



NATIONAL SUSTAINABLE DEVELOPMENT STRATEGY (2010-2021)



General Economics Division
Planning Commission
Government of the People's Republic of Bangladesh
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PRIME MINISTER
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF
BANGLADESH

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Message

General Economics Division, Planning Commission of the Government of the People's Republic of Bangladesh has prepared the National Sustainable Development Strategy 2010-21 (NSDS) to address a critical development aspiration of our time. We need to balance economic, social and environmental requirements of development in order to ensure “the needs of the present generation are met without compromising the ability of the future generations to meet their own needs.” Despite our past achievements, a large population is still in poverty, unemployment and underemployment rate is still high. This strives achieving high growth so urgent that it is easy to downplay the right of the next generation to natural resources. But a large and growing population living in a relatively small geographical area which is increasingly pressurizing our environment – air, water and soil, dictates the urgency of sustainable development in the country.

NSDS fulfils the twin objectives of formulating strategies to meet the challenges of economic, social and environmental sustainability faced by the economy as well as meeting international obligation of our country to global sustainable development principles and agenda. Meeting the sustainable development challenges will need raising the awareness and understanding of people of the challenges and coordinated efforts at the local, regional, national and global levels.

The time frame of NSDS coincides with the Perspective Plan of Bangladesh 2010-2021 which guides the economy towards its transition to a middle income economy by early next decade of this millennium. The Planning Commission will need to take necessary measures to mainstream the strategies of NSDS into national development planning processes. I hope people of our country will cooperate with each other in the best interest of their own and future generations to chart the sustainable development path as expressed in the Rio+ 20 outcome document “The Future We Want for All”. This will help transform our country into “Sonar Bangla”, the ever-cherished dream of our Father of the Nation, Bangabandhu Sheikh Mujibur Rahman and maintain it for future generations.

Joi Bangla, Joi Bangabandhu
May Bangladesh Live forever

Sheikh Hasina



Air Vice Marshal (Retd.) A. K. Khandker
Minister
Ministry of Planning
Government of the People's Republic of Bangladesh

Message

I am very happy to see the culmination of preparation of the National Sustainable Development Strategy (NSDS) document. Achieving sustainable development is one of the many challenges confronting the country in its attempt to attain the middle-income country status by 2021. This NSDS has been formulated to guide the country to face the challenge for sustainable economic growth with environmental safety and ensuring social justice.

The vision of the strategy, which has been developed through extensive consultation with the stakeholders, is “achieving a happy, prosperous enlightened Bangladesh which is free from hunger, poverty, inequality, illiteracy and corruption and belongs completely to its citizens and maintains a healthy environment”. The strategy is based on the long term development vision of the government, the Sixth Five Year Plan FY 2011-FY2015, the Perspective Plan of Bangladesh 2010-2021 and other existing plans, policies and strategies of the government.

The strategy highlights the need for population planning to maintain a balance between population, development and environment. This has been prioritized as slowing the growth of population will contribute to the health of the environment and efforts to increase the standards of living not just for present generation, but also for the future generation.

I am extremely grateful to our Honourable Prime Minister Sheikh Hasina for giving her valuable time in reviewing the document and making very important suggestions in improvement of the document. I am also grateful to my cabinet colleagues especially Minister for Finance, Minister for Agriculture and Minister for Environment and Forest for their constructive suggestions at different stages of preparation of the strategy document.

The strategy document has been prepared through extensive consultation with ministries, development partners, academia, researchers, civil societies, think tanks and NGOs. I thank all of them for their active participation in the process of formulation of the strategy. I especially thank Ministry of Environment and Forest and Department of Environment for their valuable cooperation and contribution in the process.

I congratulate the officials of General Economics Division (GED) of the Planning Commission for undertaking this challenging task of preparing the strategy document in time. It is worth mentioning that GED has also prepared the Sixth Five Year Plan and the first Perspective Plan in recent past. Their effort is therefore worth lauding and commendable.

Finally, I sincerely hope that all the Ministries and our development partners will adequately consider the NSDS while developing their future development programmes. I am confident that through proper implementation of the strategy, we shall be able to achieve the sustainable development path for the country which will lead us to ‘Sonar Bangla’, the dream of our Father of the Nation, Bangabandhu Sheikh Mujibur Rahman.

Air Vice Marshal (Retd.) A.K. Khandkar
Minister for Planning

Preamble

The National Sustainable Development Strategy (NSDS) has been prepared to meet the formidable environmental challenges that Bangladesh faces in the way to development. The challenges arise when the country's development efforts are made without proper recognition of consequential environmental impacts which lead to degraded agro-ecosystem, rivers and wetlands, coastal environment and urban environment, degradation and depletion of ground water, deforestation and desertification in different parts of the country. Equally and perhaps more important are the challenges arising from global climate change induced by the production and consumption patterns of other countries especially the developed and fast growing developing countries that exert multiple impacts on our development. Apart from the domestic exigencies, NSDS fulfils Bangladesh's commitment to the international community to formulate and implement a sustainable development strategy addressing environmental issues.

A draft NSDS was prepared by the Ministry of Environment and Forest with support from United Nations Environment Program (UNEP) and was placed before the Cabinet Committee meeting on 14 September 2009 for approval. After threadbare discussion the committee decided that NSDS would be updated with recent data and information and modified in light of the relevant government documents including the Election Manifesto of the present government, MDGs, PRSP, Perspective Plan and 6th Five Year Plan. The task of updating and modification of NSDS was entrusted to the General Economics Division of the Planning Commission.

The International Wing of General Economics Division carried out the task under close guidance of the Member, GED. The International Wing have consulted all relevant documents and data sources in its efforts to update and modify the draft NSDS. A multilayered consultative process has been followed to receive valuable inputs from experts, representatives of relevant ministries/divisions/agencies, civil society representatives and officials of planning commission. The document has benefitted enormously from the comments of Honourable Prime Minister and Members of the Cabinet in exclusive meetings on the document. I should say, the final document is a reflection of the collective wisdom of the nation.

The NSDS (2010-21) has identified five Strategic Priority Areas along with three cross-cutting areas with a view to achieving its stated vision and addressing long-term sustainability issue of productive resources. The strategic priority areas include sustained economic growth, development of priority sectors, social security and protection, environment, natural resources and disaster management. The three cross-cutting issues that will support the sustainable development of priority areas include disaster risk reduction and climate, good governance and gender. The Sustainable Development Monitoring Council will be the apex body to monitor and evaluate the progress of implementation of NSDS.

The formulation and elaboration of NSDS has benefitted from a number of persons. I am grateful to all of them for giving their valuable time to share their wisdom with GED. The foremost of them is Minister of Planning, Mr. A. K. Khandker, M.P, who took deep interest in NSDS and provided policy guidance to its preparation.

Honorable Finance Minister Mr. Abul Maal Abdul Muhith M.P, Honorable Agricultural Minister Begum Matia Chowdhury M.P, Honorable Economic Affairs adviser to the Prime Minister Dr. Mashiur Rahman and Honorable Forest and Environment Minister Dr. Hasan Mahmud M.P provided guidance, suggestions and inspiration while we prepare the documents.

The implementation of NSDS will be carried through different projects/programmes of concerned ministries/divisions/agencies which will be undertaken in the remaining period of the 6th Five Year Plan. The main burden of implementation will, however, fall on the 7th Five Year Plan (FY2016 - FY2020) period which will need to take due consideration of the strategies formulated in NSDS.



Prof. Shamsul Alam, Ph.D
Member
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LIST OF ABBREVIATIONS

AC	Air Conditioner
ACC	Anti-Corruption Commission
ADR	Alternative Dispute Resolution
BADC	Bangladesh Agricultural Development Corporation
BAPEX	Bangladesh Petroleum Exploration & Production Company Limited
BARC	Bangladesh Agricultural Research Council
BBS	Bangladesh Bureau of Statistics
BCC	Behaviour Change Communication
BCCRF	Bangladesh Climate Change Resilience Fund
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BDRCS	Bangladesh Red Crescent Society
BFDC	Bangladesh Fisheries Development Corporation
BFRI	Bangladesh Fisheries Research Institute
BMET	Bureau of Manpower, Employment, and Training
BR	Bangladesh Railway
BRT	Bus Rapid Transit
BWDB	Bangladesh Water Development Board
CBOs	Community Based Organisations
CBR	Community Based Rehabilitation
CDMP	Comprehensive Disaster Management Programme
CEDAW	Committee on the Elimination of Discrimination Against Women
CEP	Coastal Embankment Project
CETP	Central Effluent Treatment Plant
CHT	Chittagong Hill Tract
CNG	Compressed Natural Gas
CPP	Cyclone Preparedness Program
CUP	Centre for Urban Studies
CWBMP	Coastal and Wetland Biodiversity Management Project
DCC	Dhaka City Corporation
DDT	Dichloro-diphenyl-trichloroethane
DEMO	District Employment and Manpower Office
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
DOE	Department of Environment
DOF	Department of Fisheries
DMIC	Disaster Management Information Centre
DMIN	Disaster Management Information Network
DPP	Development Project Proposal
DWASA	Dhaka Water and Sewerage Authority
ECA	Ecologically Critical Areas
ECNEC	Executive Committee of the National Economic Council
EIA	Environmental Impact Assessment
EPB	Export Promotion Bureau
EPZ	Export Processing Zone
ETP	Effluent Treatment Plants
FCD	Flood Control and Drainage
FCDI	Flood Control, Drainage and Irrigation
FDI	Foreign Direct Investment
FY	Financial Year

GED	General Economics Division
GEF	Global Environment Fund
GDP	Gross Domestic Product
GoB	Government of Bangladesh
HDI	Human Development Index
HHK	Hybrid Hoffman Kiln
ICOR	Incremental Capital Output Ratio
ICT	Information and Communication Technology
IDCOL	Infrastructure Development Company Limited
IOCs	International Oil Companies
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IUCN	International Union for Conservation of Nature
IWT	Inland Water Transport
JPOI	Johannesburg Plan of Implementation
LED	Light Emitting Diode
LGED	Local Government Engineering Department
LNG	Liquefied Natural Gas
LRT	Light Rail Transit
MDG	Millennium Development Goal
MEA	Multilateral Environmental Agreement
MFA	Multi Fibre Arrangement
MIS	Management Information System
MNCH	Maternal, Neonatal and Child Health
MoEF	Ministry of Environment and Forests
MoHFW	Ministry of Health and Family Welfare
MoL	Ministry of Land
MoLE	Ministry of Labour and Employment
MoLGRDC	Ministry of Local Government, Rural Development and Cooperatives
MOPA	Ministry of Public Administration
MoPME	Ministry of Primary and Mass Education
MoSW	Ministry of Social Welfare
MoYS	Ministry of Youth and Sports
MTBF	Medium Term Budget Framework
MW	Mega Watt
NAP	National Action Programme
NAPA	National Adaptation Programme of Action
NBSAP	National Bio-diversity Strategy and Action Plan
NCB	National Coordinating Body
NCS	National Conservation Strategy
NCSA	National Capacity Self Assessment
NCSD	National Commission on Sustainable Development
NE	North-east
NEC	National Economic Council
NEMAP	National Environmental Management Action Plan
NFP	National Focal Point
NGO	Non-Government Organization
NICAR	National Implementation Committee on Administrative Reorganization
NPA	National Plan of Action
NSDS	National Sustainable Development Strategy
NRBs	Non Resident Bangladeshis
NRR	Net Reproductive Rate

NW	North-west
PA	Protected Area
PPP	Public Private Partnership
PSA	Production Sharing Agreement
RAJUK	Rajdhani Unnayan Karttripaksha
RNF	Rural Non-farm
SAARC	South Asian Association for Regional Cooperation
SDB	Sustainable Development Board
SDMC	Sustainable Development Monitoring Council
SFYP	Sixth Five Year Plan
SHS	Solar Home System
SPARRSO	Space Research and Remote Sensing Organization
SPEC	Special Project Evaluation Committee
SPM	Suspended Particulate Matters
SOEs	State Owned Enterprises
SRDI	Soil Resource Development Institute
SREDA	Sustainable and Renewable Energy Development Authority
SW	South-west
TFR	Total Fertility Rate
TAPP	Technical Assistance Project Proposal
ToT	Terms of Trade
TSP	Triple Super Phosphate
UNCED	United Nations Conference on Environment and Development
UNCSD	United Nations Conference on Sustainable Development
UNEP	United Nations Environment Programme
UCRA	Urban Community Risk Assessment
URRAP	Urban Risk Reduction Action Plan
VGD	Vulnerable Group Development
VGf	Vulnerable Group Feeding
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

EXECUTIVE SUMMARY

Bangladesh has maintained an average annual growth rate of about 6 percent for more than a decade with rate exceeding 6 percent in the last three consecutive years.(FY10,11 and 12) Sustained accelerated growth has led to improvement in per capita income and faster poverty reduction. Of the many challenges confronting the country in its attempt to attain the middle income economy status by 2021 is achieving sustainable development. The challenge to sustainability originates from both domestic source in the form of environmental degradation generated by natural and man-made processes and international source in the form of climate change. The National Sustainable Development Strategy (NSDS) has developed strategies to squarely meet the challenges of economic, social and environmental sustainability of the economy. It also represents an effort of the Government to meet its international obligation to global sustainable development agenda. The vision of the NSDS developed through extensive consultation with the stakeholders is “Achieving a happy, prosperous and enlightened Bangladesh which is free from hunger, poverty, inequality, illiteracy, and corruption and belongs completely to its citizens and maintains a healthy environment”.

The Strategy is based on the long term development vision of the Government, the Sixth Five Year Plan FY2011-FY2015, the Perspective Plan of Bangladesh 2010-2021 and other sectoral existing plans, policies and strategies of the Government. The strategies recommended in these documents have been compiled and prioritized in concise manner. The objective is to recommend strategies which contribute to sustainable development of the country most and implementable by 2021.The implementation period of the NSDS has been set as 2010-2021 with the hope that the country will reach the path of sustainable development by 2021.

The population of the country stood at 149.8 million in 2012 making it the 8th largest country in the world. Assuming replacement level of fertility is attained in 2021 the population is projected to reach 177 million in 2021 and 228 million in 2051. A large and increasing population living in a land of 147,570 sq km is the major challenge confronting the country. Providing adequate food and clothing and minimum shelter, productive employment, access to quality education, health services, adequate social protection and a healthy environment, which are constitutional obligations of the state, becomes more challenging with a large population. The need for population planning to maintain a balance between population, development and environment is emphasized. Slowing down the growth of population will contribute to the health of the environment and efforts to increase the standards of living not just for present generation but also for future generations. The other challenges of sustainable development include poverty and inequality, unplanned urbanization, energy security, inefficient water resources management, natural disasters and climate change.

The NSDS (2010-21) has identified five Strategic Priority Areas along with three cross-cutting areas with a view to achieving its stated vision and addressing long-term sustainability issue of critical areas. Key objective of the identified Strategic Priority Areas and sustainability of the critical areas which will be facilitated through the NSDS are given below:

1. Sustained Economic Growth

Accelerated growth has been suggested as a key development strategy for ensuring higher quality of life, faster poverty reduction and employment generation and transforming the economy into middle income status without compromising environmental sustainability. The key challenges of sustained economic growth are lower investment and saving rates, lower quality of human resource, lower total factor productivity and emerging land constraint.

Sustained and accelerated economic growth will be attained through enhancing public investment in infrastructure programmes, human resource development, research and development and IT encouraging private investment by improving investment incentives and investment climate and promoting PPP, improving quality of education and skills training, export growth and diversification, facilitating overseas employment, formulation and implementation of national land use plan and promoting green growth.

2. Development of Priority Sectors

The priority sectors which are important to sustainable development of the country are agriculture, industry, energy, transport and human resource development. The strategies suggested under these sectors are to provide direction to the economy as they will remain the engine for overall economic growth and support sustainable development of the country.

Agriculture and Rural Development

In the crop sub-sector, the key challenge is to achieve and maintain food security in the face of growing population, environmental pressure and climate change. The key elements of strategies are to put more focus on Aman and Aus paddy, ensuring supportive price and marketing facilities, developing and improving rural infrastructure, providing surface water irrigation, avoiding degradation of natural resources and strengthening agricultural research and extension.

In the fisheries sub-sector, the key challenge for sustainable development is better management of open water fisheries. The key elements of strategies are to enhance the current good practices of open water fisheries management; such as restocking, fish sanctuaries, banning fish capture during certain periods etc., constructing fish friendly infrastructure, e.g., fish passages in embankments and roads, and community based fisheries management. A comprehensive survey of marine fisheries will be undertaken to generate data required for sustainable development of marine fisheries. Sustainable development of shrimp cultivation will be promoted through defining shrimp farming zones in coastal region, encouraging semi-intensive shrimp farming and stopping encroachment of forested areas for shrimp farming.

The key challenge in livestock sub-sector is to increase production of livestock products (meat, milk and egg) to meet future demand. The strategies to meet this challenge revolves around ensuring feed and fodder, controlling diseases, supporting small holders and providing shelter for livestock during flood and cyclone.

The key challenges in rural non-farm activities include lack of access to credit, market and electricity and lack of education and training of entrepreneurs. The strategies aim at removal of barriers to growth of RNFs focusing on infrastructure, rural electrification, better physical and electronic communication services, education, training and skill formation, technological upgrading, access to market, rural financial services, and business development services for all including women and the poor.

Industry

The objective of industry sector strategy is to accelerate the rate of its growth without degrading the natural capital. The key challenges to development of this sector to ensure sustainable development include narrow industrial base, low productivity, and loss making SOEs, and reducing impact of industrial pollution. The strategies to attain the objective include diversifying industries and exports, reducing anti-export bias, improving investment climate, integrating environmental considerations into management practice, encouraging private

entrepreneurs to use cleaner technology, ensuring compliance with national environmental laws, rules and regulations, raising public awareness of environment protection, emission reduction devise and effluent treatment plants are in place while industries are operational, and restructuring and privatizing SOEs as appropriate.

Energy

The objective of the energy sector strategy is to provide energy security by tapping all conventional and non-conventional sources of energy to ensure accelerated pace of economic development and industrial production. The power sector strategies include enhancing power supply through increased generation and import electricity from regional countries, improving demand management, reducing dependency on gas for power generation, switching over to coal, nuclear power and other cleaner technology for electricity generation provision for dual fuel for electricity generation wherever possible, adjusting prices of electricity and liquid fuel to reflect cost of production and energy sector reform focusing on cost reduction, improved service delivery and system loss reduction, and use of environment friendly technologies in power generation.

In the gas sector the strategies focus on increasing financial and technical capacity of BAPEX, attracting international companies for offshore exploration of natural gas, improving technical and commercial performance of gas distribution companies, adjusting end user gas prices, avoiding risks of accident, gas extraction balancing both present and future needs of the country and regional and sub-regional energy cooperation.

Formulation of coal policy highlighting issues relating to exploration, extraction and utilization at present as well as in the future and promoting technologies in extraction and utilization of coal which have lower environmental impacts are key strategies in coal sector. Increased power generation through renewable sources such as biomass, solar, wind, and small hydro which do not pollute environment is emphasized.

Transport

The key objective of the transport sector is to provide mobility of the growing population at affordable cost while maintaining environmental sustainability. The key elements of strategies include giving priority to railway sector (e.g. double tracking of major railway corridors), construction of Padma Bridge, maintenance and up-gradation of existing road network (e.g. 4 to 6 lane national highways) and revival of inland water transport system through dredging.(both capital and maintenance dredging)

Human resource development

An educated, well trained and healthy population plays an important role in improving the quality of life of people, reducing poverty and attaining sustainable economic growth. Human resource development will comprise several strategies, namely population planning (containment and management), providing quality education and training, and providing quality health and sanitation services, nutrition and food safety for all.

Population planning

Population growth will be contained by giving preferential treatment to parents of one child for access to educational support, health, public sector employment, allotment of government house, old age pension and social security benefit, promoting girls' education and employment, ensuring increased age of marriage of girls, and improving population and family planning services.

Population Management Strategies will focus on reversing the trend of migration to the large cities by developing district headquarters and selected Upazila towns as viable alternatives, promoting both rural farm and nonfarm activities and growth of rural towns, undertaking safety net programmes as well as massive programmes for rehabilitation after a natural disaster, creating special economic zones to promote regional growth and wider distribution of jobs, seizing opportunities for international employment and creating awareness of all relevant ministries of their roles in population management with MOHFW as the lead ministry.

Quality Education and Training

Quality education will be promoted through sustaining gender parity in primary and secondary enrolment, achieving gender parity at tertiary level, improving quality of education in all types of education systems, ensuring equity and equality in all levels of education, promoting the spirit of liberation war, history, heritage, and national culture in education, teaching environmental issues in primary and secondary curriculum, emphasizing science and technology education and promoting research, development, extension and utilization of science and technology.

The quality of technical and vocational education and training will be enhanced through improving efficiency and quality of programmes, link between training and job markets, and teacher training, ensuring capacity utilization of public training institutes, encouraging private investment in skill development and training and encouraging private companies to undertake in-service training of labour to improve the overall skill levels of workers.

Quality Health and Sanitation Services

The major challenge of health sector is to meet the diverse health care needs of a growing population which will reach 177 million in 2021 along with improvement in quality of services to achieve HNPS targets.

The strategies include increasing the number of doctors nurses, and health technicians, ensuring strong health education programme, increasing sanitation coverage, increasing contraceptive prevalence rate to arrest population growth, ensuring every household's access to safe drinking water, developing clinical waste management system, strengthening training programmes for paramedics, nurses, and health workers and undertaking capacity building of institution.

Improved Nutrition

Meeting the nutritional target of 2122 kcal per day for 87 percent of the people by 2021 by providing a more balanced diet (reduction in contribution of cereals while increase in that of animal food comprising meat, fish, egg, milk, and milk products, oil, potato and sugar) is a key challenge.

The strategies include providing better knowledge in health and nutrition, enhancing agricultural production along with diversification to more non-cereal and non-crop products, mainstreaming nutrition service in regular services of DGHS and DGFP, improving further the

coverage of bi-annual vitamin A supplementation for children aged between 9 months and 5 years, coverage of iron-folic acid supplements for pregnant women, and coverage of other nutrition service, enhancing social mobilization and implementation of Behavioural Change Communication (BCC) activities, and mainstreaming gender aspects into nutrition programmes.

Food safety

Unsafe food is a major health hazard in Bangladesh affecting food security. The strategies for providing food safety focuses on developing national policy, strategy and action plan for controlling actions affecting food safety, increasing awareness of consumers about food safety, strengthening food inspection services, establishing a central food testing laboratory at Institute of Public Health and strengthen capacity of scientists and technicians and ensuring effectiveness of National Food Safety Advisory Council.

3. Urban Environment

Since rapid urbanization is inevitable with the economic development of the country, sustainable development of the country depends intricately on sustainable urban development. Five key issues for sustainable development of urban areas have been addressed in this section. These are urban housing, water supply and sanitation, pollution management, urban transport and urban risk reduction.

Urban housing

Demand for housing has been increasing in urban areas as a result of faster growth of urban population, growth of income and remittance growth. While housing development has served growing urban population, loss of wetland, open spaces, public parks, and land with tree cover has strong negative impact on environmental sustainability. It also affects social sustainability through its effects on growth of children and health of people including children. Some of the strategies that have been suggested for sustainable urban development include improved public commuting system to spread cities, contextual building design including introduction of green building concept, adhere to land zoning and National Building Code, preservation of wetland and natural ecosystems in and around the cities, and sustainable urban housing for slum dwellers.

Management of urban slums

The key challenge includes management of slums to make them part of dynamic urban economy. The strategies include upgrading slums, resettlements of slum dwellers, ensuring tenure security, enhancing access to infrastructure and all urban services, promoting income generating activities and providing social safety net coverage with special attention to generation of employment opportunities for the youth.

Water supply and sanitation

There is a general decline of ground water table all over the country because of extraction for diverse use including agriculture. For water supply and sanitation, the challenge is to reduce pressure on current source of water supply which is ground water and providing sanitation at

affordable cost. The key strategy should be diversification of source of water supply and sinks of sewage. It is especially important to shift from ground water to surface water as a source of water supply.

Pollution management

Reducing industrial water pollution and air pollution due to transport and managing solid waste are the key challenges for pollution management in urban area. Enforcement of environmental rules and regulation, industrial zoning and water quality monitoring forms the core of the water pollution management strategy. Improved mass transport system is the strategy to reduce both traffic congestion and air pollution.

Urban transport

The key challenge in urban transport sector is developing an integrated and balanced system in which all modes can perform efficiently. Strategy for urban transport revolves around giving prioritization to pedestrian traffic and mass transit (such as Light Rail Transit, Metro, Bus Rapid Transit, and Circular Waterways).

Urban risk reduction

Dense population with rapid urbanization, industrialization and the lack of land use planning have created major environmental problems which contribute to increasing disaster risks, especially in urban areas. In this regard, unplanned urbanization in particular has contributed to major environmental problems. Urban Community Risk Assessment (UCRA) will be conducted to assess the risks from disasters and effects of climate change on cities. Urban Risk Reduction Action Plans (URRAP) will be developed in all cities and small to medium scale risk reduction interventions will be designed for incorporation in the cities' development plans and budgets. Vulnerability will be reduced through awareness raising, safety compliance and provision of incentives for risk reduction behaviour and investments by urban dwellers who are able to undertake construction to comply with the building standards.

3. Social Security and Protection

Rights of citizens to quality, minimum shelters for all including access to services and utilities, social safety net, women's advancement and rights, children's advancement and rights, special services for aged and people with disability, expanded employment opportunities and enhancing access to information and communication technology and facilities need to be ensured to achieve sustainable development. These are the critical indicators of social development which is one of major pliers of sustainable development. Creating provisions, ensuring access and maintaining quality services are key challenges to meet growing demand of a large population at present and future.

4. Environment, Natural Resource and Disaster Management

One of the primary objectives of this Strategic Priority Area is to ensure environmental protection for humans, ecosystems and resources with due emphasis on conservation, augmentation and efficient utilization of the natural resources. It covers water resources,

forestry and bio-diversity, land and soil, coastal and marine resources, and natural disasters and climate change.

Water resources

Managing water scarcity in a sustainable manner is key challenge for sustainable development in water resources sector. Key elements of strategy include restoration and harnessing of surface water system, enter into bilateral agreements for sharing of waters of trans-boundary Rivers, formulation of river management plan, increasing water use efficiency and reducing waste, proper ground water management and water pollution management.

Forest and bio-diversity

Since most of the forest and biodiversity resources are in a degraded state, protection and conservation of these resources are the focus of the strategies in this area. The key elements of the strategies include protection and expansion of forests and forest resources, retaining the integrity of hill ecosystems that sustain plant and animal biodiversity, enhancing forest biodiversity and wildlife conservation through expanding protected area, restoring ecosystems and rehabilitating endangered species, ensuring wise use of natural resources with special emphasis on maintaining the integrity of wetland ecosystems, protecting the forest and wetland resources through adopting co-management approach with community participation, further development of coastal green belt and promoting people's ownership of social forestry. The strategy also includes for halting the degradation of fresh water biodiversity once was in plenty by gradual shifting to organic mode of agricultural production and other eco-friendly activities in the terrestrial and aquatic systems.

Land and soil

In a land scarce country, ensuring wise use of land is the major challenge. Soil degradation due to over-exploitation is another major challenge to sustainable agricultural. Key strategic elements include land zoning, preventing soil and land loss through improved agronomic practices and river training works, land reclamation in the coast, restoring soil fertility and checking salinity intrusion in the coastal region and desertification especially in the northwest region.

Coastal and marine resources

Bangladesh coast and the marine zone are especially rich in diverse natural resources. The challenge is that natural resources in the coastal zone will have to be managed in a manner that will not only ensure their sustainability but will also secure access to the poor for meeting their livelihood needs. The strategies to meet this challenge include estuary and coastal ecosystem management, coastal land zoning, integrated management of coastal water infrastructures, environmental and socially responsive shrimp farming, and marine and coastal environment development.

Natural disasters and climate change

Bangladesh has made considerable investments in disaster management over the years and is considered to be a successful country in disaster management. The challenge Bangladesh now faces is to scale up these investments in disaster risk reduction to create a suitable environment for the economic and social development of the country in the face of climate change. The strategic elements in this regard include rehabilitation and climate proofing of coastal polders

with especial focus on removing water logging, disaster risk reduction, mainstreaming disaster risk reduction and climate change, coastal char land afforestation, development of climate stress tolerant crop varieties and utilization of climate change funds.

5. Cross Cutting Areas

Three important cross cutting areas have been identified to support the Strategic Priority Areas of the NSDS. These crosscutting areas are Good Governance, Gender and Disaster Risk Reduction and Climate Change. These cross-cutting areas have been addressed in Strategic Priority Areas whenever appropriate. It appears that without addressing climate change overall sustainable development cannot be achieved. The Bangladesh Climate Change Strategy and Action Plan, 2009 prepared by the Ministry of Environment and Forest can be treated as guiding document to address climate change issue in achieving sustainable development of Bangladesh.

6. Good Governance

The objective of good governance sector strategy is to ensure an effective parliamentary system, sound law and order, pro-people, efficient public service delivery, independent, free, transparent and accountable legal and judicial system, strengthened local governance, and a corruption-free inclusive society with social justice in all fairness. The strategies focus on strengthening institutional capacity, reforming key institutions, controlling corruption, enhancing efficiency of planning and budgeting, financial sector monitoring, promoting e-governance, ensuring access to information, and reviving value and ethics in the society.

7. Institutional Framework

Apart from the existing government institutions for planning, budgeting, implementations, and implementation monitoring two new institutions need to be created for implementation and monitoring progress of the NSDS. It will facilitate keeping coherence between and among different strategic priority areas and sectors as well as existing national and sectoral policies during implementation of the strategy and monitoring progress. Sustainable Development Monitoring Council (SDMC) will be comprised of Honourable Minister of Environment and Forest, Member of Parliament, Secretaries of concerned ministries, head of relevant government departments and agencies, civil society representatives, and private sector representatives as members. The Honourable Minister of Planning will be Chairperson of the council which will have an oversight role in ensuring sustainable development of the country with special focus on effective implementation and monitoring progress of different elements of the NSDS. The Council will also review the obligations and commitments under the different Multilateral Environmental Agreements (MEAs) including United Nations Conferences on Sustainable Development (UNCSD).

The Sustainable Development Board with the Cabinet Secretary as the Chairperson of the board will be created to review the implementation status of the decisions of the SDMC and provide a report to the SDMC before its meeting. The Ministry of Environment and Forest will provide secretarial service to SDB. SDB will provide technical advice to the SDMC in implementing and monitoring strategic priority areas identified in the National Sustainable Development Strategy and suggest interim modification of the SD strategy for Bangladesh. The General Economics Division of the Planning Commission will carry out the monitoring function as part of its overall monitoring of results of development plan.

The Way Forward

The strategies of national sustainable development will be implemented by concerned ministries/divisions and their agencies through adjustments to on-going programmes and projects or undertaking new programmes/projects in the remaining period of the 6th Five Year Plan. The policies and strategies of the 7th Plan will reflect the strategies of NSDS and will thus act as vehicle for implementing the strategies.

CHAPTER 1: INTRODUCTION

1.1 Background

Bangladesh has maintained an average annual growth rate of about 6 percent for more than a decade with growth rate exceeding 6 percent in the last three consecutive years (FY10, 11 and 12). The fact that this growth has been achieved in the face of occurrence of natural disasters, world food price crisis and global recession during this period indicates the resilience of the economy supported by good economic management and favorable external factors. Sustained growth has contributed to faster reduction in poverty from 48.9 percent in 2000 to 31.5 percent in 2010 implying an average annual rate of decline of 4.3 percent over the period. Growth has also been associated with improvement in social indicators such as education, health and nutrition, and housing and sanitation. However, the recent progress has been facing fundamental challenges including maintaining macroeconomic stability, increasing energy supply to meet growing demand, lifting investment rate from years of stagnancy, improving competitiveness of the economy and achieving sustainable development.

The challenge to environmental sustainability in Bangladesh originates from two sources – internal and external. Long term acceleration in growth rate has rested on improved growth of agriculture, stable growth of services and faster growth of industry especially manufacturing. Growth of these sectors coupled with increasing population pressure has been associated with degraded agro-ecosystem, rivers and wetlands, coastal environment and urban environment and degradation and depletion of ground water and deforestation and desertification affecting livelihoods of people and quality of their life.

The other challenge to sustainability stems from climate induced changes caused by greenhouse gases in the atmosphere which is growing at an unprecedented rate and magnitude. The manifestation of climate change is very much evident in Bangladesh. The coastal region in the South and South Western part of Bangladesh is already faced with frequent high tide episodes induced inundation and salinity intrusion, reduced livelihood opportunities and so on. More frequent and severe floods, tropical cyclones, storm surges and droughts pose multiple threats to growth and achievement of targets of Vision 2021. There is also regional challenge to sustainability – decline in water flow in trans-boundary Rivers has resulted in river siltation, desertification in northwest and salinity intrusion in southwest area of the country with consequent adverse effects on environment and livelihoods.

The Government is aware of the grave challenges confronting the country. It has prepared the Perspective Plan of Bangladesh (2010-2021) and the 6th Five Year Plan (FY2011-FY2015) which is considered as the vehicle for implementing the Perspective Plan. The Perspective Plan envisions that by 2021, the war against poverty will have been won, the country will have crossed the middle income threshold, with the basic needs of the population ensured, and their basic rights respected, when everyone is adequately fed, clothed and housed, and have access to health care. And all this is achieved on a sustainable basis without damaging the environment. Furthermore, this progress will be ensured in an environment where every citizen has the

opportunity to fully and positively contribute to the economy and society and equitably share the benefits of progress achieved.

1.2 Global Processes and Bangladesh

Sustainable development emerged as a new development paradigm and has been adopted by the international community as an overarching development goal since the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil in 1992. The concept of sustainable development was introduced by the Brundtland Commission in its report, *Our Common Future*, in 1987 as “....development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The Rio declaration at the UNCED of 1992 endorsed a total of 27 principles towards achieving sustainable development that are captured in Agenda 21. Chapter 8 of Agenda 21 commits the governments to develop and pursue the National Sustainable Development Strategy (NSDS). Agenda 21 provides a thorough and broad-ranging programme of actions demanding new ways of investing in our future to reach global sustainable development in the 21st century. Its recommendations ranged from new ways to educate, to new ways to care for natural resources, and new ways to participate in designing a sustainable economy. The overall ambition of Agenda 21 was breathtaking, for its goal was nothing less than to make a safe and just world in which all life has dignity and is celebrated.

At the Rio+5 Summit in 1997, governments reaffirmed that the NSDS was an important mechanism for achieving sustainable development. It was also agreed that a National Coordinating Body (NCB) could be the useful multi-stakeholder's assembly or body to bring all the relevant stakeholders, such as government, business and civil society to a common platform and, that to address issues pertaining to sustainable development. At the World Summit on Sustainable Development (WSSD) held in 2000, heads of states and governments reaffirmed their commitments to the principles of sustainable development and other provisions of Agenda 21.

At the World Summit on Sustainable Development in Johannesburg in 2002, governments adopted the Johannesburg Plan of Implementation (JPOI) which called upon countries to take immediate steps to make progress in the formulation and elaboration of the NSDS, and begin their implementation by 2005.

The Ministerial Declaration adopted at the fifth Ministerial Conference on “Environment and Development in Asia and the Pacific” held in Seoul in 2005 introduced the approach of environmentally sustainable economic growth (Green Growth). The Green Growth is a new growth strategy that can turn the tradeoff between economic growth and environmental protection into a win-win synergy in which ‘going green’ drives economic growth.

The United Nations Conference on Sustainable Development held in Rio de Janeiro from 13-22 June 2012 (Rio+20) was participated by 191 UN member states including 79 Heads of State or Government. The outcome of the Conference, titled “The Future We Want” provides outline of sustainable development and the path to achieve it. The document is organised in six sections: Our common vision; Renewing political commitment; Green economy in the context of sustainable development and poverty eradication; Institutional framework for sustainable development; Framework for action and follow up; and Means of implementation.

The Government of the People’s Republic of Bangladesh has showed its enthusiasm and commitment to the Multilateral Environmental Agreements (MEAs). It has signed and ratified

most of the MEAs and formulated several strategies and action plans to fulfill its international commitments and support national development. It has also formulated several strategies and action plans to support national and sectoral policies.

The noteworthy strategies and action plans prepared under the auspices of the Ministry of Environment and Forests to address environment and climate change are: National Conservation Strategy (NCS), National Environmental Management Action Plan (NEMAP), National Bio-diversity Strategy and Action Plan (NBSAP), National Action Programme (NAP) for Combating Desertification in Bangladesh, Bio-safety Guideline for Bangladesh, National Adaptation Programme of Action (NAPA) to address climate change, National Capacity Self Assessment (NCSA), and Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009).

1.3 National Sustainable Development Strategy (NSDS)

Article 18 A: Protection and Improvement of Environment and Biodiversity, in the Constitution of the People's Republic of Bangladesh, proclaims "The state shall endeavor to protect and improve the environment and to preserve and safeguard the natural resources, biodiversity, wetlands, forest and wildlife for the present and future citizens". Sustainable development is thus a constitutional obligation in Bangladesh.

The NSDS is based on the existing plans, policies and strategies; other elements of the NSDS include participatory, political commitment and meeting international commitment. It is also based on the globally accepted principles of sustainable development defined through the Rio Declaration and Agenda 21, Johannesburg Declaration and Implementation Plan and Environment and Development in Asia and the Pacific.

The NSDS has addressed mainstreaming sustainable development challenges across sectors and integrate economic, social and environmental objectives across sectors. It also includes mechanism for monitoring implementation progress and institutional mechanism for people's participation.

1.4 Principles of Formulating NSDS

The United Nations Environment Programme (UNEP) and the Government of Bangladesh came to an agreement in the middle of 2007 to prepare the NSDS for Bangladesh and to establish an institutional structure in the form of National Commission on Sustainable Development (NCSD) or any other appropriate body. The Government designated the Ministry of Environment and Forests (MoEF), Government of the People's Republic of Bangladesh, as the National Focal Point (NFP) to coordinate the formulation of the NSDS, in close coordination with UNEP. The MoEF designated the Department of Environment as the executing agency for preparation of the NSDS.

The guideline for preparation of the NSDS for Bangladesh was based on the guideline prepared by the United Nations Environment Programme (UNEP). This guideline defined the Principles, Functions, Role and Elements of NSDS and Process in managing the sustainable development policies and actions in Bangladesh. The approaches and principles for formulation of the NSDS for Bangladesh, considering the guideline as well as country circumstances, are given below.

People Centered: The formulation process has followed People Centered approach in preparing the NSDS for Bangladesh so as to ensure long-term beneficial impacts on

disadvantaged and marginalized groups. Engagements of stakeholders at different stages of access to services for the people are key elements of people centered approaches.

Develop Long-term Vision: A long term vision for Bangladesh has been developed in consultation with all relevant stakeholders. The long term vision has also identified short-term and medium term strategies and activities to help achieve long-term vision.

Comprehensive and Integrated: Formulation of the NSDS has made efforts in integrating economic, social and environmental objectives, which are known as three pillars of sustainable development.

Comprehensive and Reliable Analysis: Priorities have been identified on the basis of a comprehensive analysis of the present situation and of forecasted trends and risks, examining the links between local, national and global challenges.

High-level Government Commitments and Lead Institutions: The Ministry of Environment and Forests set up a Steering Committee to guide the entire process of preparation which helps ensure high-level involvement and commitments. The Cabinet Division formulated Ministerial Committee to guide revision and updating of the NSDS in the light of Vision of the democratic government, the Perspective Plan of Bangladesh (2010-2021) and the 6th Five Year Plan (FY2011-FY2015). Attempts have also been made for ensuring such commitment involving national and local governments on a long term basis.

National and Local Level Linkages: During formulation of the NSDS, the Project Management Office organized regional and national level consultation for active engagement both in preparation and implementation of National Sustainable Development Strategy by national and local government and general mass in implementing the NSDS.

Building on Existing Mechanisms and Strategies: The National Sustainable Development Strategy has been built on existing plans, policies, strategies and implementation mechanisms to ensure complementarities and coherence.

Develop and Build on Existing Capacities: Existing political, institutional, human, scientific and financial capacity of Bangladesh have been assessed at the outset of the NSDS. Emphasis has been given on building requisite capacities on a continuous basis for successful preparation and implementation of the NSDS.

Incorporating Monitoring, Learning and Improvement: The NSDS has suggested appropriate indicators to monitor and evaluate the processes, track progress, capture lessons, and signal deviation, if any.

The vision and strategic priority areas along with goals of the National Sustainable Development Strategy of Bangladesh have been identified through stakeholder consultations at national and regional levels. The objectives, targets and strategies suggested in the National Sustainable Development Strategy are primarily based on the outputs and findings of the consultations at various stages of its preparation. The consultation outputs have been reviewed and supplemented by the strategies envisaged in the existing national plans and other relevant strategies and sectoral policies.

1.5 Sustainable Development Vision

Sustainable development focuses on inclusive development that allows people to contribute to and benefit from development and at the same time preserves and conserves the natural ecosystems. The long term development vision of Bangladesh has been set in the Perspective Plan as transformation from a low income economy to the first stages of a middle-income nation by 2021. Bangladesh in 2021 shall be a country in which (i) every citizen has equal opportunities to achieve his/her fullest potential, (ii) all citizens enjoy a quality of life where basic health care and adequate nutrition are assured, (iii) all citizens have access to a modern, technical, and vocational education tailored to meet the needs of a technologically advancing nation, (iv) sustainability of development is ensured through preserving and conserving natural ecosystems and better protection from climate change and natural disasters, (v) there is respect for principles of democracy, rule of law, and human rights, (vi) gender equality is assured; so are the rights of ethnic populations and of all other disadvantaged groups including persons with disabilities, and (vii) diversity and creativity of all people are valued and nurtured, (viii) effective participation in equitable and rules based multilateral trading system will be promoted, and (ix) people will have respect for tolerance, understanding, moderation, religious freedom and human dignity. In the transformation process the government will play the role of facilitator of private initiatives and innovation while the private sector will serve as an engine of growth. The public and private sectors will collaborate effectively and efficiently through public private partnerships and other innovative models to deliver infrastructure, utility and other services.

Based on long term national vision of 2021, the vision of Bangladesh NSDS is proposed as a result of consultation processes as follows:

“Achieving a happy, prosperous and enlightened Bangladesh which is free from hunger, poverty, inequality, illiteracy, and corruption and belongs completely to its citizens and maintains a healthy environment.”

1.6 Strategic Framework

The framework for NSDS is presented in Figure 1.1 which indicates that the goal of the strategy is to ensure sustainable development. Sustainable development denotes the processes by which people satisfy their needs and improve their quality of life in the present while protect the ability of future generations to meet their own needs. A better quality of life means a higher standard of living, usually measured in terms of income level and uses of resources and technology. It is anchored on three pillars which are to evolve concomitantly on a sustainable basis, namely, economic, social and environmental; it is centered on the human being implying that it is inclusive and promotes unity in cultural and other forms of diversity. The goal is based, as mentioned before, on a vision formed through a process of stakeholder consultations. To fulfill the vision of sustainable development the following five strategic priority areas are identified:

Sustained Economic Growth: It is expected that implementation of different strategies under sustained economic growth will ensure sustained accelerated growth, as identified in the several national policies and strategies, without compromising environment sustainability and enhancing social equity. It will also facilitate poverty reduction through employment generation, bring effective utilization of energy and mineral resource, greening manufacturing industries, promotion of exports, and enhance remittance through creating of job in international market.

Development of Priority Sectors: It attempts to provide a direction to search for possible ways and means in the agricultural sector including fisheries and livestock and rural nonfarm activities, industry, energy, transport and human resource development sector as they will

remain the engine for overall economic growth and support environmental and ecological sustainability.

Urban Development: It provides for strategies for sustainable cities. Key dimensions of cities include affordable urban housing, safe and adequate water supply and hygienic sanitation, pollution management and urban transport and management of slums.

Social Security and Protection: It suggests different strategies to ensure the rights of the citizens, quality health and sanitation services, minimum shelters for all including access to services and utilities, quality education, creating social safety net, women's advancement and rights, children's advancement and rights, special services for aged people and persons with disabilities, and ethnic people. These are critical indicators for demonstrating growth of social development.

Environment, Natural Resource and Disaster Management: Primary objective of this strategic priority area is to ensure environmental protection for humans, ecosystems and resources which will support conservation, augmentation and efficient utilization of natural resources. It covers land, forest, water, biodiversity, and pollution control as well as climate change as one of the most important issue. It appears that without addressing climate change overall sustainable development cannot be achieved.

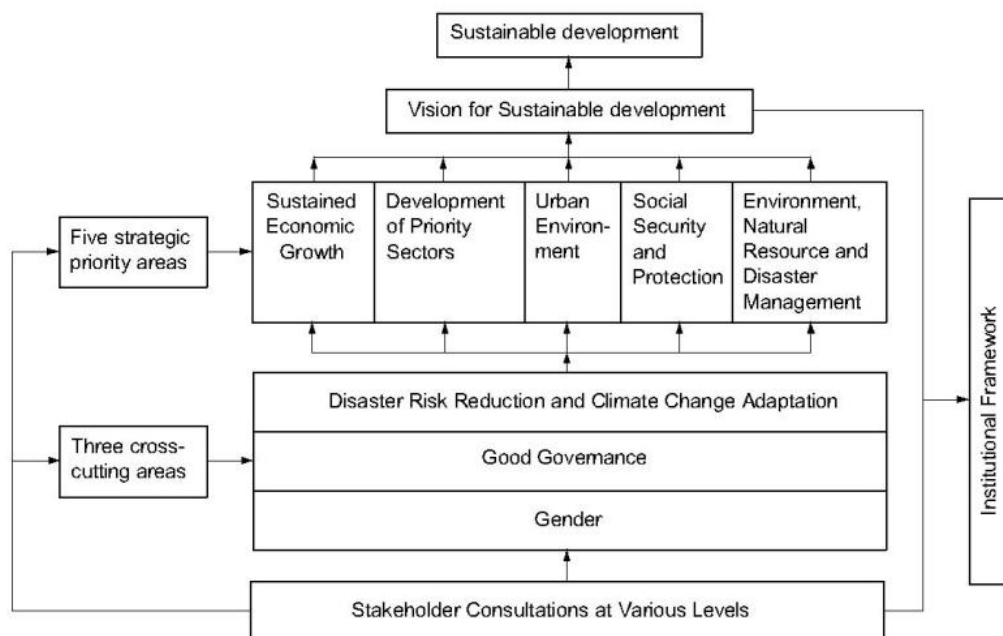
The NSDS has also identified three cross-cutting issues which are important for all five strategic priority areas. These cross-cutting areas are:

Disaster Risk Reduction and Climate Change: Objective of this cross cutting area is to highlight strategies to deal with climate change issues including adaptation, technology transfer, mitigation and development, and capacity building in all relevant areas especially agriculture, industry, energy, transport, utilities, urban housing and shelter.

Good Governance: Objective of this cross-cutting area is to highlight and suggest need for good governance which is necessary to support and facilitate overall implementation of strategies suggested under each strategic priority area.

Gender: Different aspects of gender particularly for women's advancement and rights have been primarily incorporated in the social security and protection section of the report.

**Figure 1.1 NATIONAL SUSTAINABLE STRATEGY FRAMEWORK IN FLOW
CHART IS SHOWN BELOW**



The strategies in the strategic priority areas and the cross-cutting areas are developed to ensure economic, social and environmental sustainability of development. The objective of each priority areas, present status, key challenges and future strategies have been identified through stakeholder consultations and review of existing development plans, sectoral policies and strategies.

CHAPTER 2: CHALLENGES OF SUSTAINABLE DEVELOPMENT

The challenges to attaining medium and long term goals of development of Bangladesh are identified in the 6th Five Year Plan and the Perspective Plan of the country. The development goals of the country are set taking into considerations the long term vision of development of the government. The NSDS has identified through the consultation process some key challenges that need to be overcome to ensure sustainable development.

2.1 Population

Bangladesh is the 8th largest country in the world with a population of 149.8 million in 2012 (BBS, Population and Housing Census 2011) living in an area of 147,570 sq km. The population density of the country is 1015 per sq km that makes it the most densely populated country in the world with the exception of few island nations/territories such as Singapore and Hong Kong. These population facts have important bearing on sustainable development as human impact on the environment depends on population size, per capita consumption and the environmental damage caused by the technology used to produce what is consumed or exported for consumption of other nations.

Early policy makers of the country identified population as the number one problem of the country. The urgency of the situation was amply reflected in the statement, “No civilized measure would be too drastic to keep the population of Bangladesh on the smaller side of 15 crores for the sheer ecological viability of the country.” (Planning Commission, First Five Year Plan 1973-77). Policies and strategies were devised to control population growth. Consequently, the population growth rate declined from 2.48 percent per annum in 1974 to 1.37 percent per annum in 2011. TFR has decreased from 6.3 in 1975 to 2.11 per woman in 2011 with 2.31 in rural and 1.78 in urban areas (BBS, Report on Sample Vital Registration System – 2011). These are commendable achievements for a least developed country like Bangladesh but more needs to be done for sustainable development.

The effects of high population growth rate and a large population on sustainable development are already visible. A huge population – estimated at about 45 million, lives below the poverty line. Inadequate and poor health services, poor quality education and skills, inadequate protection against risks and vulnerability, high unemployment and underemployment rate, poor governance, excessive use of natural resources such as land, water including ground water, and forest, decline in capture fisheries and increase in air, water and land pollution are some of the important features of the country which are propelled partly by high population growth relative to country's resources and their exploitation.

A large population along with high population growth required faster growth of agricultural production with significant pressure on environment. Some of the ways in which population growth has impacted on environment includes degradation of agricultural land through unbalanced use of chemical fertilizers, decline in tree cover due to collection of fuel wood, hill cutting and shift of land to crop agriculture, arsenic contamination of underground water due to over-pumping of underground water for irrigation, loss of open water fish stock due to over-fishing, decline in livestock growth because of lack of grazing land.

Concurrently, the country has benefited from declining population growth. Reduced population growth has resulted in relatively higher per capita income growth and higher per capita income with associated benefits for income poverty reduction and improvement of social indicators.

Current demographic trends indicate if total fertility rate (TFR) reaches replacement level in 2021 (NRR=1) total population will reach 177 million in 2021 and 228 million in 2051 (BBS, Sectoral Needs-based Projections in Bangladesh, March 2006). Continued population growth poses considerable challenges for sustainable development. Article 15 of the Constitution requires the state to secure to its citizens (i) provision of basic necessities of life including food, clothing, shelter, education and medical care, (ii) the right to work that is guaranteed employment at reasonable wage having regard to the quantity and quality of work, and (iii) the right to reasonable rest, recreation and leisure and the right to social security. The constitution also guarantees intergenerational equity in the distribution of ownership and utilization of natural resources. Development policies and strategies have to be geared to make all these available to the growing population of the country. The need for population planning to maintain a balance between population, development and environment needs to be recognized. Slowing the growth of population will contribute to the health of the environment and efforts to increase the standards of living not just for present generation but also for future generations.

Population, Land and Agriculture

Population growth has been raising demand for agricultural goods mainly food grains as well as other goods and services. Production of other goods and services such as housing, manufacturing, health, education, and utilities uses land some of which are agricultural land. Consequently, net cropped area declined from 8.56 million hectare in FY1981 to 7.84 million hectare in FY2011 implying a decline of about 9.2 percent during this period. In other words, agriculture has lost 24000 ha of land every year. The decline in land in the face of increasing population implies shrinkage in land-man ratio from 0.10 ha per person in FY81 to 0.05 ha per person in FY11 threatening one aspect of sustainability of agriculture. Rational responsive farmers and strongly supportive government have enabled the agriculture sector up to now to successfully respond to this challenge and Bangladesh could reach self-sufficiency in food grains production. First, farmers have increased cropping intensity from 153.74 to 190.66 through double and triple cropping during this period. Secondly, technological change in agriculture especially in rice production consequent on research and development and extension services has raised crop yield. If present trends in rice acreage –rising by 40,667 ha every year and yield- rising by 0.052 tons per ha continue rice acreage will reach 11.94 million ha and yield per ha will reach 3.43 tonnes in 2021 giving 40.95 million tonnes of rice. On the other hand, assuming a population of 177 million and daily consumption of 454 gm of rice the total rice requirement will reach 29.33 million tonnes; Bangladesh will enjoy a rice surplus.

Table 2.1 Trends in agriculture land, population, rice acreage and rice production, FY1981-FY2021

Year	Net cropped area (million ha)	Total cropped area (million ha)	Population (million)	Rice acreage (million ha)	Rice production (million tonnes)
1980-81	8.56	13.16	89.9	10.31	13.88
2010-11	7.84	14.94	149.8	11.53	33.54
2020-21 (Projected)	7.60	15.53	177.00	11.94	40.95

Source: GED calculation based on BBS, Statistical Yearbook, different issues.

However, there is no room for complacency. Bangladesh is faced with several challenges that might slow the growth of food production in the future. First, soil degradation due to continuous

rice monoculture, inadequate soil conservation measures, over-cropping and unbalanced fertilizer use can affect productivity negatively. Secondly, lack of availability of water for irrigation due to aquifer drawdown, reduction in transboundary river flows and increasing drought due to climate change can constrain future production. Thirdly, rice area might decline in south western districts due to salinity intrusion. Fourthly, environmental degradation due to increasing use of fertilizers, insecticides and arsenic contaminated water might need to be reversed. Fifthly, sustained increase in yield will require reduction in yield gap through strong extension work and continuous innovation of new varieties of rice and other crops through higher investment in research and development. Sixthly, climate change can accentuate many of the current natural hazards and create new hazards leading to decline in food grain production and its fluctuation in the long run.

The Government has been undertaking various measures to reverse or arrest the negative trends. Some of the measures include promoting crop diversification, promoting use of surface water, signing water sharing treaties with neighbouring countries, preparing Delta Plan, promoting balanced use of fertilizers, strengthening extension services, encouraging less water using aus and aman rice cultivation and cultivation of drought resistant and salinity resistant rice in concerned areas and investing in research and development. These policies need to be strengthened further and new strategies will be adopted whenever required.

2.2 Poverty and Inequality

Poverty reduction has been a priority objective of development of Bangladesh since its emergence as an independent nation in 1971. Starting from the First Five Year Plan (1973-1978) which emphasized poverty reduction through employment generation, all development plans as well as the two poverty reduction strategy papers recognized the importance of poverty reduction and developed policies and strategies for poverty reduction. Consequently, significant reduction in poverty has taken place in the last four decades – the incidence of poverty as measured by headcount rate declined from more than 80 percent in 1973-74 to 31.5 percent in 2010 (BBS, Report on the Household Income and Expenditure Survey 2010). Other measures of poverty such as poverty gap and squared poverty gap showing the depth and severity of poverty respectively have shown long term trends similar to that observed for the headcount rate. Despite notable progress in poverty reduction Bangladesh faces the stark reality that about 46.8 million of its population still live in poverty. The other dimensions of poverty which make poverty reduction more challenging in the future are rural-urban divide in poverty, regional variations in poverty with the western region of the country having a higher incidence of poverty, and the fact that 17.6 percent the total population live in extreme poverty or chronic poverty. Higher dependency ratio, decline in the availability of natural and common property resources, limited access to financial and human resources and incidence of multiple shocks such as natural and health shocks are usual correlates of extreme poverty. Besides, people living in remote char areas and remote areas of the hill tracts region, ethnic communities and people with disability are victims of extreme poverty.

The benefits of economic growth do not accrue to all individuals or households equally. Increasing inequality in the distribution of income implies a higher proportion of income accrues to the households in the higher income deciles at the cost of the households at the lower deciles. The households at the lower deciles thus miss the opportunity to reduce their income poverty taking full advantage of economic growth. Thus inequality in the distribution of income has adverse effects on poverty reduction.

Inequality has been rising in Bangladesh for a long time. Gini coefficient which provides a measure of income inequality increased from 0.36 in 1984 to 0.467 in 2005 thus reducing the

effect of growth on poverty reduction. However, the latest HIES (2010) shows a marginal decline in Gini coefficient to 0.458 which resulted in stronger positive effect of growth on poverty reduction. This decline is, however, an outcome of decline in urban inequality while rural inequality has continued to grow. Apart from its negative impact on poverty reduction inequality especially high inequality (Gini>0.50) can generate social instability. It should be noted the Gini coefficient in 2010 is still higher than what prevailed in 2000. The challenge is to contain the increase in inequality in both rural and urban areas which will result in decline in national income inequality.

Table 2.2 Percentage share of income of lower 5% and top 5% households and Gini coefficient

Income Groups	2010	2005	2000
Lower 5%	0.78	0.77	0.93
Top 5%	24.61	26.93	28.34
Gini coefficient	0.458	0.467	0.451

Source: BBS, HIES 2010 and 2000

The decline in poverty has been in large part an outcome of long term growth and employment generation in the economy. Various targeted programmes of the government and NGOs which improved access of the poor to education and health, water and sanitation, and micro credit and created employment also played an important role in the process. Acceleration in growth and employment generation will remain the primary foundation of poverty reduction in the NSDS period. The policies and strategies for growth have supported inclusive growth that ensures equal access to opportunities created for all segments of the society resulting in reduction of poverty and inequality, employment intensive growth, improved education, health and other social services and expanded social protection will be some of the major aspects of inclusive growth. The policies and strategies supportive of inclusive growth will be continued and strengthened.

Missing Poverty-Environment Linkages

Human lives and livelihood in Bangladesh are intricately intertwined with nature. Consequently, no process of development and eradication of poverty can be conceived of without caring for environment and sustainable development. On the other hand, as the poor depend heavily on nature for their livelihood, without the whole-hearted involvement of the poor, caring for environment becomes an extremely difficult task. Bangladesh is a signatory of the Multilateral Environmental Agreement by which the Government is committed to undertake certain environmental management actions which will be largely beneficial to the poor.

Operationally, poverty-environment linkages are evident at two levels - one is conservation of nature and natural resources for sustainable livelihood while the other is controlling/combating pollution for maintenance of biodiversity and protection of human health. The Government policies in the areas of macroeconomics and various sectors must keep in focus the impacts they might have on the environment. On the one hand there are “Green vs. Brown” arguments that the country’s effort to grow fast, ignoring environmental concerns, may cause long-term damage to the environment and also dampen growth and development. At the same time it is also imperative for Bangladesh to grow faster in the short-run in order to reduce poverty. Therefore a careful balancing act must be orchestrated where economic growth is maximized without compromising environmental protection and safety. Policies and actions of the

Government must not cause marginalization of the poor and force them to intensify over utilization of the open access natural resource base, or make them more vulnerable to pollution hazards.

On the other hand there is counter argument that growth will create fiscal space and resource that can be used to enhance the quality of growth and promote sustainable resource management. In terms of environmental issues it is important to keep in mind that in a country where the majority of the poor are highly dependent on natural resources, the improved management of natural resources is a prerequisite for poverty reduction.

Poverty-pollution linkages are the direct and indirect consequences of pollution, particularly of air and water, generated by public/private industries. These kinds of pollution have a strong human health impact, a major cause of erosion of human productivity and of death in many instances, particularly among the poor and marginalized communities. The combined pressure from the shrinking resource base and worsening living conditions weaken the productive capacity of the poor, make them more marginalized over time, and eventually trap them in what is often referred to as the “vicious circle of poverty”.

2.3 Unplanned Urbanization

Bangladesh has been experiencing rapid increase in urban population since its independence resulting in increase in the proportion of urban population to total population from 8.2 percent to 23.3 percent during the 1974-2011 period. The proportion of urban population will continue to grow with economic development and it is estimated that 31.4 percent of the population will be living in the cities by 2021. (GED, Planning Commission, Perspective Plan of Bangladesh 2010-2021). Population has increased in all urban centres such as metropolitan areas, district towns, upazila centres, growth centres and business centres. A large proportion of urban population is, however, concentrated in Dhaka, Chittagong and Khulna metropolitan areas. Dhaka has the fastest population growth with about 6,970 thousand population in 2011 and it is one of the most densely populated cities of the world.

Table 2.3 Growth of urban population in Bangladesh, 1974 – 2021

Region	(million)											
	1974		1981		1991		2001		2011		2021 ^a	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Urban	6.3	8.2	13.5	15.1	20.9	18.7	30.3	23.2	34.9	23.3	55.5	31.4
Rural	70.1	91.8	76.4	84.9	90.6	81.3	100.2	76.8	114.9	76.7	121.5	68.6
Total	76.4		89.9		111.5		130.5		149.8		177.0	

Note: a= GED projection based on past annual growth rate of urban population estimated at 4.74% Sources: 1. BBS, Statistical Yearbook of Bangladesh, different years; 2. BBS, Sectoral Needs-based Projections in Bangladesh March 2006.

An interesting aspect of recent urbanization process is relatively slower growth of urban population than in previous decades resulting in marginal increase in the proportion of urban population from 23.2 percent in 2001 to 23.3 percent in 2011. Expansion of employment opportunities due to growth of both farm and non-farm activities in rural areas and increase in wages vis a vis sharp increase in cost of living especially high rent relative to income in urban areas and insecurity of life due to fire hazards in urban slums and readymade garment factories are a major reason for such an outcome.

Urban areas particularly the big cities including Dhaka have serious pollution problems with respect to solid waste management, growth of slum areas without supply of clean water, and sanitation facilities, with congested living conditions, inadequate drainage system, and untreated industrial waste disposal. Most of these factors affect the urban poor in terms of general hardship, ill-health and even death. As usual it is the women and the children who are the worst victims. Such appalling conditions also adversely affect labour productivity due to disease and morbidity and thus increases vulnerability of the poor. Reduction of environmental problems related to urbanization must address improvement in the existing solid waste disposal system in all towns and cities, living conditions of the slums, and drainage congestions. The regulatory framework must be strengthened and implemented strictly with provisions for proper and adequate incentives to entrepreneurs to ensure that all industrial wastes are properly treated before disposal. With respect to waste disposal public/private collaboration is essential, system must be efficient and the Government needs to introduce sanitary landfill for all solid waste disposals and/or arrange for using the waste to produce energy. The disposal of hazardous and medical wastes in urban areas is a major cause of concern for urban life including that of the poor who are engaged in scavenging activities.

Another serious problem in the urban areas is improperly planned land development, whereby low lying lands, canals, and ponds are filled up for constructing residential and commercial buildings. This is causing reduction in the floodwater retention areas, water logging and drainage problems. Construction of roads without appropriate environmental mitigation measures is also adding to these problems. Flood protection activities around urban areas without appropriate environmental mitigation measures are also responsible for water logging.

Apart from housing shortage, the majority of houses is structurally poor, lack services and utilities and built without proper planning. Un-engineered high rise buildings in the midst of old stock building structure make Bangladesh cities very risky place to live because of the threat of earthquake. Unplanned cities give rise to new breed of risks including water logging, congestion, fire, electricity and gas accident vulnerability as well as severe lack of spaces for public safety infrastructure and protection. Rising and high land prices have also led to land grabbing and destruction of open spaces and water bodies.

Slums have grown in large cities especially Dhaka to provide accommodation to very poor migrants especially the transitory ones. Slums usually grow in areas with extreme adverse environment with little access to utilities. Slum dwellers are victims of adverse environment but are also responsible for degrading environment.

As urbanization proceeds with development efforts will need to be made to enable cities to generate growth and employment. At the same time cities should be able to provide comfortable and healthy living for residents. One can begin with the idea of 'compact township'/rural township which is a self-governing and self-financing agglomeration of houses, hospitals, schools, playing fields, water reservoir, markets, rural industries, and local government units that provide all basic services to the residents. Growth of these types of townships will need to be encouraged in growth centres and at union and upazila levels avoiding present trend of housing with low densities scattered in various locations.

Policies and strategies will seek to promote cleaner environment, control pollution, protect public health from environmental hazards and reduce disaster risks with emphasis on preventive measures and holistic and inter-disciplinary approach.

2.4 Energy Security

Energy is one of the primary drivers of economic growth and sustainable development. Lack of coverage and quality of energy supply is one of the key barriers to development of both industry and agriculture sector. In order to meet the present and future challenges, power and gas facilities should be expanded and alternative sources of power should be developed. Accountability, transparency and modernization in the management of the power and gas sector need to be ensured. Illegal electricity connections have to be severed and system loss has to be minimized. As a strategy for sustainable development of energy sector development of renewable energy, which is less polluting, will be emphasized.

2.5 Inefficient Water Resources Management

Even though water resource is an integral part of economic and social development of Bangladesh, it is managed poorly. Historically, water resource was managed mainly for the purpose of crop production. Flood control projects were constructed to protect Aman crop from monsoon flood and irrigation projects were developed to support dry season crop. These projects while contributed towards food security of the country, caused damage to the floodplain ecosystem especially to the fisheries resources.

The entire water resource system is now at a degraded state. The groundwater system is under stress due to unrestricted water withdrawal for irrigation and domestic water supply. The rivers have silted up due to very low water flow during dry season. As a result water logging has become common in many places. The wetlands especially in the urban area are being filled up indiscriminately causing frequent rainfall flood. Water resource at the coast is being threatened by salinity intrusion due to sea level rise. Industrial use of water has increased manifold causing severe water quality problems around industrial belts.

Many sectors including agriculture, fisheries, industry, navigation, and ecosystem are heavily dependent on water resource system. In this context, the restoration of water resource system is a primary challenge that the country has to meet in order to ensure its sustainable development.

2.6 Natural Disasters

Natural disaster is a regular phenomenon in Bangladesh due to its unique geographical location (the Himalayas to the north and the Bay of Bengal to the south). Key natural disasters are riverine flood, tropical cyclones, droughts, and river erosion. Earthquake is also a potential threat to the country. Figure 2.1 shows areas of the country which are vulnerable to major natural hazards.

Disasters that occurred between 1991 and 2000, resulted in nearly 200,000 deaths and caused US\$ 5.9 billion in damages with high losses in agriculture and infrastructure. The cyclone (Sidr) in 2007 caused damage worth US\$ 1.7 billion (2.6 percent of GDP). The direct annual cost to the national economy of natural disasters over the last decade (damage and lost production) is estimated between 0.5 percent and 1 percent of GDP.

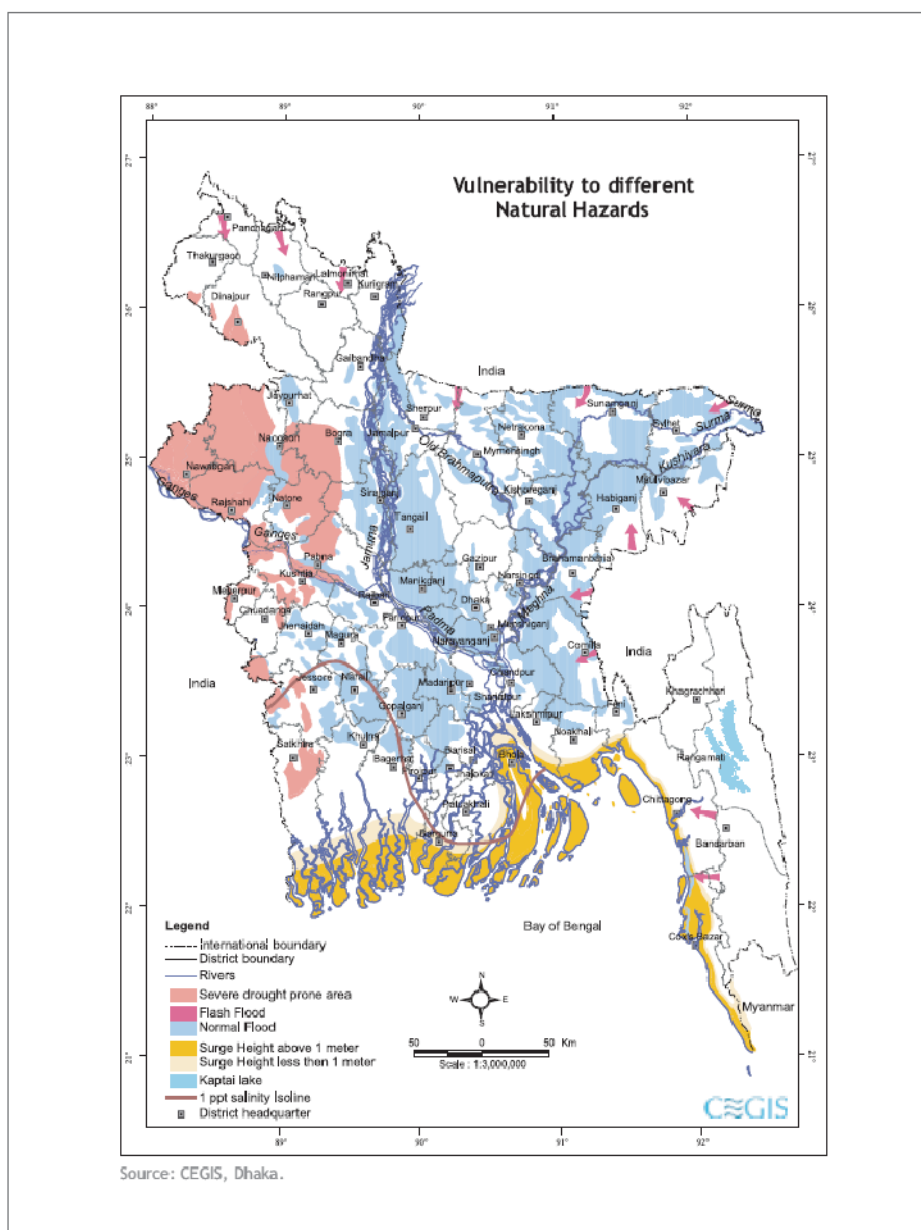


Figure 2.1: Areas of the country vulnerable to different natural hazards. (Reproduced from BCCSAP)

Floods

Floods are a regular natural disaster occurring in Bangladesh in the rainy season entailing huge damage to the economy. On average, approximately one quarter of the country is inundated. Once in every 4-5 years, there is a severe flood that may cover over 60 percent of the country and cause loss of life and substantial damage to infrastructure, housing, agriculture and livelihoods. In the last 25 years, Bangladesh has experienced five severe floods (Table 2.4), the most damaging one being in 1998 covering more than two-thirds area of the country.

Table 2.4: Severe floods in Bangladesh, 1987 – 2012

Event	Impact
1987 flood	Inundated over 50,000 sq. km, estimated damage US\$ 1 billion, 2055 deaths.
1988 flood	Inundated 61 percent of the country, estimated damage US\$ 1.2 billion, more than 45 million homeless, between 2,000-6,500 deaths.
1998 flood	Inundated nearly 100,000 sq.km, rendered 30 million people homeless, damaged 500,000 homes, heavy loss to infrastructure, estimated damage US\$2.8 billion, 1,100 deaths
2004 flood	Inundation 38 percent, affected nearly 3.8 million people, estimated damage over US\$2 billion, 700 deaths.
2007 flood	Inundated 32,000 sq. km, over 85,000 houses destroyed and almost 1 million damaged, approximately 1.2 million acres of crops destroyed or partially damaged, estimated damage over US\$ 1 billion, 649 deaths.

Source: BCCSAP

Cyclones and Storm Surges

The Bay of Bengal is a known breeding ground of tropical cyclone that hits the coastal area of Bangladesh during pre-monsoon (April and May) and post-monsoon period (October and November). One of the reasons why it hits Bangladesh coast often is the conical shape of the Bay of Bengal. Over the last 50 years, 16 severe cyclones with wind speed ranging from 140 to 225 km/hr have hit the coastal area of Bangladesh of which 8 hit in pre-monsoon and the rest in post-monsoon season.

Tropical cyclones are the most talked about climatic events in the subcontinent especially in Bangladesh and India. The coastal area of Bangladesh is more vulnerable to cyclones in the Bay of Bengal region. Among the severe cyclones that have landed in Bangladesh, five were catastrophic and killer cyclones which struck in 1919, 1970, 1991, 2007 and 2009. The cyclones in 1970 and 1991 caused death of 300,000 and 140,000 people respectively. In terms of deaths, the 1970 cyclone is considered one of biggest natural disasters of the world.

Droughts

Bangladesh experiences major droughts once in every 5 years. Droughts at local scale are more frequent affecting part of the crop life cycle. The western part of the country is vulnerable to drought during pre-monsoon period. During the last 50 years, Bangladesh suffered about 20 drought conditions. The drought condition in north-western Bangladesh led to a shortfall of rice production of 3.5 million tonnes in the 1990s. If losses to other crops such as all rabi crops, sugarcane, tobacco, and wheat as well as to perennial agricultural resources such as bamboo, betel nut, fruits like litchi, mango, jackfruit, and banana are considered, the loss will be substantially much higher.

Severe drought can affect crop yield in 30 percent area of the country, reducing national production by 10 percent. Under moderate climate change, a temperature increase of 0.5°C and annual rainfall reduction of 5 percent could reduce runoff into the Ganges, Brahmaputra and Meghna Rivers by 14, 11 and 8 percent respectively. With 12 percent reduction in runoff, the population living in severe drought-prone areas increases from 4 to 9 percent.

River Bank Erosion

Rivers in Bangladesh are morphologically highly dynamic. Erosion processes are highly unpredictable, and not compensated by accretion. These processes also have dramatic consequences in the lives of people living in the erosion prone areas. On average around 10,000 hectare land is eroded by river per year in Bangladesh affecting about 1 million people. Kurigram, Gaibandha, Jamalpur, Bogra, Sirajganj, Tangail, Pabna and Manikganj districts lie in the erosion prone area along the Jamuna River. Erosion of total area and settlement is higher along the left bank compared with the right bank. Along the Padma river, the districts of Rajbari, Faridpur, Manikganj, Dhaka, Munshiganj and Shariatpur are erosion prone. Chandpur on Lower Meghna is also seriously erosion prone.

Earthquake

Bangladesh and the northeastern Indian states have long been one of the seismically active regions of the world, and have experienced several large earthquakes during the past 200 years. The record of approximately 150 years shows that Bangladesh and the surrounding regions experienced seven major earthquakes. The Great Indian Earthquake in 1897 with magnitude of 8.7 in Richter scale and the Srimongal Earthquake in 1918 with magnitude of 7.6 in Richter scale were the most destructive. The distances of the epicenters of these two earthquakes from Dhaka city were 230 and 150 kms respectively. In the recent past, a number of tremors of moderate intensity have taken place in and around Bangladesh. Dhaka city has been suffering from mild tremors in recent times.

Landslide

In the past, landslide was not considered a major hazard in Bangladesh. However, recently landslide has emerged as a major hazard, particularly after the landslides that have occurred during the month of June 2012 in Chittagong-Cox's Bazar region due to heavy rainfall. More than 100 people have been reported dead due to these landslides. In Bangladesh, landslides are mostly triggered by heavy rainfall. However, underlying causes of landslide include deforestation, hill cutting, and unregulated development work. Moreover, poverty and landlessness force poor people to live in the risky hill-slopes.

2.7 Climate Change

The Intergovernmental Panel on Climate Change (IPCC) in its 4th Assessment Report predicts that global temperatures will rise between 1.8⁰C and 4.0⁰C by the last decade of the 21st century. The impacts of global warming on the climate, however, will vary in different regions of the world.

In South Asia, the IPCC predicts that monsoon rainfall will increase, resulting in higher flows during the monsoon season in the rivers, which flow into Bangladesh from India, Nepal, Bhutan and China. These flows are likely to further increase in the medium term due to the melting of the Himalayan glaciers. The IPCC also forecasts that global warming will result in sea level

risers of between 0.18 and 0.79 meters, which could increase coastal flooding and saline intrusion into aquifers and rivers across a wide belt in the south of the country. Rainfall is predicted to become higher and more erratic, on the one hand, and the frequency and intensity of droughts are likely to increase, especially in the drier northern and western parts of the country, on the other.

Bangladesh is widely recognized to be one of the most climate vulnerable countries in the world. It experiences frequent natural disasters, which cause loss of life, and damage to infrastructure and economic assets, and adversely impact on lives and livelihoods, especially of poor people.

Climate change will exacerbate many of the current problems and natural hazards the country faces. Bangladesh Climate Change Strategy and Action Plan (BCCSAP) apprehends that climate change will lead to:

- Increasingly frequent and severe tropical cyclones, with higher wind speeds and storm surges leading to more damage in the coastal region.
- Heavier and more erratic rainfall in the Ganges-Brahmaputra-Meghna system during the monsoon resulting in:
 - Higher river flows, causing over-topping and breaching of embankments and widespread flooding in rural and urban areas,
 - River bank erosion resulting in loss of homes and agricultural land to the rivers, and
 - Increased sedimentation in river beds leading to drainage congestion and water-logging.
- Melting of the Himalayan glaciers, leading to higher river flow in the warmer months of the year, followed by lower river flows and increased saline intrusion after the glaciers have shrunk or disappeared.
- Lower or more erratic rainfall, resulting in increasing droughts, especially in drier northern and western regions of the country.
- Sea level rise leading to submergence of low lying coastal areas and saline water intrusion up coastal rivers and into groundwater aquifers, reducing fresh water availability; damage to the Sundarbans mangrove forest and drainage congestion inside coastal polders.
- Warmer and more humid weather leading to increased prevalence of disease and disease vectors.

Each of these changes is likely to seriously affect agriculture. The higher temperatures and changing rainfall patterns coupled with increased flooding, rising salinity in the coastal belt and droughts are likely to reduce crop yields and crop production. The IPCC estimates that, by 2050, rice production in Bangladesh could decline by 8% and wheat by 32% from the base year (1990) level.

Increased river bank erosion and saline water intrusion in coastal areas are likely to displace hundreds and thousands of people who will be forced to migrate, often to slums in Dhaka and other big cities. If sea level is higher than currently expected and coastal polders are not strengthened and/or new ones built, six to eight million people could be displaced by 2050 and would have to be resettled.

Recognition of adverse impacts of climate change on economic development, life and livelihoods of the poor and ultimately impeding Millennium Development Goals has pushed urgent need for adaptation to deal with unavoidable impacts of climate stimuli including variability and extreme events in Bangladesh. According to a recent estimate by World Bank (The Cost of Adapting to Extreme Weather Events in a Changing Climate, 2011), the adaptation

cost for Bangladesh by 2050 to offset the added inundation due to flood and cyclone may run as high as US\$5.7 billion. In order to better prepare the country for such eventualities of climate change, the Ministry of Environment and Forest, Government of Bangladesh has prepared Bangladesh Climate Change Strategy and Action Plan in 2009. It is worth mentioning that Bangladesh is the first country in the world to do so, to provide overall policy and action guidance and outline action programmes.

Bangladesh has also set up the Bangladesh Climate Change Trust Fund in 2009, which has been receiving annual budgetary allocations for climate action. Over the past three fiscal years (FY2010-FY2012), the government has allocated the equivalent of US\$300 million (US\$100 million every year), which is being utilized in implementing the projects, largely focused on adaptation but also on mitigation to some extent. Another Fund called Bangladesh Climate Change Resilience Fund has been established in 2010 into which funds are being provided by development partners. Some amount has been received (about US\$190 million), which is now being utilized. More contributions to this Fund are expected. But Bangladesh's own allocation and the kind of money so far received through BCCRF and other mechanisms are very small in relation to the large need for properly addressing the impact of the evolving climate change.

2.8 Summary

A key challenge of sustainable development in Bangladesh is population which is at centre of sustainable development. While population growth degrades the environment sustainable development seeks to ensure higher quality of life for population of the present generation as well as the future generation. Other challenges of sustainable development include poverty and inequality, unplanned urbanization, energy security, inefficient water resources management, natural disasters and climate change.

Population

Bangladesh has made commendable achievements in decelerating population growth. Still the population and its growth are far from what the country needs to achieve sustainability particularly social sustainability. A large population along with high population growth required faster growth of agricultural production with significant pressure on environment. Some of the ways in which population growth has impacted on environment includes degradation of agricultural land through unbalanced use of chemical fertilizers, decline in tree cover due to collection of fuel wood, hill cutting and shift of land to crop agriculture, arsenic contamination of underground water due to over-pumping of underground water for irrigation, loss of open water fish stock due to over-fishing, decline in livestock because of lack of grazing land. The challenge facing the country is to reduce the population growth at a faster rate so that population creates less stress on natural and built resources and basic services.

Poverty and inequality

Significant reduction in poverty has taken place in the last four decades – the incidence of poverty as measured by headcount rate declined from more than 80 percent in 1973-74 to 31.5 percent in 2010. Despite notable progress in poverty reduction Bangladesh faces the stark reality that about 46.8 million of its population still live in poverty. Another reality is that income inequality has increased over the years. No process of development and eradication of poverty can be conceived of without putting caring for environment and sustainable development at the center stage. On the other hand, as the poor depend heavily on nature for

their livelihood, without the whole-hearted involvement of the poor, caring for environment becomes an extremely difficult task.

Unplanned urbanization

Bangladesh has been experiencing rapid increase in urban population since its independence resulting in increase in the proportion of urban population to total population from 8.2 percent to 23.3 percent during the 1974-2011 period. It is estimated that 33 percent of the population will be living in the cities by 2021. Unplanned development of the urban centers is a serious problem confronting the country now. Urban areas particularly the big cities including Dhaka have serious pollution problems with respect to solid waste management, growth of slum areas without supply of clean water, and sanitation facilities, with congested living conditions, inadequate drainage system, and untreated industrial waste disposal. Most of these factors affect the urban poor in terms of general hardship, ill-health and even death. As usual it is the women and the children who are the worst victims.

Energy security

Energy is one of the primary drivers of economic growth and sustainable development. Lack of coverage and quality of energy supply is one of the key barriers to development of both industry and agriculture sector.

Inefficient water resources management

Even though water resource is an integral part of economic and social development of Bangladesh, it is managed poorly. The entire water resource system is now at a degraded state. Many sectors including agriculture, fisheries, industry, navigation, and ecosystem are heavily dependent on water resource system. In this context, the restoration of water resource system is a primary challenge that the country has to meet in order to ensure its sustainable development.

Natural disasters

Bangladesh experiences frequent natural disasters, which cause loss of life, and damage to infrastructure and economic assets, and adverse impact on lives and livelihoods, especially of poor people. Frequently occurring disasters like flood, cyclone and river erosion nullifies many development gains and sets back the country. The country has gained considerable experience and reputation in management of disasters over the years, and this will be key to firmly establish the country on the path towards sustainable development.

Climate change

Bangladesh is widely recognized to be one of the most climate vulnerable countries in the world. Climate change will exacerbate many of the current problems and natural hazards the country faces now. Increasing temperature will affect agriculture production threatening the hard earned food security the country now enjoys. Increasing sea level may permanently submerge large tract of flat coastal land forcing large scale migration.

CHAPTER 3: SUSTAINED ECONOMIC GROWTH

Bangladesh has steadily increased its average decadal growth rate over the last 40 years. With declining population growth there has also been significant rise in per capita income growth. This has resulted in more than 130 percent increase in real per capita income over this period. The increase in per capita income has brought significant changes in many non-income aspects of development as well. In some cases focused government policies have been crucial in bringing these positive changes while various NGO programmes have complemented these policies. Thus the incidence of poverty has declined from more than 80 percent in 1973-74 to 31.5 percent in 2010. Notable progress has been achieved in gender parity in both primary and secondary education. Life expectancy at birth has increased from 46.2 years in 1974 to 69.0 years in 2011 with higher life expectancy for female. The total fertility rate has decreased from 6.3 live births per woman in the mid 1970s to 2.11 live births per woman in 2011. Maternal mortality rate per thousand live births has decreased from 6.48 in 1986 to 2.09 in 2011. Infant mortality rate has similarly decreased from 111 in 1981 to 35 in 2011 (BBS, Report on Sample Vital Registration System, various years). The conditions of housing have also undergone noticeable improvement with increase in the proportion of pucca and semi-pucca houses. Similar improvement has also taken place in sanitation and access to drinking water.

Notwithstanding this impressive progress in the economy many problems remain. Per capita GDP of Bangladesh stood at US\$ 772 in FY2012 which is lower than most of her South Asian neighbours. A large population - about 46.8 million lives below the poverty line. There is lack of gender parity at higher level of education and serious problem of lack of quality at all levels of education. Infant mortality rate and maternal mortality rate as mentioned above are considered very high. High incidence of malnutrition of children reduces their potential contribution to future development. Arsenic contamination of ground water in different parts of the country has threatened the achievement in universal access to safe drinking water. High level of unemployment and underemployment makes employment creation for the existing unemployed as well as the new entrants in the labour force a formidable task. Lowering population growth at a faster rate and addressing the effects of population momentum poses a major challenge for the country.

Bangladesh needs to improve growth performance in the future to overcome these problems. It will take much longer time to overcome the problems and to reach the coveted middle income country status if it maintains current growth rate of around six percent per annum. Bangladesh will accelerate its annual growth rate to increase per capita income, reduce the incidence of poverty, improve the quality of education and achieve gender parity in higher education, reduce nutrition deficiency, enhance access to drinking water and improved sanitation, reduce the incidence of unemployment and underemployment and reduce population growth at a faster rate. The Perspective Plan envisages an increase in annual growth rate from its current level to 8 percent in 2015 and further to 10 percent by 2021. Simultaneously, the country has to ensure environmental sustainability to achieve sustainable development.

Economic growth depends intricately on four types of capital, i.e., a) natural capital, b) physical capital, c) human capital, and d) social capital. Natural capital is defined as the existing stock of land, forests, fisheries, water, mineral/gaseous resources, and the quality of these resources. Physical capital is defined as the stock of various infrastructures and capital produced by man and woman, human capital is the stock of human resources (health, education, and skills) including its quality, and social capital is the network of individuals and social norms which are important ingredients for continuation of delivery of services and output in the country.

The challenge of sustained economic growth of Bangladesh is to ensure accelerated growth over long-term against depletion of natural resource base both in quantity and quality, continued investment in physical capital for meeting the growing demand of population, and enhanced human and social capital to meet quality requirements of a fast growing economy. Enhanced human capital of the poor in its turn reduces income inequality and hence poverty and ultimately reduces pressure on natural resources. It is worth noting that the growth of different types of capital does not happen in isolation and it is, therefore, important to keep a balance among the four types of capital.

3.1 Objective

The objective of the sustained economic growth strategy under the National Sustainable Development Strategy is to ensure sustained accelerated growth without compromising environmental sustainability and facilitate poverty reduction through enhancing social equity. It also implies nurturing all the four types of capital in an economy so that the capacity to produce in the future is not diminished.

The sustained economic growth component of the national sustainable development first looks at current growth rate and challenges and then examines accelerated growth rate suggested in the Sixth Five Year Plan and the Perspective Plan to meet the development requirements of the country. The key challenges to sustained accelerated economic growth in the long-run are also pointed out. Then strategies to ensure sustained economic growth with environmental sustainability are outlined.

3.2 Recent Economic Growth

In the last five years the economy has been growing at an average annual rate of 6.21 percent with a peak of 6.71 percent in FY11. There are annual fluctuations in growth rate with a dip in FY09. The sustained annual growth rate exceeding 6 percent is a modest one when compared with high growth rates of China or India. However, the growth rate can be regarded as a satisfactory one if one considers the fact that Bangladesh achieved this growth rate at a time when the economy experienced negative domestic shocks from cyclones and external shocks from decline in export demand with falling prices due to world recession. The fact that actual growth rate was not negative despite the shocks showed the resilience of the economy; people make strong efforts and are able to recover losses from the shocks. The responses of people to shocks are often supported by the Government and NGOs.

The economy had increasing inflation during this period which peaked to 10.99 percent in FY12. The inflation rate was also relatively high in FY2008 when domestic food deficit coincided with global food crisis resulted in sharp increase in domestic food prices. The inflation-growth nexus in Bangladesh suggests the existence of bi-directional causality. While inflation exerts a positive influence on growth, higher growth driven especially by agricultural sector exerts a negative influence on inflation.

The external sector has shown robust performance in the last decade. High rate of average annual growth of exports – more than 17 percent in the last five years, exerts positive effect on growth. Increasing export and remittance have resulted in current account surplus and accumulation of foreign exchange reserves. Increasing remittance has also led to sharp increase in national savings. Along with these positive influences of external sector on economic growth there is one important way in which it also exerts a negative impact. The terms of trade (ToT)

has been declining over time with sharp fall since FY08. The terms of trade stood at 77.72 in FY11 (1995-96=100) implying about 22 percentage points decline in ToT. The negative terms of trade shock tends to lower the economy's growth rate.

Bangladesh can sustain this growth rate over the long run provided the country takes adequate measures to withstand external shocks such as increase in energy price and decline in export demand and price and natural shocks including impact of climate change.

Table 3.1: Growth rate of real GDP by broad economic sectors, FY2007 – FY2012

Sectors	FY2008	FY2009	FY2010	FY2011	FY2012
Agriculture including fisheries	3.21	4.12	5.24	5.13	2.53
Industry	6.78	6.46	6.49	8.20	9.48
<i>Of which</i> Manufacturing	7.21	6.68	6.50	9.45	9.76
Services	6.51	6.31	6.47	6.22	6.05
GDP	6.19	5.74	6.07	6.71	6.32
Per capita GDP (US \$)	559	620	685	748	772

Source: GED calculation based on Ministry of Finance, Bangladesh Economic Review, different years.

3.3 Sectors and Drivers of Economic Growth

Aggregate economic growth depends on the growth of its constituent broad sectors. Because of inherent dynamics of sectoral growth the incremental contribution of the sectors to aggregate growth differs and within a broad sector some specific sectors emerge as the drivers of growth. It is worth mentioning that an economy might also have negative drivers of growth, i.e., sectors which are declining because of structural change or factors which exert negative impact on growth. For Bangladesh, the drivers of economic growth have been identified as agriculture, infrastructure, industry, technology, communication, energy, enabling environment and the informal sector. Negative drivers are adverse impacts of environmental degradation of natural resource base, natural disaster and adverse impacts of climate change which is emerging as a critical negative driver of economic growth. The broad sectors of the economy are: a) agriculture, forestry and fisheries, b) industry including manufacturing, and c) services including wholesale and retail trade and transport, storage and communication.

3.3.1 Agriculture, Forestry and Fisheries

The contribution of agriculture sector which includes crops, livestock, fisheries and forestry to GDP has been declining over time. In FY2012 its contribution to GDP stood at 19.29 percent. It generates employment for 47.5 percent of the labour force in 2010 (BBS, Report on Labour Force Survey-2010), accounts directly and indirectly for about one fourth of total export earnings, and provides food security for the growing population of the country.

Agriculture is still the single largest sector that provides employment, livelihoods and nutrition for the rural people of the country. With global development in agriculture, Bangladesh agriculture has also progressed significantly to meet increasing demand of the growing population. But the growth in the agriculture sector is characterized by annual fluctuations as a consequence of environmental shocks such as floods, droughts and cyclones in the coastal regions. There is potential for development of the agriculture sector through improved

technology, extension, proper policy/planning, strategies and management in the context of the global environmental degradation, climate change and natural hazards. The overall growth rate of agriculture sector will be enhanced to more than 4 percent in the coming years; however, the sectoral GDP contribution will decline to 15 percent in 2021 because of much higher growth of industry especially manufacturing (GED, Planning Commission, Perspective Plan of Bangladesh 2010-21). Through critical analysis and review of the present status, trend and potentials, development strategies of different sub-sectors of agriculture sector are formulated to achieve the sustainable development target.

3.3.2 Industry

The industrial sector comprises manufacturing, electricity, gas, construction, and mining and quarrying. Industry contributed 31.27 percent of GDP in FY2012 of which manufacturing contributed 19.01 percent. The manufacturing sector includes large, medium and small scale manufacturing firms; it generated employment for 12.38 percent of the labour force in 2010 and contributed about 95 percent of export earnings in FY2012. The contribution of industry to employment generation is thus not encouraging despite growth of labour intensive industries. The manufacturing sector has been growing at an annual average rate of about 8 percent in the past 5 years. The growth rate of value added of large and medium manufacturing has been 8.31 percent while that of small scale manufacturing has been 6.96 percent during this period. The sector is projected to grow at a higher rate reaching 11.7 percent in FY2015 and accelerating to 14.0 percent in FY2021 when it will contribute 28 percent of GDP.

In the manufacturing sector food processing, cotton textiles, wearing apparels, leather and leather products, footwear, drugs and pharmaceuticals, industrial chemicals, transport equipment have been the main growth generators. With implementation of the policies and strategies envisaged in the 6th Five Year Plan and the Perspective Plan emergence of new growth drivers such as pharmaceuticals, shipbuilding, toys, auto parts, electronics, and light engineering is likely to be more contributing in this sector.

The growth of industrial sector has, however, been associated with environmental degradation. Untreated chemical wastes are discharged into rivers, canals, wetlands and even agricultural lands severely degrading them and causing health risks to people and threatening open water fish stock.

Table 3.2: Projection of sectoral growth, FY2012 – FY2021

Sectors	FY2011	FY2012	FY2013	FY2014	FY2015	FY2021
Agriculture including fisheries	5.0	4.5	4.4	4.3	4.3	4.5
Industry	9.2	9.6	9.9	10.5	11.5	12.0
<i>of which</i> Manufacturing	9.5	9.8	10.1	10.7	11.7	14.0
Services	6.6	6.8	7.1	7.3	7.8	8.0
GDP	6.7	7.0	7.2	7.6	8.0	10.0

Source: General Economics Division, Planning Commission, Perspective Plan of Bangladesh 2010-2021

3.3.3 Services

The contribution of services sector to GDP does not show any long term trend; it has varied between 49 and 50 percent since 1979-80. In 2010 it generated employment for 27.17 percent of the total labour force. Services are considered more labour intensive than manufacturing. Services sector output is largely driven by demand; growth of income and expansion of trade

mainly determine services demand. In the last five years services sector GDP has grown at an annual average rate of 6.21 percent. Services sector output has income elastic demand which implies that services sector will expand faster compared with the rest of the economy. Given relatively more labour intensive production, growth is expected to generate employment at a faster rate with positive effect on poverty reduction and environmental sustainability. The Perspective Plan has projected more than 7 percent growth of services sector which gradually rises to 8 percent in FY2021; the sectoral contribution is projected to reach 48 percent of GDP. As mentioned before wholesale and retail trade and transport, storage and communication have been major drivers of growth of this sector.

It should be noted that growth of some of the service sectors creates adverse environmental impact. For example health sector generates medical waste and transport sector generates air and noise pollution. Strategies are needed to protect the environment from these harmful effects and thus facilitate green development.

The higher growth of GDP as predicted in the Perspective Plan will require higher rates of growth of all the three sectors with relatively higher growth rate of services and much higher rate of growth of industry particularly manufacturing. Relatively higher rate of growth is required in manufacturing and services for several reasons. First, the rate of growth of agriculture has been historically low and is faced with the emerging land constraint and slower rate of technological innovation. Secondly, labour will continue to be released from agriculture because of technological change, existence of underemployment and seasonal unemployment, expansion of education and lower expected returns and this labour will need to be absorbed in more productive industry and services sector with higher returns to labour. Secondly, agricultural growth itself requires higher rate of industrial growth to provide a market for the agricultural products. Agro-processing industries will create market for agricultural products as raw materials and rising income in industry and services sectors will create demand for agricultural goods in general. However, the demand for different agricultural products will rise at different rates depending on their respective income elasticities of demand.

Emphasis on industrial growth does not mean neglect of agriculture, however. Agriculture must grow also at a rate higher than in the past to ensure food security and nutrition, employment as well as higher income for farmers.

Table 3.3: Projections of structural change to 2021

(Percent of GDP)

Sectors	Average (FY2004-FY10)	Target FY2015	Target FY2021
Agriculture	19.5	15.5	15.0
Industry	28.0	32.0	37.0
<i>of which</i> manufacturing	17.3	21.1	28.0
Services	52.5	52.5	48.0
Total	100.0	100.0	100.0

Source: General Economics Division, Planning Commission, Perspective Plan of Bangladesh 2010-2021

3.3.4 External Drivers of Growth

Two external factors have been important drivers of growth of the economy; these are exports and remittance.

Exports

Export has been characterized by sustained high growth in the last five years with the exception of FY2010. Export reached US \$23992 million, i.e., 20.8 percent of GDP in FY2012 and is projected to reach 26 percent of GDP in FY2021.

Bangladesh's trade policies are devised keeping in view both medium-term imperatives and long-term development outlook. Trade policy is considered a component of overall development policy. Sustained export growth will help maintain a favourable trade balance on the one hand, and contribute positively to GDP growth, on the other and will lead to poverty alleviation through increased employment and income. The most important sector for export success has been the RMG industry which contributes 76 percent of total exports. It creates employment directly for 3.6 million workers 70 percent of whom are women and indirectly for 0.5 million workers. Apart from its contribution to economic sustainability and social sustainability RMG is also relatively less polluting. It should be mentioned that production of some of the exports such as leather, shrimp, ship, and fertilizers and backward linkage industries of RMG such as textiles cause significant degradation of environment creating a challenge for green growth. The Government will promote use of protection and mitigation measures by producers and adoption of less polluting technology and diversification of exports to less polluting industries.

The Government of Bangladesh will continue to play its role as the facilitator of the growth of RMG exports by providing a range of generous support policies such as back-to-back LC, and bonded warehouse facility. The commitment of the government to use this sector both for poverty reduction, employment creation and also for economic growth is evident in its policies.

However, continued contribution of this sector to sustainable development faces some challenges. The major challenges of the sector include (a) diversifying exports by increasing share of both existing exports as well as emerging exports, and (b) ensuring that the workers in the sector are provided decent wage and facilities, working environment as well as health and safety standards continue to improve resulting in improved quality of life of workers and better compliance with buyers' requirements.

Remittances

There has been rapid growth of remittances in the last few years peaking at US \$12735 million in FY2012 (Bangladesh Bank, Quarterly Economic Indicators Oct.-Dec. 2012) and comprising 11.01 percent of GDP. Rapid growth in remittances has contributed to the rise in gross national savings to 29.4 percent of GDP in FY2012. It is worth mentioning that gross domestic investment stood at 25.4 percent in FY2012 which is lower than gross national savings. Thus remittance has relaxed the binding savings and foreign exchange constraints on growth that Bangladesh faced in the past. Bangladesh needs to improve its investment climate to make effective use of national savings. Remittance contributes directly to increased income and wellbeing of the remittance recipient households and indirectly to the economy through multiplier effect exerting significant development impact on the economy.

The government policies –strengthened current policies as well as new policies, to leverage remittances for growth and broader development strategies will include:

- Strengthening government institutions such as Bureau of Manpower, Employment and Training (BMET) and District Employment and Manpower Offices (DEMO) under it and partnering with civil society organizations towards a comprehensive migration policy addressing pre-departure, on-site and upon return services to promote migrant's welfare and

maximize benefits of migration. Specifically, labour attaches should have adequate training to provide basic services such as adjusting to the new environment, language support and legal support and ensure safety and security of migrants, particularly of female migrants in the gulf countries;

- Lowering the cost of migration specially for unskilled workers through regulation and monitoring of recruiting and travel agencies while facilitating transfer of remittances through formal channels specially banking channel by lowering transfer cost (fixed cost for any amount and if possible lower unit cost for higher amounts) and time and easy access to services;
- Promoting the use of savings vehicles through improving upon the existing ones and introducing new ones and putting in place investment schemes and social security schemes for the eventual return of migrant workers;
- Involve civil society organizations and the private sector in integrating unskilled return migrants into the domestic labour market; and
- Improve vocational and technical training to create appropriate skilled manpower for existing and emerging markets.

3.4 Informal Sector

The informal sector, including small-scale processing and manufacturing and various informal services is responsible for a large share of the GDP and employs about 87.5 percent of the labour force (BBS, Report on Labour Force Survey 2010). This is a labour intensive sector and accelerated growth in this sector has contributed to increased growth and employment generation. The government would adopt several strategies to deal with informal employment for equitable growth:

- Expand formal employment by enhancing job creation through investment;

Formalize informal enterprises and informal jobs mainly by reducing institutional barriers to formalization of enterprises and linking formalization with access to credit and markets; and

- Improve working conditions and returns of those who continue to operate informally through ensuring labour rights and social protection.

3.5 Towards a Middle Income Economy

Two principal goals of the government over the longer term are accelerated economic growth and poverty reduction. According to the projections of the Perspective Plan growth will increase to 8 percent in 2015 and 10 percent in 2021 and poverty will decline to 22.5 percent by 2015 and 13.5 percent by 2021. Accelerated growth is required to transform the country into a middle income economy with per capita income of US \$ 2000 in 2021 (at constant 2013 dollars). Higher growth and higher per capita income will significantly improve the standard of living of the population by reducing unemployment and poverty. However, as explained above, higher growth will not have full effect on poverty reduction if inequality increases with growth. Bangladesh will thus need to achieve sustained growth which will be equitable and inclusive in nature in order to ensure its successful journey to a middle income economy with high HDI.

3.6 Technology for Sustainable Development

Economic growth in Bangladesh has depended mainly on accumulation of capital and labour and less on technological change. There are, however, sectoral differences, for example, in agriculture technological change has been important in sustaining long term growth. Bangladesh will need to invest in research and development and creation of scientific and technological manpower for generation and adaptation of technologies.

In the context of sustainable development which seeks to change the nature of economic growth rather than limit it, technologies which allow efficient use of scarce natural resources will have an important place. The technologies used in Bangladesh in manufacturing and services sectors, traditional as well as cleaner, are mostly imported. Bangladesh will need to use international processes to persuade developed countries to develop technologies appropriate for sustainable development and make these technologies widely available to developing countries.

In order to minimize damage to environment, emphasis will be put on both ‘cleaning technologies’ or end-of-pipe technologies and ‘clean technologies’. While end-of-pipe technologies (for example, Effluent Treatment Plants (ETPs) in textiles) are added to existing production processes to control and reduce pollution clean technologies, (for example, Hybrid Hoffman Kiln (HHK), Tunnel Kiln, Vertical Shaft Brick Kiln in brick making) alter production processes, inputs to the process, and products themselves. Cleaner technologies are not always available for every production process and when they are available they are often more expensive compared with the existing technologies. Legislative and economic instruments as well as voluntary approaches will need to be used to encourage firms to choose cleaner technologies.

Government legislation requires existing polluting firms to use end-of-pipe technologies to deal with pollution but firms usually avoid implementing these technologies because of lack of proper monitoring. The Government has undertaken measures to implement Common Effluent Treatment Plant (CETP) in Dhaka EPZ and planned to implement CETP in the proposed tannery estate at Savar which will facilitate relocation of highly polluting tanneries at Hazaribagh in Dhaka city.

3.7 Green Economy

Green economy has emerged as one of the tools for achieving sustainable development in its three dimensions, namely, economic, social, and environmental. The outcome document of Rio+20 entitled “The Future We Want” provides a list of green economy policies in the context of sustainable development and poverty eradication which a country can choose from in accordance with its national circumstances and priorities. Notably, many of the development policies pursued by Bangladesh coincide with green economy strategies and policies, such as striving for sustained, inclusive, and equitable economic growth and job creation, promoting productive activities that contribute to eradication of poverty, improving the livelihoods and empowerment of the poor and vulnerable groups, enhancing the welfare of women, children, persons with disabilities, and fishers, promoting the welfare of ethnic communities, promoting gender equality, and providing workers with skills through education and capacity building, promoting communication technologies, and encouraging existing and new partnerships including public private partnerships to mobilize financing for sustainable development. Bangladesh will continue to pursue these policies with broadening and deepening their scope wherever warranted. Bangladesh has also adopted some policies that promote conservation and sustainable use of bio-diversity and ecosystems and regeneration of natural resources which needs to be further strengthened and their implementation ensured. Besides, the Bangladesh Bank has undertaken Green Banking initiative which encourages banks to finance green activities/projects such as renewable energy, green buildings, green products and materials, solid waste management, water management, and clean transportation.

Implementation of these policies requires import of capital machinery, technology and materials which are relatively costly. This will raise production cost making products less competitive and peoples’ living costlier. In this context Bangladesh can ask the development partners to promote

access to and the development, transfer, and diffusion of environmentally sound technologies to Bangladesh on favourable terms, including concessional and preferential terms.

3.8 Key Challenges for Sustained Economic Growth

Ensuring sustained economic growth in the long term is a major challenge for Bangladesh. It will need higher investment, improved human resource, increase in total factor productivity, managing the land and other constraints on production and maintain macroeconomic stability.

Lower Investment and Saving Rate

- After several years of stagnancy around 24, investment rate has exceeded 25 percent in the past two years but it is still low relative to the requirement for high growth.
- Breaking out of near stagnancy of recent investment rate and raise it to the rates as envisaged in the Perspective Plan pose significant challenges. But it seems possible if experience of escalation of investment of fast growing countries such as China, India and Vietnam is considered.
- Public investment GDP ratio has a declining trend reaching its nadir in 2008-09; this constrains public investment in infrastructure which crowds in private investment.
- The contribution of FDI to investment is small – only 4 percent in 2011 unlike the fast growing countries such as China, India and Vietnam though the foreign investment regime in Bangladesh is favourable to foreign investors in terms entry and exit of investment, repatriation of profits, taxes and provision investor services.
- Gross domestic saving GDP ratio has stagnated near 20 percent in recent years constraining investment growth.
- Gross national savings has a rising trend reaching 29.4 percent in FY2012. However, it has not been translated into commensurate increase in investment GDP ratio.
- Increased investment is associated with environmental degradation in some sectors/subsectors threatening environmental sustainability.

Lower Quality of Human Resource

- Lower quality of human resource because of lack of education, quality education and quality technical education and skills training.
- Lower educational and training outcomes because of malnutrition of poorer children.

Lower Factor Productivity

- The contribution of total factor productivity to growth is insignificant.

Existence of Lagging Regions

- The western region comprising Rangpur, Rajshahi, Khulna and Barisal divisions has lower growth. It also has higher incidence of poverty excepting Rajshahi division.
- The western region has also serious environmental problems such as desertification in the North West and salinity in the South West region of the country.

Maintaining Macroeconomic Stability

- Macroeconomic stability which has been sometimes affected or threatened by domestic natural shocks such as cyclones and floods and external shocks such as global recession, food

price crisis, energy price rise and change in world trade architecture including phase out of Multi Fibre Arrangement (MFA) has to be maintained to ensure economic, social and environmental sustainability.

Emerging Land Constraint

- Limited land acts a constraint on expansion of all types of economic activities, e.g., loss of agriculture land inhibits faster agricultural growth, and lack of availability of suitable land for establishing manufacturing plants restrains manufacturing growth.
- Rapid rise in land prices especially in urban areas greatly increases the cost of any economic activity using land and thereby affecting sustainability.
- Grabbing of land especially char land and khas land by the powerful has been common in both rural and urban areas denying the poor access to such land.
- The high price of land makes access of every citizen to shelter impossible.
- Some natural and man –made phenomena are in operation which degrade land. This includes salinity, soil contamination, deforestation, water pollution, and falling water table.

3.9 Strategies for Sustained Growth

- Public investment will be enhanced by focusing more on investment in infrastructure programmes (energy, ports, telecommunication, and transportation) along with investment in human resource development, investment in research and development and investment in IT.
- Quality of investment will be enhanced by improving the planning and budgeting processes and strengthening monitoring and evaluation. PPP will be promoted in the financing of infrastructure.
- Private investment, being the main driver of growth, will continue to be encouraged by improving incentives for investment through further business deregulation, reforming taxes to discourage speculative investments in real estate and stock markets and support investments in manufacturing and infrastructure, further improving the efficiency of the financial sector to lower intermediation costs and provide long term financing options through an efficiently managed stocks and bond market.
- Investment climate will be improved by improving legal and administrative systems including property rights issues and socio-economic environment including law and order situation and by sound management of monetary policy and sustainable management of public finances.
- FDI will be attracted through improving the investment climate by reducing constraints in infrastructure, regulatory framework, and policy environment, by addressing the general governance situation including cost of doing business, by encouraging regional investment in emerging sectors, by establishing special economic zones along international borders, and by encouraging NRBs to invest.
- Quality education will be ensured at all levels and in all streams of education and in all regions of the country to develop human resources adequate for a fast growing economy in a globalized world. The quality and market relevance of skills training will be improved to enhance employability of workers both at home and abroad and to raise returns to labour especially in the lagging regions of the country.
- Higher investment will be made in research and development and in IT to bring about technological change and higher foreign direct investment which brings new technology will be attracted to facilitate Total Factor Productivity (TFP) Growth.
- Export diversification will be promoted through ensuring export competitiveness by addressing border barriers and beyond the border constraints, reducing anti-export bias of

the trade regime by rationalizing the tariff and subsidy regime, and reducing anti-diversification bias by providing emerging and potential exports a policy environment similar to RMG.

- Government will continue its efforts along with stakeholders for obtaining improved market access for diversified products and destinations under bilateral, regional and multilateral trading arrangements.
- The Overseas Employment Policy will be made more comprehensive so that it covers multiple aspects of migration, including workers' and employers' documentation, employment contracts, their implementation, and settlement of workers' welfare claim. Close monitoring and supervision of recruitment agencies will be ensured in their provision of information of skill component, working conditions, accommodation, benefits and obligations to migrants.
- Generation of self-employment and wage employment for youth will be emphasized through motivation, training and credit supports.
- Prudent financial, fiscal and institutional responses will be made to macroeconomic shocks to maintain stability.
- A comprehensive National Land Use Plan will be developed and its implementation will be ensured.
- Undertake a pilot project to construct compact houses in a village and encourage people living in scattered locations to move into those houses with a view to make optimum use of land in rural areas.
- Compliance of both government and the private sector with environmental rules, regulations and laws will be ensured. Further, capacity of DoE will be strengthened to ensure compliance.
- Measures will be undertaken for better connectivity of lagging regions with growth centres as well as with developed growth centres in neighboring countries.
- Green growth will be promoted through providing financial as well as fiscal incentives and workers will be trained in green jobs to enable them to learn skills for employment in domestic as well as foreign markets.
- Promote efficient use of renewable and non-renewable natural resources, energy and materials in production through technical, economic and institutional measures. It should be noted that in case of imported capital goods and materials the level of resource use efficiency is determined outside Bangladesh.
- Undertake preparation of a National Spatial Plan to create a more rational territorial organization of land uses and the linkages between them, to balance demands for development with the need to protect the environment and to achieve social and economic development objectives. The plan will:
 - appraise the existing spatial development patterns and recommend a more desirable spatial order for economic efficiency and global competitiveness;
 - provide an appropriate framework for sustainable and optimal use of land and other natural resources;
 - provide spatial development strategies that will address regional inequalities to enhance national cohesion and integration;
 - address environmental and climate change concerns and promote a safe and healthy environment for improved quality of life;
 - guide coordination of actions and investments over time and space as well as between private and public actions to ensure maximum positive impacts;
 - set priorities for resource use

3.10 Summary

The challenge of sustained economic growth of Bangladesh is to ensure accelerated growth over long-term against depletion of natural resource base both in quantity and quality, continued investment in physical capital for meeting the growing demand of population, and enhanced human and social capital to meet quality requirements of a fast growing economy. The objective of the sustained economic growth strategy under the National Sustainable Development Strategy is to ensure sustained accelerated growth without compromising environmental sustainability and facilitate poverty reduction through enhancing social equity.

The strategies include enhanced public investment in infrastructure programmes (energy, ports, telecommunication, and transportation) along with investment in human resource development, investment in research and development and investment in IT. PPP will be promoted in the financing of infrastructure. Private investment, being the main driver of growth, will continue to be encouraged by improving various incentives for investment. Investment climate will be improved by improving legal and administrative systems including property rights issues and socio-economic environment including law and order situation and by sound management of monetary policy and sustainable management of public finances.

Other strategies include improving quality of education, higher investment in research and development, export diversification, facilitating overseas employment and formulation of national land use plan. Green growth will be promoted through providing financial as well as fiscal incentives and workers will be trained in green jobs to enable them to learn skills for employment in domestic as well as foreign markets.

CHAPTER 4: DEVELOPMENT OF PRIORITY SECTORS

4.1 Agriculture and Rural Development

Historically, agriculture has been playing significant role in the development of Bangladesh. Vast majority of the population of the country still live in rural area and are directly or indirectly engaged in a wide range of agricultural activities including crops, fisheries, livestock and forestry. Agriculture generates employment for 47.5 percent of labour force, contributes about 5 percent of total export earnings and provides food security for the growing population of the country.

Table 4.1: Contribution of agriculture to GDP by sub-sectors (1995-96=100)
(Percent)

Sectors/ subsectors	FY2008	FY2009	FY2010	FY2011	FY2012
Crop	11.64	11.43	11.42	11.32	10.74
Fisheries	4.65	4.58	4.49	4.43	4.39
Livestock	2.79	2.73	2.65	2.58	2.50
Forestry	1.75	1.75	1.73	1.69	1.66
Total	20.83	20.49	20.29	20.02	19.29

Source: Ministry of Finance, Bangladesh Economic Review 2012.

4.1.1 Crop

The crop sub-sector of agriculture sector is the second single largest economic activity in the country. The sub-sector contributed 10.74 percent to the national GDP and 55.7 percent to agricultural sector GDP in FY2012. The sub-sector has grown very rapidly during the last 3 decades. Food grains production has significantly increased in the last decade from about 26 million tonnes in FY2002 to about 36 million tonnes in FY2011. Though the cultivable land area has been declining over time, modern varieties of crops have been cultivated in about 60 percent cultivable land (rice- 70%, wheat-100%, maize-100%, potato-70%, winter vegetables-70%) resulting in increased production.

4.1.1.1 Present Status

Production, Availability and Requirement

Production of rice is the principal agricultural activity. About 78 percent of the cultivated land is under rice cultivation. Since self-sufficiency in foodgrains has received priority in the national development plans, production of rice has increased significantly over the years. Annual production of rice increased by 5.7 percent in the 1990s, soaring from 17.86 million tonnes in 1990 to 24.90 million tonnes in 2000, an increase of 39 percent over the decade. It has further increased to 33.54 million tonnes in 2010-11. Annual production of wheat increased more than two-fold from 0.89 million tonnes to 1.84 million tonnes between 1990 and 2000. However, production started declining in the last decade. Wheat production came down to 0.97 million tonnes in 2010-11. On the other hand, maize production is showing increasing trend. It has increased from 0.15 million tonnes in 2001-02 to 1.55 million tonnes in 2010-11.

Production of pulse has stagnated over the years. Annual production of pulse increased from 0.49 million tonnes in 1990 to 0.52 million tonnes in 1995 but declined to 0.23 million tonnes in 2010-11. Production of oil seeds and spices have either stagnated or declined. Production of sugarcane has also gone down over the years. The production of potato, however, shows an increasing trend over the years. Annual production of potato increased from 1.06 million tonnes in 1990 to 8.33 million tonnes in 2010-11, an eight fold increase over 20 years.

Jute is the major fiber crop of the country. Potential exists for the fiber to increase its contribution to the economy through productivity increases and diversification. The share of raw jute and jute goods in the total exports of the country has been increasing with increased world demand for natural fiber. Now, it is the second largest export earner after readymade garments.

Productivity and Food Security Situation

Significant achievements have been made in crop production in Bangladesh although, yields of major commodities are still low in the region—yields of rice (clean) and wheat are less than three tonnes/ha. Level of fertilizer consumption is moderate and extent of farm mechanization is also low.

After achieving favourable growth during the past couple of decades and the recent success in cereal production, the present day agriculture is at a cross-road; the sector is confronted with the second generation problems and is facing the challenge of feeding increased population with the shrinking and degraded natural resources. Bangladesh imports cereal and edible oil to feed the growing population the level of import depending on in-country production. It has to substitute import considerably by augmenting food supply. The task is enormous but has to be addressed.

Demand and Supply Projection

The question of how much will be the future demand of food items in Bangladesh in 20 years from now is complex and the answer is linked with number of factors. Few of them are a) rate of population growth, b) income growth and food habit, c) internal and external trade regime. Making number of assumptions, the future demand of food items is estimated as follows.

Table 4.2: Projected demand of food, 2000-2020

(million tonnes)

Food items	Year		
	2000	2010	2020
Cereals, rice, wheat & maize	27	29	35
Milk	1.6	3.2	4.8

Fish	1.6	3.18	3.5
Meat	0.62	1.4	2.4
Eggs (million)	3554	6000	9500

According to the projection (Table 4.2), the requirement of food-grain in the country would be 35 million tonnes in the year 2020, which the country has already nearly achieved. However, the increased vulnerability to crop production due to changes in climate system may not allow the farmers of the country to continue to feed its millions of population.

Spices, pulses and oilseed are in deficit in the total production system and the demand is met through considerable import. The shrinkage of area under these crops and lack of thrust on these commodities creates this import dependence. Pulse is the major protein of the people and country is importing 70 percent of its total demand. Similar production situation also prevails for edible oil and the gap is being filled by significant import.

Environmental stresses

Recent investigation by Bangladesh Agricultural Development Corporation (BADC) shows that groundwater level is gradually declining at different rates across the country as irrigation still depends largely on groundwater. The rate is alarming at several places of the country. The country's ecology and crop production, particularly in the southwestern region, will face an extreme impact if the declining trend continues.

Few recent government documents have brought forward new challenges to sustainable development. According to Soil Resource Development Institute (SRDI), more than two lakh hectares of lands in the south have lost potential for agriculture due to increasing salinity content over the past three and a half decades. Soil scientists and water experts hold that the extent of salinity in some 263,900 hectares of lands in the area is so high that no crop will be produced if salinity persists any longer. The extent of salinity in the coastal areas increases at a time when the government looks to bring nearly 10 lakh hectares of land in the southwest under cultivation of Boro rice during the dry season to boost production and ensure food sufficiency.

4.1.1.2 Key Challenges

- Raising agricultural production to feed the growing population in the context of shrinking agricultural land and climate change impacts.
- Shifting towards commercial agriculture.
- Reduction of yield gap and large scale adoption of proven agro-technologies at farm level need large scale research and extension efforts.
- Inadequate rural infrastructure and marketing facilities.
- Reversing trend of environmental stresses due to intensive cultivation.
- Recover organic matter content in agricultural land which is alarmingly decreasing.
- Stopping conversion of agricultural land for non-agricultural purposes.
- Climate induced changes aggravating salinity, drought and desertification to the detriment of cropping system.

4.1.1.3 Strategies

In Bangladesh, agricultural growth will continue to remain important for overall economic development in the foreseeable future. The present strategic plan attempts to provide a direction to search for possible ways and means in the agricultural sector - the backbone of country's economy, which could be exploited for ensuring economic emancipation and food security for the growing populace without disturbing and degrading environmental and ecological security.

Achieving self sufficiency

- Promote food inter-cropping keeping short winter season for the production of non-rice crops (oil seed, pulse etc.), and the remaining period for growing two/three rice crops with special emphasis on Aus and Aman paddy.
- Emphasize rainfed paddy cultivation such as flood tolerant Aman and drought resistant Aus cultivation.
- Promote Boro in deeply flooded region such as Haor basin and Chalan Beel.
- Harness optimum yield potential of crop lands by balanced application of agricultural inputs and adopting advanced techniques for raising yield.
- Ensure quality seed production, preservation and distribution.
- Pursue regional approach to food security with measures including access to SAARC food bank and steps to deepen regional trade in agricultural goods.

Agricultural Prices and Marketing

- Improve the efficiency of agricultural marketing to reduce market distortions and the cost of marketing.
- Ensure that farmers get proper price for their produce especially cash crops/commercial crops.
- Align domestic prices of rice with international prices on a long-term trend basis.
- Encourage farmers to further intensify jute production by giving them price support so as to satisfy domestic and increased export demand.

Developing and improving rural infrastructure

- Increase availability of electricity in the rural areas and this will enhance agro processing and value addition activities.
- Expand and improve farm-to-market rural roads.
- Improve performance of water management structures.

Reducing environmental pressure

- Develop surface water irrigation schemes.
- Encourage preservation of surface water through rain water harvesting and also developing canal based surface water irrigation in dry session.
- Restrict conversion of prime agricultural land for nonagricultural uses such as housing and settlement.
- Encourage use of balanced fertilizer.
- Popularize use of organic fertilizer.
- Intensify and expand Integrated Pest Management program.

- Implement planned crop zoning.

Strengthening agricultural research and extension

- Grant adequate fund and autonomy to agriculture research institutes.
- Provide adequate compensation package to the promising researchers to retain their services and to encourage them in research.
- Build-up capacity of extension professionals.
- Use SAARC/ASEAN regional forum to share research results among the regional countries and to improve regional cooperation in carrying out research on common agenda such as development of climate resilient crop varieties.

4.1.2 Fisheries

4.1.2.1 Present Status

Fisheries sub-sector of Bangladesh plays significant role in the country's economy in terms of employment generation, nutrition supply and export earnings. It contributes 4.43 percent to the country's GDP and 22.21 percent to the agricultural GDP in FY2011. The country's export earnings from this sector are 2.73 percent. It is the third highest export earner of the country after readymade garments and jute. About 10 percent of the country's population depends on fisheries for their livelihoods. Fish alone is supplementing more than half of animal protein in our daily dietary requirement.

Bangladesh is bestowed with vast inland open waters measuring 4.03 million ha, 0.68 million ha closed water in manmade ponds and enclosures for aquaculture and 1,66,000 sq. km marine water in the Bay of Bengal. Moreover, legal rights has been established in favour of Bangladesh over the 1,11,651 sq.km area in the Bay of Bengal due to dispute resolution between Bangladesh and Myanmar on 14 March 2012.

The fisheries sector has two major production systems, viz: (a) inland fisheries and (b) marine fisheries. The inland fisheries has two production systems – (i) inland open water i.e. capture fisheries and (ii) inland closed water i.e., culture fisheries.

Fish production in 2010-11 is 3.062 million tonnes where inland capture, inland culture and marine fisheries contribute 1.055, 1.461 and 0.546 million tonnes respectively (Table 4.4). Per capita fish consumption is 18 kg/per year. Quantity of export of fish and fish products during 2010-11 was 96,469 tonnes (where shrimp export was 54,891 tonnes) with annual export earning Tk. 46,038 million. Table 4.4 presents the production of fish during the last 5 years. The annual average growth rate during the last three years is around 6.11 percent and is showing an upward trend most likely due to adoption of various good management practices undertaken in recent years.

Inland capture fisheries was the major source of fish production in the past but it has declined during the last three decades mainly due to over fishing and destructive fishing and loss and degradation of fish habitat/ecology due to human intervention and natural causes. While the aquaculture in inland and coastal waters have grown rapidly, almost doubling the production in last decade with technological improvement and extensive extension service. The marine fisheries has increased steadily at an average annual rate of nearly 4% during same period with improvement of fishing technology and increasing fishing effort resulting out of rapid fish demand and market price. Some of the marine fisheries resources are being exploited at

maximum sustainable yield level with sign of decline of some species like tiger shrimp which is exploited at a higher rate for export, while deep sea pelagic resources are yet to be explored and exploited. Fresh water aquaculture though growing rapidly needs proper management and regulatory regime for sustainability from bio-technological and social point of views.

While the fisheries sector has grown steadily during the last one decade, the fish bio-diversity has been affected. According to IUCN, about 54 species of fishes are endangered, of which 12 species are critically endangered or extinct. There has been a qualitative degradation of fish resources. Valuable species like Indian major carp, cat fish etc. have declined alarmingly.

Table 4.3: Sector-wise fish production in inland and marine fisheries in FY2011

Sector of fisheries	Water area (ha)	Total catch (tonnes)	%	Catch/Area (kg/ha)
A. Inland fisheries				
(i) Capture				
1. River and estuaries	853,863	144,566		169
2. Sundarbans	177,700	22,451		126
3. Beel	114,161	81,564		714
4. Kaptai Lake	68,800	8,980		131
5. Flood plain	2,810,410	797,024		284
Capture total	4,024,934	1,054,585	34.45	
(ii) Culture				
1. Pond	371,309	1,219,736		3,285
2. Semi-closed water body	25,435	51,230		2,014
3. Baor	5,488	4,864		886
4. Shrimp/prawn farm	276,492	184,939		669
Culture total	678,724	1,460,769	47.71	
Inland total	4,703,658	2,515,354	82.16	
B. Marine fisheries				
(i) Industrial (trawl)		41,665		
(ii) Artisanal		504,668		
Marine total		546,333	17.84	
Country total		3,061,687	100	

Source: BBS, Statistical Yearbook of Bangladesh 2011

Table 4.4: Sector-wise annual fish production, FY2007 – FY2011
(lakh tonnes)

Types of fisheries	FY2007	FY2008	FY2009	FY2010	FY2011
Inland capture	10.07	10.60	9.08	10.29	10.54
Inland culture	9.46	10.06	11.82	13.52	14.60
Marine fisheries	4.87	4.97	6.11	5.17	5.46
Country total	24.40	25.63	27.01	28.99	30.62
Annual growth rate	4.79	5.05	5.39	7.32	5.60

Types of fisheries	FY2007	FY2008	FY2009	FY2010	FY2011
(%)					

Source: Bangladesh Economic Review, 2007 & 2012

It is estimated that by 2020-21, the requirement of fish would stand at 3.26 million tonnes (3.06 million tonnes for domestic consumption and 0.20 million tonnes for export and other uses). If the fish production increases at the average annual growth rate of 4.5 percent, the estimated production by 2020-21 will stand at 4.55 million tonnes or if the annual production growth rate is taken at 4 percent then the estimated fish production by 2020-21 will be to the tune of 4.25 million tonnes. In the event of such situation per capita fish availability and export may increase.

4.1.2.2 Key Challenges

The sector faces various challenges and constraints for sustainable development. The challenges and constraints are:

- Overexploitation of capture fisheries due to increased fishing pressure by the rapidly growing population;
- Loss and degradation of fish habitat by natural and human interventions such as FCD/FCDI projects, industrial and agri-pollution of water, siltation water bodies;
- Environmental degradation, climate change and natural hazards;
- Revenue oriented leasing system of water bodies (Jalmohal) by MoL, that indulges destructive and over fishing;
- Lack of coordination among different agencies;
- Institutional weakness of the organizations namely DOF, BFRI, BFDC responsible for development and management of fisheries resources i.e. (a) Lack of sufficient manpower for implementation of laws and regulations and for extension (b) Shortage of fund and other logistics to carry out the activity of the sector.
- Alternative livelihoods support to fishers during banned fishing seasons and sanctuary maintenance remained low and therefore ineffective. Without such support and social safety net assistance for the poor fishers, sanctuary management and resource conservation may remain ineffective.

4.1.2.3 Strategies

The overall strategy of fisheries sub-sector development should focus more on open water fisheries, ensuring biodiversity and preserving natural breeding grounds, product diversification, value addition, capacity building and development of appropriate marketing infrastructure. The strategy should be to promote a dynamic capture fisheries and aquaculture, involving the key actors e.g. NGOs, private sector entrepreneurs and community based fishing groups. Priority areas of interventions in the fisheries sub-sector may therefore include the following:

Open water fisheries

- Restock open water fisheries.
- Restrict fish catching for some time of the year. GOB will assist the fisher folk accessing social safety nets like VGD and VGF and alternative livelihoods support.
- Enhance seasonal culture, pen culture and beel nursery.

- Conserve aquatic biodiversity and indigenous fish species. The conservation strategy will specially include seasonal ban, gear restriction, limiting number of fishers by licensing, species restriction and alike.
- Set aside at least 10% of wetland areas as fish sanctuaries. In important fish resource areas such as haor, the protected area it should be at least 20%.
- Establish and maintain sanctuaries which will comprise complete ban on fishing in certain eco-sensitive areas like the Sundarbans, parts of Kaptai Lake, and several sections of the Halda river, selected beels in haor areas and certain sections of the Bay of Bengal etc. In the coastal region, every alternate channels would be conserved as fish sanctuaries. Similarly, along the major rivers having parallel channels, selected ones will be preserved.

Institutional strengthening of fisheries sector

- Develop an efficient monitoring system within Department of Fisheries (DOF) to monitor the resources status, production level and performance of the development and management activities of the sector.
- Strengthen the knowledge and capacity of the DOF, its partners and its primary stakeholders for resource management and production for sustainable development.
- Properly enforce inland fisheries rules and regulations.

Fish friendly infrastructure

- Improve fish habitat conditions by re-linking different water bodies of the floodplain ecosystem through remodeling existing infrastructure into fish friendly infrastructure. Necessary measures should be taken by the relevant departments such as Bangladesh Water Development Board (BWDB), Local Government Engineering Department (LGED), Roads and Highways Department, DOF, etc. for reestablishment of connectivity between rives and their floodplains for maintaining floodplain ecosystem services.

Community based fisheries management

- Organize the fishers in sustainable community based organizations and such organizations will be given management responsibility of khas jolmohal on long term basis so that they conserve rather than just exploit resources. Present short term leasing system, often benefiting the influential elite and leaseholder not taking any effort to conserve, will gradually be replaced by the long term lease to organizations of genuine fishers who will be trained in sustainable management and provided other support.

Marine fisheries

- A comprehensive survey of marine fisheries resources followed by regular updating of data and monitoring.
- Determine/ re-estimate maximum sustainable yield by species, location and season.
- Identify conservation needs and methods that can be effectively administered and regularly monitored.
- Allocate fishing rights upon such assessment.
- Introduce modern techniques of fishing in the coast as well as in the sea.
- Undertake fish resource mapping of the sea and estuaries and formulate plan to harness the fish resources in a sustainable manner.

Shrimp cultivation

- Define shrimp farming zones in the coastal region based on natural advantages of shrimp and prawn farming and rehabilitate water management infrastructure in each zone to optimize production and environmental sustainability.
- Stop encroachment of forested areas for shrimp cultivation.
- Replace existing shrimp cultivation practice by organic shrimp farming. This will ensure overseas market in the longer horizon.

4.1.3 Livestock

4.1.3.1 Present Status

The livestock sub-sector including poultry has emerged as a promising and dynamic sector with high potentials for poverty reduction and nutrition supply. The sub-sector contributed 2.58 percent to the national GDP with a growth rate of 3.48 percent in FY 2011. It provided about 50 percent of animal protein in the diet of the people of Bangladesh.

As of 2010-11, the livestock and poultry population are 51.67 million and 278.81 million respectively (Table 4.5). Production of milk, meat and eggs (hen and duck egg) are 2.95 million tonne, 1.99 million tonne and 6079million respectively (Table 4.6). Comparing the production of milk, meat and egg with the demand (Table 4.2), it can be seen that there is a gap between demand and supply. The foreign exchange earnings through livestock products and by-products especially leather and leather goods exports are 1962.00, 2430.00, 3367.00 and 3150.40 crore taka respectively for FY2009, FY2010, FY2011 and FY2012 (up to March-2012) respectively, though export earnings from horn, hoofs and gelatin are not included.

Table 4.5: Number of livestock and poultry FY2007 – FY2011

		FY2007	FY2008	FY2009	FY2010	FY2011
Livestock	Number (million)	47.51	48.50	49.56	50.65	51.67
	Growth (%)	2.24	2.08	2.19	2.20	2.01
Poultry	Number (million)	246.0	252.31	262.63	270.71	278.81
	Growth (%)	5.58	2.56	4.08	3.08	2.99

Sources: Bangladesh Economic Review and Department of Livestock Services.

Table 4.6: Production of milk, meat and egg FY2007 – FY2011

Product		FY2007	FY2008	FY2009	FY2010	FY2011
Milk	Quantity (Million tonnes)	2.28	2.65	2.29	2.37	2.95
	Growth (%)	0.44	16.23	-13.74	3.46	25.32
Meat	Quantity	1.04	1.04	1.08	1.26	

	(Million tonnes)					1.99
	Growth (%)	-7.96	0.00	3.85	16.67	57.94
Egg	Quantity (Million)	5369	5653	4692	5742	6079
	Growth (%)	-0.98	5.29	-17.00	22.39	5.87

Source: BBS, Statistical Yearbook of Bangladesh - 2011

Note: Production of milk, meat and eggs at the end of 2011-12 is 51%, 115% and 156% higher than those of 2008-09.

Millions of small poor households are engaged in rearing livestock and poultry at small scale in their home yards. The husbandry practice is simple and environment friendly and does not compete with crop farming or other home based economic pursuits. Besides, many poor are employed in various backward and forward linkage activities related to commercial poultry farming. Some private sector firms have come up for contract growing of poultry and milk products supporting small farms which improved poultry and dairy breeds, quality input supplies, demand-led extension services and assured marketing facilities for poultry and milk products.

Over the last few years poultry and dairy have emerged as an important commercial enterprise in the private sector. But recently the poultry industry has had a great setback due to outbreak of bird flu. This has become a great threat to the growing poultry industry of the country.

Lack of adequate feed and fodder has been constraining the development of livestock in the country. There is ample scope for ensuring improved feed supply in Bangladesh. Also, there are bright prospects for including certain feed crops such as maize into farmers' cropping pattern by selective inter-cropping with other food or cash crops.

4.1.3.2 Key Challenges

The key challenges that the livestock sector faces are as follows:

- Ensuring feed and fodder for the growing livestock sector.
- Control of diseases such as bird flu for poultry and anthrax for cattle.
- Supporting small holders so that they can sustain and flourish in this promising sector.

4.1.3.3 Strategies

Ensuring feed and fodder

- Grow high yielding perennial fodder crops such as Napier grass, Jumbo grass and Para grass on embankments, road sides, and other underutilized areas.
- Conduct research on unconventional green grasses in hilly and char lands to meet the fodder shortage.
- Utilize char areas to produce feed crops.
- Rearing of sheep and buffalos in the char area will be promoted.

Control of diseases

- Train veterinarians for proper diagnosis and treatment of common diseases and to confirm regular immunization program by the veterinary technicians/compounders/field assistants.
- Ensure adequate supply of vaccine needed to immunize the livestock and poultry.
- Carry out research on production of vaccines sustainable in the climatic condition of the country.
- Train women folks working in the dairy and poultry sector.
- Take measures for protection against trans-boundary diseases such as avian flu, Anthrax etc.
- Encourage production of buffalos and sheep which are more tolerant to saline water, in the southern part of the country.
- Take necessary steps to conserve the indigenous species of livestock and poultry.
- Capacity building for laboratory networking and strengthening Livestock Research Institutes for development and improvement of vaccines.

Support to small holders

- Focus on livestock research, extension, and public goods provision towards improving management of small animals in small lots.
- Remove barriers that constrain the poor's ownership of both large and small animals.

Shelter for livestock

- Build adequate shelters (Killah) for livestock at flood and cyclone vulnerable areas especially at the charlands and southern coastal belts of the country.

Capacity building

- Capacity building of Department of Livestock Services should be done through upgrading manpower structure and training for sustainable livestock development and food security.

4.1.4 Rural Development: Rural Non Farm (RNF) Sector

Rural development depends on growth of agriculture which has been discussed above as well as that of rural non farm sector. This section discusses sustainable development issues concerning rural non farm sector.

4.1.4.1 Present Status

Rural non farm sector comprises a range of diverse activities of different scales including trade in agricultural inputs and outputs, construction materials, rural transport and its parts, and manufactured goods consumed by households, agro-processing, manufacturing and services such as transportation, restaurants, education and health care. As in other countries wholesale and retail trade are the most important RNF activities with 57 percent of enterprises engaged in these activities. Another 25 percent of RNF enterprises are engaged in manufacturing.

RNF sector experienced an average annual growth rate of 6.3 percent that parallels that of GDP but exceeded that of agriculture. Consequently it has emerged as a leading sector of the country's rural economy contributing to overall development of the country in four different ways: (i) it creates employment for a growing rural labour force in the background of declining agricultural employment; (ii) it contributes to growth; (iii) it slows rural urban migration and thus helps improve urban congestion and pollution. The slower rate of growth of urban

population in the 2001-2011 period (BBS, Population and Housing Census 2011) in Bangladesh can be partly explained by the growth of a dynamic RNF sector. (iv) it promotes equitable distribution of income and helps reduce rural poverty.

About 60 percent of earners of rural households depend primarily on RNF sector for their livelihood. The proportion of household income originating from RNF sector stood at 57 percent in 2008 thus exceeding income from agriculture which constituted 43 percent of household income. Even the bottom 10 percent of the households derives 40 percent of their income from RNF sector. Higher income and longer duration of employment have positive impact on poverty and vulnerability and discourage people from migrating to urban areas in search of job and higher income. The slower rate of urbanization between 2001 and 2011 can be attributed partly to increasing non-farm employment opportunities and increasing rural wages.

4.1.4.2 Key Challenges

RNF sector is widely diverse in structure, scale and product coverage and hence faces diverse constraints ranging from good road for a motorized vehicle operator to technical, management and marketing skills for a micro, small or medium enterprise.

- Rural enterprises are constrained by lack of access to credit, market and electricity and lack of education and training of entrepreneurs.
- Lack of proper infrastructure, technology, access to market, and institutional support hinder robust growth of RNF sector
- Poorer households are at a disadvantage owing to lack of credit, education and electricity and engaged in low productivity activities.

4.1.4.3 Strategies

- Create an enabling environment focusing on infrastructure, rural electrification, gas connection, better physical and electronic communication services, education, training and skill formation, technological upgrading, access to market, rural financial services, and business development services.
- Ensure access of women and lower income groups engaged in RNF sector to training, skill formation, and credit and business development services.
- Continue to allow NGOs to serve the RNFAs in providing credit and training and related services.
- Increase reach of SME-Agriculture branches of commercial banks in rural areas.
- Promote agriculture development to enable households generate income to invest in education and training of children and create investment fund for RNF activities.
- Provide fund support (specialized credit) for RNF sector.
- Disseminate use of environment friendly cooking stoves to rural households which improve women's health by reducing indoor air pollution and save energy and time.
- Encourage construction and use of environment friendly bio-gas plant in the rural areas with necessary support.
- Encourage growth of micro, small and medium enterprises to provide forward linkage for agriculture and generate employment opportunities.
- Special emphasis will be given on agro-processing industries and food processing/value addition activities.
- Expand the coverage and effectiveness of Gharey Fera (Back to Home) programme which seeks to rehabilitate the urban slum dwellers in a wholesome environment and invigorate the rural economy by creating productive activities. Strengthen other targeted programmes of

the government which transfer purchasing power to the rural economy, provide rural infrastructure, relax credit constraint of rural enterprises, create employment for rural poor and help build human capital. Relatively better living conditions in rural areas and remunerative year round employment opportunities will discourage workers to migrate to cities for work.

4.2 Industry

The objective of industry sector strategy is to accelerate its rate of growth maintaining natural capital.

4.2.1 Present Status

Faster industrial growth relative to the other two broad sectors of the economy, namely, agriculture and services has led to increase in its contribution to GDP reaching 31.26 percent in FY2012. The overall labour productivity in the manufacturing sector indicates only insignificant upward trend and indeed some sectors such as jute and paper show downward trend. Future sustained growth as envisaged in the NSDS will depend critically on accelerated growth of industry.

There has been compositional change in the manufacturing sector with the emergence of new industries both export oriented such as RMG and import competing such as food processing, electronics and small machinery, scaling up of existing industries such as food and beverages and decline in some industries such as jute. Top ten industries in terms of value added include readymade garments, pharmaceuticals, food and beverage, cotton textile, non-metallic mineral product, leather and leather product, wooden furniture, paper, printing and publishing, jute textile, and soap and detergent. The existing industries will continue to grow while new industries including emerging export oriented industries such as light engineering and ship building will act as drivers of manufacturing growth in the period through 2021.

Industrial growth has been accompanied by environmental pollution raising concern for sustainable development. Severe water pollution has occurred in areas with large concentration of industries. Large, medium, and small industries operating in the country discharge effluents directly to the rivers or nearby canal or waterbed creating environmental pollution. Effluents from Hazaribag tannery and other industries have so polluted the water of the Buriganga that its aquatic life has almost been extinguished. It has been observed that more than 300 different chemical compounds are being discharged into the river by adjacent industries. Sitalakhya river receives industrial wastes from urea fertilizer plants, textile mills and other industries. Balu river near Tongi receives untreated effluents from textiles, lead batteries, pulp and paper, pharmaceuticals, paints, detergents, iron and steel, and rubber. In Khulna industries such as jute mills, oil mills, cable, shipyards, tobacco, hardboard and others dispose molasses, starch, oil, sodium sulphide, ethane, lissapol, soda ash, dye, sulphuric acid, salicylic acid, lime, ammonium sulphide and chrome into Bhairab and Rupsa rivers. A large number of polluting industries such as textile mills, tanneries, oil refinery, TSP plant, DDT plant, chemical complexes, fish processing units, urea fertilizer factory, asphalt bitumen plant, steel mill, paper mill, rayon mill complex are located in Chittagong and they discharge various effluents into the river Karnaphuli. High water pollution that occurs in densely populated areas affect life and livelihood of large number of people.

4.2.2 Key Challenges

- Environmentally non-caring narrow industrial base of the economy.
- Low productivity of industries especially large scale manufacturing industries makes them less competitive in global and domestic markets.
- Releasing the burden of loss making SOEs
- Release of industrial pollution to nearby rivers and wetlands degrading environment
- Setting up and operating costly effluent treatment plant is a challenge for the enterprises.

4.2.3 Strategies

The following strategies will be followed for sustainable development of industrial sector:

- Ensure diversification of industries and exports which have been the main driver of manufacturing growth in the recent decades. Export diversification will not be limited to product diversification rather address other facets of diversification such as geographical, quality, goods to services, and intermediate goods diversification. Equal policy support will be given to other emerging industrial enterprises as provided to RMG.
- Trade and industrial policies will ensure export competitiveness, reduce anti-export bias, and reduce anti diversification bias.
- Promote strategic use of cross-national production networks within a globalised production system especially use of buyer driven commodity chains.
- Improve investment climate to attract industries operating in China which are looking for new low cost locations because of increasing production cost in China. Improved investment climate will also attract investment from Japan, EU and other countries and stimulate domestic investment in industrial sector.
- Integrating environmental considerations into management practice, through environmental management and auditing.
- Encourage firms to use cleaner technology and cleaner production processes to reduce waste production. Ensure compliance with national environmental laws, rules and regulations; relevant public departments/agencies and private sector entrepreneurs will conduct Initial Environmental Examination and Environmental Impact Assessment (EIA) and take necessary environmental clearance from the Department of Environment for projects and industries which need to comply with the Bangladesh Environmental Conservation Act 1995 and the Environment Conservation Rules 1997 and implement the Environment Management Plan during the implementation and operation and maintenance of the projects and industries.
- Increase public awareness of environment protection, pollution, dumping of hazardous materials on land and water.
- Undertake necessary measures for effective enforcement of rules and regulations for proper running of Effluent Treatment Plants (ETP and CETP) in the industries.
- All industries must hold green label through becoming energy and resource efficient with low carbon footprint and having ETP and 3R system to achieve zero discharge by 2021.
- Examine the feasibility of providing appropriate incentives to industries to reduce emission of pollution.
- SOEs will be restructured and rationalized to enable strategically placed industries to operate profitably and the remaining SOEs will be privatized
- Industrial complexes will be encouraged to take measures for rain water conservation and use.
- Encourage growth of micro, small and medium industries to better utilize country's human resources and resource base. Special emphasis will be given on agro-processing industries and food processing/value addition activities to promote industrialization and help develop a prosperous rural economy.

4.3 Energy

The objective of the energy sector is to provide energy security by tapping all sources of traditional and non-traditional energy to ensure accelerated rate of economic development and industrial production.

4.3.1 Power Sector

The objective of the power sector is to reach power generation capacity to 24,000 MW to meet projected 20,000 MW of electricity demand by 2021 which will ensure electricity for all in the country.

4.3.1.1 Present Status

Per capita electricity consumption in Bangladesh is only 265 Kwh in April 2012 which is much lower than India (444 Kwh) and Pakistan (388 Kwh). Only 55.26 percent of the households have access to electricity with 90.10 percent households in urban and 42.49 percent households in rural areas (BBS, Household Income and Expenditure Survey 2010). Low access to electricity and frequency of power outages threaten welfare of citizens. Electricity being an important input to production in manufacturing, agriculture, services and construction, inadequate supply and frequency of outages have emerged as a binding constraint on production

The demand for electricity has been rising rapidly with growth in per capita income, increasing industrialization, and expansion of use in agriculture and commercial sectors of the economy. In a typical developing economy a one percent increase in GDP leads to 1.5 percent increase in electricity demand. This implies an average 6 percent growth would require more than 9 percent growth in electricity supply while accelerated target growth rate of 8 percent by 2015 and 10 percent by 2021 would require more than 12 percent and 15 percent rate of growth of supply respectively. But failure to increase electricity generation capacity in the past, and failure to utilize installed capacity due to shortage of gas supply and lack of maintenance resulted in serious supply shortage. The government resorted to purchase of high cost electricity from the quick rental private power plants to ease the problem but it puts a strain on the budget. Fuel shortage has led to less than full utilization of installed capacity of these plants.

Currently power generation depends overwhelmingly on use of gas as primary energy (88%) with 2-3 percent use of furnace oil, diesel, hydro and coal. Bangladesh needs to reduce its dependence on single source gas based power generation and switch to utilize its coal deposits and other sources of energy. Declining gas reserves and its alternative use in production of fertilizer required for agricultural production necessitate such a policy shift. It should be noted, however, that in the case of coal emission of green house gases is high. With increasing use of coal carbon emissions is predicted to increase by 32 percent by 2030 from its current level of 17 percent (Bangladesh National Report on Sustainable Development (Rio+20), April 2012).

Apart from electricity generation there is also need for expansion of transmission and distribution lines to connect new users as well as maintenance of existing lines for uninterrupted distribution.

4.3.1.2 Key Challenges

- Raising supply of electricity at a faster rate to meet existing unmet and increased future demand.
- Increasing use of coal in power generation to release natural gas for alternative uses such as fertilizer production.
- Setting price of electricity, gas and coal which reflects their respective cost without unduly harming production.
- Changing energy mix for electricity generation from one with overwhelming dependence on gas to one with greater reliance on coal, nuclear energy, and renewable energy; and
- Energy conservation, increasing efficiency of power sector, renewable energy use, and reduction of system loss.

4.3.1.3 Strategies

- Enhance power supply through increased generation using different funding mechanisms such as public-private partnership, private investment, FDI and joint venture and import from neighbouring countries such as India and Bhutan.
- Promote demand management through strengthening existing measures and introducing new measures such as:
 - Reducing opening hours of shops;
 - Staggering weekly holiday in industries and shopping complexes;
 - Shift the evening peak hour of irrigation pumps to off-peak hour (11 P.M. – 5 A.M.)
 - Keep the temperature of AC's in all offices at a minimum of 25 degrees Celsius;
 - Motivate people to abstain from using AC, calendar and pump at the peak hour;
 - Avoid unnecessary illumination at home, shopping centres and other places.
 - Examine the feasibility of re-introducing day light saving time as an energy saving device which was introduced earlier for a short period.
 - Diversify fuel use in electricity generation to coal, liquid fuel, and nuclear power;
- Provision for dual fuel for electricity generation wherever possible.
- Adjust prices of electricity, gas and liquid fuel to reflect cost of production and achieve social objectives in electricity distribution through cross subsidization and explicit budget support.
- Reform energy sector to reduce cost and improve service delivery, and reduce system loss.
- Implement imported coal based and nuclear fuel based power plant ensuring adequate safeguards as recommended by PSMP 2010.
- Increase power generation through renewable sources such as solar, wind, and small hydro.
- Promote use of environment friendly technology in electricity generation wherever possible.
- Increase energy efficiency replacing inefficient incandescent lights, refrigerators, ACs, pumps, motors, and other electrical appliances by efficient ones and replacing the road lights by energy efficient LED and solar powered lights.

4.3.2 Primary Energy Sector

The objective of primary energy sector is to provide, along with power sector, energy security by 2021.

4.3.2.1 Present Status

The demand for primary energy has been increasing rapidly with economic growth and increased industrialization of the economy; this has been accompanied by a shift in energy use from bio-mass to commercial energy because of rapid urbanization.

Bangladesh has energy from both renewable sources such as hydro-electric, solar, bio-gas and bio-mass as well as non-renewable sources such as natural gas, oil, coal and coal like substance, compressed natural gas (CNG), and liquefied natural gas (LNG). The total supply of energy from different sources is given in Table 4.7

Table 4.7: Sources of annual energy supply, 2009 -12

(Percent)

Sources	2009	2010	April 2012
Gas	50.0	46.0	42.0
Biomass	33.3	34.6	34.1
Oil	11.1	18.3	22.8
Others	5.6	1.1	1.1
Total	100.0	100.0	100.0

Source: Ministry of Finance, Power and Energy Sector Road Map: Second Update, April 2012

4.3.3 Natural Gas

4.3.3.1 Present Status

The main source of primary energy in Bangladesh is natural gas. Rapid growth in demand in the face of lagging supply consequent on inadequate investment in gas exploration has resulted in acute shortage. Against an average annual demand of 873 billion cubic feet of gas in April 2012 total supply was 709 billion cubic feet implying a shortage of 164 billion cubic feet to total annual demand. Presently, natural gas is mainly used in electricity, fertilizer, manufacturing, transport and households. The percentage of gas used in electricity generation has increased from 55 percent in 2009 to 58 percent in 2012. Gas shortage has severely constrained electricity generation threatening energy security of the economy.

4.3.3.2 Key Challenges

- Increasing investment in gas exploration by national gas companies as well as by IOCs.
- Maintaining production level of existing fields operated by national gas companies.
- Connecting the gas fields with the main demand centres in Dhaka and Chittagong as well as other demand centres in the country.
- Reducing distribution loss of gas distribution companies.
- Improving efficiency of using scarce gas resources.
- Encouraging gas conservation and improving financial operations of the gas sector.
- Ensuring adequate measures to prevent accidents in gas exploration.

4.3.3.3 Strategies

- Increase financial capacity of BAPEX by forming Gas Development Fund as well as its technical capacity to undertake exploration.
- Attract investment by IOCs under PSAs in exploration in new areas especially the offshore blocks where domestic companies do not have prior experience and facilitate the process through speedy processing of tenders and signing of agreements for offshore blocks.
- Undertake timely maintenance of existing fields, drilling of additional wells, optimization of recovery, and appraisal of existing gas fields to maintain current production as well as to ascertain the possibility of additional gas production.
- Construct a national gas transmission network by connecting main demand centres with gas fields.

- Improve technical and commercial performance of gas distribution companies to reduce distribution losses and improve end use efficiency.
- Adjust end user gas prices to encourage energy conservation and provide adequate margins for national gas companies to generate funds for investment.
- Undertake measures to avoid risks of accident which have negative environment impacts.
- Gas extraction will be based on a long term plan balancing both present and future needs of the country.
- Consider regional and sub-regional energy cooperation with neighbouring countries.
- The historic verdict on 14 March 2012 has given Bangladesh sovereign right over 200 nautical miles of exclusive economic zone and also outer continental shelf in the Bay of Bangladesh. A similar verdict is expected by 2014 concerning maritime dispute with India in the western area of the sea. Bangladesh will need to start policy planning to take advantage of these historic events.

4.3.4 Coal

4.3.4.1 Present Status

Bangladesh has discovered five coal mines all in north western area of the country with possibility of extraction of coal from four mines. These four mines have a total reserve of 2.2 billion tonnes of coal. More coal mines may be discovered in other parts of the country with more exploration. Commercial production has started only in Barapukuria coal mine in Dinajpur where clean coal technology is being used for running two power plants each with 125 MW generation capacities. The Government plans to expand coal mining to Phulbari field by 2014 and Khalaspur by 2017 in order to replace imports by domestic production in future. The Government's plan to extract coal is being dissented by certain quarters in civil society because of its potential adverse impact on economic, social and environmental sustainability. However, the need for diversifying primary energy sources makes utilization of coal very urgent for ensuring energy security of the country.

4.3.4.2 Key Challenges

- Coal extraction and utilization addressing the technical, economic, social and environmental consequences have remained a challenge.

4.3.4.3 Strategies

- Continue coal exploration to estimate total coal reserves of the country.
- Formulate and approve National Coal Policy highlighting issues relating to exploration, extraction and utilization at present as well as in future.
- Promote technologies in extraction and utilization of coal which have lower environmental impacts. Since carbon emission from coal use is higher compared with other primary energy best available technology will need to be used to minimize its environmental impacts.
- Provide adequate incentives for resettlement of the displaced inhabitants and for the development of the surrounding areas of the mining locations.
- Build awareness of people about mining methods especially for open pit coal mines.
- Obtain public opinion of the locality, ensure environmental safeguards, and undertake infrastructure development and rehabilitation of affected people of the area where open pit mining is found to economically profitable.
- Articulation of government's position on import of coal.

4.3.5 Renewable Energy

4.3.5.1 Present Status

Increased use of renewable energy such as solar, wind, tidal, geothermal and modern bio-mass technologies, can help achieve energy security in the country as there is shortage of non-renewable energy as the source of fuel. But its use is still very limited- this source produced only 55 MW electricity in 2011. However, renewable energy use is increasing worldwide because of rising price of non-renewable energy and because renewable energy is environment friendly. Increased use of renewable energy will reduce dependence on imported fuel resulting in foreign exchange saving. Bangladesh plans to generate 5 percent of its electricity from renewable energy sources by 2015 and 10 percent by 2020.

The Government has taken a number of actions on priority basis to promote production and use of renewable energy in different areas of the country. There has been some progress in expanding use of solar power for domestic purposes especially in off-grid areas. Irrigation pump driven by solar power, solar mini-grids in the distant islands, solar panel assembly plants and telecommunication towers driven by solar power have been installed. In 2011 the government made it mandatory for developers to install solar power in new buildings to meet 3 percent of their total electricity requirements before getting electricity connections. This saves energy from non-renewable sources and forces the developers to plan for green buildings.

The potential for wind-mill run power plants in coastal areas is recognized by experts but there has not been any progress because of capital cost as well as high variations and seasonal changes in wind speed. The Government will conduct wind-mapping in five coastal areas eventually to set up a wind turbine based 15 MW power plant. The tidal range of the coastal belt is adequate for generation of tidal power but initiative to harvest this energy is yet to come. The Delta Plan 2100 will need to consider generation of wind and tidal energy in the coastal areas.

There has also been limited progress in biogas development and spread use of cooking stoves which save a lot of fuel wood. It is worth mentioning that about 500 biogas plants are being set up by IDCOL every month. The Government has taken steps to establish Sustainable and Renewable Energy Development Authority (SREDA) which will assist the government in policy framing and promote energy efficiency, energy conservation and renewable energy in Bangladesh. Considering the potential of solar power in the country, the Government has undertaken 500 MW solar power generation programme.

4.3.5.2 Key Challenges

- The technical, social, and institutional barriers to the adoption of renewable energy technologies have to be overcome.
- Relatively high capital cost of solar home system (SHS) is a constraint on rapid expansion of use of solar power.

4.3.5.3 Strategies

- Promote use of renewable energy such as solar power, wind power, tidal power and bio-mass by providing appropriate incentives.
- Use of solar energy can be disseminated in off-grid rural areas and in irrigation through subsidizing capital costs.
- Undertake measures to set up nuclear power plant to meet long term energy needs.

- Explore possibilities of hydroelectric power generation and use in co-operation with Bhutan, India, and Nepal.

4.4 Transport

4.4.1 Present Status

The transport system of Bangladesh consists of roads, railways, inland waterways, sea ports, maritime shipping and civil aviation catering for both domestic and international traffic. Presently there are about 21,040 km of paved roads; 2,835.04 route-kilometers of railways (Broad-gage - 659.33 km, Meter gage - 1,800.88 km and Dual Gage - 374.83 km); 3,800 km of perennial waterways which increases to 6,000 km during the monsoon, 2 seaports and 3 international airports (i.e. Dhaka, Chittagong, and Sylhet) and 8 domestic airports. There are also several land ports along international borders to facilitate trade with India and Myanmar.

Bangladesh witnessed rapid growth of transport sector since independence. The overall annual growth rate was nearly 8.2 percent for freight transport and 8.4 percent for passenger transport. Even then, the transport intensity of Bangladesh is considerably lower than that of many comparable developing countries. The relative roles of transport modes are evolving with road transport expanding at the expense of railways and inland water transport because of its inherent technical, time and cost advantages. In fact, road transport in our country has emerged as the most dominant mode in surface transportation carrying in recent years over 80% of passenger and freight traffic.

Roads and Highways

The history of road network development in Bangladesh is of recent past. While the paved road network was only 600 km in 1947, it has grown to about 4300 km in 1981. The real development of road network in Bangladesh, both in quantitative and qualitative terms, started in the early nineteen eighties and the pace of this development gradually accelerated in later periods. The Government has been following the strategy of road network development activities giving priority to 5 important corridors: Dhaka-Chittagong, Dhaka-Northwest, Dhaka-Khulna, Dhaka-Sylhet and Khulna-Northwest with special emphasis on Dhaka-Chittagong, Dhaka-Northwest and Khulna-Northwest arterial corridors. The major share of funds allocated to the transport sector including foreign assistances in the various plans has been invested to develop the strategic road corridors.

While the extended network has provided great benefit to the society by facilitating movement of people and goods and providing critical access to previously isolated population, the long-term sustainability of the road network is at risk. It is observed that there is large scale deterioration of the network due to lack of proper maintenance. Large sections of the network have inadequate structural strength and many of them are severely damaged by vehicle overloading. As a result, only about 40 percent of the main roads (the National and Regional highways and the Zila roads) are in good condition.

Lack of adequate road safety has already reached an alarming level; faster and smooth movement along the highways is not possible due to the presence of large number of huts and bazaars right on the edge of roads. Lack of traffic safety is resulting in frequent road accidents.

Railway

After liberation, Bangladesh Railway (BR) had 2858.23 km rail line, 270 stations, 486 locomotives, 1,643 coaches and 16,823 wagons. At present BR has 2,835.04 km rail line, 440 stations, 286 locomotives, 1,509 coaches and 9,970 wagons. The share of allocation of the railway sub-sector in total allocation of transport sector has declined from 23.9% in the First Five Year Plan to 13% in the Fifth Five Year Plan. These allocations could barely meet the need

of rehabilitation/ replacement costs. As a result, no improvement or up-gradation took place and some railway sections and stations had to be closed down. On the other hand, huge investment in road sub-sector resulted in high road density of 69.2 km per 100 sq. km. of land in Bangladesh.

In a land scarce country like Bangladesh, railways can perform a useful and effective role in transporting bulk freight and passengers more cost effectively and with lower adverse environmental impacts than road transport. Its contribution to pollution is very little, consumption of fuel is only 10% of the other modes of transport and rate of casualties in accident is negligible in comparison to other modes of transport. Travelling costs in railway is cheaper than any other mode of land transportation. Although railway has great potential, it carries only 4% of all traffic. Due to lack of proper investment, BR faces a number of constraints which limit its ability to provide service and minimize its losses.

During the past three decades, the only remarkable investment is the establishment of railway network over the Bangabandhu Multipurpose Bridge. Due to inadequate investment, the railway track is in poor condition in a number of areas, including the vital Dhaka-Chittagong corridors which need immediate rehabilitation and upgrading. Almost 78% of the locomotives and 28% of passenger coaches are beyond their economic life and need immediate replacement. Seventy percent of the signaling system has become old aged and obsolete and needs modernization including human resource development. All these result in serious deterioration of the performance of BR.

Inland water transport

The country possesses a navigable waterways network, which varies from 5,968 km during the monsoon season to 3,865 km during the dry season. Owing to the vast river network in Bangladesh, inland water transport (IWT) continues to be an important mode of transport, despite years of neglect and the emergence of expensive road transport system. More than fifty percent of the economic activities in the country are located within a distance of 10 km for the nearest navigable waterways in all seasons. The water transport network of the country not only caters to the inland movement of freight and passengers but also plays an important role in the transportation of import and export items through the ports of Chittagong and Mongla. During the monsoon season when roads become impassable, riverboats are the only mode of transport for an important part of the Bangladesh's rural population. The country boat plays significant role and provides about 50% of the total employment in the transport sector as a whole. They are also the main mode of transport in the south coastal areas where the road network is little developed.

The performance of the IWT in terms of passenger and cargo transportation is satisfactory. The sector served 8.9 billion passenger km and 3 billion cargo tonne km in 2005. In terms of productivity per kilometer of network, IWT has the same productivity for passenger and more than twice the productivity for cargo compared with road transport. Inland waterways have more accessibility compared with other surface network. Studies have also shown that 12.3% of the rural population or 50% of rural households have access to water transport. It is the cheapest mode of transportation, as the tariff per tonne km is Tk. 1 compared with Tk. 4.5 for road and Tk. 2.5 for rail transport.

Moreover, the topographic, soil and climatic conditions in Bangladesh are such that cost of building and maintenance of roads and railways are very high compared to inland waterways. Besides, cultivable land is needed for the improvement of roads and railways while it is not necessary for inland waterways.

Sea ports

The two seaports, Chittagong and Mongla have the potential of playing great role in regional trade. Chittagong port is the principal maritime port of Bangladesh and handles about 95% of the country's sea borne export and import trade. In future the port may also provide international transit facilities to neighboring countries mainly Nepal, Bhutan and eastern states of India. By river route and road, Mongla port is in a unique position to serve all parts of the country as well as Nepal, Bhutan and boarder areas of India.

4.4.2 Key Challenges

- To prioritize investment among different modes of transport

4.4.3 Strategies

The main elements of the overall transport strategy for the NSDS in order of priority are as follows:

- Railway linkages will be established between the east and the south west zones of the country through construction of the first Padma Bridge. Expansion of line capacity by double tracking of major rail corridors, rehabilitation/upgrade& replacement of old aged railway track, bridges, signaling and other assets, acquisition of modern rolling stocks to provide speedy, environment friendly and cost effective transport facilities to the national, regional and international traffic will be made.
- Connect the capital city with Cox's Bazar, Mongla Port, Tungipara, Barisal, Chittagong Hill Tracts and other areas where rail network does not exist. Improve commuter train services to provide better urban transport facilities to the daily passengers around Dhaka, Chittagong, Khulna, Rajshahi, Sylhet and Rangpur.
- In road sector more attention will now be given to upgrading and maintenance of existing roads than new road construction. The government will take steps to remove the maintenance backlog and strengthen capabilities in all the fields of road maintenance in engineering, contracting and cost control. The Government will also take steps to remove all traffic hazard spots along the national highways in order to improve road safety. Additional measures to improve the road safety include restricting mixed mode and non-formal traffic in major roads, constructing medians, and awareness programme for drivers and passengers.
- National highways should receive priority attention to ensure a high level of service, safety and quality. The Dhaka-Chittagong Highway is to become a four-lane road and then to six-lane while the other highways should gradually become four-lane. These roads can form part of the regional road network, as well as the Asian Road network facilitating trade between Bangladesh and neighbouring countries. The Padma Bridge will serve southwest part of Bangladesh and improve the connection between Mongla Port and Dhaka.
- The development strategy for the rural transport will be reoriented for efficient external access through optimal integration of road and inland water transport and off-road internal accesses.
- Expansion of the dredging program including procurement of dredgers to improve existing channel conditions of inland waterways and provision of navigational aids and safety for smooth navigation of water crafts.

4.5 Human Resource Development

People lie at the centre of development in Bangladesh with the benefits of development shared equitably by all. An educated, well trained and healthy population plays an important role in improving the quality of life of people, reducing poverty and attaining sustainable economic growth. Accordingly, the following routes will be critical to human resource development in the NSDS period:

- Population planning
- Providing quality education and training, and
- Providing quality health and sanitation services and nutrition for all.

4.5.1 Population Planning (containment and management)

The objective of this strategy is to reduce population growth to reach stabilization level population earlier and manage population to enhance its contribution to sustainable development.

4.5.1.1 Present Status and Emerging Challenges

Population planning in Bangladesh seeks to contain the population size through reducing birth rate by providing family planning services and by creating conditions which affect birth rate such as delayed marriage, women education and employment, etc. Another aspect of population planning involves management of the large and growing population to achieve sustainable development.

It has been mentioned in Chapter 2, assuming total fertility rate will decline to replacement level (i.e., $NRR=1$) in 2021 the population of the country has been projected to reach 177 million in the same year. At replacement level of fertility the country will still be adding about 2 million population annually and the population size will continue to grow impeding achievement of objectives in various sectors of the economy. In this context a sharper reduction in TFR is recommended so that TFR reaches below replacement level of fertility at 1.7 children per woman. To achieve this TFR the contraceptive practice rate (CPR) will have to increase from 55.8 percent in 2007 to 74 percent by 2016 and 80 percent by 2021.

The increasing population will be accompanied by some structural and distributional changes which have profound implications for sustainable development. First, the demographic transition results in an increase in working age population which enhances growth known as demographic dividend. A higher proportion of working age population leads to relatively higher per capita income, increased savings, increased investment, higher growth and higher employment. However, adequate productive jobs - domestic as well as foreign will need to be created to benefit from the dividend. Failure to do so will result in higher unemployment and underemployment and demographic dividend may turn into a demographic curse. Second, the proportion of elderly population (60 years and above) will gradually increase owing to increased life expectancy at birth reaching 14 million in 2021 and 30 million in 2051 (Perspective Plan of Bangladesh 2010-2021). The ageing trend will result in greater number of cases of both communicable and non-communicable diseases of adults with implications for health cost, skill mix in health sector and medical school curriculum. Thirdly, rapid rural urban migration will lead to absolute decline in rural population and large increase in urban population. The proportion of urban population will increase from 23.30 percent in 2011 to about 65 percent in 2051 turning much of Bangladesh into cities with tremendous pressure on

social aspects of development such as urban health, education, water, sanitation, and transport, housing and waste disposal services. Fourthly, age-specific fertility rates show a shift towards early child bearing and a sharp decline in fertility of older women. Fifthly, both primary and secondary school age children will have cyclical pattern – decrease in the beginning followed by an increase with a plateau in between. The number of school age children will be lower in 2051 compared with that prevailing in 2006. Population management will need to address the issues of size, structure and distribution of population.

4.5.1.2 Strategies for Containment of Population

- Preferential treatment will be given to parents of one child in case of educational support, access to health, public sector employment, and allotment of government house, old age pension and social security benefit.
- Preference will be given to parents with up to two children while including in VGD/VGF or other safety net programmes.
- Emphasis will be given on girls' education, small and medium employment opportunities for young women.
- Since age specific marriage rate for women is high for early age and mean age at marriage has not changed during last two decades despite progress in women's education measures will be examined to increase age of marriage.
- Improve population and family planning services through following interventions:
 - Promote delay in marriage and child bearing, use of post partum FP and FP for appropriate segments of population;
 - Strengthen FP awareness building efforts through Information, Education and Communication (IEC) activities with special emphasis on mass communication and considering local specificities;
 - Use different service delivery approaches (including domiciliary services) for different geographical regions and segments of population having low CPRs;
 - Register eligible couples with particular emphasis on urban areas to establish effective communication and counseling; and
 - Compensate for lost wages for long acting and permanent method contraceptive performance; and
 - Strengthen FP services especially post partum and post abortion FP and demand generation through effective coordination of services with DGHS.
 - Strengthen advocacy for male participation in permanent and other methods of contraception.

4.5.1.3 Population Management Strategies

- Reverse the trend of migration to the large cities by developing district headquarters and selected Upazila towns as viable alternatives with quality education and health facilities, employment, investment and business opportunities, and improved municipal services which will attract a large proportion of migrants to these emerging towns.
- Promote both rural farm and nonfarm activities and growth of rural towns to facilitate wider regional distribution of population.
- Undertake safety net programmes as well as massive programmes for rehabilitation of infrastructure, housing and rural farm and non-farm activities immediately after a natural disaster so that the affected poor people do not migrate to cities in search of work.
- Implement the government policy to create special economic zones with all types of utilities and good connectivity with Dhaka and ports to promote regional growth and wider distribution of jobs.

- Though the people of Bangladesh need to contribute primarily to sustainable development of their own country, they have to also exploit the opportunities for international employment as migrant workers to ease the pressure on domestic labour market as well as earn foreign exchange.
- Create awareness of all relevant ministries of their roles in population management with MOHFW as the lead ministry.

4.5.2 Providing Quality Education and Training

The objective of the strategy is to ensure quality education and training at all levels to develop efficient and moral human resources.

4.5.2.1 Present Status

Universal primary level enrolment is one of the main educational goals of Millennium Development Goals (MDGs). Bangladesh has made significant progress in achieving this goal. Net primary enrolment rate rose from 61 percent in 1991 to 98.7 percent in 2011; secondary level enrolment rate increased from 28 percent in 1991 to **53.70** percent in 2011. Gender parity in access to education at primary and secondary levels has also been achieved.

There are, however, major challenges in the education system that must be met to provide the foundation required for a more productive labour force. The greatest problem is the poor quality of education at all levels which results in low achievement and completion rate. Low quality of education is a culmination of several factors such as low physical facilities, inappropriateness of curricula, low capacity of the teachers, and lack of standards. Poverty and child labour affect learning and completion rate of children from poor families. Gender discrimination prevents girls from entering tertiary level education.

The government has taken four major steps to improve the quality of education: first, digitization in education such as , introduction of ICT in education, ICT facilities in class room, teacher training on digital content & multimedia in class room, uploading e-book in the website, online result publishing & admission, ; second to update curriculum at primary & secondary level as well as introduce creative question; third to improve the classroom environment through infrastructural development such as construction of academy building and four, to strengthen education management. Plans have also been drawn to improve the quality of teachers through training and better recruitment. The government plan for improving the quality of education focused more at school levels while teachers for these schools come from the college and universities. If colleges and universities don't produce quality graduates, schools can't have good teachers. A master plan is now being implemented by the government to improve the quality of higher education. Bangladesh not only needs high quality education but also diversification of education particularly expansion of technical education. In addition to government universities, private universities are imparting education only on few subjects that have relatively better job market.

Education must have twin goals; one is to prepare a person for enabling her/him to be effective in real life, another one to make the person a good citizen with necessary attributes. In terms of strategy, it is necessary to see how far educational institutions of private and public sectors are meeting these goals. Further, in the context of sustainability of development the education system must also provide students with knowledge and awareness about the environment and related challenges and foster attitudes and motivations to take appropriate actions to meeting the challenges.

Technical and Vocational Education and Training

The quality of labour has to be enhanced for at least three inter-related reasons. First, labour needs to be trained to enhance their knowledge, skills, and creativity to achieve full employment by 2021. Secondly, as the economy moves to its middle income status and ensure sustainable development labour with better skills will be required in diversified manufacturing and skill intensive service sectors. Thirdly, skilled labour will be needed to serve the overseas labour market where demand for semi-skilled and skilled workers will increase with economic development. Such workers will need to be skilled not only in the narrow technical aspect of their work but also need to acquire some generic skills such as reading, writing and communication, adaptability, group effectiveness, responsible behaviour and sustainable development orientation.

The Labour Force Survey 2010 shows about 40 percent of labour are without any formal education and another 23 percent have barely primary level education. The proportion of labour with technical/vocational training is insignificant at 0.1 percent. Thus the quality of labour force in terms of formal education and training is low.

To address the shortage of Technical and Vocational Education and Training, National Skill Development Council has been established. And National Skill Development Policy has already been formulated and approved by the government. This policy will be implemented by joint collaboration of Ministry of Education and Ministry of Labour & Employment.

4.5.2.2 Key Challenges

- Ensuring and sustaining universal education for all at primary and secondary levels for an increasing number of children.
- Increasing the quality of education at all levels and in all types of education and reduce the quality differential between **urban and rural areas as well as government education institutes and private educational institutes.**
- **Providing adequate and appropriate education to cope with the demand at national and international manpower market for human capital development to face the challenges of globalization**

Table 4.8 Indicators of performance of primary and mass education

Indicators	FY2011	FY2015	FY2021
Gross enrolment rate	103.5	105	105
Net enrolment rate	98.7	99.5	100
Repetition rate	12	<5	<3
Completion rate	70.4	100	100
Survival rate	59.7	99	100
Student absenteeism	18	3	3
Student Teachers ratio	1:49	1.40	1.40
Class room size	40	25	25
Percentage of trained teachers	70.39	100	100

Sources: GED, 6th Five Year Plan FY2011-FY2015; MoF, Medium Term Budget Framework FY2013 – FY2017.

- Establishing and maintaining centre of excellence in higher education.
- Providing quality science and technology education.

- Imparting social and human values and spirit of liberation war in education to enable students to become worthy citizens.

Technical and Vocational Education and Training

- Shortage of skilled manpower in technical and vocational education and training.
- Mismatch of jobs and skills.
- Training content and quality are not highly valued in the market as all workers receive similar wages.
- Shortage of well-equipped training institutes and at the same time underutilization of existing institutes.

4.5.2.3 Strategies

- Maintain achieved gender parity in primary and secondary enrolment.
- Achieve gender parity in completion rate at primary and secondary level and promote gender parity at tertiary level.
- Improve quality of education in all types of education systems (Madrasha, English medium, and Bangla medium) and at all levels of education through such measures as infrastructure development, curriculum development, effective teacher training, fair teacher selection, competitive salary and incentive packages for teachers, community participation, and encouraging teacher commitment.
- Ensure equity and equality in all levels of education.
- Undertake measures to improve the overall quality of tertiary education focusing on general science, technical, vocational and business administration education.
- Inculcate the spirit of liberation war in students through appropriate curriculum.
- Inspire students to learn national history, heritage and culture through compulsory courses, visit to places of historic importance and other appropriate means.
- Include environmental issues in primary and secondary curriculum in detail to foster attitudes, motivations, and commitments to make informed decisions on environmental issues.
- Promote sustainable development awareness among youth, including by programmes for non-formal education.
- **To attain gender parity in higher education, stipend and other assistance needs to be extended & continued for the female students to promote female education at higher/tertiary level.**
- Undertake steps to implement the National Education Policy 2010 in the quickest possible time.
- Put emphasis on science and technology education and promote research, development, extension and utilization of science and technology.
- Instill scientific approach to generation and use of knowledge to students.

Technical and Vocational Education and Training

- Improve efficiency and quality of programmes.
- Improve the link between training and job markets.
- Ensure capacity utilization of public training institutes through coordination of all the training institutes of a district and other means.
- Improve teacher training and attach teachers to industries as part of training.
- Expand vocational and technical education to provide skills with market demand.

- Encourage companies to undertake in-service training of labour to improve the overall skill levels of workers.
- Make training relevant to needs of informal sector which presently employs 87.5 percent of country's labour force.

4.5.3 Providing Quality Health and Sanitation Services

The primary objective is to ensure sustainability of past achievements of health and sanitation in future and create provisions to meet the growing needs of the society.

4.5.3.1 Present Status

Health is a pre-condition for and an outcome and indicator of sustainable development. But health facilities in Bangladesh are grossly inadequate to provide services to its 149.8 million population. In 2010 there are only 2501 hospitals, 2,732 persons per hospital bed inclusive of non-government ones, 1,860 persons per physician, and nearly 5,782 persons per nurse. Per capita annual government (non-development and development) expenditure on health and family welfare is only Tk. 592.0 (about US\$ 7.5) in FY2012. The health indicators amply demonstrate that health service is inadequate and a significant proportion of population is bound to be deprived of their constitutional rights to medical care simply because of non-availability of facilities.

Despite these inadequacies Bangladesh has made significant progress in some health and family welfare indicators because of many targeted government interventions complemented in some cases by NGO services. For example life expectancy at birth has increased to 69.0 years (BBS, Report on Sample Vital Registration System 2011) from 54.8 years in 1981. Notwithstanding the few successes Bangladesh is far short of providing required health services to all. Anemia is extremely high among women of child bearing age. Diarrhoeal diseases are still a major killer. Communicable and poverty related diseases that are preventable continue to remain the top ten causes of poverty. Complications during pregnancy and childbirth are a leading cause of death and disability among women of reproductive age. Non-communicable diseases such as cardiovascular diseases, diabetes, cancer, and respiratory diseases are emerging as major problems. Road accidents constitute another public health hazard.

4.5.3.2 Key Challenges

- The major challenge of health sector is to meet the diverse health care needs of a growing population which will reach 177 million in 2021 along with improvement in quality of services to achieve HNP targets.

Table 4.9 Key HNP targets, 2015 and 2021

Indicators	2011	2015	2021
Life expectancy at birth(years)	69.0	68	70
Population growth rate	1.37	1.3	1.0
Maternal mortality rate (per 100,000 live births)	209	143	57
Infant mortality rate (per 1000 live births)	35	32	15
Underweight of under 5 children (6-59 months) (%)	41.3	33	29
Total fertility rate (TFR)	2.11	2.4	2.1
Use of birth control methods (%)	58.4	74	80
Poverty rate (head count ratio, %)	31.5 ^a	22.5	15.0

Notes: Values for 2011 are actual values while those for other years are projected (Perspective Plan of Bangladesh 2010-2021).a=2010

Sources: i. BBS, Report on Sample Vital registration System 2011; ii. NIPORT, Bangladesh Demographic and Health Survey 2011; iii. BBS, Household Income and Expenditure Survey 2010.

- The primary goal of the health sector would be to reduce incidence of diseases that occurs seasonally and persist among the poor for lack of information and unhygienic environment in which they live. To meet this goal public health sector would be strengthened and health education vigorously launched both in rural and urban areas to make people aware of the diseases and enable them to adopt appropriate measures before the occurrence of incidences.
- Although priority should be given to public health sector, the importance of clinical services must not be undermined because the poor cannot afford service in private clinics.
- Investment in public health sector is most crucial for reducing the incidence of diseases especially investment that minimizes the breed of diseases. For example, investment to supply safe drinking water will reduce water born diseases requiring minimum clinical services. It is necessary to identify the areas for investment in public health and estimate the cost and benefits for setting priorities.
- The long term goal to overcome these problems is to produce more doctors by establishing educational institutions and creating opportunities for higher training so that specialized physicians can be sent outside big cities and towns and more general physician can be made available to people. Since making clinical service available to people is time consuming public health sector should be strengthened to keep the incidences of disease as low as possible.
- There has been a strong campaign as well as activities to improve the sanitation system of the country. There has been encouraging progress in sanitation; **63.6** percent of the households in the country have access to sanitary toilets (BBS, Report of Sample Vital Registration System 2011). The sanitation programme is implemented by the Government along with UNICEF. NGOs are supplying material for sanitary latrine at a very cheap rate (US\$7.0) in installments. However, present activities in this sector needs to be continued to meet the growing demand as well as reinstallation of damaged system immediately after disaster.
- Bangladesh is moving towards achieving the goal of providing safe drinking water to all households in the country. In 2011, 98.2 percent of the households had access to drinking water from tap and tube well (BBS, Report on Sample Vital Registration System 2011). But arsenic in tube well water has become a severe problem in rural areas. Today it has become necessary to think about the old aged practice of using surface water for household use as well as agricultural use. The campaign may be made stronger to motivate people to use surface water as much as possible which is also environment friendly.

4.5.3.3 Strategies

- Increase the number of doctors – both general and specialized physicians, nurses, and health technicians to improve the unfavourable persons/ doctor and persons/ nurse ratio and hence the quality of services.
- Ensure strong health education programme by including courses/subjects on environment and hygiene in different levels of education systems.
- Increase sanitation coverage to a wider number of people by pulling government and NGO funds for making sanitary materials available to people at affordable cost.
- Increase contraceptive prevalence rate to arrest population growth by making services and contraceptives available to people at minimum cost and using door to door service wherever required.

- Ensure every household's access to safe drinking water by supplying technology for purifying arsenic contaminated water as well as surface water including desalinization in the coastal areas. Research should be undertaken to develop affordable desalinization techniques.
- Develop clinical waste management system and awareness and training programmes on clinical waste management system.
- Strengthen training programmes for paramedics, nurses, and health workers. Undertake capacity building of institutions, through infrastructure development, producing physicians, nurses and paramedics.

4.5.4. Promoting Improved Nutrition

4.5.4.1 Present Status

Despite considerable progress in health status of people, children and women in Bangladesh continue to suffer from high levels of malnutrition and micronutrient deficiencies, undernutrition. At the same time new health problems resulting from over-nutrition such as obesity are emerging. Malnutrition early in life has long lasting negative effects on overall growth, morbidity, cognitive development, educational attainment, and labour productivity.

The proportion of stunted children (height for age) decreased from 50.6 percent in 2004 to 41.3 percent in 2011 and that of underweight children (weight for age) decreased from 42.6 percent in 2004 to 36.4 percent in 2011 but the proportion of wasted children (weight for height) increased from 14.5 to 15.6 percent during the same period. Fifty one percent of children aged 6-59 months are anemic of whom 29 percent are mildly anemic, 21 percent are moderately anemic and less than 1 percent are severely anemic.

Forty two percent of ever married women aged 15-49 years are anemic of whom 36 percent are mildly anemic, 7 percent are moderately anemic and less than 1 percent are severely anemic. The proportion of ever married women aged 15-49 years who have Body Mass Index (BMI, weight in kg divided by height in meters squared) $<18.5 \text{ kg/m}^2$ has decreased from 32 percent in 2005 to 24 percent in 2011. However, a disquieting feature is rapid increase in prevalence of overweight ($\text{BMI} > 25 \text{ kg/m}^2$) among women; 17 percent of such women are obese. Overall 65 percent of ever married women aged 15-49 years live in a food secure environment. However, only 35 percent of in the lowest wealth quintile are food secure compared with 90 in the highest wealth quintile (NIPORT, Bangladesh Demographic and Health Survey 2011).

Undernutrition remains a major problem in urban areas especially for the poor living in slums. Moreover, over nutrition due to life style changes and intake of junk food is an emerging problem in urban areas.

4.5.4.2 Key Challenges

- Meeting the nutritional target of 2122 kcal per day for 87 percent of the people by 2021 by providing a more balanced diet (reduction in contribution of cereals while increase in that of animal food comprising meat, fish, egg, milk, and milk products, oil, potato and sugar) is a key challenge.
- Delivering nutritional interventions to the target groups consistently across the country suffers from limitations.

4.5.4.3 Strategies

- Provide better knowledge in health and nutrition through improved formal and non-formal education and electronic media.
- Enhance agricultural production along with diversification to more vegetables, fruits, pulses, fish, dairy products, poultry and other proteins to support people have a more balanced diet.
- Mainstream nutrition service in regular services of DGHS and DGFP. Integrate nutrition services with maternal, nutrition and child health services (MNCH).
- Improve further the coverage of bi-annual vitamin A supplementation for children aged between 9 months and 5 years, coverage of iron-folic acid supplements for pregnant women, and coverage of other nutrition service.
- Ensure more coordination in the treatment of moderate and severe acute malnutrition at the health facility as well as the community level.
- Enhance social mobilization and implement Behavioural Change Communication (BCC) activities to promote good health and nutrition.
- Coordinate nutrition activities with other sectors capable of synergistic impact on nutrition.
- Mainstream gender aspects into nutrition programmes.

4.5.5 Food safety

4.5.5.1 Present Status

Unsafe food is a major health hazard in Bangladesh affecting food security. Every year about 45 million people suffer from food borne illnesses which range from mild illness to death including disability. Food borne illnesses may also affect physical and mental growth of children. Unsafe food thus has significant social and economic consequences including losses in productivity, income and income generating capacity. Food may be contaminated with micro-organisms (bacteria and virus) and chemical contaminants (pesticides, residues, preservatives, micro toxins, and food additives).

4.5.5.2 Key Challenges

- Bangladesh has several Acts related to food safety and quality and policies linked to it. However, a comprehensive national policy and strategy to ensure food safety and quality is lacking.
- Lack of knowledge of consumers as well as producers about the impact of unsafe food is a major factor behind production, processing and consumption of unsafe food.
- Inadequate food inspection services and lack of food laboratories with adequate equipment and trained personnel also undermine food safety and quality.

4.5.5.3 Strategies

- Develop national policy, strategy and action plan for controlling actions affecting food safety.
- Undertake preventive measures focusing on increasing awareness of consumers about food safety, strengthening consumers associations, and developing training and technical support materials for small and medium food businesses.
- Strengthen food inspection services focusing on upgrading training materials and guidelines for food inspectors, improving food inspection services and harmonizing food inspection procedures, and ensuring integrity and efficacy of food inspection services.
- Establish a central food testing laboratory at Institute of Public Health and strengthen capacity of scientists and technicians.

- Hold regular meetings of National Food Safety Advisory Council to coordinate efforts of different Ministries to oversee sectors of food supply chains.

4.6 Summary

The priority sectors which are important to sustainable development of the country are agriculture, industry, energy, transport and human resource development. The strategies suggested under these sectors are to provide direction to the economy as they will remain the engine for overall economic growth and support development of the country.

Agriculture and rural development

In the crop sub-sector, the key challenge is to achieve and maintain food security in the face of growing population, environmental pressure and climate change. The key elements of strategies are to put more focus on Aman and Aus paddy, ensuring supportive price and marketing facilities, providing surface water irrigation and strengthening agricultural research and extension.

In the fisheries sub-sector, the key challenge for sustainable development is better management of open water fisheries. The key elements of strategies are to enhance the current good practices of open water fisheries management; such as restocking, fish sanctuaries, banning fish capture during certain periods etc., constructing fish friendly infrastructure, e.g., fish passages in embankments, roads etc.

The key challenge in livestock sub-sector is to increase production of livestock products (meat, milk and egg) to meet future demand. The strategies to meet this challenge revolves around ensuring feed and fodder, controlling diseases, supporting small holders and providing shelter for livestock during flood and cyclone.

The key challenge to rural non-farm sector is that rural enterprises are constrained by lack of access to credit, market and electricity and lack of education and training of entrepreneurs. Additionally, lack of proper infrastructure, technology, access to market, and institutional support hinder robust growth of RNF sector. The strategies include creating an enabling environment focusing on infrastructure, rural electrification, better physical and electronic communication services, education, training and skill formation, technological upgrading, access to market, rural financial services, and business development services.

Industry

The objective of industry sector strategy is to accelerate the rate of its growth without degrading the natural capital. The key challenges to development of this sector to ensure sustainable development include narrow industrial base, low productivity, loss making SOEs, and reducing impact of industrial pollution. The strategies to attain the objective include diversifying industries and exports, reducing anti-export bias, improving investment climate, integrating environmental considerations into management practice, encouraging firms to use cleaner technology, ensuring compliance with national environmental laws, rules and regulations, raising public awareness of environment protection, enforcing proper running of Effluent Treatment Plants in the industries, and restructuring and privatizing SOEs as appropriate.

Energy

The objective of the energy sector strategy is to provide energy security by tapping all sources of traditional and non-traditional energy to ensure accelerated rate of economic development and industrial production. The strategies in the power sector include enhancing power supply through increased generation and import from India and Bhutan, demand management, diversifying fuel use in electricity generation to coal, liquid fuel, and nuclear power, provision for dual fuel for electricity generation wherever possible, adjusting prices of electricity and liquid fuel to reflect cost of production and achieve social objectives through cross subsidization and explicit budget support, energy sector reform focusing on cost reduction, improved service delivery, and system loss reduction, and use of environment friendly technology in electricity generation.

In the gas sector the strategies focus on increasing financial and technical capacity of BAPEX, attracting international companies to exploration in offshore, improving technical and commercial performance of gas distribution companies, adjusting end user gas prices, avoiding risks of accident, gas extraction balancing both present and future needs of the country and regional and sub-regional energy cooperation.

Formulation of coal policy highlighting issues relating to exploration, extraction and utilization at present as well as in the future and promoting technologies in extraction and utilization of coal which have lower environmental impacts are key strategies in coal sector. Increased power generation through renewable sources such as biomass, solar, wind, and small hydro which do not pollute environment is emphasized.

Transport

The key objective the transport sector is to provide mobility of the growing population at affordable cost while maintaining environmental sustainability. The key elements of strategies include giving priority to railway sector (e.g. double tracking of major railway corridors), maintenance and up-gradation of existing road network (e.g. 4 lane national highways) and revival of inland water transport system through dredging.

Human resource development

An educated, well trained and healthy population plays an important role in improving the quality of life of people, reducing poverty and attaining sustainable economic growth. In the NSDS period human resource development will focus on population planning (containment and management), providing quality education and training, and providing quality health and sanitation services, and nutrition and food safety for all.

CHAPTER 5: URBAN ENVIRONMENT

According to the latest Census 23.3 percent of the population in Bangladesh live in urban areas. The quality of life of this segment of population suffers from numerous problems of urban development. The problem is worsening as uncontrolled and unplanned expansion of urban settlements make it extremely difficult to provide quality services such as electricity, water, sanitation and sewage and transport and non-compliance with government rules concerning housing, space, and infrastructure is dominant. The urban problem is made more complex by the emergence of slums in hazardous areas. In order to make the urban areas livable for people of all income groups corrective and innovative measures will have to be taken.

5.1 Urban Housing

5.1.1 Present Status

Demand for housing has been increasing in urban areas as a result of faster growth of urban population, growth of income and growth of remittance. All urban areas experience demand growth with larger metropolitan cities most notably Dhaka experiencing much higher growth. Rapid demand growth in the face of scarcity of land and resources has created problems for sustainable housing in urban areas whose severity varies across pourashavas and metropolitan cities.

A majority of the households obtain their land and housing through individual household initiatives. The development authorities in various urban areas develop and allot residential plots to selected households where the recipients can construct multi-storied houses at their own initiatives or jointly with real estate firms. The government provides residential accommodation to a small proportion of employees with the rest living in rented or own houses. The government has also been providing residential accommodation for working women and accommodation for slum dwellers though the coverage is very small.

Housing structure varies widely across households. In 2010 about 57 percent of households had walls made of concrete and about 27 percent had roof made of concrete (BBS, HIES 2010). The rest of the houses had walls made of CIS/wood, mud brick/wood, fence/straw/bamboo/leaves and roofs made of CIS/wood, mud/tile/wood, straw/bamboo and others. This average picture, however, hides the high concentration of concrete built houses in metropolitan cities especially Dhaka and Chittagong. Many of these houses use costly imported materials. The supply of housing being constrained by rising price and scarcity of land for housing relative to demand has resulted in large demand-supply gap in housing. In this context, high rise residential buildings have emerged as a viable solution. But basic infrastructures like electricity supply, drainage system, and sewage system and roads for people's mobility that were designed to fit the older requirements of these areas are now becoming grossly inadequate for the new density.

Fast growth in demand for housing in Dhaka has resulted in expansion of housing development to all types of land leading to loss of wetland, open spaces, public parks, and land with tree cover causing environmental degradation and depriving people especially children of spaces for physical activities. Even though houses are constructed with approval of appropriate authority, house building codes are not always adhered to. Consequently, building is not properly designed that addresses the issues such as setback to provide soakable land for rain water, enough gap with the next building to provide natural ventilation for surrounding buildings and itself, day lighting, parking, and properly designed structure.

The location of residential buildings, commercial buildings, industrial buildings and community services is guided by relevant rules and regulations. However, the separation of location could

hardly be maintained and most residential areas even the planned areas in Dhaka such as Dhanmondi and Banani have turned into a mix of residential, commercial, and industrial areas with offices, hospitals and educational institutions including universities sprouting in between. This amalgam is a violation of rules but it also indicates a failure or breakdown of long term planning for provision of adequate and accessible services to a rapidly growing city inhabited by people with increasing income and rising expectations.

In a country with power crisis the residential and commercial buildings will have to be energy efficient but non- contextual building design and use of non-contextual materials have caused higher use of electricity. Buildings designed in recent times seem to be stylistic copy of the western world, using more reflective surface and heat absorbent surface in the buildings. Because of less greenery this type of buildings are heating up the atmosphere more. To cool the buildings air conditioner is being used and in the process the outdoor units of the air conditioners is heating up the atmosphere even further.

Houses use water, gas and electricity, emit CO₂ and create waste. Houses should be able to make efficient use of these resources through use of alternative technologies. Such as energy saving bulbs, low water consuming flush toilets, auto electric switches. Further, access to these resources can be expanded through rain water harvesting and use of solar energy. When building new houses they can be designed to optimise energy performance, maximize use of natural light and air, utilize rain water, and improve protection from heat.

5.1.2 Key Challenges

- Providing affordable housing and infrastructure for people of all income classes.
- Lack of wetland, open spaces, public parks, and land with tree cover causes environmental degradation, deprives people spaces for physical activities, and creates aesthetic discomfort.
- Making living comfortable by maintaining unique character of residential areas.
- Inefficient resource using buildings creates burden on the society.
- Reducing building density to manageable level.
- Protecting cities - buildings and infrastructure, from natural disasters such as floods and cyclones, climate change impacts and earthquakes pose increasing challenge for cities.

5.1.3 Strategies

- Government will plan a reliable public commuting system with better new road network to spread the city more with less density. More new satellite towns with easy connectivity will lessen the pressure on the main cities making them livable.
- RAJUK and other concerned authorities will incorporate contextual building design and 'local and contextual material use' criteria in the building codes.
- Introduce green building concept.
- Building regulations and Zoning provision should consider privacy, comfort, daylight and air circulation along with electricity consumption and heat generation of buildings.
- Compliance with Bangladesh National Building Code will be ensured to make buildings sustain natural disasters including future earthquake.
- Land use has to be based on zoning and adherence to rules will be ensured through oversight.
- Preserve the wetlands and natural ecosystems in and around cities.
- Make provision of water tank/pond compulsory in every housing development project.
- The flood flow zones and flood water retention areas around and inside major flood affected areas will be strictly maintained through strict enforcement of law.

- There will be clean town competition among the cities. Gradually the competition will be spread throughout country.

5.2 Management of Urban Slums and Squatter Settlements

5.2.1 Present Status

Continuous large scale migration of homeless, landless and asset less poor people from rural to urban areas and lack of any mechanism to provide immediate shelter to these people have resulted in growth and proliferation of slums and squatter settlements in the urban areas. The largest concentrations of urban slums are found in Dhaka followed by Chittagong, Khulna, and Rajshahi. In a survey carried out by CUS in 2005 the proportion of urban population living in slums varied from 19.5 percent in Khulna to 40 percent in Dhaka. Urban slums vary in population size – about 62 percent of slums had population 200 or less. In Dhaka, however, there are large concentrations of population in slums and 50 percent of slum population lives in 3.2 percent of slums. Secondary cities or district towns also have significant concentrations of urban slums and squatter settlements. In 2005 there were 4300 slums and squatter settlements in Dhaka city corporation area inhabited by about 2.8 million slum dwellers.

Living conditions in urban slums are generally poor though conditions vary across types of services. Electricity and water from tap and tubewell are widely available while sanitation facilities such as toilets, sharing of toilets and garbage collection are very poor. Construction materials are generally poor but they are better in private slums. There has been a shift in ownership of land in slums – 89.8 percent of slum clusters and 70.3 percent of slum households were on private land giving security of tenure.

Majority of the population living in slums are poor and 80 percent of the households have income levels below the upper poverty line. More than 90 percent of the income earners are engaged in informal activities such as rickshaw pulling, transport work, hawking, day labour, small factory work, and construction. Many of the female members of slum households work in formal sector garments factories while a large number of them are engaged in informal sector as household maids. Few of the male slum dwellers are unemployed which perhaps underlie the large rural urban migration causing growth of slums.

5.2.2 Key Challenges

- Slums need to be managed to make them benefit from and contribute to the dynamic urban economy.
- Providing adequate housing facilities to a large number of slum dwellers is a key challenge as none of the formal land and housing development agencies provide housing to the urban poor.
- Providing access to infrastructure and urban services to all slum dwellers/inhabitants of informal settlements is of utmost necessity for improving their lives.
- Urban slum dwellers should be enabled to supplement their main source of income to overcome poverty.
- While slums are part of urbanization, proliferation of slums needs to be discouraged.
- The slum dwellers lack security of tenure which prevents them from undertaking improvement of housing.

5.2.3 Strategies

- Undertake in-situ upgrading/improvement of slums which are tenable in terms of risk to human health or life of the residents, and damage to public interest.
- Undertake relocation/resettlement of dwellers of untenable slums addressing the issues of settlement sites, service provisions, transportation services to workplaces, and gender concerns.
- Implement National Housing Policy to ensure shelter for the urban poor. The policy provides an enabling framework for addressing land and housing markets in Dhaka, and enforcing basic property rights.
- Ensure access to essential urban services such as safe and adequate drinking water, sanitation, electricity, fuel, garbage disposal, drainage and access road through a community based approach.
- Support informal sector activities of slum dwellers especially home based income generating activities to supplement their income through providing credit, marketing advice, training and capacity building, business networking and space for hawkers and vendors.
- Discourage large migration to big cities especially to Dhaka by developing secondary towns and economic growth centres with employment opportunities, improved health and education facilities, adequate urban services and cultural and sports activities.
- Undertake appropriate social safety net programmes for the poor slum dwellers.
- Undertake capacity building of local government officials in management of urban slums.
- Address issues of crime and violence in urban slums through a community approach, improving trust between community and police, focusing attention to children and youth and women and focusing attention to drug and alcohol abuse.

5.3 Water Supply and Sanitation

5.3.1 Present Status

The situation with respect to water supply in urban areas is not yet fully satisfactory. The Dhaka Water and Sewerage Authority (DWASA) is supplying 2110 million litres per day against daily demand of 2250 million litres a day. A segment of the population enjoys adequate supply of water while for the rest of the population, the water supply is quite inadequate. The situation in low income communities is much worse.

According to HIES 2010 the urban water supply coverage is about 94.96 percent of which the coverage by piped water supply is 35.57 percent and the remaining 59.18 percent is by hand pump tube wells. The future urban water supply has to rely on the piped system as the presently used hand pump tube wells are suspected to be contaminated from leaching from pit latrines and septic tanks. Moreover, they will no longer be appropriate for the densely populated areas.

The situation is worse for slums but statistics on access is unclear. In a survey in 2009 about the living conditions of the urban poor in Bangladesh, 58 percent of all respondents reported water-sanitation-hygiene related diseases in their households during the three-month period preceding the survey.

Conventional sewer systems are absent in all urban areas except Dhaka city. Only 20 percent of the population of Dhaka is served by an expensive sewer network, the rest use septic tanks, pit latrines, unhygienic latrines or none at all. The sanitation conditions of urban slums are deplorable having no other option than drains, open fields, roadsides or riverbanks.

Sanitation coverage in urban slums is very low. Only 8.5 percent of households have access to improved sanitation facilities, compared with urban average of around 76 percent. The use of hanging latrines, suspended over ponds and rivers is twice as high in urban slums than the national average. This means that urban water sources are more likely to be contaminated with raw sewage.

5.3.2 Key Challenges

- Extensive pumping of groundwater in Dhaka has severely depleted aquifers, calling into question the sustainability of the city's groundwater supply which constitutes 87.72% of Dhaka's current water supply.
- Surface water as a viable water source is problematic as it is often polluted by untreated sewage and industrial waste. The situation is similar in other cities and pourashavas.
- In urban areas, the long term aim must be to extend the public sewer system. In many new and expanding developments, as well as existing slums, that will not receive trunk connections in the foreseeable future development of alternative solutions is called for.

5.3.3 Strategies

Diversify water supply sources

- Control further groundwater abstraction.
- Shift to surface water supply sources, for example, new intake at Meghna for Dhaka city.
- Encourage rain water harvesting as an in-situ water supply source.

Diversify sewage treatment facilities

- Build sewage treatment plants for big cities like Dhaka and Chittagong and gradually to other districts.
- Provide off-site sanitation options such as modified sewerage and settled sewerage, for small to medium size townships.
- Emphasis on less energy intensive technologies like constructed wetland, oxidation ditch, extended aeration, stabilization ponds, etc.
- Enforce appropriate de-sludging of septic tanks and pit latrines and dispose of effluent in a proper manner.

5.4 Pollution Management

5.4.1 Present Status

Water Pollution

In the past, a convergence of unregulated industrial expansion, rural to city migration, encroachment of rivers and water bodies, overloaded infrastructure, confusion about institutional responsibility for the quality of urban water bodies, and insufficient enforcement of environmental regulations have taken their toll on surface water quality.

Most of the liquid wastes created by the industries in Dhaka are dumped directly or indirectly into the rivers Buriganga, Balu and Sitalakhya. Estimates show that pollution from tanneries in Hazaribag is responsible for an increase in the health-related expenditure of people living in the vicinity of the tanneries by 125 US dollar per capita. In Khulna, industrial areas include Shiromoni, Kalishpur and Rupsha. Some 300 mills and factories located in and around Khulna City currently discharge huge amounts of liquid waste into the river Bhairab. These pollutants are causing serious damage to both freshwater and marine ecosystems of the region including those of the Sundarbans.

In Chittagong, the main polluters are the pulp and paper, fertilizer and petroleum refineries/industries. Most of the industries are located on the banks of the Karnafuli River and the Kaptai Lake. Similarly, the ship building industry contributes significantly to marine oil pollution. The other source of oil pollution is the ships and mechanized boats all over the country especially those using the port and the outer anchorage area of Chittagong. Ballast and bilge water from oil tankers and ships anchored in the port should only be emptied at installations where the oil can be separated and recycled. This is mandatory in many countries, but in Chittagong ships directly discharge their waste oil-water mixtures into the Bay of Bengal.

Air Pollution

Outdoor air pollution has been a major problem in the cities of Bangladesh, especially in Dhaka and Chittagong city. Over the past few years, air pollution has been reduced because of the introduction of lead-free gasoline, conversion of liquid fuel run vehicles into CNG run vehicles and withdrawal of two stroke three wheeler baby taxis from Dhaka city. The level of suspended particulate matter, both PM₁₀ and PM_{2.5}, in capital Dhaka remains 3-4 times higher than the National Ambient Air Quality standard during the dry winter months. The brick kilns around Dhaka city, transports comprising very old buses and trucks, steel and re-rolling mills, re-suspended road dusts and other minor emission sources contribute to worsening the air pollution. Estimates show that more than 3500 premature births a year in Dhaka are attributable to air pollution due to particulate pollution. Air pollution in Dhaka contributes to disease burden to the citizens particularly the elderly, school going children and minor ones. Unfortunately, the slum dwellers, who live in open air, are also the major victims of this environmental degradation.

Solid Waste

Waste disposal is an emerging problem in almost all urban areas of Bangladesh. The increase in waste generation can be primarily attributed to factors such as rapid rate of urbanization, rural-urban migration, changing consumption pattern and high population growth rate. The waste is generated from different source (domestic, commercial, industrial, street sweeping, health care facilities etc.).

Among the major environmental concerns confronted today in the urban areas of Bangladesh are problems relating to proper management of solid waste. Dhaka city is facing serious environmental degradation and public-health risk due to uncollected disposal of waste on streets and other public areas, clogged drainage system by indiscriminately dumped wastes and by contamination of water resources near uncontrolled dumping sites.

3 (three) 'systems' of waste management are coexisting side by side in Bangladesh. One is the 'Formal System', where municipalities/city corporations are responsible for Solid Waste Management. 'Formal system' is based on the conventional system of collection-transportation-

disposal of waste carried out by the local authorities. In this system the concept of transfer stations, resource recovery, minimization and recycling are absent.

Next is the 'Community Initiative' that is based on primary solid waste collection by CBOs and NGOs, 'Community Initiatives' of house-to-house waste collection in neighborhood started due to lack of satisfaction with solid waste management service.

Finally, 'Informal System' represented by the large informal labor force that is involved in the solid waste recycling trade chain.

5.4.2 Key Challenges

- The priority surface water quality challenge is treatment of industrial waste. Because of lack of enforcement of environmental regulations industry pollutes the surface waters with impunity. To reduce the pollution of surface water bodies, both on-site and centralized treatment of industrial effluents are required.
- Despite important steps in reducing air pollution concentration of respirable particulate matter in Dhaka exceeds standards for more than 100 days of the year. Mobile sources will remain the priority for emission control in urban areas. Diesel vehicles are a particular concern in Dhaka. Measures aimed at controlling the age of vehicles need to be assessed, as well as further promotion of efficient public transport is required.
- The management of solid waste in urban areas remains a major challenge. The population of more than five million people living within the area covered by DCC produces about 3,500 tonnes of solid waste daily, of which only 42% is collected and disposed of at an open unlined landfill site. The unsanitary conditions created by the poor management of solid waste impose economic costs in the form of health impacts, blocked drainage and aesthetic discomfort.

5.4.3 Strategies

Water quality

- Introduce land zoning of industries.
- Provide fiscal and other financial incentives for retro-fitting or for reduction of effluents from industries.
- Strengthen water quality monitoring.
- Enforce the Environment Conservation Act & Rules.
- Take measures for creating appropriate institutional, technical, human and logistic capacity for identifying, monitoring and implementing remedial measures.
- Ensure reduction of effluent discharges from mechanized vessels in rivers;
- Introduce waste reception and treatment facilities in ports.
- Clean-up and rehabilitate hot spot areas in Dhaka, Chittagong and Khulna. The priority action will be to shift tanneries at Hazaribag to Savar with central treatment facilities.

Air pollution

- All vehicles older than 15 years should be banned.

- Improved mass-transit systems in major cities should be introduced to reduce both traffic congestion and air pollution.
- Dust control measures should be made mandatory in construction works.
- Air Quality Index should be disseminated to the public on a daily basis.
- Traditional gross polluting brick kilns should be replaced by energy efficient brick kilns.
- Monitor and control sources of emission through establishing air shed management plan all over the country. For that purpose, air quality database of different air sheds surrounding clustered or individual emission sources should be established.

Solid waste management

- Encourage community initiatives in managing solid waste.
- Source separation of waste should be promoted for better management of solid waste.
- Initiate various programmes and projects under 3r (Reduce Recycle and Reuse) policy adopted by the Government.

5.5 Urban Transport

5.5.1 Present Status

Rapid urbanization in Bangladesh during the last few decades increased transport demand quite significantly leading to manifold increase in the number of motorized and non-motorized vehicles on the streets. The increase in the number of vehicles without concomitant expansion of road facilities has led to severe congestion on roads and deterioration in urban environment.

The situation further deteriorated due to insufficient public transport facilities and weak management of traffic. Non-existence of transport planning and inefficient traffic engineering result in low quality traffic management. Mass transit facilities are poorly organized and dominated by slower forms of vehicles such as rickshaws. Buses are in short supply and there is inadequate metro or rail system to handle day-to-day commuter traffic in big cities.

Dhaka, the capital of Bangladesh (1528 sq. kms.) is the largest and most industrialized city of a nation of 149.8 million people. Its present population is about 6,970 thousand which is increasing at an alarming average annual rate of 4.5% creating additional demand for services including transport services. Unfortunately, it is an unplanned city. It is perhaps the only city of its size without a well organized, properly scheduled bus system or any type of mass rapid transit system. Both motorized and non-motorized transport plies in the same route where traffic management is very weak. There is no parking policy for the city; coordination among the agencies is also very weak. This situation compromises the ability of the transport sector to serve and sustain economic growth and provide an acceptable quality of life. At the prevailing condition it is extremely difficult to meet the current transport demand alone not to say of future demand.

5.5.2 Key Challenges

- The pressure on urban transport systems in the country has been increasing rapidly as a consequence of rapid urban growth resulting in extreme traffic congestion.
- Transport interventions in urban areas aim at improving transport and traffic infrastructure so as to meet existing and potential demands, and developing an integrated and balanced

system in which all modes (motorized and non-motorized) can perform efficiently and each mode can fulfill its appropriate role in the system.

5.5.3 Strategies

Prioritization of pedestrian traffic

- Pedestrians should be given the highest priority in urban transportation policy and planning.
- Sufficient provision should be kept for sidewalks. Sidewalks must be kept free of all encroachments.
- Some roads can be declared exclusively pedestrian walks for 24 hours or part of the day or night.

Developing public transport alternatives

- Steps should be taken to increase the number of large-size buses including double-decker buses on trunk routes and buses of optimum sizes on other routes.
- Introduction of Rapid Bus Transit through the use of high capacity dedicated bus lanes should be given due consideration.
- Rail-based mass transit systems should be considered as part of a long-term integrated transport strategy for Dhaka Metropolitan Area.
- Provision for underground metro-rail, commuter train and overhead expressway should be planned for Dhaka and subsequently in Chittagong, if necessary. Other options may include construction of an overhead monorail system, elevated expressway and circular waterways around Dhaka city.

5.6 Urban Risk Reduction

5.6.1. Present Status

Urban hazards from natural disasters consist of the typical urban living-induced problems of water logging and fire hazards and structural risks from substandard construction. However, the capacity of city authorities to manage risks and respond to disaster events are very low as they lack the basic requirements for public protection such as fire trucks, search and rescue facilities, ambulances, and field hospitals.

Additionally, as revealed by seismic assessment and microzonation mapping conducted by the Comprehensive Disaster Management Programme (CDMP), the major cities of Bangladesh are exposed to earthquake. In the event of even moderate earthquake, Bangladesh cities will suffer devastating damages and losses.

5.6.2. Key Challenges

- The rapid pace of urbanization continues as enterprises and businesses are expanding their activities adding to the burden of the already stretched carrying capacities of the cities. The city authorities, on the other hand, have to cope with the growing problems with inadequate resources.
- Urban risk reduction and public protection involve high investment for low probability event that is economically unattractive and even prohibitive. In this context, public safety will continue to be compromised at best and disregarded or even undermined at worst.

- Dense population with rapid urbanization, industrialization and the lack of land use planning have created major environmental problems which contribute to increasing disaster risks, especially in urban areas. In this context, it is important to promote the initiative of Making Cities Resilient.

5.6.3. Strategies

Identify and reduce hazards

- The seismic assessment and micro-zonation mapping exercises will be completed and scaled up in three principal cities and seven major cities that have been conducted by the CDMP.
- Urban Community Risk Assessment (UCRA) will be conducted to assess the risks from disasters and effects of climate change on cities. Urban Risk Reduction Action Plans (URRAP) will be developed in all cities and small to medium scale risk reduction interventions will be designed for incorporation in the cities' development plans and budgets.

Reduce urban dwellers' vulnerability

- Vulnerability will be reduced through awareness raising, safety compliance, and provision of incentives for risk reduction behaviour and investments by urban dwellers who are able to undertake construction to comply with the building standards.
- CDMP's efforts will be continued to map out the cities lifelines such as water, gas, electricity, health, fire stations, and education facilities to improve disaster preparedness and to allocate open spaces for evacuation.

Strengthen the cities risk reduction capacities

- The Safer Cities Global Campaign will be promoted and sustained through the implementation of the "Ten Essentials for Making Cities Resilient". This is a guide for action and monitoring of the Global Campaign. Already 140 City Mayors of Bangladesh have signed up to this campaign during the 2012 National Disaster Preparedness Day. It calls for local leaders to raise awareness regarding disaster risks in urban settings, and to exert efforts to reduce them to make cities safer and more resilient in line with the Hyogo Framework for Action that provides the blueprint for building the resilience of nations and communities to disasters.

5.7 Summary

Since rapid urbanization is inevitable with the economic development of the country, sustainable development of the country depends intricately on sustainable urban development. Five key issues for sustainable development of urban areas have been addressed in this section. These are urban housing, water supply and sanitation, pollution management, urban transport and urban risk reduction.

Urban housing

Demand for housing has been increasing in urban areas as a result of faster growth of urban population, growth of income and remittance growth. While housing development has served growing urban population, loss of wetland, open spaces, public parks, and land with tree cover has strong negative impact on environmental sustainability. It also affects social sustainability through its effects on growth of children and health of people including children. Some of the

strategies that have been suggested for sustainable urban development include improved public commuting system to spread cities, contextual building design, land zoning and adherence to National Building Code, preservation of flood flow zones, and sustainable urban housing for slum dwellers.

Urban slum management

While urban slums and squatter settlements are part of urbanization, they cannot be allowed to continue to have their negative impact on living environment and poverty and lack of dynamic contribution to the economy. The key strategies will be in-situ upgrading/improvement of slums, relocation/resettlements of slum dwellers, provision of infrastructure, supporting income generating activities and development of secondary towns and economic growth centres.

Water supply and sanitation

For water supply and sanitation, the challenge is to reduce pressure on current source of water supply which is ground water and providing sanitation at affordable cost. The key strategy should be diversification of source of water supply and sinks of sewage. It is especially important to shift from ground water to surface water as a source of water supply.

Pollution management

Reducing industrial water pollution and air pollution due to transport and managing solid waste are the challenges for pollution management in urban area. Enforcement of environmental rules and regulation, industrial zoning and water quality monitoring forms the core of the water pollution management strategy. Improved mass transport system is the strategy to reduce both traffic congestion and air pollution. Community initiative in solid waste management is the preferred strategy.

Urban transport

The key challenge in urban transport sector is developing an integrated and balanced system in which all modes can perform efficiently. Strategy for urban transport revolves around giving prioritization to pedestrian traffic and public transport (such as rail based mass transit system, bus rapid transit, circular waterways).

Urban risk reduction

Dense population with rapid urbanization, industrialization and the lack of land use planning have created major environmental problems which contribute to increasing disaster risks, especially in urban areas. In this regard, Urban Community Risk Assessment (UCRA) will be conducted to assess the risks from disasters and effects of climate change on cities. Urban Risk Reduction Action Plans (URRAP) will be developed in all cities and small to medium scale risk reduction interventions will be designed for incorporation in the cities' development plans and budgets. Vulnerability will be reduced through awareness raising, safety compliance and provision of incentives for risk reduction behaviour and investments by urban dwellers who are able to undertake construction to comply with the building standards.

CHAPTER 6: SOCIAL SECURITY AND PROTECTION

One of the important aspects of sustainable development is social sustainability which means citizens should be ensured social security and protection. One of the fundamental principles of state policy as enshrined in the constitution of Bangladesh is to ensure citizens basic necessities of life that is right to food, shelter, clothing, education, medical care, rest recreation and leisure and social security. Article 15 of the constitution spells out the right to social security as follows: “---the right to social security, that is to say to public assistance in cases of undeserved want arising from unemployment, illness or disablement, or suffered by widows or orphans or in old age, or in other such cases.” A basic element of development strategy in Bangladesh is thus to make provision for basic necessities of life for all citizens.

In order to ensure rights granted by the constitution, many policies have been formulated and laws enacted in the country. These include health and sanitation policies, education policy, and laws regarding dowry and gender equity. But few policies are properly implemented due to lack of commitment of policy executioners, lack of efficient officials, and corruption. Over the years the Government introduced some social security and protection programmes such as old age pension, VGD, VGF, allowance for the insolvent physically challenged citizens, honorarium programme for insolvent freedom fighters, allowance for poor lactating mothers, employment generation programme for the poorest, National Service Programme and Ashrayan Programme. But in many cases the allowances are small for a person or a family relative to requirement though they are revised upward from time to time. However, these programmes are good as a first step toward an improved social security system and further progress can be built upon them.

NSDS is concerned with citizen’s rights because economic development should not only ensure better life for all but should also ensure the protection of interest of all irrespective of their socio-economic status. It recognizes the need to develop strategies to ensure the protection of rights of all that would be primarily supportive to social aspects of sustainable development. Key objectives of the Social Security and Protection are to:

- a. Provide minimum shelter for all with access to essential services and utilities;
- b. Ensure social safety net for poor and vulnerable;
- c. Promote and ensure women’s advancement and rights;
- d. Promote and ensure children’s advancement and rights;
- e. Provide special services for aged people and persons with disabilities;
- f. Create employment opportunities for workers;
- g. Enhance access to information and communication facilities;
- h. Promote development of small ethnic communities;
- i. Arrest marginalization; and
- j. Keep cultural diversity.

This section discusses in brief the key challenges, and strategies for achieving sustainable development. In a broader sense social security and protection aims at ensuring fundamental rights and equal access to resources and services for promotion of social security, protection and social justice.

6.1 Provide Minimum Shelter for all with Access to Essential Services and Utilities

The objective of shelter with essential services is to ensure minimum secured shelter for all with access to quality services and utilities.

6.1.1 Present Status

Despite significant improvement in housing structure in the last four decades or so, a large number of households still live in houses with walls and roofs built with poor quality materials especially in rural areas. In rural areas about 43 percent of households live in houses with walls made of mud/unburnt brick and hay/bamboo/leaf/others. In urban areas about 18 percent households live in this type of houses. In terms of roof materials the condition of housing is much better. While about 10 percent of households in rural areas live in houses made of straw/hay/bamboo/other roofs, only 3 percent households in urban areas live in this type of houses (BBS, Household Income and Expenditure Survey 2010).

While housing structure improves mainly because of increased income of the households, it can deteriorate due to natural disasters such as cyclone, flood, river erosion and drought as well as man-made disasters such as fire. Natural disasters render thousands of people homeless every year. Research has shown that the majority of rural-urban migration is associated with natural disasters such as cyclones, floods, drought, river bank erosion which directly affect the livelihoods of people. Since this has become a common occurrence, a permanent solution is required immediately.

In principle, the first step to a solution should be to protect and shelter people during the disaster particularly at the time of cyclone, flood, tidal bore, and tornado. There is still shortage of cyclone and disaster shelters in coastal areas. Adequate number of shelters must be built in the coastal belt of the country. Government has undertaken long term projects for building shelters with the help of foreign donors and local contributors. The most serious concern for the victims is the waiting time between the incidence and the arrival of help to rebuild their homes.

Disaster victims are not the only shelter-less people; shelter-less people are gradually increasing due to increasing migration to the cities and towns due to various push and pull factors. Shelter for these people should also be ensured. Before making any plan, reliable statistics on present numbers of shelter-less people both in rural and urban areas along with future projection of shelter-less people are necessary. These people are likely to be poor and unskilled, who will migrate wherever they will get an employment. Therefore, one of the policies for industrialization may be to decentralize the industries to such locations where people can come to workplace from home.

All houses - new or old require utilities such as water, fuel and electricity. Table 6.1 shows the state of access to different types of utilities by households. It shows provision of utilities will have to be expanded to achieve appropriate level of coverage of the households.

Table 6.1: Access of Households to Utilities in Bangladesh, 2010

Utilities	Rural	Urban
Supply water	1.47	35.57
Tube well water	94.97	59.18

Wood/bamboo fuel	50	38.4
Gas as fuel	1.6	23.8
Electricity	42.49	90.1

Source: BBS, Household Income and Expenditure Survey 2010

The provision of utilities faces several constraints:

- i. Arsenic contamination of tube well water impedes access to safe drinking water for all.
- ii. Installation of water treatment plant and supply of ground water for household use have been limited to larger cities and towns.
- iii. Access to electricity is constrained by insufficient generation and distribution.
- iv. Access to gas is constrained by inadequate exploration and extraction of gas and installation of costly distribution lines.
- v. The disappearance of forests and homestead gardens in the rural area has created a serious situation for fuel wood with high prices both in villages and towns where natural gas supply is yet to reach.
- vi. Diffusion of fuel efficient stove for cooking introduced by Bangladesh Centre for Scientific and Industrial Research (BCSIR) has been limited because lack of promotion and marketing.

6.1.2 Key Challenges

- Ensuring secure and comfortable shelter to all people who will reach 177 million in 2021, especially the disaster affected and shelter-less people.
- Moving jobs to people rather than people to jobs through decentralized industrialization.
- Ensuring access of all households to quality utility services –pure water, uninterrupted electricity, and gas.
- Encouraging social forestry to be able to supply fuel wood
- Promoting efficient use of energy, gas and water by all households.

6.1.3 Strategies

- Ensure minimum housing facilities for all in both urban and rural areas through both government and NGO programmes.
- Expand coverage of government social safety net programmes such Grihayan Fund, Ashrayan and Gharey Fera and develop other targeted programmes for housing.
- Build and repair multi-purpose shelters for natural disaster victims. Provide training to the community people for management and maintenance of shelters.
- Ensure emergency supply of house building materials for the disaster victims.
- Provide low cost housing materials for the rural and urban poor.
- Shift and build industries to rural setting to reduce the demand of new houses and services.
- Reduce dependence on groundwater by harvesting rainwater by excavating ponds, canals, creeks, streams, and rivers.
- Recycle water through treatment in all urban centres.
- Promote development and use of technology for treatment of arsenic contaminated water and train people in the use of the technology.
- Popularize biogas stove for reducing dependence on fuel wood.
- Increase efficiency in electricity production, distribution and use to meet the growing demand of electricity as short-term and build new plants as long-term strategy.
- Promote production and use of alternative sources of energy such as solar energy, bio-gas, wind energy and nuclear energy.

- Create awareness of people about efficient use of water, electricity, fuel, and other energy resources.
- Promote establishment of Compact Township with all civic amenities including provision for low cost housing for landless and marginal farmers and disadvantaged people.
- Promote research on energy efficient, materials efficient and sustainable buildings and promote their use through rules and regulations as well as awareness campaign.
- Scale up the disaster resilient habitat projects that have demonstrated comprehensive solution to the shelter and housing problems in view of recurring disasters and climate change.
- Seize the post-disaster recovery phase to examine the linkage between housing and vulnerability and introduce rehabilitation and reconstruction measures including major investments that would dramatically reduce the risks from disasters and climate change.
- Promote research on energy efficient, materials efficient and sustainable buildings and promote their use through rules and regulations as well as awareness campaign.

6.2 Ensure Social Safety Net

The objective of social safety net is to prevent the poor and those vulnerable to shocks and poverty from falling below a certain poverty level, reduce inequality and achieve specific social objectives.

6.2.1 Present Status

Government operates a number of social safety net programmes to support the chronic poor, the transient poor and people with special circumstances such as people with physical and mental disabilities, poor women and excluded people. First, some programmes address the basic needs of the poor and vulnerable people, namely, food, shelter, education and health. Secondly, some programmes aim at ensuring social security of the vulnerable poor and their empowerment. Thirdly, some programmes aim at addressing the special needs of target groups within the poor and underprivileged groups such as physically challenged children, disabled persons, socially excluded population in tribal areas, and poor women. It should be mentioned in FY2011 the government allocated 15 percent of total national budget for social protection programmes which constituted 2.5 percent of GDP of the country.

6.2.2 Key Challenges

- The social safety net programmes face some implementation challenges, namely, inadequate coverage, mis-targeting of beneficiaries, multiplicity of programme leakages, and disparity in regional distribution and all these have to overcome or minimized.

6.2.3 Strategies

- Maintain adequate food grain stock for distribution at a fair price during the crisis period as well as for operating regular programmes;
 - Expand and enhance financial support to old, widow, persons with disability, and sick;
 - Ensure free and efficient medical services for all at government hospitals;
 - Introduce health insurance for all employees of government, semi- government organizations and private enterprises;
 - Introduce compensation for health hazards during duties both in government and non-government organizations;

- Make the existing and new programmes better targeted to intended beneficiaries. Undertake measures to stop leakages.
- Develop a comprehensive National Social Protection Strategy with sufficient focus on poverty, risk reduction in an industrializing economy, and social cohesion.
- Build closer link between social safety net programmes and disaster and climate change risk proofing of the development investment. Every opportunity will be seized to implement social safety net in such a way that its result will fortify the development investment and reduce people's vulnerability to disasters and climate change.

6.3 Promote and Ensure Women's Advancement and Rights

The objective of women's advancement and rights is to create a society where men and women will have equal opportunities and will enjoy all fundamental rights on an equal basis. This is to be achieved by ensuring women's advancement and rights in activities of all sectors of the economy.

6.3.1 Present Status

Bangladesh has made significant progress in women's advancement and rights in a number of areas including education, participation in labour force, health and nutrition, and participation in public services. Gender parity has been achieved in enrolment at the primary and secondary levels of education, and women's labour force participation rate has reached 36 percent in 2010 from 23.9 percent in 1999-2000 (BBS, Report on Labour Force Survey 1999-2000 and 2010). Still women are far behind men in many areas such as tertiary education and public sector jobs. Besides women are victims of discrimination and sufferings in many dimensions of society. For example, the laws of the country stipulates minimum age for marriage of women, dowry is illegal, marrying second time without the consent of the first wife is illegal, and some share of husband's and parental properties are guaranteed by law, but these are hardly executed. The government has undertaken various initiatives to reduce the gap between men and women but some challenges remain.

6.3.2 Key Challenges

- Overcoming the challenge of low economic participation of women. Labour force participation rate for female is 36.0 percent against 82.5 percent for male (LFS 2010).
- Violence against women in the form of physical and sexual assaults, including acid throwing is pervasive which needs to be stopped.
- Stopping marriage of women before legal age which leads to loss of education, employment opportunities, decision-making power, and early childbirth.
- Promoting gender sensitivity in disaster coping mechanisms and strategies as natural shocks such as droughts, floods, cyclones and environmental degradation and climate change affect women differently than men.
- The main problem with gender governance is the implementation of the existing laws, rules and regulations and stated policies. In addition, reforms of some laws, rules and regulations, policies and the institutional mechanism are needed to make governance gender sensitive.

6.3.3 Strategies

- Develop policy and legal framework for ensuring equal rights for women based on the constitution and the government's commitment to various international forums, e.g., CEDAW and Beijing Platform for Action.

- Undertake measures to improve women's employment opportunities and wages and also ensure equal pay for equal work. An enabling environment would be created by ensuring compliance with social issues of work such as safe workplace and transportation facilities and infrastructure like separate toilets, lunch rooms and lunchtime, and day care centres in the workplace. Provision would be made for life and disability insurance for workers, especially women workers. Steps would be taken to ensure secure jobs and decent working conditions for women in the formal and informal sectors.
- Promote gender mainstreaming by reforming laws, rules and regulations, institutional mechanisms, policies, projects and programmes which are not gender sensitive. Continue to integrate gender issues in planning and budgetary processes to reduce disparities in education, health, and nutrition.
- Continue and expand existing programmes for social protection for disadvantaged women. Undertake measures to protect women from economic vulnerability and risk due to natural disasters and climate change.
- Ensure increasing participation of women in the National Parliament and the local political institutions. Undertake initiatives to make women politically more conscious, encourage women to participate in politics and to build leadership among women at all levels.
- Ensure elimination of all forms of violence against women through appropriate administrative, legal and judicial actions. Strengthen "One-Stop Crisis Centre" in medical college hospitals to provide medical treatment, legal and psycho-social counseling to women and children victims of violence, and provide shelter facilities and make efforts for their reintegration and rehabilitation in society.
- Facilitate women entrepreneurship through providing relevant training and finance.
- Undertake a survey of urban women focusing on their occupational choice, income, and expenditure and economic, social, and other constraints on their lives and livelihoods with a view to designing long term government policies and programmes.

6.4 Promote and Ensure Children's Advancement and Rights

The objective of children's advancement and rights strategy is to create 'a world fit for children'.

6.4.1 Present Status

Bangladesh has made significant progress in the area of child rights promotion, survival, and development. Nevertheless, the general situation of the children in Bangladesh needs to improve further since the survival and development of many Bangladeshi children are still threatened by malnutrition, disease, poverty, illiteracy, abuse, exploitation, and natural disaster.

6.4.2 Strategies

- Improve food and nutrition of children through distribution of Vitamin A supplements. Control iodine deficiency disorders through universal salt iodization. Control anemia through iron-folate supplementation, antenatal treatment, fortification, and BCC to increase the consumption of iron-rich foods and promoters of iron absorption.
- Ensure child health through programmes for eradication of polio, elimination of measles and neonatal tetanus, improvement of nutrition and strengthening the school health programme. The actions will include maximizing the efficiency and cost-effectiveness of health expenditure and improving governance.
- Provide quality child education through expanding early childhood education to all children in the country, sustaining the gains in primary and secondary enrolment rates for male and

female children, increasing enrolment rate in the higher secondary and tertiary education, increasing completion rate at primary and secondary levels, training primary teachers, increasing the attendance rate, increasing contact hours, and maintaining gender parity in access and achievement. Non-formal education (NFE) will be provided to diverse types of children deprived of education, like un-enrolled or drop-out children and hard to reach children to enhance their employability and productivity through skill training.

- Ensure access to sanitation and safe drinking water in primary schools. Environmental hazards for children (sound, air, water pollution, etc) would be reduced and standards for sound, air and water pollution would be implemented.
- Ensure all children, particularly those who are vulnerable right to protection from abuse, exploitation and violence. The policies of existing National Plan of Action (NPA) would be used against sexual abuse and exploitation of children and trafficking. Laws affecting children will be harmonized and enforced.
- Undertake effective measures to reduce child labour, and eliminate worst forms of child labour with particular focus on child domestic workers, migrants, refugees and other vulnerable groups. Street children will be assisted in accessing their rights and protecting them from all forms of abuse and exploitation. Working children will have access to learning opportunities in formal and non-formal facilities.

6.5 Provide Special Services for Aged People and Persons with Disabilities

The objective of the strategy for aged people is to ensure their rights and support their needs.

6.5.1 Aged People

6.5.1.1 Present Status

Life expectancy has increased to **69.0** years (BBS, Report on Sample Vital Registration System 2011) resulting in an increase in the number of old aged people. In the past, life expectancy being short, only few people would live up to the old age. The scenario has been changing. With the control of epidemics and improvement in health of people, the mortality has fallen significantly and consequently the proportion of older people has increased. There are several issues regarding old age population. First is their income and economic welfare. Old age population has to depend on their savings or pensions or income of children or income of kin depending on individual circumstances. In recent years the Government has been supporting some of the poor old people with transfer payments through some safety net programmes. However, even now the overwhelming majority of aged people are dependent upon their children many of whom may not be well off. Secondly, the incidence of diseases especially old age diseases is high among the old age population such as hearing loss, sight loss and memory loss. Understandably, they need more medical care than younger members of the family. Thirdly, ageing people are subject to neglect and mistreatment sometimes by members of their own family. Fourthly, with breaking down of joint families, small families, increasing migration and smaller residences increasing number of old people will be living alone with feeling of loneliness.

6.5.1.2 Strategies

- Expand coverage of allowances, health care and shelter for ageing people to address the problems of food deficiency and lack of shelter, old age care and health care.
- Expand pension system in the private sector gradually.

6.5.2 Persons with Disabilities

The objective of the strategy for persons with disabilities is to promote and protect rights of persons with disabilities and facilitate their full participation and inclusion in mainstream social, political and cultural lives.

6.5.2.1 Present Status

Data from BBS (Household Income and Expenditure Survey 2010) show that 9.07 percent of the population suffers from any type of disability such as eye sight, hearing, walking and climbing, mental, self-care and speaking and communicating. The actual figure might be somewhat different because of exclusion of children aged below 2-3 years for absence of necessary cognizable symptoms. Not all persons have the same level of difficulty- 11.38 percent have some difficulty, 2.17 percent have severe difficulty and 0.46 percent is fully unable.

The National Disability Action Plan was adopted in September 2006 to implement National Policy on Disability 1995 and Disability Welfare Act 2001. The action plan is very comprehensive involving 46 ministries and divisions of the government to undertake actions for persons with disabilities. The Ministry of Social Welfare, Department of Social Services and Foundation for Development of Disabled Persons are responsible for providing services to persons with disabilities. The Ministry has taken up programmes for enabling and integrating persons with disabilities with mainstream of society through various programmes including stipend programmes for students, subsistence allowance, skill training, and interest free micro credit. In addition to its own initiatives, the Government provides funds to NGOs to provide education facilities to persons with mental disability.

Despite some progress, access to special education, training and rehabilitation, equal opportunities, creation of employment and income generating opportunities, social security, accessibility to physical facilities, fixation of quota, and prevention of disabilities are not yet fully ensured since different ministries are not legally responsible for addressing disability issues in their action plans. Proper supervision and monitoring of NGO activities is essential.

6.5.2.2 Strategies

- Ensure education for persons with disabilities by expanding existing institutions for hearing impaired, autistic children and mentally retarded children along with expansion of integrated education programme for visually impaired children. New institutions will be established to provide access to more children with disabilities at primary, secondary and tertiary levels. A collaborative effort among the government, NGOs and the private sector will be encouraged to expedite the expansion of the existing institutions, establish new institutions, and undertake teachers' training and action researches on disability.
- Ensure adequate health services for persons with disability through actions to (i) strengthen early detection of symptoms of disability and provide primary medical rehabilitation, fitment of artificial aids and appliances; (ii) undertake a nutrition programme for pregnant women; (iii) appoint trainee doctors, nurses and other caregivers to deal with disability issues; and (iv) introduce support services of assistive devices and equipment at the health centers.
- Ensure access of persons with disabilities to all physical facilities and information and communication. Their inclusion would be ensured in various national and community level decision making processes that affect their lives. Vocational rehabilitation and micro credit

will be provided through community based rehabilitation (CBR) programme in the rural areas. The requirements of the poor and vulnerable, including women and children, will be prioritized in all activities related to persons with disabilities.

- The Bangladesh Disability Welfare Act would be amended to clarify definitions of disability and make it consistent with standards set out internationally on disability rights. The National Coordination Committee for persons with disabilities would be strengthened to monitor and coordinate activities of different ministries/divisions.

6.6 Create Employment Opportunities for Workers

6.6.1 Present Status

Estimated civilian labour force of both sexes aged 15 years and above in Bangladesh is about 56.7 million (BBS, Report on Labour Force Survey 2010). About 47.5% of the labour force is engaged in agriculture, forestry, and fisheries sector followed by trade, hotel and restaurant (15.53%), and manufacturing (12.8%); the rest of the sectors employ 24.59% of the labour force. The most important point to note here is that the manufacturing labour force is still very small, which indicates relatively small investment in the manufacturing sector. It should be pointed out that there is no country in the world, which has achieved sustainable development engaging majority of the labour force in agriculture.

The rate of unemployment is very low at 4.5 percent. However, it is known that rate of (open) unemployment is not a good indicator of the employment situation in Bangladesh. Underemployment (disguised) defined as employment of less than 35 hours per week- indicates better the labour market situation in the country. The underemployment rate is 21.31 percent which indicates that though officially employed more than one-fifth of the workforce works for limited number of hours.

One aspect of the labour force needs to be emphasized here. The youth labour force (aged between 15-29 years) comprises about 37 percent of the total labour force. The unemployment rate of youth labour is 7.5 percent which is 3 percentage points higher than the national rate. The government will continue to make efforts to generate employment opportunities – both self- and wage employment, for this most dynamic segment of the population.

In the context of sustainable development, it is necessary to reduce the share of labour force in agriculture and increase its share in industry specifically manufacturing. This is also necessary for reducing our dependence upon foreign manufactured goods. A rapid growth of manufacturing requires much higher investment and better technology in the sector. Moreover, manufacturing technology has to be environment friendly; otherwise its negative impact will be very costly for the nation.

Despite these limitations, it is important to explore the possibilities of employment for the labour force especially the youths. One such area is export of workers to foreign countries. Nearly 8.3 million Bangladeshi workers (BMET, Overseas Employment and Remittance from 1976-2012) are working now in different countries of the world. The remittances sent by these workers are a major source of foreign exchange. The prospect of overseas employment depends on the world economic situation, economic conditions and employment policies of the labour importing countries, and skill composition of the workers. Restrictions imposed by worker importing countries often affect the prospects of overseas employment. Currently, majority of the workers employed in the Middle East are unskilled or semi skilled. However, Government has always been active in sending more workers to foreign countries. In this context, an active

role of Bangladesh Missions abroad is needed to carry out a scoping exercise to find traditional and non-traditional labour markets. Besides, vocational training institutes should be able to impart appropriate skills training to workers to make them suitable for present and future labour market abroad. At the same time, more employment opportunities need to be created for youths at home.

There is no alternative to industrialization but the question is what kind of industrialization should get priority. From the perspective of employment generation and technological capability of the country development of small, medium, micro, cottage and IT industries, including IT enabled services, food processing and agro-processing industries should get priority. Labour intensive export oriented industries such as RMG, toys, footwear, electronics would be encouraged. At the same time special emphasis will be given on import substituting agro-processing industries. In all cases industrialization will need to be compliant with environmental standards of the country and in the case of exports, those of WTO.

An important aspect of work is social protection which assists individuals, households and communities to better manage income risks that make people vulnerable. In Bangladesh government employees, who constitutes about 4.8 percent of employed workers, enjoy benefits of social protection. In the private sector social protection benefits are limited and rare. This is particularly true of the informal sector where 87.5 percent of the labour force is employed. In the formal sector the multinational corporations and a number of large national enterprises offer social protection. In some bigger industrial and commercial enterprises only some of the benefits such as gratuity, contributory provident fund and pension are offered though not regularly.

6.6.2 Strategies

Bangladesh labour market is successfully making transition from low productivity agriculture sector work to more productive nonfarm work in both rural and urban areas. This process has to be continued and accelerated, with support from the government, so that a larger proportion of labour is employed in more productive and better paid jobs

- Strengthen vocational and technical training of people for local and international employment.
- Diversify agriculture production system and encourage more scientific agricultural practices for increasing production, which in turn will increase productivity and generate more productive employment.
- Establish agro-based industries using local products as raw materials.
- Promote investment in labour-intensive SMEs, and micro and cottage industries in order to reduce dependence of large numbers of workers on agriculture.
- Promote manufacturing through diversifying exports to high value added products such as electronic, engineering and metal work.
- Create an enabling environment for employment generation especially for the youth.
- Examine feasibility of providing insurance coverage to workers in agriculture, forestry and construction sector.

6.7 Enhance Access to Information and Communication Technology and Facilities

6.7.1 Present Status

The government has set its target of achieving Digital Bangladesh by 2021. To this end a number of initiatives are being adopted by the government which includes introducing e-Governance (e.g., establishing websites of ministries/divisions, directorates and departments, E-Tendering, Electronic Government Procurement and e-Governance architecture), commencing e-commerce (e.g., introducing electronic/digital signature and establishing e-Payment Gateway), formulating National ICT Policy to develop and expand information technology related services (e.g., reducing telephone and internet call charges, reduce bandwidth usage charge, enhance the submarine bandwidth capacity, increasing use of Bangla on the web, increasing e-Literacy, and installation of multi-media classrooms) and expansion of internet and telecom services. In addition, digital infrastructure is being expanded e.g., expanding telecommunication infrastructure, building nationwide regional information highway, building a Hi-Tech Park and a software technology park and increasing the number of graduating scientists and engineers.

It is recognized that Bangladesh is characterized by digital divide as in other developing countries. To address this problem, Union Information and Service Centres have been established to provide information and government services to citizens living in remote areas.

Recent improvement in telecommunication and electronic media has increased the access of people to information. Access of people to service stations, police beat, etc. has increased due to infrastructure development in rural areas. However, there is no reason for complacency with these limited achievements as it is still far behind the mid-level developed countries like Indonesia, Thailand, and Malaysia. There should be information centres both in urban and rural areas so that people can have necessary information about health services, agriculture services, police services, and legal services

The Disaster Management Committees at districts and upazilas are provided with hardware, software, training and basic operational cost to run Disaster Management Information Centres (DMICs) which are interconnected in the Disaster Management Information Network (DMIN). This network will work as a knowledge brokerage in disaster management and climate change, and as tool for coordination of disaster management activities such as needs assessment, reporting and coordination.

6.7.2 Key Challenges

- Absence of technology friendly quality education and inadequate opportunity.
- Lack of human resources.
- Lack of professionalism, management and limited funds in the IT industries.
- Inadequate IT infrastructure.

6.7.3 Strategies

Improving overall quality of education and incentives

- Establish an international level Information Communication Technology Institute for producing world class IT manpower;
- Establish a National Certification Authority to ensure uniformity of quality of graduates;
- Ensure adequate training to IT teachers and provide performance based benefits to teachers and provide appropriate incentives for exceptional achievements in IT;
- Encourage IT education through providing special education loan and scholarship for meritorious students;

Improving financing

- Create venture capital fund for innovative/creative young IT businessmen and professionals;
- Provide low interest loans to IT firms through establishment of Special Working Capital Fund in commercial banks.
- Ensure access of young IT graduates to Equity Entrepreneurship Fund without any collateral;
- Take cooperation of development partners for achieving targets set in the IT Policy.

Expediting infrastructural development

- Expedite installation of second submarine cable connection for expanding high speed internet facilities and plan for installation of third submarine cable;
- Reduce internet connection fees and cost of bandwidth;
- Expand broadband connection in rural areas under public private partnership and government-NGO partnership;
- Expand and improve Union Information and Service Centres;
- Appoint system analyst/programmers in government offices to ensure sustainable use of IT.

6.8 Promote Development of Small Ethnic Communities

6.8.1 Present Status

Bangladesh has about forty-five different ethnic communities, most of them living in the Chittagong Hill Tracts, greater Mymensingh, greater Rajshahi, greater Sylhet, Patuakhali and Barguna. The Chakma, Garo, Manipuri, Marma, Munda, Oraon, Santal, Koch, Khasi, Tipra, Mro, Hajang and Rakhain are the well-known ethnic communities of Bangladesh. There are 1.59 million ethnic people in Bangladesh including plain land ethnic people (BBS, Population and Housing Census 2011). Some of the ‘hardcore poor’ of Bangladesh are found among the small ethnic communities. Small ethnic communities face discrimination and are subject to extortion by land grabbers. The level of social self-awareness among them is in many cases very low. Many suffer from ill-health, bad nutritional conditions and lack of safe drinking water and sanitary toilets.

The objective of the strategy for small ethnic communities is to ensure their social, political and economic rights; ensure security and fundamental human rights; and preserve their social and cultural identity. It will also seek to ensure that they are not subject to any discrimination in social, political and economic activities. They will be ensured access to education, health care, food and nutrition, employment and protection of rights to land and other resources.

6.8.2 Key Challenges

The challenges with respect to addressing social and economic conditions of small ethnic communities are mainly: (i) living in remote areas and far away from each other makes it difficult to reach, mobilize and organize them, (ii) the ‘Land Disputes Resolution Commission’ is not fully operational to prevent land grabbing and displacement of ethnic people, (iii) lack of specific objectives concerning needs and concerns of ethnic people in the National Policy of respective ministries/divisions, (iv) lack of an alphabet and dearth of students hindering development of the curriculum in ethnic languages at schools, (v) low food production resulting in food insecurity, (vi) lack of an institutional mechanism to establish linkage and coordination

with NGOs and the private sector to address issues related to ethnic people in a more comprehensive way, (vii) lack of comprehensive understanding of the problems of the ethnic communities, and (viii) lack of census and statistical data on ethnic population with ethnic disaggregation.

6.8.3 Strategies

- The Government will consider implementation of the unimplemented provisions of the peace accord.
- A holistic land policy will be formulated to deal with the land disputes of ethnic peoples. A secure land tenure system will be introduced in CHT. Representatives of the ethnic communities will be included in undertaking development projects in areas inhabited by ethnic communities.
- The Government will ensure participation of local governments in the management of natural resources and will recognize the traditional knowledge of ethnic communities. The government will ensure community involvement in the adoption of technologies without competing with their traditional food production system. An authentic sense of ownership/tenure of resources will also be developed.
- A programme to promote awareness of the situation of small ethnic communities will be undertaken.
- Ministries of Land, Education, Primary and Mass Education, Health, LGRD, Social Welfare and Agriculture will be mobilised for the development of ethnic peoples. The Ministry of Chittagong Hill Tracts Affairs (MoCHT) will be the lead ministry to mobilize other ministries/divisions to ensure ethnic people's access to education, health, sanitation and water, skill training facilities and employment. In the case of the ethnic people outside the CHT, the Special Affairs Division will be the lead agency.
- Existing human development programmes under MoLE, MoPME, MoHFW, MoLGRDC, MoSW and MoYS will address the special needs of ethnic people. Monitoring and supervision will be strengthened so that education, health and maternal child health services, and nutrition and housing facilities reach the ethnic people.
- An action plan on mainstreaming the education of children of small ethnic communities will be implemented. The fund for stipends and purchasing learning materials under the block allocation of PM office will be increased for ethnic students.
- The national power grid and distribution system for electricity supply in different Upazilas of hill districts will be expanded. The electricity generation capacity of the Kaptai Hydroelectric Power Station will be increased. Appropriate steps will be taken for expansion of solar electricity supply in the CHT region. The mobile phone network area coverage will be expanded.
- Assistance will be provided in hill districts to strengthen their capacities and increase employment opportunities to cope with any sudden decrease of their income due to damage to Jhum crops caused by flood and drought.
- In the hill districts income generating activities through small and cottage industries, small trading and poultry and livestock rearing will be expanded. The income of poor people will be enhanced through social forestry in hilly areas and cultivation of fruits and medicinal plants. Studies will be carried out to assess the feasibility of pisciculture in hill districts by creating small lakes.
- Area-appropriate Micro-credit activities for the poor people will be expanded and vocational training will be provided to the poor. Development of rural roads and hat-bazars for marketing of agricultural products will continue. Action will be taken to eliminate barriers so that agriculture and local products have easy access to national and international markets. Action will be taken to ensure electricity supply for small and medium enterprises.

- Measures will be taken to support EPB's one district one product initiative under which 'Textile for Rangamati', 'Pineapples for Khagrachari' and 'Rubber for Bandarban' has been decided.
- Private investment will be encouraged to develop sustainable tourist facilities in Rangamati, Bandarban and Khagrachari.

6.9 Arrest Marginalization

6.9.1 Present Status

In 2010, 31.5 percent of the population in Bangladesh lived below the poverty line. The absolute number of poor is still very large. The process of marginalization is still continuing in rural area as more and more small farmers are becoming landless. Many of them sell their lands to wealthy land grabbers. In the urban areas, marginal people are those who live in slums. Their number is also increasing due to increasing migration of rural poor. Also, some lower middle class people are sliding down to marginalized category for lack of employment or due to natural shocks.

6.9.2 Strategies

- Increase financial support and emergency relief to poor and marginalized group.
- Create job opportunity round the year for poor, marginalized and lower middle income group.
- Protective laws for sharecroppers and lessee.
- Implement risk reduction and climate change adaptation particularly livelihood schemes for the most vulnerable and deserving members of the poorest communities.

6.10 Keep Cultural Diversity

6.10.1 Present Status

People of different faiths, such as Islam, Hinduism, Christianity, Buddhism, and tribal religions live in the country. Beside Bengalees there are many hill and plain land tribes who are ethnically different from each other. They have their own cultural practices in terms of food, housing, clothing, rituals, and marriage patterns. Although at present all ethnic groups are living peacefully there were some commotions between tribal and non-tribal people in the past. Harmony in living is of tremendous benefit to the society in terms of keeping peace. Cultural diversity will also improve the image of the country in the community of nations.

6.10.2 Strategies

- People of all faiths should be equal in the eyes of law.
- Ethnic minorities should not be discriminated in any sphere of society.
- Traditional tribal rules, rituals, practices must be respected and allowed to uphold by respective tribe.
- Undertake cultural diplomacy activities to promote image of the country where diverse cultures coexist and thrive creating a nation.

6.11 Summary

Minimum shelters for all including access to services and utilities, social safety net, women's advancement and rights, children's advancement and rights, special services for aged and people with disability, expanded employment opportunities, enhanced access to information and communication facilities, development of ethnic communities, arresting marginalization and cultural diversity need to be ensured to achieve sustainable development. The key strategies are as follows:

Minimum shelters for all

Expand coverage of Grihayan Fund, Ashrayan and Gharey Fera and develop other targeted programmes for housing, provide low cost housing materials for the rural and urban poor, and promote establishment of compact township with provision for low cost housing for landless and marginal farmers and disadvantaged people.

Social safety net

Maintain adequate food grain stock for distribution at a fair price during the crisis period as well as for operating regular programmes and expand and enhance financial support to old, widow, persons with disability, and sick.

Women's advancement and rights

Undertake measures to improve women's employment opportunities and wages and also ensure equal pay for equal work and continue to integrate gender issues in planning and budgetary processes to reduce disparities in education, health, and nutrition.

Children's advancement and rights

Improve food and nutrition of children, ensure child health through programmes for eradication of polio, elimination of measles and neonatal tetanus, improvement of nutrition and strengthening the school health programme and provide quality child education through expanding early childhood education to all children in the country.

Special services for aged and people with disability

Expand coverage of allowances, health care and shelter for ageing and disabled people to address the problems of food deficiency and lack of shelter, old age care and health care. Expand pension system in the private sector gradually.

Employment opportunities

Strengthen vocational training of people for local and international employment, diversify agriculture production system and encourage more scientific agricultural practices for increasing production, which in turn will generate more employment, establish agro-based industries using local products and promote investment in labour-intensive SMEs, and micro and cottage industries in order to reduce dependence of large numbers of workers on agriculture.

Access to information and communication technology and facilities

The government has set its target of achieving Digital Bangladesh by 2021. The target will be achieved through improving overall quality of IT education and incentives, improving financing and expediting infrastructure development.

Development of ethnic communities

The Government will ensure participation of local governments in the management of natural resources and will recognize the traditional knowledge of ethnic communities. The government will ensure community involvement in the adoption of technologies without competing with their traditional food production system. An authentic sense of ownership/tenure of resources will also be developed.

Arresting marginalization

Increase financial support and emergency relief to poor and marginalized group and create job opportunity round the year for poor, marginalized and lower middle income group.

Cultural diversity

Ethnic minorities should not be discriminated in any sphere of society and traditional tribal rules, rituals, practices must be respected and allowed to uphold by respective tribe.

CHAPTER 7: ENVIRONMENT, NATURAL RESOURCE AND DISASTER MANAGEMENT

Environmental problems of Bangladesh are partly a consequence of her own development activities and largely a consequence of production and consumption activities at the global level. Bangladesh will need to make appropriate responses to degradation in a number of areas such as water resources, forest and bio-diversity, land and soil, coastal and marine resources and natural disasters and climate change.

7.1 Water Resources

7.1.1 Present Status

The economic growth and development of Bangladesh has been all highly influenced by water – its regional and seasonal availability, and the quality of surface and groundwater. Spatial and seasonal availability of surface and groundwater is highly responsible on the monsoon climate and physiography of the country. The eastern part of the country receives about 3,000 mm of rainfall while western part receives only half of that amount. About 80% of the rainfall is concentrated in five rainy months during monsoon. Availability also depends on upstream flow, as 93% of the catchment is beyond the country's boundary, and withdrawal for consumptive and non-consumptive uses.

Annual rainfall and evapo-transpiration of the country show that there is a substantial excess of rainfall everywhere in the monsoon season. From the annual overall averages, dependable rainfall exceeds evapo-transpiration by over 10 per cent in most parts of the country, except in the Northwest (NW) and Southwest (SW) regions. In the NW region, rainfall and evapo-transpiration are almost equal, but in the SW the overall deficit is about 10 per cent. From November to May, evapo-transpiration exceeds rainfall all over the country, except in the Northeast (NE) region.

The largest use of water (about 70%) is made for irrigation. Besides agriculture, some other uses are for domestic and municipal water supply, industry, fishery, forestry and navigation. In addition, water is of fundamental importance for ecology and the wider environment. Even where sufficient long-term freshwater resources do exist, seasonal or annual variations in the availability of freshwater may at times cause water quality degradation.

Water use in the country is heavily dependent on its groundwater resources. In year 2010-11, 67% of the total irrigated area of 7.45 million hectares was irrigated by groundwater. For its nearly 12.5 million city dwellers, Dhaka Water Supply and Sewerage Authority (DWASA), produces 2,110 million litres of water per day, 87.72 percent of which comes from underground while the rest from the surface. The groundwater system is under severe threat because of arsenic in groundwater, salinity in the shallow aquifers in the coastal areas and lowering of groundwater level due to unsustainable abstraction.

Rivers are lifelines of Bangladesh. Therefore, it is of paramount importance to keep those healthy and functional. Unfortunately, there have been developments in the past which are causing problems in sustaining the river system. Such developments include water development projects, upstream diversion of water and pollution of river water due to industrialization and urbanization.

Currently there are about 500 water development and flood control projects in the country covering about 40% of the country. While these water development and flood control projects have contributed to ensuring food security of the country there have been serious negative impacts on wetlands, fisheries and on the ecosystems of some parts of the country. Different components of the riverine ecosystem such as rivers, wetlands and floodplains have become delinked from each other by these projects along with the roads. As a result, most of the services of floodplain ecosystem have been lost.

Bangladesh shares 57 rivers with its upstream neighbors. The upstream water withdrawal in many cases is causing damage to the downstream riverine ecosystems. Sundarbans mangrove ecosystem is facing threat due to low flow through Gorai. Other important uses of river water such as fisheries, irrigation and navigation are also being compromised. The uncertainty in water availability in the shared rivers is causing problem in undertaking long term water resources planning.

The increasing urbanization and industrialization of Bangladesh have negative implications for water quality. The pollution from industrial and urban waste effluents and from agro-chemicals in some water bodies and rivers has reached alarming levels. The long-term effects of this water contamination by organic and inorganic substances, many of them toxic, are incalculable. The marine and aquatic ecosystems are affected, and the chemicals that enter the food chain have public health implications. Water quality in the coastal area of Bangladesh is degraded by the intrusion of saline water that has occurred due to lean flow in the dry season. This affects agriculture significantly, as well as other consumptive uses of the water.

There is a huge wastage of water in the irrigation and urban sectors through leakages and mismanagement. Water waste reduction is often not a consideration in water planning. For example, supplied piped water is used for construction works which is unthinkable in other countries.

7.1.2 Key Challenges

- Maintaining fully functional river system.
- Restoring the health of river-floodplain ecosystem.
- Addressing water scarcity during dry season both in terms of quantity and quality.
- Reducing pressure on ground water system.

7.1.3 Strategies

Restoration of surface water system

- The surface water system should be restored by re-establishment of the links between various components of the river-floodplain ecosystem.
- All water bodies including water tanks should be preserved.
- Fish passes should be made integral part of construction and rehabilitation of water development projects.
- Environmental flow should be ensured through all rivers.
- Any intervention within the rivers including river protection works should be made eco-friendly.
- Natural canal system should be maintained and re-excavated whenever necessary. Rubber dam technology may be encouraged for storage of monsoon water that can be used in dry season crop land irrigation.

- Rain water harvesting should be encouraged for construction works, car washing, car cleaning and gardening.
- An ecosystem approach should be adopted for water resources management of the country.

River management

- The linkages between the rivers should be restored.
- The conveyance capacities of the rivers should be restored through capital dredging and regular maintenance.
- The proposed Delta Plan-2100 can be entrusted to formulate a river management plan for Bangladesh. The objectives of the river management plan will be to ensure adequate environmental flow through the rivers, safeguard the rivers against encroachment and pollution, provide protection against river bank erosion, and reclaim land through eco-friendly river training.

Addressing dry season water scarcity

- Priority would be given on water sharing of the common/trans-boundary rivers with the neighboring country/countries following the model of the Ganges treaty-1996.
- The Ganges Barrage project with ancillary infrastructure should be undertaken.

Increasing Water Efficiency and Reducing Waste

- Build capacity in water efficiency measurements and waste reduction in urban and irrigation sectors.

Ground Water Management

- A sustainable groundwater management plan is to be developed to reduce pressure on ground water system.
- Coastal aquifers should be protected from exploitation in order to check saline intrusion. Buffer zone should be clearly delineated.
- Groundwater exploitation should be regulated so that extraction does not exceed safe yield.

Water pollution management

- Institutional capacity of DoE should be increased particularly in relation to monitoring and enforcement so that it can play its mandated role in protecting water bodies from pollution.
- ‘Polluters-pay’ principle should remain the corner stone of future strategies of pollution management. The payment should include the cost of environmental damage as well as severe penalty/tax so as to discourage future pollution.

7.2 Forests and Biodiversity

7.2.1 Present Status

Forestry is an important resource having both economic and environmental value. It is one of the most important components of environment balancing the ecosystem. However, its economic value is far exceeded by its environmental importance/significance.

The forestry sub-sector presently accounts for 2.93% of the GDP with annual growth rate about 5%. Official record of forest area is 2.5 million hectare or 17% of the total land area of the country, but practically it is for less than this figure. The forest area has declined due to clearing of forest land for cultivation, shrimp farming, industry, and settlements. However, the social/homestead and community forestry has significantly grown due to vigorous public sector campaign for plantation.

Most of the forests of Bangladesh are located in the Greater Districts of Chittagong, Chittagong Hill Tracts (CHT), Sylhet, Khulna, Dhaka, Mymensingh, and Tangail. The moist deciduous forests are found in Dhaka, Mymensingh, Rangpur, Dinajpur, and Rajshahi districts. Sundarbans Mangrove forest in the coast is a World Heritage Site. Additionally, plantations have been established on the newly accreted char land of the coastal areas totaling an area of 160,000 hectares.

Forests in Bangladesh are home to many species of indigenous trees, plants, insects, birds and animals, some of them are rare. Almost 80% of terrestrial biodiversity finds refuge in forests. Thus the forests also provide a much needed habitat for endangered biodiversity. However, in Bangladesh, the forest products are unfortunately being overexploited to the point of making the forests unsustainable. The country's forest cover has come down from more than 90% of about 100 years ago to less than 7% in 2000s as per satellite imagery. Forests in Chittagong Hill Tracts have been especially depleted contributing to massive loss of biodiversity, making some species extinct and putting many species on the endangered list. Since then, through concerted efforts of the Forest Department, the area under tree cover has increased close to the MDG target of 20%, but the density is much less than the target of 10% and above.

Bangladesh is a transitional zone of flora and fauna, because of its geographical settings and climatic characteristics. There are many rivers and streams in the country covering a total length of 22,155 km. About 11% of the country's area belongs to different types of water bodies. In addition to the regular inland waters, seasonally a large part of the country remains submerged for 3-4 months during monsoon. Haor basin in north-east region of the country is such an important wetland. The wetland system is a vast repository of bio-diversity. The wetland ecosystems have been suffering due to contaminated agricultural runoff which contains the fertilizer and pesticide residues.

The IUCN Bangladesh Red Data Book has described 266 species of inland fishes, 442 marine fishes, 22 amphibians, 109 inland reptiles, 17 marine reptiles, 388 resident birds, 240 migratory birds, 110 inland mammals, as well as 3 species of marine mammals in Bangladesh. According to the Red List of IUCN, there are 54 species of inland fishes, 8 amphibians, 58 reptiles, 41 resident birds, and 40 mammals, which are threatened throughout the country. Among the marine and migratory species of animals, 4 fishes, 5 reptiles, 6 birds, and 3 mammals are threatened.

The Government of Bangladesh in 1999 declared 8 areas of Cox's Bazar and Teknaf Peninsula, St. Martin's Island, Sonadia Island, Hakaluki Haor, Tanguar Haor and Marjat Baor, the Gulshan-Baridhara Lake and 10 km land ward periphery of Sundarbans as Ecologically Critical Areas (ECAs). Later in 2009, 4 rivers around Dhaka city (Buriganga, Sitalakhya, Balu and Turag) were declared as ECAs. The GEF/UNDP assisted project titled Coastal and Wetland Biodiversity Management at Cox's Bazar and Hakaluki Haor (CWBMP)' which is being

implemented by the Department of Environment, has been undertaking various programs towards conservation of the biological diversities of 4 ECAs namely Cox's Bazar- Teknaf Peninsula, Sonadia Island, St. Martin's Island and Hakaluki Haor. The aim is to ensure conservation, management and sustainable use of the biological and other resources of the ECAs through establishing institutional arrangement.

There are 34 Protected Areas in Bangladesh, of which 17 are National Parks and 17 Wildlife Sanctuaries. The total area of PA is 265,403 hectares which is 10.51 percent of the total forest areas of the country. All the protected areas are notified under the Bangladesh Wildlife Order 1973. The biggest protected area in Bangladesh is the Sundarbans (a World Heritage Site) West Wildlife Sanctuary with an area of 71502.13 hectares and the smallest Protected Area is the Ramsagar National Park with an area of 27.76 hectares. There are 4 Marine protected areas, of which 3 are wildlife sanctuaries situated in Sundarbans and one is Nijhum Dweep National Park situated in the mangrove forests in Noakhali. Biological zoning approach has been adopted in PA to ensure the protection of wildlife species and floral habitats.

7.2.2 Key Challenges

- Protection of ecosystems for bio-diversity conservation.
- Restoration of depleted ecosystems including wetlands.

7.2.3 Strategies

Protection and expansion of forests and forest resources

- Moratorium on felling in the natural forest will continue. Special attention will be given to the Sundarbans Reserve Forest for its biodiversity conservation.
- 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.
- 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.
- Adopt co-management approach to safeguard the forest biodiversity.

Enhance forest biodiversity and wildlife conservation through expanding protected area

- Increase protected area.
- Retain the integrity of hill ecosystems that sustain plant and animal biodiversity.
- Manage protected areas in keeping with the ecosystem approach involving the local communities with collaborative management.
- Declare more areas as ECA with formulation of appropriate management plans. Potential areas which can be declared as ECA include oxbow lakes namely Jhapar and Bukbhara baors, Kaptai (man – made reservoir) and natural lakes.

Restore ecosystems and rehabilitate endangered species

- Support rehabilitation of the rare, threatened and endangered native, wild and domesticated species.
- Create and launch initiatives for restoration of degraded ecosystems.
- Encourage afforestation and reforestation programmes with indigenous species.

Ensure wise use of wetland resources

- Identify key habitats that ensure ecosystem integrity and connectivity (migratory flyways of birds, fish passes, etc) and support actions to maintain and promote such connectivity between the earmarked critical and sensitive areas.
- Promote conservation of biodiversity through ecosystem approach for watershed management in order to ensure adequate water supply, in terms of quality and quantity, for households by developing appropriate management plans for watersheds and their use.
- Establish and manage fish sanctuaries both in fresh water and marine ecosystem.
- Adopt co-management approach for conservation of wetland biodiversity and sustainable use of its resources.
- Master Plan for Haor Area is to be followed for management of ecological resources of the haor area.
- Gradually shift to organic mode of agricultural production and other eco-friendly activities in the terrestrial and aquatic systems.

Coastal green belt

- The existing coastal afforestation and enrichment plantation will be continued.
- The existing mature coastal plantations will remain.

People's ownership of social forestry

- 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 afforestation program at the grassroots level under this program and NGOs will be more directly involved in afforestation program.
- 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.

7.3 Land and Soil

7.3.1 Present Status

Land use in the country is diverse and often conflicting: it is intensively used for agriculture, settlements, forests, shrimp ghers, natural fisheries, salt production, industrial and infra-structural developments and tourism. All these have resulted into the following features: demand for expansion in all land uses (urban area, settlement, shrimp etc.); increasing demands for new uses (tourism, export processing zones and others); conflicting land uses and demands, and encroachment and conversion of land from one use to the other.

The population is increasing and the land is being converted from directly productive purposes, such as crop cultivation, to other uses like housing and roads and urban development. It is reported that cultivated land has been declining by almost one percent per year. Present per capita agricultural land of 0.05 ha will be decreased to 0.025 ha by 2050. Without effective measures to arrest this alarming trend the land available for crop production will continue to fall.

Degradation of land refers to loss of its potential production capability as a result of degradation of soil quality and also its loss for effective use. Estimates by BARC indicate that soil related problems may be a major constraint on agricultural growth. Declining soil fertility, soil erosion, and salinization affect 5.6–8.7 million hectares, 5.3 hectares, and 3.05 million hectares of land respectively. Soil erosion being irreversible, is generally regarded as the most serious problem of soil degradation. Various kinds of soil erosion such as sheet, rill and gully erosion, land slide, riverbank erosion and coastal erosion are occurring in Bangladesh. Accelerated soil erosion has been encountered in the hilly regions of the country.

Soil fertility has declined due to high cropping intensity, unbalanced or over use of chemical fertilizers and less or no use of organic matter. One of the important causes of land degradation in Bangladesh is over-exploitation of biomass from the cultivation fields for fuel, fodder and thatching. BARC estimates that organic matter depletion is observed in 7.5 million hectares of land. With the loss of organic matter soils could become more susceptible to drought. The critical areas in this respect are the areas where Aus followed by transplanted Aman are grown. Another critical area is the Barind Tract, the western part of which shows symptoms of increasing aridity during the dry months, i.e., March and April.

The exploitation of ground water for irrigation for dry season rice farming (boro) has gone beyond the capacity of annual recharge of aquifers, with adverse effects on the supply of safe drinking water. The irrigated area has expanded to over 5.5 million ha out of 8.0 million ha of cultivated land, and over three-fourths of the area is irrigated with ground water, mostly by privately installed shallow tube wells. The arsenic contamination of drinking water in large parts of the country is often blamed to exploitation of ground water for irrigation with shallow tube wells.

The process of desertification is defined by the United Nations Convention to Combat Desertification, 1994, as “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climate variation and human activities”. The north-west region of the country especially the Barind area shows signs of desertification. Such threats will accentuate under climate change scenario.

The country loses about 10,000 ha of land to river erosion every year. The erosion is particularly severe along the Jamuna and Lower Meghna rivers. This loss of land in a land scarce country has serious socio-economic impact. There is great potential of increasing land area along the coast of the country. Since 1973, land has been accreted in the Noakhali coast at a rate of 18 sq.km/year. It is projected that by the year of 2050, a land mass of 1,000 sq km can be raised. The process of reclamation can be accelerated through variety of means. If it can be done in a sustainable manner then the country will be greatly benefitted by the extra land.

7.3.2 Key Challenges

- Optimize land use.
- Increase land area of the country along the rivers and coast.
- Restore soil health.
- Check the threat of salinity intrusion and desertification.

7.3.3 Strategies

Land zoning

- Accelerate land zoning process including formulation of necessary laws and acts.

Reducing soil and land loss

- Prevent soil erosion by promoting and adopting improved tillage and irrigation practices wherever feasible.
- Bring all denuded hills under afforestation programmes.
- Adopt river training to reduce land loss to river erosion.

Land reclamation in the coast

- Make sustainable land reclamation a priority action under the proposed Delta Plan 2100.
- Continue mangrove plantation in the newly accreted lands to stabilize lands.

Restoring soil fertility

- Motivate farmers to use recommended/balanced doses of chemical fertilizers, extensive production and use of organic fertilizer, and proper utilization of soil guide and soil testing facilities to enhance soil fertility.
- Check removal of top-soils for non-agricultural purposes such as brick making, boulder extraction etc. in order to sustain the soil fertility.
- Popularize crop rotation for restoration of soil health.

Checking salinity intrusion and desertification

- Increase fresh water flow from upstream to check salinity intrusion.
- Increase vegetation coverage in Barind area.
- Reduce stress on water resources system.

7.4 Coastal and marine resources

7.4.1 Present Status

The coastal zone contains several ecosystems that have important conservation values: mangrove, marine, estuary, islands, coral, sandy beaches, sand dunes. The world's largest uninterrupted stretch of mangrove ecosystem, the Sundarbans, has been declared a World Heritage Site in 1997, whereas coral ecosystems are found around St Martin's Island. These ecosystems are not only biodiversity hot spots, but also provide the ecological foundation for an important common access resource: the fisheries in the Bay of Bengal. The government has already declared several ECAs in the coast. Many sanctuaries have also been created. Most recent example is declaration of three sanctuaries for dolphins in the Sundarbans.

Recently Bangladesh won a landmark verdict at the International Tribunal on Law of the Sea, which sustained its claims to 200-nautical-mile exclusive economic and territorial rights in the Bay of Bengal. The verdict of the tribunal gave Bangladesh a substantial share of the outer continental shelf beyond 200 nautical miles, which would open up possibilities for peacefully

exploiting immense resources (gas, oil, fish and others). The tribunal also awarded Bangladesh a full 12- nautical mile territorial sea around St Martin's Island, overruling Myanmar's argument that it should be cut in half.

Formation of new land in the Bay of Bengal also gives the country another opportunity which is to increase its land size. More than 50,000 ha of new lands were reclaimed along the Noakhali coast through Meghna cross dams. Subsequently, these newly accreted lands were used for new settlements and socio-economic development of the people. The Forest Department started coastal afforestation in 1966. Vast areas in newly accreted chars and islands were put under mangrove plantation. Forest belt along the coast, Coastal Green Belt, has been instrumental in protecting life and property in coastal areas from cyclone and storm surges.

One of the earliest interventions in the coast, since 1968, was the Coastal Embankment Project (CEP). The BWDB constructed a series of polders. CEP was instrumental in enhancing productive potential of coastal land by protecting it from saline intrusion. Polders are now a natural feature of the coastal hydro-morphological setting. Sea dykes are considered as first line of defense against the impacts of sea-level rise. One unintended effect of CEP however, has been sedimentation of the rivers resulting in severe water logging in the southern part of Khulna and Bagerhat districts. The Tidal River Management adopted in Khulna-Jessore area shows a promising sustainable option.

Land use in the coast is diverse and often conflicting: it is intensively used for agriculture, settlements, forests, shrimp ghers, natural fisheries, salt production, industrial and infra-structural developments and tourism. Over the years, uncoordinated development activities have led to the depletion of natural resources like fish and forests and overall degradation of the natural environment. These activities have also sometimes created conditions of scarcity for the poor and the disadvantaged by different kinds of social, economic, technical or institutional barriers which limit access to common property resources on which they are dependent for their livelihood. Natural resources in the coastal zone will have to be managed in a manner that will not only ensure their sustainability but will also secure access to the poor for meeting their livelihood needs.

Coastal shrimp aquaculture of Bangladesh inside the embankments has been boosting the national economy. Development of shrimp aquaculture however, has created negative environmental impacts such as habitat destruction, pressure on fisheries resources, salinisation of agricultural land, pathogen intensity due to introduction of exotic species and nutrient pollution. The unplanned shrimp culture expansion has also led to social conflicts over land tenure and user rights, leading to marginalization of small rice farmers who have been forced to lease out their lands to large shrimp farmers. It may be mentioned that the High Court in its verdict on February 1, 2012, declared harnessing salt water in the agricultural and forest lands for shrimp farming as illegal.

7.4.2 Key Challenges

- Protecting the estuarine, marine and coastal ecosystems.
- Reducing conflict in coastal land use.
- Integrated management of coastal and marine resources

7.4.3 Strategies

Ecosystem management

- Conservation effort should be continued to protect the coastal ecosystems.
- Services provided by the natural ecosystems should be properly evaluated and appreciated. Required research should be initiated in this regard preferably in the coastal universities such as Khulna University and Chittagong University.

Coastal land zoning

- The Detailed Coastal Land Zoning could be considered as one of the proposed tools to help government in planning for rational use of land.

Integrated management of coastal water infrastructures

- The polders should be managed in an integrated manner which includes a system of embankment maintenance with foreshore afforestation and fisheries and agricultural development.
- The polders should be managed in such a way the water logging problem in the south-west coast is relieved permanently. The proposed Delta Plan-2100 should guide towards a comprehensive and sustainable solution to the water logging problem in the south-western coast.

Environmental and socially responsive shrimp farming

- Promote semi-intensive shrimp aquaculture practices.

Marine and coastal environment development

- Keep the exploitation of the marine resources within sustainable limits by following the major regional and international programs for their conservation.
- Protect the sea from land-based activities such as destruction and alteration of habitats, destructive fishing, untreated sewage, oil pollution from ocean and inland vessels including ship breaking yards and eutrophication.

7.5 Natural Disasters and Climate Change

7.5.1 Present Status

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 and that a rise in sea levels could have a significant impact on the lives and livelihoods of up to 30 million people.

About 75% of all disasters are originated by weather-climate extremes and because of global warming and climate change, Bangladesh had already experienced some significant impacts especially in terms of coastal inundation and erosion, saline intrusion, deforestation, loss of biodiversity and agriculture, and large scale migration. Drought affects annually about 2.32 million hectares and 1.2 million hectares of cropped land during the Kharif (November to June) and Rabi (July to October) seasons respectively, while soil salinity, water logging and acidification affect 3.05 million hectares, 0.7 million hectares and 0.6 million hectare of crop land, respectively in the country.

Over the past years, the Government of Bangladesh has invested over \$10 billion to make the country less vulnerable to natural disasters. These investments, in many cases supported by development partners, include flood management schemes, coastal polders, cyclone and flood shelters, and the raising of roads and highways above flood level. In addition, the GoB has developed state-of-the-art warning systems for floods, cyclones and storm surges, and is expanding community-based disaster preparedness. Climate resilient varieties of rice and other crops have also been developed.

The International Red Cross Society initiated Cyclone Preparedness Program (CPP) in the early 1970s that developed into a joint venture programme of Government of Bangladesh and Bangladesh Red Crescent Society and eventually has emerged as a world model of physical and institutional infrastructure for disaster management in cyclone prone areas. Along this line, the government has set a target to build a 62,000 strong urban volunteer corps that, so far, has reached the 32,000 level through the collaboration of the Fire Services and Civil Defense and the Comprehensive Disaster Management Programme. More than 2000 multi-purpose cyclone shelters were built so far to provide security to the people in the vulnerable areas. An extensive network of radio communication contributes in cyclone preparedness of coastal communities.

Bangladesh has made the paradigm shift from the conventional response and relief oriented approach to the comprehensive disaster management framework. Important elements in this are the structural interventions such as construction of embankments, cyclone shelters, and others. There have also been non-structural investments such as the establishment of the Disaster Management Committees at all levels, government policies and programmes, as well as notably the community-based cyclone early warning system and response mechanisms. Taken altogether they contributed significantly in the country's reducing the impacts of disasters.

The Disaster Management Vision of the Government of Bangladesh as stipulated in National Plan for Disaster Management 2010-2015 is 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.

Bangladesh prepared the Bangladesh Climate Change Strategy and Action Plan in 2009. 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.

In the regional level, Bangladesh is a member to the SAARC that, among its various portfolios, has disaster management in its centre stage. There are indeed regional dimensions in term of causes and consequences of disaster and climate change that transcend national boundaries. It is therefore crucial that Bangladesh continues asserting leadership in the disaster management in the region. The Country is leading the development of the SAARC Comprehensive Framework for Action and now the SAARC Plan of Action on Disaster Management, and hosts several

regional centres in this field. This regional engagement has reached new height with the signing of the SAARC Regional Agreement on Rapid Response to Natural Disasters where member states are bound to extend or to receive assistance in the onset of disasters.

7.5.2 Key Challenges

- The challenge Bangladesh now faces is to scale up the investments made over the years in disaster risk reduction to create a suitable environment for the economic and social development of the country in the face of climate change.

7.5.3 Strategies

Rehabilitation of coastal polders

- Repair and maintain the coastal polders and defenses which have been washed away by cyclone Sidr and Aila. Carry out the rehabilitation work taking into consideration the anticipated sea level rise.

Disaster risk reduction

- Increase resilience of the vulnerable population through various poverty reduction measures.
- Develop other instruments for disaster risk reduction including formulation of Ecosystem based Detailed Area Planning for urban areas for flood risk reduction, Land zoning and building codes for earthquake risk reduction, shelters and strengthening of CPP programme for cyclone risk reduction, surface water irrigation for drought risk management, soft (e.g. geobag) protection measures for erosion protection etc.
- Strengthen institutional capacity of government sectoral ministries, departments and the Disaster Management Committees, and other technical and academic actors in ensuring the inclusion of Disaster Risk Reduction and Climate Change Adaptation issues and agenda within their respective sectoral policies, plans, programmes and allocations of businesses as well as in the local development planning.
- Use the SAARC forum for exchange of data related to disaster and climate change forewarning.

Integrating Disaster Risk Reduction and Climate Change Adaptation

- Integrate the Disaster Risk Reduction and Climate change Adaptation into the context of “risk reduction” as a core component of sustainable development.
- Create and sustain the opportunities to interface, to synergise, and eventually, integrate the policies, mechanisms and resource management for more cogent and coherent disaster risk reduction and climate change adaptation.

Afforestation

- Afforestation program should be strengthened to take advantage of its effect on disaster risk reduction and climate change mitigation.
- Other measures of this kind should be promoted including the plantation of deep rooted trees and vegetation to mitigate erosion and to reduce landslide, massive plantation of robust canopies that serve as windbreaker to reduce wind velocity, protect disaster lines of defenses, and mangroves that reduce the coastal abrasion and mitigate the ferocity of possible tsunami.

Development of climate tolerant crop variety

- Carry out research to develop and field test climate tolerant varieties adapted to likely future conditions so that choices are available for farmers as climatic conditions change.

Improvement in cyclone and storm surge warning

- The present cyclone and storm surge warning system should be reviewed and improved where necessary.
- Improvement in cyclone and storm surge warning dissemination to local communities should be made through awareness campaign and radio communication.

Utilization of climate change funds

- Strengthen the project selection, disbursement of fund and monitoring mechanism of Climate Change Trust Fund and Climate Change Resilience Fund.

7.6 Summary

Primary objective of this Strategic Priority Area is to ensure environmental protection for humans, ecosystems and resources which promotes the conservation, augmentation and efficient utilization of the natural resources. It covers water resources, forestry and bio-diversity, land and soil, coastal and marine resources, and natural disasters and climate change.

Water resources

Managing water scarcity in a sustainable manner is the key challenge for sustainable development in water resources sector. Key elements of strategy include restoration of surface water system, water sharing treaties of the trans-boundary rivers, formulation of river management plan, increasing water efficiency and reducing waste, proper ground water management and water pollution management.

Forest and bio-diversity

Since most of the forest and biodiversity resources are in a degraded state, protection and conservation of these resources are the focus of the strategies in this area. The key elements of the strategies include protection and expansion of forests and forest resources, enhancing forest biodiversity and wildlife conservation through expanding protected area, restoring ecosystems and rehabilitating endangered species, ensuring wise use of wetland resources with special emphasis on Haor ecosystem, further development of coastal green belt and promoting people's ownership of social forestry.

Land and soil

In a land scarce country, ensuring wise use of land is the major challenge. Soil degradation due to over-exploitation is another major challenge to sustainable development. Key strategic elements therefore, are land zoning, reducing soil and land loss, land reclamation in the coast, restoring soil fertility and checking desertification especially in the northwest region.

Coastal and marine resources

Bangladesh coast and the marine zone are especially rich in many natural resources. The challenge is that natural resources in the coastal zone will have to be managed in a manner that

will not only ensure their sustainability but will also secure access of the poor to these resources for meeting their livelihood needs. The strategies to meet this challenge include ecosystem management, coastal land zoning, integrated management of coastal water infrastructures, environmental and socially responsive shrimp farming, and marine and coastal environment development.

Natural disasters and climate change

Bangladesh has made considerable investments in disaster management over the years and is considered to be a successful country in disaster management. The challenge Bangladesh now faces is to scale up these investments in disaster risk reduction to create a suitable environment for the economic and social development of the country in the face of climate change. The strategic elements in this regard include rehabilitation of coastal polders with especial focus on removing water logging, disaster risk reduction, mainstreaming disaster risk reduction and climate change, coastal char land afforestation, development of climate tolerant crop variety and utilization of climate change funds.

CHAPTER 8: GOOD GOVERNANCE

The objective of governance strategy is to ensure an effective parliamentary process, sound law and order, pro-people public services, improved legal and judicial system, strengthened local governance, and a corruption-free society with social justice.

8.1 Present Status

The World Bank has developed quantitative measures of governance indicators covering the three dimensions of governance, namely, political, economic and institutional. The governance ranking is low for Bangladesh using this approach; there is also not much improvement over time. Lack of good governance is felt in all sectors of the economy to a varying degree. The coexistence of poor governance with good progress with most development indicators in Bangladesh has been a development paradox to many observers. However, past growth is explained by implementation of good policies and growth of some institutions. If governance does not improve good policies and strategies in the future will have risk of being overwhelmed by poor governance and attainment of sustainable development will prove extremely difficult, if not impossible.

8.2 Key Challenges

Bangladesh is a multiparty democratic country with parliamentary form of government. Functions of the government have been divided into different ministries with their mandate and responsibilities. Planning and Finance Ministries deal with overall development plan and resource allocation while sectoral ministries deal with sectoral issues and development. Ministry of Law deals with law and judiciary issues as well as provides inputs in formulation of policy, rules and regulations by other ministries. Overall environmental issue lies with Ministry of Environment and Forests including the climate change. Providing good governance requires effective institutions across all government organs, ministries and agencies.

Governance, which deals with institutions, is a long-term challenge that has to be pursued continuously. Progress is required with a wide range of institutions such as rule of law, a functioning judiciary, accountable and effective public service agencies, sound government agencies dealing with finance, taxation, planning, public administration and monetary policies. Reduction of corruption is also an essential element of governance.

8.3 Strategies

Making parliamentary process effective

The parliament can hold the government accountable through legislative debates. The parliamentary committees will be made more effective to scrutinize executive actions and review public policy and expenditure and provide inputs to ensure that these reflect the interests of their clients (the citizens).

Strengthening local governments

The Government will continue to take steps to strengthen local governments. Efficient and dedicated local government bodies can deliver services such as education, health and law and order and generate social and economic awareness to achieve the national goals.

Reforming public services

The aim of public service reform is to establish a high performing civil service that is fundamental to improving governance. To this end a number of initiatives have been undertaken by the government. A draft of the Public Service Act has been prepared with a view to build a modern, effective, responsive, and service oriented civil service based on an institutionalized merit system operating within the sphere of laws and rules. Performance based evaluation system has been approved for experimental implementation in three phases starting from MOPA in 2013. Personnel Management Information System which includes relevant information to be used for posting, transfer, promotion and training of officers or taking disciplinary actions against them, has been introduced in MOPA and is being gradually expanded to include data for all 27 BCS cadre. E-file Management has been introduced in MOPA to improve efficiency, dynamism, and transparency of the administrative process. Citizen Charter has been introduced in service providing government organizations throughout the country to improve the quality of service provided by civil servants. As reform is an on-going process other reforms will be introduced gradually to improve civil service performance. Capacity building initiatives of the administration on gender related and environment and climate change issues will be mainstreamed in the process.

Controlling corruption

Corruption wastes national resources, causes social inequities, and creates distrust among people. The Government will strengthen the anti-corruption commission (ACC) and ensure that it is able to function with constitutional guarantees about its powers, and is free from the influences of the executive and lower judiciary. The ACC also must act transparently and must not penalize any person and organization without following due legal process.

The government will create public awareness and education in preventive measures and create the right conditions for improved delivery of public services including automated services in private sector to government payments.

Legal and judicial system reform

The Government recognizes that an independent and effective judiciary is critical to good governance, especially to protect the rights of citizens especially the vulnerable group including the poor, the women, and other socially disadvantaged groups. Accordingly the Government measures will continue to improve the quality and pace of the civil justice delivery system; reduce backlog; make the system more accessible to the users, particularly to the disadvantaged, women and children; and institutionalize the resolution of disputes out of court. The alternative dispute resolution (ADR) mechanism, legal aid services, the National Legal Aid Organization, computerized court case recording and tracking system will be made effective in delivering targeted services.

Promoting E-governance

The Digital Bangladesh initiative championed by the government will be a key instrument to improve governance. Appropriate legal and technical measures will be adopted and institutions developed to promote E-governance. ICT facilities will be expanded to the upazila/union levels ensuring access of the poor and women. E-governance will be promoted in environment and climate change issues.

Improving project implementation capacity

The Government will continuously upgrade project implementation capacity of the government officials through proper assignment of staff, through better training, and through better accountability. Use of program and results based approach instead of project-by-project approach, improving project quality, simplification of aid disbursement procedure, timely procurement of goods and services, and use of management information system (MIS) will contribute to improving implementation capacity.

Improving sectoral governance

Corruption at the sectoral and entity levels is also a major governance issue. Therefore sectoral level anticorruption strategies would be formulated that would focus on minimizing risks in the flow of goods and services. Special emphasis will be placed in improving governance in areas where the scope for corruption and rent seeking are particularly important.

Ensuring access to information

Better access to information, especially for the poor, is fundamental to poverty reduction as these create new opportunities and prevent misuse of public resources. Right to Information Act 2009 and the Information Commission will contribute to ensuring access to information. The media has assumed a very important role as a watchdog for public interest. Training of press and media personnel will be arranged to make them aware of the rules of game and code of conduct. Access to information will play a critical role in environment and climate change areas. The Government will protect the ability of the media to disseminate information objectively and freely. The ministries and agencies will open and maintain their respective websites and ensure transmission of updated information relating to activity for public access and scrutiny.

Protecting human rights

Notwithstanding laws prohibiting discrimination in society, lack of enforcement brings suffering for the weaker section of the society. Here the state role is central and rights can be safeguarded with an independent judiciary, adequate legislation and establishment of democratic institutions. The National Human Rights Commission Ordinance 2007 and the independent human rights commission will ensure that violation of fundamental rights of citizens does not happen.

Promoting Public-Private Partnership

The Government has put emphasis on public- private partnership (PPP) to ensure expeditious development of infrastructure and utility services by attracting local and foreign investment and improving the expertise and technology. Private initiative would be encouraged to promote quality service delivery in the area of essential economic infrastructure as well as social sectors with due consideration of protection of natural capital.

Government-NGO cooperation

The Government-NGO cooperation is fruitful in areas where expectation of profit is not high to attract profit-making private operators. More importantly, Government-NGO cooperation can improve efficiency in the management of service delivery of some essential utilities. The NGOs are involved in the delivery of several basic services such as education, health, water supply and

sanitation. These experiences in the social sectors can be utilized to forge wider cooperation in other areas, such as providing water in Pourashavas and slums, cleaning and waste disposal in cities, rural energy supply programmes, creation of service facilities in the urban cities, development of recreational facilities around urban river banks, and building shelter houses for the poor.

Planning and Budgetary Processes

Efficient planning and budgetary systems can play an important role in improving the efficiency of public spending. The Government will continue to strengthen its past initiatives to improve planning and budgetary processes: a move away from the traditional incremental budgeting towards a medium term budget framework (MTBF) process, a move away from the traditional public-investment focused plans to more strategic planning/ indicative planning that puts emphasis on strategies, programs and policies for the entire economy, and link better the medium-term development plans to the MTBF process by making the plan a living document with annual review of performance. The results of the annual reviews will be shared with the cabinet and used to determine changes in plan goals, targets, strategies and policies as necessary in light of the changing global and local economy and the results of the plan implementation.

The institutional capacities of line ministries will be substantially strengthened to do proper planning and budgeting in the context of the implementation of the MTBF along with mainstreaming environment and climate change issues.

The technical capacities of the Ministry of Finance and the Planning Commission will be substantially strengthened through proper staffing and training to ensure the timely implementation of the Plans, the NSDS, and the MTBF. All efforts will be made to strengthen coordination between these two core ministries with a view to avoiding duplication, overlap and delays.

The line ministries especially those concerned with sectors focused in the NSDS will formulate sectoral Master Plans consistent with the Perspective Plan and the NSDS and ensure implementation of the plan within the MTBF.

Introducing Sustainable Development Audit

Ministry of Finance will undertake sustainable development audit. Government tax and expenditure can affect sustainable development differently from development. Sustainable development audit will analyse the impact of government tax and expenditure on sustainable development to guide tax and budget allocation policies. Institutional capacity of Ministry of Finance will be strengthened to undertake this task.

Financial Monitoring for Macroeconomic Stability

Acceleration of sustained economic growth will depend crucially on efficient mobilization and utilization of investment resources in increasing volumes. This will in turn will require a dynamic financial sector integrating ever closer with financial markets abroad to attract foreign savings, and utilizing these in socially and environmentally responsible inclusive financing of all productive pursuits of all population segments. To this end Bangladesh Bank as the financial regulator and supervisor will chalk up and pursue appropriate strategies and action plans. Coordination between the government's fiscal policies and Bangladesh Bank's monetary policies will be maintained towards safeguarding macroeconomic stability.

Reviving Ethics and Values

Achieving the humanitarian goals of Vision 2021 will require a revival of ethics and values permeating the nation's social fabric. These must be inculcated in society, with educational and training institutions acting as the primary medium for their dissemination to young and future leaders. The present generation will need to change their mindsets and refrain from any act of mis-governance.

Reforming Police

The Police force must be strengthened so that it is able to regain confidence of the people. Police will maintain a working level of public order, preventing, detecting and investigating crime. The perception of police being only protective of the wealthy, and indifferent or contemptuous to the poor or the working class, must be changed. A system of gender sensitization training (covering violence against women issues and other laws to protect human rights) will be established for all legal and police officers. The concept of community police will be reinforced.

Regulatory Framework

The private sector is the engine of growth in a market driven economic system with the public sector playing the role of a friendly regulator and facilitator. In the circumstances, many burdensome regulations will have to be streamlined within a reformed regulatory framework which promotes rather than hinders private initiative and risk-taking. Only then the vision of accelerated growth and poverty reduction can be achieved by 2021. To this end, the public sector will have (a) to reform the existing regulations in the service delivery system of ministries and departments, and the agencies they manage, (b) to facilitate citizens' access to government services, and (c) to keep the operation of the private sector and civil society within a transparent framework. Strengthening the capacity of the office of C & AG, currently under implementation shall embrace the oversight function of the Public Accounts Committee of the Jatio Sensed. The capacity of regulatory authorities like Bangladesh Bank, Energy Regularity Commission, and the Telecom Regulatory Authority will be further strengthened.

Introducing agency performance ranking

A composite set of Agency Performance Indicators will be initiated for ministries and agencies to facilitate public disclosure of performance data for each and every agency. It will set a standard for performance, transparency and accountability and will be helpful tool in policy making.

8.4 Summary

The objective of good governance sector strategy is to ensure an effective parliamentary process, sound law and order, pro-people public services, improved legal and judicial system, strengthened local governance, and a corruption-free society with social justice. The strategies focus on strengthening institutional capacity, reforming key institutions, controlling corruption, enhancing efficiency of planning and budgeting, promoting e-governance, ensuring access to information, and reviving value and ethics in the society.

CHAPTER 9: INSTITUTIONAL FRAMEWORK

Institutional Framework is one of the key elements of implementation and monitoring progress of the NSDS. It will facilitate keeping coherence between and among different strategic priority areas and sectors as well as existing national and sectoral policies during implementation of the strategy and monitoring progress. The following important issues are considered for setting up the institutional framework for implementation and monitoring of the NSDS:

- Setting up of the Institutional Framework based on existing organizational arrangement for national environment management and facilitating development;
- Setting up of the Institutional Framework through a process of consultation with stakeholders from government and non-government organizations;
- The Institutional Framework will comprise members from government, private sector and major groups as identified in Agenda 21;
- It keeps a good balance among different groups such as government, non-government, civil society, private sector and academic to attain their appropriate representation in the institutional framework;
- Setting up a secretariat within the Ministry of Environment and Forests to support activities of the institution to be formed for implementation and monitoring of the NSDS.

9.1 Review of Existing Organizational Arrangement for Environmental Management

In order to provide overall guidance and implement National Environment Policy 1992, a National Environment Committee headed by the Honourable Prime Minister has been set up to ensure effective top-level management of the environment and to integrate development and environment at the national level. The Ministries of Agriculture, Water Resources, Finance, Industry, Power, Energy and Mineral Resources, Education, Environment and Forest, Planning, Local Government and Rural Development and Planning Commission are key members of the committee. Representatives from academic institutions, private sector bodies and non-government organizations are also members of the committee. Key mandates of the National Environment Committee are:

- Review of progress of implementation of the National Environment Policy and environment related activities;
- Consider and provide guidelines for fulfillment of Government of Bangladesh obligations under Agenda 21;
- Identify problems impeding implementation of the National Environment Policy and provide guidelines for solving those problems.

The government of Bangladesh has formed National Economic Council (NEC) as the highest political authority to consider development activities reflective of long-term national policies and objectives. The NEC consists of all members of the Cabinet and is chaired by the head of the government, i.e. the Prime Minister. The NEC meets as and when required, and in one particular meeting the attendance requirement depends on the subjects under consideration. The Planning Division of the Planning Ministry works as the secretariat of the NEC. The NEC's functions are to:

- provide overall guidance at the stage of the formulation of national plans including Annual Development Programme and all national economic policies;
- review progress of implementation of development programmes;
- take such other decisions and actions considered necessary for socio-economic development; and
- appoint such committees as required to assist the NEC in discharging its responsibilities.

For approval of the projects and monitoring economic activities and situation of the country, an Executive Committee of National Economic Council (ECNEC) has been formed in 1982 headed by the Prime Minister and the Finance Minister as the alternate chairperson. The other members include Ministers for Planning, Local Government and Rural Development and Cooperatives, Education, Food, Water Resources, Industries, Commerce, Post and Telecommunications, Agriculture, and Science and Technology. The relevant ministers whose subjects are taken up are also members. The cabinet secretary, principal secretary of Prime Minister's office, secretary of External Resources Division, secretary of Planning, secretary of Implementation, Monitoring and Evaluation Division, Governor of Bangladesh Bank, the relevant members of the Planning Commission are required to assist ECNEC. Key functions of ECNEC are to:

- consider and approve all DPP/TPP;
- consider and approve all projects recommended by Special Project Evaluation Committee (SPEC) costing above taka 50 million;
- review the progress of implementation of development project;
- consider private sector investment projects and those under joint venture;
- monitor economic situation and economic activities of the country and review policies;
- review financial programme of public statutory corporations;
- consider the output prices of products manufactured in the public sector and determine rates and fees of services, and
- consider measures relating to foreign aid, expansion of commerce and determine targets for the Bangladesh missions abroad in respect of export of manpower including review of progress in these areas.

9.2 Recent Discourse on Institutional Arrangement for Environmental Management

A Policy Dialogue on Institutional Framework for Sustainable Environmental Governance was organized in August 2007 under Bangladesh Capacity Development Action Plan initiative. A total of 65 high level government officials - in the rank of Joint Secretaries from various line ministries/divisions attended the dialogue to review an institutional framework developed under the initiative. The policy dialogue suggested the creation of Sustainable Development Commission (SDC) as an institution for the future sustainable environmental governance in Bangladesh. The concept of having a Sustainable Development Commission for monitoring the sustainable environmental governance has been appreciated by the participants. However, finally, it has been suggested to rename the proposed SDC as "Sustainable Development Monitoring Council (SDMC)". The dialogue also suggested that the status of the Commission would be similar to the National Economic Council (NEC) or the National Implementation Committee on Administrative Reorganization (NICAR).

The dialogue also suggested that role of the commission would be to ensure sustainable development; ensure coordination among all the ministries, divisions, departments, agencies; and to develop partnership between the public and the private entities.

9.3 Proposed Institutional Framework for NSDS

The institutional framework suggested for implementation of NSDS is primarily based on outcome of the recommendations of the policy dialogue for preparation of Bangladesh Capacity Development Action Plan for Sustainable Environmental Governance. The idea of creation of "Sustainable Development Monitoring Council (SDMC)" as suggested under the above mentioned policy dialogue has been shared in the national consultation on National Sustainable Development Strategy held in February, 2008 for further discussion and addition in the context of NSDS. Subsequently, the institutional framework has been shared with Steering Committee and other key experts for finalization. The consultation process for NSDS has agreed to keep "Sustainable Development Monitoring Council (SDMC)" as institution for NSDS with modification. It also recognized that SDMC needs engagement of the concerned ministries, divisions, departments, agencies, research organizations, leading training institutes, NGOs, civil societies and private sectors.

The participants in the stakeholder consultations for revision and modification of NSDS reviewed the composition of SDMC and suggested two modifications. First, the council should include secretaries of relevant ministries. Second, as preparation of national development plans and strategies and its monitoring fall under the purview of Ministry of Planning, the Minister of Planning will be the chairperson of the Council. In this context, a secretariat will be established in General Economics Division, Planning Commission and Member, General Economics Division, Planning Commission will act as Member Secretary of SDMC. The suggested composition of the National Sustainable Development Monitoring Council is given in Table 9.1.

Table 9.1 Composition of the Sustainable Development Monitoring Council (SDMC)

Sl. No.	Designation & Organization	Position
1	Minister, Ministry of Planning	Chairperson
2	Minister, Ministry of Environment and Forests	Member
3-5	3 Hon'ble Members of the Parliament (selected by Hon'ble Speaker)	Member
6	Cabinet Secretary, Cabinet Division	Member
7	Principal Secretary to the Prime Minister	Member
8	Secretary, Finance Division	Member
9	Secretary, Economic Relations Division	Member
10	Secretary, Planning Division	Member

11	Secretary, Ministry of Agriculture	Member
12	Secretary, Ministry of Environment and Forests	Member
13	Secretary, Ministry of Fisheries and Livestock	Member
14	Secretary, Ministry of Water Resources	Member
15	Secretary, Energy and Mineral Resources Division	Member
16	Secretary, Power Division	Member
17	Secretary, Ministry of Industry	Member
18	Secretary, Ministry of Education	Member
19	Secretary, Ministry of ICT	Member
20	Secretary, Local Government Division	Member
21	Secretary, Implementation, Monitoring & Evaluation Division	Member
22	Secretary, Ministry of Land	Member
23	Secretary, Food Division	Member
24	Secretary, Disaster Management and Relief Division	Member
25	Secretary, Ministry of Health and Family Welfare	Member
26	Secretary, Ministry of Foreign Affairs	Member
27	Secretary, Road Division	Member
28	Secretary, Ministry of Chittagong Hill Tracts Affairs	Member
29	Rector, Bangladesh Public Administration Training Centre	Member
30-31	Two Professors from National Universities (selected by Minister of Education)	Member
32	Director General, Department of Environment	Member
33	Chief Conservator of Forests, Forest Department	Member
34	Inspector General of Police, Bangladesh Police Department	Member
35	Chairman, SPARRO	Member
36	Director General, Bangladesh Meteorological Department	Member
37	Director General, Bangladesh Water Development Board	Member
38	Director General, Water Resources Planning Organization	Member
39	Director General, Department of Agricultural Extension	Member
40	Executive Chairman, Bangladesh Agriculture Research Council	Member
41	Chairman, BCSIR	Member
42	President, FBCCI	Member
43	Country Representative, IUCN Bangladesh Country Office	Member
44-45	Representatives from the Civil Society (selected by the Chairperson)	Member
46-47	2 Representatives from the leading NGOs (selected by the Chairperson)	Member
48	Representative, Joint River Commission	Member
49	Member, General Economics Division, Planning Commission	Member- Secretary

9.4 Overall Role of Sustainable Development Monitoring Council

The role of the Sustainable Development Monitoring Council is to ensure sustainable development of the country with special focus on effective implementation and monitoring progress of different elements of NSDS. The Council will also review the obligations and commitments under the different Multilateral Environmental Agreements (MEAs) including UN Commission on Sustainable Development (UNCSD). The Council will meet at least three times a year. At the outset, the council will give thrust on the following five Strategic Priority Areas as identified as part of sustainable development of Bangladesh.

Sustained Economic Growth:

Implementation of different strategies suggested under sustained economic growth will ensure sustained and accelerated growth without compromising environment sustainability and enhancing social equity. It will also facilitate poverty reduction through employment generation, bring effective utilization of energy and mineral resource, greening manufacturing industries, promotion of export, and enhance remittance through creating job in international market.

Development of Priority Sectors:

Provide a direction to search for possible ways and means in the priority sectors as they will remain the engine for overall economic growth and support development.

Urban Environment:

Provide direction for implementation of different strategies to improve urban environment.

Social Security and Protection:

Implementation of different strategies to ensure the rights of the citizens, quality health and sanitation services, minimum shelters for all including access to services and utilities, quality education, creating social safety net, women's advancement and rights, and implementation of rights for children and special services for children, aged and people requiring special assistance.

Environment and Natural Resource Management:

Provide guidance to ensure environmental protection for humans, ecosystems and resources which promotes conservation, augmentation and efficient utilization of the natural resources.

To perform the above responsibilities and conducting evaluative studies/results based monitoring, if desired by the SDMC; appropriate programmes with budgetary support may be developed.

9.5 Sustainable Development Board (SDB)

It has been suggested that the Sustainable Development Monitoring Council (SDMC) will need technical advice from a small professional expert group. This body may be headed by the Cabinet Secretary and named "Sustainable Development Board (SDB)". The suggested composition of the Sustainable Development Board is given in Table 9.2.

9.6 Terms of Reference of Sustainable Development Board

The Sustainable Development Board will review the implementation status of the decisions of the SDMC and provide a report to the SDMC before its meeting. It will provide technical advice to the SDMC in implementing and monitoring strategic priority areas identified in the National Sustainable Development Strategy and suggest interim modification of the SD strategy for Bangladesh.

The Ministry of Environment and Forest will provide the secretarial support to the Board and the Board may co-opt any other organization/expert as member of the Board if necessary. The Board will sit four times in a year.

Table 9.2 Composition of the Sustainable Development Board (SDB)

Sl. No.	Designation & Organization	Position
1	Cabinet Secretary, Cabinet Division	Chairperson
2	Member, General Economics Division	Member
3	Secretary, Ministry of Environment and Forests	Member
4	Director General, Department of Environment	Member
5	Representative, Finance Division	Member
6	Representative, Ministry of Land	Member
7	Representative, Planning Division	Member
8	Representative, Ministry of Agriculture	Member
9	Representative, Ministry of Food and Disaster Management	Member
10	Representative, Ministry of Fisheries and Livestock	Member
11	Representative, Ministry of Water Resources	Member
12	Representative, Ministry of Energy and Mineral Resources	Member
13	Representative, Ministry of Industry	Member
14	Chief Conservator of Forests, Forest Department	Member
15	Specialist from Department of Agriculture Extension	Member
16	Specialist from Bangladesh Agriculture Research Council	Member
17	Specialist from Water Resources Planning Organization	Member
18	Specialist from Bangladesh Meteorological Department	Member

9.7 Institutional Support to Sustainable Development Monitoring Council

The Sustainable Development Monitoring Council will provide overall guidance, ensure implementation and monitoring NSDS and therefore there is a need for supporting institution to carryout instructions and follow up with relevant ministries, departments and agencies. The General Economics Division will be provided with adequate staff and logistics to provide the required secretarial support to the Council.

9.8 Monitoring Indicators for Sustainable Development

United Nations Commission on Sustainable Development has recommended a core set of 50 indicators. These core indicators are part of a larger set of 96 indicators of sustainable development. The Millennium Development Goals indicators consist of 48 indicators linked to the eight goals derived from the United Nations Millennium Declaration. The General Economics Division of the Planning Commission has formulated a comprehensive result based framework for monitoring the progress of the targets set in the 6th Five Year Plan.

After reviewing these indicators, a simplified set of indicators are being proposed as follows (Table 9.3), for monitoring the progress of the country towards reaching the path of sustainable development by 2021. The list is indicative and can be modified; it will also need to set benchmarks and targets in order to be able to assess progress of NSDS.

Table 9.3: List of indicators for monitoring sustainable development of Bangladesh for the period of 2010-2021

Theme	Target (2021)	Indicator
Socio-economic		
Income	Bangladesh becomes a middle income country	Per capita GDP
Inequality	Income inequality decreases	Gini coefficient
Poverty	Poverty is halved from current level	% of population below poverty line
Food security	Bangladesh becomes self sufficient in cereal production	Total production of rice, wheat, and maize
Energy security	Bangladesh produces 20,000 MW of electricity with 10% of generation coming from renewable sources	Electricity generation capacity; Mix of renewable/non-renewable sources
Transport	East-West road and rail connection is completed through construction of two bridges on the Padma Mass Rapid Transit introduced in major cities	Progress in construction of the bridges Metro rail, LRT and BRT are in operation
Water supply and sanitation	Entire population has access to pure drinking water and hygienic sanitation	% of population with access to pure drinking water and hygienic sanitation
Gender	Gender parity achieved in education, health, and nutrition	Enrolment and completion ratio
Social protection	Increase social protection	- Government expenditure on social protection as proportion of GDP - Percentage of poor people covered
Environment		
Industrial pollution control	Install and operate effluent treatment plants (ETP) and emission control device in all industries by 2015. Achieve zero effluent discharge and emission reductions in all	% of industries with ETP and Emission Control Device

	industries by 2021.	
Water quality	All the rivers attain the water quality standards of DoE	Dissolved Oxygen
Air quality	Air quality in all urban areas meet the National Ambient Air Quality standards	Suspended particulate matters
Forest	Forest coverage increase to 25% of land area	Forested area with at least 70% canopy coverage
Bio-diversity	Terrestrial and marine protected area doubles	Declared terrestrial and marine protected area
River-floodplain ecosystem	The link between all rivers and their floodplains are re-established	Fish production and fish diversity in rivers and floodplain
Disaster and climate change risk reduction	Bangladesh will be less vulnerable to disasters and climate change	- % of Upazila Parish ads/ Union Parish ads consulting Community Risk Assessment (CRA) and Risk Reduction Action Plan (RRAP) for preparation and implementation of development activities - Number and percentage of usable cyclone shelters

The SDMC is the apex body to provide a balanced and impartial assessment of the progress towards targets and causes of lack of progress with appropriate guidance for performance improvement. The information on monitoring indicators will come from MOEF and other concerned Ministries and their departments and agencies. An institutional mechanism will have to be established for data generation, collection and collation. An institutional mechanism for monitoring and evaluation of the 6th Five Year Plan is being established by GED, Planning Commission. Without duplication of efforts the same institutional arrangements can be used for monitoring NSDS. In fact once firmly established with adequate capacity the same institutional arrangement can carry out monitoring and evaluation of any national development plan and strategies.

9.9 Summary

Apart from the existing government institutions for planning, budgeting, implementations, and implementation monitoring two new institutions need to be created for implementation and monitoring progress of the NSDS. It will facilitate keeping coherence between and among different strategic priority areas and sectors as well as existing national and sectoral policies during implementation of the strategy and monitoring progress. Sustainable Development Monitoring Council (SDMC) will be comprised of Honourable Minister of Environment and Forest, Member of Parliament, Secretaries of concerned ministries, head of relevant government departments and agencies, civil society representatives, and private sector representatives as members. The Honourable Minister of Planning will be Chairperson of the council which will ensure sustainable development of the country with special focus on effective implementation and monitoring progress of different elements of the NSDS. The

Council will also review the obligations and commitments under the different Multilateral Environmental Agreements (MEAs) including United Nations Conferences on Sustainable Development (UNCSD).

The Sustainable Development Board with the Cabinet Secretary as the Chairperson of the board will be created to review the implementation status of the decisions of the SDMC and provide a report to the SDMC before its meeting. The Ministry of Environment and Forest will provide secretarial service to SDB. SDB will provide technical advice to the SDMC in implementing and monitoring strategic priority areas identified in the National Sustainable Development Strategy and will suggest interim modification of the SD strategy for Bangladesh. The General Economics Division of the Planning Commission will carry out the monitoring function as part of its overall monitoring of results of development plan.

9.10 The Way Forward

The strategies of national sustainable development will be implemented by concerned ministries/divisions and their agencies through programmes and projects as well as routine activities. This will require adjustments to on-going programmes and projects or undertaking new programmes/projects for the remaining period of the 6th Five Year Plan. The major burden of implementing the strategies will, however, fall on the 7th Five Year Plan which will start in FY2016 and end in FY20. The policies and strategies of the 7th Plan will reflect the strategies of NSDS and will thus act as vehicle for implementing the strategies.