

# CHAPTER 8: ENVIRONMENT, CLIMATE CHANGE AND DISASTER MANAGEMENT FOR SUSTAINED DEVELOPMENT

## OVERVIEW

In 1987, the United Nations released the Brundtland Report<sup>24</sup>, which defines sustainable development as 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. This report was the result of a realization by the world community that economic progress, which brought material prosperity to large sections of the world population, also imposed costs on current and future generations in terms of environmental degradation. Consequently, there was broad consensus that the environment and production systems should be tailored to minimize damage to the environment to ensure the sustainability of development.

Environmental degradation has posed as a pressing development concern for Bangladesh. Economic progress, accompanied with rapid urbanization and industrialization, had left its toll on Bangladesh's own ecosystem. This was evident from natural calamities, loss of bio-diversity, deforestation, destruction of wetlands and inland fisheries, arsenic contamination in the ground water in the many parts of the country, soil nutrient depletion and inland salinity intrusion in the South West region, and creeping desertification in the Northern region. Bangladesh is also one of the most natural disaster prone areas that suffer from ravages of floods, cyclones, storm surges and drought. In urban areas, air pollution, sound pollution and waste load from industries, hospitals, and municipalities are a matter of great concern.

One major threat for the country that has recently emerged is the predicted climate change and sea level rise due to global warming. Climate change scenarios such as a sea level rise, increased air and sea surface temperatures, enhanced monsoon precipitation and run-off, reduced dry season precipitation, heat waves and increase in the intensity of tropical cyclones and storm surges, floods, and prolonged droughts have all been experienced in the recent past, which have significantly affected the country's development processes. According to Intergovernmental Panel on Climate Change (IPCC), Bangladesh will be among the worst victims due to climate change. Sea level is apprehended to rise on account of escalating atmospheric temperature and the frequency of cyclone-storms will increase. As projected, the impacts of climate change will force millions of people to migrate, squeeze settlements and resource-use patterns, and have

---

<sup>24</sup> United Nations. 1987. "Report of the World Commission on Environment and Development". General Assembly Resolution 42/187, 11 December 1987.

serious implications on the physical and natural environment. Food and energy security will be threatened leading to rise in different types of diseases and frequency of natural calamities. To top at all, the high density of population will make the problem worse.

Understandably, the adverse interactions of environmental degradation and climate change could have severe consequences for citizen's welfare, especially for the poorer segment that may not have adequate access to coping mechanisms. Climate change under a business-as-usual scenario will threaten the significant gains made in poverty reduction over the past two decades and disproportionately impact the life and wellbeing of vulnerable groups that include women, children, elderly and ethnic minorities and constrain progress toward achieving the millennium development goals. Indeed degradation of land, water pollution and arsenic in ground water, floods and cyclones, rising levels of sea water can easily threaten the sustainability of poverty reduction strategies unless appropriate measures are taken to protect the environment and address the climate change issues. An adequate disaster management strategy to tackle associated challenges is equally important.

## **ENVIRONMENTAL MANAGEMENT**

### ***Progress with Environmental Management***

Degraded environment implies that there are fewer resources available not only for the present but also for future generations, creating adverse impact on both production and consumption activities of the people. In this context, the Ministry of Environment and Forests (MOEF) has been working for the conservation of environment and undertaking various activities to prevent environmental degradation.

### ***Government Programs for Protecting the Environment***

The MOEF is formulating and implementing policies and programs that ensures a balance between the existing livelihood requirement of the people and sound environmental resource management that can ensure sustainability. Programs undertaken by the DoE include raising awareness on environment, implementation of the international conventions and protocols signed by the government, environmental management and its monitoring and overseeing the implementation of existing environmental laws of the country.

During the Fifth Plan period, DoE implemented two major projects: Air Quality management Project (AQMP), and Bangladesh Environment Management Project (BEMP). The objective of the AQMP was to develop components of an air quality management system to reduce human exposure to vehicular air pollution in Dhaka, Chittagong and Khulna. The key components were improved enforcement; setting appropriate air quality standards; better monitoring and dissemination of information; and overall evaluation. The BEMP was implemented with the goal of increasing the capacity for sustainable environment management in Bangladesh by enabling

the DoE to exercise its legislative powers and functions as expressed under various environmental laws.

One specific program being implemented is the Clean Development Mechanism (CDM), which is among the three mechanisms adopted under the Kyoto Protocol toward abatement of GHG emissions. As provided in CDM, industrial establishments belonging to the developed world will be able to accumulate their Certified Emission Reduction (CER) credit under their respective heads of account through investment in developing countries in lieu of reduction of GHG emissions from their industries located within their respective own countries. With a view to developing management of waste of the city of Dhaka under the auspices of CDM, 700 MT of decomposable waste is being collected from kitchen markets of various locations to prepare compost fertilizers. Such a program will save cost of waste collection and transportation and will simultaneously ensure the availability of environment-friendly organic fertilizers produced from the above collected kitchen market wastes.

Besides completing a large number of projects during the previous plans, DoE is engaged in implementing a number of programs to improve as well as to protect the environment. A brief listing of these programs is:

- Control of Air Pollution
- Controlling Industrial Pollution
- Conservation of Ecosystem
- Partnership Program for Environment Protection
- Conservation of Biological Diversities
- Protection of the Ozone Layer
- Measures toward Management of Wastes
- National Bio-Safety Framework
- Control of Noise Pollution
- Saving the River
- Generating electricity from waste
- Declaring Ecologically Critical Areas
- Reduction in the Production and Use of Black Polythene
- Poverty-Environment-Climate-Disaster Nexus Initiative in National Planning Process

## *NGO Activities for Conservation of Environment*

In alliance with the Government, a good number of NGOs/CBOs have been working to address environmental problems and to improve environmental system of the country since long. The NGOs/ CBOs play an important role in motivating people at the grass root level to protect environment and take coordinated efforts in solving environmental problems. Besides taking part in various environmental protection related activities NGOs/CBOs have been participating in all international negotiations on climate change as part of the government delegation.

## *Conserving Forestry Resources*

The Forest Department plays an important role in the development of physical, socio-economic development, maintenance of environmental balance and sustainable land based production system. There is an estimated 2.52 million ha of land as forest land which is only 17.49 percent of the total land area of the country. Out of this total forest land 2.25 million ha. is owned by the government as classified and unclassified forests and 0.27 million ha is owned privately. Government forest land, managed by the Forest Department, covers both natural and plantation forest. Out of 64 districts, 28 districts had no public forest in the past. But now almost all districts have been brought under forest coverage through social forestry program. In the past plans, the main emphasis was to expand forests and to increase supply of timber and wood. The ever increasing population of Bangladesh is creating pressure on existing government managed forest resources and has resulted in over exploitation of such resources. With a view to bringing the government owned fallow khas land under forestry coverage participatory social forestation program has been introduced in early eighties. The present government has amended the rules and according to amended rules unlike previous regime only marginal poor are eligible to participate in the program. Besides, government has also significantly increased the profit margin for the participating poor that have increased people's participations in forest management. Based on the implementation of the Social Forestry Program through people's participation, about 0.40 million ha. of land has been brought under forest cover. Nevertheless, wide-spread destruction, clearing of forest land for agriculture and homestead etc. seriously impedes achieving of target of 20 percent forest coverage by the end of 2015.

With a view to intensify forest management in the government managed forest area, a number of Integrated Management Plans for different Forest Divisions have been prepared. A number of feasibility study report, base line survey report and technical report have been produced for future activities. During the Fifth Five Year Plan due attention was given to aforestation of the newly accreted lands. Green belt was established in the coastal zone to serve as shelterbelt during cyclone and tidal surge. Qualitative improvement of natural forest through artificial regeneration was also given priority. In support of environmental and biodiversity conservation, extraction in the natural forest was discouraged. World Heritage Site has been declared in the Sundarbans. Emphasis was given and accordingly initiatives have been taken to establish national park,

botanical garden and eco-park in selected areas. Establishment of regional botanical garden has been proposed in connection with biodiversity conservation in the country. Participation in the national and international seminar, workshop, symposium and conference has strengthened the knowledge base. Finally, human resources have been developed and the efficiency and effectiveness of forest management have improved.

To promote conservation of biodiversity the government has declared 28 Protected Areas which were on the verge of losing important biodiversities. The Forest Department has also identified 58 areas which have potentials of developing as ecotourism sites. Efforts have been made to implement various activities for biodiversity conservations in these areas and sites. With a view to reducing dependency of people living around forests on forest resources different types of alternative livelihood programmes for these people are being introduced. Various endeavors will also be undertaken for maintaining ecological balance in the Sundarban mangrove forests and protect it from the impacts of climatic adversities. In confirmatory to developing cooperation with the neighboring countries in the field of biodiversity conservation a regional wildlife protection project has been undertaken with support from the World Bank. Along with Bangladesh the other partner countries in this project are India, Nepal, and Bhutan. The main objectives of the project have aimed at conserving the biodiversity and protecting the wild life of this region through mainly sharing of information, checking poaching and illegal trade of wild animals and their parts.

### **Research and Development in Forestry**

The forest in Bangladesh is characterized by immense biotic pressure, low productivity and acute degradation. Despite the efforts to afforest the land by planting trees, loss of natural forests continues unabated. The direct causes of degradation are poverty, landlessness, dependence of livelihoods on forests, lack of proper land use planning, uncertainties in land tenure system, biotic interferences, inadequate institutional capacity and lack of restrictive covenants and punitive legislations. The research support to the issues of forest productivity, protection and conservation, utilization and substitution of forest products, ecosystem management and newer dimensions of forestry are, therefore, urgently needed to reverse the trend of degradation and to make available forest products for meeting increasing demand of the country.

Bangladesh Forest Research Institution (BFRI), only government organization for conducting various researches on forestry, has been providing up to-date research based innovative technological support to the Department of Forest (FD) and Bangladesh Forest Industry Development Corporation (BFIDC) and other actors working in the forest sub-sector since 1955. The institution conducts pilot researches in the field of development of quality planting materials, plantation technique & forest management, bamboo and non timber based livelihood development approach as well as modern forest inventory management.

Besides, adequate attention to transfer the technology from BFRI laboratory to the field has yet not been done effectively. Research extension linkages in terms of sharing of information and technology transfer are still very weak. Research results are not adequately transferred to the grass roots level. One of the root causes of such a situation is the lack of institutional capacity of BFRI. In this context, the Ministry of Environment and Forest (MOEF) is planning to implement a Project for Modernizing BRFI with an estimated cost of TK. 10879.00 during SFYP period. It is expected that successful implementation of the proposed BFRI modernization project will greatly contribute to build the overall capacity of BFRI.

### ***Managing Environmental Health***

Environmental health relates to those aspects of human health and disease that are determined by factors in the environment. Important sources of environmental health risks include industrial and medical waste, air emissions and water discharges, human waste, consumer products, living conditions, and ionizing and non-ionizing radiation. Plausible effects of degraded environment include various health impacts of climate change, cancer, cardio-pulmonary diseases, asthma and other respiratory diseases, allergies, neuro-toxicity and neurological impairment, gastro-intestinal diseases, developmental and congenital abnormalities, and acute and chronic poisoning.

Although potentially environmental-related disease in Bangladesh is likely to be significant, Bangladesh lacks sufficient expertise to assess this burden and has only limited environmental and health policies to address this. The core functional components of a national environmental health program should include an integrated research strategy, capacity development to monitor, assess and reduce environmental health risks and hazards, and academic and technical training for the expertise required to inform policy, develop regulatory standards, and guided decision-making.

### **Ecosystem Management in Wetlands:**

Bangladesh is endowed with huge wetland resources that include haor, baor, beels, floodplain and other natural water bodies. Wetlands provide short and long term benefits and services to the people of Bangladesh including crop and fish production, swamp forest and reed land maintenance, regulation of water flow as well as biodiversity conservation. Besides being rich in fish resources, it has other functional values like flood water retention and ground water recharge, etc. It provides refuge to thousands of inland and migratory birds. Wetlands are under threat from encroaching and competing forms of land use. Most of the wetlands are subjected to rapid degradation due to population pressure, massive withdrawal of resources in unscientific methods and destruction of swamp forest. In almost all cases, the resources are exploited in unsustainable ways, like leasing system. To protect the wetlands' resources and conserve its biodiversity participation of the community people in management of wetlands has been recognized as the most efficient and acceptable system worldwide. Considering the importance of wetlands, the Government of Bangladesh ratified the Ramsar Convention in 1992. As a

signatory to the Convention, government is committed for wise use and sustainable management of wetlands according to ‘Ramsar Wise Use Guidelines’. Through this declaration, Government of Bangladesh has committed to conserve and manage the wetlands in a sustainable way. Instead of continuation of traditional leasing out system government has endeavored developing co-management systems comprising of different concerned stakeholders especially the local community people for the management of some wetlands such as in Tanguar Haor in Sunamgonj district. Through the initiative a co-management system is established and functional for conservation, stabilization and sustainable use of the natural resources of Tanguar Haor that generates opportunities for significant improvements in the livelihoods of rural communities. Towards this, the Government has banned the leasing system and successfully stopped the unsustainable harvesting of resources from Tanguar Haor. During the SFYP period, government is very keen to see the change in management paradigm and to consolidate the co-management system not only in the Tanguar Haor but also for overall wetland management in Bangladesh.

### ***The Bangladesh National Herbarium***

The Bangladesh National Herbarium (BNH) is a research organization under the Ministry of Environment and Forest which deals with the exploration, collection, identification and preservation of plant resources of the country. It plays an important role in the conservation of biodiversity and environment. The collection of the herbarium is a national property that goes down to the posterity through generations and work as reference materials on the flora of the country.

The net result of the various environment protection and control measures over the next five years will be to ensure a cleaner environment and a more sustainable ecosystem around the country. But this is not solely dependent upon the performance of DoE. With the enactment and enforcement of law, rules and regulations DOE would act as a conduit. But the main responsibilities lie with the polluters. So, there should be coordinated efforts from all stakeholders to produce a cleaner environment which would help maintaining sustainable ecosystem in the country.

Despite progress made in strengthening the implementation of environmental protection program, there is a substantial unfinished agenda that will need to be addressed in the SFYP. Amongst the most important challenge is proper waste management that continues to pose serious health risks. Environment and waste management and weak basic services including sanitation still remains as formidable challenges. Limited capacity of local government institutions such as the municipalities is a matter of concern. These institutions seriously lack capacities in managing household waste through effective participation from community people. The air pollution is another top ranking health concern that requires more attention. The DoE needs to be considerably strengthened, particularly to enable it to undertake environmental impact assessment as mandated by the Environment Conservation Rules promulgated under the

Environment Conservation Act 1997. Enforcement of environmental standards is also a serious challenge. The role of local government institutions also needs to be strengthened in managing urban waste and drainage.

### ***Mainstream Poverty-Environment-Climate Nexus in National Planning Process***

Poverty environment-climate mainstreaming of Planning Commission aims to reverse environmental degradation in ways that will benefit the poor, and to enable sustainable economic development. Any poverty reduction effort must fully take into account the country's vulnerability, susceptibility and capacity to manage environmental and climate risks and adaptation. This requires changing processes and decisions that impact on the environment. However, past experience suggests that many of these processes and decisions are outside the direct control of environment institutions. In Bangladesh, key institutions that impact on pro-poor environment outcomes include Planning Commission, Ministry of Planning, Ministry of Environment and Forest and Ministry of Finance. So it is vital that environment and climate issues that matter to the poor are "mainstreamed" into these institutions and their political and economic processes and decisions. The indicators for successful PECM are institutions, policies and investments that do not undermine pro-poor environment outcomes, instead positively contribute to livelihoods of both men and women.

### ***Environmental Management Objectives in the SFYP***

While perceiving the long-run consequences of environmental degradation to the country's ecosystem and citizen's welfare, the Government has set a number of goals to attain a sustainable environment and to address the fallout of climate change. With a view to attaining these goals, the main objectives relating to environment and climate change under the SFYP can be described in the following manners:

- To promote appropriate environment management system for mitigation and adaptation to climate change.
- To promote appropriate environment management system for sustainable development.
- To preserve, protect and develop the natural resource base.
- To ensure conservation of biodiversity and its sustainable utilization.
- To ensure active participation of the poor, especially the women in environment management activities at all levels.
- To promote environment friendly activities in development of interventions.
- To monitor, control and prevent environmental pollution and degradation related to soil, water and air.
- To strengthen the capability of public and private sectors to manage environmental concerns.

- To initiate actions with regard to obligations under international treaties and conventions for minimizing adverse impact on global environment.
- To promote cooperation with regional and international institutions/organizations to address local, regional, and global environmental problems.
- To build capacity in the area of environmental health through both public and private sectors.
- To undertake research and development for innovating technology in national perspective and application of modern technology, information exchange and benefit sharing with other countries.
- To create public awareness, in order to participate in environment promotion activities.
- To undertake Environmental Assessment and environmental reporting.
- To promote 3R (Reduce, Reuse and Recycle) waste management strategy.
- To improve air quality through clean fuel and vehicle.
- To promote public-private partnership in environment management.
- To reduce dependency on fossil fuel by promoting solar/green energy.
- To improve air quality in major cities through monitoring and prevention measure.
- To establish Environment Management System (EMS) in Industries for pollution control.
- To mainstream poverty-environment-climate-disaster nexus in the development project design, budgetary process, project implementation and monitoring process.

### **Environmental Management Strategies in the SFYP**

The significance of attaining a sustainable environment can hardly be over-emphasized. In this context, the Government is undertaking the following policies, strategies and programs during the SFYP:

- Environment committees at Division, District and Upazila levels will be activated with the participation of all stakeholders.
- National Environment Council headed by the Prime Minister and executive committee of National Environment Council headed by the Minister for Environment and Forests would be activated.
- Drafting of EIA guidelines for all sectors under the Environment Conservation Act (ECA) 1995 will be formulated in order to ensure effective enforcement of EIA.
- Existing environmental laws and regulations will be amended to address new environmental issues.

- Department of Environment will be strengthened in the light of existing Environment Policy, Environmental Act, Rules and Environment Management Action Plan in order to coordinate, monitor and implement these activities.
- ‘Polluters Pay Principle’ will be followed in order to ensure strict compliance of environment legislation.
- Sectoral legislations are to be reviewed and redrafted in light of Bangladesh’s commitments expressed through signing and ratifying of a number of International Conventions and Protocols on environment.
- Incentives, in the form of tax-rebate, tax-holiday etc. will be provided and incremental cost incurred by the Environment-friendly entrepreneurs will be met in various forms/sources.
- Environmental Impact Assessment will be made while processing each development project requiring approval of the Government.
- ‘National Environment Fund’ will be established in order to provide assistance to the victims of environment degradation caused by the natural disasters and anthropogenic activities.
- Enhance national capacity to mainstream poverty-environment-climate nexus in the development project design, budgetary process, project implementation and monitoring process.

### ***Capacity Building***

Proper management of environmental degradation requires substantial capacity in the public sector as well as interaction and cooperation with the citizens. Accordingly, the Sixth Plan will take a number of initiatives to strengthen environmental capacities. In the public sector efforts will continue to strengthen the Department of Environment and other ministries dealing with environment including Agriculture, Land, Water, Energy, Industry and Local government. For the private sector, emphasis will be placed on environmental research and development, strengthening educational programs that promote broad-based awareness of environmental concerns, and strengthening the dissemination of environmental knowledge through ICT and mass media.

### ***Financial Management***

Implementation of NEMAP, Forestry Master Plan, National Conservation Strategy and a number of development activities related to environment will require adequate financing. The shared responsibility for improvement of the environment by all partners in development including various government organizations, local government bodies, NGOs, research and training institutes will be strongly emphasized. Private sector will be increasingly involved in providing support to the environment protecting programs under the Sixth Plan.

## *Forestry Sector*

### *Objectives under the SFYP*

The main objectives during the Sixth Five Year Plan are to expand forest resources, make forests productive, develop institutional capabilities, and to encourage people's participation. About 20 percent forest coverage by the end of 2015 has been expected in the Twenty Years Master Plan (1995-2015) prepared for Forestry Sub Sector. Accordingly the plantation target had been fixed in the last Three Years Rolling Plan, MTBF and Fifth Five Year Plan. Under the present trend of allocation, it is not possible to achieve that target of 20 percent forest coverage by the end of 2015. Despite 91 percent utilization of allocation which was 72 percent of the planed allocation, only 1 percent new forest coverage has been created. Considering the allocation constraints this Sixth Five Year Plan has been estimated only with 4 percent target of new forest coverage that will be created through different types of forest plantations.

However this small target might be increased to 4 to 5 percent depending on the foreign investment. As the investment policy is favorable, investment from donors are still expected to increase the plantation target during the Sixth Five Year Plan. National responsibilities and commitments will be fulfilled by implementing various international efforts and government ratified agreements relating to global warming, clean development mechanism, desertification and control of trade and commerce of wild life birds and animals. Tissue culture, root trainer nursery development, vegetative propagation etc will receive due attention:

- Conserve and protect the eco-system for bio-diversity and overall environmental stability;
- Watershed management and soil conservation;
- Ensure greater contribution of the forestry sector in the economic development;
- Continue and expand people-oriented afforestation program for poverty alleviation and increased employment opportunity including women;
- Achieve meaningful participation of local people, local government bodies, NGOs and government agencies in forestry program;
- Promote multiple land use technology like agro-forestry to ensure increased productivity and supplement agricultural production;
- Strengthen forestry extension activities to transfer improved technology and research information to end-users, e.g., local people and private homesteads;
- Increase facilities for education, need-oriented co-oriented research and experimental works;
- Human resources development;
- Encourage private plantation of rubber, teak, mango, jackfruit and other high-value trees;
- Facilities for eco-tourism and recreation;
- Mass initiative to be taken under Clean Development Mechanism and REDD;

### *Forestry Management Policies, Strategy and Programs*

In line with the above objectives, policies, strategies and programs for the forestry sub-sector during the Sixth Five Year Plan will be as follows:

- a. An estimated 250,000.00 ha. land of hill forest and 7000.00 ha. of plain land forest will be planted during the plan period. Productivity of plantations will have to be increased manifold. Multi-purpose trees will receive special attention to increase the productivity of land under forest.
- b. Moratorium on felling in the natural forest will continue. Existing scattered and denuded hill forests will be replanted to increase productivity. Scientific management principles will be strictly followed to restore productivity of these lands.
- c. People's participation will be incorporated in all forest development activities. Integration of tree plantation and crop cultivation will be practiced. Program to rehabilitate the sal forests will be taken up as part of important development activities.
- d. The existing coastal aforestation and enrichment plantation will also be continued. The existing mature coastal plantations will remain. Some 40,000 ha. will be planted and replanted in the coastal areas. SRF is presently engulfed with severe ecological problems. Special attention will be given to the Sundarbans Reserve Forest (SRF) for its biodiversity conservation.
- e. To prevent the extent of damage by cyclones and tidal surges, Coastal Green Belt will be created and seedling will be raised to distribute or sale in the coastal zone.
- f. The redlands of Sylhet has long been lying unutilized. Under the Sixth Five Year Plan 5000 ha. of redlands will be planted.
- g. Development and establishment of different eco-parks and botanical gardens, safari park, national park have already been initiated during the Fifth Five Year Plan. Such activities will be continued under this Sixth Five Year Plan. Establishment of regional botanical garden will set uniform biodiversity conservation initiative in the country.
- h. Social forestry has now become a social movement in Bangladesh. Social forestry program will continue for expansion and strengthening of thana nurseries, union level nurseries, expansion and strengthening of forest extension and nursery training centers. Local government bodies will co-ordinate the aforestation program at the grassroots level under this program. During the Sixth Plan, NGOs will be more directly involved in aforestation program. They will motivate people through informal training and other extension sources and will help the Forest Department to implement such program.
- i. Past record indicates that wood energy contributes 13 percent of the total fuel consumption of the country. For the prevailing demand through social forestry, short/medium rotation fast

growing tree species have been planted along the roads and embankments, and on marginal and follow lands with active participation of local people.

- j. Non-wood forest products have substantial potentials for economic benefit. Bamboo, cane, murta, medicinal plants, honey, wax, gol-patta, etc. will be developed during the Sixth Five Year Plan in a systematic way.
- k. Emphasis will be given for forest land survey and updating the land record. Initiative has been made through formulating project which is expected to be implemented during the Sixth Five Year Plan. Forest areas will be demarcated to avoid unlawful encroachments.
- l. Presently, only 1.70 percent of the total land area falls under protected land area category which is about 10 percent of the total forest land. The protected area will be increased to 15 percent of the total forest land during the Sixth Five Year Plan period. Effective management for all the protected areas will be established.
- m. Regional botanical garden will be established in the northern and southern region. People's participation will be effectively utilized in conserving resources in the respective zones. Ban on the use of fuel wood in brick fields will continue and be made more effective and other modes of efficient use of energy will be promoted, e.g., improved cooking stove. Moreover, programs will be developed and implemented to protect the threatened, endangered species of flora and fauna and the fragile eco-system. Wildlife farming of deer and reptile like crocodiles, iguana, snakes and frogs, etc., will be encouraged and promoted on a commercial basis through private initiatives.
- n. Watershed management, wetland conservation etc. will be initiated in the new area and also will be intensified in the old area for better conservation of nature in the country during the plan period.

### **Private Forests**

In Bangladesh the village forest area is computerized of only 0.27 million ha. But this forest has been meeting most of the demand for forest products like timber, firewood etc. Over the years the village forests including the homesteads have grown into a major source of forest products especially with the initiative and involvement of local people. However, during the earlier plan periods, supports were preceded from the government mainly in terms of technical back-up and extension services. Extension, training and credit facilities will be provided to encourage the private sector to undertake rubber, teak, jackfruit and other high value crop plantation on a commercial basis.

### **MANAGING CLIMATE CHANGE**

Bangladesh is one of the most climate vulnerable countries in the world and will become even more so as a result of climate change. Floods, tropical cyclones, storm surges and draughts are likely to become more frequent and severe in the coming years. It is therefore essential that

Bangladesh prepares now to adapt to climate change and safeguard the future well-being of its citizen. Recently the issue of protection of the environment assumed special importance because of the accumulation of evidence of global warming and the associated climate change that it is likely to accompany. Climate Change is not the only problem of environmental degradation, the problem runs far deep and its reach in destabilizing many of the natural systems is potentially immense.

The challenge Bangladesh faces is to scale up investments to create a suitable environment for the economic and social development of the country and to secure the well-being of the people, especially the poorest and most vulnerable groups, including women and children. The Government of Bangladesh's Vision is to eradicate poverty and achieve economic and social well-being for all the people. This will be achieved through a pro-poor Climate Change Management Strategy, which prioritizes adaptation and disaster risk reduction, and also addresses low carbon development, mitigation, technology transfer and the mobilization and international provision of adequate finance.

### ***Implications of Climate Change in the Context of Bangladesh***

Human-induced changes in the global climate and associated sea level rise are widely accepted by policy makers and scientists. The Intergovernmental Panel on Climate Change (IPCC) concluded that “the balance of evidence suggests a discernible human influence on global climate”. The exact magnitude of the changes in the global climate is still uncertain and subject of worldwide scientific studies. It is broadly recognized that Bangladesh is very vulnerable to these changes because it is low-lying, located on the Bay of Bengal in the delta of the Ganges, Brahmaputra and Meghna and densely populated. Its national economy strongly depends on agriculture and natural resources that are sensitive to climate change and sea level rise.

Studies on climate change in Bangladesh report that the surface average temperature has been rising, though there is no agreement in these studies on the rate of change. Available literature suggests that a general warming is expected in future, where the rate of warming will be higher for the winter months (i.e., December, January and February) than the monsoon months (i.e., June, July, August).

There is a great deal of local-level perception-based evidence that the rainfall pattern has become erratic in recent years, if not in recent decades. However, the official agency has ruled out any possibility of drastic change in rainfall patterns beyond climate change. Intriguingly, a bi-modal shift in rainfall behavior has already been reported and rainfall may contribute to recent shifts in hydrological peaks in various rivers of Bangladesh. Local level experience and anecdotal evidence clearly show that in both Gaibandha and Jamalpur, people now observe two to three flood peaks instead of one, as the latter had been regularly observed decades ago.

**Increased susceptibility to natural disasters:** All the above phenomena clearly highlight the increased hazard susceptibility in terms of flood, drought, storm surge and salinity ingress in Bangladesh. As it has been reported in many articles, floods will be more intense, will inundate more areas and occasionally will perhaps prolong to devastate people's livelihoods, national economy and infrastructure. Similarly, literature suggest that the central western region will be hit hard due to exacerbated drought and marginal farmers would not be able to maintain livelihood thrusts by switching technologies to offset moisture stress. Simultaneously, increased salinity would tend to reduce crop suitability throughout the southwestern region and perhaps appear to be a deterring factor for industrial activities in the affected areas.

**Coastal impacts - water logging:** A northward shift in isohaline lines under climate change would compound the already alarming effect of water logging in the southwestern region. It has been reported that the sea surface temperatures along the northern Indian Ocean (i.e., Bay of Bengal) has gradually been rising steadily. Though there is no evidence that the frequency of occurrence of cyclone along the Bay of Bengal has actually changed over the past five decades due to rising sea surface temperatures that cyclone intensity might be increased by as much as 10% due to increased warming. A devastating example that Bangladesh has been observing in this regard is the Aila affected areas in Satkhira, Khulna and Bagerhat district.

**Coastal impacts-rough seas and cyclones:** There is a strong correlation between increasing sea surface temperatures and the occurrence of too many rough sea events in the recent years. High wind actions have been causing economic damage to fisher folks by quickly damaging the traditional boats.

High wind actions have been eroding sea-facing coastal islands; even embankments located far inland than the open sea. Sudden breaches in embankments have been destroying standing crops, inundating crop lands with saline water, thereby diminishing economic potential of the coastal lands, and forcing poor people to out-migrate from the affected areas by destroying their livelihoods.

A potential implication would be that future storm surges might be even higher than those observed currently. About 1.2 million hectares of arable land are affected by varying degree of soil salinity, tidal flooding during wet season, direct inundation by saline water and upward and lateral movement of saline ground water during dry season. Inundation of brackish water for shrimp farming is key causes for secondary salinisation of coastal lands. The severity of salinity problem has increased over the years and expected in increase in future due to sea level rise.

**Increased drought posed higher risks:** North-western region (Barind tract) of Bangladesh is normally drought prone. Droughts are associated with the late arrival or an early withdrawal of monsoon rains and also due to intermittent dry spells coinciding with critical stages of T. Aman rice. Droughts in May and June destroy broadcast *Aman*, *Aus* and jute. Inadequate rains in July delay transplantation of *Aman* in high Barind areas, while droughts in September and October

reduce yields of both broadcast and transplanted *Aman* and delay the sowing of pulses and potatoes. *Boro*, wheat and other crops grown in the dry season are also periodically affected by drought.

**Global Response to Climate Change & its Implication for Bangladesh:** The first definitive action came in 1992 at the UN Conference on Environment and Development held in Rio de Janeiro. The Conference established the United Nations Framework Convention on Climate Change (UNFCCC, or, Convention) which came into force in 1994. Countries which have signed the Convention and ratified are called Parties (194 in number). A Conference of Parties takes place every year. Linked to the Convention, a protocol has been signed in 1997 in Kyoto (hence called Kyoto Protocol) which came into effect much later in 2005. The Kyoto Protocol is a legally binding instrument under which industrialized countries committed themselves to a lowering of emission on an average of 5% below the 1990 level. The first commitment period ends in 2012. Bangladesh is among the least responsible countries for polluting stratosphere with GHG but it is the worst recipient of stress from the climatic perturbations.

The Bali Action Plan and Subsequent Developments: The thirteenth Conference of Parties in Bali saw some path-breaking changes in the negotiations for mitigation (i.e., emission reduction). The actions adopted in the Conference, known as the Bali Action Plan, calls for a *global shared vision and enhanced actions on 4 areas*, (i) mitigation (i.e., emission reduction), (ii) adaptation, (iii) finance and (iv) technology transfer and development as well as capacity development. The most interesting aspects were the decisions which dealt respectively with mandatory mitigation commitment by developed country parties and voluntary mitigation actions by developing country parties. All country parties are expected to reduce emission. Much of the debate that is going on since then revolves around the conditions under which these should become operational. Specifically, the relationships of these with the commitments under Kyoto Protocol beyond 2012, and the level of reduction pledged given the scientific evidence that there has to be drastic cuts in emission and its peaking within 2015.

Operationalizing Bali Action Plan in Bangladesh context: The Bali Action Plan makes it clear that the developing countries responsibilities and actions have to be looked at within the framework of sustainable development. Bangladesh, in subsequent submission regarding how to operationalize the Bali Action Plan, has put it in terms of ensuring four types of security. These are food security, water security, energy security and livelihood security (including health). Given that agriculture is expected to be heavily adversely affected, food security becomes the most important issue for Bangladesh. On the other hand, much of what happens to various sectors due to climate change relates to water, too much or too little of it or its spatial distribution between and within years. Furthermore, water is also a shared natural resource for Bangladesh with some of the country's neighbors which calls for regional actions for ensuring availability. Water security is thus absolutely essential. Livelihood security relates to the ultimate well-being of the people without which development is meaningless. As health becomes a major issue under

climate change, this is also included as part of well-being under climate change.

The issue of energy security is interesting in Bangladesh context. Given that Bangladesh is a low energy consumer while her demand for energy is increasing with development, the country must be allowed to consume as much energy as necessary for development. While this may seem obvious, a potential conflict may arise with the decision 1b(ii) under the Bali Action Plan that calls upon all developing countries to contribute, as their situations permit, to lower emission which means in many cases lowering energy consumption. But this may conflict with the right to development. Bangladesh has made it clear that while it will use energy in the most efficient way, it will not compromise with the needs for energy for development. Indeed, the four securities are inviolate principles of development which has been later incorporated in the Bangladesh Climate Change Strategy and Action Plan.

The Cancun Climate Agreement 2010: After two weeks of intensive negotiations amongst nearly two hundred countries taking part in the sixteenth conference of parties of the United Nations Framework Convention on Climate Change in Cancun, Mexico the Cancun Climate agreement has been reached

The Cancun agreement created a new Green Climate Fund to receive and distribute up to \$100 billion a year from 2020. Although this fund will take some time to actually be set up and start distributing funds to vulnerable developing countries the transitional committee to set it up has been agreed.

For the shorter term the developed countries have pledged and already started disbursing the \$30 billion of ‘fast start finance’ which was pledged in 2009 in the Copenhagen Accord.

There were also significant agreements reached on three of the negotiating tracks namely reducing emissions from deforestation and land degradation, technology transfer and adaptation.

On adaptation the Cancun Adaptation Framework was adopted with a high-level adaptation committee to oversee support for adaptation in vulnerable developing countries.

However, the mitigation targets under the Kyoto Protocol and establishing a new legally binding agreement was not resolved in Cancun but shall remain in play to be resolved at COP17 in Durban, South Africa in December 2011.

Against this backdrop it is crucial that Bangladesh positions itself strategically and take steps towards more effectively addressing its climate change-induced vulnerabilities particularly when related to disaster hazards.

### **Bangladesh Climate Change Action Plan**

Bangladesh prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and revised it in 2009. This is now an approved document of the Government. This is

expected to be the blue print for subsequent integration of climate change issues such as adaptation, technology transfer, mitigation and development, and capacity building into the mainstream planning process.

The BCCSAP takes the Bangladesh submission on Bali Road Map, particularly the 4 securities, as the starting point and develops a sustainable development strategy centered on climate change. The programs mainly fall under development of crop varieties and development of technology suitable for agricultural production under various adverse climatic conditions that are likely to materialize in future. Three of the themes including food and livelihood security fall under adaptation, which is the prime need of the country. The other two adaptation programs concern construction and maintenance of necessary infrastructure, especially for water management. The third important area is disaster management as disaster risk reduction and post-disaster rehabilitation are going to engage a lot of energy and resources of the country due to climate change. Under the action plan, there are six major themes and 44 programs (Table 7.1):

- Food Security, Social Protection and Health: The very first relates to ensuring food and livelihood security, especially for the poorest and most vulnerable in society, including women and children. It focuses on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- Comprehensive Disaster Management: This is to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
- Infrastructure: This Action Plan is to ensure that existing assets (e.g. coastal and river embankments) are well-maintained and fit-for-purpose and that urgently needed infrastructure (e.g. cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
- Research and Knowledge Management: This is to predict the likely scale and timing of climate change impacts on different sectors of the economy and socioeconomic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on science, and best practices of climate change management.
- Mitigation and Low Carbon Development: This is to evolve low carbon development options and implement these as the country's economy grows over the coming decades and the demand for energy increases.
- Capacity Building and Institutional Strengthening: This is to enhance the capacity of government ministries and agencies, civil society and the private sector to meet the challenge of climate change and mainstream them as part of development actions.

The serious consequences of climate change, including especially the consequences for

Bangladesh, lead naturally to the question of what should be our response. Two types of response need to be considered. The first relates to adaptation, i.e., measures that have to be taken given the very high likelihood that climate change will occur and will have adverse effects. The second relates to mitigation, i.e. steps to be taken that might reduce the extent of climate change.

### **Adapting to Climate Change**

Supporting communities and people in rural areas to strengthen their resilience and adapt to climate change will remain a high priority in coming decades. However, with increasing urbanization and economic growth, the type of risks Bangladesh faces will change. New urban areas must be built to be climate resilient. This will call for better planning to ensure that the pattern of urbanization takes account of the likely risks from climate change.

The direct annual cost to the national economy of natural disasters over the last 10 years (damage and lost production) is estimated to be between 0.5% and 1% of GDP. As the economy grows, these costs are likely to increase in absolute terms and also as a proportion of GDP, if climate change is not factored into long-term economic planning.

Over the decades, the Government, with the support of development partners, has invested in:

- Flood management schemes to raise the agricultural productivity of many thousands of kilometers of low-lying rural areas and to protect them from extremely damaging severe floods.
- Flood protection and drainage schemes to protect urban areas from rainwater and river flooding during the monsoon season.
- Coastal embankment projects, involving over 6,000 km of embankments and polder schemes, designed to raise agricultural productivity in coastal areas by preventing tidal flooding and incursion of saline water.
- Over 2,000 cyclone shelters to provide refuges for communities from storm surges caused by tropical cyclones and 200 shelters from river floods.
- Comprehensive disaster management projects, involving community-based programs and early warning systems for floods and cyclones.
- Irrigation schemes to enable farmers to grow a dry season rice crop in areas subject to heavy monsoon flooding and in other parts of the country, including drought-prone areas.
- Agricultural research programs to develop saline, drought and flood-adapted high yielding varieties of rice and other crops, based on the traditional varieties evolved over centuries by Bangladeshi farmers.
- Coastal ‘greenbelt’ projects, involving mangrove planting along nearly 9,000 km of the shoreline.

These investments in ‘climate proofing’ have resulted on major impacts on economic growth and

poverty reduction. Over the last 10-15 years, the number of fatalities from natural disasters has declined, as the country's ability to manage risks, especially floods and cyclones, has improved and community-based systems have been put in place.

Over the decades, Bangladesh has also learnt how to plan and implement these programs more sustainably (e.g. to integrate capture and culture fisheries into the design and operation of flood management projects) by involving communities in planning, construction and management. We must undertake climate change investments with communities, learn from them, build on their knowledge of their local environments, and ensure that proposed investments meet their needs.

The Government recognizes that tackling climate change requires an integrated approach involving many different ministries and agencies, civil society and the business sector. There is also a need to strengthen the capacity of Government and other organizations to plan and implement development programs. Development organizations need to strengthen their capacity so that they can implement their regular programs more effectively and rise to the challenge of climate change.

### **Mitigation Activities**

Even though Bangladesh's contribution to the generation of GHGs is miniscule, the country wishes to play its part in reducing emissions now and in the future. The mitigation activity must be consistent with the country's energy security as the demand for energy will increase with the quickening of the pace of development. GoB, therefore, encourages increased energy and cost efficiency in the development and utilization of conventional energy. Emphasis is also given to the development of renewable energy, particularly solar homes and biogas plants so that the emission is as small as possible without jeopardizing the access to energy. In partnership with civil society, a major nationwide program of social forestry has also been implemented and coastal 'greenbelts' has been planted as a key adaptation-mitigation strategy. As Bangladesh industrializes and develops coal reserves, the country will seek the transfer of state-of-the-art technologies from developed countries to ensure that the country follows a low-carbon growth path. Bangladesh is also committed to reducing GHG emissions from agriculture and urban waste management. The country is further committed to the development of forestry resources and in this regard is exploring all avenues including the mechanisms under REDD (Reducing Emission from Deforestation and Forest Degradation).

Currently Bangladesh has two Clean Development Mechanism (CDM) projects concerned with solar energy and waste management. It looks forward to increasing the number of similar programs and experimenting with new instruments to generate carbon credits and facilitate carbon market financing in the future.

## Climate Change Benchmark and Targets for the SFYP

It is important to recognize that climate change is not something for which any quantitative benchmark in physical terms can be set. The agenda is large and involves creation and management of knowledge, formulation policies, and development of institutions. It also requires coordination and collaboration with regional and global partners. The BCCSAP 2009 provides a very convenient framework to build on the climate change agenda for the SFYP. Given the large agenda, it would be prudent to prioritize the urgent tasks that need to be taken up and may be completed, by and large, within the next five years. As such, the following may form part of target programs of the SFYP, listed in accordance with approved themes (Table 8.1).

**Table 8.1: Sixth Plan Benchmark and Proposed Target Programs**

Theme	Program	Benchmark	Target
<i>Food security, social protection and health</i>	Institutional capacity for research on climate resilient cultivars and dissemination	Capacity exists; certain new varieties released recently	Extension service to be geared up
	Adaptation against drought, salinity resistance and heat	Very limited experience	To be started
	Adaptation in fisheries sector	Very limited experience	Initial studies for ideas on adaptation
	Adaptation in livestock sector	Very limited experience	Initial studies for ideas on adaptation
	Adaptation in health sector	Very limited experience	Initial studies for ideas on adaptation
	Water and sanitation programs for climate-vulnerable areas	Limited experience	Immediate actions needed
	Livelihood protection in ecologically fragile areas	Little experience	Initial interventions to be made
	Livelihood protection of vulnerable socio-economic groups	Major experience	To be made immediately
<i>Comprehensive disaster management</i>	Improvement of cyclone and storm surge warning	Limited experience	Needs review for improvement
	Awareness raising and public dissemination	Some experience	Needs review for improvement
	Risk management against loss of income and property	Limited experience	Needs review and pilot intervention
<i>Infrastructure</i>	Repair and maintenance of existing flood embankments	Limited activity	To be taken up immediately
	Repair and maintenance of existing cyclone shelters	Limited activity	To be taken up immediately
	Repair and maintenance of existing coastal polders	Limited activity	To prioritize and taken up immediately
	Urban drainage needs assessment	Limited activity	To prioritize and taken up immediately

<b>Theme</b>	<b>Program</b>	<b>Benchmark</b>	<b>Target</b>
	Adaptation against Floods and constructing new embankments and flood shelters	Limited activity	Needs review for improvement & construction
	Adaptation against tropical cyclones and storm surges through land use planning	Limited activity	To be taken up immediately
	Planning & Design of river training and bank erosion mitigation works	Major experience with limited success	Needs review for significant improvement
	Resuscitation of rivers and khals through dredging	Limited activity	To prioritize and taken up immediately
	Earthquake resilient structure and land slide protected structure have to be constructed and retrofitted	Limited activity	To prioritize and taken up immediately
<i>Research and knowledge management</i>	National Centre for research, knowledge management and training on disaster and climate change	Limited activity	Scope to be extended immediately
	Climate change modeling and their impacts	Limited human and institutional capacity	Training to be arranged for imparting skill
	Preparatory studies for adaptation against SLR	Capacity exists; limited experience of adaptation	To be initiated and continued
	Research on the climate change adaptation for knowledge and technology generation	Capacity exists, some technologies are in use	To be expanded the scope and ongoing effort
<i>Low carbon development</i>	Renewable energy development	Limited experience	To be expanded
	Management of urban waste	Limited experience	To be taken up immediately
	Aforestation and reforestation	Some experience	To be taken up immediately
	Rapid expansion of energy saving devices	Some experience	To be taken up immediately
	Improving energy efficiency in transport sector	Limited experience	To be introduced in phases
<i>Capacity building</i>	Revision of sectoral policies for climate resilience	-	Immediate need
	Mainstreaming CC in national, sectoral and spatial development programs and policies	-	Immediate need; BCCSAP to be part of National Plan
	Strengthening human resource capacity	Limited capacity	To be started
	Gender considerations in CC	-	To be started
	Strengthening institutional capacity	Limited capacity	To be started
	Mainstreaming CC in media	Limited experience	To be started

The Climate Change impacts that Bangladesh may face present a daunting challenge for policymakers. Adaptation is the prime need right now as any delay will create havoc with the growth prospects of the economy and deny millions of people even their basic necessities.

International support might come eventually but may be woefully inadequate given Bangladesh's enormous requirement of resources annually to combat the menace of Climate Change.

In this situation, the Sixth Plan will place first priority on the repair and maintenance of coastal polders and defenses which have been washed away first by Sidr and then by Aila. The second priority will be to mainstream Climate Change issues of adaptation, mitigation and capacity building based on the actions identified in Table 7.2.

Bangladesh will continue its active dialogue and participation in international forum to ensure compliance with the agreed global agenda while at the same time ensuring that Bangladesh's rights to seek progress with economic growth and social development are protected. Similarly, Bangladesh will work hard to ensure that equitable solutions are found to help Bangladesh finance appropriate adaptation measures resulting from past global actions. Nevertheless, it is recognized that the financing needs for proper adaptation are large and that global funding will be limited. Proper funding of priority adaptation programs will be a key policy focus in the SFYP.

### **Implementing the Strategies**

The Government recognizes that it needs to strengthen existing institutions and may also need to create and develop new ones to respond effectively to the enormous challenges of climate change. A National Steering Committee on climate change has been established to coordinate and facilitate national actions on climate change. It is chaired by the Minister of the Ministry of Environment and Forests and comprises the Secretaries of all climate-affected Ministries and Divisions, and representatives of civil society and the business community. It reports to the National Environment Committee, chaired by the Prime Minister.

The National Steering Committee on Climate Change also provides guidance on international climate change negotiations, including bilateral, multilateral and regional programs for collaboration, research, exchange of information and development. A Climate Change Unit will be set up in the Ministry of Environment and Forests, to support the National Steering Committee on Climate Change. It will work with Climate Change Focal Points to be set up in all ministries. In fact, eight are already in place.

The Bangladesh Climate Change Strategy and Action Plan was originally developed through a participatory process involving all relevant ministries and agencies, civil society, research organizations, the academia and the business community. Programs funded under the Action Plan will be implemented by the line ministries and agencies, with participation, as appropriate, of other stakeholder groups, including civil society, professional and research bodies and the private sector.

While adaptation and mitigation are the main tasks, finance and technology are the means to

achieve them. The two areas have therefore attracted much attention during the climate change negotiations from the beginning. The broad principles are clear. First, the present day climate change is the result mainly of historical GHG emission by Western and other industrialized countries. The finance for adaptation and mitigation therefore has to come mainly from these countries which does not preclude national action by the affected countries on their own. How the funding may be generated is a matter of international negotiation. However, Bangladesh wishes that it be under a new financial architecture in which LDCs, G-77, China and other groups will have voice in generating, allocating and disbursements of the funds.

All funds for adaptation has to be on a purely grant basis as the need for adaptation arise because of climate change due to the historical emission of GHGs by the industrialized countries. Mitigation depends mainly on energy production, distribution and consumption technology. Often the most efficient technologies are expensive. Bangladesh wishes to do her bit, however small, in the global effort to minimize GHGs emission by adopting such energy-efficient technology. However, unless the additional costs of adopting efficient technology is not paid for through the international financial mechanism, Bangladesh will not be able to adopt them. Like adaptation, this part of the additional cost of procuring efficient technology should be financed on a grant basis.

The Government has established a National Climate Change Fund. The Government desires that all development partners who so wish will contribute to this fund. Exactly what would be the operational modality may be worked out by the government and the particular development partner. But the cardinal principle of the operation of the fund shall be that it will be used solely to finance activities under the Action plan. Secondly, this contribution will not be a substitute for other normal funding for development by the development partners.

## **DISASTER MANAGEMENT**

Bangladesh, because of its geo-physical location, topography and high population density is at risk of recurring natural and human induced hazards with an average 10 million people affected every year. Frequent floods, cyclones, river bank erosion, water-logging, drought and tornadoes significantly disrupt Bangladesh's economy and the lives and livelihoods of its population. Bangladesh is in the top of the list of 10 most disaster affected countries. During 1990-2008 the country incurred annual loss of US\$2,189 million (1.8% of annual GDP) from disasters. Climate change is adding a new dimension to the current risk environment with global predications suggesting that the country could expect more intense cyclones, storm surge and flooding (disaster)-and that a rise in sea levels could have a significant impact on the lives and livelihoods of up to 30 million people.

Disaster management has assumed an important concern for the government and the people. The Government of Bangladesh sets the **Disaster Management Vision** as *“to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and*

*human induced hazards, to a manageable and acceptable humanitarian level, and to have in place an efficient emergency response system capable of handling large scale disasters.”*

Disaster Management in Bangladesh is guided by a number of national and international drivers which among others includes a) the Standing Orders on Disasters first introduced in 1997; b) the Millennium Declaration of September 2000 to protecting the vulnerable from the consequences of natural disasters; c) the Hyogo Framework for Action (HFA) 2005-15; and) the SAARC Framework for Action (SFA) 2006-15. Bangladesh recognizes that disaster management, which includes both risk reduction and response management, is the responsibility of all sectors, all organizations and all agencies. Disasters can either be human induced, natural or even arising out of technological causes; the risk is dynamic and changing. Therefore, mainstreaming risk reduction efforts within the government, NGOs and private sector is critical to achieving sustainability in all hazards risk-reduction interventions.

In last few years, country's emphasis has been placed to create a foundation to achieve a paradigm shift in disaster management from a conventional relief and response practice to a more holistic risk reduction culture. To achieve this paradigm shift, the Standing Orders on Disasters (SOD) was revised and the National Plan for Disaster Management 2010-15 (NPDM) was introduced. In April 2010 the National Disaster Management Council approved the Revised SOD and NPDM which will guide Government sectoral ministries and departments, NGOs, civil society organizations and public representatives to carry out disaster risk reduction and climate change adaptation functions. Disaster management has become an integral part of the educational curricula at primary, secondary and tertiary levels as well as major training courses of all public training institutions. The Executive Committee of the National Economic Council (ECNEC) on 8<sup>th</sup> October 2007 meeting approved the decision to include information on “lessons learnt from the previous project” as well as “Risk Identification and Risk Mitigation” in all Development Project Proposal (DPP) and Working Paper for the ECNEC as the first milestone achieved to ensure the integration of risk management in the development activities.

Bangladesh has also achieved a number of other milestones. The country has established a planning and strategic framework with the following seven strategic goals which were set as the basis of action matrix under the NPDM:

- Professionalizing the disaster management system
- Mainstreaming disaster risk reduction and climate change adaptation
- Strengthening institutional mechanisms
- Empowering at risk communities
- Expanding risk reduction programming across all hazards and all sectors
- Strengthening emergency response systems

- Developing and strengthening regional and global networks.

### **Disaster Management Strategy in the SFYP**

The SFYP will carry forward the implementation of the approved National Disaster Management Plan 2010-2015. It will continue the comprehensive all hazard, all risk and all sector approach and be built on the foundations laid in the last several years and learn from the positive experiences. The Bangladesh Disaster Management Model which made the basis for revising the disaster management policy and planning documents has mainly comprised of two inter-related elements: Disaster Risk Reduction and Emergency Response. The plan will focus more on Disaster Risk Reduction (DRR) in order for reducing the relief and recovery needs and also be prepared to deal with any emergencies.

### **The DRR Activities**

These include:

- Professionalizing the Disaster Management systems and institutions through execution of the Disaster Management Regulatory Framework already established.
- Strengthening the Disaster Management Bureau’s capacity to monitor and take part in cross-government mainstreaming of disaster risk reduction through pre, during and post disaster assessment.
- Strengthening institutional capacity of government sectoral ministries, departments and other technical and academic actors in ensuring inclusion of DRR and Climate Change Adaptation (CCA) issues and agendas within their respective sectoral policies, plans, programs and allocations of businesses.
- Empowering at risk communities to withstand and cope up with the disastrous situations through community and household level risk reduction interventions and livelihood support services.
- Reducing vulnerabilities of at risk communities through social safety nets – ensuring protection of women, children, the aged and differently able people giving due attention to their special needs.
- Preparedness for Earthquake and Tsunami risks through
  - vulnerability and risks assessments and mapping,
  - hazard land zoning,
  - Land use planning
  - contingency planning,
  - strengthening search and rescue capacity of fast responding institutions and

- mass public awareness
- Building Knowledge on DRR and CCA through
  - piloting and adaptation research
  - Establishing an Integrated Approach to disaster management including Climate Change and climate variability impacts
  - Developing climate change scenarios and accordingly anticipated hazard risks following climate change
  - Updating hazard maps such as flood, cyclone, drought, earthquake and tsunami
- Strengthening national capability to reduce the risks of Chemical, technological and biological hazards; Infrastructure collapse; Fire; Road accidents; Launch capsizes and Landslide.
- Strengthening national capacity for erosion prediction and monitoring.
- Developing and establishing policy and planning frameworks to incorporate all hazard risks.
- Establishing public - private partnerships for disaster risk reduction.
- Supporting regional and global risk reduction initiatives and ensure representation that is consistent with the government integrated all sector risk reduction approach at all levels.

### **The Emergency Response Activities**

These include:

- Strengthening and improving all Hazard Early Warning Systems through technical, technological and physical capacity strengthening of Bangladesh Meteorological Department and Flood Forecasting and Warning Center.
- Establishing and strengthening regional networks for real time data/information sharing
- Establishing an effective Community Alerting System through capacity strengthening of Cyclone Preparedness Program and Disaster Management Committees (DMC) at District, Upazila and Union levels.
- Introducing Contingency Planning and Disaster Preparedness across all sectors and at all levels.
- Establishing and improving Search and Rescue Mechanism by: (i) preparing a potential search and rescue scenario; (ii) strengthening Search and Rescue capability of first responding institutions by providing training and equipments support; (iii) establishing an all hazard volunteer groups for Search and Rescue operations; (iv) establishing an effective command and control system and, (v) construction and maintenance of sufficient multi-

purpose disaster shelters.

- Strengthening GO-NGO and private sector co-ordinations on relief and emergency management.
- Developing and establishing a well coordinated multi-sectoral post-disaster recovery and reconstruction mechanism.
- Establishing and operational a National Disaster Management Information Centre connected with all the 64 Districts and high-risk Upazila DMCs to: (i) archive and share disaster risk reduction information; (ii) to produce and share policy briefs; (iii) to receive and disseminate early warning information; and (iv) to receive and disseminate information on emergency need assessments and management.

**Strengthening institutional process in disaster management:** Various government and non-government organizations are working in the field of disaster management and mitigation. A key effort in the SFYP will be to strengthen the inter-ministerial coordination as well as coordination with the NGOs.

As per the revised SOD and NDMP the Disaster Management and Relief Division, Ministry of Food and Disaster Management is the focal agency for disaster risk reduction and emergency management. The focal point for disaster management is the Ministry of Food and Disaster Management and the Disaster Management Bureau under the Ministry. The Bangladesh Meteorological Department (BMD) is responsible for forecasting natural disasters, particularly cyclones, droughts, storms etc. The Bangladesh Space Research and Remote Sensing Organization (SPARRSO) is responsible for providing satellite images while the Flood Forecasting and Warning Centre (FFWC) of Bangladesh Water Development Board is entrusted with the responsibility of forecasting flood. A number of institutions and Bureaus under different ministries such as the National Disaster Management Council headed by the Prime Minister, the Directorate of Relief and Rehabilitation, the Directorate General of Food, Department of Public Health Engineering, The Local Government Engineering Department, Water Resources Planning Organization (WARPO) and Armed Forces Division are involved in disaster management. Given these multitude of governmental organizations, better coordination will increase the effectiveness of the response as well as cut inefficiencies and wastage.