



# BANGLADESH NATIONAL CONSERVATION STRATEGY (2016-2031)

## PART I: EXECUTIVE SUMMARY



MINISTRY OF ENVIRONMENT AND FORESTS  
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH



Ministry of Environment and Forests  
Government of the People's Republic of Bangladesh

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# BANGLADESH NATIONAL CONSRVATION STRATEGY (NCS) (2016-2031)

## PART I EXECUTIVE SUMMARY

September 2016

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and

Bangladesh Forest Department

Bana Bhaban, Agargaon, Dhaka 1207

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## NCS PROJECT TEAM

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### TEAM LEADER

M. Asaduzzaman

### PROJECT MANAGER

Mohammad Abdul Motaleb

### SECTORAL EXPERTS

Emdadul Haque Chowdhury

Abu Wali Raghib Hassan

Md. Shamsul Hoque

Monzur Hossain

Mohammed Kamal Hossain

Nazrul Islam

A. S. M. Maksud Kamal

Mohammad Hafizul Islam Khan

Mohammad Monirul Hasan Khan

Mizan R. Khan

Niaz Ahmed Khan

S. M. Munjurul Hannan Khan

Mihir Kanti Majumder

M. Niamul Naser

Mahbuba Nasreen

Nurul Islam Nazem

Sharmind Neelormi

Laskar Muqsudur Rahman

Md. Mizanur Rhaman

Md. Mushfiqur Rahman

Mohammad Rezaur Rahman

Muhammad Abdus Sabur

Md. Shamsuddoha

M. Ahsan Uddin

### PROJECT ASSISTANTS

Md. Ashraful Haque

Muntasir Akash

Mohammad Sultan Ahmed

Zubair Hussni Fahad

### INSTITUTIONAL ADVISORS

Ishtiaq Uddin Ahmad

Haseeb Md. Irfanullah

(These sections will be added after finalization and acceptance of the whole report)

## **MESSAGE**

Prime Minister  
Government of the People's Republic of Bangladesh

## **MESSAGE**

Minister, Ministry of Finance and Chairperson, Cabinet Review Committee of NCS  
Government of the People's Republic of Bangladesh

## **MESSAGE**

Minister, Ministry of Planning  
Government of the People's Republic of Bangladesh

## **MESSAGE**

Minister, Ministry of Environment and Forests  
Government of the People's Republic of Bangladesh

## **PREFACE**

Secretary, Ministry of Environment and Forests  
Government of the People's Republic of Bangladesh

## **ACKNOWLEDGEMENT**

Chief Conservator of Forests, Bangladesh Forest Department  
Government of the People's Republic of Bangladesh  
And  
Country Representative, IUCN Bangladesh

## **ACRONYMS**

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# INTRODUCTION

## 1.1 PREAMBLE

Does Nature matter for human welfare and economic and social development? This question has been debated for the last few decades in modern times. One can go about resolving this issue from two angles. One is the theoretical but evidence based one which does make it explicit that Nature does matter and matter very much for ultimate existence of life including human life and human welfare be it though economic development and material prosperity or otherwise.<sup>1</sup> The other is that the general idea seems to be held increasingly by world leaders. The first significant even was in 1980 when the World Conservation Strategy was formulated. The second significant event was the adoption of the Millennium Development Goals (MDG) in late 1990s. The MDG had among its goals targets related to environmental integrity but this was rather understated. The last even was the adoption of the SDGs last year by the UN which has resource conservation, efficiency in resource use and maintaining integrity of the environment in general specific natural resources in particular as the main focus and process for attaining particularly goals 1 and 2 on eradication of poverty and hunger. What all these mean is that increasingly Nature has taken a centre stage in development discourse and practice. The present draft National Conservation Strategy takes its cue from all these three events as well as the general development discourse surrounding Man's relationship with Nature.

## 1.2 INITIATION OF THE FORMULATION OF THE NCS

Bangladesh Forest Department (BFD) under the Revision and Updating National Conservation Strategy (NCS) Project funded by Ministry of Environment and Forest under Climate Change Trust Fund, requested the IUCN, International Union for Conservation of Nature and Natural Resources, represented by its Bangladesh Country Office to help in the revision and updating of the draft NCS document for Bangladesh that had been prepared previously. The proposed project period was eight months starting from 5th November 2015 but has since been extended to 31 December 2016.

The present report is the first draft of the main report. It is based on the background reports of the various sectors and issues that have been considered vital for the formulation of an NCS.

1 For an illuminating discussion on these issues by one of the masters, see Dasgupta, Partha, *The Place of Nature in Economic Development*, Chapter 74, *Handbook of Development Economics*, Volume 5, 2010, Elsevier B.V.\_

## PROJECT BACKGROUND

The Government of Bangladesh is committed to conserve its natural resources guided by policy, law, strategies, international treaties and conventions, and also as enshrined in its constitution. The Bangladesh National Conservation Strategy, when prepared and approved, is expected to be a key government document to be the guideline for the purpose.

After Bangladesh endorsed the 1980's World Conservation Strategy, the Government started working on developing the National Conservation Strategy (NCS) document for Bangladesh. Between 1980 and 1993, several task forces were set up by the Government to draft the National Conservation Strategy (NCS) for Bangladesh. An NCS document was presented to the Cabinet in 1993. Since then the draft had been revised and presented to the cabinet several times, the last one being in 2013.

After due consideration of the last updated version in 2013, the Cabinet directed the Ministry of Environment and Forests (MoEF) to revise the draft yet once again to consider recent changes and also incorporate some new areas for analysis and formulation of strategy. The Cabinet also formed a Ministerial Committee headed by the Finance Minister with provision of necessary secretarial services by the MoEF. To facilitate the project, the MoEF in April 2013 formed an Expert Committee comprising of nine members (see Annex 1 for the composition of the Expert Committee).

Subsequently the Expert Committee decided that it would necessitate formulating a study project to incorporate the desired revisions and updating and extensions outlined by the Cabinet. A project to be housed in the Bangladesh Forest Department (BFD) and financed under the Bangladesh Climate Change Trust Fund had finally been approved for implementation. Against this backdrop, BFD approached IUCN Bangladesh Country Office to conduct the project on its behalf and subsequently a contract between the two organizations had been signed on 5<sup>th</sup> November 2015.



# GOAL, OUTCOME AND OUTPUT

## 3.1 GOAL

The overarching goal of the project is to foster development in the country through the conservation, development and enhancement of natural resources in the country within the framework of sustainable development, particularly as envisioned under the Sustainable Development Goals (SDG).

## 3.2 OUTCOME

The outcome of the project is expected to create a conducive policy environment and strategy for conservation, development and enhancement of natural resources in the country.

## 3.3 OUTPUT

The main output of the present project is to be a *Bangladesh National Conservation Strategy* for consideration of the Ministerial Committee and finally the Cabinet for approval and implementation. The process shall involve the submission of several deliverables before the final one. These are

- Deliverable 1 : Inception report
- Deliverable 2 : Interim report
- Deliverable 3 : Preliminary draft of the NCS
- Deliverable 4 : Final report of the NCS
- Workshops and stakeholder meetings in the Divisional HQs and a national one
- Deliverable 5 : Updated NCS (Executive summary) – Volume 1 (300 copies in English)
- Deliverable 6 : Updated NCS (Sector profiles) – Volume 2 (300 copies in English)
- Deliverable 7 : Updated NCS (Executive summary) – (300 copies in Bangla)



## FEW OBSERVATIONS AND FINAL DECISIONS ON ToR FOR NCS

The Inception Report was prepared and submitted to the BFD in xxx, 2016. The Inception Report made several observations on the ToR (see Annex 2 for the ToR). Several observations and on their basis proposals for revision of the ToR were made. First, several sectors/ activities appeared very closely linked and some time almost indistinguishable such as urbanization, urban development and public housing. Such sectors/activities were proposed to be merged together. This issue was subsequently discussed with the Expert Committee which suggested that while these sectors/sub-sectors/activities may be put together; there should be some clear ideas and analysis of each within the composite sectoral report.

Secondly, it became imperative to add a few more new ones such as marine and coastal resources, institutional issues and legal aspects of NCS. An important issue that is still missing is natural resource and cultural heritage. While accepting the newly added sectors/activities, It was decided in the Expert Committee that this issue will be considered if possible in the final draft rather than it being a separate issue for a background report.

Third, the time schedule for the formulation of the NCS appeared to be quite tight. Originally there were 18 sectors in the last draft of the NCS. The Cabinet added 7 new sectors and activities raising the number to 25. Four more were considered to be important for inclusion making the number 29. After rationalization and merger, however 25 remained (see Annex 2 for the revisions, mergers and new sectors and the final list of sectors).

One issue of concern here may be that there is no specific sector on pollution and effluents which can and do degrade the quality of many natural resources. The sources of pollution mainly are domestic waste, municipal waste, industrial effluents and run-offs from agricultural fields. These are all externalities out of human activities based on natural resources although some of the pollutions/contaminants may be natural (such as arsenic contamination of ground water). Hence rather than treating the issue separately, this has been subsumed under specific sectors.

Another issue that came up during the preparation of the background reports was how to treat the issue of climate change which will have implications for resource quantity, quality and human activities based on them. As advised by the Expert Committee it was decided that the issue be treated at least briefly in all relevant sectors as this is a cross-cutting issue.

A perusal of the earlier sectoral reports indicated that there would have to be major revisions and in some case, almost new analyses for understanding their policy implications not to speak of the wholly new ones which would necessitate full reviews and analyses.

Furthermore, the previous NCS did not appear to have a holistic view of the issues involved particularly from the view point of a heavily resource dependent yet a poor country as Bangladesh. There was little awareness that the interactions between natural resources and the growth and development of a country may not be always conducive to growth had been little thought of.<sup>2</sup> It was therefore argued and finally agreed to extend the time frame of the project to 12 months from the original 8 months.

This time it has been intended to use the recently developed and globally adopted sustainable development framework and its goals.<sup>3</sup> This will necessitate almost wholly new conceptual framework for the NCS and molding each sectoral profile and evaluation accordingly. This means that a substantial volume of literature will have to be studied for their applicability to Bangladesh which would be globally acceptable. This is going to be one of the first exercises. This issue was also discussed with the Expert Committee which approved of the idea.

One new addition this time is the evaluation of NCS documents of other countries in the region and elsewhere to understand globally the best practices and assess their suitability for application to Bangladesh.

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<sup>2</sup>Among economists there appears to be two major strands of thought and analyses on these interactions. Particularly the "natural resource curse" has gained quite some support. See Sachs, Jeffrey D. and Andrew M. Warner, 'Natural Resources and Economic Development: The curse of natural resources', in *European Economic Review*, Vol 45, 2001, pp. 827-838. For an opposing view see Barbier, Edward B., *The Role of Natural Resources in Economic Development*, Joseph Fisher Lecture, Adelaide University, September 2002, Blackwell Publishing Limited, University of Adelaide and Finders University of South Australia. Also see Dustin Chambers, and Jang-Ting Guo, 'Natural Resources and Economic Growth: Some Theory and Evidence', *Annals of Economics And Finance* 10-2, 367-389 (2009).

There is yet a third stream of thought which goes by the name of Environment Kuznets Curve. Kuznets in a 1955 seminal article hypothesised that inequality first increases as an economy develops under a market-based system and then begins to fall as the economy advances further giving the plotted relationship as an inverted U-shape (with growth in the horizontal and inequality in the vertical axis). See Kuznets, Simon, Economic Growth and Income Inequality. *American Economic Review* 45 (1955) (March): 1-28. The same inverted U-shaped relationship happens,, as some would argue, in case of environmental degradation. As an economy grows environment degrades but at higher levels of development environment recovers due to better policies and actions to conserve nature and environment. For an exposition of the Environment Kuznets curve, see Shafik, Nemat. Economic development and environmental quality: an econometric analysis. *Oxford Economic Papers* 46 (1994), October: 757-773. The Enviromnet Kuznets Curve has however been heavily criticized by many. For a review of the literature

<sup>3</sup> United Nations, Transforming Our World: The 2030 Agenda for Sustainable Development , A/RES/70/1, 2015

# METHODOLOGY/APPROACH

## 5.1 BASIC FRAMEWORK

During the preparation of NCS emphasis was given on a unified and holistic sustainable development framework rather than stand-alone sectoral issues – distinguishing between renewables and non-renewables. There are several basic reasons for choosing the SDG framework.

First any NCS is not an end in itself. This has the objective of consolidating economic, social, and cultural gains and development in a country as natural resources provide a major base and means for attaining them. Indeed That natural capital along with man-made capital as well as human capital are basic elements behind the progress of any country is now widely accepted. Sustainable development goals framework provides a holistic and synergistic view of these interactions. It should also be mentioned here that the NCS will also have major implications for Green Growth which at its bare essentials can be said to be growth within a sustainable development framework. While NCS by and large concentrates on environmental sustainability, economic efficiency and social inclusiveness may not be sidelined as the present exercise indicates with major areas of inquiry being human resources, rural development and gender.

The second reason is operational. The SDG framework and the indicators have been developed after long and wide-ranging debates and discussion by all countries and governments have unanimously adopted than for implementation. Indeed, if we correspond the NCS sectors that the present study wishes to discuss, we find a general correspondence in many cases directly and in others indirectly. For the SDG framework see next section. Also see a table indicating correspondence between NCS sectors/activities and SDGs and their targets in the same section.

Thirdly, as the correspondences are quite close, SDG targets and indicators thus provide the basic premise from which Bangladesh can develop its own indicators for monitoring. Fourthly, for implementation of the SDG, support in the form of global finance, technology transfer and capacity-building are expected to be provided. Bangladesh must tap into these resources for which the close synergy between SDGs and the NCS sectors will provide a basic common platform.

## 5.2 MAIN ANALYTICAL ISSUES

Four basic considerations have been addressed for the NCS review, updating and development,

- Status and analysis of the resource degradation
- Status and analysis of resource depletion
- Proposals for resource enhancement

- Inter-sectoral linkages and their implications for development, conservation of the resources or sectors with attention to synergy or conflicts between or among sectoral policies

## 5.3 METHODOLOGY

The sectoral reports have been developed by consulting and reviewing the secondary literature, expert opinion, public consultations, and in some cases one to one discussions. Originally it was intended to prepare this preliminary report and then get feedback from the divisional stakeholder consultations. After beginning work, it was found that it would be more educative have prior consultation regionally with stakeholders. Accordingly, seven consultation workshops were held except in Dhaka which is expected to be held after this Preliminary Report is completed and consultation with the Expert Committee is held. Once the consultations are held, this report will be revised based on the comments and observations. The report will be finally submitted to MoEF for onward transmittal to the Ministerial Committee for its approval.

## 5.4 SECTORS

Originally there were 18 sectors in the draft NCS. Seven were added by the Cabinet while the Consultant added 4 more. Then there was certain rationalization and merger putting similar sectors or activities together. These are shown Annex 3. Initially, the documents are prepared in English. For wider dissemination, Bangla translation of the Executive Summary of NCS document will be published. The activities and methods to be followed to achieve the targeted objectives are described here under following heads.

## 5.5 TRANSPARENCY

The methodology and NCS document preparation has followed a completely transparent and inclusive manner. The project has a website of its own wherein various relevant documents including intermediate outputs of the project had been uploaded from time to time. Furthermore, the general public may take part through providing their ideas on conservation, impediments to and opportunities for such conservation either taking part in the stakeholder consultation workshops or by uploading their comments in the website for which a designated section has been provided. This will be most useful after this preliminary report is uploaded in the website.



# TASKS OF NCS

The implementation of the project involved several intertwining tasks. These were as follows:

## **Task 1 : Development of a Sustainable Development Framework**

This is a conceptual exercise based on literature survey and assessment. While the recent UN documents are the major sources, efforts have been made to find out how other countries may have used it for the formulation of their NCS or similar documents. The output of this exercise is shown as the next chapter.

## **Task 2: Updating Existing and Rationalized and New Sectoral Reports**

### **Addressing Issues:**

This has been done following the guideline as shown under Annex 3.

### **Deliverables:**

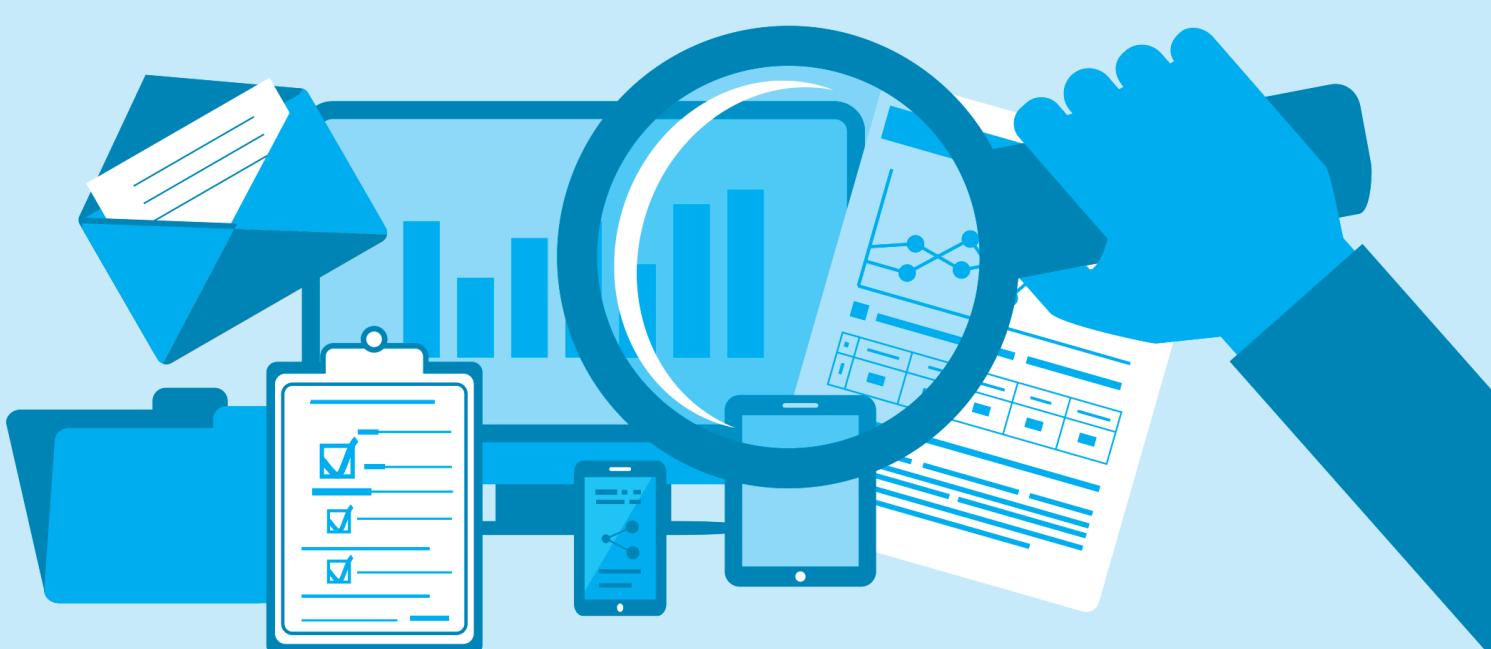
25 sectoral reports which are separately being published as Vol 2 of this report

## **Task 3: Consultation and workshops**

See Section 5.3 for the process and the output and their use.

## **Task 4: NCS Report Synthesis**

Under this task the final output (the new and updated NCS document) to be prepared within a holistic and sustainable development framework and submitted for approval first by the Expert Committee, then the MoEF and finally the Ministerial Committee. The main part of this report i.e., Section 7 contains this output.



# AN SDG FRAMEWORK FOR NCS

## 6.1 THE SDG

The SDG has 17 goals (see Annex 4). Of these the first 5 relate to ending poverty, hunger, ensure healthy living, education for all and gender balance in development. These may be termed as the over-arching objectives of the SDGs. The next several ones are most interesting and can be said to be the management of natural resource base for achieving the first 5. Let us elaborate a little pointing out several of these goals.<sup>4</sup>

There are specific goals and targets for the following natural resource under SDGs. These are water (Goal 6), modern energy (Goal 7), marine resources (Goal 14), forestry (Goal 15), biodiversity (Goals 2 and 15), inland fisheries (Goal 2) and livestock (Goal 2). All these form the core resources for management under NCS. SDG also includes goals and targets for resource using sectors practically all of which form part of the NCS. These are crop agriculture (Goal 2), industries (Goal 9), Power (Goal 7), Transport and communication (Goal 9), Urbanization (Goal 11). The implementation of NCS necessitates the use of several strategies, policies and actions. Again practically all are subsumed under different goals and targets of the SDG for its implementation. These are Human resources (Goals 3,4,5), Gender issues (Goal 4), Health and sanitation (Goals 3 and 6), Disasters (Goals 11, 13), Environmental and International Treaties and Obligations (Goal 13, 15), Information and Communication Technology (Goal 9), Financing (Goal 17), Monitoring and Coordination (Goal 17), Institutional framework (Goal 16), Legal aspects (Goal 16) and lastly natural and cultural heritage (Goal 11). More detailed information but still indicating a non-exhaustive list of mapping of the NCS sectors as approved by the Cabinet Sub-committee and the Expert Committee with the goals and targets of SDG is provided in Table 1.

What the Table 1 and the brief discussion above indicate is that the implementation of the SDGs depends crucially on the implementation of the NCS. Indeed the Consultant suggests that the NCS and its implementation form the core of the SDG and its implementation. The NCS details out the characteristics of the configuration of the natural resources in the country along with the sectors that use these resources to create value in the economy and ultimately lead to the attainment of the first two overarching goals under SDG, namely the eradication of poverty and banishing hunger. Time and again the UN resolution calls for the sustainable management of natural resources (in other words the basis of present NCS) as the process to attain the overarching goals of economic and social well-being. Even the particular issue of Natural and Cultural Heritage which we have been unable to include under this NCS has been included as a full-fledged target under Goal 11, target 11.4. Thus the core issues of a development process which is environmentally sustainable,

<sup>4</sup> In fact, even here there are specific points of outcome as will be evident as we discuss these issues further.

economically efficient and socially desirable under SDG and the NCS are the same and similar.

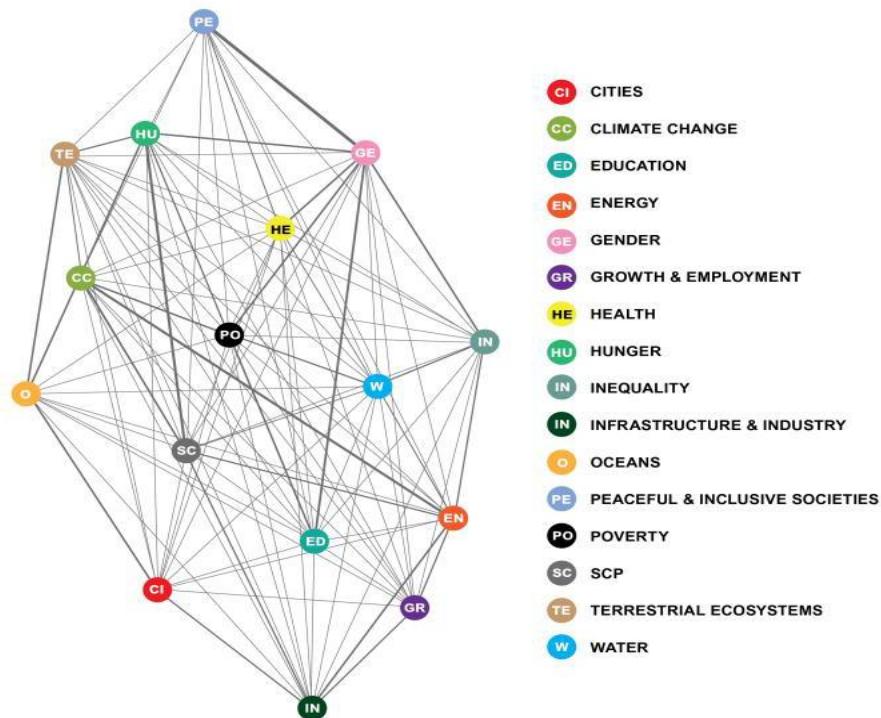
**Table 1:**  
**Correspondence between Present NCS Sectors and SDGs and Targets**

NCS Sectors	SDG Correspondence	
Natural Resource Sectors	Direct	Indirect
Land Resources	Goal 15 - target 15.3	
Water Resources	Goal 6- targets 6.3, 6.4, 6.5	Goal 13 - target 13.2
Forest Resources	Goal 15- targets 15.1, 15.2	
Biodiversity (Flora and Fauna)	Goal 2- target 2.5; 2.a Goal 15 - targets 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 15c	Goal 14 - target 14.4
Fisheries Resources (inland)	Goal 2 - target 2.3	Goal 15 - target 15.1
Coastal and marine resources	Goal 14 - targets 14.1 to 14.c	
Energy and Minerals	Goal 7 - targets 7.1 to 7.b	Goal 12-target 12.2, 12.c
Livestock	Goal 2 - target 2.3, 2.4, 2.5, 2.a	Goal 12 - target 12.3
Natural Resource Dependent/using Sectors	Direct	Indirect
Crop Agriculture	Goal 2 - target 2.3, 2.4, 2.5	Goal 2 - target 2.b, 2.c Goal 6 - target 6.4 Goal 12 - target 12.2, 12.3
Industry/small & cottage industries	Goal 9 - target 9.2, 9.3, 9.4, 9.5	Goal 12 - target 12.2; 12.5, 12.c
Power	Goal 7 - targets 7.1 to 7.b	Goal 12-target 12.2, 12.c
Rural development		Goal 2 - target 2.a; 2.c Goal 12 - target 12.2
Transport and communication	Goal 9 - target 9.1, 9.a; Goal 11 - target 11.2	Goal 3 - target 3.6
Urbanization/housing	Goal 11 - target 11.1, 11.3, 11.6, 11.1, 11.b	
Supporting Sectors	Direct	Indirect
Human resources	Goals 3,4,5	Goal 8- target 8.5
Gender Issues	Goal 4 - target 4.1, 4.24.3, 4.5, Goal 5;	Goal 1- target 1.2; Goal 3 - taget 3.7; Goal 11 - target11.2, 11.7,
Health & Sanitation	Goal 3;	Goal 6 - target 6.1, 6.2, 6.b
Disasters and disasters management	Goal 11 - target 11.b; Goal 13 - target 13.1	Goal 11 - target 11.5
Environment and	Goals 13, Goal 15 - target	

International obligation	15.1	
Environmental education and awareness	Goal4 - target 4.7	
Information and Communication Technology	Goal 9 - target 9.c;	Goal 3 - target 3.d; Goal 4 - target 4.b; Goal 5 - target 5.b; Goal 12 - target 12.b; Goal 16 target 16.6,16.9, 16.10; Goal 17 - target 17.8
Financing Strategy	Goal 17 -target 17.1 to 17.5;	Goal 3 - target 3.8, 3.c; Goal 4 - target 4.b; Goal 8 - target 8.10; Goal 10 - target 10.b; Goal 11 - target 11.c; Goal 15 - target 15.a, 15.b
Monitoring and Coordination mechanism for NCS implementation	Goal 17 - target 17.18, target 17.19	
Institutional framewok	Goal 16 - target 16.3, 16.5, 16.6, 16.7, 16.8,16.10	Goal 12 - target 12.7; Goal 17 - target 17.14, 17.17
Legal aspects	Goal 16 - target 16.b	
Natural and cultural heritage	Goal 11 - target 11.4	

Source: Constructed by the Consultant based on information in UN, *Transforming Our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1, 2015

**Fig. 1: Inter-linkages among SDGs**

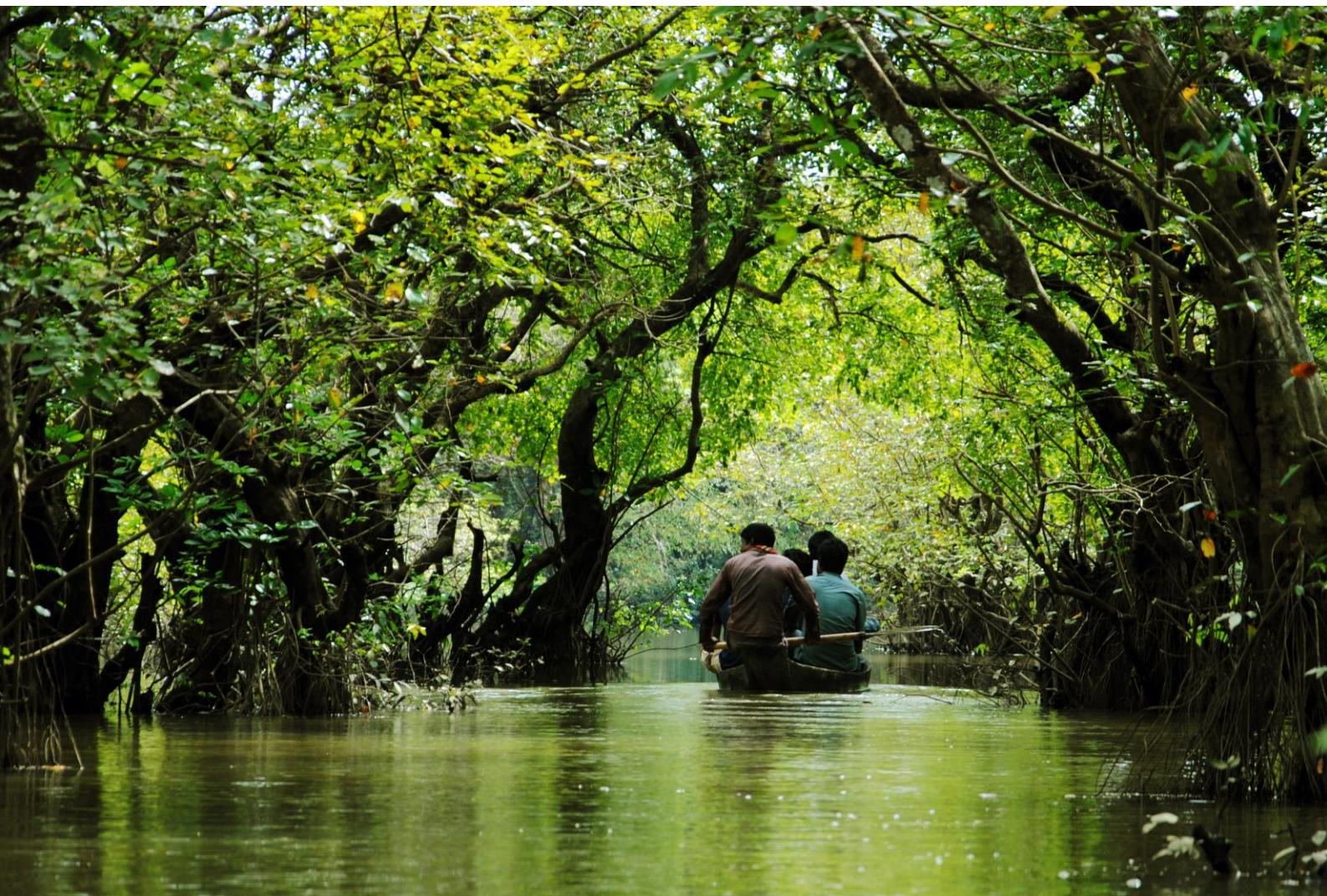


Source: ICSU and ISSC, Review of targets for the sustainable development goals: the science perspective (ICSU, 2015), as reported in UN, Integrated Perspectives on Sustainable Development Goals, Brief 2, in UN, Global Sustainable Development Report, 2015

Note: SDG 17 is excluded as it is linked to all other goals. The thickness of the lines indicates the relative strength (qualitative) of linkages.

The SDGs are internally connected with each other. This has been shown as a diagram of interconnected goals (Fig. 1). Quite obviously as NCS may be taken to be a core part of the SDGs (in fact of the 16 goals shown in the diagram, 13 are directly and indirectly in NCS), the sectors under it are also similarly so connected. And there are both synergy and possible conflict among them. For example, while water is essential for crop agriculture, without water of a minimum acceptable quality, this may not be possible. Thus depending on the situation, a the conservation of a resource or activities dependent on them may have clear bearings on the quantity and quality of other natural resources and the activities dependent on them and consequently the support services for the conservation process (note that one of the issues to be discussed as stated in the Guideline is synergy and conflict among sectors). In fact, the situation may be even more complex than what is apparent because such complex interconnection may lead to a kind of butterfly effect which means that a small change somewhere may ultimately lead to a major unintended change in the system.

In the next section we deliberate on the NCS sectors one by one and the following section tries to bind them together as a coherent strategy.



# CORE NCS SECTORS: NATURAL RESOURCES

## 7.1 LAND RESOURCES



### 7.1.1 Introduction

Land is a scarce resource in Bangladesh. At present the country accommodates more than 150 million people in an area of 148,394 sq. km. (57,295 sq. miles). The density of population is one of the highest in the world, 1134 per sq km. The land in Bangladesh has direct links with food security, economic growth and overall development of the country. Due to an overwhelming population pressure on land, its degradation has been observed everywhere; on the other hand, agricultural and wet lands have been gradually declining. The conservation and proper management of this vital and scarce resource is thus an important concern for all, especially the policy makers and planners in the country.

### 7.1.2 Current status

At present the country has less than 10 percent of its area under forest coverage compared to about 24 percent in the 1960s. It has been estimated that by 2050 its population would be around 250 million, a net increase of about 100 million in the next 40 years. The country will then have to accommodate these people through densification. Per capita land will

decline further from *0.16 acre to less than 0.10 acre*. Agricultural land is diminishing by about 1.3% every year due to various land use changes while wetland and forests are being converted into crop lands and for other purposes. The following points may indicate the problems regarding land resources in the country.

Land degradation is a major problem. It is defined as the long term loss of ecosystem services centered around land. Worldwide the total economic value of such degradation has been estimated to be about US\$231 billion per year or about 0.41 % of the global GDP in 2007.<sup>5</sup> While we have no comparable such economic value of losses due to degradation, it is widespread. If we use the same percentage for our GDP in 2015, the loss comes to nearly 71 thousand Crore taka.

Rather dated information (BARC: 1999) indicates that the loss of intrinsic soil fertility may account for 8 million ha of degraded land or more than one-half of total land area due to deficiencies in various nutritional elements (phosphorus, potassium, and sulphur). In fact sulphur deficiency may affect up to almost 9 mn ha. At the time of collection of the data, all these lands represented moderate degradation meaning that up to a quarter of crops may be lost due to low fertility. Soil organic matter is depleted in more than 7.5 mn ha of land of which more than 4 mn ha or nearly 54% of land is severely degraded meaning that crop product losses may be that up to 75% of the normal output may be lost. Pan formation accounting for 2.8 mn ha or nearly 20% land is also moderately degraded (crop output loss up to 25%). Other major reasons of land degradation or depletion are water erosion water logging and salinization. Salinization has increased over time. There appears to be limited information on low soil moisture problem earlier. But now it is known that there has been some time drastic depletion of the water table particularly in the north-western parts of the country. In general by this time degradation may have pervaded more land than before and may have become more severe than previously.

- Agriculture remains the main economic use of land. Yet, most farmers have only a little land of their own. The distribution of land is thus highly unbalanced. About 6 percent of the households in rural Bangladesh are absolutely landless whereas 30 percent of the households in rural areas own only 5 percent of the land. The situation in urban areas is even worse.

In recent years, the situation has probably worsened because of either lack of policies or their proper implementation. If such affairs continue unchecked, there might be a serious crisis affecting food security, livelihoods, economic growth and long term sustainability of the ecosystem.

### **7.1.3 Policies and institutions**

The management of land resources of Bangladesh is promoted through a number of policies such as Land Use Policy, Agricultural Policy, forest policy, water policy, coastal zone policy, Environment policy and fisheries policy. There are some other policies which are also directly or indirectly relevant to land management issue. Among these Bangladesh Climate

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5 Nkonya, Ephraim, Alishar Mirzabayev and Joachim von Brown (ed.), *Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development*, Springer, 2015.

Change Strategy and Action Plan, National Action Programme (NAP) for Combating Deforestation, Bio-diversity Act, etc are important. In Bangladesh, there is no national policy in effect for land use management, particularly for rural/agricultural land. Absence of such national policy results in uncoordinated, irrational and conflicting utilization of land. However, the practices have never been conceived in a holistic way, to comprehend and minimize land issues properly. Despite the fact that land is the most important resource in Bangladesh, it remained far from efficient, sustainable and uniform management system.

Several ministries are involved in land management. Within the Government of Bangladesh there are 11 Ministries and 27 agencies under them directly use land or administer land use. These are the Ministries of Land, Agriculture, Environment and Forest, Water Resources, Local Government and Rural Development (LGRD), Fisheries and Livestock and Communications. Besides there are a number of other ministries also involved indirectly with the management of land. There are also some specialized organizations which deal with land such as DLRS, SPARRSO, SOB, development authorities like RAJUK, CDA, KDA and city corporations and municipalities. The Ministry of Land is the custodian of the Government own lands. Quite obviously coordination is major problem, in fact, the rules and practices on the ground by district administration create a lot of problem related to land conversion. But if we look at the main degradation issues of soil fertility losses and soil organic matter losses, there seems to hardly any agency looking after the matter in any effective way. One reason of course is the problem of reaching millions of peasants with ideas of conservation agriculture and making them understand its economic benefits. There are some good starting points such as detailed maps of the whole country and from very micro level to macro scale. However, such facilities are not enough to evaluate land for its use for different purposes. It is necessary to produce comprehensive land use map of Bangladesh for making land zoning and other plans on land.

#### **7.1.4 Strategies for future**

SDG target 15.3 calls for restoring degraded land and soil, including land affected by desertification, drought and floods and strives to achieve a land degradation-neutral world. Burgeoning population which may go up to 250 million by 2050 will put tremendous pressure on land for food, shelter, urbanization and deplete available land for many of the legitimate purposes for livelihood while the innate capacity of the land to produce enough food will fall. It is already at a precarious situation and might go further downward. There may be several kinds of strategy perhaps all to be practiced in various degrees. There are of course the administrative regulatory measures and awareness programmes regarding land use changes. But the real drivers perhaps have to be addressed with more indirect and economic incentives. For example, payments for ecosystem services which seems to be in practice in some countries. But this has the disadvantage that the practitioners such as farmers do get only part of the benefits.<sup>6</sup> The greater society gets most of it lowering the incentives for the actual practitioner. Also often such schemes are captured by the elite.

There are generally three perspectives from which the situation may be analyzed and possibly managed or perhaps in an integrated manner, combining all three. There are the

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<sup>6</sup> A global estimate puts the share of benefits at 46% for those who invest in sustainable land management to 54% for those who does get the positive externality from outside the community. See Nkonya, Mirzabayev and von Brown, op. cit.

geographical perspectives in which issues such as land zoning feature prominently in which case use of land is determined mainly by the suitability of land for specific purposes. Analyses from economic perspectives tend to focus on the demand and supply of goods and services. These more effectively reflect the trade, globalization and pricing issues. Ecological perspectives think of allocating land based on biodiversity conservation which may not appeal automatically to say a poor peasant. The disadvantage of the purely geographic models and ecological models do assume that prices are exogenous but obviously this is not. The advantage of economic modeling type of reasoning is that the direct incentives and disincentives become much clearer and the scopes for motivating the land managers (farmers, foresters, district administrators and the like) become clearer. In practice it may often be that all the perspectives may need to be brought into focus.

Whatever needs to be done cannot be done without specifically explicit policies on land management and its linkages with other sectors i.e., without a holistic view. Then again accurate data are needed on both the use of land, their beneficiaries, the barriers to sustainable land management and of course technology for analyzing and managing some of the major aspects of land degradation such as declining soil fertility. The strategy and corresponding action plan therefore should have the following elements as core issues:

- An appraisal of land resources and its quality which will seek to revalidate the existing knowledge and reclassify land by quality and principal causes of degradation
- Formulation of a National Sustainable Land Management Policy and possible necessary legal provisions through necessary acts of Parliament
- Setting up of a National Land use Commission
- A comprehensive Land Management Regulation to be overseen by the National Land Commission
- Land use Survey and publicly available Land Information Database
- Programmes for poor's access to land and its sustainable management



## 7.2 WATER RESOURCES



### 7.2.1 Introduction

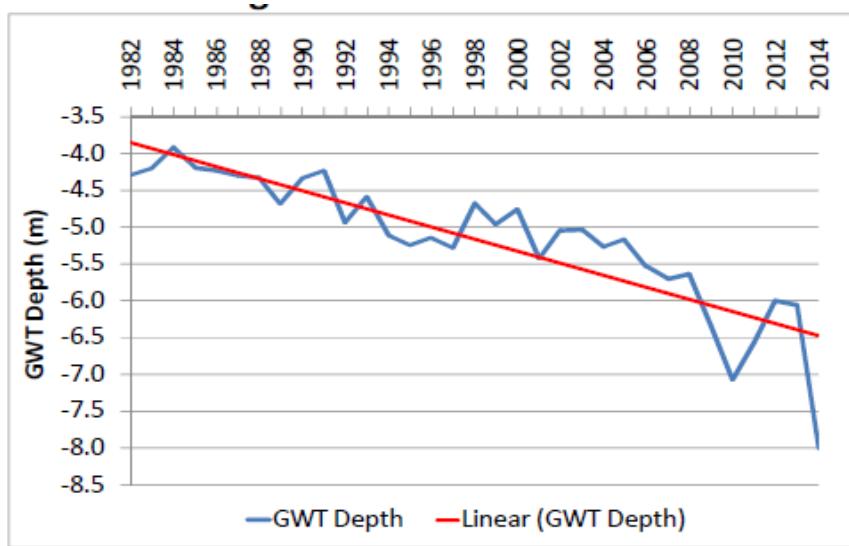
Water is an extremely precious natural resource in Bangladesh. Its society, culture and economy have grown and flourished centered around this resource. The endowment comprise of three types of resources - rainfall, surface water and ground water. The annual volume of rainfall falling over Bangladesh except eastern hill region is  $284 \text{ km}^3$ . Annual renewable surface water flow is around  $1210 \text{ km}^3$  and the groundwater recharge is estimated to be between  $28 \text{ km}^3$  to  $65 \text{ km}^3$ . There are about 230 rivers in the country with a total length of 24,000 km. Most of the flow in the river system is generated from outside the country and passes over the country through 57 trans-boundary rivers. Many consumptive and non-consumptive dependency of this resource in sector of agriculture, industry, fisheries and navigation keep economy of Bangladesh in continuum. Although the country is well endowed with water resources in terms of volume, its spatial and temporal variation causes shortages of resources for its many uses often inciting conflicts among various users. Conservation of this resource is indispensable for sustainable development of the country.

### 7.2.2 Current status

Water resources management in Bangladesh faces immense challenge for resolving many diverse problems and issues. The most critical of these are alternating flood and water scarcity during the wet and the dry seasons, ever-expanding water needs of a growing

economy and population, and massive river sedimentation and bank erosion. Bangladesh also faces serious water scarcity during dry season. Rivers and wetlands are dried up because of diminishing upstream flow. Groundwater table falls because of abstraction for irrigation and has become a major concern due to an ever increasing fall in the water table in certain parts such as the Barind in the country (see Fig. 2). Additionally, the industrial pollution becomes so bad at number of places that further limits the availability of usable water.

**Fig. 2:**  
**Groundwater Table depth in Northern Bangladesh**



Source: Water development board as reported in Ministry of Food, Food Planning Monitoring Unit, *National Food Policy Plan of Action and Country Investment Plan: Monitoring Report 2015*, June 2015.

Water supply is also facing obstacles to meet the continuous growing water demand. Only 21% water demand is met by surface water and only 15% of the total surface water is available in the dry season. Using more surface water is a considerable challenge at the moment because of lack of infrastructure for abstraction, treatment and distribution. Also groundwater abstraction is at constraint due to salinity intrusion and arsenic contamination. As practically available water now is  $36 \text{ km}^3$  and total water demand (agriculture, municipal and industrial) is  $35.78 \text{ km}^3$ , thus in near future water demand is bound to exceed the practically available resources, especially under climate change scenarios, if no intervention has taken place.

There is a growing need for providing total water quality management (checking salinity, deterioration of surface water and groundwater quality, and water pollution), and maintenance of the eco-system. There is also an urgency to satisfy multi-sector water needs with limited resources, promote efficient and socially responsible water use, delineate public and private responsibilities, and decentralize state activities where appropriate. All of these have to be accomplished under severe constraints, such as the lack of control over rivers originating outside the country's borders, the difficulty of managing the deltaic plain, and the virtual absence of unsettled land for building water structures.

### **7.2.3 Interventions made in water sector**

While there is not a long historical trend available on water-related investments data in Bangladesh, during the period 2007 to 2011, government investments have been allocated mainly to water resource protection, disaster prevention and preparedness, flood prevention and control, water resources policy and administrative management, and river development. The Ministry of Agriculture has undertaken some development projects for improving the efficiency and overall performance of irrigation systems with better on-farm water management practices. Bangladesh has established a regulatory framework for untreated effluent discharge into water bodies. Despite these, most of the industries are not in conformity as they are not connected to an effluent treatment plant and discharge directly into the rivers.

### **7.2.4 Earlier strategies, programmes and institutions**

Recognizing the shortcomings and challenges, the National Water Plan (NWP) project was initiated in 1983 with a view to develop a perspective in water development plan for the period 1985-2005 based on a comprehensive assessment of needs and availability of water resources.

To boost up the progress, the Water Resources Planning Organization (WARPO) was established 1991. The first environmental impact assessment (EIA) document for the water sector was brought out in 1992 by the Flood Plan Coordination Organization (FCPO) which was later merged with WARPO in 1996. The Flood Action Plan (FAP) studies were summarized in the Bangladesh Water and Flood Management Strategy in 1995 as a preparation of a national water management plan, strengthening of water sector organizations, and allowing the private sector provide water related services whenever possible. Given the diversity of hydrological settings and unique regional requirements, recommendations have been incorporated into the National Water Policy in 1999, the Development Strategy in 2001 and the National Water Management Plan (NWMP) in 2003.

### **7.2.5 Strategy and action plan**

Of 17 goals and 169 targets formulated as part of SDGs, without a full attention to the development of the water sector, fulfillment of these targets by 2030 will be major challenge for Bangladesh. The existing sectoral status has been analyzed within the framework of relevant SDGs with direct correspondence to Goal 6 and indirect correspondence to Goals 12 & 13 with specific reference to water and sanitation i.e. consumptive needs of water along with its supply, inter-year and seasonal and spatial availability, water-related issues and problems such as flooding, inland water and drought and also discussing quality issues particularly near industries, salinity and arsenic issues. Based on the preceding discussions and the SDGs and its targets, a conservation action strategy is formulated. Concentrating on eight keys such as economic development, poverty alleviation, food security, public health and safety, standard of living and protection of the natural environment, the conservation strategy may have the following foci:

- Increasing water use efficiency in agriculture sector (efficiency in water supply infrastructure in rural and urban areas, water quality monitoring, rain water harvesting, reliable arsenic mitigation technologies, community water supply and sanitation facilities etc)

- Reducing dependency on groundwater (natural and artificial recharge of groundwater., private sector withdrawal for agricultural/industrial usages, discouraging groundwater mining)
- Increasing trans-boundary flow during dry season (monitor quantity and quality of trans-boundary inflow, reviewing existing treaties, resolving any persisting issue etc)
- Reducing water pollution, strict and regular quality monitoring and enforcement of laws, ensuring natural flow of all rivers and canals, development/updating of IEE and EIA manuals, conducting environmental screening & post-evaluation.

Improvement of water efficiency in agriculture, which is low, through adoption of improved irrigation methods and alternate cropping, will potentially save considerable amount of water. The dependency of agriculture and drinking water supply sector on groundwater needs to be reduced by shifting to surface water sources as far as practicable. That, in turn, will require increasing trans-boundary flow especially during dry season through successful treaties with upstream countries. Reducing water pollution through strict enforcement of existing rules and regulations will be another focus of the action plan.



## 7.3 FOREST RESOURCES



### 7.3.1 Introduction

As of Forest Department (FD), the total area of forest land in Bangladesh is about 2.6 million hectares. Out of which 1.6 million hectares is under the control of the Forest Department (FD). Un-classed State Forests (USF) extending over an area of 0.73 million hectares were until recently under the control of the Deputy Commissioner and now have been placed under the control of District Councils. The village forests scattered throughout the country amounts to 0.73 million hectares. On the basis of location and topography forests are classified as hill forests, plain land sal forests, mangroves, coastal plantation forests, fresh water swamp forests and village forests. The state-owned forests are eccentrically distributed in the. Over 90 per cent of the state owned forestland is concentrated mostly in 12 districts in the eastern and south-western regions of the country and out of 64 districts, 32 districts have no state owned forest at all (BBS 2016). Of the total forest area, 84% has been classified as natural forest and nearly 16% as plantation forest. The two most common types of forest, namely Hill forest and Mangrove forest cover more than 68% of total forest area. Legally, forests are classified as Reserved Forest, Protected Forests, Acquired Forest, Vested Forest, and Private Forest.

### 7.3.2 Current status

The forestry sector accounts for about 3% of the country's gross domestic product (GDP) and 2% of the labor force. However, these figures do not reflect the real importance of the sector in terms of monetary value. The GDP figure does not properly count the large quantities of fuel wood, fodder, small timber and poles, thatching grass, medicinal herbs, and other forest produces extracted illegally. Services provided by forests cover a wide range of ecological, political, economic, social and cultural considerations and processes.

Forests contribute to climate change protection through carbon sequestration as well as offering economic, environmental, and socio-cultural benefits. Role of forests in poverty alleviation is immense. In 2015 employment in forestry sector was 1.5 million Full Time Equivalent (FTE) of which 0.60 million were due to women. There are at least 19 million of people who are absolutely dependent on forests for their livelihoods in Bangladesh. There could be another 19 million who are dependent on forests in one way or another. Literature shows contribution of village forest income to total household income varied from 8.9% to 18.6%. Lastly, but not the least forest are the reservoir of both plant and animal biodiversity which in a way regulate the web of life.

On the other hand, continuous forest degradation and losses hinder prospect of its sustainable development. Owing to such factors as over exploitation, conversion of forest land for agriculture, fire and grazing, forest resources in Bangladesh have been continuously depleting in terms of both area and quality.<sup>7</sup> According to the Global Forest Assessment 2015, Bangladesh annually lost 2600 hectares of primary forest land between 1990 and 2015. Primary forest land of the country gradually decreased from 1.494 million hectares in 1990 to 1.429 million hectares in 2015. And wherever there are forests, there are in many cases only limited crown cover at best.

There are many factors behind deforestation and degradation of forest land. Population pressure and conversion of forest land into pastures or crop land often followed in many countries but not necessarily in the same manner<sup>8</sup> and thus there is a need for understanding the exact nature and manner of such conversion.

### **7.3.3 Interventions made**

Steps regarding forest resources development and preservation and assessment of its benefits and utility have been taken in the following areas:

- Increasing forest cover, protection of biodiversity through strict enforcement of laws (such as ban on logging) and participatory management<sup>9</sup>;
- Optimizing consumption of fuel wood, timber and bamboos, rehabilitation of shifting cultivators greening the Un-classed State Forest (USF) lands in the Chittagong Hill Tracts under participatory community forest programmes, abolishment of traditional villager system through relocation, relocation of forest encroacher subject to policy directives and incentives, constitution of national nature conservation institute and conservation of common property resources;

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7 The forest degradation and deforestation had quite some media attention which indicates the popular idea of role of forest in the livelihood of the people and the immediate causes of such degradation. For an analysis see, Sadath, Md. Nazmus and Sabrina Rahman, Forest in crisis: 2 decades of media discourse analysis of Bangladesh print media, Forest Policy and Economics, 68 (2016) 16–21

8 Ashraf, Jawaid, Rajiv Pandey and Wil de Jong, Assessment of bio-physical, social and economic drivers for forest transition in Asia-Pacific region, Forest Policy and Economics (2016).

9 Chowdhury, M. S. H., M. Koike and N. Muhammed, Embracing Collaborative Protected Area Management for Conservation: An Analysis of the Development of the Forest Policy of Bangladesh, International Forestry Review Vol.11(3), 2009.

- Scaling-up of co-management of Protected Areas (PAs), promotion of eco-tourism activities and provision Alternative Income Generated Activities (AIGAs) for forest dependant people residing outside forests through cooperatives have as well been intervened.

Question of course arises as to how far such interventions have borne fruit, particularly logging bans to arrest deforestation. Literature seems to suggest that these have had little effect unless accompanied with alternative pathways for the local communities and those depending on the forest for livelihood are found and practised.<sup>10</sup>

### **7.3.4 Strategies**

The Government of Bangladesh adopted the first National Forest Policy in 1979 with the objective of providing greater protection and placing greater emphasis on conservation of the country's forest assets whilst concomitantly developing its rural and industrial economies. Principally, the Department of Forests (FD) is responsible for the management, planning, protection and strategy development of country's forest resources in accordance with the National Forest Policy (updated in 1994), Forest Act and regulations.

The current strategy is co-management. But this is practiced only in small patches of forests, not in the major ones. Other strategies in the past included agro-forestry and social forestry in the villages to supplement the supply of tree products (fuel wood, timber). But note that such social forestry while good in itself for providing certain livelihood and income benefits to the community, does not really fulfill the functions of a natural forest including preservation of bio-diversity and other benefits such as prevention of soil erosion. Hence the future strategies should give more attention to the full and effective practice of co-management as well as preservation of natural forests. Then again while social forestry should of course be encouraged this should not be taken to be a substitute for natural forestry. These issues need to be considered while suggesting any action plan to halt forest depletion and degradation and forest regeneration and afforestation.

### **7.3.5 Action Plan**

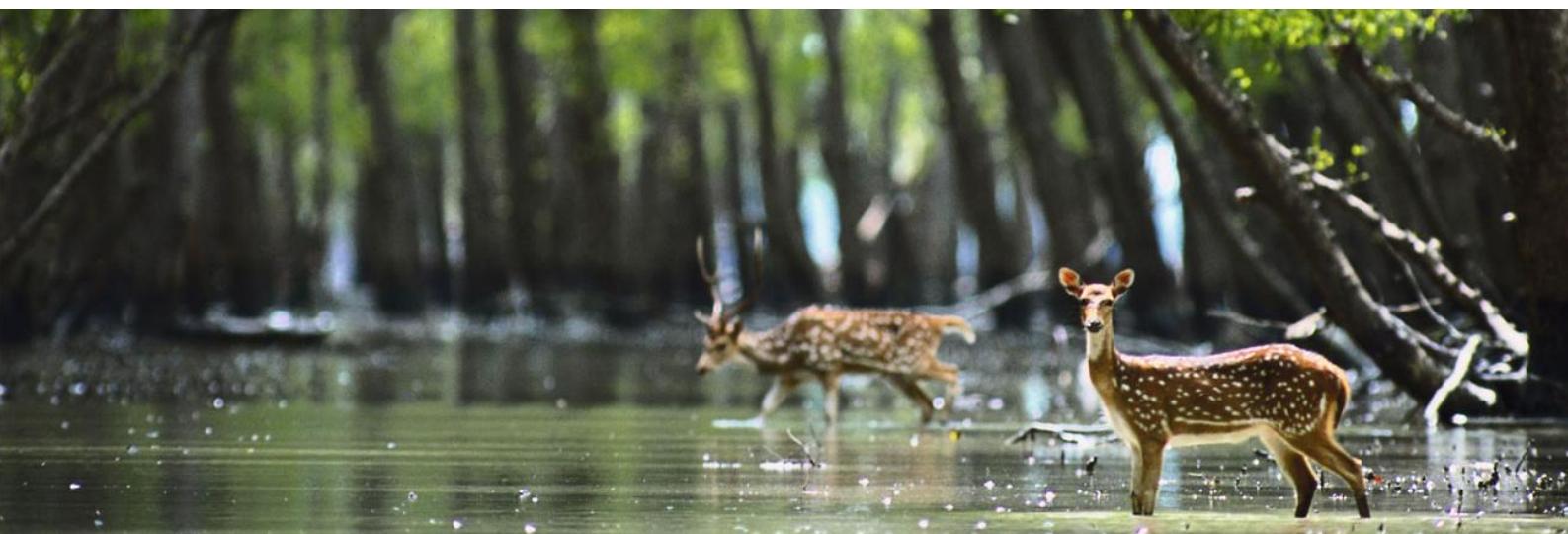
Given that there are major problems of forest degradation and depletion in the country and the drivers behind them while anecdotally known, knowledge of the pathways and the processes behind the factors are limited. There is a dire need for information collection and review before major investment and policy decisions are taken for the forests. Given such

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10 Sarker, S. K., J.C. Deb, and M.A. Halim, A Diagnosis of Existing Logging Bans in Bangladesh, International Forestry Review Vol.13(4), 2011; Mukul, S.A., J. Herbohn, A.Z.M.M. Rashid, and M.B. Uddin, Comparing The Effectiveness of Forest Law Enforcement and Economic Incentives to Prevent Illegal Logging in Bangladesh, International Forestry Review Vol.16(3), 2014. For major forest areas such as Sundarbans others have suggested changes in the property regime systems, more specifically co-management with the forest communities having specific roles, responsibilities and benefits along with the State. However, while this has been the theory, in actual practice, there are shortcomings particularly on behalf of the owners of the forest (State forest departments) which need to be attended to. For a historical analysis in case of the Sundarbans, see Roy, Anjan K. Dev, Khorshed Alam and Jeff Gow, A review of the role of property rights and forest policies in the management of the Sundarbans Mangrove Forest in Bangladesh, Forest Policy and Economics 15 (2012) 46–53.

premise, the following may be elements of an action plan for conservation, halting degradation and depletion and regeneration of natural forests as well as encouraging social and agro-forestry. Note that interventions both of bio-physical, socio-economic (including management style being participatory rather than hierarchical) nature will be necessary.

- Generate information and data on forest land encroachment, depletion, deforestation and causes behind them followed by critical analysis of the factors and their importance by forest
- Upgrade and update of National Forest Policy, Forestry Master Plan and frame Rules under Bangladesh Wildlife (Protection and Safety) Act, 2012;
- Enact a new Forest Conservation Act to restrict non-forestry use of forest land and protection of trees outside forests, amend the Forest Act;
- Reorganize the Forest Department; build capacity and provide necessary logistics for FD and change management style in line with participatory forestry practices and co-management with clear rights and obligations of forest community, beneficiaries and the forestry management
- Redefine khas land to exclude Acquired Forests, Protected Forests, newly accreted and forested coastal land and common property resources like haor, baor, beel, rivers and other wetlands to avoid lease for the sake of conservation of these fragile ecosystems;
- Implementation of Social Forestry Programme and Ecotourism type activities whenever seem feasible with the support of GoB;
- Identification, protection and management plan compilation for environmentally sensitive and biologically potential areas as well as for natural forests;
- Constituting a task force to review transfers of forest land after 1972 and recover lands which are not absolutely necessary for the purpose for which these were initially transferred.
- Bringing un-classed State Forests under Community Forestry Programme. To the extent possible, all Government owned (Khas) land in all hill areas, Barind and Madhupur Tracts to be brought under agroforestry or reforestation activities. Public-private partnership in such areas can also be explored;
- Review of clear felling method in order to reduce damage to biodiversity. Experimental plantations to be commenced without burning debris;
- Incorporate the international collaboration themes of ICTPs to which Bangladesh is a party in existing and new projects.
- Ensuring adequate financing for forestry sector and to this end use the Global Climate Fund as a possible source



## 7.4 BIODIVERSITY

Biodiversity is the variety of all life forms and their interactions with one another, and with the physical environment that has made Earth habitable for humans. Biodiversity can be said to be the cradle of life (including human life) without which it cannot ultimately survive. Biodiversity provides the basic necessities of life, offer protection from natural disasters and disease, and are the foundation for human culture. Though small in size and denser in population, Bangladesh is a biodiversity rich country. The people of the country have traditionally been dependent on biodiversity resources for generation after generations. Biodiversity usually is categorized as animal life system (fauna) and plant life system (flora). While many of the issues are similar across them, there are major scientific, economic, and cultural differences in the interaction between humans and biodiversity type and hence these are discussed below separately.

### 7.4.1 BIODIVERSITY: FAUNA



#### 7.4.1.1 Introduction

Bangladesh is exceptionally rich in wildlife and other biodiversity as a consequence of its location in the subtropical belt at the confluence of two major biotic sub-regions of the Oriental Region: Indo-Himalayas and Indo-China. This strategic location makes Bangladesh as one of the most ecologically significant and biologically diverse landscapes in terms of migratory species, stepping stones, staging ground and flyways for wildlife movements of the region. The hilly area in the southeast of Bangladesh form part of Indo-Burma Biodiversity Hotspot. The diverse ecosystems and plants support many species of fauna. Of

the wildlife, there thrive a total of 138 mammal, 650 bird, 167 reptile and 49 amphibian species.<sup>11</sup>

The biodiversity of Bangladesh is important for various reasons, the most important of which is to support the life in general and lives and livelihoods of the people in particular. The biodiversity in crop agriculture, fisheries, livestock, and forestry sectors are essential particularly for food security as well as for livelihood. However, more often than not the interspecies interrelationships or symbiosis are understood only in limited sense and many are also only ill-understood. On the other hand, the country has limited institutional capacity, and limited education and training facilities for the development of conservation and management of biodiversity.

#### **7.4.1.2 Current Status**

Bangladesh has rich faunal biodiversity as stated above. But there are major threats to it. According to the national Red List of Threatened Species, 22% of all the assessed species are nationally threatened. At least 13 species, most of which were charismatic wildlife, have extirpated from Bangladesh. Thankfully, Bangladesh still has many important species of wildlife like the Tiger (*Panthera tigris*). The main direct threats are habitat degradation and fragmentation, change in land-use pattern, change in hydrological regime, pollution, over-exploitation of resources, unplanned and uncontrolled tourism, expansion of invasive alien species, and climate change. The indirect threats include legal and institutional systems that promote unsustainable exploitation, economic systems and policies that are not supportive to biodiversity conservation, inequality sharing of benefits of biodiversity, insufficient knowledge and awareness, and erosion in genetic diversity.

#### **7.4.1.3 Interventions Made**

As highlighted in the Fifth National Report to the CBD in 2015, the most notable achievement for Bangladesh is the expansion of protected area network through the declaration of new protected areas. Currently, Bangladesh has a network of 38 National Parks and Wildlife Sanctuaries. Moreover, the Government has so far declared 13 wetlands and coastal-marine areas of biodiversity significance as Ecologically Critical Areas (ECAs). The Government has declared a number of wild flora and fauna as the nationally protected species. The captive breeding programmes of some important species of wildlife are also going on. Other than the wild animal diversity, there are some initiatives of the conservation of domestic animal diversity as well.

#### **7.4.1.4 Strategies**

As a party to the Convention on Biological Diversity (CBD), Bangladesh is committed to conserve the biodiversity and the commitments are articulated in the Wildlife (Conservation and Security) Act in 2012. Despite the formulation of the National Biodiversity Strategy and Action Plan (NBSAP, 2006) and the Climate Change Strategy and Action Plan (BCCSAP, 2009), there is however no long-term, comprehensive programme in achieving implementation of

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11 It should be noted that this only indicates species biodiversity. There are two other types of biodiversity, viz., genetic biodiversity and ecosystem biodiversity. As the terms suggest genetic biodiversity relates to the variation across and within species in the genes while ecosystem biodiversity relates more to the variations in interactions among species and the physical world within a given ecosystem. Usually however it is the species diversity which is commonly discussed.

the biodiversity strategies, action plans and targets. One of the major aims of mainstreaming biodiversity issues remains yet a distant objective.

The Aichi targets have 5 strategic goals with 20 targets adopted in 2010 were expected to be achieved and/or implemented by 2020. Among the targets, the most immediate need is to make people aware of the value of biodiversity and mainstreaming these issues in development process and planning based on knowledge, science and technology relating to all aspects of biodiversity which must be improved, widely shared, transferred, and applied. Subsequently the SDGs called for targets by 2030 some which are basically the same to be achieved by 2020. What these bring to the focus is the necessity of ensuring scientific and socio-economic analytical assessment of the value of biodiversity and its processes and the consequences of its loss prior to any major specific intervention and subsequent mainstreaming. Note that the National Biodiversity Strategy and Action Plan 2005 had as its first Strategy as "Recognize the value and importance of biodiversity for the Bangladesh people and document properly its components, distribution and value". This became Bangladesh policy even 5 years prior to Aichi targets. The action plan therefore has to reflect these concerns and issues apart from very specific ones of technical and scientific nature.

#### **7.4.1.5 Action Plans**

Considering the priority actions needed for Bangladesh in line with the Aichi targets and relevant SDG targets, some major actions may be suggested as follows:

- Major efforts at data and information collection for understanding the biodiversity processes by specific ecosystems and its value to the society, the complex symbiotic relationships among species and human society;
- broad-based awareness and advocacy;
- Prepare satellite plan for integrating biodiversity concerns into national and local level planning for ultimate mainstreaming
- formulation and implementation of updated policy and laws, regular monitoring and research;
- widespread stakeholder consultation regarding how biodiversity concerns by locality may be integrated within local area development projects, plans and processes
- national capacity building for scientific management, development and protection of biodiversity;
- formalization of processes by which local stakeholders can take part in protected area governance;
- benefits sharing, avoidance of the alien/invasive species and
- Careful development of non-consumptive uses of protected areas and wildlife through ecotourism.
- effective and well-managed protected area network and inclusion of strategically chosen new areas;



## 7.4.2 BIODIVERSITY: FLORA



### 7.4.2.1 Introduction

The floral diversity of Bangladesh is extraordinary. Considering the country's bio-geographic features, the country possess notable diversity in its ecosystems, e.g. Sundarbans Mangrove ecosystem, Chittagong Hill Tract, Sal forests, Ratargul wetland ecosystem, Agro-ecosystem and Homestead ecosystems etc. 'Encyclopedia of Flora and Fauna of Bangladesh' recorded 3,611 angiosperm taxa from the country, whereas the number increases to 3,723 due to recording of many new plants by 2015. Considering genetic diversity, some agri-cultural crops possess rich genetic resources, e.g. jute and allied fiber crops (6,012 accessions), 9,925 accessions of 137 agri-horticultural crops by BARI. Forest genetic resources are also rich, e.g. 2,260 plant species are reported from the Chittagong region and 1,048 tree species including the gymnosperm, dicot and monocots reported from the country.

The people of Bangladesh depend on its floral stock for their day-to-day sustenance as well as overall livelihood security. Through agriculture and forestry as well as aquatic plant diversity, plant resources provide food, fiber, medicine, timber and also contribute significantly to national economies and employment of the large population.

### 7.4.2.2 Current Status

However, the present condition of floral diversity in Bangladesh is at stake. The stress is mainly induced due to population pressure, reckless pollution, habitat destruction through land use change, introduction and rapid spread of invasive alien species along with the recent climate change vulnerabilities. Over exploitation of resources, e.g. unregulated harvesting, illegal felling, encroachment, shifting cultivation in CHT, indiscriminate harvesting of medicinal plants and non-wood forest products exerts a significant negative

impact on the biodiversity of the country. About 486 vascular plants are identified as threatened in Bangladesh, and expectation is that more species will be threatened if adequate measures are not taken to halt the destruction of the biodiversity.

#### **7.4.2.3 Interventions Made**

Bangladesh has recently updated its National Biodiversity Strategy and Action Plan (NBSAP). The revised NBSAP has given Bangladesh the opportunity to give a momentum in biodiversity conservation. Globally a new set of 17 goals has recently been approved as the Sustainable Development Goals (SDGs) to guide global development until 2030. Bangladesh has been exclusively upheld the goals 14 and 15, focusing on marine and terrestrial ecosystems separately. The sector biodiversity is believed to coherence between the MDG and Aichi Biodiversity Targets 2020 that will continue in the SDG era till 2030.

#### **7.4.2.4 Strategies**

Considering the importance of protection and improvement of the country's environment and biodiversity, the GoB in 2011 inserted the section 18A in the constitution as "the state shall endeavor to protect and improve the environments preserve and safeguard the natural resources, biodiversity, wetlands, forests and wildlife for the present and future citizens". The global policy guidelines are by this time are well-known and been discussed in the earlier sub-section on faunal biodiversity. In line with these guidelines in 2012, the Government enacted the Bangladesh Wildlife (Conservation and Security) Act for biodiversity protection. Given these and the Aichi and SDG targets, the same strategy as before and general action plans may be adopted while the following additional action plan may also be considered.

#### **7.4.2.5 Action Plans**

- Updating of inventory on existing and endangered flora and fauna;
- Develop database of all known species based on published information
- Prepare a handbook that illustrate and describe the known species of plants and animals in Bangladesh;
- Wildlife survey to be initiated with adequate qualified personnel and equipment in the protected areas. Survey will include study of population dynamics and listing of rare, endangered and threatened species
- Inventory build-up of marine biodiversity, micro organism, agro-biodiversity, lower plants etc;
- Develop a National Policy on Genetic Resources;
- Prepare management plan for all ecosystem of the country including the Wildlife Sanctuary, National Parks, Ecologically Critical Areas etc;
- Integrate biodiversity information and communication protocol in all development projects;
- Network biodiversity information system so that they are accessible across sectors
- Build capacity in the local government to manage biodiversity locally;
- Plant species bearing food and providing shelter to wild animals and bird should be included in tree planting programme in rural and forest area;
- Restoration and re-colonization of native tree species with Assisted Natural Regeneration (ANR);

- Create widespread awareness amongst the general public;
- Graduate courses on wildlife biology and management to be introduced in universities for production of professionals on the subject;
- School curricula to be incorporated with small projects on fields' visits of 'biodiversity hotspots';
- Physical facilities and expertise of the Universities to conserve germplasm;
- A National Committee for domesticated Plant and Animal Genetic Resources should be established. This may be constituted under the auspices of a National Institute, e.g BARC (apex body of the NARS);
- Eco-tourism to be developed in protected areas for public awareness and generating income.



## 7.5 INLAND FISHERIES



### 7.5.1 Introduction

Fisheries resources play extraordinary role in the economy of Bangladesh, as the sector alone responsible for about 3.65% to GDP and 23.84% to agricultural GDP. Straddling on the Tropics and blessed by the largest delta of the world, Bangladesh has a total inland water area of 4.7 million ha of which 83.1% is open water capture fishery and 16.9% for closed water culture fishery. Seasonal floodplain expands over a massive 2.7 million ha of area for 4-6 months of the year. The arena inflates the fisheries sector ideally for the country.

### 7.5.2 Current Status

In 2014, the FAO ranked Bangladesh as 4<sup>th</sup> in aquaculture and 5<sup>th</sup> in open water fish producing country of the world. Fish accounts for about 60% nationwide animal protein intake. About 10% of annual export earning comes from the fisheries sector and ranks 3<sup>rd</sup> among the export oriented industries. This sector provides employment to about 1.2 million full-time and 12 million part-time fishermen and workers. The annual fish catch from the rivers of Bangladesh shows that in total 1, 74,878 mt fishes were produced in 2014-2015 fiscal year. Of them, *Hilsa* singly contributes to more than 77.5%. Besides, major and minor carps (2.25%), larger catfishes and live percoids (1.15%), shrimps (3.2%) and other fishes (16%) comprise the remaining catch in the open waters.

Despite exponential growth in fishery production, native fish diversity of Bangladesh is at stake. As of IUCN Bangladesh (2015), out of 253 native species, 64 have been assessed as threatened (3 CR, 13 EN, 13 VU) in comparison to 54 from 266 species assessed back in 2000. Several in-bound and trans-boundary dams and embankments are playing crucial role

in setting fate for the fisheries production. In case of *Hilsa*, after the fifties, the production sharply fell in the Padma river system after the Farraka barrage construction in early 70's. Grave threats are also caused due to increasing usages and accidental and intentional discharge of effluents industrial and agricultural sectors. Native breeding ground like Halda River, despite being declared Ecologically Critical Area (ECA), is falling victim to effluent-induced pollution. The major climatic factors that influence the fish and fisheries of Bangladesh so far identified as, rainfall, drought, temperature and siltation. Major changes in these elements of climate cause loss of natural habitat for the fishes. The high temperature causes low survival of spawns; in addition, underdeveloped and lack of techniques work as restraints for the overall progress in hatchery and farming practices.

### **7.5.3 Interventions Made**

Historically, the fisheries sector in Bangladesh has been managed on ad-hoc basis. In early seventies it was under agriculture ministry and now under Ministry of Fisheries and Livestock. However other ministries are also involved in the sector due to the multidimensional uses of the aquatic bodies and resources. National development Strategies and programs for the fisheries sector are formulated in the context of the country's five-year development plans. The major objectives related to fisheries sector development during the Sixth Five Year Plan (2011-2015) have been set according to the vision 2021 and objectives of the perspective plan as well as the goals of the Millennium Development Goals.

### **7.5.4 Strategies**

The targets-under-focus, matching the SDG framework for 2030, for sustainable inland fisheries resources fall in seven broad categories: (i) Income and Poverty; (ii) Human Resource Development (iii) Water and Sanitation; (iv) Energy and Infrastructure, (v) Gender Equality and Empowerment; (vi) Environment Sustainability; and (vii) Information and Communications Technology (ICT). To achieve these, DoF use more than one dozen of regulation and acts such as the Protection and Conservation of Fish Act (1950), Bangladesh Fisheries Development Corporation Act (1973), National Environmental Policy (1992), National Water Policy (1997), National Fish Policy (1998), Reservoir Protection Act (2000), National Shrimp Policy (2014) etc. How far these strategies and policies actually work in practice remains debatable. Secondly, there seems to be limited information on actual fish catch and their species composition particularly the small commercial and subsistence variety. It has been documented that the catch figures are substantially biased downwards, particularly that from the inland capture fishery.<sup>12</sup> This is a major issue from the view point of people's livelihood, food security and nutrition. Similarly, how far can the culture fishery can actually be a substitute of capture, wild and natural fishery remains little investigated and understood. From nutritional and other points of view, culture fishery is only at best a limited substitute. In any case the fisheries biodiversity and genetic diversity certainly cannot be maintained with culture fishery alone. In this connection it is instructive to refer to one of the Aichi Biodiversity targets which reads as "By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on

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12 Asaduzzaman, M. and S. M. H. Khan, Impacts of Climate Change on Food and Nutrition Security in Bangladesh: Issues, Policies and an Agenda for Action, unpublished (2016).

threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits."

### **7.5.5 Action Plans**

Based on the above issues, concerns and guidelines, the following actions may be suggested for adoptions and implementation:

- Improvement of the understanding the species diversity of different inlands water bodies like *Beels*, lakes, rivers and streams of Bangladesh.
- Regular monitoring of the water quality and pollution of different water system for threshold ecosystem requirements.
- Demarking the land and water use area uses.
- Understanding the life patterns and livelihoods of the fisheries dependent people
- Control of exotic/alien fish/crustacean/ predator species import in the country.  
Formulation of quarantine laws and establishment of laboratories for fish importation in Bangladesh.
- Management plans incurred from human causes and natural disaster.
- Adopting partnerships and collaboration among various agencies, organizations, academia and related Industries to conserve the target fishes.
- Improvement of educational and extension efforts to advance the understanding of fish and fisheries resources among the general public and various stakeholders.



## 7.6 COASTAL AND MARINE RESOURCES



### 7.6.1 Introduction

Bangladesh is well-endowed with extensive living and non-living natural resources in its long and extended coastal and maritime jurisdiction in the Bay of Bengal. Bangladesh has about 710 km long coastlines, 37,000-km<sup>2</sup> continental shelf having 50m depth in the Bay of Bengal. The Exclusive Economic Zone (EEZ) of Bangladesh extends from the base line to 200 nautical miles seaward. Following the international verdict on the disputed maritime areas with the neighboring countries the total 19,467 km<sup>2</sup> unexplored avenue of opportunities has been opened to explore and utilize marine resources for economic development of Bangladesh. Coastal and Marine ecosystem of Bangladesh considered as one of the world's 64 Large Marine Ecosystems. 12 different agro ecological zones have been identified in the coast that supports wide range of flora and fauna including rich genetic diversities.

Of the coastal and marine resources the main resource so far exploited is the fishery and aquatic resources. Indeed among all kinds of fishery, industrial marine fishing has grown the fastest at the rate of nearly 9% per year over the years 2000-13. Artisanal marine fishery has on the other hand grown rather slowest among all types of fishery, just short of 3%. The implication is obvious in that the poor coastal people dependent on marine resources may be losing out to the commercial endeavors of the rich.

### 7.6.2 Current status

The coastal fauna of Bangladesh are a total 453 species of birds, 42 species of mammals, 35 reptiles and 8 amphibian species. A total of 301 species of mollusks and over 50 species of commercially important crustaceans and 76 species fish from estuarine have been recorded

so far in the coastal zone. The marine waters of Bangladesh are also having 442 species of Fish, 36 species of marine shrimps, about 336 species of mollusks. There are 50 species of brown algae 82 species of red algae and 26 species of green algae. 5 species of sea grass have so far been reported from Bangladesh coast. In addition, 3 lobsters and 7 species of turtles and tortoises, 168 species of seaweeds, 3 sponges, 16 crabs, 3 lobsters, 10 frogs, 3 crocodiles, 24 snakes, 3 otters, 1 porcupine, 9 dolphins and 3 species of whale found in Bangladesh territorial water. The present total would be 529 marine and 149 estuarine fish species in Bangladesh water. There are about 100 commercial species of which 20 fish families are highly commercial. In addition, abundance of pelagic fishes, e.g. seven species of tuna and skipjack, four species of mackerel, fourteen species of sharks and rays were also found. Bangladesh also has a rich diversity of shellfish. About 36 species of shrimps have been recorded from the marine water of Bangladesh. With a recent record a total of 63 shrimp and prawn found in inland and marine water of Bangladesh. The coastal region of Bangladesh houses several mangrove ecosystems as well.

The country produced 3.06 million tons of fish in 2010-11, of which 0.55 million tons (18%) came from marine capture fisheries. Fisheries sector contributes 5.71% of total export earnings and 4.92% to the GDP. The sector contributes 22% of the total agricultural production and 63% of the total animal protein intake of the country. The coastal marine fisheries sector provide livelihoods opportunity to millions of rural poor and contributes significantly to national food and nutrition security.

### **7.6.3 Interventions and strategy**

Bangladesh Government took different initiatives to focus on restoring ecological diversity as well as fostering blue economy in the Bay of Bengal. The Sustainable Development Goals (SDGs) also calls for conservation and sustainable use the oceans, seas and marine resources for sustainable development (Goal 14). The interventions are stated below:

- 204 km<sup>2</sup> fishing ground declaration to provide safe breeding ground for fisheries and shrimps.
- 5 sanctuaries declaration to protect Hilsa breeding ground
- 1738 km<sup>2</sup> declared as the Swatch of No Ground (SoNG-MPA) as country's first marine protected area for the long-term protection of cetaceans.
- 4 Ecologically Critical Area (ECA) declared for pollution mitigation.
- 5 wildlife sanctuaries, 1 game reserve and two national parks declared in coastal zone.
- Sundarban mangrove forest declared as RAMSAR site and UNESCO World Heritage site.
- Ban 65 days for trawl fishing and shrimping in the Bay of Bengal to protect shrimp.

Question arises regarding the efficacy of these measures. But more importantly the implications of the different trends should be understood properly such as the very slow rate of expansion of artisanal marine fishery as well as the general pattern of landings by type of fishes being mixed, and small demurrals predominating in terms of quantity as well as real value. In fact, there still is only limited information on the available resources, the interactions of people with them and the way their livelihood depend on them and what their losses might mean to them. Furthermore, there is the issue of pollution as well as hazards arising out of the climatic variability and change and the potential and actual degradation that may be occurring. The action plan needs to reflect these concerns and issues.

#### 7.6.4 Action plan

For the protection of coastal and marine resources the following actions should be taken,

- Exploratory survey needs to be conducted for aquatic and coastal resources and stock assessment.
- Establishment of more Marine protected areas (MPAs) should be another priority.
- Introducing participatory co-management system in hilsa sanctuaries, with more comprehensive compensation measures for lost earnings during ban season.
- Thin canopy of the Sundarbans as well as other coastal areas should be bought under mangrove rehabilitation program.
- Proper utilization of newly accreted land as well as other coastal land should be ensured through a coastal land-use planning.
- Coastal and marine tourism development should be guided under proper planning, management standards and guidelines of green tourism.
- Effective and adaptive conservation management plans and actions are required including the identification of climate sensitive coastal and marine areas for conservation.
- Strategies need to develop for regional initiative to stop transportation of 'illegal migrants' and other illicit activities that cause subjective insecurity (e.g. piracy) in the 'High Seas'.
- Co-operation and coordination among different agencies of the government and other stakeholders are required at multiple scales.



## 7.7 LIVESTOCK RESOURCES



### 7.7.1 Introduction

Livestock is a natural resource and an integral part of the farming system in Bangladesh. In 2014-15, livestock contributed 1.73% to GDP. The sector grew at the rate of 3.1% per annum. Livestock provides nutritious food (milk, meat and eggs) for human nutrition and good health and contributes in national economy in many other ways; draught power, cow dung as a source of - biogas, manure, organic fuel; hides, skin and bone grist as a source of foreign exchange; offal, blood and feathers as a source of protein concentrate for feeds, etc.

### 7.7.2 Current Status

Over 60% of the population is involved either with subsistence or commercial livestock farming and is thus important for generation of employment including for women. Livestock is directly or indirectly associated with at least 9 SDGs. The milk, meat and egg productions from livestock were 6.97 mn mt, 5.86 mn mt and 10995.2 million nos., respectively in FY15 against a national demand of 14.48 mn mt, 6.95 mn mt and 16504 mn nos., respectively. Indicating that the country is still far behind in meeting the national demand

The growth rate of livestock is comparatively slower than any other sectors of agriculture. Major constraints of this sector are poor genetic makeup of the animals; limited development of proper technologies and high price of livestock inputs; outbreaks of infectious diseases; poor veterinary services; absence or low enforcement of policy, acts, rules and guidelines; insufficient access of farmers to credit; limited or absence of risk coverage schemes for farmers; inept infrastructure of the department of livestock services (DLS) and Bangladesh livestock research institute (BLRI); for regulatory, research and

extension services. Although DLS has established a Veterinary Hospital at every Upazilla, its limited manpower and infrastructure capacity restrict the service only around the Upazilla centre.

Due to increased cultivation of agriculture crops, natural pasture land is decreasing every year that ultimately results in degradation of genetic potentials of farm animals due to lack of feeds. The genetic pool of cattle is being changed by the present crossbreeding program of DLS which while improving the productivity of animal is also resulting in gradual degradation of indigenous genetic pools. There are about six native chicken germ plasms in the country, of which three (Aseel, Native dwarf type and Yasmine) are at the risks of extinction. As of emergence of new trans-boundary animal diseases, the stocks are under threats, especially the poultry due to avian influenza.

### **7.7.3 Interventions Made**

DLS has taken several steps to overcome the constraints. Initiatives regarding this sector have been made and implemented. A new organizational structure of DLS has already been proposed to the Ministry of Livestock and Fisheries. For fodder development, steps have been taken to introduce cultivation of local and some imported high yielding fodder. In 1958, artificial insemination (AI) has been introduced in the country to improve the genetic makeup of the cattle. However, due to lack of proper breeding policy and insight, the steps are not fully adopted or been effective.

### **7.7.4 Strategies**

More than 14 national policies, acts, rules and guidelines are either in place or in process. Of the policies, Slaughter Act (2011), Animal Feed Act (2010), National Poultry Development Policy (2008), Animal Disease Rule (2008), Avian Influenza Compensation Strategy and Guidelines (2008), National Livestock Development Policy (2007), Animal Disease Act (2005), Bangladesh Animal and Animal Product Quarantine Act (2005) and few others are in operation. A Bangladesh Zoo Act and National Livestock Extension Policy have also been drafted. These policies are to improve disease control and feed supplies, genetic potential of stocks, quality control of livestock inputs, drugs, vaccine and biologics, market of livestock products and to support strategies and action plan in context of National Conservation Strategies (NCS).

### **7.7.5 Action Plans**

For conservation of livestock, long term action plan is necessary and required for acquiring following milestones –

Supply of quality inputs, providing doorstep/one-stop veterinary services and establishing laboratories for the diagnosis of diseases, safety and quality assessment of inputs;

- Swift development, analysis and approval of Dairy and Poultry Development Policy to boost up dairy and poultry farming;
- Proper, effective and well-monitored usages of antibiotics in poultry farming under veterinary regulation;
- Support to farmers by providing credit and insurance coverage;
- Development of organized marketing channel;

- Capacity build-up of DLS, BLRI and other relevant institutes for the production of vaccine, biologics and climate resilient livestock;
- Encouragement of private sector participation in research and livestock enterprise development and
- Development and promoting area-specific livestock practice e.g., buffalo farming along the coastally raised lands.



## 7.8 ENERGY AND MINERALS



### 7.8.1 Introduction

The extraction of minerals and primary energy resources in the present time continues to be considered as an input to productions; therefore extractive industries justify their actions primarily from the viewpoints of revenue earnings, resource use to support economic growth and advancement of material welfare. The growing demands for energy and mineral resources in our country have significantly been increased with the growth of population, urbanization and with industrial developments and generate pressures for rapid extraction of mineral resources. At the same time, extraction of mineral resources contributes to many of the problems (like environmental degradation, carbon emissions, displacement of populations, worsening economic and social inequality, social and political conflicts, tax evasion and corruption, increased risk for many health problems) that the SDGs are trying to address.

### 7.8.2 Current Status

Bangladesh is not very rich in minerals and primary energy sources. Major commercial deposits of minerals discovered in the country include among others: natural gas, coal, peat, construction rocks, sand, limestone, heavy mineral sand and white clay. Natural gas dominates as primary commercial energy source in the country and has been extracted at a rate of approximately 2700 million cubic feet per day from the existing 25 gas fields' reserves. The gas exploration efforts have been limited and the present productions cannot fully meet the existing demands. The country must look for more ways and means for extending the gas reserves in the country. And one way is reservoir management and the other is further exploration both of which are expensive activities. Then again one should

also perhaps look for other upcoming sources and their feasibility in the areas under Bangladesh jurisdiction.

More specifically there is need for off-shore exploration of gas hydrates for which there may be a good possibility of discovery in the Bay of Bengal.<sup>13</sup> There is a desperate necessity for diversifying primary energy sources.

Apart from natural gas resources of 14 trillion cubic feet in situ, our country has five discovered coalfields with good quality coal resource measuring approximately 3 billion tonnes. The peat resources are deposited in the scattered marshy lands having no major commercially attractive deposits as per present day's valuations. Only a small underground coalmine at Barapukuria, Dinajpur produces nearly one million tonne of coal annually. There is urgent need for coal resource development from existing coal deposits to supplement energy resources from domestic sources and to maximize local natural resources use with the objectives to supply sustainable and affordable energy to fuel economic development of the country.

The experience of coal mining in Barapukuria and mining of sand, stone, white clay in different areas of the country invited significant agricultural land loss, land subsidence, environmental degradation and displacement of people involuntarily. The existing mining practices and mine planning with careless environmental and social impacts and mine hazard assessment invited social unrest and environmental degradation of the locality. The cost of mining coal has been increasing significantly to address the issues in a compelling situation.

Although limited, extraction of construction stone, sand, white clay, limestone and heavy mineral sand have been targeted for revenue earning without a comprehensive bio-environmental and natural resource conservation strategy. As a result unplanned extractions of these minerals often leave behind destroyed scenic beauty, increased pollutions, threatened water bodies, agricultural land loss and threatened physical infrastructures and natural river flows. Part of the environmental and resource damages is caused by the existing leasing practices for mineral resource extractions. The other part is linked to limited or no monitoring facilities from the regulators, part lack of community awareness and the inadequate regulatory and administrative institutions.

Bangladesh needs to secure rational and sustainable use and diversify its primary energy sources in line with SDG targets to improve efficiency in energy consumption at an affordable cost and increase use of renewable energy. At the same time the energy intensive mining of primary energy commodities and other minerals should improve energy use by introducing energy efficient technology and waste reduction measures.

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13 For a global assessment of the issues involved, see Beaudoin, Y. C., Waite, W., Boswell, R. and Dallimore, S. R. (eds), *Frozen Heat: A Global Outlook on Methane Gas Hydrates*, Volume One, United Nations Environment Programme, GRID-Arendal, 2014; Beaudoin, Y. C., Dallimore, S. R. and Boswell, R. (eds), *Frozen Heat: A Global Outlook on Methane Gas Hydrates*, Volume Two, United Nations Environment Programme, GRID-Arendal, 2014

### **7.8.3 Strategies and Policies**

Many mining related laws prevailing in our country are age old and not enforced currently. Also there exist several laws and regulations having environmental implications. There are different organizations and government agencies directly or indirectly involved in mineral resources, land, environment, and water resources management. But Bangladesh lacks specific and functional legislation and policy that provides guidance to rehabilitation and resettlement of project affected people due to mining of energy and mineral resource extractions. Therefore, these regulations, policies and institutions should be updated/reformed and adequately made functional in line with national 7<sup>th</sup> Five Year Plans and SDG targets.

### **7.8.4 Action Plan**

Apart from regulatory and policy reforms and updating them towards improved resource conservations and efficiency enhancement for primary energy use, there are needs for developing institutional capacity and allocation of funds for environment and mining regulatory organizations, improve coordination and target oriented activities among the mining and environment regulators.

For mineral resource sector management, quality of project feasibility study and environmental and social impact assessment should be improved and monitoring of adverse impacts due to resource extractions be strengthened. For innovative and effective conservations and management of energy, introductions of advanced technology and environment conservation actions there should be incentive offers in various forms to encourage stakeholder organizations and business enterprises.

Finally, exploration for more gas of conventional nature and in other forms must be geared up as soon as possible. For initiating such efforts for technical help one may perhaps approach the Technology Bank proposed for LDCs by the Secretary General of UN.(ref.)??



# NATURAL RESOURCES DEPENDENT SECTORS

## 8.1 CROP AGRICULTURE



### 8.1.1 Introduction

Crop agriculture plays a vital role in economic development of Bangladesh. It has critical roles in food security, livelihood and income and nutrition of people. Yet, it faces many challenges. All the major issues are direct or indirect relation to the relationship and dependence of agricultural activities on natural resources including particularly land, water, and energy. Unfortunately, no long term strategy has been proposed to conserve agriculture biodiversity or effective use of agriculture biodiversity for improving food production nor lowering the materials intensity of agriculture. It is important to facilitate environmentally sound development in crop sub-sector within agriculture through appropriate changes in production management, and production organization for protection and conservation of the environment and encouraging sustainable use of resources.

### 8.1.2 Current Status

Agriculture sector comprises crops, fisheries, livestock, and forestry sub-sectors with crop sub-sector being the predominant. the most important sub-sector of agriculture contributing about 12% of national GDP in the financial year 2013-14 where agriculture sector's total contribution to GDP was around 18.5%. More importantly, the crop sub-

sector provides staple food and other food items, raises rural income and creates jobs for rural poor people. Since independence, rice production has tripled from 11 million tones (milled rice) in 1972 to about 34.86 million tons in 2014-15 i.e. increased more than three times.

Agriculture in general and crop agriculture in particular has to confront climate change, loss of biological diversity, loss of soil fertility, water shortage, etc. Quality of land is deteriorating due to degradation of soil fertility (e.g. nutrient imbalance), soil erosion, soil and water pollution, depletion of soil organic matter, water logging, increased soil salinity, pan formation, acidification and deforestation. There is non-regulated and excessive use of groundwater and very little effort to augment surface water. Excessive and injudicious use of agro-chemicals/fertilizers by the farmer, threatening soil and human health and degrading of agricultural environment and destroy agriculture biodiversity.

To address the issues for conservation and sustainable use of soil, land, water and other related natural recourses several policy redirections may be made. There are two major redirections that are needed. One is to preserve and agricultural genetic, species and ecosystem biodiversity. This issue is dealt with in biodiversity sub-sections. The other major issue is lowering resource use footprint.

Bangladesh crop agriculture is generally inefficient and there are substantial rooms for improving resource use efficiency. This relates to water use, raising land productivity through various means and lowering energy use directly and indirectly. Apart from biodiversity, modern agriculture systems should adopt techniques of sustainable agriculture system like mixed farming, organic agriculture, integrated pest management, more use of organic fertilizers, crop rotation, recycling crop and animal wastes, no-tillage or minimum tillage agriculture, inter- cropping, multi-cropping, cover crops, etc. And it must be resileient against the impending threats of climate variability and climate change. Resources, techniques, and good examples are all available for meeting the specific needs but this necessitates integration and patronization of good practices with utmost resolve.

### **8.1.3 Strategies**

Bangladesh over time has taken up many policies and strategies for agriculture in general and crop agriculture in particular. There are good examples of success albeit mixed in many cases. Part of the reason is that the policies lack proper coordination and vision for the future. The NAP 2013 give scant attention to, say for that matter, climate change. Nor does the 7th Plan on agricultural issues appear to be concerned with these issues. The problems of resource use inefficiency do not see to be given any coordinated effort either. One reason perhaps is that the policies are not backed by specific strategies and action plans. In any case, what strategy to take under the above circumstances?

The SDG targets against crop agriculture in Table 1 earlier clearly states which are important for 2.3 and 2.4 clearly charts the direction for agriculture to take in terms of raising agricultural productivity, conserving genetic diversity, raising irrigation efficiency, and use natural resources more efficiently. The strategy for national conservation should be built upon them and the actions plan should take the cue from them. Crop sub-sector in Bangladesh including conservation strategies with the action plan for mitigate the issues would therefore put emphasis on the sustainability of crop production, conserve

biodiversity, preventive measures to crops and environment, sustained and provide adequate supply of irrigation water, reduce land degradation, safe use of agrochemicals and related other issues. As one of the signatories to the Convention on Biological Diversity, Bangladesh is committed to conserving its biological diversity. Special attention should be given in to conserve and use of its unique agricultural biodiversity.

#### **8.1.4 Action Plan**

- Pilot conservation tillage and crop agriculture for wide scale adoption at a later stage
- Based on already existing knowledge, initiate extension services tailored to agro-ecological zones in more coordinated manner
- Use of organic and balanced fertilizer, increase mixed crop cultivation
- Popularize the use of organic fertilizers, green manure and bio fertilizer among the farmers; Inclusion of legume varieties; identification and classification of soil on the basis of productivity
- Preserve indigenous crop varieties in gene bank; improvement and conservation of plant genetic resources
- Augmentation of surface water for irrigation; promote alternate wetting and drying irrigation method (to lower cost, lower energy use and lower methane and carbon emission); re-excavate canal and pond for rain water; reduce use of ground water; use water saving technology and adopt effective policy instruments (such as market based and economic ones) for resource conservation
- Encourage agronomic practices for more balanced use of fertiliser particularly urea to conserve energy, lower emission
- Encourage cultivation of less water-intensive crops
- Promote integrated pest management (IPM)



## 8.2 INDUSTRY (LARGE AND SMALL & COTTAGE)



### 8.2.1 Introduction

The importance of industries cannot be overestimated in a country such as Bangladesh, where land is extremely limited for agricultural expansion and realistic employment opportunities predominantly exist in industries and its allied service sector. Like many development activities, industrial activities however result in environmental externalities – even if conservation measures are imposed and implemented. Certain industrial activities release pollutants. There exist potential risks of degradation of certain resources, which might diminish potential of such resources to be used as industrial raw materials. However, the adverse impacts of environmental pollution can also be far reaching – it may simultaneously affect human health, diminish ecological integrity, and may severely restrict future use potential by means of over-extraction (beyond self-regenerative capacity of the resource base in question).

### 8.2.2 Current Status

Although industrialization in Bangladesh has yet to graduate from its rudimentary stage (with respect to developed countries), two types of issues have already arisen. One is that of materials intensity of industries, inefficiency of resource use and consequent low productivity, wages and livelihood of industrial labour. This problem is directly related to the conservation of various resources including land, water, raw materials (which may include both renewable and non-renewable depending on industry), and energy that directly is a concern for conservation of resources. The other is the impact on environment and resource degradation which is an externality imposed on the society. There are definitive evidence that all the adverse effects have already been observed on local environment and various resources. Aquatic and forest resources including biodiversity have so far suffered

the heaviest damages. Since Bangladesh is set to rather rapid industrialization in the next decade, it appears imperative that adequate conservation strategies are formulated and measures are implemented for enjoying industrial goods and services in decades to come.

### **8.2.3 Strategy**

The two problems of resource use inefficiency and degrading surrounding resources through discharge of effluents and polluting them can be thought of separately as two differently issues but these are also somewhat interconnected as excessive and inefficient use of resources and raw materials may actually increase the resultant pollution load of a firm. Given the interconnectedness, the policy instruments for one are likely to be somewhat different from those for the other. But again the nature of the barrier against both may be quite similar.

On resource use inefficiency, the key to raise efficiency is of course technology (by technology is meant not simply the technique of the production process but also the management of it). But whether or not an appropriate efficient technology is used depends on a host of factors, including costs, profitability, availability of technology and of course awareness. In many cases, the technologies are not new and available but may not be known or protected under IPR. Proper policies need to be undertaken and instruments (including economic ones) used for facilitating the adoption of the technology. Without such policies and instruments firms may be unwilling because their market competitiveness may be eroded.

On discharge of untreated effluents and pollution of land and water, there are again issues of technology but also barriers against their adoption. Cost is one issue and erosion of competition is the other fear among entrepreneurs. The advantage is that the technology is available off-the shelf. But it seems that the main barrier is perhaps the state of mind of the policy makers. There appears an undercurrent among the policy makers that we may grow now and shall clean up later when we become rich, a kind of environmental Kuznets curve-based thinking. This may not be correct because the cost of inaction may be much higher and may be borne by the present generation which has a much higher weight than the "brighter" future which is likely to be heavily discounted.

Among a few burning conservation related issues in Bangladesh with respect to industries, one may find the following: (a) weaknesses in implementation of legal and regulatory frameworks, (b) inadequate performance of institutions regarding conservation against mandated functions, (c) complex and counter-productive interventions by state functionaries and actors including political power holders, (d) weak whistle blowing capacity of non-state actors, (e) variety of hindrances and gaps including institutional, financial and human capacity gaps, etc.

Lack of industrial zoning towards containing certain pollutant types through implementation of central treatment plants is also identified as a major limitation for conservation. Climate change might appear as a factor with compounding adverse implications in future. Despite the above mentioned pitfalls, there are a few recent initiatives which offer silver-lining in the backdrop of black clouds.

### **8.2.4 Action Plan**

Given the above and harking back to Table 1 shown earlier, the types of interventions necessary and observing that Bangladesh has started to gain economically from industrial activities and simultaneously, financial incentives are being created to facilitate conservation. As a part of a national conservation strategy, the following elements, some of which are already part of present policy regime, need to be considered in relation to establish a healthy industrial environment in Bangladesh:

- (i)** Enforcement of regulatory framework and provisions to be ensured which should use both administrative, economic and other means to encourage entrepreneurs to adopt greener technology;
- (ii)** Industrial land zoning to be imposed and planned relocation of highly polluting industries to be implemented again with substantial provisions of incentives;
- (iii)** Import and subsequent use of toxic substances as raw materials to be discouraged with both bans wherever necessary and also taxing them heavily;
- (iv)** Coverage of green industries to be broadened, strengthened and incentives for 'conservation technologies' be provided (with provisions for IPR issues to be negotiated if necessary);
- (v)** Conservation of resources in industries needs to be incentivized through adoption of greener technology again through both administrative and economic instruments of subsidies, taxes, credit and interest rates on related loans;
- (vi)** Agricultural top soils to be conserved in brick-making industries;
- (vii)** lobbying must be done for trade facilitation in favour of export-oriented industries if they have to adopt high cost greener technology for which appropriate resource mobilization windows may be tapped;
- (viii)** Research capacity on conservation options need to be enhanced and stimulated, and
- (ix)** Mass awareness regarding green opportunities to be raised by extensive use of media.

Although environmental conservation should be considered as a primary role of Ministry of Environment and Forest (MOEF), it cannot perhaps deliver adequate conservation actions all by itself. By keeping MOEF and Ministry of Industry at the core, it is important to establish a national high level forum to take coordinated conservation measures across tiers of governance and to ensure high level political guidance for successful implementation of conservation measures. Involvement of research, academia, non-state actors and media is necessary towards ensuring good governance in implementing conservation measures.



## 8.3 POWER



### 8.3.1 Introduction

Power is vital for economic growth in any country and a key ingredient in improving the socioeconomic conditions. In Bangladesh, over the past two decades the power consumption has been rising rapidly. To cope with the increasing demand, power supply must thus rise rapidly in order to sustain the country's growth momentum. However, since 1971, the country has struggled to generate adequate electricity to meet demand.

Sustainable primary fuel supply and financing of the highly capital intensive power projects are the main challenges to meet future electricity demand of about 20,000 MW by 2021 and more than 30,000 MW by 2030. Adequate generation capacity in future will help in achieving targets under SDG 7.

To provide electricity to the customers at an affordable price, low cost primary fuel availability is a precondition. In the perspective of present depleting scenario of domestic gas reserve, indigenous coal reserve of 3.2 billion ton in the north-western part of the country is the only option for low cost fuel for power generation from domestic primary energy resources. Power System Master Plan 2010 and 2016 suggested that future fuel mix for power generation should be coal (indigenous & imported) and nuclear for base load duty (because of low cost) and liquefied natural gas for mainly intermediate and peaking duty. In future, renewable energy, cross border power trade and next-generation nuclear technology will play an important role in power sector development and will help building low carbon society. But as we shall see later these assumptions may not fully hold.

### **8.3.2 Current Status**

A significant progress has been made in the power sector of Bangladesh over the last five years. Installed generation capacity (grid) has doubled from 6,000 MW in 2010 to 12,000 MW at the end of 2015. Number of consumer's increases from 12 million to 18 million. Population with direct access to grid electricity has increased from 48% in 2010 to 66% in 2015. By this time 60,000 villages were brought under electrification program. Per capita electricity consumption, which is an important indicator for overall socio economic development, has increased from 168 kWh in 2010 to 251 kWh in 2015, but still it is one the lowest in the world. Though installed capacity was 12,000 MW, actual maximum peak generation of 8,200 MW in 2015 against demand of about 9,000 MW indicates that system is facing rolling blackouts during hot summer days due to some bottlenecks exists in transmission and distribution system. Though load shedding has reduced substantially but still this sector is struggling to supply quality electricity to its customers. Power sector is also struggling with increasing per unit supply cost due to increasing oil based electricity generation.

In the mean time, there had been great advances in lighting the dark areas through the introduction and large scale diffusion of solar homes. However, whether that remains a desirable policy anymore remains an issue.

### **8.3.3 Interventions Made**

Considering the fuel need of the power plants the Government of Bangladesh has planned to establish a deep-sea port in Sonadia, North Moheshkhali and Matarbari for coal and LNG import and movement. Bangladesh and India have agreed to install high capacity extra high voltage regional grid inter-connections in the northern side of Bangladesh to import hydropower from Northeastern region of India. Bangladesh and Russia have signed an Inter-Governmental Agreement (IGA) in 2011 to install two units of 1200 MW each Water-Water Energetic Reactor (WVER) at Rooppur, Pabna. Government already prepared 'Energy Efficiency and Conservation Master Plan (EECMP) to address this issue.

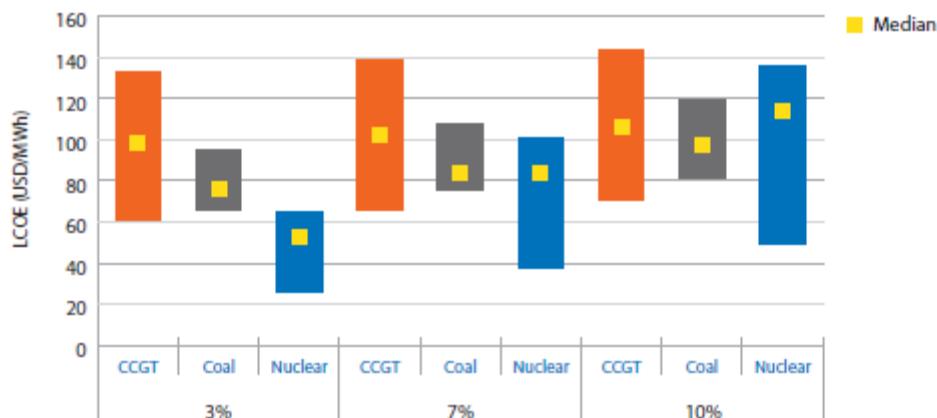
### **8.3.4 Strategy**

In order to conserve energy in the context of - depleting fossil fuel reserve, primary fuel supply constraint from indigenous sources, global warming and climate change- the best way is to improve energy efficiency and control misuse of energy. Government has already prepared an 'Energy Efficiency and Conservation Master Plan' to address this issue. The Master Plan has suggested, for example in its scenario 1, for 20 % reduction of energy demand by 2030 over the baseline projection of demand. This national target is quite in conformity with the SDG target of 12.2. The question remains as to the process through which this national target is to be achieved and how far the efficiency in generation and transmission and distribution may be increased at the same time. But even before that one needs to be sure that we are adopting a correct portfolio of power generation for the future.

The cost of electricity generation varies widely by country and there are difficulties in comparing the costs because of various factors including local labor costs, costs of fuel and its origin and the like. There is another issue which is the discounting factor which heavily

influences lifecycle costs. It has been found that as the discounting rate increases; nuclear increasingly becomes uneconomic or more costly compared to other generating processes based on natural gas or coal.<sup>14</sup> The figure below shows this clearly.

**Fig. 3: LCOE for Base Load Generation by Discount Rates**



Source: IEA/NEA (2015)

Note: CCGT: combined cycle gas turbines; percentages in the horizontal axis indicate discounting rates; LCOE are life cycle average levelised expected costs of electricity for commissioning plants by 2020 based on discounted cash flows at the indicated rates

The median cost of a nuclear plant is the highest while coal is the cheapest for discount rates above 3% which is obviously too low and in Bangladesh a 10% discount rate is the norm. Even at 7% discount rate, coal is at par with nuclear. CCGT remains the costliest. In any case, given the shortage of gas and no apparent immediate prospects of its augmented supply, the option of gas is not valid. What these figures imply is that while coal based generation is a right kind of decision, nuclear is not. Also nuclear option has the added disadvantage of safety issues.

A similar exercise for renewable energy indicates that onshore wind turbines are the most cost effective. Residential PV, in fact no PV can compete with wind. On the other hand, the next low cost technology is large solar PV system. What this establishes is that apart from hard to reach areas, residential solar homes are no longer going to be preferred options. Recent media reports also suggest that households prefer to have on-grid electricity than the off-grid solar PV systems.

Coal (indigenous or imported) is thus the near term option for low cost source of electricity. On the other hand coal is most pollutant among all fossil fuel. So, optimum balance between fossil fuel and non-fossil fuel (nuclear, hydro power import and renewable energy) will be the key approach for future power generation. On the other hand the least polluting and least resource intensive power generation should be the super critical technology which

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14 IEA/NEA, Projected Costs of Generating Electricity, 2015 Edition

the Government has opted for at least in case of the controversial Rampal project. Note that the resource use implications (GWH/mtoe) has been slowly falling over the last few years and is expected to remain roughly the same (around 4700 GWH/mtoe) but would jump to nearly 5100 GWH/mtoe by 2030. This is of course only a small improvement of 11.7% only in resource use in 15 years time.<sup>15</sup> More needs to be done to achieve the target 7.3. Technology may be an issue but there may be others. Given these consideration, the Action Plans that may be followed are given in the next sub-section.

### **8.3.5 Action Plan**

Key actions related to power sector development, efficiency improvement and conservation are as follows:

- 1.** Integrated approach is required for the development of deep sea port for multiple uses including coal handling terminal, commercial container terminal, LNG terminal, oil terminal for refinery at north Moheshkhali, Cox's Bazaar.
- 2.** Prepare roadmap for domestic coal development for power generation keeping in view the resource use and waste generation efficiency of the technology to be used.
- 3.** Implement least cost generation expansion plan (PSMP 2016).
- 4.** Prepare a comprehensive roadmap for implementation of Renewable Energy program.
- 5.** Establish a regional power market for cross-border power trade.
- 6.** Modernise and upgrade NLDC for efficient grid operation, frequency control and merit order dispatch.
- 7.** Introduce 'smart grid' for loss reduction and better customer services.
- 8.** Implement and practice 'Grid Code' and 'Distribution Code' for quality power supply.
- 9.** Implement EE&C Master Plan (Energy Management Program, EE Labeling Program, EE Building Program etc) for energy conservation.
- 10.** Ensure good governance and introduce corporate culture in the sector entities.

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<sup>15</sup> The GWH/mtoe for the past few years had been 4251 (2012), 4210 (2013), 4437 (2014) and 4547 (2015). The projected efficiencies are 4735 (2021) and 5081 (2030).

## 8.4 RURAL DEVELOPMENT



### 8.4.1 Introduction

Rural development is mostly targeted towards poverty alleviation through employment, income generating activities, cooperatives and increasing access to finance. A review of the key national policies regarding rural development points to the fact that inadequate emphasis is given to the conservation of natural resources as a mean of addressing rural development. An approach that aims to alleviate poverty through the judicious utilization (without compromising the need for conservation and sustained growth) of forestry, livestock, fisheries and other natural resources may be the key strategy for the conservation of natural resources. Making an effort to radically change the national policy priorities is a time and resource-consuming process; besides, it may not be attainable in the short term. In this context, leveraging the existing national policy priority of poverty alleviation through proper utilization of forestry, livestock, fisheries and other natural resources seems to be the most pragmatic course of action for furthering the agenda of natural resource conservation.

### 8.4.2 Present Status

The 7<sup>th</sup> Five-year plan as well as the SDGs target towards increasing agricultural productivity and higher allocation in agricultural research. These goals would also cater the needs of food security and rural poverty reduction and alleviation. In order to achieve the goals, the agricultural and rural development sector should be prioritized. Although the nominal allocation for both the sectors has increased; it is expected with the formation of increasingly larger GDP. Notably, the share of allocation for development in the agricultural and rural development sector shows a declining trend. The development allocation of agricultural

sector was 12.72% in FY2011. The allocation reduced to 9.94% in FY2016. Similarly, the development allocation for rural development sector was 6.6% in FY2011 whereas it reduced to only 4.85% in FY2016. The development allocation has decreased by 1.75% point for agricultural sector and 2.78% point for rural development sector from FY2011 to FY2016.

#### **8.4.3 Interventions Made**

Diverse interventions have been made for rural development, which are not sufficiently linked with the natural resource utilization. This prevents the policymakers from taking interventions that may result in a sustainable way of economic growth and rural development. Related projects that are renowned for rural development; Social Forestry; *Ekti Bari Ekti Khamar*; Comprehensive Village Development Programme 2nd Phase; Economic empowerment of the Poorest in Bangladesh Projects; and Chars Livelihoods Programme 2nd Phase.

#### **8.4.4 Strategies**

Rural development in Bangladesh face a whole range of issues ranging from government and NGO collaboration to social capital and capacity building at the grassroots. Different strategies have been taken to reduce trouble related to rural development; Go-NGO Coordination and Collaboration; Exploration and use of Indigenous Knowledge; Tackling Multiplicity and Overlap; Public Consultation and Participatory Planning; Sustainable Resource Use; Capacity Building and Human Resources Development; Local Resource Mobilization; Social Capital, Collective Action and Empowerment; and Coastal Island.

#### **8.4.5 Action Plan**

Actions need to be taken to update the policies that have and to take initiatives to overcome the present and upcoming challenges for rural development sector.

- Update the National Rural Development Policy 2001 so that it can put special emphasis on the use of natural resources as a mean of poverty reduction
- Allocate budget for technical research on addressing the challenges of low crop and forestry sub sectoral growth and taking advantage of the fisheries and animal farming sub sector
- Include fisheries sub sector in the Development Result Framework (DRF) of 7<sup>th</sup> Five Year Plan under the national priority outcome goal of 'Promoting sustainable agriculture to ensure self-sufficiency and reduced disparities in food safety and security'
- Allocate budget for technical research on developing supply chain linkages between rural raw material production for manufacturing sub sector
- Allocate for budget for project based research in order to form empirical evidence on how sustainable utilization of natural resource can induce the goal of achieving rural development
- Allocate budget for advertisements and campaign to popularize social forestry
- Increase the share of national development allocation in agricultural and rural development sector
- Allocate adequate budget for agricultural research

## 8.5 TRANSPORT AND COMMUNICATION



### 8.5.1 Introduction

The transport system of Bangladesh consists of roads & highways, railways, inland waterways, seaports, maritime shipping and civil aviation, catering to both domestic and international traffic. Among these modes of transport, roads and highways are considered as the economic backbone of the country, which carry over 80 and 88 percent of freights and passenger traffic respectively. 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 personalized door-door facility and passport of freedom attribute. The main objective of the Bangladesh National Conservation Strategy (NCS) for conservation of resources in the transport sector is to establish a safe, low cost, modern and technically dependable and environment friendly transport system to reduce the financial cost and time.

### 8.5.2 Current status

Because of heavy investment in building road infrastructure, the country's road network has increased from 3764 km in 1971 to 425,860 km in 2015 with 125,265 km being all-weather paved road. At present the railway carries only 4% of passengers and 4% of freight. Inland water transport is very primitive although it is regarded as the most environmental friendly, cheapest, less accident-prone, comfortable and most affordable. But due to lack of proper attention and investment, its share had been falling in carriage of passengers and freight. Its share was estimated at 8.9% of passengers and 16% of freight movement in 2005, while in 1971 the respective shares were 16% and 37%. The water transport network of the country not only caters the inland movement of freight and passengers but also plays an important role in transportation of import and export items.

During 2014-2015 fiscal, Chittagong port has handled nearly 1.86 million TEUs of containers as against about 44,000 TEU by Mongla. Another important transport system at present the air transport. The aviation activities are being carried out from 3 international and 12 domestic airports, about 38 airlines are now operating in and out of the country; about 43 states signed bilateral agreements with Bangladesh.

Government prioritized road transport system for the last four decades and consequently more than 80% of transport sector investment was routed to improvement of road network. Currently about 2 % of GDP is expended for importing energy required in transport sector. If the fuel price increases to \$120/bbl by the year 2030 about 14 % of national GDP will have to be expended in order to maintain mobility of country's transport system. One estimate suggests that 30 % diversion of modal share from road to rail, in addition to increased use of CNG in road vehicles, may reduce transport energy import demand to about 4 Mtoe in 2030 and result in cost reduction by about 10 % of GDP. Through investment for improvement of navigational and terminal facilities, about 10 % in passenger and 20 % in freight transport demand shift in modal share can be achieved which may result in reduction of energy demand by about 2 Mtoe in 2030 and import cost by 5 % of GDP.



## 8.6 URBANIZATION, HOUSING AND SETTLEMENT PLANNING



### 8.6.1 Present Status of the Sector

The status of urbanization in Bangladesh today is that although it is still low in the level/degree of urbanization (meaning percentage/proportion of national population living in urban areas), the absolute size of the urban population is very large (43 million in 2011 census). More significant is the fact that it is still growing very rapidly (at over 4% annually), with the possibility that by 2046, there will be more people in urban than rural areas. This trend significant that there will be more negative impact of urban growth and expansion on natural environment and ecological balance. More forestland, wetland and agricultural lands will be depleted, unless strong measures against such trends are taken.

Rapid urban expansion negatively impacts on the quality of environmental elements, such as air and water, which may adversely influence on human health. Rapid and disproportionate growth of Dhaka creates disparity in economic and social development in the country, threatening political harmony. Structurally quality of housing in the country has improved since independence but this may be short term since this has necessitated rampant collection of sand from river beds and massive depletion of top soil for brick making. Both urban and rural settlements have basically expanded without proper planning or development control.

### 8.6.2 Lack of Political Commitment

The above features have been so principally because of inadequacy on the part of policy makers to visualize the physical development process in the country. Although a National

Housing Policy was approved in 1993, the Government has never been serious about implementation of the policy

The National Urban Policy still remains in the Draft form. The only positive aspect is its recognition in the Seventh Five Year Plan. It remains to be seen how serious is the government in its implementation.

### **8.6.3 Resource Inadequacy**

There is definitely inadequacy in resources for implementation of projects on urban development, housing and settlement, either in urban or in rural areas. More significantly there is allegations of wastage and misuse of resources due to inefficiency and corruption.

### **8.6.4 Lack of Planning**

Urban planning has been in practice in the country since the late 1950s, beginning with Dhaka. Since independence, hundreds of Master Plans have been prepared but with very little evidence of implementation. Basic problem is lack of commitment on the part of the relevant authorities.

### **8.6.5 Action Plan**

A long list of Action Plans has been proposed in this sector. Priority actions are proposed for adoption, such as the National Urban Policy and implementation of the already approved plans. Strong regulatory measures are taken to control encroachment on rivers and other water bodies, forestland and agricultural land. Another priority Action Plan is to establish good urban governance ensuring democratic participation of all stakeholders and citizens.



## 9.1 HUMAN RESOURCES



### 9.1.1 Introduction

Human beings are the center of concerns of every sustainable development. They are entitled to be healthy and productive assets in harmony with nature. For swift enhancement in education, health care, food security and for proper implementation of government activities, developing proficient and deft human resources is inevitable. Bangladesh, harboring at crossroads towards graduating to Middle Income Country (MDC), emphasizes human resources as root of all development in formulation process of the NCS.

### 9.1.2 Current Status

To build up ingenious and enterprising human resources, Bangladesh is *en route* to the completion of achieving prerequisites. Good track records are persisting well ahead of the Millennium Development Goal targets set for 2015 and being widened remarkably in access to education, facilities in health sector, augmentation in social protection in and skill in agricultural practices. Following are the concise aspects of this sector surfaced out so far:

- Gender parity in terms of enrolment at primary and secondary level but not in thereafter levels; dropout rates and repetition have declined. However, low transition

rates across various levels still exists as an issue, indicating low levels of learning in the country.

- About 5 million children are still out of school, mostly due to poverty.
- Life expectancy at birth has increased to 69.0 years from 54.8 years in 1981. Along with notwithstanding problems of high levels of malnutrition and micronutrient deficiencies, obesity resulting from over-nutrition is emerging.
- Currently Bangladesh does not have a structured policy for human resource planning in the health sector.
- Agro chemical usage and exposure is to health hazard level.

### **9.1.3 Interventions Made**

Ensuring sustainability for human development has three requirements, which the Sustainable Development Goals seek to ensure. Thus, Bangladesh shapes up her initiatives around this sector as aiming at the following attributes –

- The number and range of life-enhancing opportunities – at home, at work and in the community – available to all individuals over their lifetimes and that of their descendants does not diminish.
- The capabilities to take advantage of these opportunities – over all individuals' lifetimes and across generations – continue to be enhanced.
- Social, cultural, political or physical barriers that may inhibit individuals from accessing opportunities that best meet their capabilities – whether due to lack of participation, security, empowerment or infrastructure – are eliminated.

In harmony to the steps taken and foreseen, although low by international and regional standards, the Government of Bangladesh stands as the largest contributor to education financing.

### **9.1.4 Strategies**

The National Sustainable Development Strategy (NSDS, 2013) has been adopted by the Government of Bangladesh, where Education and Health sector was given priority to develop Human Resources towards sustainable development. The Ministry of Health and Family Welfare are after attaining a skillful, healthy generation. From the ministry, the Bangladesh Health Workforce Strategy in 2008 had been published. The goal of the Ministry is to implement the HR strategy in collaboration with the private sector, development partners and other stakeholders that work towards the greater good of Bangladesh, and to review it every five years for necessary updates.

### **9.1.5 Action Plan**

Bangladesh's total population is projected to grow by 29 percent from 149.8 million in 2011 to 193.4 million in 2030 and further to 247.0 million in 2050. With the emerging imperatives of globalization and changing pattern of global economic relations, Bangladesh needs to act quickly to take advantage by building build a sustainable future in the three indices i.e., income, human asset index and economic vulnerability index. The medium term growth scenario adopted by the government in its Perspective Plan covering the period 2010-2021 indicates that the growth in the country's GDP will rise to 8.0 percent in 2015 and then to 10.0 percent in 2021. In the circumstance, the framework in future should take further strides in

- Inclusive and equitable quality education and promote lifelong learning opportunities for all;
- Reducing undernourishment, mortality among mothers and children;
- Increasing the secondary school enrolment ratio and adult literacy;
- Standard nutrition food supply (minimum of 2122 kilo calories);
- Elimination of all types of contagious diseases, increasing longevity up to 70%
- Empowerment of women and girls
- Designing sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
- Ensuring sustainable consumption and production pattern



## 9.2 GENDER



In the gendered economics and gendered culture women suffer more than men from poverty, hunger, malnutrition, economic crises, health related problems, insecurity and become victim of violence added with environmental degradation. Loss of biodiversity and climate change poses new threats on women adding additional burden on them.

In the past forestry, agriculture, irrigation, water system has been discussed under the theme of development. They include women's interrelations with the environment in the context of conservation of nature, economic development as well as the effects that environmental degradation has had upon women's lives (lack of water, fuel, fodder in rural; air, water and chemical pollution in urban areas). However, earlier issues related to gender and environment and women's role in conservation have been ignored or less emphasized in Bangladesh.

Although women are playing significant roles in protecting biodiversity through their direct contributions to conservation such as through their involvement in agriculture; homestead and community forestry; ensuring households' food and water security etc. many of their roles remained unrecognized.

The national and international drivers related to conservation and environmental protection provided increased attention to gender dimension. For example, in the Seventh Five Year Plan in Bangladesh a Background document has been prepared on 'Climate Change and Disaster Management' for the first time with a wide range of gender dimension including role of women in protecting environment. A Gender Action Plan for Climate Change (ccGAP)

has been prepared with detailed analysis on gender dimension to climate change based on different pillars of Bangladesh Climate Change Strategy and Action Plan (BCCSAP). However, implementation of these national strategies needs to be focused with time bound actions, especially their implications in relation to Sustainable Development Goals.

It is recommended that the conservation strategy provides recognition of the roles of women and safeguards those. Coordinated efforts in implementation of strategy of different sectors should reflect issues as mentioned in the following: perception of women with regard to challenges of environmental sustainability and conservation; their experiences within their households and surroundings (indoor, outdoor pollutions etc.); comparative analysis of the gender based differences of men and women's views, roles, needs and interests in context of conservation and ensuring environmental sustainability. Steps should be taken focusing on the gender based differential experiences, roles and priorities.



## 9.3 HEALTH AND SANITATION



### 9.3.1 Introduction

Adequate sanitation, together with hygiene and safe water, are essential for good health and social and economic development of a country. Improper sanitation pollutes environment and affects health. Thus to conserve environment addressing sanitation is a pre-requisite. Health plays a significant role in achieving meticulous development outcomes; on the other hand, development strategies can also have significant positive and negative impacts on the health of populations. Sanitation (together with water) is vital for health, generate economic benefits, contribute to dignity and social development, and help the environment. Appropriate hygienic practices also can greatly improve health, ultimately helping to reduce morbidities and mortalities. Since development is prejudiced by health, which in turn is dependent on sanitation and that also impacts environment, health and sanitation is important in National Conservation Strategy.

### 9.3.2 Present Status

Good improvement has been made in improving health outcomes for the people of Bangladesh and made good progress in almost all of the health-related MDGs. Bangladesh has achieved international recognition for these remarkable outcomes. Bangladesh also has emerged as a leader in Asia in experimenting with and implementing innovative approaches to rural sanitation, and high rate of access to improved water sources. A study revealed that, Bangladesh "now has the longest life expectancy, the lowest total fertility rate, and the lowest infant and under-5 mortality rates in South Asia, despite spending less on health care than several neighboring countries.

Over 40 percent turn down in Maternal Mortality Rate (MMR) between 2001 and 2010 and further projected decline to 170/100,000 live births (UN interagency estimate) indicates remarkable progress. The reduction in neonatal mortality is still less than the desired level and stands at around 24 per 1000 live birth. Bangladesh has been able to reduce the under-five mortality below the MDG 4 target, and the rate stands at 41, against the target of 48 per 1000 live births by the year 2015. Bangladesh has reduced the under-five mortality by 72

percent since 1990 with an annual rate of reduction of over 5.4 percent, which stands highest in the SAARC countries. The infant mortality rate is 38 deaths per 1,000 live births, and the child mortality rate is 8 per 1,000 children.

Bangladesh has achieved significant success in preventing and controlling communicable diseases, especially HIV/AIDS, malaria and tuberculosis, and a range of Neglected Tropical Diseases (NTDs). Bangladesh has also significantly reduced under nutrition in the last two decades, driven partly by sustained income growth and partly by greater coverage of health and nutrition services.

### **9.3.3 Strategies**

Health and sanitation sector is guided by the overarching government policy documents and international commitments together with sector and specific policies. Different national policies/strategies have been taken by the government namely; National Health Policy 2011, National Population Policy 2012; National Nutrition Policy 2015; Health, population and Nutrition Sector Development Programme 2011-2016; Health Care Financing Strategy 2012-2032; Bangladesh Health Workforce strategy 2016-2021; National Sanitation Strategy 2005; Sector Development Plan for water Supply and Sanitation Sector in Bangladesh 2011-2025; National Hygiene Promotion Strategy for Water Supply and Sanitation in Bangladesh 2012.

### **9.3.4 Action Plan**

Following actions are recommended to prevail over the challenges of health and sanitation sector.

- Update National Health Policy 2011 in light of SDGs, Universal Health Coverage
- Formulate new law for enforcement of medical waste management
- Development of educational curricula incorporating medical waste management and conservation in the medical, nursing, para-professional courses
- Mass awareness creation about proper medical waste management and sanitation with conservation of water using educational institutes, social organizations, print and electronic media
- BHE/DGHS and IEM/DGFP to develop appropriate awareness materials in collaboration with MOEF and other relevant
- MOHFW to allocate proper fund to its facilities and programmes for proper medical waste management
- LGD/MOLGRD&C to ensure proper medical waste management by the respective LGIs
- MOF to ensure that respective ministries allocate proper fund to its health facilities for appropriate medical waste management



## 9.4 DISASTERS AND DISASTER MANAGEMENT



### 9.4.1 Introduction

Bangladesh, in the process of transition from an LDC to a lower middle income country of South Asia, is one of the highly disaster prone countries of the world. Every year the country suffers environmental and consequent socio-economic shocks from several geophysical, hydrological, meteorological, climatologically, and biological hazards. Bangladesh is one of the most natural disaster prone countries in the world, occupying the 5th position among 173 countries. The country ranks 1<sup>st</sup> in terms of vulnerability and 6<sup>th</sup> in terms human exposure to floods and cyclone in the world. Attempt has made to bring about coherence between various policy instruments at global level so that the DRR/CCA goals converge with the Sustainable Development Goals (SDG) that are agreed for 2015-2030.

### 9.4.2 Current Status

The 2011 Global Assessment Report of the UNISDR revealed that in terms of number of people exposed to flood, tsunami and cyclone, Bangladesh is ranked first out of 162 countries. Floods, drought, cyclone and salinity constitute the largest risk to majority of the population throughout the country. Regular river floods affect 30% of the country increasing in and around 70% in extreme years. The Multi-hazard, Vulnerability and Risk Assessment report indicates that the area subjected to flooding has increased from 52% to 61.1% for 50 years and 68% to 80.6% for 100 year return period.

Storm surges accompanying cyclones cause the most damage in the coastal areas. In the last 55 years, eighteen major cyclones devastated the coastal areas, with the most-devastating 1970 cyclone killing about 300,000 people. The most recent severe cyclone was

the Cyclone Sidr in 2007 which struck the coastal region. The economic loss caused by cyclones of 1970, 1991 and 2007 were US\$ 87 million, US\$1.5 billion and US\$ 1.7 billion respectively, while the death toll progressively declined from 300,000 (1971) and 138,882 (1991) to 3363 in 1997. Death, injuries and economic damage are caused by tornado. The most recent tornado of 2013 struck 20villages with a diameter of 8km traveling at a speed of 70km per hour, killed 31 people and injured approximately 500 in Brahmanbaria district.

During the last decade erosion along the river seems to have diminished slightly ranging from 1,000 to 2,500 hectare (ha) per year. Along the Jamuna, the Ganges and the Padma rivers, about 88,462 ha, 29,854 ha and 33121 ha of land have eroded respectively during the period 1973 – 2015. Bangladesh suffered about 20 drought episodes. The drought conditions in northwestern Bangladesh in recent decades led to a shortfall of rice production of 3.5 million tonnes in the 1990s. As much as 17% of the *aman* crop - the main paddy crops in the wet season - may be lost in a typical year due to drought. Bangladesh has also suffered from earthquakes; risk assessment reveals that if an earthquake of magnitude 7.5 occurred at Madhupur fault, about 72,000 building would be damaged beyond repair in Dhaka city.

#### **9.4.3 Interventions and issues**

Bangladesh has made considerable and significant development gains over the last 10 years and achieving five out of eight of the MDGs. All of this progress has been achieved in the face of considerable vulnerability and exposure to natural and human-induced hazards. This progress is a testament to the innate resilience of the Bangladeshi people, who continue to make developmental gains despite living with disasters and climate risk.

In order to enhance the technical capacity of the Government of Bangladesh with regard to DRR, with the support of donor agencies, the Ministry of Disaster Management and Relief (MoDMR) undertook an initiative titled Comprehensive Disaster Management Programme (CDMP) to bring about a paradigm shift in disaster management from the conventional approach of urgent response and relief to a more comprehensive and sustainable approach. Fundamentally CDMP aimed to create the right environment to ensure populations at risk have a better chance at preparing for and overcoming recurrent hazards. Concerted efforts for disaster management in all sectors, availability of timely warning of impending hazards and appropriate information for adaptive measures are at the heart of such a desired approach. Phase-I of CDMP (2004-2009) laid the foundations for institutionalising the risk reduction approach and framework. Bangladesh has made a strong commitment Hyogo Framework for Action (HFA) during 2005-2015 for critical guidance in efforts to reduce disaster risk.

#### **9.4.4 Strategies**

The Ministry of Disaster Management and Relief (MoDMR) of the Government of Bangladesh (GoB) act as the nodal agency coordinating disaster management (DM) in the country, under the overall direction of the National Disaster Management Council (NDMC), headed by the Prime Minister. MoDMR is committed to mainstream DRR and CCA into strategies, policies, planning, and development programmes at all levels by 2021 as a part of paradigm shifts in disaster management. The Sixth Five year Plan (2011-2015) and National Sustainable Development Strategy (NSDS-2010-2021) integrates DRR as strategic key priority area. The framework is comprised of:

- Disaster Management Act 2012
- Standing Order on Disaster, 2010
- National Plan for Disaster Management ( 2010-2015)
- National Disaster Management Policy, 2015
- Cyclone Shelter Construction, Maintenance and Management Policy 2011
- Guidelines for Government at all Levels (Best Practice Models)

#### **9.4.5 Action Plan**

Long term policies should be taken to reduce disaster risk and to overcome the challenges for sustainable development.

- Pursue an integrated multi-hazard approach for sustainable development to reduce the incidence and severity of disasters
- Integrate disaster risk reduction in all our development work
- Invest substantively in disaster preparedness
- Increase awareness of the importance of disaster reduction policies
- Allocate appropriate budget



## 9.5 ENVIRONMENT AND INTERNATIONAL OBLIGATIONS



### 9.5.1 Introduction

Bangladesh has signed a number of multilateral environmental agreements (MEA) both national and international for the conservation of natural resources since 1970. Among them major 12 MEAs are addressed here by considering the present environmental needs in Bangladesh. Due to these agreements Bangladesh availed some opportunities as well as responsibilities in terms of financial provision, technological support and capacity building.

### 9.5.2 Current status

In 1971 the wetland conservation focused through Ramsar convention where Bangladesh was an active party. The mission of this convention is to conservation and prudent use of country's wetlands through local & international actions & cooperation to achieving the sustainable development around the world. Convention on international trade in endangered species of wild fauna and flora (CITES) was signed in 1973 to stop the rapid decline of threatened species worldwide due to overexploitation and illegal trading. Migratory species of wild animals threats increases due to habitat degradation, hunting and food scarcity. Concerning the vulnerability of these species owing these threats convention on the conservation of migratory species was adopted in 1979. The regional seas program set under United Nation Environment Program (UNEP) in 1974 to address the increased degradation of world's seas and promotes sustainable management of marine resources. In order to mark the ocean boundary and protection of marine resources the convention on law of the sea III was signed in 1982. United Nation Framework Convention on Climate Change (UNFCCC) adopted in 1992 sets out a legal framework for stabilizing the atmospheric concentrations of greenhouse gases to avoid climatic hazards. This ultimately

led to the Paris Agreement in 2015 to which Bangladesh has become a signatory although parliamentary ratification is yet to be made. In order to promote the biodiversity conservation by sustainable use and equitable sharing of its components the convention on biological diversity (CBD) accepted in 1992. The United Nation Convention to Combat Desertification (UNCCD) adopted in 1994 to encourage the international community's efforts to combat the desertification and land degradation in the dry lands. International treaty on plant genetic resources for food & agriculture (1982) contains sections on general provisions, farmers' rights, supporting components, and financial and institutional provisions. The treaty covers 35 food crops and 29 forages. Aarhus convention on access to information, public participation in decision-making and access to justice in environmental matters (1998) is the first environmental agreement to combine environmental principles with democratic rights and explicitly recognizes peoples' right to live in a healthy environment.

The present SDG framework one way or other takes care of the concerns of all of these environmental issues under the MEAs in one way or other. In cases, it has recalled the commitments under them which were previously more voluntary in some cases but have been more mandatory now. In some cases, the targets have been made more explicit than before. Thus MEAs in general have come to be subsumed in principles in many of the SDGs and their targets.

### **9.5.3 Interventions made**

The ultimate goal of all the MEAs is to achieve the sustainable development but the challenge is to effective implementation of such huge agenda. To meet the terms of MEAs the GoB has taken some initiatives related to conservation. National Adaptation Program of Action (NAPA) and National Adaptation Plan (NAP) submitted through the United Nations Framework Convention on Climate Change (UNFCCC) addressing the urgent climate change need. Besides, national reports on actions have been submitted to CBD & UNCCD secretariats. Least Development Country reports also are prepared at regular interval for submission in case of other important MEAs. During the last two decades, many projects and programs have been implemented both by the government and the NGOs to address particularly climate change adaptation. As an institutional development GoB has established a Climate Change Cell in the MoEF to manage the Climate Change Trust fund, Climate Change Resilience Fund and revised the Sectoral plans for mainstreaming the climate change issue into development strategy. Program Monitoring and Implementation Unit (PMIU) activated under MoEF for smooth operation of environmental related projects.

### **9.5.4 Strategies**

Bangladesh Ministry of Environment and Forests has adopted some new policies like Environment Policy (2013), Wetland Conservation Act (2012) and Climate Change Trust Act (2010). Also an amendment (18Ka) added to the Constitution, specifying the environmental protection as a constitutional obligation. These strategies comprises the following things,

- Capacity building at individual, organizational and systemic levels, through formal and informal education and training.
- Instituting an enabling legal and policy framework that mainstreams conservation into development process.

- Establishing stakeholder partnerships and networks nationally and internationally to mobilize financial, technical and technological resources for implementation of the MEAs.

### **9.5.5 Action plan**

The concerns under the MEAs are subsumed under several specific SDGs as well as NCS sectors such as land, forestry, climate change, land degradation and desertification; and biodiversity. The action plans under those NCS sectors need to be considered along with those here. Given the caveat, the following actions need to be taken in line with the MEAs to become an integral part of the NCS and simultaneously achieve some of the sustainable development goals,

- Development of climate-resilient strategy and integrate it to national development strategy;
- Development of a National Biodiversity Preservation and Enhancement Plan and its integration within the mainstream development and planning process;
- Sustainable management of natural forests and a strategy development for management of protected and ecologically critical areas.
- Identification and mapping of desertification areas and expansion of forest cover on those areas.
- Development a comprehensive strategy for protection of Exclusive Economic Zone (EEZ) for sustainable harvesting of marine resources.
- Inventory preparation for wetland protection and recovery along with fish, migratory species of birds and wildlife.
- Strengthen domestic and foreign resources mobilization through multi-sectoral cooperation, technology and innovation.

Under Rio agreements, public education, research and training, appropriate legislation, public participation in decision-making, and reporting are some of the common requirements.



## 9.6 ENVIRONMENTAL EDUCATION AND AWARENESS



### 9.6.1 Introduction

Environmental education (EE) is critical for developing proper understanding of environment and its goods and service that are particularly important for maintaining better human life. At the same time, creating awareness among resource users on the importance of sustainable use and protection of environment is essential to continue sustainable and healthy environment as well as economic growth. Environmental integrity must be considered as pre-condition while devising strategy for achieving SDGs. As stated earlier in Table 1, there is in fact a direct correspondence between environmental education and awareness and target 4.7 which exhorts states that they should "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development; including, among others, thorough education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of cultural contribution to sustainable development."

Over emphasizing economic growth without an effective and strong regulatory framework often leads to environmental degradation in the form of soil degradation, deforestation, desertification and other environmental pollution at the national and global levels and hence could bring eco-disasters resulting ultimately in negative impacts on economic growth. Environmental education and awareness can play a vital role in imbuing the needs and process of sustainable development into the minds of the youth and also ensure participation of mass people to safeguard environment. Agenda 21 stated that, education is critical for promoting sustainable development and improving the capacity of the people to

address environment and development issues. As noted above, SDG 4.7 has pointed out the necessity more forcefully in several dimensions of sustainability.

### **9.6.2 Current Status**

In Bangladesh, the education system constitutes four major levels: primary level (year 1-5), Junior High School (years 6-8), Secondary level (year 9-10), Higher Secondary (years 11-12) and Tertiary level. General science and social science, which are taught at three school levels: primary school, Junior and secondary high school. The content of the textbooks emphasized the physical geographical aspects of the environment (soil, air, water etc) and other environmental issues such as pollution and natural disaster. Other environmental problems such as depletion and degradation of natural resource and biodiversity are not represented as widely as necessary for education in the textbook. Emerging environmental issues such as climate change have not been integrated into the textbook.

The National Curriculum and Textbook Board (NCTB) of Bangladesh has introduced a new curriculum and changed the entire textbooks from class I – V. The textbook on Bangladesh and Global Studies covers a wide range of topics regarding ESD. The topics include “society and environment of Bangladesh, tradition, culture, the history of liberation war, basic needs, children right, duties and responsibilities of children, sense of cooperation and compassion toward all walks of people of the society, attaining the qualities for becoming good citizens of the society, being respectful to the culture and occupation of others, proper use and maintenance of resources, social environment and disaster, population and human resources” all these issues are being incorporated into the textbook. Most of the public universities offered degree in basic science by which environmental education started at the formal education system.

### **9.6.3 Issues**

The environmental problems including the impacts of climate change, water, air, soil pollution, loss of biodiversity, land degradation, deforestation, ecosystem alteration etc are the emerging issues, which need to be prioritized to minimize current environmental degradation. To minimize the extent of the environmental pollution would require undertaking policies and strategies to counter such challenges and also effective dissemination of environmental knowledge and education

### **9.6.4 Strategies**

Bangladesh Government has demonstrated its commitment to improve the environment and combating the adverse impacts of climate change through formulating various policies and strategies. The environmental policy (1992) comprises the following statements on environmental education and awareness to; eliminate...Moreover, the National Education Policy (2010) was established with the intention of building a unified schooling system and introducing various mandatory subjects. The National Adaptation Programme of Action (2005) recognized the inclusion of climate change related issues in curriculum at secondary and tertiary institution (MOEF, 2005). The Bangladesh Climate Change Strategy and Action Plan (BCCSAP)-2009 specifically highlighted the importance of knowledge generation in climate change.

### **9.6.5 Action Plan**

A number of actions suggested for the betterment of the education system and also to aware people on environment and related issues, such as,

- Dissemination of information and education regarding environmental pollution and degradation;
- Education and training on livelihood related activities can be developed considering utilization of ecosystem goods and services;
- Environmental education, training and awareness programs can be developed for wise use of natural resources to support poor people to address their hunger during stress period;
- Environmental education must be included at all levels such as primary, secondary and tertiary to enhance awareness to understand environmental management as well as sustainable use of natural resources in production system;
- Special environmental education and awareness program must be developed for inclusion of women and children;
- Comprehensive environmental education and awareness program should be developed on access to clean water, basic knowledge about hygiene and sanitation, safe drinking water and water conservation;
- Environmental education and awareness program should be developed and implemented to ensure wise use of resources and responsible consumption for sustainable use and conservation of resources;
- Education and awareness program on environmental justice for all should be developed and implemented widely;
- All the actions initiated must be gender-sensitive and mindful of cultural diversity.
- Environmental education and awareness program must be implemented through partnership of government, non-government, private, professional groups and local communities to reflect the views of all stakeholders;
- The awareness programme must be run with the help of print and electronic media who should be encouraged to dedicate specific slots on the appropriate issues;
- Lastly, but not the least, the education programme must be based not simply on text and reference books but should be combined with working with communities as to how to understand the nature, extent and impacts of environmental problems and resolve them.

## 9.7 INFORMATION AND COMMUNICATION TECHNOLOGY



### 9.7.1 Introduction

Information and communication technology (ICT) is a broader spectrum that store, retrieve, manipulate, transmit or receive information through electronic and print media. People around the world having access to internet via computer and mobile application can perform and share different activities for public awareness through social media, business transactions, education, knowledge and monitoring. In terms of biodiversity conservation the ICT is highly effective means for environment and climate monitoring, ecosystem conservation, natural disaster management, research and monitoring data and the preservation of natural resources such as land, water, forest, fisheries, livestock & agriculture. ICT's contribution to human resource capacity building and urban development is also significant. This capacity and role of ICT has been recognized in the SDGs and consequently one finds that while ICT has been specifically mentioned to be a major vehicle for sustainable development, its application for achieving other SDGs has been mentioned in as many as 9 cases.

### 9.7.2 Current status

There are two aspects of ICT that are important. One is fostering ICT particularly in LDCs for fast and reliable communication. The second is its use in management of sustainable development through exchange of information, its storage and speedy retrieval. It is the second set of issues that are of more relevance here although without the first being achieved, the s

In Bangladesh ICTs have contributed to climate adaptation and monitoring program. The program comprises the large-scale and long-term implementation tools such as: early warning systems, weather management, remote sensing and meteorological systems, smart and sensor networks, Global Positioning Systems and modeling. On the other hand, small-scale and short-term implementation tools included the knowledge management, information sharing, planning and decisions making.

ICT improves the different facets of human development such as education, health, citizen empowerment & capacity building. In land administration and management ICT supports to land markets, land governance and reform activities among others. A number of ICT tools have been applied to improve water availability, efficiency, accessibility, and sustainability. ICT application to water management included real-time monitoring and control systems deployed in water plants and big facilities for real-time optimized operations, alarms management, energy optimization, quality control and crisis management.

Forest management capacity improved through e-government services and open government applications, advocacy campaigns through text messages and internet social networking. In terms of fisheries sector ICTs are being used for resource assessment, capture or culture to processing and commercialization. Fishermen are using the Global Positioning System (GPS) and Sonar for fish navigation and location finding, mobile phones for trading, information exchange and emergencies, radio programming with fishing communities and web-based information and networking resources.

In livestock and crop sectors ICT helps to collect and disseminate the reliable and updated market information to producers, traders, processors, and consumers to promote greater participation in local and regional markets. In Urban development and management sector ICT provides the technology-enabled solution. In the Healthcare sector, Tele-health services connected to hospitals to remote facilities for consultation, diagnosis, and sometimes training.

### **9.7.3 Interventions made**

ICT is included as a subject in the secondary, higher secondary, undergraduate and postgraduate curriculum for the development of human resources. The GoB has also enacted an ICT Professional Skill Assessment and Enhancement Program (IPSAEP). An ambitious Digital Land Management System (DLMS) has proposed that will digitalized all ownership information and allow the sharing of up-to-date information online. The "Communication for Development (ComDev)" project incorporated the participatory communication methods and processes with a variety of media and tools ranging from rural radio to more advanced ICTs. Computer based Resources Information Management System (RIMS) unit recorded the detailed inventories of all major forest type in the country that supports for the preparation of comprehensive management plans for different forests. ICT tools are using for Coastal and Marine Spatial Planning (CMSP). The CMSP is an analytical process involving spatial (i.e. geographic) information to produce maps and when required for visualizing objects or processes in space and time. In crop and agricultural sector the Geographic Information System (GIS) is now being used to assess the crop production. In addition a web-based and SMS-based fertilizer recommendation system has been developed. Government e-portal allows public access to know and share the knowledge.

#### **9.7.4 Strategy**

The Bangladesh government has adopted the National ICT act in 2006, which amended in 2009 and 2013. The National ICT policy has approved in 2015. For support and coordination of ICT activities a national ICT taskforce had been created. Besides this to assist the taskforce, a program called Support to ICT Taskforce (SICT) was inaugurated in 2003. These do help in mainstreaming ICT as a major information processing, storage, retrieval and communication vehicle.

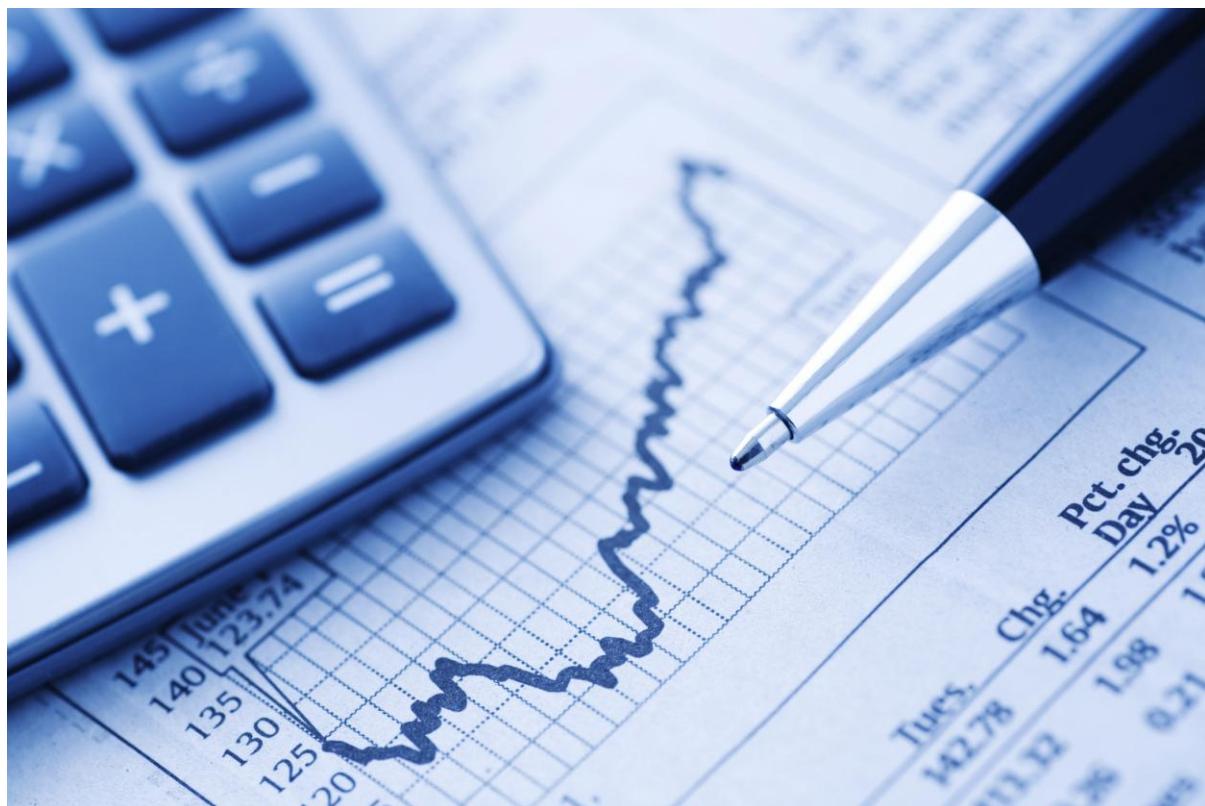
#### **9.7.5 Action plan**

The applications of ICTs are vital to achieve the Sustainable Development Goal (SDGs) as indicated earlier. Recommendations and good practices will balance the short-term gains of ICT and usage of ICT with long-term goals for sustainable development. The following actions are thus proposed to be undertaken.

- Establishing ICT Centers of Excellence and assess skills of ICT professionals and meet gaps with targeted training programs.
- Develop a process of Land Information System.
- Using latest wireless technologies for connecting to various types of sensors for real-time monitoring of water supply and demand parameters.
- Comprehensive forest management information systems to improve forest management.
- Information collection in the form of remote sensing for storing organism genetic information and crop zoning.



## 9.8 FINANCING NCS



### 9.8.1 Introduction

Financing conservation of nature is a complex issue and not understood properly. And there is not much that has been done yet at the international level. The Addis Ababa Conference of Financing for Development in 2015 came up with rather more generic ideas.<sup>16</sup> The SDG agenda has under its Goal 17, 5 targets under financing SDGs which put the first stress on domestic resource mobilization aided by the international community to enhance fiscal management capacity. Then there is the usual cliché about 0.7% of GNI from developed countries to the developing ones and the associated targets for LDCs. Given the lackluster performance regarding the achievements of the target, one perhaps cannot hope much for the future in this regard. However, it is also true that there are various innovative methods that are coming up although generally concentrated in a few areas (NCS sector and/or SDG target), these do open up new avenues. Regarding financing of NCS, apart from the regular and conventional means therefore one has to be innovative and for that one needs to review the various possibilities, the practices world-wide and examine the best practices for replication adjusted to the country context.

### 9.8.2 Current status

Most of the NCS sectors (e.g., land, water, infrastructure, energy, power, crop agriculture, forestry etc) are already mandates of one ministry or other and in that sense they have their

<sup>16</sup> United Nations, Addis Ababa Action Agenda of the Third International Conference on Financing for Development, New York, 2015,

own funding sources through the public budgeting system much of which these days are financed from domestic sources. But note that some of the initiatives such as public-partnership which has been touted for NCS financing in some countries could not even get off the ground in Bangladesh even for conventional programmes, let alone those intended for conservation ones. On the other hand, it may also be noted that some of the NCS sectors such as land, biodiversity, forestry have specific multilateral conventions of their own and there are certain financial mechanisms under them. However, accessing them had been rather problematic mainly due to the paucity of funds and secondly due to lack of institutional capacity.

### **9.8.3 Issues**

Even before one begins to look for funds, there are several intertwined steps that must be taken. The very first one is how much funding might be needed. This is an onerous exercise because; one then has to find out exactly what needs to be done. These will involve both intellectual and practical exercises of planning, programming and project formulation and time profile based on national priorities. For the time being on perhaps one can begin with the finalized and approved action plans under various NCS sectors. Then comes the sixty four million dollar question as to how much these will cost again with a time profile. There is also a peculiarly national issue.

Bangladesh apparently is one of the very high cost country in the world when it comes to infrastructure investment in which is generally much costlier than in other investment programmes. In many cases, there are sheer wastage and leakage (for technical and other reasons) that take place. Indeed both the Addis Ababa Agenda and the SDG targets (Goal 16, target 16.5 and 16.6) caution against such tendencies. For any future financial mechanism there have to have built-in systems against such wastage and leakage.

Given the above caveat, how to go about estimating the costs remains a big challenge. But in the beginning perhaps the costs will be more for the planning parts which may not be much. There are global estimates available which run into incremental investment of \$2-3 trillion per year. For developing countries, incomplete estimates<sup>17</sup> run into a minimum of \$689 bn for large infrastructure projects (power, transport, telecom, water and sanitation), the next highest is other agriculture (\$210 bn), followed by health (\$51 bn), food security (38), access to modern energy (\$34 bn), access to water and sanitation (\$27 bn), ecosystems including biodiversity (\$18 bn).

Be it global or national, the next few steps are to identify the sources for mobilising the finds, the channels that may be used, and the instruments to channel the funds. All of these need quite a bit of ingenuity. The action plan therefore needs to emphasise at least on a preliminary basis these above steps. Of course if the idea of a Sustainable Development Commission (SDC) materialize (see sub-section 9.10 below), its set up and provisioning will also need to be considered which perhaps can be initially financed from domestic public resources. The SDC will be in charge of commissioning the necessary reports.

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<sup>17</sup> Schmidt-Tarub, Guido and Jeffrey D. Sachs, *Financing Sustainable Development: Implementing the SDGs through Effective Investment Strategies and Partnerships*. Sustainable Development Solutions Network, A Global initiative for the United Nations, Working Paper, Revised version, 18 June 2015.

#### **9.8.4 An Immediate Action Plan**

The action plan for financing NCS may be as under. It should be understood that this is actually a planning phase. Subsequently, once the planning ideas seems feasible, the investment financing phase may begin. The planning phase, once started may take to 2-3 years.

- (i) Review the various programmes and projects under the NCS sectors and corresponding allocations and expenditure, find out how far those had been conservation-centric and whether any such itemization can be done at all; if not suggest specific budget heads that should be inserted in the future;
- (ii) Review the impacts of the various conservation-centric programmes and projects and their replicability for the future;
- (iii) Review the various funding sources by the quantum of funds that have been used and the gestation period from initial ideas to actual funding and the reasons behind delays; review the prospective funding sources (such as Bio-fin) and the amounts of funds that are available and weigh them against estimated needs, if any.
- (iv) Examine the various financing mechanisms that have been suggested or are in practice across the world such as specific policies, taxes and subsidies, green bonds, payments for ecosystem services, eco-tourism, derivatives, debt for nature swap and their efficacy for conservation;
- (v) Based on a review of literature and wide stakeholder consultation, examine how the private sector and the community organizations might be involved in resource mobilization and utilisation for conservation-centric investments;
- (vi) Make an estimate of the conservation-centric investments that might be needed over successive 5 years cycles, viz., 2016-2020, 2021-2025 and 2026-2030.
- (vii) Make recommendations to the SDC for further processing ad actions on financing.

## 9.9 MONITORING & COORDINATION MECHANISM FOR NCS IMPLEMENTATION



### 9.9.1 Introduction

Environmental monitoring mechanism is essential to observe and check the progress or quality of service over a period of time where coordination among different organization enables them to work together effectively. For moving towards the adopted sustainable development goals it requires the effective monitoring system to undertake proper decision, measures and policies. The vital role of monitoring has been acknowledged in the SDG in targets 17.18 and 17.19 under the rubric of "Data, monitoring and accountability". The key M&E system includes the initial need assessment, project design, logical framework, indicator set up and evaluation. Based on the nature of development program the environmental monitoring protocol must be adjusted with indicators to evaluate the results.

### 9.9.2 Current status and interventions made

In Bangladesh, every developmental project implemented and monitored by the associated ministry and departmental planning cell. The existing projects also monitored and evaluated by the Internal Monitoring and Evaluation Division (IMED) of the Planning Ministry. Therefore, quick coordination among ministry, department and IMED will act as a precursor for proper implementation of projects under National Conservation Strategy. The Ministry of Environment and Forests is the central institution for environmental monitoring. However, some major agencies are working in this field as technology providing hub for conducting environmental monitoring by the MOEF.

However, the SDG monitoring and by implication NCS monitoring also depends upon the statistical system in the country. Bangladesh Bureau of Statistics is the official statistical agency under the Planning Ministry assigned with the task of monitoring various aspects fo the economy and development including all natural resource use in the country. So far the BBS had been using certain satellite accounts for alternative estimates national income adjusted for resource degradation and depletion.

### **9.9.3 Strategy**

The existing laws and strategies related to environmental conservation in Bangladesh are also important in terms of monitoring and evaluation. Following mentioned the concise part of laws and strategies,

- Forest act 1927 (Amended 2000) had articulated the rules of managing, improving and protecting the forest resources through assigning prescribed responsibilities to the village community
- The Bangladesh Environment Conservation Act, 1995 and Bangladesh Environment Conservation Rules, 1997 have been using as legal instruments to monitor ecosystems of the country as well as to prevent degradation of critical and fragile ecosystems of the country.
- The National Forest Policy 2016 (draft) emphasized monitoring of the forest resources and created opportunities for resource users to be involved in decision making process and management of forest resources.
- The Environment Policy, 1992 implementing the steps to conserve the environment with coordinated efforts of the government or semi-government or autonomous organizations at the national levels.

The role of BBS has bee mentioned earlier. The mandate of BBS should be also included here. But note that in most cases there are no definitive national monitoring indicators. While it is expected that the UN system will soon propose a set of monitoring indicators, the country needs to contextualize them and this should e one of the major tasks of any action plan apart from putting in a proper and effective, open, transparent and accountable data collection, processing, storage and retrieval system as well as development and monitoring of the indicators.

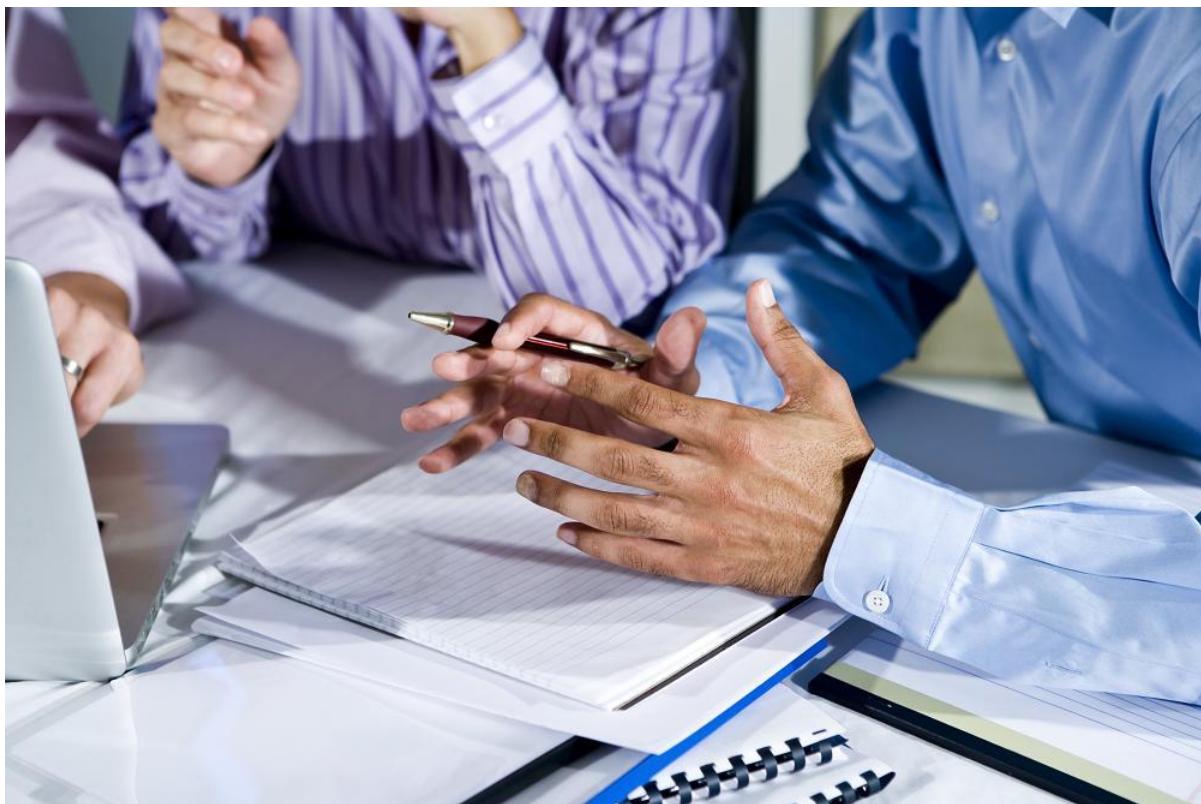
### **9.9.4 Action plan**

Specific environmental monitoring system helps to know whether the environment is improving or transitioning towards destruction. So the monitoring should be well focused to particular audience and uses. GIS and remote sensing technology can be used for mapping and monitoring different aspects of the environmental systems. Developing an effective monitoring framework must include the following elements,

- Design the plan considering what environmental aspects will be monitored, how the data will be applied, what indicators will be established and how the stakeholders will be integrated/involved into the system.
- The methods and sampling strategies need to be tested.
- Collected data need to be archived and documented.
- Quality control of the collected data.
- Synthesis and analysis of the data
- Internal and external reporting and communication.
- Audit and review of the system.

Timely monitoring is another important factor for assessment. Participatory monitoring by engaging key stakeholders can build understanding and ownership. The monitoring information should not be restricted for project management but to share with beneficiaries, donors and other relevant stakeholders.

## 9.10 INSTITUTIONAL FRAMEWORK FOR NCS IMPLEMENTATION



### 9.10.1 Introduction

Natural resource conservation has become the essential part for sustainable development process. 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. To enhance conservation efforts for developing and running formal organizations, enacting laws, strengthening local authorities and ensuring the service delivery the effective and productive legal as well as institutional framework is needed. The legal aspects are dealt with in another sub-section. In this sub-section we intend to discuss institutional issues in NCS. Before the pertinent issues are elaborated, one must point out here what is meant by institutional framework for NCS implementation (IF-NCS).

This definitively does not mean that there would be one single framework for all NCS related activities. As may be clear by this time, for each of the core natural resource sectors as well as resource using sectors there are many acts, policies, rules and procedures and there are specific institutions to carry them out. The supporting sectors similarly have in some cases specific institutions with mandates to intervene in those specific aspects. Of course there are overlapping areas of jurisdiction and the need for coordination is supreme. This is more important now than before because NCS becomes an integrated set of strategy and corresponding action plan which unless coordinated well can not be carried out properly. This then also defeats the purpose behind SDG. Indeed, a new institutional framework means having a holistic view of the whole thing but the actual implementation be carried out in proper sequence and in a coordinated manner. No siloed institutional

framework which is generally the case will do. This is indeed a challenge for any government, more particularly in an LDC such as Bangladesh.

### **9.10.2 Present status & interventions**

As per the provision of Convention on Biological Diversity the Bangladesh is committed to develop necessary policies, legal and regulatory framework to conserve biodiversity. In 1927, enactment of forest acts the conservation efforts started in this land. Later the biodiversity conservation efforts got an accelerated momentum with the formulation of National Biodiversity Strategy and Action Plan in 2004. To face the consequence of climate change through mainly mitigation and adaptation activates, Bangladesh has developed Bangladesh Climate Change Strategy and Action Plan, 2009. The forestry sector master plan was developed to improve deteriorating status of natural forests. A Guideline for participatory water management was developed in 2000 to ensure community participation in water management decisions. 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.

### **9.10.3 Action plan**

The action plans for the various NCS sectors have already been discussed in appropriate places. These of course will have to be done. Question is how can these be coordinated. Indeed, before that it must be pointed out that NCS must be mainstreamed or at least some of its major components which had not been so clearly integrated such as land, biodiversity should be so integrated now. However, even in case of those which are apparently mainstreamed such as water or agriculture or forestry are all in a siloed framework. Each of those have to be integrated not simply with the development process but also with each other otherwise the butterfly effect that had been pointed out earlier may happen and spoil the whole NCS implementation. The action plan therefore should therefore have basically three types of issues to consider. These are:

- Establish a Sustainable Development Commission (SDC) with clear mandates in line with particularly relevant targets under SDG 16 (see Table 1 earlier) to oversee both the implementation of SDG and NCS and their coordination; SDC composition may be thought about carefully keeping the provision that it has the mandate to get advice from and/or get hearings from the government, the private sector and the civil society and community leaders
- SDC to review all NCS sectoral policies, rules, acts, procedures and mandates to check where there are synergies and conflicts and harmonise them and recommend to the government for such harmonization and necessary revision as per law
- SDC to oversee the formulation of monitoring indicators for various NCS sectors as well as the corresponding SDG targets and prepare a State of Sustainable Development on a regular, preferably annual basis
- All NCS sectors shall report to the SDC their activities on an annual basis subject to the provision that if so deemed necessary, the SDC may request for specific report from specific ministry or agency on a specific NCS related activity

## 9.11 LEGAL ASPECTS OF NCS



### 9.11.1 Introduction

Bangladesh has undergone a process of natural resource degradation over the years that cause now a great concern. While various environmental policies have been adopted over time to overcome these harmful effects on nature and natural resources, the situation has come to a stage when more stringent actions are necessary. Particularly time has come to identify the scope, gaps, and constraints of existing legal and policy frameworks in Bangladesh related to these concerns.

### 9.11.2 Current status & interventions

This review and assessment process identifies the following key concerns to be addressed in the future for an effective implementation of NCS:

- Policies, laws and the regulations related to public land and water management are ad-hoc and sectoral.
- Sectoral conflicts and contradictions in terms of legal and institutional structures, functions and mandates deprive local communities from secure access to public lands and related resources.
- Absence of legislative and policy frameworks for land zoning resulting uncertainty in compliance of the sectoral laws and policies.

- Current management approaches to water bodies in Bangladesh still aim at generating government revenue instead of ecological sustainability and secure livelihoods for poor users, instead they create obstacles to fair access to public waters for traditional users.
- Sectoral approaches of policies and laws undermine one another; e.g. laws related to fisheries focus on general conservation, but access (leasing) of fisheries is regulated by land related laws and policies set by Ministry of Land.
- The basic elements of community based resource management including community access to resources, community participation in decision making processes, and secure benefits for local communities particularly the poor are not yet institutionalized in Bangladesh with appropriate legal and policy mandates.
- The concept of common natural resources (e.g. common property institutions) does not exist in laws and policies, which are inflexible and focus on allocating exclusive rights of use to individuals (khas land) or cooperatives (waterbodies).
- Policies and their implementation create space and opportunities for local elites to capture common natural resources.
- There is no clear decision or policy on whether rural people have a right to flood protection or suitable water for their traditional/preferred livelihood activities (e.g. legal cases over failure to repair cyclone damaged embankments and release of saline water for shrimp farming affecting crop cultivation did not result in recognition of any rights or norms).
- Sectoral laws and policies, those are adopted recently, addressed the issue of climate change. The energy related policies and legislation including on renewable energy adopted recently addressed broader contexts of promoting low emission development, but needs to be adopted specific legislations on institutional arrangements. But the key legislations and policies on transport and industry do not provide any specific directions for reducing GHGs from transport and industry sectors.
- Laws and policies related to forest, agriculture and water sectors, which can address the mitigation and adaptation measures together for climate resilient development processes, do not address the issues in the sectoral policies and legislations at all.
- Compliance and Monitoring Mechanisms within the legal and policy frameworks are very fragile which fail to promote the transparency and accountability in the conservation regime.
- Access to justice and dispute resolution mechanism found very complex in terms of judicial, administrative and alternative dispute resolutions (ADRs).

### **9.11.3 Action plan**

Considering a specific country context, an appropriate legal and policy framework with effective monitoring and compliance mechanism can help to reduce environmental damage and to promote environmental sustainability, sound natural resource management and sustainable development. In particular, required legal and institutional frameworks need to be developed with monitoring-reporting-verification, auditing, over sighting and communication mechanisms, which would promote the transparency and accountability in conservation governance regime in Bangladesh to protect its citizens from vulnerabilities and also to promote sustainable development. However, as to immediate actions within the National Conservation Strategy Framework GoB Bangladesh can take initiatives:

- To remove the inconsistencies identified in this report from the existing policies and legislations related to environment, natural resource management, climate change, disaster management and sustainable development; and
- To establish an integrated and coordinated policy and legal framework to ensure sustainable use and management of environment and natural resource considering the climate impacts.

The SDC that has been advocated as an Institutional Framework for NCS implementation can take these initiatives.



## INTEGRATED VIEW OF NCS

In the foregoing sections an attempt has been made to discuss the role of an NCS in national sustainable development. It has been clearly established that the SDG and the NCS are intertwined, nay in many cases, they are indistinguishable. For this reason we have tried to formulate the NCS within the framework of SDG. We have further shown how intricately the NCS sectors and the SDG targets are interlinked while the SDG targets and by implication the NCS sectors are also so linked among themselves. The linkage is such an intricate one that often the implementation of one is a necessary condition for attaining the other targets and conservation in another sector or target. Butterfly effects are almost certain in such a situation.

Achieving the SDG targets and the conservation of nature therefore calls for an integrated action plan without a siloed mentality. This does not mean that there cannot be specific projects and programmes tailored to the needs of a specific sector but that whenever a programme is undertaken under any sector, it must carefully examine what it might mean for other sector performance. Some sort of integration might be achieved by mainstreaming some specific sector concerns which include land, water, biodiversity and energy/power.

A very important aspect of any particular programme, project, technology or activity must be the resource footprint it may have and examine how in cost-effective manner the least resource-intensive actions might be taken. This of course means that the present project documents must be revised yet again to reflect these concerns.

One major aspect of NCS must be to prepare the future leaders in environmental management, activists and planners. Environmental education and awareness building at all layers of education is a must. So is the institutional mechanism for which we have recommended the setting up of a Sustainable Development Commission with adequate power, mandate and jurisdiction and finance. A proper legal framework for conservation of resources and checking their depletion and degradation is also absolutely important for the process of sustainable development and conservation of nature. Last, but not the least, the Government must also make it clear that it does not believe in the philosophy of "grow now and clean-up later" mentality.

## ANNEX 1

The Expert Committee was formed through an office order (MoEF/Env-3/NCS-01/2013/830, dated 9 April 2013) and is constituted as follows:

- Dr. Qazi Khaliquzzaman Ahmad, Chairman, PKSF, Convener;
- Dr. Ainun Nishat, Former Vice Chancellor, BRAC University, member ;
- Dr. Atiq Rahman, Executive Director, BCAS, member;
- Mr. Ishtiaq Uddin Ahmad, Country Representative, IUCN Bangladesh, member;
- Dr. Sultan Ahmed, Director (Natural Resource Management), DoE, member;
- Dr. Fazle Rabbi Sadeque Ahmed, Director, PKSF, member;
- Mr. S.M. Ahsanul Aziz, Deputy Director, DoE, member;
- Mr. Habibur Rahman, Senior Assistant Secretary, MoEF, member; and
- Dr. Md. Afzal Hossain, Deputy Secretary, MoEF, Member Secretary to the Expert Committee;

## ANNEX 2

### Mergers, split and addition of new sectors

- It was found that few sectors are related and overlapping to each other that will be considered during the preparation of final NCS. Beside this new import sectors are also missing that will also be added later. During the preparation of NCS international best practices will be considered and reviewed. Specific concerns that are not limited to are as follows,
- **Merger of related or overlapping sectors and activities such as**
  - Urbanization, Urban Development and Public Housing and Settlement Planning
  - Industries and Small and Cottage Industries
  -
- **Splitting of initial sector**
  - Energy and Minerals have been split into Energy and Minerals (with only primaty energy under its purview) and Power (transformation of primary energy into electricity)
- **Wholly new sectors/areas**
  - Coastal and marine resources
  - Legal aspects
  - Institutional framework for NCS implementation

## ANNEX 3

### **Guideline for preparation of the sectoral background reports**

**Note that this is only a guideline. The author if he/she wishes may change the format, but the minimum required information have to be given as per this guideline. He/she may elaborate as much desired on any of the points.**

#### **TITLE OF THE SECTOR**

*Name, designation, address, email, phone number of the author*

**Page limit: 25-30 pages preferably but if necessary, author can go beyond the average page limit (excluding Executive Summary, abbreviations, acronyms, tables, figures, references and annexes). Suggested page lengths are only a guide. Authors can shorten or lengthen them depending on circumstances, but pl do not try to be cryptic in name of brevity.**

**All text should be in A4 size page set up with 1 inch margin both one left and right side and line spacing should be at 0-0 and 1.5. As far as possible use references fully as footnotes or end notes and provide a full bibliography of all works cited.**

#### **Executive summary**

#### **Abbreviations, Acronyms and Local Terms**

#### **1. INTRODUCTION (2-3 pages)**

##### **○ General introduction of the Sector**

This should provide a general qualitative introduction to the sector by way of its importance in conservation strategy - if it is a natural resource, mention its role in human welfare in terms of relevance (such as in food security, production activities, employment generation, poverty reduction, ecological services etc.). If it is a human activity based on natural resources, such as industrialisation, mention its role in economic development, employment generation etc. If it is a supporting activity, mention how it helps in nature conservation. For cross cutting issues such as gender or rural development, mention how various natural resources management and the particular sector are related.

Then mention why this is part of the NCS.

##### **○ Importance of the sector**

This will elaborate the brief discussion in preceding Introductory section. If a natural resource, provide quantitative estimates/idea of its extent (for example for forestry; if a human activity based on the natural resources, provide the extent of the activity by way of some quantitative estimate (for example, for industry, its role in GDP, employment etc). If it is a supporting activity for NCS (such as environmental education or awareness, pl elaborate further on the issue as discussed under general introduction. If it is a cross-cutting issue, elaborate further on what has been discussed under Introduction.

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##### **○ Relationship of this sector with others**

How the activities related in this sector impinge upon others and how other sectors' activities constrain or facilitate this sector - this should be both in terms of activities and in terms of conservation

**○ Analytical context within the framework of SDGs**

How conservation of the natural resource or the activity may fit in with the SDG framework - what analytical points should be discussed or considered for linking up with SDGs. The same applies to supporting and cross-cutting issues.

**○ Scope of the report**

In the light of the analytical context above, describe in as much detail as necessary the scope of the report i.e., Issues to be covered under this report for fulfilling the ToR.

**○ Data and method of analysis (if any)**

If primary or secondary data to be used directly or will be reanalysed. What kind of analytical or statistical techniques (if any) to be used and their . If the methodology is qualitative, mention what qualitative technique (for example content analysis in case of text based secondary information) to be used - limitations of the method(s) used.

**○ Limitations of the scope of analysis and report and the reasons thereof**

○

**○ What boxes (if any is used) for highlighting any point**

## 2. STATUS (6-8 pages)

**○ Current status of the sector**

This should provide first a brief review of the sector as was done for the last NCS exercise- developments in the sector since then in terms of its extent, productivity, extraction (in case of non-renewables), structural change (as in case of crop agriculture)., For new sectors or activities (based on the resources use or as supporting NCS), and also for cross-cutting issues such as rural development or gender provide an up to date information since at least last best known time. Resource use efficiency by activities based on natural resources such as agriculture, industry, fisheries, power sector etc are absolutely necessary. If no upto date information is available, anecdotal evidence may be provided but should be explicitly stated so.

**○ Resource degradation status**

If a natural resource, state how the resource degradation is measured - productivity, contingent valuation or other method; a critical review of the degradation status estimate; quantify as far as possible the extent of resource degradation; causes of degradation by direct immediate factors (such as technology of use or extraction) or indirect and/or ultimate factors; Rate of degradation over time and their proximate causes such as resource use intensity, inefficiency in resources use in activities depending on the resource (such as land degradation on agricultural inefficiency; or fisheries degradation on demand factors) - policy factors (only provide an indication, details to be provided in section 4) - relative importance of factors responsible for resource degradation (provide quantitative estimates of any as far as possible) - was any rigorous diagnosis ever made by the government on these degradation? When and what were the diagnostics?

● **Resource depletion status**

Relevant more for non-renewable resources but issues otherwise should be similar for analysis of Resource degradation

● **Important issues mentioned in the boxes** (if any)

### 3. ISSUES (5-7 pages)

○ **Interventions**

What interventions (policies, budgetary resource, technology, institutional, organisational (Gov/NGO) have been made during the last 15 years and to what effect? - budgetary resources allocated/expended and their adequacy -did the interventions try to address the factors responsible for resource degradation or depletion or inefficiencies in activities based on the natural resources use particularly raising their resource use efficiency-Use any evaluation made of these interventions and in the light of the diagnostics or factors behind degradation, depletion, resource use inefficiency as discussed above, have these factors/issues been addressed in these interventions?

For cross-cutting issues try to state as far as possible what steps (interventions) were taken to raise over-all efficiencies in those sectors

○ **Important issues mentioned in the boxes** (if any)

### 4. STRATEGIES/POLICIES/LEGISLATION/INSTITUTIONS?COORDINATION (5-6 pages)

○ **Mandates and policies existing related to the sector or in other sectors of relevance with important bearings on the sector**

List here the policies which may include strategies, policies, legislations, rules and procedures related to the sector

Provide here an analysis on the mandate and policies regarding the sector by formal Institutions responsible for them

Gaps in the existing policies and mandates -should be in light of relevant SDGs as well as the factors responsible for limited effectiveness or advancement regarding conservation in the sector analysed earlier

○ **Institutional issues**

Formal institutions responsible for the sector or conservation related activities under it Current management system/practices and their effectiveness including coordination mechanism

○ **Important issues mentioned in the boxes** (if any)

### 5. ACTION PLAN (4-5 pages)

Must be within the framework of relevant SDGs

Issues	Actions	Implementing agency
Problems 1	What needs to be done directly to address this problem 1. 2.	MoEF, FD, Universities, NGOs, INGOs, BFRI
Problem ....	....	....
Problem N	What needs to be done to	MoEF, FD, Universities,



	address this problem 1. 2.	NGOs, INGOs, BFRI
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## **6. Reference/Bibliography**

## **7. Annexes**