladesh Climate Change Strategy and Action Plan (BCCSAP). Climate Change Unit (CCU) has been established to strengthen coordination and management of the government funded adaptation and mitigation projects related to climate change. A balanced climate investment and adaptation measures need to be ensured to reduce vulnerability of the most vulnerable groups or population.

1. BACKGROUND

Bangladesh with a population of over 150 million is facing a number of challenges including environmental hazards, socio-political conflicts, development crisis, and effects of climate change. Climate change and its associated hazards, including variations in temperature and rainfall, increased intensity of flood, drought, cyclone and storm surge, and salinity intrusion are already affecting the communities, ecosystems and infrastructure of the country. The impacts and vulnerabilities of such climate induced

hazards are greater in Bangladesh, and may be due to its geophysical location, hydrological influence of the monsoons and regional water flow patterns, low-level resilience of the affected people in terms of technical and financial capacity, and lack of proper arrangement and implementation of policy and institutions to address the challenges (Rahman et al., 2007). The country gets too much water during the monsoons, causing floods, and too little water in the dry season. This situation may be aggravated by the warm climate, resulting in increasing and recurrent floods and severe droughts. It has also been predicted that by 2030 and 2050 the sea level will rise at least by 30 and 50 cm respectively (World Bank, 2000). This may cause serious environmental, social and economic crisis in the country. The report shows that a 25 centimeter rise in sea level may cause a loss of 40 percent of the Sundarbans, while a rise above 60 cms may make it disappear, i.e., the entire Sundarbans may be submerged (Hare, W., 2003). Further, for a 1m sea level rise, a large portion of the productive land of the country might be inundated in salt water (Rahman et al., 2007).

To address the impact of climate change, the government of Bangladesh has adopted a number of policy and institutional initiatives including preparation of the National Adaptation Programmes of Action (NAPA) in 2005 and Bangladesh Climate Change Strategy and Action Plan in 2009, establishment of the Climate Change Unit, creation of the Climate Trust Fund, and some high level committees with specific functions to facilitate the adaptation actions. The government is also playing a vital role in global climate negotiation processes by raising its voice for the country, the LDCs, and also as a member of G-77 and China. The Civil Society Organizations (CSOs)/Non-Government Organizations (NGOs), private sectors and development partners are also playing their respective role to deal with the impact of climate change in Bangladesh.

2. CLIMATE CHANGE ELEMENTS: SENSITIVITY AND VULNERABILITY

In Bangladesh, the temperature is predicted to increase by 0.7°C in monsoon and 1.3 °C increases in winter (World Bank, 2000). The recent report indicates that the temperature is generally increasing in the monsoon (June, July and August) while the average winter (December, January and February) maximum and minimum temperatures show

respectively a decreasing and an increasing trend (Rahman and Alam, 2003). Increased temperature especially during pre-monsoon (March-April-May) is a major concern as expressed in different community consultation in the recent past in the coastal zone.

The total rainfall doesn't significantly change over the long-term period but there is erratic behavior being observed in different locations of the country. For example, an analysis shows an increasing trend of annual rainfall in Satkhira during 1950-2006 while it was a decreasing trend for the period of 1950-1980 (Rimi et al., 2011). In addition, rainfall in monsoon and post monsoon was found to be on the increasing trend while it was on decreasing trend in pre-monsoon and winter. In some locations, especially in northern districts and central part of the country shows slight decreasing trend over the last thirty years while in the coastal zone it is on slight increasing pattern as mentioned above. But all parts of the country face erratic behavior of rainfall that includes early rainfall, late rainfall, and excessive rainfall in short period of time.

The geographical shape of the country coast possibly makes it more vulnerable to recurrent cyclones and storm surges. The coast of the country was affected by at least two super cyclone (greater than 220 km/hour) and 19 very severe cyclones (119-220 km/hour) in last 40 years. It is now evident that both the frequency and intensity of cyclonic events along the Bay of Bengal is on increasing trend over the years.

The salt water is intruding to fresh water and increasing the level of salinity in many coastal districts (southern part of the country) including Patuakhali, Pirojpur, Satkhira, Bhola, Khulna, Feni and Noakhali (Islam, 2004). These are affecting agricultural production and supply of clean water to domestic, industrial, agricultural and also business purposes. Saline water intrusion remains one of the major physical effects of climate change for the coast of the country in future. Cyclone Sidr affected at least 6000 ponds with saline water in the coastal zone in 2007 (Rabbani et al., 2010).

The north-western districts of the country usually face drought almost every year during (March-April- May). Some of the coastal districts also suffer from drought problems. The severity of drought may increase in future under changing of climate system.

The flood and water logging due to excessive rainfall often affect the communities and ecosystems. The recent floods in 1998, 2004 and 2007 affected most of the districts. In future, the increased snow melt from the Himalayan permafrost, due to increase in temperature may force more water to flow through the Ganges, Meghna, Brahmaputra river systems and their river networks resulting additional flooding extending over the central flood plain of Bangladesh (Rahman et al., 2007). However, increased flood due to climate change may affect large areas with high incidences and casualties in the country.

On the Sea Level Rise (SLR), the World Bank report states that the country would face 30 cm and 50 cm SLR in 2030 and 2050 respectively (World Bank, 2000). A recent report shows that there is a trend of increasing sea level rise at Hiron Point near Sundarban by 5.3 mm/year during 1977 to 2002 (Centre for Environment and Geographic Information Services, 2006). Some of the other stations along the Bangladesh coastline also show increasing trend of SLR. The low lying coastal lands might be gradually inundated affecting all agricultural activities, water supply and sanitation system, infrastructure etc unless these are protected from SLR.

The climate change and associated hazards are affecting the production of crops especially rice. Lack of water for irrigation during pre-monsoon is already limiting the production of High Yielding Variety rice which accounts about 36 % of the total rice production (Ahmed & Roy, 2007). A recent estimation denotes that the country may lose 0.2 Million tons of crops for saline intrusion in a moderate climate scenario but it might be more than double in a severe climate scenario (Huq and Ayers, 2008). Water related hazards including flood, cyclone and storm surge, salinity in surface and ground water are also affecting the communities. Safe drinking water, proper sanitation and hygiene practices remain challenge for many people especially in coastal zone and charland areas of the country. Human health may be severely affected (direct and indirect pathways) under a changing condition.

3. POLICY AND INSTITUTIONAL ARRANGEMENT: ADDRESSING VULNERABILITY OF CLIMATE CHANGE

3.1. National Level

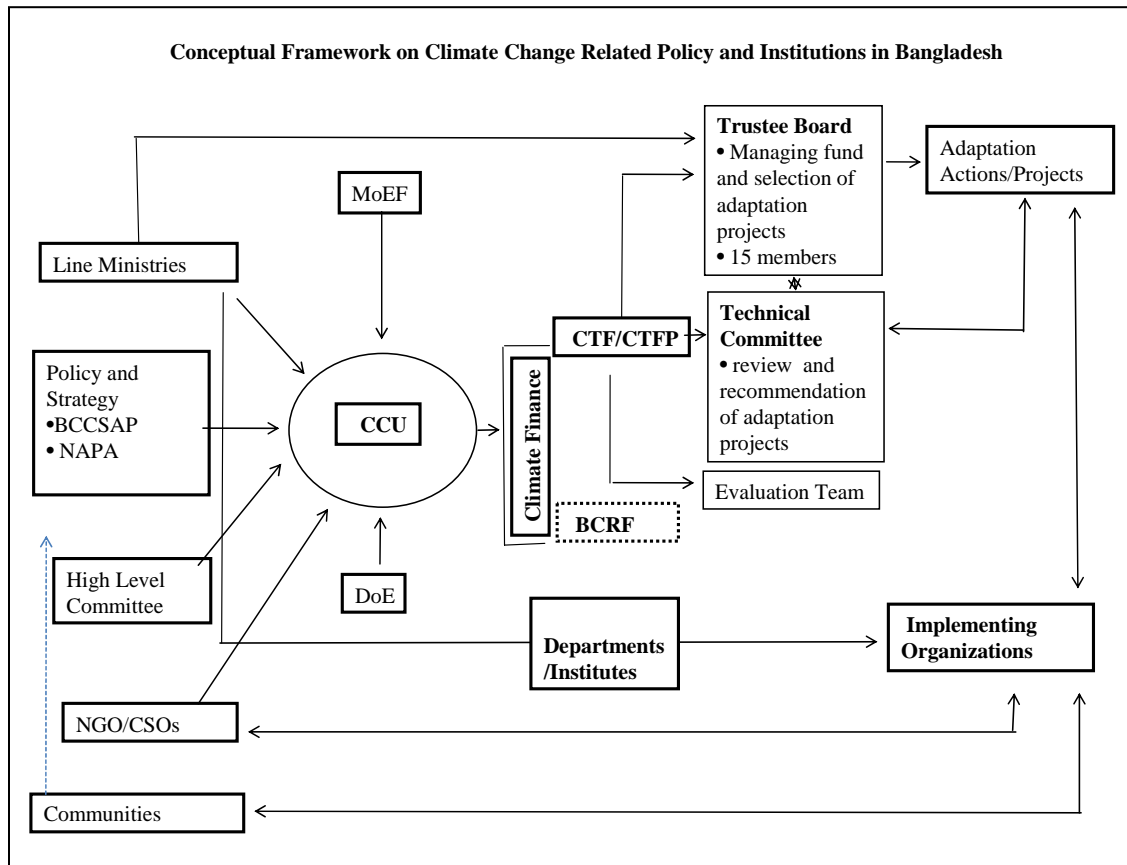
The Government of Bangladesh through Ministry of Environment and Forests (MOEF) has taken a number of policy and institutional decisions to address climate change and climate variability issues in Bangladesh. The following sections provide brief description and synthesis of policy and institutional aspects at the national level in relation to climate change.

3.1.1. Policy and Institutions

The MOEF has taken the lead on discussing, planning and developing policy and programmes on climate change issues in the government system. It is also responsible to take the climate change issue forward at the global level as operational focal point of United Nations Framework Convention on Climate Change (UNFCCC) and Global Environment Facility (GEF). The major responsibilities for MoEF remains preparation of national communication, formulation of adaptation programmes, providing approval of CDM projects, leading international negotiations, facilitating mainstreaming climate change at sectoral level etc. The MoEF has made substantial progress in developing some policy and institutional instruments to reduce impacts of climate change. These mainly include development of National Adaptation Programmes of Action (NAPA), Bangladesh Climate Change Strategy and Action Plan (BCCSAP), establishing Climate Change Unit (CCU) under the MoEF, Climate Trust Fund.

The Figure 1 illustrates how the MoEF is acting on climate change and adaptation with the line ministries and civil society organizations through Climate Change Unit and Department of Environment to implement projects and programmes under NAPA and BCCSAP at the community level. The CCU is currently supporting adaptation actions under Climate Trust Fund (CTF) which is being guided by a Trusty Board and a Technical Committee. The government has also initiated another window namely Bangladesh Climate Resilience Fund (BCRF) for supporting actions to address climate change.

A number of high level committees were also formed to have close look at the planning and implementation process of the adaptation actions in the country. The committees include Inter ministerial Committee on climate change headed by the state minister, MoEF; All Party Parliamentary Committee on Environment and Climate Change headed by a senior member of the Parliament.



The following sections provide more details on some of the key instruments:

3.1.1.1. Climate Change Unit (CCU)

The government officially launched the “Climate Change Unit” under the Ministry of Environment and Forests (MoEF) in June 2010. The main responsibilities of CCU will be to manage the climate related funds of the government. The unit will be equipped with 9 senior officers and 33 general staff. Some national level experts will also be recruited as advisors to strengthen the unit and make it better functional. The government is also

establishing similar type of units in all relevant ministries to plan and implement the projects to address climate change. The CCU initially received 20.5 million BDT (over 0.8 million USD) to institutionalize itself and implement immediate projects in next two years.

3.1.1.2. National Adaptation Programmes of Action (NAPA)

The MoEF in association with relevant line agencies e.g. Bangladesh Agriculture Research Council (BARC) and leading civil society organizations e.g. Bangladesh Centre for Advanced Studies (BCAS) prepared the development of National Adaptation Programmes of Actions (NAPA) as a response to the decision of the Seventh Session of the Conference of the Parties (COP7) of the UNFCCC. NAPA identified fifteen immediate actions to adapt with floods, salinity intrusion, and droughts as most damaging effects of climate change. It also determines the coastal population at the highest risk of climate change and suggested a number of measures to avoid such risks and vulnerabilities.

3.1.1.3. Bangladesh Climate Change Strategy and Action Plan (BCCSAP)

Bangladesh Climate Change Strategy and Action Plan (BCCSAP) is the latest policy documents of the government to address both adaptation and mitigation for the current decade (until 2018). It was developed in 2009 which suggests 10 years action measures to face challenges and changing condition. It recognizes all the climate induced hazards including flood, drought, SLR, salinity intrusion, cyclone and storm surge variations in temperature and rainfall etc and their associated impacts on different sectors. BCCSAP identified a set of activities/measures under six major themes

- 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

BCCSAP is currently being implemented by the government relevant agencies and civil society organizations with support from CTF. The CCU already provided about 50 million USD under CTF to support implementation of 34 projects (initial phase) in different vulnerable areas. About 70 % of this total investment (until October 2010) goes to adaptation actions and the rest for mitigation and low carbon development. Many projects are under process of approval especially the proposed projects of NGOs/CSOs. An estimation of current adaptation investment (50 million USD, October 2010) under CTF shows that the highest investment (44 %) goes to coastal zone. The drought prone area gets the lowest amount for adaptation activities (Fig 2). The “others” category (e.g. institutions and capacity building) received 28 % of the current total. On the sectoral distribution, the investment is the highest for infrastructure (31 %) followed by water sector (20 %) (please see Fig 3). Agriculture sector received only 7 % while forestry got 13 % of the total initial investment.

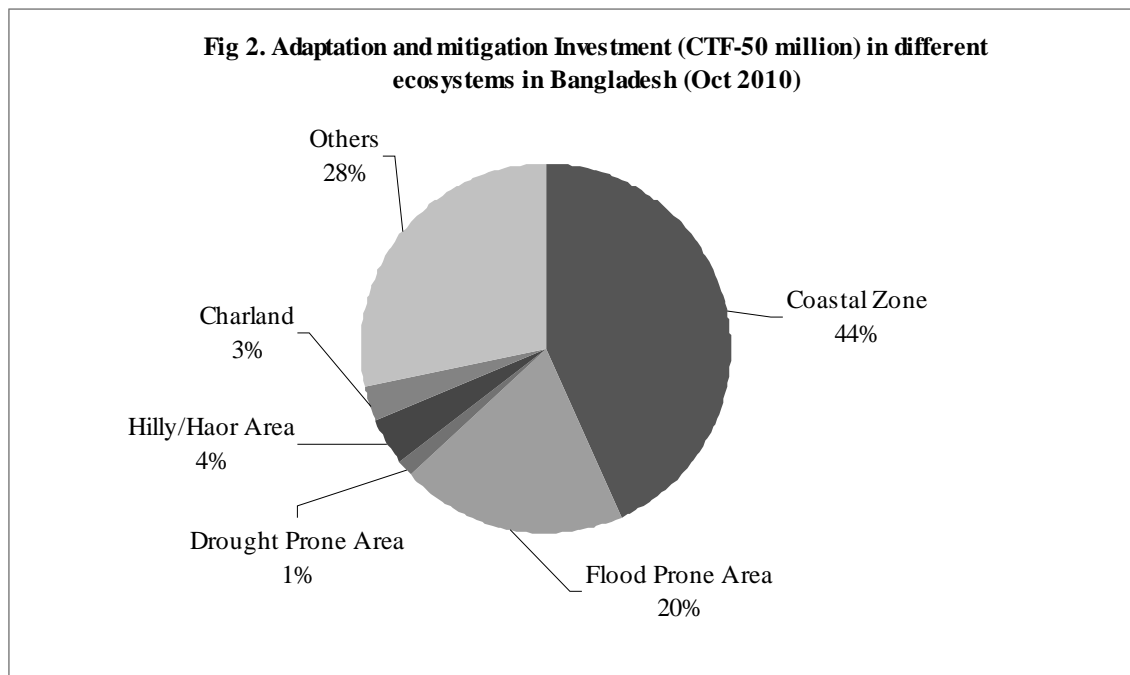
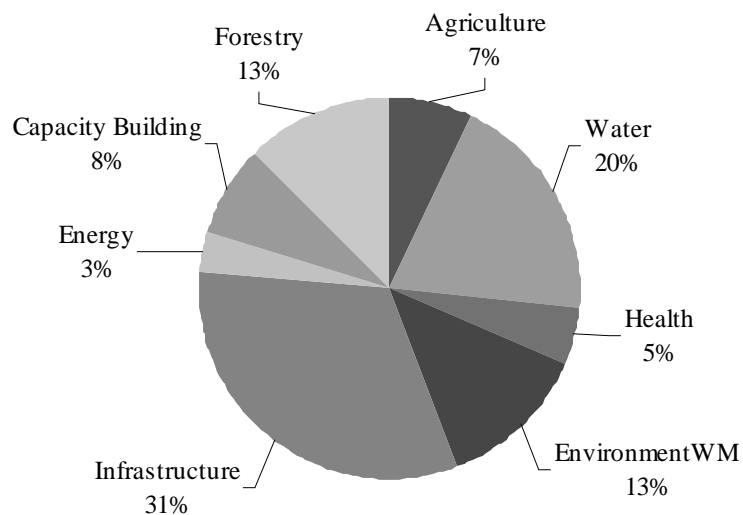


Fig 3. Adaptation and mitigation investment (CTF-50 Million) in different Sector (Oct 2010)



3.1.2. Climate Change Fund

The Government of Bangladesh has allocated specific budget to address climate change impacts in the country. In 2009-2010 FY, the total allocation was 100 million USD under CTF to take adaptation and mitigation actions on the ground. It is to be noted that another 100 million USD was added with initial allocation in 2010-2011 FY, and more recently the government allocated 100 Million USD more for 2011-2012 FY to implement BCCSAP. In addition, the country recently established Bangladesh Climate Change Resilience Fund (BCCRF) with contribution from development partners/donor countries to implement the projects and programmes. The BCCRF was created with an amount of 110.2 million USD, supported by UK (\$ 86.6 million), Sweden (\$ 11.5 million), Denmark (\$ 1.6 million) and European Union (\$ 11.5 million), in early June 2010. This fund will be managed and implemented by the government and technical support will be provided by the World Bank to ensure that the requirements are met in the implementation process. A governing council and a management committee chaired by the government will be the apex bodies to manage the fund. However, representatives of the line ministries, development partners and civil society will be included in both the council and management committee. It is reported that 66 percent of the fund will be spent to implement activities under BCCSAP while 34 percent will be deposited in the

bank to face crisis. A policy titled “Climate Change Trust Fund Policy” has been developed by the Cabinet as part of an integrated plan to face disaster due to climate change in the country. In addition, Climate Change Trust Fund Act, 2010 has been approved recently by the cabinet to utilize the climate change fund judiciously and transparently to ensure that the affected communities are benefited properly.

3.1.3. Projects and Programmes

As mentioned above that the government through the Ministry of Environment and Forests approved 34 projects under six themes of BCCSAP. All these projects will be implemented by the different relevant government institutions. The following table shows that about 70% of the investment has been allocated for adaptation activities in different vulnerable ecosystem. The highest investment is attributed to mitigation and low carbon development followed by the thematic area of comprehensive disaster management. The lowest amount is approved for capacity building and institutional strengthening.

Table 1. The projects being implemented under six thematic areas of BCCSAP in Bangladesh (As of October 2010)

Thematic Area	Project (no)	Project title*	Budget (US\$ in Million)	% of total investment
Food security, social protection and health	5	A	4.5	9
Comprehensive Disaster Management	3	B	10.5	21
Infrastructure	7	C	9.5	19
Research and Knowledge Management	6	D	6.5	13
Mitigation and Low Carbon Development	10	E	16	32
Capacity Building and Institutional Strengthening	3	F	1.6	3.2

* The project titles under 6 themes are given below (Source: Ministry of Environment and Forests, 2011)

A: Food security, social protection and health

1. Farm Productivity and Food security Enhancement of the Vulnerable Farmers in the 13Char Areas of Jamalpur and Sherpur districts
2. Research on climate resilient rice varieties and extension
3. Measure for supplying Safe Drinking Water and Social Security for Women and Children exposed to adverse effects of climate change
4. Risk reduction and adaptive measures in the context of Climate Change impact on health sector in Bangladesh
5. Improve management of Food Security by Increasing agricultural Production and protection of the crops from the effects of climate change through Strengthening the Agricultural Weather Forecasting and Early-warning System on Adverse climate condition

B: Comprehensive Disaster Management

1. Establishment of Cyclone Resistant Housing at the Aila Affected Areas from Khulna District
2. Establishment of Cyclone Resistant Housing at the Aila Affected Areas from Borishal District
3. Establishment of Cyclone Resistant Housing at the Aila Affected Areas from Borishal, Khulna and Chittagong District

C: Infrastructure

1. Removal of Polythelene and other Wastes deposited in the Burigonga and Turag River

2. Excavation of River Boleshwari from Bagmara to Depara (through Khetnakata Launch ghat, Kochua Bazaar and Adajuri)
3. Project on ensuring water flow in Rangunia and Boalkhali sub-district
4. Reconstruction and repair of embankment along the Karnaphuli river
5. Development of Dredging System of Chittagong City Corporation
6. Repair of affected Sea Dyke and other infrastructure of the Coastal Polder no. 63/1
7. Re-excavation of Drainage Khal of Madaripur Beel Route Chabnnel (MBR) of Gopalganj District due to Climate Change Under Climate Change Turst Fund

D: Research and knowledge management

1. Feasibility Study for Establishment of a Ship Recycling Facility in Bangladesh
2. Sustainable Cropping System for Drought and Coastal/Saline prone areas in Bangladesh
3. Pilot Project on temperature and Saline Tolerant Crops to adapt with Climate change
4. Establishment of Permanent Observation Network and Calculation of Mathematical Model for Identification of Salinity Intrusion in the groundwater resources
5. Expansion and Capacity Building of Bangladesh Space Research & Remote Sensing Organization (SPARRSO) for CC Research & Impact Study
6. Research Capacity building for Knowledge Management on Climate Change

E: Mitigation and low carbon development

1. Pilot Initiative on Reduction, Reuse and Recycle (3R) of Wastes in Gulshan, Baridhara and Dhanmondi areas of Dhaka City and Nasirabad and Khulshi Areas of Chittagong City
2. Coastal Aforestation along the Embankment and charlands

3. Nursery projects for countrywide mass Afforestation to adapt with Adverse Impacts of Climate Change
4. Project on "Programatic CDM" by Using organic Waste of the Urban Areas (Pouroshova and Municipalities) of Bangladesh
5. Climate resilient afforestation in the Core Zone of the Central Region
6. Introduction of Solar Powered irrigation pump as well as Power management and Distribution system to mitigate energy Crisis and Climate Change
7. Evaluation of projects of DNA under CDM, capacity building of CDM entrepreneurs as well as CDM baseline
8. Re-vegetation of Madhupur Forests through rehabilitation of forest dependant local and ethnic communities
9. Community Based Adaptation in the Ecologically Critical Areas Through Biodiversity Conservation and Social Protection
10. Project on environmental management of Parki beach

F: Capacity building and institutional strengthening

1. Strengthening Institutional Capacity of Climate Change Unit of the Ministry of Environment and Forests
2. Institutional Strengthening of Climate Change Study Cell at BUET for Knowledge generation and human resource Development
3. Developing Capacity of BPATC & Public Sector Human Resources for Addressing Effectively the Adaptation and Mitigation Measures

A number of national NGOs/CSOs are playing an active role on climate change and adaptation issues in Bangladesh. Bangladesh Centre for Advanced Studies (BCAS) is active as pioneer organization on climate change issues not only in Bangladesh but also at the regional and international level. BCAS is involved with local, national and international level climate change research, capacity building, policy/advocacy,

modeling, monitoring and evaluation and community level demonstration on adaptation projects. Some other active organizations are Centre for Environment and Geographic Information Services (CEGIS), Institute of Water Modeling (IWM), Bangladesh Unnayan Parishad (BUP), Centre for Natural Resources Studies (CNRS), IUCN-Bangladesh and others. Some regional and local level NGOs are also implementing projects related to climate change. Academic institutions including North South University, Independent University of Bangladesh are offering short courses and training programs on climate change. International NGOs including International Institute for Environment and Development (IIED), Oxfam International, Action Aid-Bangladesh, Practical Action, Christian Aid Bangladesh, Caritas Bangladesh, Islamic Relief Bangladesh also implement projects with local partners. A study indicates that about 100 (small and medium scale) adaptation projects were implemented between late 1990s and 2005 (BCAS, 2008). Most of these projects are located in South and North-west region of the country.

3.2. Regional level

South Asian ministers adopted the Dhaka Declaration on climate change 3rd July 2008, under the auspices of the South Asian Association for Regional Cooperation (SAARC). They declared that they would work together to build regional capacity to reduce the impacts of climate change and consult each other before international negotiations. The declaration concluded with an action plan which includes Capacity building for Clean Development Mechanism (CDM) projects, exchange of information on disaster preparedness and extreme events, exchange of meteorological data, monitoring climate change impacts including sea level rise (SLR), glacial melting and threats to biodiversity, mutual consultation in international negotiation process, media briefing as and when required (The Daily Star, July 4, 2008).

The Sixteenth Meeting of the Heads of State or Government of the Member States of the South Asian Association for Regional Cooperation (SAARC) also adopted “Thimphu Statement on Climate Change (TSCC)” in Thimphu, Bhutan, during 28-29 April 2010. The TSCC identified 16 activities to be implemented at the regional level to address climate change. Some of the key activities include:

- Establishing an Inter-governmental Expert Group on Climate Change to develop clear policy direction and guidance for regional cooperation as envisaged in the SAARC Plan of Action on Climate Change;
- Initiating a study for presentation to the Seventeenth SAARC Summit on ‘Climate Risks in the Region: ways to comprehensively address the related social, economic and environmental challenges’;
- Undertaking advocacy and awareness programs on climate change, among others, to promote the use of green technology and best practices to promote low-carbon sustainable and inclusive development of the region;
- Commissioning a study to explore the feasibility of establishing a SAARC mechanism which would provide capital for projects that promote low-carbon technology and renewable energy; and a Low-carbon Research and Development Institute in South Asian University;
- Incorporating science-based materials in educational curricula to promote better understanding of the science and adverse effects of climate change;
- Planting ten million trees over the next five years (2010-2015) as part of a regional afforestation and reforestation campaign, in accordance with national priorities and programmes of Member States;

3.3. International Level (brief)

The government has formed a Committee for Climate Change Negotiation under UNFCCC. The committee is co-chaired by the Secretary, MOEF and senior expert on climate change from the civil society organizations. Members of the committee include representatives from the government relevant organizations and civil society experts and scientists. Currently, the government is putting its utmost efforts to raise the voice of the affected communities of the country at both regional and global level climate discussions.

4. Synthesis of the discussion (climate change vulnerability, policy and institutions and gaps):

☑ **Climatic hazards, vulnerability and needs of adaptation actions**

Bangladesh has been a pioneer amongst the least developed countries (LDCs) in developing national level scientific expertise and government level actions as well as at non-governmental level. The knowledge capacity in the country, compared to many other LDCs is relatively high and policies and institutions are taking shape. The challenge remains to implement policies effectively and to make sure that lessons are learnt and acted upon in a timely manner.

☑ **Current policy and institutional arrangement-needs institutional strengthening and proper functioning with transparency and accountability.**

As the Government of Bangladesh starts to implement their climate change policies and actions it is important that these actions be done in a manner that is transparent and effective. The key issue is not to avoid mistake (which will be inevitable as it is a new subject) but to learn from them. To do this effectively it is important to be able to acknowledge mistakes when they occur and take corrective actions in a timely manner.

☑ **Gaps/needs improvement: sectoral/geographic balance of adaptation investment (based on vulnerability), selection of projects and programmes, monitoring and evaluation (who does it, how it would be done), transparency and accountability.**

As actions on tackling climate change begin to take place around the country in different regions and sectors, more knowledge will be gained and gaps appear which will need to be filled. That is why the implementation of the climate change activities must remain as a work-in-progress so that changes in prioritization of actions can be taken as new knowledge emerges.

5. Conclusion

Bangladesh has been one of the most pro-active LDCs to taking the issue of climate change seriously. It has developed considerable scientific capacities, strong policies and allocation of resources and has a very active civil society. All these are an excellent platform to take this issue forward. However, many challenges remain, not least that actions taken by all actors, including the government, need to be as transparent as possible and that there be a pro-active learning mechanism to inform policies and action as they develop over time. Climate change is a new problem facing mankind and we do not have all the answers yet, so a learning-by-doing attitude must remain the main paradigm for next few years.

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