BANGLADESH
NATIONAL CONSERVATION STRATEGY

INSTITUTIONAL FRAMEWORK FOR NCS IMPLEMENTATION

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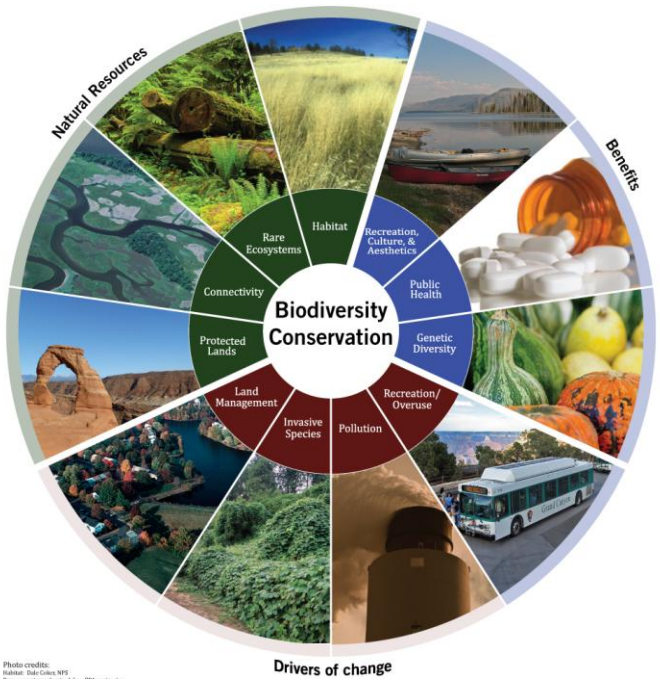
1 INTRODUCTION

1.1 GENERAL

A natural resource is anything that comes from the nature and we can use them. We can't make natural resource, but can manage collect, conserve and modify them in ways that are beneficial to use. In practical, natural resources are useful raw materials that we get from the earth. The human being and all other lives are dependent on this natural resource. As the world population as well as in the techniques and gears to extract natural resources are going up, the pressure on natural resource are also getting increased. Pressure on some natural resource needs conservation activities as the increased pressure has been decreasing the replenishing capacity of some natural resources like land, water, forest, fishing and the like. Our demand for a comfortable life has also increased the extraction of natural raw materials or resources for industrial production. Alongside the extraction of natural resources for industrial use, the discharge of industrial wastes and effluents as well as some human activities are contributing either to pollute the environment or degrade the environment. Climate change as a result of excessive anthropogenic emission of some green house gases are creating extra threats for the environment and natural resources. Climate change exerts direct pressure on biodiversity and other abiotic natural resources.



In this context, conservation of natural resources has become the most prime need for our survival. We have borrowed this mother earth with natural resources from our ancestors and we have to hand over the same with a favorable situation to our descendants. Education, public awareness, technological development, recycling of wastes, development of alternatives and improving efficiency in all natural resources management can effectively contribute to conserve the natural resources. But they need effective and productive legal as well as institutional framework for developing and running formal organizations, enacting laws, rules and guidelines, improving service delivery, developing regulatory and enforcement bodies, involving formal, informal and private sectors, developing and strengthening local authorities, involving civil society organizations, non-government organizations and community based organizations.

2 INSTITUTIONAL FRAMEWORK

The institutional framework that are in place and to be needed in future to implement the natural resource conservation efforts for some major sectors in this country in brief, are as follows:

2.1 ECOSYSTEM AND BIODIVERSITY

Background

The conservation of Biodiversity (CBD) defines an ecosystem as a `dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit`. Ecosystem is the living thing (plant, animals and microorganism) in an area with their interaction with each other the as well as interaction with the nonliving environments like weather, soil, climate and atmosphere. As Bangladesh lies in between the Tropic of Cancer and Tropic of Capricorn and the per capita water availability in Bangladesh is more than three times than that of the world average, Bangladesh is very rich is ecosystems and biodiversity.

Ecosystem is very complex and sensitive for its wonderful interaction of living things and their environment. Any change of living things or external factors like temperature rise can cause serious damage to ecosystems. The biotic members of an ecosystem, together with their abiotic factors depend on each other. Therefore, the absence of one biotic member or one abiotic factor can affect all partners of the ecosystem. Natural calamities like cyclone, flood, and storms also affect the ecosystem seriously. The biodiversity of all flora and fauna including the microorganisms depend on this ecosystem.

Policy and Institutional Framework

Ecosystem and biodiversity are directly linked as well as dependant on each other. Conservation of ecosystem improves biodiversity and degradation of biodiversity affects the ecosystem directly. As a signatory to Convention of Biodiversity (CBD), Bangladesh is committed to develop necessary policies, legal and regulatory framework to conserve biodiversity as per the provisions of the convention. Bangladesh ratified this convention in 1994. The conservation efforts started in this land with the enactment of Forest Act, 1927. The then East Pakistan Government created 'The East Pakistan Water Pollution Control Ordinance, 1970`to control water pollution. Before that some provisions of Penal Code, 1860 was the only legal and regulatory base, though inadequate, for natural resource conservation. The efforts further enhanced its coverage with the enactment of 'The Environment Pollution Control Ordinance, 1977'. Enactment of Brick Kiln (Control) Act, 1985 and the Brick Kiln (Control) Rules, 1981 have some contributions to control pollution and conserve forest which ultimately improved the status of top soil, forest ecosystem and biodiversity management. The Environment Conservation Act, 1995 mainly played the pivotal role in conserving the ecosystem, forest, biodiversity and other component of environment. The Environment Conservation Act 1995 with its amendment in 2000, 2002

created the opportunity to promulgate different rules to conserve ecosystem, biodiversity and total environment in this land. The biodiversity conservation efforts got an accelerated momentum with the formulation of National Biodiversity Strategy and Action Plan in 2004. The Conference Parties of CBD in its 6th meeting (Cop-6) adapted the Biodiversity Target 2010 for promoting biodiversity of this earth. The World Summit on Sustainable Development (WSSD) held in Johanesburg, South Africa in 2002, described biodiversity as essential to our planet, human well being and to the livelihood and cultural integrity of people. It endorsed the 2010 Biodiversity target for sustainable development and poverty alleviation. In this context, Bangladesh developed its National Biodiversity Strategy and Action plan in 2004 to achier significant reduction of current rate of biodiversity loss by 2010. Accordingly, Bangladesh prepared and submitted the 4th National report in 2010 stating the status of Biodiversity, target as well as achievement. The 10th Conference of Parties to the Convention on Biological Diversity (CBD) held in Aichi, Japan, in 2010 recognizing the need for biodiversity promotion, adopted the Strategic Plan for Biodiversity 2011-2020 with 20 Aichi Biodiversity Targets. Bangladesh has prepared and submitted the 5th National Report describing the status, actions, achievements and program to reach the target.

In practical, management of ecosystem and biodiversity is related to different legal and institutional arrangements associated with the ecosystem and biodiversity of forests, agriculture, inland water, wetland, marine, coastal, hill, homestead and the like administered by different Ministries and Departments. Climate change has started affecting the ecosystems and biodiversity as a whole. Bangladesh is a signatory to the United Nations Framework Convention on Climatic Change (UNFCCC) and its Kyoto Protocol, the Convention on Biological Diversity the United Nation Convention to Combat Desertification, Viena Convention for the Protection of the Ozone Layer and its Montreal Protocol, the Ramser Convention on Wetland and other international agreements. To face the consequence of climate change through mainly mitigation and adaptation activates, Bangladesh has developed Bangladesh Climate Change Strategy and Action Plan, 2009 and enacted Climate Change Trans Fund Act, 2010. Development of Climate Change Trust Fund and regular budgetary allocation from own recourses earned acclamation in the international community. The international community also contributed to develop Climate Change Resilience Fund administered by the World Bank to improve resilience capacity and face the consequences of climate change.

Bio-safety issues have come up as an important dimension for conservation of biodiversity as well ecosystem. In this context, Bangladesh developed Bio-safety Guidelines in 2007 promulgated and Bio-safety Rules in 2012. The major legal and regulatory instruments that contribute to conservation of biodiversity and ecosystems are as follows:

- The Forest Act, 1927
- The Environment Conservation Act, 1995.
- The Environment Conservation Rules, 1995.
- The Ozone Depleting Substance (control) Rules 2004.
- Hazard Waste and Ship Breaking Waste Management Rules, 2011.
- Brick Kiln Control Act, 2001.
- Brick Kiln Control Rules, 2001.

Water Pollution Control Board was the first institutional arrangement to control water pollution, which had a direct contribution for conservation of ecosystems and biodiversity. The dimensions of this initiative have been widened establishing Environment Pollution Control Board and then Department of Environment in 1995. Forest Department is the oldest institutional arrangement in this land to conserve forest as well as forest biodiversity including wildlife. The Water Development Board and Bangladesh Inland Water transport Authority work for inland water conversation and maintain environment flow. The land management run by the Ministry of land through District Administration and land offices have also significant role to conserve the land, water bodies and forest, which are the major components ecosystems and biodiversity. The Department of Fisheries with its organizational resources contributes to increase fisheries production and conserve the fisheries diversity. Different R&D organizations like Bangladesh Forest Research Institute (BFRI), Bangladesh Livestock Research institute (BLRI), Bangladesh Fishery Research institute (BFRI), Institute of Water Modeling, Centre for Environment and Geographical Informal Service (CEGIS) also play important role to conserve and promote ecosystems and biodiversity. R&D initiatives of different public and private Universities need also to be mentioned are this respect. IUCN Bangladesh, UNDP Dhaka, GIZ, water aid, USAID and some international organizations either take initiatives or support the local initiatives significantly to conserve ecosystem and biodiversity. The participation of some environmental and wildlife NGOs, Civil Society Organizations and participation of community people through co-management and cooperatives are also contributing to conserve ecosystem and biodiversity in this land.

Strength

- The legal and regulatory instruments relating to ecosystem and bio diversity conservation are not inadequate. Moreover, the instruments have been updated and amended to improve the situation;
- Organizational set up of respective organizations are available up to the grass- root level;
- Payment for ecosystem service (PES) Program is being implemented to ensure and strengthen community participation through social forestry, co-management, Jatka conservation and the like;
- Development of alternative livelihoods for ecosystem and Common Pool Resource (CPR) dependent people is in practice in major rural development initiatives;
- Documentation of flora and fauna by developing Encyclopedia of Flora and Fauna of Bangladesh;
- Development of Environment Award, Tree plantation Award, and wildlife conservation Award for controlling pollution and promoting the tree plantation, wildlife, ecosystem as well as environment.

Challenge

- Inadequate coordination among the respective Ministries and Department for ecosystem and biodiversity conservation;
- Conflicts in policies as well as among some departments relating to management of forest, water bodies, land management, irrigation, fisheries are prominent;

- Inadequate survey for documentation of flora and fauna with primary data throughout the country;
- Increased incidence of natural disaster due to climate change;
- Enactment of Biological diversity Act is still under process;
- Status of declared Ecologically Critical Area (ECA) has not been improved;
- Topsoil damage and other activities relating to ecosystem and biodiversity loss are also exist;

Institutional need for conservation

- Biological diversity Act and related Rules need to be enacted.
- Institutional as well as regulatory needs to ensure and strengthen community protection should be addressed.
- The coverage and support relating to payment for Ecosystem service needs to increased to minimize the dependence of the community on biological recourses.
- Documentation of all flora and fauna needs to be done for developing a sui-generis system to meet the IRR laws including TRIPS.
- Development community Biodiversity Registry to strengthen biodiversity conservation through community participation.
- Promotion of ecosystem-based approach in all sectors with potential impacts on biodiversity and ecosystem, as well as inter-sectoral integration.
- Development of institutional and regulatory needs for an integrated management approach to minimize conflicts in policies as well as among department for sustainable management of land, water, forest and other biodiversity.

2.2 FOREST MANAGEMENT

Background

Forests cover about 30 percent of the Earth's surface and in addition to providing food security and shelter, forests play a significant role to developing livelihoods, combating climate change, conserving biodiversity, producing timber and other minor forest goods, working as a natural barrier against the devastation of cyclone, storm as well tidal upsurge and the homes of indigenous people.

The institutional forest management efforts in this land date back to 1840, when the British Colonial Administration promulgated 'Crown Land (Encroachment) Ordinance'. This Ordinance vested all forests, water, unoccupied and uncultivated land to the Crown. The Imperial Forest Department was established is 1864 and after one year the 'Indian forest Act 1865' was enacted. The initiative of sustainable forest conservation was almost absent in the Ordinance. Rather, the forests was considered and recognized as an important source of revenue generation and natural resource of extraction. After the British Rule, East Pakistan Forest Service was created comprising of East Pakistan Senior Forest Service and East Pakistan Subordinate Forest Service. This institutional arrangement inherited the responsibility of forest management from the Imperial Forest Department. The Senior Forest Service has been renamed as Bangladesh Civil Service (Forest) under the Bangladesh Civil Service Cadre Rules 1980. The Forest Department has been managing 2.14 million hectare public forests and conducts different promotional activities to conserve, improve and increase the public and village forest (0.27 million hectare). The area of the public forest and village forest is about 16% of the total land surface. Though this area also includes denuded forestland and encroached land. The forestland has been classified into hill forests, unclassified state forest (USF), deciduous Sal forest, mangrove forest, coastal forest, and village forest. The status of this forest area is shown as under:

Forest Type	Location	Area in million hectare (% of total area)	Remark
Mangrove **Natural Plantation**	South-west Coastline	0.60 (4.07) 0.13 (0.88)	
Hill forest **USF**	Eastern Part of Chittagong Hill Tracts	0.67 (4.54) 0.73 (5.0)	Denuded forest and forest is under pressure
Plain Land Sal forest	Central and north-west region	0.12 (0.81)	
Village Forest	Homestead forest throughout the country	0.27 (1.83)	

With the growth of population size, the practice of forest depletion or deforestation of natural forest has increased till 1990-1995. The deforestation rate has reached to near 1%, which is much higher than the rate in South Asia (0.6%). This higher rate of deforestation happened due to population density and more dependence a huge number of people on forest resource. For this reason the per capita forest land availability in this country went

down to 0.022 hectares, which is one of the lowest rates in the world. The forestland was being managed by classifying and conserving the forest land as reserve forest, protected area, wild life sanctuary and game reserve. With a view to improving the situation the Government started introducing participatory and social forestry, conducting road side plantation, declaring more national parks, protected areas and eco-parks and implementing many programs and projects to improve the situation and strengthen the conservation efforts.

Policy and Institutional Framework

The British Government started institutional forest management in 1855 after the declaration of 'Charter' of Indian Forest'. The first Forest Act was enact in 1878, which was largely revised in 1927. The first Forest Policy in this land was promulgated in 1894 and later amended in 1955. There was a practice of private forest management but the management was not systematic. The Private Forest Act, 1945 was enacted to develop a systematic private forest management. With the enactment of State Acquisition and Tenancy Act, 1950 the private forest and all other private owned common property were vested to the Government. But the process of felling trees for revenue generation was not stopped. The Pakistan Government declared its first Forest Policy in 1955 with almost all the provision of the British Colonial Forest Policy. The Policy was revised in 1962 with some modifications for forest conservation.

After the liberation in 1971, a total ban was imposed on felling the trees from natural forests. The first Forest Policy of Bangladesh was promulgated in a 2-page statement in 1979 focusing of expansion of forest and scientific management. The detailed Forest Policy was promulgated in 1994. As participatory system in forest management with the local forest dependant people has got momentum in different countries, a new dimension of participatory forestry known as social forestry has come up for forest management in Bangladesh. The Forest Act, 1927 was therefore, amended in 2002 to accommodation social forestry under legal cover. The Forestry Sector Master Plan was developed to improve the deteriorating status of natural forests. Forest management is deeply related to the land related policies. The Land Use Policy has been promulgated in 2001, which supports the forest conservation. But the existence of provisions in other land related laws and land reform decisions; conversion of forestland for agriculture, industry and development of fisheries has been continued with a slow pace. Lack of coordination among the related Departments was and also now is in place. The differences and conflicts in mainly the land, agriculture, industry and related policies and lack of coordination among the respective Departments contributed to accelerate the deforestation pace in some areas. The deforestation and destruction of Chokoria Sudarbans, one of the major mangrove forests was the result of such differences in respective policies and lack of coordination among the Departments. The major laws and rules that are enacted and promulgated for conservation of forests are as follows:

- The Forest Conservation Act, 1927
- The National Forest Policy, 1994
- The Forest Conservation Rules
- The Atia Forest Production Ordinance, 1982
- The Brick Kiln (control) Act, 2013

- Social Forest Rules, 2004
- The Wild Life (Preservation and Conservation) Act, 2010
- Forest Goods Transportation (Control) Rules, 2011
- Sundarban Tourism Rules
- Agor Tree Sale Rules, 2010
- Compensation Guidelines for Casualties Caused by Wild life, 2010.
- Compensation Guidelines for Casualties to Community Forest Worker, 2010.
- Bangabondhu Award for Wild Life Conservation Guidelines, 2010.

Bangladesh is a signatory to CBD as well as most of the Multilateral Environment Agreements and forest promotional agreements. The provisions of those Conventions and Agreements and its compliance also contributed to promote forest conservation.

The Co-management practice in protected area forest conservation has become a new and effective dimension in forest conservation. Guidelines and cooperative by-laws have been developed to promote forest conservation to institutionalize this conception of co-management and cooperatives. Forest conservation cooperatives in Madhupur Sal forest and other forest areas have been surfacing as a potential method of forest conservation. Other innovative and institutional interventions like tree plantation fair from national to grass-root level, Tree plantation Award, Environment Award, Wild life Award played a significant role in forest conservation and promotion.

Forest Department has stretched its activities in every area of the country. Under the Forestry Sector project, forest nurseries have been developed in every Upazila with necessary manpower. Thousands of forest nurseries have been developed with the support and guidance of Forest Department. With the participation of all sorts of people, tahe tree plantation program has become a movement throughout the century. Development of Green Belt on the costal embankments has improved the resilience capacity of the coastal community. Development of Safari Parks, Botanical Gardens, Eco-parks and other promotional establishments have created the opportunity to provide education, create awareness and facilitate research activities.

Strength

- Forest Department is equipped with sufficient office and manpower in the forest divisions, range and beat offices.
- Bangladesh Forest Academy in association with the Chittagong University contributes to develop potential human resource for forest management.
- Bangladesh Forest School under the Bangladesh Technical Education Board also contributes to develop human resource and skilled manpower.
- The Bangladesh Forest Research Institute (BFRI) and different universities do different R&D initiatives on forest management.
- Participatory or Social Forestry covering roadside plantation, wood lot plantation, agro-forestry have become an effective method of forest conversation and poverty alleviation.
- Co-management in protected areas and forest conversation cooperatives are gaining momentum to popularize and promote afforestation and conservation through community participation.

- Provisions and compliance of the provisions of CBD and other Multilateral Environment and Forest Conservation Agreements have direct as well as indirect effect for forest conservation.
- Development of nurseries in every Upazila by the Forest Development and providing guidance and support to develop thousands of nurseries in the private sector have created scope to supply different species of plants at a very lower cost.
- Efforts and declaration of wildlife sanctuaries, reserve forests, national parks, eco-parks, botanical garden, Safari park have significantly increased overtime.
- Tree plantation fair from national to local level, tree plantation award, wildlife award, environment award and other innovative approaches have popularized the tree plantation program as a movement, popularized and strengthened the forest and wildlife conservation initiatives.

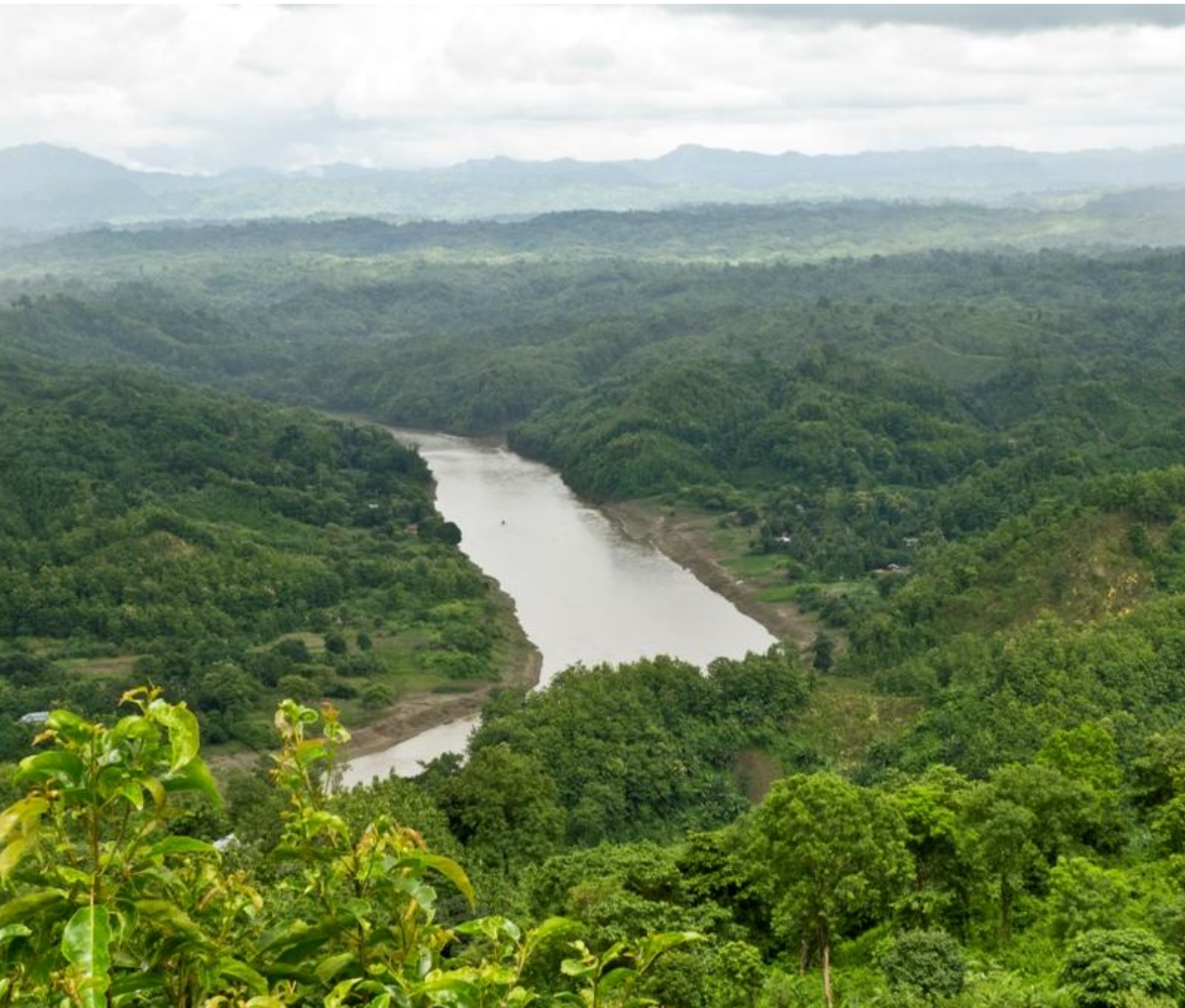
Challenges

- Bangladesh is a land hungry country and therefore, there exist always a pressure on forestland for deforestation.
- Population density is the highest in the word and their dependency on the forest goods never decreases.
- The processes of declaring reserve forest are very slow and this delayed process helps the illegal occupants to deforest and occupy the forestland.
- A huge forest area is in the Chittagong Hill tracts known as the Unclassified State Forest (USF) administrated by the District Administration have a very low tree cover.
- There also exists a significant denuded forest land controlled by the F
- Forest Department.
- The contribution of Bangladesh Forest Research Institute (BFFI) relating to R&D activities is not adequate.
- The budget allocated for forest management is not sufficient.
- Organized but illicit tree felling has been continuing still under legal coverage named *Jote* Permit in the Chittagong Hill tracts.

Institutional Needs for Conservation

- The process of declaration of Reserve Forest needs to be simplified and time-bound.
- Community participation through social forestry, co-management and forest conservation cooperatives for conservation of forest and wildlife need to be extended and strengthened.
- The Payment for Ecosystem Service (PES) model should be extended for all categories forest dependent people.
- Special program needs to conduct to bring tree cover to all USF lands with the participation of community people.
- Enactment of special law to conserve the Common Pool Resource (CPR) with strong provisions for conservation and enforcement.
- The Forest Act and other forest related laws needs to be appraised and updated regularly.
- The denuded forest area and the forest with less tree cover in the protected area, game reserve, reserve forests under the Forest Department need to be afforested with the native plants.

- The system of *Jote* Permit to fell and transport trees in the Chittagong Hill Districts need to be reviewed.
- The budget allocation for forest and wildlife needs to significantly improved.
- The institutional arrangement for social forestry needs to be extended and strengthened.
- The Bangladesh Forest Research Institute needs to be strengthened for conducting diversified R & D efforts for forest conservation.
- Capacity of the forest Department needs to be improved with sufficient manpower, equipment and training program.



2.3 WATER MANAGEMENT

Background

Bangladesh is located at the lower riparian part of the Ganga, Brahmaputra and Meghna Basin popularly known as GBM Basin. For this location benefit, per capita water availability in this land is more than three times higher than that of the world average. Availability here of water mainly depends on the flow of the Trans-boundary Rivers and amount of rainfall round the year. In the monsoon, more supply of water causes floods and in the dry season water flow goes down creating water scarcity.

The key role of water can be attributed to agriculture, fishery, livestock, and domestic use. With the pace of development, water for industrialization, electricity generation and the like have also come up. Surface water and ground water are the two sources of water in Bangladesh. The source of surface water are rainfall, trans-boundary water flow and water in the reservoir and water bodies like river, canal, lake, pond, wetland, haor, baor, beel and the huge floods plains which become seasonal wetland during the rainy season. The main source of ground water is the recharge of aquifer from the surface water. The landmass of this country has been developed through sedimentary alluvial and deltaic deposits over thousands of years. This process of deposition has formed the aquifer, which acts as the ground water reservoir. During the rainy season surface water is more than the adequate. This causes monsoon floods and flash floods frequently. Floods due to tidal upsurge in coastal area and floods for insufficient drainage system are also common during the other times. But in the dry season, Bangladesh suffers from surface water shortage and the ground water table also goes down due to over extraction and inadequate recharge.
Ground water is being used mainly for irrigation and domestic use. It is the main source of drinking water. Ground water table can be found from zero to 20 meters in most of the areas. It is difficult to extract ground water from the rocky layer in hill areas. Arsenic continuation, salinity and downward trend of ground water table for inadequate recharge have become a serious problem in extracting and using ground water in recent years.

Policy and Institutional Framework

Interventions as well as public investments in water management in this land dates back to hundreds of years. In the Pre-British period, the Kings, Queens and even the *Jaminders* used to dig big ponds called *dighis* to supply water for dirking, irrigation and controlling floods. The existence of such *dighis* and even myths like '*Kamala Ranir Deghi*' can be found in many parts of the country. During the British Colonial Rule some significant activities relating policy and regulation relating water were taken. The then Pakistan Government took the first institutional arrangement for water management separately by establishing East Pakistan Water and Power Development Board Authority (EPWAPDA) in 1959 as per the recommendation of Krug Mission of the United Nations to control flood. The EPWAPDA with the Support USAID developed a 20-year Water Master Plan in 1964. The British Government enacted and promulgated different laws relating to land having some provision of water management. They enacted some specific laws like the canals Act (1864), the Irrigation Act (1876) and the Tanks improvement Act (1939) to facilitate irrigation and domestic water supply. The EPWAPDA Master Plan mainly focused on flood control by developing embankments or polders and facilitating irrigation activities in order to address the food security and control the flood. The institutional and regulatory framework mainly focused

on irrigation and drainage system. Therefore, construction of embankments or polders, sluice gates, dams and drainage canals involved mainly the civil engineers. Thus, the initiatives were mostly based on structural engineering ignoring other social and non-structural solutions.

After the historic liberation in 1971, Bangladesh Water Development Board has been formed which inherited the manpower, system and structural engineering focused solutions for water management. In this context, the International Bank for Reconstruction and Development (IBRD) submitted a study report entitled `Land and Water Sector Study' following the recommendation of a study conducted to find out the efficiency of previous investments in the water sector. The practice of using low lift pumps (LLP) and tube-wells (TW) and small-scale flood control actives entered into the system as per the said recommendations. In 1972 the Indians Govt. started constructing the *Farakka* Barrage on the Ganges at about 20 km upstream from the Bangladesh border to divert the water flow to Hoogly-Bhagirathi River for improving the navigability of Kolkata Port. The withdrawal of water with this barrage severely affected the water flow in Padma. The barrage was commissioned in 1975. The usual flow of Ganges water down to *Farakka* before 1975 was recorded between 65000 to 70000 cusecs at Harding Bridge Point. India planned to divert 40000 cusecs of water towards Bhagirathi by this barrage. But before the commissioning of the *Farakka* Barrage, the Heads of Government of Bangladesh and India came to an understanding and signed a Joint Indo-Bangladesh Declaration on May 1974. According to that understanding, India started withdrawing water between the ranges from 11000 to 16000 cusecs. It had the provision to ensure a minimum flow of 44000 cusec of water down to *Farakka*. After the expiry of the first agreement, Bangladesh signed the second water sharing agreement with India for 5 years in 1977. The second agreement provided the provisions to ensure a minimum flow of 34500 cusecs down to *Farakka*. The 1977 agreement expired in 1982. In between 1982 to 1988, two subsequent Memorandums of Understandings were signed with India on water sharing. There was no effective water sharing agreement with India in between 1989 to 1996. In 1996 the then Government signed a historic water sharing agreement with India effective for 30 years.

The growing need for water management and improving water efficiency created a demand for developing a National Water Plan (NWP) and therefore, a Master Plan Organization (MPO) was created in 1988. The MPO after several studies and efforts developed a draft Water Code and a plan for institutionalizing the processes of planning and development of water resource. Accordingly, the MPO has been institutionalized as Water Resource Planning Organization (WARPO) in 1991 to strengthen and continue the water management activities. In the meantime, due to the incidence of severe flood in 1987 and 1988 that caused huge infrastructural damage, loss of lives, damage of standing crops, the Government with the support of the development partners started developing a Flood Action Plan (FAP) in 1989. In 1995 the FAP final report was surfaced as 'Bangladesh Water and Flood Management Strategy (BWFMS). This BWFMS brought, along with other programs, a new dimension of water management through community participation. It also brought in Environmental Impact Assessment in the planning process. The community-based water management has come up following the success of the Community-Based National Resource Management (CBNRM). This concept of community participation in water management attracted Local Govt Engineering Department (LGED) alongside BWDB to form

water conservation cooperatives and other non-formal groups for water management. A Guideline styled 'Guideline for Participatory Water Management' was developed in 2000 to ensure community participation in water management decisions. With a view to supporting the BWFMS Report, the Government started developing National Water Management Plan (NWMP) and National Water Policy and accordingly, the first Water Policy of Bangladesh was promulgated in 1999.

The Rules of Business empowered different Ministries to do their respective jobs effectively. But the water related clauses in the Rules of Business involved different Ministries and Divisions. Some of those clauses are as follows:

a) Ministry of Agriculture: Clause 12 & 14
b) Ministry of Land: Clause 1 & 11
c) Ministry of Fisheries & Livestock: Clause No. 1 to 9, 23, 24, 25, 29 and 30.
d) Local Govt. Division. Ministry of Local Government, Rural Development & Cooperatives: Clause 6, 7(a), 7(b), 7(c) and 8.
e) Ministry of Health and Family Welfare: Clause 9(b) and 9(f)
f) Ministry of Environment and Forest: Clause No- 1, 2 and 11.
g) Ministry of Shipping: Clause- 1 to 20.
h) Ministry of Water Resource: Clause- 1 to 19.

Following the water related clauses in the Rules of Business; different Ministries framed some Polices, Plans, Acts, Laws and Guide Lines. Some of those Polices and Laws are as follows:

Ministry of Environment and Forest

i. The Environment Policy, 1992
ii. The Water Master Plan in 1964.
iii. The Forest Policy
iv. The National Forestry Plan, 1994
v. The Environment conservation Act, 1995
vi. The Environment Conservation Rules, 1997
vii. The Wildlife Preservation Act, 2010.

The Ministry of Fisheries and Livestock

i. The Livestock Development Policy, 1992
ii. The National Fisheries Policy, 1998
iii. The Protection and Conservation of Fish Act, 1982
iv. The Marine Fisheries Ordinance, 1983

Ministry of Civil Aviation and Tourism

i. National Tourism Policy, 1992

Energy Division, Ministry of Power and Energy

i. The National Energy Policy- 1996

Local Govt. Division, Ministry LGRD and Cooperatives

i. The Water Supply and Sewerage Authority Act, 1996

ii. The National Policy for Safe Drinking Water Supply and Sanitation- 1998
iii. The City Public Lands Protection Act, 2000
iv. The National Arsenic Mitigation Policy, 2004

Ministry of Water Resources

i. The Canals Act, 1864
ii. The Irrigation Act, 1876
iii. The Embankment and Drainage Act, 1952
iv. The Water Sector Master Plan, 1964
v. The National Water Plan, 1986
vi. The National Water Policy, 1999
vii. The National Water Management Plan, 2001
viii. The River Research Institute Act, 1990
ix. The Water Resources Panning Act, 1992
x. The Integrated Coastal Zone Management Act, 2005
xi. The Bangladesh Water Development Board Act, 2000

Ministry of Agriculture

i. The National Agriculture Policy, 1999
ii. The Ground Water Management Ordinance, 1985

Ministry of Industries

i. The National Industrial Policy, 2000

Ministry of Shipping

i. The National Shipping Policy 2000
ii. The Port Act, 1908
iii. The Inland Water Transport Authority Ordinance, 1958
iv. The Territorial Waters and Marine Zone Act, 1974.

The organizations that are now associated with the management of water are as follows:

- Water Resource Planning Organization (WARPO)
- Bangladesh Water Development Board
- Bangladesh Haor and Wetland Development Board
- River Research Institute
- Joint Rivers Commission
- Bangladesh Inland Water Transport Authority
- Bangladesh Agriculture Development Corporation
- Barind Multipurpose Development Authority
- Water and Sewerage Authority
- Local Govt. Engineering Department
- Department of Public Heath Engineering
- Department of Fisheries
- Department of Environment

Strength

- Strong network with sufficient manpower for management of water

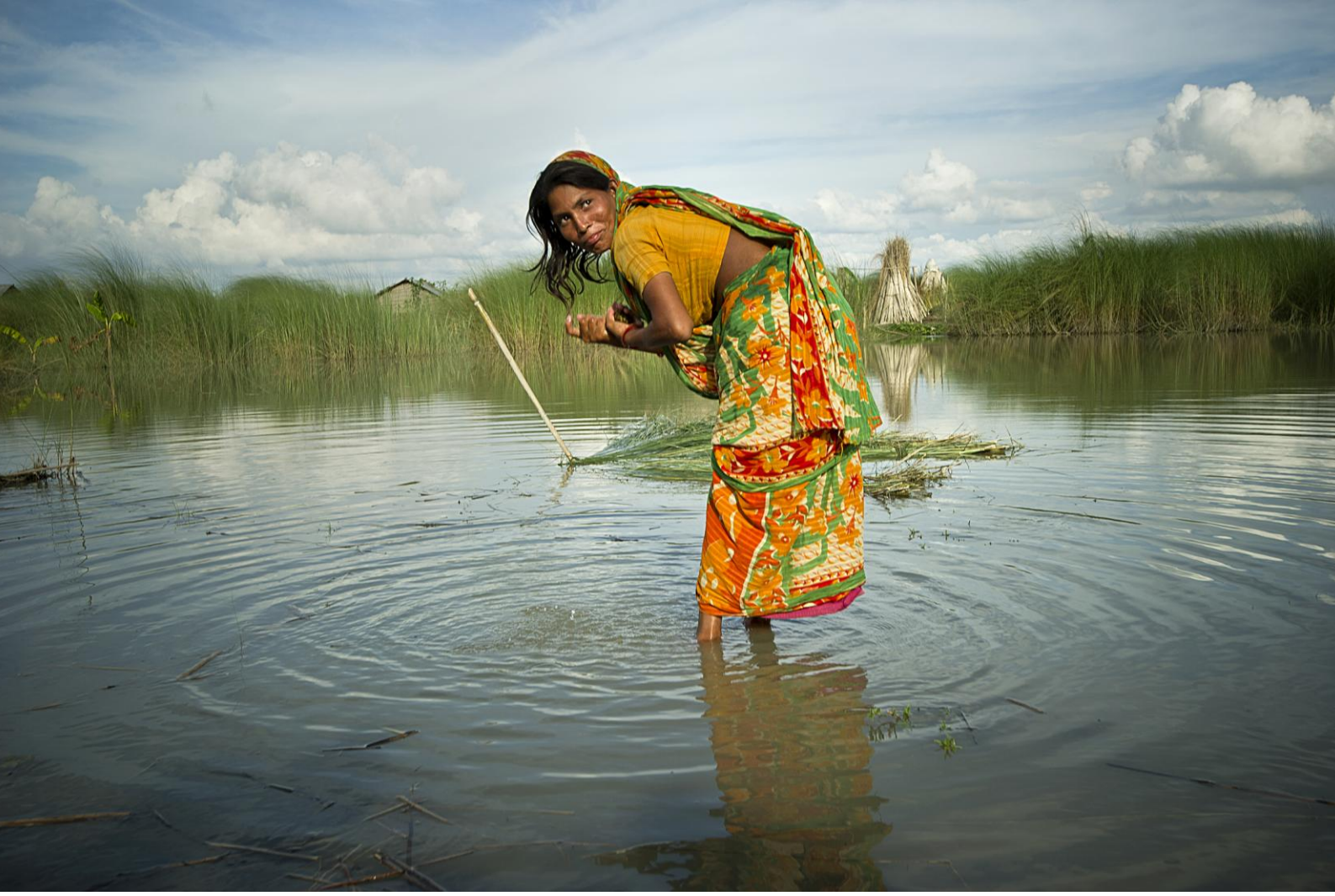
- Legal arrangement including the laws, rules and other regulatory instruments are not inadequate.
- Adequate number of R&D organizations having commendable R&D initiatives.
- Adequate and renowned academic institutions for developing human resource.
- Per capita water availability is three times higher than that of the world average.
- Community-based water management efforts are in place.
- Accumulation of ground water in the aquifer at low depth.
- Existence of huge member of rivers, canals, wetlands and water bodies to ensure the supply of surface water.
- Most of the cultivable areas of the country become a seasonal wetland in the rainy season.
- Sufficient rainfall during the monsoon to fill the water bodies and supports the agriculture activities.

Challenges

- Domination of rice-based agriculture, which demands huge quantity of water.
- Construction of *Farakka* barrage to withdraw a portion of Ganga river flow.
- Over extraction of ground water to cultivate *Boro* and HYV rice during the dry season.
- Siltation of riverbeds with sediments for inadequate water flow in the river in the dry season.
- Erratic rainfall due to climate climate change causing water scarcity in peak period and flood during the monsoon.
- Decrease of fresh water flow in the rivers and canals in the lean period as a climate change effect.
- Damage and in some cases death of some wetland and rivers for morphological change due to silt and other anthropogenic activities.
- Occupation of wetlands and water bodies by illegal encroachers.
- Over use of structure-based water solution ignoring social and other forms of solution.
- Increase of saline water intrusion in the southern area of the country.
- Increased intensity as well as frequency of floods, cyclones and tidal upsurge due to climate change.
- Increased water pollution due to discharge of industrial effluents and municipal wastes.
- Practice of leasing and even permanent settlement of land from the water bodies that suffer from siltation.
- Lack of efforts to asses as well as conduct actions to ensure the environment flows in the rivers, wetlands and other water bodies.
- Existence of conflict among different government Agencies and respective policies on sharing of water.
- Inadequate coordination among the Govt. Departments having water-based activities.
- Lack of a strict law to conserve Common Pool Resource (CPR) including water resource.

Institutional needs for conservation

- Strengthening the Bangladesh Inland Water Transport Authority, Bangladesh Water Development Board to conduct capital dredging to increase navigability of rivers and increase the water holding capacity of all water bodies.
- Strengthening the R&D organizations to conduct R&D efforts for increasing water efficiency and ensuring environment flow in the water bodies.



- Enactment of a law with strict provisions for conversation of Common Pool Resources (CPR) including water bodies.
- Strengthening the *Haor* and Wetland Board for conserving the wetlands with their flora and fauna.
- Recovery of land of the water bodies occupied by the encroachers.
- Enhancing coordination arrangement among the Govt. Agencies to address their respective demands ensuring the demand of environment flow.
- Strengthening the inter-sector Policy linkage relating to water such as National Policy for Safe water Supply and Sanitation (1988), National Fishery Policy (1988), National Agriculture Policy (1999), National Environment Policy (1992), to facilitate coordination and minimize the conflicts.
- Making a paradigm shift from leasing of water bodies through auction for revenue generation to community-based management for ensuring environment flow and meeting the needs of the community as well as water bodies.
- Increasing and strengthening the water management cooperatives.
- Updating the Water Resource Policies addressing the components of sustainable rural livelihoods.
- Updating the Water related policies, laws, rules and guidelines at regular intervals.
- Prohibiting the practice of giving permanent settlement of land of any form from the water bodies.

2.4 SOIL AND LAND

Background

Soil in the integral part of earth's ecosystem and is located at the interface between the earth's surfaces and bedrock. It has been developed through different physical, chemical and biological processes including the weathering of rock and the decay of vegetation. It contains organic maters, clay, silt, sand and gravel mixed in such way to facilitate the growth of land plants. Soil is a non-renewable resource and it takes thousands of years to develop and build up. Therefore, conserving and making the best use of land and soil are very much important for our survival. To conserve and use the land we have to understand and conserve soil.

The UNEP and FAO stated land as `the term land, as employed in land evaluation, land use planning, has a wider meaning than just soil. It refers to all natural resources, which contribute to agricultural production, including livestock production and forestry. Land thus covers climate and water resources, land form, soils and vegetation including both grass land resources and forests. Land means either cultivable or uncultivable and swampy or muddy soil that has an ability to produce some profit. It also includes houses, building and any other land related things.

Bangladesh is basically a land scarce country as the population density in very high in comparison to land. The total area of the country is 1, 47,570 sq km. The area includes agriculture land, river and canals, forests, wetland and wasteland. Per capita land availability is very low. The total cultivable land was 20.12 million acres in 1983-1984, which has been reduced to 17.5 million acres in 1997. Per capita land is 0.27 decimals, out of which cultivable land is only 0.117 decimals. Therefore, the production of food and address other land-based need have become the dire need in the country. Per-capita cultivable land decreasing trend still exists for developing homestead, industrialization, road construction and other purposes. A huge quantity of cultivable land is being used every year for developing new homesteads.

The land and soil of this country have been facing so many challenges. Alongside per capita land decrease, the soil fertility goes down for producing more crops without giving any rest period for the soil to replenish the fertility components. The consequence of climate change results in soil erosion, less flow of water in lean period, flooding due to erratic rainfall, intrusion of saline water in new area and other climate related natural hazards. The population pressure compels to convert one-crop land to two or three cropland every year. Excessive use of fertilizer and paste damage the microorganisms and favorite insects in the soil. The practice of illegal occupation on *khas* land and conversion of grazing land for other non-agriculture activities are not rare. Data base for land record systems as well as the land information and level management system are archaic and not conservation friendly. The practice of leasing of wetland as '*Jalmahal*' and collection of sand from '*balumahal*' through auction is not also conservation friendly. Therefore, there is no alternative to conservation and sustainable management of land and soil.

Soil and land degradation relate to natural as well as anthropogenic factors. Soil or land degradation is a process and results of that process, in which land loses its essential

elements of plants' growth and productivity. The ecological and environmental balance and soil of land depend of the balance to three categories of lives. They are producer, reducer and consumer. All kinds plants including the trees and herbs are the producers. The microorganisms and insects, which decompose the plants, plant products and other decomposable things, are the reducers and human being with all kinds of birds, fish and animals are the consumers. Without the growth of plants and without having a balance among the three categories of lives, life cannot survive.

Policy and Institutional Framework

The practice of land management in this land dates back to hundreds of years. The Kings of Rulers developed a practice to establish the system for imposing and collecting tax. They had the right to expel a peasant from his/her holding for non-payment or even delay in paying the land tax. Agriculture was the main source of income and the King had no other source to generate revenue except land. But the practice of keeping rent-free land for religious and charitable organizations as well as individuals was also in place. This system of land management continued till the presence of Mughal Rulers. The *Muhgal* Rulers engaged '*Jaminders*' and '*Talukders*' as land revenue collectors and they had also the right disposes such collectors. The peasants enjoyed land having the customary rights through *Patta* and *Kabuliyat*. It is the Ruler Sher Shah who first introduced the system peasants' ownership over land.

The East India Company after taking the power in 1765 increased the land revenue manifold which resulted in less production of food and caused the infamous 1770 famine. The Fakir Bidroho, Sannasi Bidroho and other mass-movements compelled Lord Warren Hastings to introduce the 5-year land settlement system. Lord Cornwalis formed 'The Land Revenue Board' first time in 1786. The first institutional instrument enlitted 'The Permanent Settlement Regulation Ordinance' was enacted by Lord Cornwalis in 1793. The company then enacted 'The Bengal Alluvion and Dillnvion Regulation' in 1825 and then the injudicious 'The Sunset Act' in 1841. The practice of land collection through '*Jaminder*', '*Chowdhury*' and '*Talukder*' continued for long time. After the Sepoy Mutiny in 1857, the British Queen took over the power of Indian Sub-Continent and enacted number of land related laws to improve the land management system and increase tax collection efficiency. The important laws enacted during the British Rule are as follows:

- The Taxation Act, 1862
- The Canals Act, 1864
- The Alluvium and Diluvium Act, 1875
- The Irrigation Act, 1876
- The Land Improvement Loans Act, 1883
- The Agriculture Loan Act, 1884
- The Bengal Tenancy Act, 1885
- The Government Building Act, 1899
- The Registration Act, 1908
- The limitation Act, 1908
- The Destructive Insects and Pests Act, 1914
- The Agriculture and Sanitary Improvement Act, 1920
- The Forest Act, 1927

- The Tanks improvement Act, 1939

The Pakistan Government enacted the 'The State Acquisition and Tenancy Act, in 1950 to abolish the middleman or *'Jamindari'* system and improve the system of land management. The then Government enacted different land related Acts and laws. Some important laws are as follows:

- The East Bengal Revenue Act, 1949
- The East Bengal Evacuees Act, 1949
- The East Bengal Land Revenue Rent and Ceases Act, 1949
- The East Bengal Alienation of Agriculture Land Act, 1949
- The East Bengal Non-Agriculture Tenancy Act, 1949
- The East Bengal Acquisition of Waste Land Act, 1950
- The East Bengal Walk of Act, 1951
- The East Bengal Evacuee Property Act, 1951
- The East Bengal Alluvial Land Act, 1952
- The Land Registration (Amendment) Act, 1953
- The East Pakistan State Acquisition (Bonds) Act, 1957
- The Court of Words Ordinance, 1958
- The Sairat Mahals (Management) Ordinance, 1959

The then Pakistan Government enacted those laws and promulgated Rules and Guidelines to administer the land information as well as land management system and earn revenue. The Deputy Commissioner as the Collector of land revenue administered the land management system through the Revenue Offices and Tahasils at the grass-roots level.

After the independence in 1971 Bangabandhu Sheikh Mujibar Rahman promised to make tax free land up to 25 *bighas* and enacted the President order No-96 of 1972. The Government declared to continue with the existing land laws with some changes. The state Acquisition and Tenancy Act has been amended many times and some new laws like- The Land Development Tax Ordinance 1976, The Chittagong Hill Tracts Act 1984, The Land Revenue Act 1989, The Land Reformation Board Act, 1989 and different Rules and Regulation have been enacted to improve land management and increase agriculture productivity. The First Five Year Plan promulgated in 1973 and subsequent Five Year Plans included the arrangements and allocation to increase the productivity of land as well as agriculture. Land related different laws and policy like the Agriculture Policy (1992), Crop Policy (1999), Irrigation Policy (1998), Water Policy (1999), Agriculture Extension Policy (1997), Environment Action Plan (1992), Embankment and Drainage Act, 1992, Ground Water Management Ordinance (1985), Environment Conservation Act, 1995 and related rules have been enacted and promulgated to improve the land management system, conservation of land and water, increase agriculture productivity and conserve the environment as a whole where land and soil are the most important components.

Strength

- Enactment and promulgation of sufficient policies laws, rules and guidelines to conserve the soil and administer the land management system.
- Adequate fresh water flow to support the soil fertility.

- Existence of fertile land and rich biodiversity.
- Adequate institution for land and soil management form national to grass-roots level.
- Availability of sufficient manpower to enforce the laws and maintain the system.
- Adequate number of R&D institutions to take R&D initiatives to improve the system of conservation and management.
- Adequate number of academic institutions to develop appropriate and skilled human resource.
- More emphasis in the planning process and budget allocation to increase agriculture productivity by improving the soil and land conservation.

Challenges

- Highest population density and per capita land availability is very low.
- Pressure on grazing land, water bodies and other land related Common Pool Resource (CPR).
- Land information and land management system are still archaic and have not yet been digitalized.
- Excess use of fertilizer and chemicals for agriculture production.
- Conversion of agriculture land for new homesteads, industries, roads and development of different establishments.
- Deforestation of forest land for non-forest activities.
- Conversion of one-crop land to two or three-crop land and decrease the nutrient repletion capacity of the soil.
- Inadequate attempts to enact Land Use Policy and its enforcement.
- Soil corrosion due to natural calamities and climate related hazars.
- Intrusion of saline water in new areas due to climate change.
- Insufficient soil conservation efforts including inadequate awareness among the farmers for soil conservation.

Institutional Needs for Conservation

- Digitalization of land information as well as land management system.
- Enactment of Land Zoning Act and its strict enforcement.
- Development of sufficient skilled manpower and strengthen the land management establishments to improve the management efficiency.
- Development of clustered village system gradually to minimize the land for homestead and optimize agriculture productivity.
- Awareness campaign for knowing the nutrient and micronutrient status of every piece of land and address the need according.
- Utilization of fertilizer and pesticide according to the need of the soil and promote organic farming.
- Conservation forest, wetland, rivers, canals and other water bodies.
- Increase the production and use of organic fertilizer promoting composting including vermi-compost at the grass-roots level.
- Increase and improve efforts including R&D initiatives, enactment of laws and enforcement for soil conservation.
- Enactment of a law to conserve the Common Pool Resource (CPR) with strict provisions and appropriate enforcement.

2.5 MANAGEMENT OF FISHERIES

Background

Bangladesh is fortunate enough in having an extensive inland water resource in the form of rivers, canals, haors, lakes, beels, ponds and estuaries covering an area of 4.56 million hectares. The country is one of the leading inland fisheries producer countries and has been ranked as the 2nd largest inland fish producing countries and 5th largest aquaculture producing countries among the top ten fish producing countries of the World. The country has the 3rd largest aquatic biodiversity in Asia after China and India having about 800 fresh, brackish and marine water species. Moreover, about 12 exotic species have been introduced. Besides, there are 10 species of pearl bearing bivalves, 12 species of tortoise and turtle, 15 species of crab and 3 species of lobster which have enriched fish and aquatic diversity of the country. The country is blessed with about a 710 km long costal belt and a continental shelf of about 37000 sq. km. The area of Exclusive Economic Zone (EEZ) is about 164000 sq. km, which is larger than the total landmass of the country. The fishery sector contributes to about 22% of the total agriculture production and 63% of the total animal protein intake of the population. Most of the cultivable lands of the country become a huge seasonal wetland during the rainy reason, which supports the spawning, breeding and nursery ground for fishes accelerating the production of fresh water fishes in the country.

Policy and Institutional Framework

Because of the existence of huge number of water bodies including rivers, canals, wetlands and ponds and conversion of all paddy land into a huge seasonal wetland in the rainy season, Bangladesh is a very suitable ground for fish breeding, spawning and natural growth for fish. Fish has become the main source of protein intake as well as culture. Every person held the right to catch natural fish from the common water bodies in the past. Therefore, no policy and regulatory activities have been developed and enacted in this land in the past except the related provisions in the land laws. Open water fisheries were then considered as the source of revenue generation through open auction. The Tanks improvement Act, 1939 enacted by the British Rule for ensuring drinking water supply facilitated the closed water fishery management to some extent. The open water fisheries including rivers, canals and other natural water bodies were managed by the '*Jaminders*' under the related provisions of the land laws during the British Rule. With a view to institutionalize this system, `The Sairat Mahals (Management) Ordinance, 1959` was enacted by the Government to manage and conduct auction of the open fisheries along with hats and bazars.

The enactment of 'The State Acquisition and Tenancy Act, 1950' created the provision under section 20 to bring all the natural water bodies as the common property and vested them with the Government. The first law relating to conservation and management of fisheries saw the light through enactment of 'The Protection and Conservation of Fish Act, 1950'. In 1959 East Pakistan Government Fisheries (Protection) ordinance, was enacted. The Deputy Commissioner working as the Collector of revenue throughout the districts managed the fishery and collected revenue through the Revenue Offices and Tahasil offices at the Thana and grass roots level.

After the liberation, the existing laws of the Pakistan Government have been adopted with some modifications at the initial stage. In 1982, the Govt. enacted the amended fish conservation law and promulgated 'The Protection and Conservation of Fish (Amendment) Ordinance, 1982. It has been further amended in 1995 and then in 2002. With a view to promoting the fishery sector, the Government enacted 'The Bangladesh Fisheries Development Corporation Act, 1973 and established the Corporation under this Act. As marine fishery surfaced with huge possibilities, the Government then promulgated 'The Marine Fisheries Ordinance in 1993. The Fisheries related Laws are as follows:

- The East Bengal Protection and Corporation of Fish Act, 1950
- The Bangladesh Fisheries Development Corporation Act, 1973
- The Protection and Conservation of Fish (Amendment) Ordinance, 1982
- The Protection and Conservation of Fish Rules, 1985
- The Marine Fisheries Ordinance, 1983
- The Marin Fisheries Rules, 1983
- The Fish and Fish Products (Inspection and Quality Control) Ordinance 1983
- The Fisheries Research Institute Ordinance, 1984
- The Shrimp Culture Tax Act, 1992
- The Shrimp Culture Tax Rules, 1993
- The Fish and Fish Product Rules, 1997
- The National Fishery Policy, 1998
- The Fishery Hatchery Act, 2010
- The Fish Feed and Animal Feed Act, 2010
- The Fishery Hatchery Rules, 2011
- The Fish Feed Rules, 2011

The following institutions are directly and indirectly contributing to the fisheries Sector:

- Department of Fisheries under the Ministry of Fisheries and Livestock.
- Bangladesh Fisheries Research Institute (BFRI)
- Bangladesh Fisheries Development Corporation (BFDC)
- Academic Institutions for developing human resource and conducting research
- Land Administration through District Administration.
- Department Land Reform and Land Survey
- Export Promotion Bureau
- Bangladesh Krishi Bank and other Banks and financial Institutions
- Development Partners Associated with the aquaculture promotional activates
- Bangladesh Rural Development Board (BRDB)
- Department of Cooperatives
- R&D Organizations for rural development and poverty alleviation like Bangladesh Academy for Rural Development (BARD), Rural Development Academy, Bogra (BDA) and Bangladesh Academy for Poverty Alleviation and Rural Development (BAPARD).
- Youth Development Tanning Centres
- National and International NGOs
- Marine Fisheries Academy
- Defenses and Security Agencies like Bangladesh Navy and Coast Guard

Strength

- Existence of adequate inland water bodies
- Existence of huge marine area mainly the EEZ which is more than the total landmass of the country
- Existence of the World's largest spawning and nursery ground in the estuaries and rives for hilsa fish.
- Adequate laws and regulations for conservation and sustainable management of fish and aquatic resources.
- Organizational Strength upto Upazila level.
- Adequate number Government and Private Hatcheries for supporting aquaculture.
- Existence of Sundarban with adequate water bodies which acts a spawning, breeding and nursery ground of fish and aquatic resource.
- Adequate number of R&D Organizations.
- Adequate number of academic institutions to develop human resource and conduct research activates.
- Payment of ecosystem Service (PES) for Jatka Conservation.
- Community-based fishery management, in a limited scale.

Challenges

- Old fashioned laws and regulations relating to management and conservation of fisheries.
- Inadequate manpower at the grass-roots level to promote and conserve fisheries, as well as aquaculture.
- Inadequate laws, institutions and manpower to conserve the marine aquatic resources.
- Inadequate prorated areas in the inland water as well as marine and coastal areas.
- Inadequate survey about the stock of the marine aquatic resource.
- Over harvesting of marine aquatic resources without proper survey of stock.
- Inadequate management to address the need of the ecosystems for supporting sustainable management of fisheries.
- Inadequate research activities on marine aquatic resources.
- Inadequate coordination among different Government Agencies having water related activities.
- Existence of conflicts among different Government Agencies as well as in different policies.
- Inadequate budget allocation in the fisheries sector to meet the growing protein need.
- Less access of fisher community to aquatic and marine aquatic resources.
- Excessive Pollution in some water bodies including the river Buriganga due to discharge of untreated industrial effluents and municipal wastes.
- Existence of Ecologically Critical Area (ECA) and less efforts to improve the situation.
- Existence of auction system to earn revenue from the fishery sector ignoring the conservation of aquatic biodiversity and limiting the access of poor fishers to the natural fisheries.

Institutional needs for conservation

- The laws and regulation relating to conservation and management of fisheries need to be updated.

- The monitoring, control and surveillance (MCS) of the Department of Fisheries need to be increased.
- Developing of organizational establishments below the Upazila level with skilled manpower to promote and support conservation as well as aquaculture.
- Updating the Marine Fisheries Ordinance, 1983.
- Declaration of Marine protected areas as per the provisions of Convention on Biological Diversity (CBD) and Aichi Biodiversity Targets.
- Survey of stock of marine aquatic resources and limiting the marine fisheries harvest based on the stock.
- Strengthening the establishments with skilled manpower and resources for conservation of marine fisheries.
- Strengthening the academic institutions for development of sufficient manpower to explore the marine resources including aquatic resources.
- Strengthening the R&D Organizations and conducting sufficient research activities.
- Promoting Community-based fishery management and increasing the access of poor fishers to natural as well as marine fisheries.
- Development of alternative livelihoods for the poor fishers to minimize the pressure on fisheries.
- Extension of Payment for Ecosystem Services (PES) model with adequate support among the fishers community including the jatka fishers.
- Minimize the conflicts among the Government Agencies associated with the water related activities.
- Executing a paradigm shift from auction-based fishery management to biodiversity conservation-based management through community participation.
- Enacting a Law on Common Pool Resource (CPR) conservation with strict provision for conservation of water bodies and fisheries.
- Controlling pollution in water bodies by enforcing the environmental laws.
- Organize campaign, promote organic farming and conduct activities to control the excess use of fertilizer, pesticides and chemicals in agriculture.