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## Introduction

Economic growth has been considered as the precondition of human welfare and development. But the traditional system of estimating economic growth on the basis of goods and services does not consider environmental effects. It is now appreciated that the environmental problem is also an economic issue indeed. For these reasons, there is no scope to visualize economic and environmental activities in isolation. An integrated approach is, therefore needed for the sake of efficient management of environmental resources.

Bangladesh Economic Review 2006

Natural resource accounting (NRA) is a response to the need for valuing natural resources and integrating those values into the overall system of decision making. Resource depletion and degradation associated with population growth, natural hazards, and economic development is visible in Bangladesh. So it is vitally important that current policies and programs be carefully reviewed to assess their contribution to the country's sustainable development<sup>1</sup> if Bangladesh is to provide the basic needs and even an improved quality of life for its peoples. To proceed, the country will require an improved understanding of the conditions and trends of the natural resource base; similarly comprehensive and accurate information is essential for policy analysis. NRA offers statistical information relevant to understanding the linkages between the environment and the economy (Statistics Canada, 2006), and provides essential data on the physical quantities and attributes of natural resources and their changes over time.

This research is an outcome of my internship at the Bangladesh Bureau of Statistics (BBS), funded by the Canadian International Development Agency (CIDA) through the Students for Development Program, York International, York University. This research aims to discuss the rationale for NRA and a way to develop an NRA framework and associated institutional arrangements in adopting NRA in Bangladesh.

### 1.1 Context and Background

In Bangladesh, the rate of growth of GDP is the principal measure of economic progress and transformation. All of the country's economic analyses and forecasting approaches are based on the current system of national accounting, which totally ignores the contribution of natural resources. These approaches should be revised to properly account for the goods and services provided by natural resources and integrate the true cost of their degradation with economic decision making.

The Bangladesh Economic Review<sup>2</sup> (2006) presents the growth performance of the Bangladesh economy, showing considerable improvements since 1990s (see figure 1), and savings and

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<sup>1</sup> Sustainable Development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987; p.8). Many of the concerns related to resource depletion and environmental degradation are reflected in the concept of sustainable development (Statistics Canada, 2006). Bangladesh has adopted the sustainable development concept through the formulation of policies and implementation of programmes related to environmental issues (NEMAP, vol. 1, 1995).

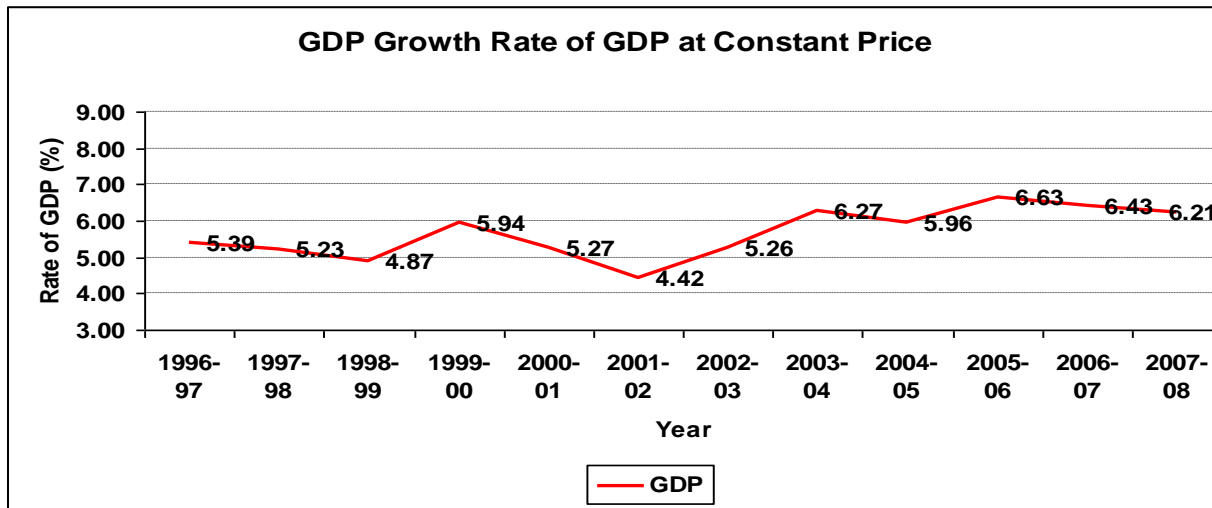
<sup>2</sup> The Bangladesh Economic Review is a regular publication of the government of Bangladesh and focuses on trends of macroeconomic indicators, development policy, strategy and sectoral progress of the Bangladesh economy.

investment registering a gradual rise along with economic growth. The Minister of Finance and Planning states that considering the positive trends of socioeconomic development such as reduction of human poverty in the areas of education, health and nutrition, Bangladesh has fulfilled its human welfare commitment and surpassed the achievements of many developing countries (Finance Division, 2007). The Bangladesh Economic Review (2006) further states that the World Bank has identified Bangladesh as one of the most rapidly growing economies among 31 large developing countries in recent times. It is surprisingly true that the Bangladesh Economic Review (2006) reflects only the so-called economic growth, and does not reflect how much natural resource base (land, water, forest, wetland etc.) has been maintained, preserved and conserved to sustain the important sources of the growth of GDP. The key indicators of success include the growth rate of GDP, exports, foreign export reserves, augmented national investment, credit expansion to the private sector etc. There is no indicator to show whether the economic growth is sustainable or unsustainable. The World Resource Institute's (WRI) report showed that overuse and destruction of natural resources is already, in fact, negatively impacting the welfare of millions of people in Bangladesh, and threatening their food security and quality of life (WRI, 1990). Policy makers want to integrate economy and environment in national planning. So how can the information presented in the Bangladesh Economic Review based on the Bangladesh Bureau of Statistics (BBS)'s conventional economic accounting be useful to the policy planners?(See Box 1 for some remarks on GDP growth)

The macroeconomic situation of Bangladesh tells us that the actual GDP growth in FY 2004-05 exceeded the projected growth of 5.38 percent to 6 percent, partly due to higher than expected growth in agriculture. The GDP growth rate in FY 2005-06 was projected at 6.71 percent, which is one of the highest growth rates in the last three decades (Bangladesh Economic Review, 2006, p 1).The question is in a country like Bangladesh, where land and water constitute the two major essential physical inputs required for crop production and have a dominant role in income and employment generation, but are degraded, depleted and diminished, and even the estimates of crop production do not take into account land degradation and water shortages and water pollution due to cropping intensity and use of agro-chemicals, how can the country's GDP continue to increase while running down its natural resource base due to increased economic activities. So the country's current emphasis on economic development cannot be effective on a sustained basis if the quality of major natural resources is deteriorating.

Some evidence, including the WRI study, has revealed that over half of the forested land of Bangladesh has been cleared in the last three decades, to a point where tree cover amounts to less than 6 percent of the total land area (BNCS, 2007). The World Bank states that the country has already lost most of its natural forest, which is now only 5-7 % of the total land area (the World Bank, 1997). This is reiterated in the introductory section of the *Compendium of Environmental Statistics of Bangladesh, (2004)*. This deforestation is destroying the natural balance of the ecosystem as well as causing permanent destruction of habitats.

**Figure 1: GDP growth rate in Bangladesh over the last decade**



Source: Bangladesh Bureau of Statistics and Bangladesh Economic Review, 2006

**Box 1 Some remarks on GDP growth in natural resource base in the last two decades**

It is very difficult to show a comparative picture of GDP growth and disappearance of natural resource base in the last two decades because of a serious lack of sufficient specific data on degradation and depletion of natural resources in Bangladesh. It is a fact that the exact figures of natural resource loss are still unestimated. However different national documents including the Compendium of Environmental Statistics of Bangladesh 2005; Bangladesh National Conservation Strategy, 2007; Bangladesh National Capacity Self-Assessment for Global Environmental Management, 2007; National Environmental Management Action Plan, 1995; Effects of Climate and Sea-level Changes on the Natural Resources of Bangladesh, 1993; and Bangladesh: Environment and Natural Resource Assessment, 1990, have demonstrated loss of agricultural land; loss of forest cover and forest land; loss of wetlands; loss of wildlife; depletion of fisheries; depletion of ground water level and many other resource problems. Yet, in not one of those 20 years did the annual accounts of national income, expenditure, savings, and capital formation reflect that natural resource assets had disappeared during those years. The accounts showed only continuing growth in national GDP. The national accounts gave no warning that the basis for continuing growth was being destroyed. Unfortunately the decrease of natural assets went unrecorded, unnoticed, and uncorrected.

The Bangladesh National Conservation Strategy, 2007; the Bangladesh National Capacity Self-Assessment for Global Environmental Management, 2007; and the National Environmental Management Action Plan, 1995 have simply given emphasis to the need for a data bank on natural resources. But raw data is not information in itself. Unless data can be processed, analyzed, and converted into information in a format that can be assimilated by planners and decision-makers (See Fig. 2) in mainstreaming environmental considerations into economy-wide policies and developing sustainability indicators. The most important and efficient step would be to change the country's national accounting system. National indexes that show how much the nation is growing must reflect the relationship between environmental and socioeconomic systems (the World Bank, 2000). Until it is done, the GoB may be making inefficient choices in allocating natural resources to uses that destroy or degrade natural capital.

The GoB indeed faces with difficult choices among the many competing priorities in its attempt to allocate natural resources to uses. Population growth is putting increasing pressure on Bangladesh's natural resource base. Bangladesh was the eighth most populous country in the world during the year 1999, with a total population of 127 million. With this growth rate the population of Bangladesh will reach 156 million in 2011 (NCS, 2007). WRI reports that even if population growth is somehow reduced, the demands of the current population on the natural resource base of Bangladesh are such that these resources are already being stressed, degraded and depleted in many ways (WRI, 1990). Besides, many natural hazards (cyclones, floods, river bank erosion, drought and salinity) pose a serious threat to both people and natural resources and erode the resource base. Bangladesh is highly vulnerable to the projected impacts of global climate change. If sea levels were to rise by the predicted amount of 88 to 89 cm, the effect on Bangladesh would be disastrous. Besides losing arable land, the rising seawater would make most agricultural activities near the "new" coastline almost impossible. So there is a need for an empirical basis on which to base policy decisions regarding trade-offs among the many difficult choices of a developing nation.

If the GoB is to evaluate the success of environmental and economic policies, then the GoB must develop measurable indicators that serve as suitable proxy for needs to see the success of the country's economic activity or development. Measurement of natural wealth is an important aspect of assessing the sustainability of economic development. So Natural Resource Accounting (NRA) can be the source of estimates of the value of natural resource asset stocks that are required to supplement the measure of national wealth (Statistics Canada, 2006). The incorporation of natural resources in the national accounting system ensures that natural resources are not seen as a free gift of nature with limitless abundance. Incorporating more realistic resource information would result in a more comprehensive source of data for identifying the causes of economic problems related to natural resource management.

The idea of the development of NRA through the national accounting framework is not new. The theories have been around for at least 60 years, although only since the early 1970s has there been a concerted effort by national statistical organizations towards the development of formalized systems for this purposes (Statistics Canada, 2006). Since that time, there has been tremendous growth in the attention paid to integrating natural resources and economic concerns in decision making. In 1987, the highly influential World Commission on Environment and Development (the so-called Bruntland Commission) recognized the need for integrated environmental and economic accounting with its call for "an annual report and audit on changes in environmental quality and in the stock of the nation's environmental resource assets". Such reporting, the Commission noted, is "essential to obtain an accurate picture of the true health and wealth of the national economy and to assess progress towards Sustainable development" (World Commission on Environment and Development, 1987; p.314). The Bruntland report also asked all countries, rich and poor, to take full account in their measurement of economic growth of improvement or deterioration in the stock of natural resources (IUCN, 1994, Cato, 1993, p7). A number of other influential studies calling for the need to integrate natural resources into the national accounts appeared (for example Repetto et al., 1989) about the same time. Agenda 21 of the United Nations Conference on Environment and Development, held at Rio de Janeiro, Brazil in 1992, also suggested activities for the promotion of NRA (IUCN, 1994). Then we saw the revision of the international System of National Accounts (SNA 93) by United Nations to better

reflect the environment. More recently the System of Integrated Environmental and Economic Accounting (SEEA-2003) prepared by the United Nations has become an extremely useful tool for both economists and natural scientists dealing with the interaction between the natural world and the human economy (Lange, 2007). The World Bank adds that one of the most important challenges to achieve sustainable development is integrating economic policies with policies for the management of natural resources and the environment. Such integration has been the motivation for developing environmental accounting (The World Bank, 2006).

## **1.2 Identification of the problem**

The need for NRA is now widely recognized. While the United Nations provides a methodological framework for NRA, its appropriateness to the developing countries needs to be examined (IUCN, 94). For example Bangladesh is a very small, populous and poor country that needs economic development, and where agriculture is dominant, bio-mass/fuel-wood dependence is very high for energy needs, and hundreds of millions of poor people depend on natural resources for their subsistence; so the NRA approach may need to be modified depending on those characteristics. Even if a well developed framework for NRA were available, several areas have to be addressed in order to set up a comprehensive system for NRA in a developing country like Bangladesh. Very little attention has been paid to institutional issues and capacity-building for resource information administration staff. The World Bank states that resource information project or program of success has very frequently been tied to an adequate solution to institutional problems. Appropriately, more and more attention is being given to institutional issues, but it is still an under-researched domain (World Bank, 1992).

Moreover, general understanding of the linkages between economic development and natural resource depletion and degradation, and awareness of policy makers and statisticians about the importance of NRA and its policy uses, are matters of great concern for the successful adoption and implementation of NRA. A more serious problem is a lack of government planners who see the connection between resource degradation and economic development in Bangladesh, which undermines the use of NRA. This has happened around the world due to the dominance of the GNP and GDP model in defining the nature and scope of national statistics (CIDA 1993, pg.77). The IUCN states that introduction of NRA requires the awareness and participation of experts and institutions dealing with economic and environmental accounting (IUCN, 94). Signs of breakdown are found in pilot projects on Natural Resource Accounting or Environmental Information supported by international agencies in Bangladesh. These kinds of projects have not penetrated deeply into broad macro-economic development planning. CIDA has suggested that a prerequisite for this penetration is the institutionalization of NRA in the routine data collection of Central Statistical Offices (CIDA, 93). The other major problem is lack of know-how. The system of environmental and economic accounting (SEEA 2003) is the first international handbook on environmental accounting developed by the UN, whose part 7 and 8 describes the natural resource stock accounts. Surprisingly, however, this new handbook is not well known to many practitioners (Lange, 2007). For example Bangladesh Bureau of Statistics (BBS) is drafting guidelines for national accounts but those guidelines are followed by old SNA versions and SNA 93 but not followed by SEEA-2003.<sup>3</sup>

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<sup>3</sup> The handbook of the UN guidelines on the System of National Accounts is known as SNA. The environment was not a central consideration in the development of the original system of national accounts in the 1940s and 1950s. The version of the SNA

### 1.3 The Argument and Objectives

This paper will attempt to demonstrate that NRA with an appropriate methodological framework for developing countries could be effective if it is supported by a strong institutional environment and if it is demanded by policy makers. Then the construction of a NRA framework for a developing country might well encourage policy makers to consider the impact of specific policies on the stock of natural resources and might contribute to the country's environmental, economic and financial decision making.

The principal objective of this paper is to overview the application of important aspects of Ecological Economics in the Bangladesh System of National Accounting (BSNA) in order to contribute to "ecologically sustainable economic development"<sup>4</sup> in Bangladesh. The special focuses are to i) examine why Bangladesh needs NRA by demonstrating the linkages between economic development and natural resource depletion and degradation; ii) explore awareness of policy makers and statisticians about the importance of NRA and its policy uses to identify the gap between the supply of and demand for the tool of NRA; iii) examine the current system of national accounting in Bangladesh and its shortcomings for adopting NRA; iv) investigate the institutional issues for NRA; vi) identify a more realistic accounting framework for Bangladesh to show how natural resources might be reflected in the Bangladesh national accounts; and finally v) outline an action plan for NRA in Bangladesh.

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guidelines, published in 1968, did not include much guidance on balance sheets and consequently provided little information on the assets that should be covered by balance sheet. Although the 1968 SNA included in principle natural assets in its asset boundary, it did not do so in a systematic manner.

The SNA 93 has corrected this weakness by providing explicit guidance as to the natural resource assets that should be included in balance sheet accounts and how these assets should be valued. Expansion of the scope of the asset boundary by the 1993 SNA removes some of the limitations of the 1968 version. The criterion for inclusion of assets in the SNA is whether the assets are privately owned and used in commercial production of goods and services so that economic value can be established (Repetto, et, al. 1989). Natural resources in the public domain such as surface water, old growth forest, and ecosystem are excluded. While some progress toward a more realistic view of the environment in relation to the economy can be noted in the SNA 93-in particular in the extension of the system's asset boundary to include some natural resources-the handbook is far ideal in this regard. It fails entirely to account for the negative consequences of economic activity through pollution emission, it does not go far enough in extending the asset boundary to include natural capital particularly ecosystem assets, and it fails to work the extension of the asset boundary fully through all the potential consequences for the accounting system, including the possibility of adjusted figures for national product and savings.

The SEEA 2003(a publication under the title of Handbook of National Accounting: Integrated Environmental and Economic Accounting) accounts expand asset boundary to include non economic assets and considers how the economic accounts of the SNA might be adjusted to account for the impact of the economy on the environment. Three sorts of adjustments are considered; those relating to depletion, those concerning so-called defensive expenditures and those relating to degradation.

<sup>4</sup> Ecologically Sustainable Economic Development is a path of economic development that safeguards the welfare of future generations, protects biological diversity and maintains essential ecological processes and life support systems, the natural foundation on which economic activities are based. It has to do with improving all aspects of quality of life, in a way that maintains the ecological processes on which life depends. Practically speaking, Ecologically Sustainable Economic Development will mean changes to our patterns of resource use, including improvements in the quality of our air, land and water, and in the development of new environmentally friendly products and processes (The Australian Government's *National Strategy for Ecologically Sustainable Development*, 1992).

## 1.4 Methodology

The overall methodological approaches entail the following elements:

- Extensive documentary research and literature reviews on ecological economics, NRA, and their applications in developing countries. The principal objective has been met by using the ecological economics framework of SEEA 2003.
- Interactions with GoB officials of BBS, Department of Forest (DOF), Finance Division (FD), Ministry of Environment and Forest (MOEF), Ministry of Water Resources, Ministry of Agriculture, Ministry of Land, Ministry of Fisheries and Livestock, Planning Commission, Water Development Board, Soil Resource Development Institutes, Department of Agricultural Extensions (DAE) and feedback from bureaucratic experience during my field work at the BBS as well as interviews with government officials. My interview process helped to assess the awareness level of policy makers in Bangladesh.
- A review of the state of Bangladesh's natural resource base from the perspective of sustainable development and consideration of how NRA could be incorporated into the system of national accounting for economic and environmental decision making. Information has been gathering through an extensive literature review, including media reports and exploration of published national documents for the management and conservation of natural resources and case studies of forest and land resources. Here the ecological economics concept of goods and services provided by natural resources has been used to examine the sustaining economy in Bangladesh.
- Visits and email contacts with other important institutions and sources of information. I tried to meet with the large number of non-governmental and international organizations including IUCN, and the World Bank in Bangladesh that are especially well informed about the various issues being addressed. A series of preliminary findings and recommendations were formulated and presented in two informal briefings with GoB officials during my field work; their comments were added to this paper. Lists of Participants present in Informal briefing at BBS and Finance Division (FD) are provided in Annex 4 & 5 and evidences of the two informal briefings are provided in Annex 6 & 7.
- The weaknesses and shortcomings of the present system of national accounting in Bangladesh have been assessed by reviewing the BBS handbook on Sources and Methods of the BSNA. It should be noted that other related influential studies calling for the need to integrate environmental considerations into the national accounts appeared (Repetto et al., 1989 for example) and study of the SNA 93 and the SEEA 2003. Moreover, institutional arrangements for Canadian environmental accounting at Statistics Canada have been studied for comparison.
- Assembly of additional useful information, including many informative and influential documents prepared by the World Bank, WRI, International Union for Conservation and Nature (IUCN) and many national documents (Bangladesh National Conservation

Strategy prepared by IUCN, Bangladesh: Environment and Natural Resource Assessment prepared by WRI, Bangladesh Country Environmental Analysis prepared by the World Bank, National Environmental Management Action Plan prepared by MOEF for example).

This paper presents findings and recommendations based on my review of available information, as well as in-country consultation with the World Bank, IUCN experts, GoB officials and staff of many different organizations in Bangladesh.

Much attention has been given to the need for understanding the linkages between the environment and the economy and similarly to the importance of NRA and its associated institutional issues. However my detailed assessment of the situation in a given area was constrained by the lack of data on physical changes in natural resources and the value of loss or degradation of natural resources. Further, methodologies are hard to find for showing the actual effects of natural resource loss or degradation on the national economy. So this paper has made constructive assumptions about such effects on the national economy.

### **1.5 Organization of this paper**

A brief discussion on Natural Resource Accounting: What it is and what it does is provided in chapter 2.

In Chapter 3, this paper explains the rationale for NRA by discussing in detail the major natural resource sectors in Bangladesh; outlining their linkages to economic development, and pointing to gaps in information. This chapter also briefly examines Bangladesh management and conservation practices and their successes. Hence it explores the importance of NRA before recommending methodologies or a framework for NRA.

Chapter 4 deals with a proposed framework for NRA which might be appropriate for Bangladesh. This chapter starts with the discussion of the current system and the shortcomings of BSNA. A list of principles (from a sustainable development perspective) steps is then presented.

Institutional issues relating to NRA adoption in Bangladesh are discussed in chapter 5. Institutional weaknesses, along with the limited awareness level of policymakers about the linkages between natural resources and economic development and about the importance of NRA, are then explored in general terms.

Chapter 6 presents the experience of some other developed and developing countries in establishing their own systems for NRA. In chapter 6 an action plan is formulated for developing natural resource accounting in Bangladesh. The paper concludes in chapter 8, by looking at planning and underlining the importance of NRA for policy making.



## 2

### **Natural Resource Accounting: What it is and what it does**

Natural Resource Stock Accounts measure quantities of natural resources stocks and the annual changes in these stocks due to natural and human processes. These accounts follow the structure of the asset accounts of the SNA, with data for opening stocks, closing stocks, and changes during the year. The changes that occur during the period are divided into those that are the result of economic activities (for example extraction of minerals, harvesting of forests), and those that are the result of natural processes (for example, growths, births and deaths). These accounts, which are recorded, use both physical and monetary units.

The aim of natural resource accounting is to provide an informational framework best suitable for analyzing policy issues. Resource accounts provide a way to determine how much we are depleting our natural capital. They provide the framework for tracking our use of natural resources, valuing resource stocks and changes in stocks, and thus putting a value on some of the additional changes in the value of capital that must be subtracted from initial estimates of income in order to obtain a measure of sustainable income (Hecht, 2004).

Many economic uses of natural resources do not pass through markets and therefore do not show up in the conventional accounts. NRA captures those resources. The system of environmental and economic accounting (SEEA 2003) is the first international handbook on environmental accounting developed by the UN. Parts 7 & 8 describe the natural resource stock accounts. The basic accounting identity of NRA is that opening stocks, plus all growth, increases or additions, less all extraction, destruction or diminution, equals closing stocks (Repetto, 1989). The SEEA asset accounts are accumulation accounts, showing a balance sheet with opening values of the asset stocks; changes over the year; and a balance sheet with closing values. The asset accounts may be physical, monetary or both. The SEEA-2003 suggests building both physical and monetary asset accounts. Physical data on the extent of natural resources are a key input into estimates of the value of those resources, so most countries working in this area have indeed begun with physical assets accounts (Hecht, 2004).

In order to monitor the rate of depletion of a specific natural resource, it is necessary to measure the stock of the asset at the start of an accounting period and to account for all the changes which occur during that period to give the stock level at the end of the period. For natural resources, these changes are likely to be quantitative (SEEA, 2003). Physical accounts include information about natural characteristics of natural resources and its uses. Physical Asset Accounts generally have the following format:

- Opening Stocks
  - Changes due to economic activities
  - Other changes
- Closing stocks

Thus the physical accounts record detailed changes in the asset's positions (See box 2) over the year and give a clear picture of resource consumption, extraction and increase. Their capability is to assist in the understanding and management of potential trade-offs between conventional economic development objectives and environmental goals as a tool of policy formulation.

<b>Box 2 Physical Accounting Format of Forest Land</b>	
Opening stock	
+ Changes in forest land	
Man-made changes	
+Afforestation	
- Deforestation	
Natural events	
+ Natural expansion	
-Degradation	
Change in classifications	
Economic decisions	
- Net transfer of forest land to non- forest uses	
- Loss of forest land due to shifting cultivation	
Catastrophic events	
+ Net reclassification and other changes	
= Closing stocks	

Source: Adapted from SEEA and Sanyal et al. 2007

Resource accounts may help to answer some of the following questions:

- Are stocks of natural capital, in both value and physical terms, being maintained?
- What are the flows of raw materials associated with economic activity? Who uses these flows (industries, households or government)? Are these flows on the increase or decrease, both in total and per unit of economic activity?
- What are the patterns of land use? Are stocks of important land types, high quality agricultural land for example, being maintained?
- How much is spent to protect the environment? Who makes these expenditures? Are they increasing or decreasing and why?

The principal policy and analytical uses of these accounts include the following:

- Measuring physical scarcity of natural resources;
- Improving resource management: generating empirical evidence of over exploitation;
- Establishing a balance sheet of resource sectors: analysis of sectoral economic performance ( e.g. productivity) taking into account resource depletion;
- Measuring total wealth in examining policies for sustainable development;
- Measuring the efficiency of natural resource use by economic sector;
- Dealing with aspects of international trade;
- Analyzing structural changes in the economy;
- Analyzing the effects of environmental degradation;

- Measuring the sectoral costs associated with government regulation and policy;
- Portfolio analysis and management;
- Ecological fiscal reform;
- Financial and economic decision- making for resource sector;

Source: Adapted from Ernst Lutz, 1996; OECD, 1995; Serafy, 1997

Thus natural resource accounts, and their counterparts in the national balance sheet<sup>5</sup> accounts, can have wide use with regard to resource management, conservation policies and environmental and economic policies. An account showing the value of a stock of assets at a point in time is known as balance sheet. The natural resource accounting framework provides for "reconciliation accounts" that link balance sheet and flow accounts. These revaluation accounts encompass changes in opening stocks due to changes in prices during the period, and due to physical changes such as growth, discoveries, depletion, extraction, and natural losses. So the reconciliation accounts could show that natural resource assets valued at more than one year's GDP had disappeared during the past year. Moreover NRA can alter perceptions of what kind of development is desirable and in turn, what policy choices are advisable. The asset accounts track the changes in stock over time and indicate whether depletion is occurring. Thus they can show the effects of resource policy on the stock and can be used to motivate a change in policy. For example, the biological depletion of Hilsa<sup>6</sup> fishery in the years 1999-2002 has provided a very clear picture to policy makers of the devastating impact of uncontrolled, open-access fishing in Bangladesh.

### 3

### **Why does Bangladesh need Natural Resource Accounting?**

Countries whose industrial structure is dominated by primary sector activities, or whose exports are mainly or appreciably made up of primary commodities, are a priority target for NRA investigation (Serafy, 1997). Bangladesh's economic structure is dominated by many primary activities like fisheries, forestry, natural gas extraction, livestock, etc. and 19.19% of its total exports consist of primary commodities (Finance Division, 2007). Serafy noted that economists working on these countries should realize that it makes no sense to produce optimistic extrapolations of exports, say, over a ten-year period, without carefully examining the resource base from which these exports will have to emanate (Serafy, 1997). Countries where environmental depletion or degradation has reached the point where it constrains economic activity should be interested in knowing what percentage of their current gross economic output might be consumed by the loss of natural capital (SEEA, 2003). Developing countries like Bangladesh whose natural resources are rapidly depleting, and where the depletion is counted misleadingly in the national accounts, especially need NRA in their national accounts.

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<sup>5</sup> A balance sheet is a statement, drawn up at a particular point in time, of the values of assets owned by an institutional unit or sector and of the financial claims (*i.e.*, liabilities) incurred by this unit or sector; for the economy as a whole, the balance sheet shows what is often referred to as "national wealth" – the sum of non-financial assets and net claims on the rest of the world. (SNA 13.1 and 13.2)

<sup>6</sup> Hilsa is the national fish of Bangladesh and remains the most important fish in the captive fishery

Natural Resources are considered essential to the long-term sustainability of the economy. Natural resource stocks are the source of raw materials used in the production of manufactured goods. For example land is essential for the provision of space in which economic activity can take place. Ecosystems are essential for the services that they provide directly and indirectly to the economy including provision of productive soil; provision of biodiversity; provision of reliable flows of renewable natural resources. As these reserves are depleted, the economy must search for new ones to replace them. But all resources are ultimately finite, so this process of replacement becomes gradually more difficult over time. In Bangladesh, peoples still depend on natural resources including land , water, crops, fish, trees, fruits, vegetables both from land and water to manage their livelihoods. Any degradation and loss of access to natural resources deprive them of their livelihood potential. Any destruction of ecosystem based natural resources affects the poor people's nutrition intake and makes them most vulnerable. So the GoB needs to decide how fast the resource should be extracted and how the revenue should be used.

We know that economic production involves a transformation of raw materials into finished goods, and the success of many economic enterprises is tied, to some degree, to the cost and availability of raw material. For example in Bangladesh, there is evidence that the state owned emprise once used Gewa native trees as a raw material for production of pulp and paper in an unsustainable way, so that the government had to stop the production due to a shortage of raw materials (See box 5). Thus whenever a society or economy depletes its stock of resources, it reduces its future productive capacity. Unless the stock can be renewed, or unless some substitutions for the depleted stock can be made, the path is unsustainable. For a sustainable economy, the net "disinvestment" of natural capital or any other forms of wealth which contributes to economic activity, must be minimized or prevented. Accordingly, before proceeding to strong arguments about the rationale of NRA for Bangladesh, it makes sense to discuss natural resources and their contribution in Bangladesh.

### **3.1 The Current status of natural resources and their linkages to economic development in Bangladesh<sup>7</sup>**

Natural resources and their proper inventory are not structured and classified as such in Bangladesh, as they are classified in SEEA 2003. The following major natural resource sectors are discussed in general terms based on the available information:

#### **Land and soil resources**

Land in Bangladesh is a scarce resource. Bangladesh accommodates 230 million people in a land area of 14.4 million hectares. 75% of the populations depend directly or indirectly on agriculture for its livelihood (SHED, 2002). The share of land per capita is shrinking every year and making the resource base for agriculture, forestry and other resource related activities vulnerable and marginalized. For example, in 1983-84, there was 20.0 million ha of total cultivable land, which dropped to 17.5 million ha in 1997 (BNCS, 2007). On average Bangladesh is losing nearly 82,000 ha of land each year (MOEF, 2007). So the most formidable challenge is to increase

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<sup>7</sup> This study based on BNCS, 2007; WRI, 1990; NEMAP, 1995; The Compendium of Environmental Statistics of Bangladesh, 2004

agricultural output from the same stock of land. The Bangladesh National Conservation Strategy has identified many man made and natural causes of land degradation. It shows that degradation of agricultural land caused nearly a 3.5 percent loss of agricultural output with no date indicated. A combination of factors creates a challenging situation for land use in Bangladesh. Man made causes of land degradation are shifting cultivation, faulty cultivation practices, use of pesticides, soil mining from agricultural land, irrigation practices and overexploitation of biomass. Among natural causes, changes in morphology, river bank erosion, sedimentation of agricultural land, salinity and land fragmentation are common. In Bangladesh, there are many types of land use conflicts such as agriculture vs. settlements, forest vs. settlements, agriculture vs. fisheries, forest vs. fisheries, forest vs. agriculture, and agriculture vs. livestock.

The ability of soil to sustain agricultural production is an issue of national concern. There is insufficient evidence to support the assertion that agricultural production is declining as a result of a decline in soil productivity in Bangladesh. However there are causes for concerns: scientists have expressed that salinization, acidification and arsenic contamination are emerging soil quality problems, and a decline in soil properties associated with soil productivity and nutrient mining is occurring (BARC, 2001, The World Bank, 2006). In many areas, soil resources are being degraded due to improper use of land, fertilizer, irrigation, intensive cropping and some other activities (BNCS, 2007). If excessive fertilizer is used to get immediate improvement in crop production in Bangladesh, it will simply lead to soil erosion which will ultimately lead to permanent loss of crop production. So this crop production at the cost of soil erosion (see box 2) can only be reversed if certain measures are taken (Ahmad et al., 1999). In the usual BSNA, the calculation of these factors is not considered.

### **Water Resources**

Water is an essential, non substitutable resource for life. It is important for households, businesses, industries, agriculture, navigation, fisheries, hydropower generation and recreation too. Moreover, water bodies act as habitats for numerous aquatic and amphibian species. In relation to water availability in Bangladesh, the main concern is its temporal and spatial distribution of water. The Compendium of Environmental Statistics of Bangladesh shows that the different parts of the country suffer from frequent flood and drought due to uneven distribution of water in the month of February and July. Thus the availability of water has profound effects on the economy and ecology,

The availability of safe drinking water is an indicator of development. Most of the drinking water comes from ground water sources. In some rural areas, the availability of drinking water is affected by the increasing demand of irrigation water. In urban areas, the supply of potable water is already depended on deep tube wells. The ground water levels have already fallen due to excessive withdrawal rate and rapid decline in recharge area. For example, in the capital city, Dhaka, the ground water level has fallen by 20 meters in the last decade (BEMP, 2005).

The river system is threatened by the withdrawal of Ganges<sup>8</sup> water during the dry season. As a result, the ground water level of the sixteen northern districts has gone down and caused desert situation in those districts. The Bangladesh National Capacity Self-Assessment for Global Environmental Management reports that 700 rivers with total length of 221,555 km, has

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<sup>8</sup> Ganges is one of the world's largest river.

constraint as a result of silting river beds. About 1200 km river bank has been actively eroded and more than 500 km has facing severe problems of river erosion (MOEF, 2007). The degradation of important water bodies is gradually becoming very important in Bangladesh. The Dhaka Environment Programme shows the complexity of different issues linked to everything through water and estimate the cost of water degradation (MOEF, 2005) (See Box 3). Water logging is another important concern. More common causes of water logging include rise of ground water table in poorly drained areas due to intensive irrigation; blockage of water flow due to construction of roads and railway tracts; filling up of drainage channels; and improper construction and operation of hydraulic structures. Often water projects were designed based on the old topographic and other land use data that did not match with the existing ground conditions. The incident of Chalan Beel<sup>9</sup> of greater Pabna is a well publicized case of water logging.

Water resource sector is heavily subsidized in Bangladesh. The water delivery and pricing system is not appropriate. There is no quantitative assessment of the present and future needs and availability of water on national basis. Food production through irrigation got most attention than other non-consumptive water uses and activities such as navigation, fisheries, wetlands and water quality over the last decades. The WRI study shows that the impacts of the irrigation program are a reduction of up to 2.3 billion cubic meters in regional stream flow during the dry season and a lowering of the water table below the suction limit of hand tubewells which are a principle source of domestic water.

The WRI study reports that agricultural uses must be weighed against the other contributions, water resources make to the economy and to the quality of life in terms of supporting inland fisheries, riverine transportation, drinking water and other domestic needs, manufacturing and industrial processing. A careful area by area evaluation of the contribution of different sectors should be basis for deciding how much water should be allocated to fisheries, how much to dry season irrigation and how much to other non-consumptive sectors. NRA could be an essential tool to make decisions on trade-offs between water uses in a systematic way.

### **Forest Resources**

The National Forest and Tree Resources Assessment (NFA) 2005-2007 reports that a rapidly increasing population in Bangladesh with the increased demand for resources and livelihoods has led to overexploitation of forest and tree resources during the last decades. According to the Bangladesh National Conservation Strategy (BNCS), forest lands are encroached illegally due to the population growth. But the WRI study argues that it would be incorrect in a number of instances to assume that overuse or depletion of a resource is simply a function of population pressure. The study showed that forest reserves in the vicinity of pulp and paper mills were overharvested to produce wood which had been sold well below its market value. Wrong policies were also responsible for such activities (See box 4 and 5).

Data on the actual forest cover in Bangladesh is misleading. According to the Compendium of Environmental Statistics, Bangladesh has lost more than 50% of its natural forests. 17% of the total land area of Bangladesh is designated as forest land. According to the Forest Master Plan of 1993, the actual forest cover of the country is about 6%- much less than 17.4% of the forest land.

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<sup>9</sup> Chalan Beel is a wetland

However, the NFA reports that the total forest area is 9.8% and 78% of that land are disturbed<sup>10</sup>. Among forest disturbances, 60% of the Hill Forest and less than 40% of the Bamboo forest are heavily<sup>11</sup> and moderately<sup>12</sup> disturbed. According to the Economic Review 2006, the contribution of forestry sector to GDP is about 1.79(05-06) and according to BNCS, the contribution is 3 percent and employ about 2% of the total labor force. However, these figures are misleading. So there is a need for careful analysis of the forest resource stock and its use.

The Compendium of Environmental Statistics states that per capita forest land has declined from 0.035 ha in 1969 to 0.02 ha in 1990. Depletion of natural forests at the rate of 3.3 % per year is highest in Asia and the Middle East and the third highest in the world after Haiti and Jamaica. Decrease in timber and other forest products incur direct economic loss. The cost of these impacts on the economy was estimated at 1 percent of GDP in 1990(BBS, 2005). While the impact of forestry on GDP appears low at the national level, it is highly significant for Bangladesh, demonstrating the importance of specific forest accounts within the national accounting framework.

### **Livestock:**

Livestock plays an important role in the agrarian economy of Bangladesh. Important domestic animals are cattle, buffaloes, goats, sheep, chicken and ducks. It is considered to be one of the important sectors for creating jobs and alleviation of poverty. This sector accounted for 2.93 percent of GDP in 2005-2006 (Finance Division, 2007) and about 25 percent of population depend on this sector on full time basis and 50 percent on part time basis (BBS, 2005). There is a great demand for livestock and poultry in Bangladesh for draught power, meat, milk and eggs. The resource base is insufficient to meet this demand and has been declining steadily for several decades. The BNCS reports that:

the database on livestock is very weak. The Livestock Survey of 1983-84 is the main sources of information on livestock production. However, horses, pigs, geese, and pigeons were not counted in this census. Over the last two decades chicken and goats increased at a rate of about 6 percent and 2 percent per year respectively, while the number of cattle is almost stagnant. The number of buffaloes, sheep and ducks slightly declined during this period. There is an acute shortage of feed and fodder for livestock in the country. Supply and demand analysis of draught animal for land preparation indicates a shortage of 22 percent on national basis and 37 percent during peak season. There is an acute shortage of breeding bucks and rams. A livestock statistics wing should be set up under the BBS for regular collection of livestock statistics. (BNCS, 2007)

There is evidence that inadequate information on livestock resource base. Data concerning the economics of livestock operations under rural farming conditions are urgently needed. Actual feed requirement, milk yield, egg production, feed utilization, fertility rate, mortality rate and its causes, slaughtering rate and draught power of animal need to be carried out. Although, the GoB has given importance to livestock and poultry sectors in Fifth Five Year Plan, there are no

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<sup>10</sup> In NFA, “forest disturbance” refers to the “impact level of human activity in the forest”.

<sup>11</sup> In NFA, “heavily disturbed” refers when the rate of removal of products is higher than the Mean Annual Increment (MAI), additionally, biodiversity degradation is caused by high pressure on selected species and encroachment of agriculture leads to high rate of deforestation.

<sup>12</sup> In NFA, “moderately disturbed” refers when many products are collected without conforming to management plans, and the notion of sustainability is not respected.

initiatives to take this sector's proper contributions into account with a view to develop livestock resources, poultry farms, and goat rearing projects.

### **Wildlife:**

The wildlife of Bangladesh is in serious condition. The BNCS reports a decline in the population of various species. It presents a statistics, over the last 100 years; Bangladesh has lost about 10% of its mammalian fauna, 3% of avifauna and 4% of reptiles. Inventories of wildlife in most of the protected areas in Bangladesh are not available. The depletion of wildlife will continue until there is none left. The main causes of the decline of wildlife in Bangladesh are unauthorized hunting, habitat losses and environmental degradation (Akonda, 2001). According to Akondo, 201 species among 323 threatened species of wildlife are data deficient. Wildlife is an essential feature of life, and not only that it is a treasured resource to be conserved, it is important for nature related activities such as bird watching, fishing and other recreational, medicinal and educational values. And it can continue to provide sustenance for the spirit in future ages as it has in the past ages.

Although, the GoB banned the exports of monitor lizard skin and frog legs, 1.78 million lizard skins had been exported to Japan, and frog legs are being collected in many areas, which is suspected that frog legs are also being exported after the ban. There are no necessary tools in place to reverse the present pattern of wildlife decline and to recover and rebuild them to healthy levels.

### **Crop Agriculture:**

The number of local varieties of different crops is steadily declining due to promotion of only a few selected varieties, specifically of the High Yield Variety (HYV) of rice and wheat and the introduction of genetically modified organisms. This is causing irreparable loss of the genetic diversity of the nation's crop plants and their wild relatives (Haque, 2001). The official strategy of GoB is the intensification of agriculture that have been carried out with the help of a new HYV technology since 1960. This technology is characterized by irrigation facility, seeds with higher yield potentiality, and chemical fertilizer and insecticide. The negative consequences of the decrease in the diversity of cropping are the decline in the supply of various kinds of non cereal crops. As a result, the price of various kinds of pulses has been raised, which again adversely affected the poor people's nutritional status since pulses are the chief source of protein to them (Akash, 2002). The World Bank also states that the cropping intensity is high, agricultural input are imbalanced and nutrient mining is occurring in Bangladesh (The World bank, 2006). The chief argument of the non-sustainability of HYV technology in Bangladesh is that the increasing substitution of organic fertilizer with chemical fertilizer is bound to destroy the inherent quality of the health of soil in the long run. So the economic cost of soil degradation (See box 2) and lost crop diversity should be integrated into the crop production cost for sound policy decisions in the crop sector.

### **Natural Gas:**

In the non-renewable natural category, natural gas is one of the important sources of energy that accounts for 73 percent of commercial energy of the country. According to the Compendium of Environmental Statistics, commercial natural gas consumption is around 66 percent. Natural gas is the key energy source of power generation, fertilizer production, industrial and domestic



purposes (Finance Division, 2007). The depletion of natural gas is one of the main concerns in Bangladesh. The Compendium of Environmental Statistics further reports, at the projected rate of demand, the exploitable stock of natural gas in Bangladesh will be exhausted in around 2020, unless new reserves are discovered. Billah states that 45-50% of gas consumed by the power sector alone and fertilizer is the second largest sector of gas consumption. If the current gas extraction trend of Bangladesh is maintained at 7.5% rate annually, the present stock would likely to exhaust within 13/14 years of time, which is the serious concern for the nation's economy (Billah, 2003). In Bangladesh, it has become extremely important to explore and develop new gas fields to meet the increasing demand of gas. Moreover the natural gas sector is heavily subsidized in Bangladesh. The domestic gas price for the power and fertilizer sector is very low in relation to that of the neighboring countries. The demand for gas both in power and fertilizer sectors has tremendously increased over the last two decades. Billah shows that the increased demand led to the extraction of gas almost double over the last decades. He pointed out, if the current stock of natural gas is extracted excessively, future rents will be declined. An adjustment for the gas resource depletion to sub-sectoral national account should be made in order to examine the economic sustainability of the country (Billah, 2003). So there is a need to take the physical depletion of natural gas into account in the national accounting system. NRA could be the most appropriate tool to address this issue.

#### **Fisheries Resources:**

The fisheries sector of Bangladesh accounts for 6% of the GDP, provides 9% of the country's employment, and is the second most important source of foreign exchange (The World Bank, 2005). The capture fisheries, both inland and coastal/marine, are in decline, at rates of about 2.1% and 1.6% per year respectively. The continuing losses of floodplain habitat due to agriculture and urbanization; the significant reductions in dry season riverine flows; unregulated water extraction for irrigation over fishing; and rapidly increasing industrial, human and agricultural pollution have declined the production of the inland capture fishery. The IUCN Red Book<sup>13</sup> for Bangladesh suggests that almost 30 % of all inland fish species are in danger of extinction. The Red Book reports that 54 inland and estuarine fish species out of a total of 266 present are endangered in Bangladesh.

The World Bank notes that fisheries statistics are at present unreliable in Bangladesh. Even the lack of quality time series data makes the economic losses in Bangladesh's fisheries difficult to quantify. There is significant disagreement over the actual state of the country's fish production and fish biodiversity. Most authorities within and outside the Bangladesh fisheries sector agree that current statistics on fisheries are not reliable and do not reflect the actual state of the fisheries (The World Bank, 2005). Specific management and investment decision-making are almost impossible without current reliable information (The World Bank, 2006). The Ministry of Land (MOL) controls 3,773 open water areas and 8,549 closed or semi-closed water bodies and

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<sup>13</sup> One of the major activities of IUCN (The World Conservation Union) is to monitor the status of ecosystems and species throughout the world, which is manifested in the publication of the Red Lists of Plants and the Red Lists of Animals. The IUCN's series 'Red Book' publication on threatened species of Bangladesh provide the profile of all the threatened species-- their habits and habitats, the threats to them and suggest necessary conservation measures (www.iucnbd.org).

leases out those water bodies to generate revenue. The current leasing system is part of the reasons of the continued declines of the Bangladesh fisheries and wetlands. Consumption information from the 2000 Household Expenditure Survey of the BBS shows that average fish consumption in the country has declined by 12% since 1995, while fish consumption of the poorest 22% of the population has declined by 38%. There is evidence that lower per capita fish supplies are pushing fish prices beyond the reach of the poorest consumer. Although some management schemes are adopted by the GoB, there is a need to assess and monitor the success or failure of these management schemes to oversee fish catch, fish growth and mortality.

### **Wetlands:**

It is reported by the World Bank that Bangladesh has lost 50% of its permanent wetland areas. The fate of Bangladesh's capture fisheries is inextricably tied to the condition of the nation's wetlands. Recent economic studies indicate that wetlands have almost twice the economic output of rice crops, exceeding Tk. 35000/ha/year and the largest share of their direct benefits goes to poor people in rural communities. In addition, wetlands provide a variety of indirect environmental services in the form of flood control, ground water recharge and pollution abatement. The beels<sup>14</sup>, haors<sup>15</sup>, baors<sup>16</sup> and rivers that make up the wetlands in Bangladesh have been undervalued by the decision-makers and developers, few of whom are aware of their true economic values and the environmental services they provide. The World Bank presented many results of different studies, surveys and affirmed that wetlands are of critical importance to Bangladeshi's rural poor. The poor depends on, and are major beneficiaries of public wetlands for food, income and other purposes. The Bank pointed out one study in Greater Noakhali, which was conducted for DANIDA. The study showed that 80-93% of the community of the Greater Noakhali district utilized those wetlands and the poorest members of that community derived 15% of their income from harvesting its products.

### **3.2 Efforts to protect and conserve Natural Resources and their success in Bangladesh**

The BNCS states that the GoB is committed to conserve its natural resources through a series of international treaties, conventions and also by its constitution". But the World Bank said that there is not yet any systematic process through which the environmental soundness of such policies may be assessed and monitored. It is true that The GoB has taken a number of important steps to strengthen environmental management in Bangladesh. The need to protect the quality of the environment has been recognized since the birth of Bangladesh, with the Water Pollution Control and Wildlife Preservation Acts being established in 1973. A new Ministry of Environment and Forests was established in the mid-1989 and the mandate and resources of the Department of Environment were being considerably upgraded and strengthen (WRI, 1990). Following the creation of the Ministry of Environment and Forests, the government took a number of important policy steps to guide the strengthening of environmental management, starting with the development of the National Environmental Policy in 1992, the National Forest Policy in 1994, and the National Environmental Management Action Plan (NEMAP) in 1995. A legal framework was created, anchored in the Environmental Conservation Act of 1995, and

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<sup>14</sup> Beels are geologic depressions or swampy lands formed in the dead channels of former rivers which contain water year round( Environmental Statistics, 2004, p 13)

<sup>15</sup> Haors are tectonic depressions which may dry up during dry season( Environmental Statistics, 2004, p 13)

<sup>16</sup> Baors are oxbow lakes formed in the meandering parts of rivers( Environmental Statistics, 2004, p 13)

elaborated in the Environmental Conservation Rules of 1997. Mechanisms for Enforcement of these provisions were strengthened through the Environment Court Act of 2000, and have since been clarified through a series of amendments to the Environmental Conservation Act and Rules. Among the larger donor supported initiatives, the Sustainable Environment Management Programme (SEMP), the Sundarbans Biodiversity Conservation, the Bangladesh Environmental Management Project (BEMP), the Air Quality Management Project, and the Bangladesh Biodiversity Strategy and Action Plan were the most important efforts. Although, a range of significant sectoral policies including the National Water policy, the Forest policy, the Tourism Policy, the Energy Policy, the Agriculture Policy and the Fisheries Policy are in place, the integration of environmental concerns into sectoral policies is still poor.

Despite the existence of the environmental rules and regulations, the forestry sector policies and different projects and programmes on plantation and conservation, the amount of forest cover is not satisfactory yet. Although so-called tree plantations have increased, they are not actually forest. Philip Gain describes the nature of the GoB's forestry efforts in his book 'Stolen Forest' very clearly.

Most of the plantation programs in Bangladesh are targeted on degraded, denuded and less productive forest lands which were actually native forests that had immense social, cultural, traditional, educational, medicinal and environmental values. Plantation afforestation with few exotic species has replaced the native forests of Garjan, Sal and numerous other species. It is very unfortunate to hear that the biggest chunks of the Modhupur Sal forest, illegally occupied, are banana, pineapple, and papaya plantations today. The stock of bamboo in the hills is drastically reduced nowadays. With the disappearance of the natural forest, most of the wildlife in the Sal forest has also vanished. Even reserved and protected areas are often the prime targets for plantation and development projects. For example vast expanses of mangrove forests have been clear cut for commercial shrimp farming projects funded by ADB and the World Bank. Over-harvesting and departmental corruption has also reduced the forest stock in many reserve forests. (Philip Gain, 2006)

Very recently, the GoB has permitted one foreign company to explore gas in the doubly protected areas (Lawachhara National Park) to meet energy crisis, which has led to the violation of the Wildlife (preservation) Order of 1973, the Environment Conservation Act, 1995 and the Environment Conservation Rules, 1997. This was reported in many national dailies in April, 2008. It is true that Bangladesh is an energy poor country, and at the same time it is a forest poor country too. The overriding priority receives importance from the government because of high energy prices and it has direct market value. But many benefits from the standing forest are unknown to policymakers. Many goods and services provided by forests are not even sold in the market. For that reason, policymakers may totally ignore the value of goods and services provided by forests in their decision making.

If we look at other natural resource sectors like fisheries, crop, livestock, wildlife, wetlands, land and water resources, we will see the same picture. It is hardly possible to find successful initiatives. The Land Use Policy, 2001 may apply to private lands ( e.g., land use restrictions through zoning, prohibition of building too close to lakes and rivers), but regulation to protect the natural capital on private lands is far from comprehensive. If public decision makers do not recognize the value of the benefits from the goods and services generated by natural capital, they will be more inclined to favour land uses that do generate revenues (for example property tax revenues and development fees). When natural waste treatment provided by wetlands has been

eliminated by their conversion into urban areas, the GoB can construct sewage treatment plant, wetland for waste water as proposed by BEMP (See box 3). There is evidence that the substitute for natural capital is far more expensive than sustaining the natural capital services. Olewiler states that New York City decided that it was far cheaper to pay \$ 1.8 billion to private landowners to protect 80,000 acres in the watersheds providing its drinking water than to spend \$ 8 billion to construct a new water filtration plant (Olewiler, 2004). Neither the Land Use Policy of Bangladesh, 2001 nor BEMP include any economic instruments to conserve or enhancing the natural capital on private lands. So before substituting produced capital for natural capital, decision-makers should ensure that the manufactured substitutes replicates all the essential functions of natural capital and costs no more than the natural capital. It is very important to note that some forms of natural capital are clearly essential- water and air for example, and there are no substitutes for that. Having a value of the goods and services generated by natural capital will allow the decision maker to compare these alternatives more easily and can help in formulating better regulatory policies.

The report of the DEP states that when the GoB tries to solve one problem, it often creates another problem due to lack of a systematic framework which can provide the linkages between natural resource management and economic development for policy makers (BEMP, 2005). However, a variety of disturbing trends in natural resource sectors, a growing recognition of the linkages between economic development prospects and natural resource management have further prompted a change in the attention given to natural resource accounting. More importantly, the government policies need to take a holistic perspective on the treatment of the natural capital. A policy is only as good as the information on which it is based. Statistics are the eyes of the policy makers. So, accurate, timely, relevant and useful statistics are very important to improve public management by promoting an environment for evidence-based policy making. Indicators (land use indicators, national wealth indicators, physical resource stock indicators) are developed from NRA, provide information about the success and failure of the management of a nation's natural resource stocks and resource use in the economy and help decision-makers to efficiently allocate resources to uses.

### **3.3 The rationale for NRA in Bangladesh**

Bangladesh is legally bound to adopt NRA. At the UN Conference on the Environment and Development in Rio, de Janeiro, Brazil in 1992, The GoB signed the Rio convention and ratified the convention on May 03, 1994. Agenda 21 of the United Nations Conference on Environment and Development is a basis to attain sustainable development, urged countries to “carry out inventories of environmental, resource and developmental data, based on national/global priorities for the management of sustainable development (The World Bank, 2000). Moreover, the Rio convention explicitly has a provision stating that ‘timely, reliable and accurate information on forests and forest ecosystems is essential for public understanding and informed decision-making’ should be made available by the participating countries (DOF, 2007). As a signatory of Agenda 21, the GoB has the obligation to accomplish the required.

Natural resource based economies are those that depend on mining, fisheries, forestry or agriculture. In Bangladesh, agriculture, forestry, fishing, natural gas extraction and other primary activities rooted in the physical environment, are usually the major sources of the country's

prosperity. As these resources are depleted, the very basis of this prosperity is undermined. So economists should pay attention in their analysis to the sustainability of natural resources. When the population size and the scale of economic activity in Bangladesh are larger relative to nature's abundance, it does not make any sense for economists effectively to exclude natural resources from their vision as free gifts. From the present conditions of natural resources and the government efforts to protect them, there should be a clear framework to record current pictures of natural resources and that framework should describe the linkages between resource degradation and economic development. If the policy maker know how much land has been used for different purposes and the money value of the loss of soil fertility that will be lost from the nation's GDP, the policy makers will be more alert about what actions are really needed.

Bangladesh adopted a National Conservation Strategy in 2007 to protect and conserve natural resources. Her last Five Year Plan also highlighted the need for protecting the environment for the betterment of the people. Bangladesh is also committed to sustainable development and has adopted the UN Millennium Development Goals (MDGs). The GoB's commitment to the MDGs requires it to take action to integrate principles of sustainable development into the country's policies and programs and reverse the loss of environmental resources (The World Bank, 2006, BNCS, 2007). So the key to achieving sustainable development is by integrating policies to ensure that the process of loss of environmental resources is halted. Perrings suggest that if governments are interested in sustainable development, they need measures of development that capture its sustainability (Perrings, et al, 2003). In Bangladesh where GDP is the principal measure of economic progress, the BSNA does not capture the sustainability of its economic progress. It totally ignores changes in the stock of natural resources. So the measures based on GDP fail to meet the first test of a sustainability indicator. NRA can alter perceptions of what kind of development is desirable and, in turn, policy choices. So the GoB can use these accounts to guide their actions and people can use them to judge the performance of the Government.

## 4

### **The Construction of a NRA Framework in the Bangladesh System of National Accounting (BSNA)<sup>17</sup>**

#### **4.1 Discussion on the Current System<sup>18</sup> and Shortcomings of BSNA for NRA<sup>19</sup>**

The BBS considers SNA-93 as the 'state-of-the art' framework of national accounting and compilation of GDP and other aggregates and indicators. But BBS's practice of national accounting is far from meeting the minimum criteria of SNA-93. In Bangladesh, the rate of growth of GDP is the principal measure of economic progress and transformation. So the main focus of BSNA is on GDP, which is of interest as a measure of the overall level of activity in the domestic economy. The national accounts are compiled according to the fiscal year of the government covering each July-June annual period. For the compilation of national accounts

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<sup>17</sup> This study is based on Indonesia, Costa Rica, and African countries case studies

<sup>18</sup> The discussion on the current system BBS is based on my field experience in BBS, knowledge sharing with BBS staff and BBS's draft Handbook on Sources and Methods of the BSNA, 2007(Unpublished)

<sup>19</sup> The discussion on shortcomings of the BSNA is based on the comparative study of Indonesia, Costa Rica, and African countries

especially GDP, BBS has divided all the economic activity sectors of Bangladesh into 15 broad industries based on the international standard industrial classification (ISIC)<sup>20</sup>. For the purpose of data collection and analysis, the industries or economic activity sectors are divided into sub-sectors and sub-sub sectors. For example, the agriculture and forestry sector is subdivided into crops and horticulture, animal farming and forest and related services. Fishing is divided into inland and bay fishing. Inland fishing is again subdivided into capture and fish farming.

The Bangladesh system of national accounts currently consists of compilation of annual GDP by production and GDP by expenditure methods in both current and constant prices and estimation of gross domestic savings, gross national savings and gross fixed investments. BBS does not compile GDP by the income method. The sequence of accounts for the total economy begins with the production accounts. BBS follows the fundamental equation of national accounting termed by SNA-93 as  $\text{Output} + \text{Import} = \text{Intermediate Consumption} + \text{Final Consumption} + \text{Gross Capital Formation} + \text{Exports}$ . Output consists of domestically produced goods and services and intermediate consumption consists of goods and services consumed in the production process, excluding the consumption of fixed assets. In this equation, there is no entry for natural resources as fixed capital. GDP is "gross" in the sense that the consumption or uses of fixed capital or assets used in the production process are not netted out. So GDP might not be a good indicator to assess economic progress. In BSNA, fixed capital is conventionally defined as the stock of tangible, durable fixed assets owned or used by resident enterprises for more than one year. This includes plant, machinery, vehicles & equipment, the value of land improvements, and buildings. Land itself is not included in fixed capital even though it is a fixed asset, because it is not a product (a reproducible good).

In the production approach, BBS measures output and intermediate consumption of goods and services, obtains value added as the difference between output and intermediate consumption, and sums the values added by different producers to obtain GDP. In the expenditure approach, GDP is measured as the sum of expenditure components (namely, final consumption expenditure, gross capital formation and net exports). The balancing item is Value Added (VA) then in the factor distribution account; the VA is distributed on the factors of production, labor and capital. The simplified sequence of accounts does not present the opening and the closing balance sheets. BSNA is not product consistent. For example, production and consumption are measured independently of each other; intermediate consumption is estimated by a fixed input coefficient in fixed prices; the balancing of production and consumption is an approximation, residuals are hidden. For example in crop production, seeds, fertilizer, pesticide and irrigation services are added to intermediate consumption but the important inputs of water and soil are excluded. On the other hand the Planning Commission made an input output coefficient table to determine intermediate consumption for the crop sector based on the 1995-1996 year. BBS is still using that table despite huge changes in soil conditions reported by SRDI<sup>21</sup>, and increases in rates of fertilizer use reported by Finance Division (FD, 2007). Although, the value of land improvements is included, BBS does not consider soil degradation cost and other environmental degradation cost estimated by different organizations (See box 3). The simultaneous accounting of production, consumption and income; the balancing strategy between the production and

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<sup>20</sup>ISIC provides internationally comparable standards for classification of industries for accounting purposes. ISIC classifications are based on economic activities. (BBS draft handbook, 2007, chapter 1)

<sup>21</sup> SRDI: Bangladesh Soil Research Development Institute

consumption side; and the fixed input coefficient approach when determining intermediate consumption, all create inconsistencies and inefficiencies in the BSNA. The valuation rules used for recording flows are generally in accordance with the SNA-93. Market output is valued at producer prices. The valuation of intermediate consumption is at purchaser's values, that is including sales tax and excise tax. BBS collects primary data from field surveys only for crop production, and collects secondary data from different Ministries and Institutions for other sectors.

BBS demands that the asset boundary of BSNA be generally in accordance with SNA-93. Some biological resources including crops, fish, timber, and livestock are already included in the BSNA as economic activity sectors. But BSNA treats forest and fisheries differently from manufactured assets such as buildings, factories, and machines. Repetto states in his Indonesian study that:

man-made assets –buildings and equipment for example- are valued as productive capital, and are written off against the value of production as they depreciate. There is no depreciation factor in the flow accounts to represent the loss of forests, the depletion of minerals, the erosion of soils, or the deterioration of water resources, even though these user costs impair the future income generating capacity of those assets. The forest should be treated in the same way as a machine or building. (Repetto at, el. 1989)

### **Box 3 Cost of Environmental Degradation in Bangladesh**

#### **Cost of land Degradation in Bangladesh**

The current NFA shows that in “Cultivated land” and “Villages” of Bangladesh, one of the most common environmental problems is loss of soil fertility. It reports 24% of the forest area and 20 % of the cultivable land has encountered loss of soil fertility (DOF, 2007). Soils Division of the Bangladesh Agricultural Research Council (BARC) reports a decline in soil fertility which has been occurred through a combination of causes (lowering soil organic matter and loss of nutrients for example) in 1999. The Soils Division shows that the problem is enhanced by intensive land use plan without appropriate soil management. It states that a good soil should have an organic matter content of more than 3.5%. But in Bangladesh, most soils have less than 1.7 %, and some soils have even less than 1% organic matter. The Soils Division estimates the cost of land degradation in Bangladesh. It shows that 4.27 million tons of cereal productions loss and 1.22 million tons of additional inputs are needed per year due to decline in soil fertility. The estimated cost of this lost cereal output is US \$566.84 million /yr and cost of additional inputs is US \$ 461.04 million /yr.

Source: BARC, 2001

#### **Cost of Dhaka Environment Degradation**

Very recently, the Dhaka Environment Programme (DEP) reveals that ignoring the value of goods and services provided by river system, watersheds and wetlands surrounding the Dhaka region in decision-making of land use, water use, waste disposal etc., have resulted in the degradation and destruction of natural capital and led to outcomes that are very costly to the society. The DEP estimates the total financial loss of US\$ 51.1 billion over the next 20 years accrue from losses in agricultural and fisheries production; deterioration of human health; losses due to flooding; time lost in procuring drinking water; loss of financial return on provision of water and other urban services; and loss of opportunities for investment in business, etc. The DEP further estimates investment cost of at least US\$ 8 billion assigned only to strategic benefit/cost analysis of cleaning up the Dhaka environment over 20 years. Although, forty-five technical interventions including construction of wetland for waste water, sewage treatment plant etc., have been defined in the DEP, these have not been costed in terms of infrastructure, personnel requirements, operation and maintenance cost. The DEP states that if the GoB does not take proper action, the financial loss will consume 3.3% of the Dhaka Region GDP in 2005, equivalent to US\$ 670 million, or about \$45 per year for each person living in this area.

Source: BEMP, 2005

If trees were harvested at the rate they grew back (the level of sustainable yield), the forest could produce income every year. If the whole forest is cut down in two years, however, it will no longer keep producing (See box 5 for such example). This should be treated in the accounts as capital consumption. Some goods and services such as watershed protection by forests and absorption of pollutants by water are not included in the BSNA in the sense that these are not bought and sold in the market. However some non-market products, such as crops and livestock grown by agriculturists for their own consumption, are included in the BSNA.

Although, BBS follow the SNA-93, it still doesn't take into account the "unowned" resources despite the enormous evidences on the shortage of ground water level, land degradation, deforestation, soil erosion etc. Actually BBS does not compile asset accounts according to the SNA-93. Though illegal activities are not in the BBS's scope of activities, illegal timber collection is included in forest production. Among tangible assets, leases are not included in the BBS asset boundary due to lack of data.

**Box 4 Some Policies of the GoB directly encourage resource depletion in Bangladesh**

Though land in Bangladesh is a scarce resource, land use and land allocation have not received the required attention. Land use patterns have changed due to human activities.

- The Government Land Management and Settlement Policy encourages people to exploit land's productive capability. For example, the Non- Agricultural Land and Settlement Policy of 1995 declared that all agricultural land (low land, middle land, and wetland suitable for agriculture) in Thana (Sub-district) cities should be assumed to be non-agricultural land. The main reason was to increase the land development tax, because the rate of non-agricultural land tax is six times higher than for agricultural land (100 Tk for 1 acre agricultural land and 600 Tk for non-agricultural land). Under this policy, the government is allocating agricultural land for different industrial purposes.
- The Ministry of Land Administration and Land Reform passed an order for changing land classifications on 04-06-1975 by memo no 385-16-75/75 LR. This order has a direct impact on the depletion of important wetlands, water bodies, and forest land. The order states that different types of wetland and water bodies which based on their sizes are locally known as doba, nala, haor, baor or pukur are drained or forests are cut, and those lands are abandoned, then the government will change their classification into high land( locally known as chala land) and will take initiatives to allocate that land for industrial purposes or human settlement. Though this order is long outdated, all local land office are still taking initiatives according to this order.
- The Ministry of Land passed another land use order on 2-10-1999, stating that if any government forest land has been abandoned for a long time, then the Ministry of Land can take over that land through an interministerial meeting and allocate it for different industrial purposes.
- The leasing system of government water bodies is responsible for the depletion of fisheries(BNCS,2007)
- The Ministry of Agriculture's recent strategy for high yield production on 1 million hectare land (Source: DAE) might have a negative impact on soil resources that may cost more for the society.

BBS does not prepare input-output tables, balance sheets or supply and use tables despite their recognized importance for national economic accounting in the SNA. National balance sheets



provide a picture of a country's tangible and financial assets at different points in time. The evaluation of a nation's future potential for sustained income generation can be enhanced by the detailed analyses of national assets through the preparation of national balance sheets. Supply and use tables provide a detailed analysis of the process of production, the use of goods and services and income generated in that production. Input-output tables are valuable because they permit analysis of the relationships among different sectors of the economy, considering how a change in one sector will ripple through the entire economy (Hecht, 2004, p45) Furthermore, activities that deplete or degrade natural resources, are not recorded as consuming capital. Even non-reproducible physical assets such as soil or the natural growth of trees are not included in the gross formation of capital. Water supply and natural gas supply are included as service sectors in BSNA. But their system losses are not recorded.

On the other hand the BSNA does include land improvement costs (drained wetlands, conversion of forest and agricultural land to cattle rearing, poultry, establishment of industry etc), costs of developing and extending timber producing areas, costs of infrastructure for the fishing industry, shrimp farming, and costs of mineral exploration in reserve forests (e.g. mineral exploration in the Lawachaura Reserve Forests) in its measures of gross capital formation. The BSNA records such actions as contributing to recorded income and investment, although they can destroy valuable natural resources through deforestation, soil erosion and over fishing etc. This loss of capital, as natural resources are used beyond their capacity to recover, is not recorded in the income and investment accounts. In Bangladesh, the combined contribution of all sub-sectors of agriculture (forest, fisheries, crop and livestock) to GDP is 21.77 percent in FY 2005-2006 (FD, 2007). The BSNA treats agriculture and forestry-related natural resources destruction as an increase in income, instead of as a loss of wealth. Bangladesh's natural resources have deteriorated seriously, as discussed in the chapter 3 to this paper. However, the net revenues from overexploiting forest, soil, fishery, and water resources are treated as factor income, but not treated as capital consumption. Even worse, the accounting system defines the conversion of land suitable only for forests into shrimp farming or a goat development project as a capital investment, even if the goats ruin the soil and the shrimp enterprise is neither ecologically nor economically viable.

Here is a specific example. Gazipur district is an industrial zone. There are plans to establish industries, a picnic spot, recreational area, and village hat-bazaar on its periphery of forest land, wetland, and a water body due to faulty land policies (See box 4). The corrupt business men gradually cut the trees or drain the wetlands or water bodies with the support of local political leaders, and corrupt local land and forest staff. Due to very poor monitoring by local land and forest offices, those changes are not recorded or presented to the government at the proper times. Once those lands are drained or cleared, then they apply for the permanent settlement of those lands for industrial purposes<sup>22</sup>. These are very common phenomena in Gazipur district and all over the country. Some GoB policies are directly responsible for changes in natural resource base and encourage resource depletion (See box 4). There are no changes in the forest land and land use statistics of BBS within the last five years despite the easily-seen forest destruction and wetland depletion all over the country. The recent land policy of 2001 does not address these issues properly. Faulty policies are still in practice. Instead of restoration of the physical features

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<sup>22</sup> Source for this information is the author's personal experience as an Assistant Commissioner of Land, Sreepur, Gazipur.

of those lands, government is allocating those lands to be used for permanent settlement. Because there is no informational tool to give a warning to policy makers, even BSNA does not include any changes in resource depletion in the national accounts. The BSNA should help to warn policy makers that natural resource assets have disappeared over the last three decades due to poor government policies. Even the revenue earned from changing land classifications goes to current transfers<sup>23</sup> instead of capital consumption.

**Box 5 Some wrong decisions and assessments of forest resources**

- An interministerial meeting in April 1990 permitted the state-owned enterprise, Khulna Newsprint Mill to extract 133,140 m<sup>3</sup> of timber per year from reserve forests to meet raw materials, until there was a noticeable decrease in the growing stock. At this level of harvesting there was no gewa (old growth tree) available to the match factories in Khulna. Accordingly one match factory was shut down and the other stopped operating at later date (MOEF, 1992). The supply of gewa wood on which the production of the-state owned enterprise is based, had been declined drastically and as a consequence, production suffered badly. Subsequently, Khulna Newsprint Mills Ltd. was shut down on November 30<sup>th</sup>, 2002 due to shortage of raw material. (BCIC, 2000-2001, 2001-2002)
- The GoB imposed a moratorium on tree felling from reserved forests in 1989 and has extended it to 2010 (MOEF, dated Jan 25<sup>th</sup>, 2006). In this moratorium, government makes a condition that if any state-owned enterprise needs gewa wood, it should be provided from the Sundarban reserve forests. This relaxation shows that the government policy might accept the loss of renewable resource for the sake of economic development. Therefore the growing stock of the forest needs to be used for calculation.
- According to the NFA, selective felling is practiced in natural forest stands and clear felling in plantation forest in Bangladesh. Timber exploitation was carried out in 63% of the total forest area. Out of the exploited area, 82% was selectively felled. The clear felling was carried out mainly in the “Hill Forest”, which may imply that these are either clear-cut plantations or potential areas for shifting cultivation. But a number of newspaper reports, literature on forest alleged that trees were illegally felled from different natural forest over the country (People's Report on Bangladesh Environment 2001, Philip Gain, 2006). This can result in quite misleading economic signals about economic growth and development.
- It is important to note that major forest products, e.g. timber, fuel wood, and bamboo are sold at a very low price by the forest department to state-owned industries. Similarly, the fee or royalty charged for non timber forest products such as fish, honey, wax, grass etc. do not reflect their respective market price. According to the BNCS, the economic value of forest resources as presently reported is likely to be grossly underestimated.
- More importantly, the income from harvesting timber from natural forests are recorded in the national accounts, depletion of natural forest and essential life support services provided by forest ecosystem are not recognized at all. Even illegally felled, detected theft and other unrecorded production refer to extraction of timber without proper record.

As things are going, investment in state-owned enterprises has proved that Bangladesh's commercial forests are exhausted (shortage of raw material is one of many reasons that have forced the government to stop the production of the Khulna Newsprint Mill, See box 5) and a source of valuable fuel wood, non- wood products and wildlife habitat is disappearing. The current national accounting system of Bangladesh serves poorly because it does not reflect the economic value of lost natural resources. Clearing old growth forest for so called tree plantations

<sup>23</sup> Current transfers are transactions without receiving goods and services in return. (BBS, 2007)

is classified as investment. The loss of forest capital is totally ignored. The national accounts have not recognized that the destruction of a forest today is a loss of income tomorrow. If the loss of potential forest income were taken into account, the true net value of conversion would often be negative.

It is surprisingly true that in the BSNA, increases in production as a result of human activity are part of output. But the BSNA ignores scarcity of natural resources and the productive role of natural resources. It is more relevant to think of natural resources as productive assets than as consumer goods. BBS uses the SNA guidelines for national accounting and the macroeconomic analysis that almost completely ignores the country's principal assets. The situation of the national accounts is confusing and unsatisfactory. The conventional consolidation and balancing procedure has to be dropped and a new kind of underlying data has to be collected and a new balancing procedure has to be developed. There is therefore an urgent need for improvement of the BBS production and economic and resource data generation system by adopting the concepts, definitions and classifications of SEEA-2003 with a view to achieve complete harmonization of the two.

## **4.2 Why use a SNA approach for NRA<sup>24</sup> in Bangladesh**

The desirability of focusing on the national accounting framework in the development of natural resource accounts in Bangladesh can be explained by a number of factors.

- The national accounting framework is well-established, having a history of more than 40 years of implementation around the world (Statistics Canada, 2006). The BSNA follows this framework, (if not in its entirety, at least in its major outline) and has more than 30 years of implementation experience. This makes BSNA a readymade and internationally comparable information system. So there is an appeal to link natural resource accounts into BSNA (80% of my interviewees approved of the idea of linking NRA to BSNA (The detail survey has been explained in chapter 5).
- Interest in integrating the environment into economic development comes from a range of sources (BNCS, 2007, WRI, 1990, Rahman et al, 1997, State of Environment Report 2000) in Bangladesh and is driven by a demand for a sophisticated data base. The national accounts of Bangladesh are a very influential source of economic information. The indicators such as GDP and saving rates derived from BSNA are regularly used in economic analysis, forecasting of economic trends, development plans, estimating economic effects of government policies, and formulating and evaluating various aspects of public policies. Despite its recognized deficiencies, politicians, journalists, policy makers and even sophisticated economists in official agencies continue to use GDP growth as the prime measure of economic performance. For environmental policy to be most effective it must be articulated and implemented within an economic context and those making economic policy are familiar with the framework of the SNA (SEEA-2003). So natural resource information linked with the national accounts can, therefore, be quickly and easily integrated into existing economic and environmental decision making

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<sup>24</sup> This study based on *Econnection*, 2006

processes. This increases the likelihood that economic and environmental policies will also be integrated.

- In addition to the general criticisms<sup>25</sup> of the BSNA, there are also environmental criticisms<sup>26</sup> of the BSNA and have been well documented in the literature and media. So the statistical agency of Bangladesh should take this challenge to address long standing criticisms of the national accounts.
- Repetto states that the system of national accounts is more complete with respect to natural resource accounting (Repetto, 1989). The SNA provides for balance sheets that record opening and closing stocks, and sources of increases and decreases. Moreover, the UN Satellite System for Integrated Environmental and Economic Accounting (SEEA-2003) approach builds upon the existing systems of national accounts, principally the United Nations System of National Accounts (SNA). Decisions regarding the accounting system of Bangladesh are in the hands of data producers of BBS. They have already developed expertise in the existing systems of national accounts, so natural resource accounting framework developed in the system of national accounting would easily be grasped by national statisticians and would take fewer resources in terms of staff, budgets, and raw data than an independent accounting framework.

### **4.3 Considerations for Accounting Framework and the Design of a NRA Effort in Bangladesh<sup>27</sup>**

The need for NRA is now recognized worldwide. Much activity is going on in this area in many countries. As yet, however, a common generally acceptable framework for NRA is not available (IUCN, 1994). However, an NRA framework means how various heterogeneous natural resource data should be selected, organized, aggregated, and incorporated into or linked with the information provided by the SNA<sup>28</sup>. Statistics Canada defines an accounting framework which includes the following elements:

- What is, and what is not, to be measured
- What units of measure are to be used;
- How often measurement is to be undertaken
- The geographic scope for measurement; and
- The format in which results are presented

The basic objective of resource accounting systems is to provide a coherent picture of resource use and depletion or increase, which can be linked to, or integrated with, the national accounts. Many approaches have been found from experiences of natural resource accounting around the world (described in chapter 6). To summarize, all those NRA approaches<sup>29</sup> can be grouped under the following broad categories:

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<sup>25</sup> The former Cabinet Secretary Saadat Husain made comment on the bane of statistics in Bangladesh (Jan 3, 2008, The Daily Star)

<sup>26</sup> Ahmed et, al.(1997) provide an excellent overview of these criticisms.

<sup>27</sup> This study based on Econnections, 2006 and Juan Sève, IRG, 2002, Pekin,1989,Theys, 1989

<sup>28</sup> This definition of an NRA framework is adapted from Norgaard, 1989

<sup>29</sup> NRA approaches are adapted from Econnections 2006, IUCN(1994), Juan Sève, IRG, 2002, Pekin,1989,Theys, 1989

### **SNA linked "Satellite Accounts"<sup>30</sup> system:**

This approach focuses on developing a separate physical accounting system for natural and environmental resources. It is very simple approach, where adjustments can be made. One approach attempts to incorporate natural resources assets in the national accounts. The principle of this approach is that NRA should be independent of economic accounting and that linkages should be made between the accounts. Due to valuation difficulties the resource accounting should be maintained in physical units to the extent possible, and multiple approaches to linking accounts with the SNA should be developed and used as appropriate. For example, Norway's resource accounts concentrate on selected natural resources and extend the SNA balance sheets to cover the total stock (including nonmarketed stocks) of the respective natural resources in physical units (Peskin, 1989). Linking NRA with the conventional economic accounts, one approach is to define an additional economic sector, i.e., "Nature" and to account for the non-marketed goods and services generated by this sector in a way that is similar to the treatment of marketed goods and services generated by conventional sectors (Peskin 2000).

### **Extensions of SNA-type systems:**

This approach focuses on the improvement of the existing SNA by including the value of natural resource services in the current account and the variation in the value of resource stocks in the capital account. The expanded accounting framework plans to treat the inputs and outputs of environmental and other nonmarket entities in an analogous manner. That means an accounting system with everything measured and aggregated in monetary terms so that planners can readily compare options. Examples of expanded SNA-type systems are the UN Satellite System for Integrated Environmental and Economic Accounting approach (SEEA) and the Environmental and Natural Resources Accounting Project (ENRAP) framework adopted in the Philippines. The SEEA approach incorporates the changes in SNA to account for natural resources in a comprehensive manner, but without merging the Natural Resources Account with SNA. The basic purpose of this system is to present in detail the values of natural resource asset stocks and the annual changes in the volume of these stocks. The basic principle of the ENRAP framework is that the services of economically valuable environmental assets should be treated in an accounting system just like the services of man-made assets, such as factories and machines. But there are limits on the accuracy of economic valuation for natural resource goods and services, and this could undermine the accounting initiatives.

Natural resources can be integrated according to any suitable framework. Two sets of environment related guidelines are presented in the SNA93. The first set deals with the incorporation of natural resources into national balance sheet accounts. The second set describes the development of a satellite system for integrated environmental and economic accounting (Statistics Canada, 2006). Statistics Canada is complying with the SNA93's recommendation respecting natural resources and balance sheet accounts and has chosen the national accounting

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<sup>30</sup> Satellite account: they complement the economic information drawn from national accounts without modifying the system of national accounts. Satellite accounts combine physical information from environmental statistics and natural resource accounts with monetary information such as environmental expenditure or environmental damage costs. Information drawn from satellite accounts can be used, inter alia, to calculate alternative national accounts aggregates. These alternative aggregates are conceptually different from the adjustment of the system of national accounts. (OECD, 1995)

framework, in part, so that the statistics of natural resource accounts may be directly linked with those of the national accounts.

The United Nations has considered inclusion of depreciation accounts for natural resources through satellite accounts. The World Resource Institute developed a methodology for natural resource accounts (Repetto et, al, 1989) and initiated a few country (Indonesia, Costa Rica) studies. Physical accounts are set up for natural resources and changes in stock are recorded for the accounting period. The valuation is done on the principle of economic rent according to WRI methodology. Finally the income accounts for natural resources are integrated with the national accounts.

A study of Indian forests (Sanyal et, al, 2007) presents physical and monetary accounts for forestland, timber and carbon. They recorded the changes in the forest stocks over the accounting period and constructed asset value for timber, carbon and non timber forest products (ntfps), but not forest land. And finally, they integrated their estimates with the national accounts. They chose to focus on adjustments to Gross/Net Domestic Product (GDP/NDP) and Gross/Net National Product (GNP/NNP). They showed that their forest accounting affected three components of the national accounts: GDP, NDP and capital accounts. They added the amount of missing timber (which was unreported), which increased both GDP and NDP. Moreover they expanded capital formation accounts to add the value of accumulation of natural forests to investment, which increased GDP/GNP and GNP/NNP. Furthermore they expanded consumption in the capital account to include the cost of depletion of natural forests, which decreased NDP/NNP.

In Bangladesh, various activities listed in the international standard industrial classification (ISIC) of BSNA refer to the use of natural resources, such as agriculture, hunting, forestry, logging, fishing, mining, water supply, natural gas supply and transportation. The cost of land improvement is included in gross capital formation in BSNA and this concept also covers transactions dealing with selected natural resources. But there are not any functional classifications developed that separately identify goods and services provided by natural resources in the ISIC of BSNA. A basic principle of the BSNA is to represent national output, normally defined to be the production that is reflected in the sales and purchases of the market economy. The omission of many non-market activities, particularly, those involving natural resources, is the very concern that might lead to a natural resource accounting effort. But what would be an accounting framework for NRA in Bangladesh is a great matter of concern. Would it be an integration of natural resource assets into balance sheet accounts or SNA-linked satellite accounts or an extension of the SNA-type system which builds upon the existing systems of national accounts? An attempt to implement the expanded accounting structure requires sufficient modifications to account for all environmental-economic interactions. This approach is the most ambitious and covers all the information needed. So clearly, the lack of data is one of the more serious problems. A properly conducted NRA effort will require not only critical doses of data, analytical capability, staffing, funding, and time. An expanded accounting system that includes nonmarket, environmental activities requires acceptable valuation methods for nonmarket goods and services. In particular, the valuation difficulties may not be fully solvable. At first glance, these requirements may seem overwhelming for Bangladesh, where even official

national economic accounts are of poor quality and sizable informal sectors are omitted from the accounts as presently assembled.

The WRI's methodology is not particularly suitable for Bangladesh because the WRI's depreciation accounts have considered only loss in potential sustainable wood output but not incorporated other products and benefits in the evaluation, where deforestation is not only due to wood extraction, agricultural expansion, fuel wood collection and industrial development are also other causes of deforestation.

While links between physical and monetary accounts are already well-established in conceptual terms, exploring the links between physical and monetary accounts could be fruitful, in particular at the sectoral level (OECD, 1995). However, Bangladesh can start NRA programs as modest efforts focusing on a limited number of priority sectors, as we have seen in Canada. BBS is trying to adapt with the SNA-93 in terms of national accounts right now. So in my view, BBS's first step should be to comply with the SNA-93's recommendations respecting natural resources and balance sheet accounts.

One other consideration in determining the most appropriate direction and level of effort is the scope of the accounting function. Should the resource accounts be confined to environmental assets or should the effort attempt to cover a full spectrum of nonmarket assets? In principle, the latter approach is preferable to reflect interdependence between environmental resource use and other nonmarket activity, because some nonmarket activity such as household fuel wood production, gathered wood such as lops and tops and agricultural residues may need to be accounted for as their use may have consequences for deforestation, and soil degradation. Not to account for these activities leads to underestimation of the resource use and production. Although nonmarket activities pose difficulties mainly because there are no objective records of the valuations, there are numerous techniques available for estimating both the quantity and the value of non-market activities, but they almost always require gathering additional data and involve complex imputations.

All approaches described above contain methodological drawbacks. Preference for one methodology over another stems from one country's special needs. However a good system of accounts for appropriate development of NRA is important but too complicated to be pursued through a single approach. Norgaard suggests that the use of multiple methodologies will reduce the likelihood of making a significant error (Norgaard, 1989). So the “learning by doing” approach to building an NRA effort is very fundamental for Bangladesh. In fact, the best way of developing accounting techniques is by implementing the accounts. The “learning by doing process” can begin by assembling rather crude data for the construction of initial accounts. The purpose of “learning by doing” should be the training of a critical mass of national professionals capable of undertaking and maintaining NRA systems without the need for foreign involvement.

#### **4.4 Considerations for Natural Resource Assets to be included in NRA<sup>31</sup>**

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<sup>31</sup> This study based on Statistics Canada, 2006, Juan Sève, IRG, 2002 and SEEA 2003

SEEA uses the term "natural capital" a synonym of natural resources. The stock of natural resources, ecosystems and land have been called natural capital in the sense that these resources are assets that yield goods and services over time (goods and services that are essential for the sustained health and survival of the population and economy).

According to the SNA-93, natural resources, over which ownership rights can be established, should be considered as economic assets. The SNA 93 recognizes four broad categories of natural resources: land, subsoil assets, non-cultivated biological resources and water, which are considered as economic assets. Natural resources, over which ownership rights cannot be established, cannot be considered as economic assets. These include air, major water bodies and ecosystems that are so vast and uncontrollable that effective ownership rights cannot be enforced. Likewise, resources whose existence has not been proven by exploration and development (undiscovered subsoil assets, for example) or that are currently inaccessible (remote forests, for example) are also not considered economic assets (Statistics Canada, 2006). Despite these restrictions, a number of important environmental assets are included in the SNA as economic assets.

In contrast, SEEA expanded the asset boundary and included non-economic assets in the SNA sense. In the SNA, though the accounts are usually drawn up for all assets of an institutional unit or sector, the main interest is based on the criterion of ownership rather than the nature of the assets. The SEEA asset accounts in contrast are concerned with the nature of the asset and only secondarily with the ownership of the asset by the various sector of the economy (SEEA 2003). The asset boundary of SNA and SEEA is presented in summary form in table 1.

**Table 1 Comparative Summary of Asset Boundary in the SNA93 and SEEA 2003**

Environmental assets within the 1993 SNA	SEEA asset classification
<p><b>Produced assets</b> Fixed assets 1. Tangible fixed assets</p> <ul style="list-style-type: none"> <li>• <i>Cultivated assets</i></li> <li>• <i>Livestock for breeding, dairy, draught, etc.</i></li> <li>• <i>Vineyards, orchards and other plantations</i></li> </ul> <p>2. Intangible fixed assets</p> <ul style="list-style-type: none"> <li>• <i>Mineral exploration</i></li> <li>• <i>Inventories</i></li> </ul> <p><b>Non-produced assets</b> 1. Tangible non-produced assets 1.1 Land</p> <ul style="list-style-type: none"> <li>• <i>Land underlying buildings and structures</i></li> <li>• <i>Land under cultivation</i></li> <li>• <i>Recreational land and associated surface water</i></li> <li>• <i>Other land and associated surface water</i></li> </ul> <p>1.2 Subsoil assets</p> <ul style="list-style-type: none"> <li>• <i>Coal, oil and natural gas reserves</i></li> <li>• <i>Metallic mineral reserves</i></li> <li>• <i>Non-metallic mineral reserves</i></li> </ul>	<p><b>Natural Resources</b></p> <ul style="list-style-type: none"> <li>• Mineral and energy resources</li> <li>• Soil resources</li> <li>• Water resources</li> <li>• Biological resources</li> </ul> <p><i>Timber resources</i> <i>Crop and plant resources, other than timber</i> <i>Aquatic resources</i> <i>Animal resources, other than aquatic</i></p> <p><b>Land and surface water</b></p> <ul style="list-style-type: none"> <li>• Land underlying buildings and structures</li> <li>• Agricultural land and associated surface water</li> <li>• Wooded land and associated surface water</li> <li>• Major water bodies</li> <li>• Other land</li> </ul> <p><b>Ecosystems</b></p> <ul style="list-style-type: none"> <li>• Terrestrial ecosystems</li> <li>• Aquatic ecosystems</li> <li>• Atmospheric systems</li> </ul>



<p>1.3 Non-cultivated biological resources  1.4 Water resources  2.Intangible non-produced assets  3.Leases and other transferable contracts</p>	<p><b>Memorandum items. Intangible assets related to environmental issues (extended SNA codes)</b></p> <ul style="list-style-type: none"> <li>• Mineral exploration</li> <li>• Transferable licenses and concessions for the exploitation of natural resources</li> <li>• Tradable permits allowing the emission of residuals</li> <li>• Other intangible non-produced environmental assets</li> </ul>
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Source: Adapted from SEEA 2003, Chapter 7

While the SEEA asset boundary is in principle very broad, it is recommended that for practical reasons, the environmental accounts actually compiled in any one nation will be much narrower. SEEA suggests that:

In some countries, the quantity of water found in surface and groundwater bodies is also enormous and the value of compiling a stock estimate for all such water is questionable. In such countries, a pragmatic approach to water resource accounting which could be to focus on only those water bodies that are in close enough proximity to human populations to play an important role in provision of water for human and industrial use. (SEEA, 2003, p 253)

Statistics Canada started with the estimates of natural resource asset values for subsoil assets (fossil fuels, metals, and potash) and timber to be included in the Canadian National Balance Sheet Accounts. And they decided to include other types of land (forest land and parkland for example), biological resources (other than timber) and water on the balance sheet in the future, once suitable data sources and valuation methods are found (Statistics Canada, 2006).

For Bangladesh , an accounting framework should be based on the principle that services derived from natural resources do in fact have economic value if they are scarce in an economic sense, i.e., when demand for the services is limited by available supply. If such services are traded in markets, they would have observable market prices, and thus would be included in the conventional accounts. Produced or cultivated biological resources such as agricultural production, plantation forestry, fish farming and livestock farming are already included in the BSNA. But non produced or non-cultivated biological resources grows in the wild, rather than being a product of cultivation, are not included in the BSNA( for example, fish in the sea, timber in the old growth native forest, etc). Therefore at the starting point, it needs to be decided which resources should be included in the BSNA accounting framework for NRA. Bangladesh can start NRA programs as modest efforts focusing on a limited number of priority sectors as Canada has done. Bangladesh has fuel wood, timber and energy crises. Timber and subsoil assets, particularly natural gas are already included in the BSNA and they have market value. Similarly some lands already have market value too. So it can be recommended for Bangladesh that the focus of NRA should start with timber, natural gas and land accounts. However, the fact that a resource does not qualify as an economic asset does not preclude its inclusion in NRA (Statistics Canada, 2006). So the future development of NRA in Bangladesh should definitely expand the asset boundary to include all natural resources that provide benefits outside of traditionally-measured economic activity.

## 4.5 Considerations for Physical versus Monetary Accounts<sup>32</sup>

The NRA initiative may be physical, monetary or both. Both approaches have drawbacks. If Bangladesh attempts NRA, it will need to decide its preference regarding physical accounts and/or monetary accounts. The following discussion clarifies these issues.

The focus of physical accounting is to measure physical changes in the stock of environmental assets over time. Statistics Canada reports that a comprehensive description of the stocks of natural resources and their contribution to the economy is not possible without physical data (Statistics Canada, 2006). Hecht states that any resource accounting system must be based on a core of physical data of the resources. Physical data on the extent of natural resources are a key input into estimates of the value of those resources, so most countries working in this area have indeed begun with physical asset accounts (Hecht, 2005). The Indonesian study shows that physical accounts are necessary prerequisites to economic accounts (Repetto, et, al. 1989). Peskin suggests that while the physical data are collected, efforts should also be made at monetary valuation (Peskin, 1989). Statistics Canada follows the same rule.

However, physical accounts have many disadvantages. Bartelmus points out that comparing the physical stocks of natural and produced wealth is hardly possible, in different units of weight, area or volume, and stresses the monetary values of physical stock data. In addition, Statistics Canada states that:

physical data are often difficult to aggregate due to the use of different units of measure (tonnes versus hectares, for example). Even when physical stock measures are commensurable, the results of aggregation are often meaningless. Summing gold reserves with nickel reserves and reporting the results as "x" million tones of metallic minerals does not yield a result that can be readily interpreted. (Statistics Canada, 2006)

Similarly, Smith reports that:

timber accounts expressed in cubic metres are not easily combined with accounts of mineral assets expressed in tonnes. What if it is found that timber stocks are increasing in physical terms while mineral stocks are decreasing? Is a country getting better off under such conditions, or worse off? (Smith, 2007)

Therefore there is an argument that accounts maintained in physical units do not enable economic policy makers and planners to understand the impact of economic policies on nations' natural resources or to bring environmental considerations into economic decisions. On the other side, many comments are found in favor of monetary accounts. Physical indicators of deforestation, loss of fish stocks, declining mineral deposits, soil erosion and the like are certainly useful for drawing attention to environmental decline, and can serve as a basis for monetary valuation of environmental loss, but clearly their economic role would be vastly enhanced if incorporated in an adjusted set of macroeconomic measurements (Serafy, 1997). The monetary accounts have great advantages and the monetary values of different assets, produced and nonproduced, can be combined to provide a figure for total national wealth. In contrast, the disadvantages of monetary accounts essentially are rooted in the difficulty of valuing natural resources. The "revaluation due to price change" item in the asset accounts is a particular

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<sup>32</sup> This study based on Econnections, 2006; Juan Sève, IRG, 2002 and SEEA 2003; The World Bank, 2006; Serafy, 1997; Bartelmus ;Hecht, 2005; IUCN, 1994

problem in monetary accounting, and establishing monetary accounts for changes in environmental quality is by no means so straightforward.

From the above discussion, one thing is very clear: physical accounts are very important as a basis to establish monetary accounts. Serafy states that physical indicators derived from physical accounting will not be sufficient for addressing natural resource deterioration and its implications for economic policies especially for the less developed countries. Although, Bartelmus says that physical stock data need to be expressed in monetary values, at the same time he shows in his Philippines study that the value of forests went up by nearly a quarter, while its volume decreased by about 30% in constant prices and cubic meters. So he suggests clearly that both physical and monetary accounts need to be consulted before making any managerial or policy decision on the short-or long-term exploitation of particular natural stocks. The World Bank reports that most developing countries, with asset accounts for natural resources, have typically published the accounts separately for each resource, but have not attempted to measure total natural capital (the sum of all resources) and total national wealth (the sum of manufactured and natural capital) (The World Bank, 2006). Given the poor representativeness of monetary assessment, it is necessary for Bangladesh, at least initially, to concentrate on physical accounting. So a physical accounting approach can be a starting point of Bangladesh's NRA efforts. At the same time Bangladesh should start monetary accounts with economic assets, and gradually include other assets when suitable data sources and valuation methods are found, as Statistics Canada has planned.

Assets accounts are described and illustrated in chapters 7 and 8 of the SEEA 2003. Chapter 7 gives detailed units for specific resources. Bangladesh should follow SEEA guidelines. Peskin suggests that a complete body of physical data should cover the stock of natural resources, the demands for the services of these assets (for example, the demands for waste disposal services by industry, the demands for recreation services by households and tourists, and the demand for potable water), and the negative physical consequences on final and intermediate demand from consumption of these services (for example, adverse health effects from water pollution, damage to crop production from soil loss, and damage to electricity production from sedimentation). BBS should include physical assets that have no monetary value but should nevertheless be tracked in the physical accounts. They should also capture changes in the quality of natural resources as a result of degradation.

## **4.6 Considerations for Valuation Principles**

To view natural resources as capital, and to incorporate them into economic analyses, economic value must be assigned to them. Although, the valuation is an appropriate approach to measure the levels of economic activity, the task of valuation of natural assets is not easy. IUCN states that:

the first step in valuation is to identify the services that the various natural assets provide. For example, land can be used for cultivation, building a house, a playground etc. A change in quality that affects its suitability for a particular use can be utilized to assess the change in the value of the asset. Thus land that is used as a farm becomes degraded, and the farmer's income goes down. The present value of the stream of income loss is then the loss in the value of the land. (IUCN, 1994)

Often many goods and services provided by nature are not easy to value. The well-known example of an asset that is difficult to value is biodiversity. The concept of willingness to pay is frequently used for benefit-cost analysis, the idea being that the value of a non-market good or service should be measured by what society would be willing to pay for the good or service. In practice this usually means what individuals in society would be willing to pay. For a developing country like Bangladesh, where most of the populations is living under the poverty line, the willingness to pay for environmental services would be a poor measure of their values. Thus identifying the services made available by natural resources is useful. It provides a means to value the asset and when such a valuation is not possible, it draws attention to such services. Often a natural resource may provide a service that is not easy to value. Therefore, it is important to develop valuations and valuation methods for non-market goods and services whether or not the willingness to pay concept is appropriate for economic and social structure of Bangladesh.

Natural capital is an important input into the production of goods and services. Table 2 provides a detailed list of many goods and services provided by natural capital.

**Table 2      Types and Examples of Goods and Services by Natural Capital Type**

<b>Types of Natural Capital</b>	<b>Types of Goods &amp; Services</b>	<b>Examples of Goods and Services Provided</b>
<b>Natural Resources:</b>		
Mineral and Energy resources	Raw materials, energy	Natural gas, fossil fuel, rocks, ore etc.
Soil resources	Soil formation, erosion control, nutrient cycling	Food production, accumulation of organic material, nitrogen fixation, nutrient cycles
Water resources	Water supply	Supply water for agriculture use, drinking, transportation etc.
<b>Biological resources:</b>		
Crop resources	Supply of crops, raw materials, genetic resources	Different types of crops, agricultural residual, genes for crop pests
Timber resources	Supply of timber, raw materials, genetic resources	Timber, fuelwood, lops and tops, honey, medicine
Fisheries resources	Supply of fish and fisheries resources, raw material	Fish
Livestock resources	Supply of animal resources, food production, raw material, genetic resources,	Meat, eggs, skin, milk, genes for animal resistance, manure
<b>Land and surface water</b>		
Wetland	Water supply and treatment, food production recreation, cultural, habitat/refuge, total ecosystem, disturbance regulation	Water storage by reservoirs, aquifers, and watersheds, supply water for agriculture, drinking, transportation, industrial use, storm protection, flood control, drought recovery
Forest land	Carbon storage and sequestration,	Maintain CO <sub>2</sub> /O <sub>2</sub> balance, accumulation

	soil formation, waste treatments, biological control, cultural, storm water control, recreation, raw material(timber), air quality, genetic resources	of organic material, waste treatment, predator control of prey species, aesthetic, artistic, education, spiritual, scientific aboriginal sites, ecotourism, products for materials, science, genes for plant resistance, ornamental species etc.
Water body	Water supply, waste treatment, food production, recreation, total ecosystem	Supply of water for irrigation, pollution control, detoxification, ecotourism, sport fishing, boating etc.
Crop lands	Food production, habitat/refuge, scenic	Production of different crops, habitat for different species
<b>Ecosystems</b>		
Terrestrial ecosystems	Habitat/refuge, recreation, cultural	Habitat for migratory species and locally harvested species, wintering grounds, ecotourism,
Aquatic ecosystems	water supply, water stabilization, waste treatment, recreation	Supply of water for irrigation, pollution controll, detoxification, ecotourism, sportfishing, boating etc.
Atmospheric systems	Atmospheric stabilization,air treatment, climate stabilization	CO2/O2 balance, stratospheric ozone, SO2 levels, clean air, greenhouse gas production, cloud formation

Source: Adapted from Olewiler, N. (2004). The Value of Natural Capital in Settled Areas of Canada, Ducks Unlimited Canada and the Nature conservancy of Canada. 36pp; SEEA, 2003

Many measurement techniques have been proposed to date, but all are fraught with difficulties. In general, among the many obstacles to assigning a monetary value to a natural resource, one is the question of what to measure and how to measure it. If one defines a single component of a natural system as an asset (for example, forest timber), how does one define its role as part of the larger asset that is the natural system (for example, the forest itself, with its myriad ecological, recreational, and aesthetic functions)? Of course, broadening the asset definition greatly complicates the problem of monetary valuation. Market goods and services can be combined with non-market goods and services provided by natural resources after valuation to obtain better measures of the level of economic activity. Similarly, the value of natural resource stocks can be added to that of man made capital.

A number of methods that can measure various values of the numerous functions of natural resources and ecosystems are available. Once such values are integrated into the national accounts, such accounts would more closely reflect the goals of sustainable development (The World Bank, 2000). For example, the value of household production of fuelwood has been calculated based on the estimated amount of labor required, multiplied by an assumed wage rate. Other household production (mainly agricultural crops), was valued using available prices for equivalent crops that were sold in markets. If NRA is to be successful, cooperative research is needed to address not only the conceptual and definitional problems described above, but also to

overcome technical challenges in valuing natural assets and to devise suitable methods and practices for accurate natural resource accounting.

Two methods have been used to value assets: the net present value (NPV) and the net price method. The NPV method of valuation requires assumptions about future prices and costs of extraction, the rate of extraction, and the discount rate. It is often assumed that net price and level of extraction remain constant. A wide range of discount rates have been used by different countries (The World Bank, 2006). Most of the resource accounting work uses the net price method rather than NPV. The net price method simply applies the net price in a given year to the entire remaining stock.

The SNA-93's recommended method of valuing natural resource assets for inclusion in balance sheet accounts is based on a present value calculation. Statistics Canada states that valuation of natural resource asset stocks in NRA would ideally be based on observed market values for transactions in these assets. But such values are not available for most resource assets. So estimates of market value must be derived indirectly for other resources. For that reason the classification of assets and the identification of the benefits and uses of assets are important steps in valuing resources.

SEEA 2003 gives a detail discussion on different valuation methods (SEEA, 2003, Chapter 7). SEEA suggests that the market price is the preferred method of valuing assets. Market prices for natural resources may or, more probably, may not exist. When market prices do not exist, other means of valuation have to be developed drawing on what market transactions are available, and where these are missing, on estimation methods based on the economic theory of price and value. This in turn leads to discussing the expected life length of the asset, the resource rent it provides and what sort of discount factor should be used to value future returns at the present time. In the absence of market prices, a valuation by means of establishing the net present value of future resource rents must be used.

Although, methodological drawbacks exist in all approaches, Bangladesh should start with economic assets and use market prices. When the valuation and estimation methods are available, Bangladesh should then test several methods of monetary valuation concurrently.

#### **4.7 Considerations for a Cooperative Approach to data Collection<sup>33</sup>**

Accounting systems in general have two principal objectives: scorekeeping and management. Scorekeeping refers to the calculation of statistics—such as GDP or NDP—measuring the performance of a business or an economy. Management refers to the body of data generated by the accounting process that supports the formulation and implementation of business or economic policy. Since a major purpose of an NRA system is the understanding of trade-offs between economic development and environmental policy goals, the management function appear to be more important than scorekeeping. (Juan Sève, 2002)

If an attempt is made to implement NRA in Bangladesh, several difficulties regarding data collection must be overcome. The feasibility of NRA in Bangladesh will depend primarily on the ability to adapt data originally compiled for other purposes or to use existing statistical infrastructures to gather information from other sources. Many decision makers, I surveyed,

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<sup>33</sup> This study based on Theys, 1989; The World Bank, 1992, Smith, 2007

clearly said that the lack of data is one of the more serious problems. It is true that more urgent priorities for statistical data have not yet been fulfilled in Bangladesh. But some valuable data on natural resources may be obtainable from existing sources including the *Compendium of Environmental Statistics of Bangladesh*, the Bangladesh State of the Environment Report, the Bangladesh Development Studies Journal, Environmental Profile of Bangladesh and the People's State of the Environment Report for Bangladesh. Different line ministries' research institutes prepare information for specific objectives. The Bangladesh Agricultural Research Council (BARC) publishes agricultural research. IUCN Bangladesh publishes National Conservation Strategy.

Some periodical statistics are available on land area under agriculture; agricultural yields and production; livestock; fertilizer and pesticides use; quantity of timber and forest products; and catches of fish etc. These data, however, have been compiled by a wide variety of different agencies, ministries, scientific institutes, business farms and international organizations. For example, the Bangladesh Soil Research Development Institute (SRDI) collects data on soil properties such as soil type, colour, depth, salinity level, organic content, permeability and drainage characteristics. These data could be useful for the description of flow resources with many uses (e.g. a soil well suited to growing one crop may not be suitable for another). Recently, the Bangladesh Forest Department (DOF) is carrying out a national forest and tree resources inventory, "The National Forest and Tree Resources Assessment 2005-2007", with the co-operation of the Bangladesh Space Research and Remote Sensing Organization, Ministry of Defense (DOF, 2007). This is the first exercise of its kind in Bangladesh. This assessment was supported by the Food and Agricultural Organization (FAO)'s technical assistance. The inventory has covered a large array of biophysical and socio-economic variables with emphasis on the management and use of the resources. Remote sensing is now being used systematically to observe changes in forests. Biophysical and socio-economic data about forests and trees outside forests were collected from a national grid of systematic field sampling and wall-to-wall land use mapping.

This forest assessment is often narrowly focused on the inventory of forest and the classification system of forest as the interests of the FAO who sponsor it. For example, the definition of forest used by the Government of Bangladesh is not the same as the global definition of forest used by the NFA and SEEA. Statistical data are still inadequate on important environmental phenomena such as deforestation, soil erosion, water pollution and many more. Statistics on deforestation are still missing. Although, data on plantation and natural forests are provided, statistics on decreases in the stock due to deforestation and degradation, and changes in forest land due to human interventions, are totally absent. The important Sal forests are totally missing from that assessment. So this assessment may not generally meet the needs of a wide range of users, it can only fulfill objectives of the Forest Department, although, with some small changes, the data might be more generally useful for NRA purposes.

The environmental statistics program has drawn on data collected elsewhere in BBS and other departments to meet its needs. BBS does not collect raw data; instead they just compile the existing data based on United Nations Framework for Development of Environmental Statistics (UNFDES). New surveys have not been mounted by the BBS for Environmental Statistics. Bartelmus points out that the UNFDES framework is a very flexible framework without

recommending statistical definitions and classifications; no direct linkage through common concepts and classifications was established with the SNA or other statistical systems (Bartelmus, 1989). Bartelmus suggests that environmental statistics systems should attempt to compile raw data from a multitude of sources and to present them in a coordinated manner in statistical compendium. The environmental statistics program should then draw on new surveys to fill the data gaps. Further aggregation and more rigid presentation of the stocks and flows of natural resources in physical terms are, on the other hand, the objective of natural resource accounts and balances. The Compendium of Environmental Statistics of Bangladesh is unrealizable without a cooperative effort among ministries of environment and forest, other resource ministries and planning agencies.

Thus statistics directly usable for NRA might be obtained. But these data are scattered and diversified. They are not coherent with one another. They are incomplete and not consistent over time. These data are not standardized, centralized, or even widely disseminated or published. Some reports on the state of the environment are based on insufficient specific data. This situation will surely restrict the GoB capacity to develop and monitor progress towards environmental policy goals. Very recently, former Cabinet Secretary of the government of Bangladesh, Saadat Husain made his comment on the bane of statistics in Bangladesh. He said that government statistics are replete with divergent statistics on a particular subject that reflects the lack of coordination amongst different agencies dealing with statistics on a particular subject (Jan 3, 2008, The Daily Star). As the need to pursue the harmonization of economic and environmental goals become more urgent, this situation will become increasingly untenable. He suggested that the country needs to have an apex coordinating agency for statistical activities carried out in the government sector. This situation may be due in part to the following reasons:

- Gathering information on the environment is generally not yet a priority concern for statisticians in Bangladesh. For example, the BBS has prepared and published one-time environmental statistics. It is not a continuous process.
- Although the Planning Commission has the authority to supervise and coordinate cross-sectoral and inter-ministerial activities affecting the use of natural resources and the environment (WRI, 1990), the Planning Commission does not require structural information on natural resources. However the avoidance behaviour of BBS would not have happened if the demand for these data had been forthcoming from a more powerful planning agency instead of the much weaker environmental protection agency.
- The interest of the Department of Environment or the Ministry of Environment and Forest is normally in the availability and use of resource information, and not in the details of its production.
- Despite the preparation of the National Environmental Management Action Plan (NEMAP) to integrate environmental considerations into the country's overall economic and social development strategy, requiring information for the analysis of cross-sectoral problems and solutions and a systematic determination of the types of data to be gathered, maintained, updated, analyzed, and disseminated, NEMAP has not included a focus on NRA.

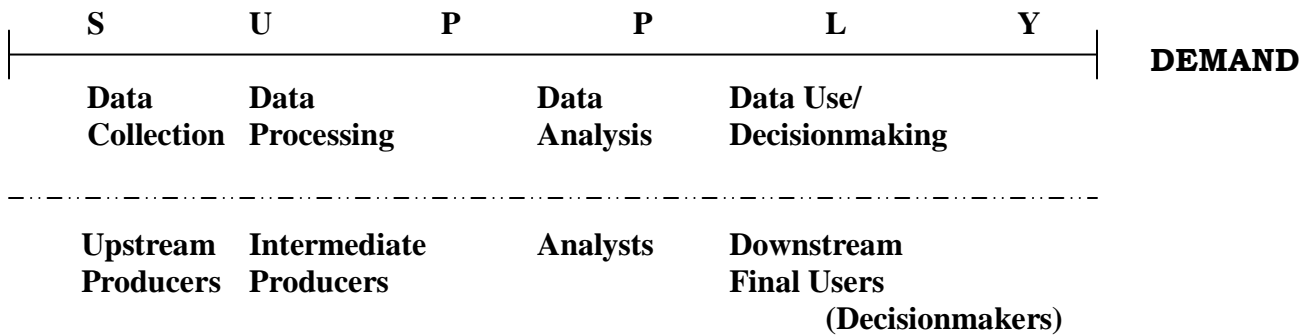


The high cost of compiling new data and the chronic lack of qualified personnel in the combined fields of statistics and the environment might make it difficult in the short term to prepare resource accounts in Bangladesh. In contrast, the harmonization of information frameworks is very important. Statistics collected on the basis of a sound conceptual framework are more likely to be of wider relevance. The data collection of resource ministries should be reoriented towards statistical indicators. The Task Force on institutional development of the Bangladesh Bureau of Statistics recommended that a common strategy is to be adopted for compilation of environment statistics using uniform concepts, definition, and scope (BBS, 1996). Therefore, there should be consistency on the development of statistical meta-language (concepts, definitions, and classification systems) of resource ministries and BBS.

Right now BBS does not have sufficient capability to collect, update, process, and disseminate the various types of resource information. Institutional problems typically arise when the position of an institution on this continuum, as determined by its statutory mandate, is not clear or is not respected. BBS doesn't have a statutory mandate which defines the role they should play in the information continuum (see Figure 2). The World Bank describes the information continuum in the following way:

The supply and use of information may be thought as a braid of information streams along a continuum from the upstream producer of raw data, to the intermediate producers who interpret or process the raw data into corrected aggregate data, to the analysts who combine data from various sources into models, and to the downstream final user, often a decision maker who acts on the basis of the information provided. (The World Bank, 1992)

**Figure 2 The Information Continuum**



Source: Adapted from the World Bank, 1992

A problem of coordination among suppliers, and between suppliers and users in the information continuum has happened in Bangladesh due to lack of a coordinating structure capable of bringing together multidisciplinary teams, and a lack of connections between different bodies of data. In this regard, the creation of resource accounts could represent a decisive step forward to create a minimum of harmonization and thus to serving as a meeting ground where data producers and users, who otherwise have little contact, could meet. The establishment of a NRA system is complex and long term, requiring cooperation and coordination among many research institutes and government agencies on the categories of scientific focus on environmental

mapping; GIS technology and modeling of ecosystems; developing the capacity to collect, compile and disseminate natural resource data; and developing statistical data series from environmental monitoring; and finally the frameworks of NRA (CIDA, 1993).

In summary, the establishment of an Environmental Information Centre within the BBS or Department of Environment to centralize resource information activities is very necessary. A strong central group will be better able to coordinate activities and ensure data coordination; that would be the most appropriate institutional response to the collection of information and the introduction of new technologies such as remote sensing and geographic information systems. Remote sensing is an effective, well-developed tool. It is particularly well adapted to evaluating natural resources, and, having demonstrated its reliability, remote sensing can be an extremely useful tool in creating NRA. They says it is particularly inexpensive compared with other methods of statistical analysis. The primary mandate to collect and manage resource information will remain distributed in institutions such as the survey department, the forestry department, the agriculture department, the statistics department, and a range of other institutions including research institutions, NGOs, and even the private sector. A natural resource section could gradually be added to other surveys. Centralizing computer equipment may save on costs. Within the context of the National Environmental Management Action Plan, a technical government department, such as the environment department in cooperation with BBS, should be designated to define a common resource information policy.

## 5

### **Institutional Issues in Adopting NRA in Bangladesh**

#### **5.1 The Previous Policy Attempts and Experiences Related to NRA in Bangladesh**

Like most other developing countries, Bangladesh faces a whole spectrum of environmental problems. Although, many activities on NRA are going on in many developed and developing countries, the government of Bangladesh has not really engaged with this issue.

The NEMAP-1995 is a plan of the GoB, prepared by the Ministry of Environment and Forest to identify key environmental issues to promote sustainable development. It is an initiative that reiterates Bangladesh's commitment to Agenda 21. Although, the NEMAP identified a long list of concerns related to natural resource depletion and degradation<sup>34</sup>. Unfortunately, this document doesn't put a demand for accounting such depletion and degradation in its recommended actions for future work.

In the context of the restructuring of BBS in order to make the Bureau the most capable and functional official statistical agency of the government, the Task Force on the institutional development of the Bangladesh Bureau of Statistics recommended 'environmental statistics' to include within the BBS's mandate (BBS, 1996). But the Task Force didn't make any constructive

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<sup>34</sup> The list of resource depletion and degradation includes deforestation to satisfy rural energy requirements; depletion of forest resources due to encroachment on forest land for agricultural and human settlement; soil erosion due to unsustainable agricultural practices; depletion of fish production and loss of fish habitat due to coastal embankment, unrestricted use of pesticides and agrochemicals; loss of agricultural land fertility due to overuse of agro-chemicals; loss of bio-diversity etc.(Ministry of Environment and Forest, 1995)

suggestion for institutional arrangements; professional and technical capabilities; and methodologies to collect and institutionalize 'environmental statistics' within the BBS's mandate. This might have been because the right people were not included on the task force. Ecological & Environmental economist should have been involved in that decision-making process. Right now the BBS is drafting a handbook on sources and methods for the BSNA. BBS has not included any concepts or methodologies on collecting environmental data in this handbook despite the Task Force's recommendation on Environmental Statistics. So it may conclude that investing time, money, energy and knowledge in preparing the Task Force's report has been in vain.

To explore the concept of green accounting with special reference to the newly designed SEEA, International Union for Conservation and Nature (IUCN, an international non-government organization), Bangladesh organized two workshops on November 02, 1997; and February 18, 1998. The participants consisted of experts, academics, bureaucrats, policy-makers, and consultants representing a broad spectrum of government and non-government agencies. The proceedings of the workshops were published for the purposes of wider readership and creation of awareness of the need for application of environmental accounting in Bangladesh. This publication, entitled "*Environmental Economics in Bangladesh*" edited by Ahmed et. al (1999), is the first recognized green accounting work in Bangladesh. This book gives some ideas in firming the future course of action to explore the possibilities of initiating a green accounting process at all levels. It identifies soil erosion and some externalities due to human activities. But it doesn't give a conceptual framework to keep track of such depletion and externalities.

Since then very limited efforts have been initiated to produce comprehensive information on the environment which is indispensable for environmental, economic and financial policy formulation. The *Compendium of Environment Statistics of Bangladesh*, 1999 and 2004, are publications of the Sustainable Environment Management Programme (SEMP), a project under implementation in BBS. Although, the main objectives of the project were to i) prepare and publish environment statistics; (ii) begin natural resource accounting; and (iii) develop institutional capacity, the outcome of this project was only this compendium. Why the other two objectives have been dropped is an open question. Lack of know-how, budget constraints and lack of demand or insignificance for NRA might be possible reasons for this failure. The compendium presents some data on a number of natural resources and the environment. But the collections of environmental statistics are often incomplete and these data are not reliable and comprehensive. For example, although the compendium reiterates in its introductory section that the country has lost much of its natural forests which have now come down to a size of about 5-7% of the total land area, this is not reflected in the land use and forest land statistics provided by this compendium (table 4.02 of this compendium provides almost the same forest land statistics from 1999 to 2004). These gaps may prevent complete understanding of trends in the state of the forest and the human activities linked to these trends, and can limit the usefulness of environmental statistics. Moreover these data are not suitable to integrate in the national accounting system because of inconsistency. Many more comments are provided in chapter 4(4.3). The Bangladesh Economic Review of 2006 includes a chapter on environment and adds some words about SEEA but doesn't make any commitment to integrate environmental or natural resource accounts in economic forecasting.

## **5.2 Awareness of Policy Makers, Policy Planners, other Data users and Data Producers**

IUCN states that wide promotion and introduction of NRA requires awareness and the participation of experts and institutions dealing with economic and environmental accounting (IUCN, 1994). To assess the awareness level of policy planners, decision makers (excluding political decision makers)<sup>35</sup>, data producers, researchers and experts on NRA, I designed and implemented an interview process during my field work in Bangladesh in late 2007.

A total of 21 high levels and mid levels policy makers of different government institutions; mid levels and high levels statisticians of BBS; senior researchers of government research institutions; and experts of international organizations participated in the interview process. A list of the organizations and positions of interviewees is provided in appendix 1 and the Questionnaires are provided in appendices 2 & 3.

Among policy makers, almost every one agreed that they use GDP figures for different policy purposes. The most of the policy makers of government institutions are not very aware about Green GDP. Among them, 80% are not well aware about NRA. Although they expressed their need for information on changes in natural resources, they don't know what is implied by natural resources. They are not acquainted with the methods of NRA. Only two policy makers of government institutions explicitly expressed that they need physical and monetary accounts of natural resource stocks and their tangible and intangible goods and services. They said both physical and monetary accounts are essential for different purposes.

Among statisticians of BBS, all of them said they are aware about NRA but they never use or read the SEEA handbook. 50% of them said the implementation of Environmental Statistics was a supply driven and 50% said it was driven by policy demand. It can be concluded that the implementation of Environmental Statistics was a supply driven because all policy makers said that they didn't ask BBS to produce such data. They ask their own research institutions to provide required information instead BBS. The reason is that they know BBS doesn't have the capability to assemble and produce such data. Researchers are relatively well aware about NRA. They expressed their opinion of the need for NRA.

International experts said the lack of political commitment, lack of demand and ignorance of the subject matter are the biggest constraints on implementing NRA in Bangladesh. Policy makers don't think that funding is a problem for implementing NRA. They think lack of political commitment is the biggest constraint.

Some answers to my survey were really frustrating. Some policy makers believe that human wellbeing comes first, then the environment. Some think NRA is a matter for the ministry of environment, not others. When they have been asked what kinds of information they need for policy decisions, 80% of policy makers identified their own sector specific information. But they didn't identify other related cross cutting information. For example, for the National Forest Policy, forest department needs information on forest stocks, changes in forest stocks, goods and

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<sup>35</sup> I made a decision to exclude political decision makers from this interview process during my field work in Bangladesh in late 2007 because the government of Bangladesh is ruled by an interim government. In this period the political situation is in turmoil. So I thought that it would be difficult to interview them as they might not be in a position to answer all of my interview questions properly or show interest about NRA.

services provided by forests, forest ecosystems etc. Information on demography, soil conditions, water conditions, and demands for energy are equally important for forest policy too. So it is very clear that most of the policy makers fail to see the connection between different elements of the environment. Moreover, it can be easily seen in everywhere that there was a knowledge gap among different levels of policy makers about NRA. As this paper discussed in text box 1 that the most important national documents related to natural resources did not emphasize NRA at all.

### **5.3 Legal, Systematic and Institutional weaknesses of BBS to adopt NRA<sup>36</sup>**

The issue of legal, systematic and institutional weaknesses of BBS is important because of the growing interest of policy makers, researchers and statisticians to include an NRA effort within the BBS mandate. Most of them said BBS should take the charge of NRA activities in cooperation with other line ministries and research institutions. So before suggesting NRA within BBS, a feasibility study of BBS is quite logical.

The policy makers and statisticians of BBS were asked the question why this area has not progressed. Part of the answer of the policy makers and statisticians was the lack of resources and insufficiency of existing data for initiating NRA programs. However, these are not totally convincing because there already exists a substantial body of statistics in the resource ministries (i.e., agriculture, land, forestry, water, fishing and mining), which can be augmented by information housed in natural resource ministries, and in mapping, and national planning agencies, as discussed in chapter 4(4.7). In terms of funding, aid agencies do recognize the need for developing countries to establish reliable data collection systems. There are many examples in Bangladesh where funds have been allocated for feasibility studies (e.g., cost benefit analysis of different projects), environmental statistics (e.g., the compendium of environmental statistics), and resource inventories (e.g., The National Forest and Tree Resources Assessment 2005-2007). There has also been a long history of international aid in support of population censuses, agricultural statistics, geological and hydrological surveys, and general data bases for resource management (CIDA, 1993).

One may well ask why the Forest Department or BBS have produced the same forest land statistics from 1999-2004 despite knowing about forest encroachment. One high official said if they produce real data, the government will question them. The statement clearly indicates the lack of government commitment. So funding and insufficiency of existing data are not the key problems. Almost all policy makers said lack of demand and lack of political commitment are the main constraints to implement NRA.

Realistically, limitations of available staff and money may preclude development of a system for NRA. One high official of BBS said that discontinuation of the Environmental Statistics project [component 1.3 of the Sustainable Environment Management Programme (SEMP)] and lack of expertise were the main reasons to step forward in this area.

Sustainable development is highly dependent upon accurate, credible, and timely statistics. But the quality of data is itself contingent upon the quality of governance in national statistical agencies. The success of modern national statistical systems is intrinsically linked to how well its managers ensure the integrity and credibility of data; build up the relevant knowledge base;

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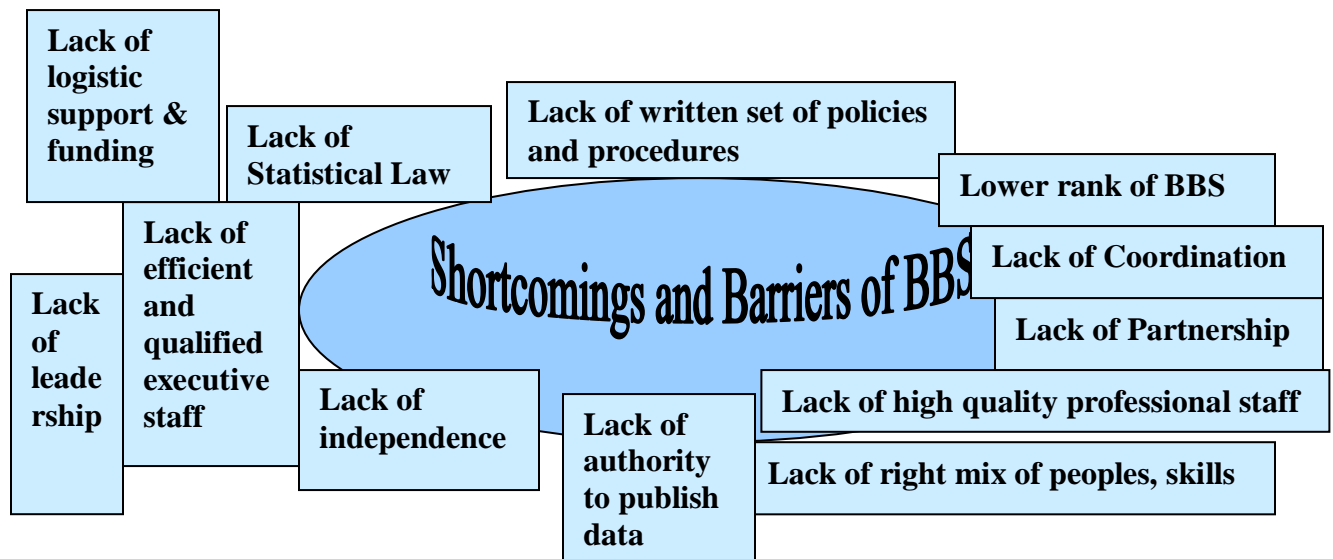
<sup>36</sup> This study based on CIDA, 1993, BBS, 1996, Theys, 1989

organize the use of Information Technology; promote effectiveness; and carry out strategic planning. More efficient processes and more effective technologies for natural resource accounting are not enough, but a positive change in the BBS's culture and behavior is also important. Only good governance can promote improved collection, analysis, use and dissemination of statistical information in Bangladesh. A policy is only as good as the data on which it is based. And statistics are the eyes of the policy makers. So, accurate, timely, relevant and useful statistics are very important to improve natural resource management by promoting an environment for evidence-based policy making. But right now the BBS faces a number of challenges in their governance work (See Fig. 3). The significant challenges are the following:

- There is a lack of legal framework. BBS doesn't have a general statistical law which governs the activities of the BBS. Currently there are only two out-dated pieces of legislations: 1) the Census Order, 1972; and 2) the industrial Statistics Act, 1942. So it would be desirable to enact a general Statistical Act to empower the BBS. Besides, BBS does not have a written set of policies and procedures to guide the organization. Currently BBS is drafting guidelines for sources, concepts and methods for BSNA. This draft also lacks sufficient guidelines to comply with the SNA-93 in terms of natural resource stock and balance sheet accounts.
- BBS is headed by a Director General who is responsible for technical work. Seven functional wings of BBS are headed by Directors. The DG, Deputy Director General and some times wing heads are appointed by the Prime Minister. Education levels, skills, and competencies and professional expertise as statisticians for executive staff are not considered during these appointments. So leadership and direction for NRA or any innovation in accounting systems cannot be expected from such executives. Besides, its staff does not keep up on the latest techniques.
- As a legacy of the planning system, a large numbers of government departments other than BBS are collecting vast amount of data. The choice, quality and coverage of specific statistics are dictated by the relevant government department. BBS does not have authority to impose a unified framework within which data are to be collected across all governments. In many instances, BBS is likely to know little about exactly how the data were collected. The low rank of BBS may also prevent it from launching innovations in data collection and from cooperating with other government bodies on an equal footing.
- BBS does not have the right mix of people, skills and abilities to support and develop plans and policies. It lacks scientific employees and valuation staff. The knowledge and expertise of BBS's workforce are vital to the effectiveness of its programming.
- There is no mechanism of coordinating with stakeholders to influence the development of statistical standards and indicators. This involvement is very important for effective interchange on statistical standards, frameworks and methodologies. The need for NRA is totally unrealizable without a cooperative effort among ministries of environment, natural resources, planning commission and BBS.

- There is a huge limitation of statistical reporting and accountability. Data on government revenues are collected by the fiscal departments (Finance Department). BBS does not have authority to collect these data, or to explain them. Even when it comes to sensitive data, such as the inflation rate or GDP data, BBS is constrained by institutional imperatives. An economically meaningful measure of the inflation rate and GDP are not provided to the public. BBS needs approval from the authorities to report these data to the public. If BBS attempts to implement NRA, BBS needs to be more independent.
- Local statistical offices are deficient in adequate trained manpower, computing equipment, computer-aided data collection system, storage, and retrieval and dissemination system. Strengthening of local statistical offices is very urgent.
- There is a lack of timely reliable data in some sectors for monitoring economic, financial and environmental development. For example although there is a substantial changes on forest land, BBS has been publishing the same statistics on forest land for last five years. Such practices fail to capture the impact of structural changes in the economy and, thereby, distort the measurement of real economic outputs.
- Demand for these data has not been forthcoming from the powerful planning agencies. Increased demand will lead to plans for “new organizational structure” with the status of funding, staffing, and technology to support this extended mandate.

**Figure 3 Shortcomings and Barriers of the Bangladesh Bureau of Statistics (BBS) to the launch of NRA**



Source: Author

## 5.4 Recommendations on Institutional Arrangement for NRA<sup>37</sup>

There was no disagreement on the institutionalization of NRA within BBS's mandate. If an NRA effort is to go beyond the level of a one-time academic study, an initial focus on institutionalization is essential. But it is quite difficult at this time to be too precise about the appropriate staffing of such a NRA effort in Bangladesh. All policy makers, and statisticians stressed institutional capacity building in terms of funding, policy development and, professional development. They said BBS should have a data processing cell, monitoring cell, improved computer equipment etc. BBS should be modernized by extensive reform and a training program for BBS staff should be ensured.

Another important consideration has to do with the “home” of a NRA effort. This is basic to the institution-building dimension. Because the subject matter is natural resource and environmental accounting, there is a natural tendency to place a project of this type within environmental and resource administrations. The risk in proceeding in this direction is that usually these administrations focus on sectoral interests that are not always consistent with the comprehensive view provided by the augmented accounts. Additionally, any official government agency may be reluctant to publish accounts derived from crude data, or any data that might suggest problems with past policies. Therefore, it would be best, at least in the initial stages; to place a NRA project in some non-governmental research institution with close ties to the BBS. Or BBS should be independent before placing any NRA project within BBS mandate. In this context, recommendations have been made regarding institutional arrangements for a NRA effort within Bangladesh.

### Recommendations:

- Statistical acts to empower BBS and its independence should be ensured and the mandate of BBS should clearly mention NRA. The draft handbook on the sources, concepts and methods for BSNA should include concepts and methods for NRA.
- It should be strongly recommended that the post of DG be filled by the chief statisticians of the country.
- Restructuring of BBS institutional structure by adding a new division for NRA with adequate scientific, technical staffs and specialists under the National Accounting Wing should be ensured. The division of NRA can have four to five subject matter sections namely land and associated surface water sections, natural resource section, ecosystem section and valuation sections. Each section's main responsibility is for the natural resource stock components of the NRA, including valuation. Considerable subject-matter knowledge related to natural capital is required in the section, in addition to GIS Specialist, expertise on remote sensing for the modelling, analysis and mapping work required for the resource accounts. Specialized knowledge related to terrestrial, aquatic ecosystems, physiographic, soils science and the human and natural processes that change the characteristics of land and soils is also required in this work. The valuation section requires specialized knowledge for the valuation of

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<sup>37</sup> This study based on BBS, 1996, Organizational Structure of Statistics Canada ([www.statcan.ca](http://www.statcan.ca))



existing natural resource stock accounts and for research into the valuation of more complex environmental assets such as ecosystem services. Adequate funding should be ensured for such reform.

- In addition to degree in statistics, mathematics and economics, other subjects including environmental science/studies, biological science, social science, geography, environmental economics, and ecological economics should be included in the qualification requirements for BCS<sup>38</sup> (Statistics) cadre entry post of Statistical Officer. Because high quality scientific staff is necessary for NRA. BBS statistical officers should be offered opportunities to upgrade their professional competence through pursuing post-graduate academic programmes on environmental economics, ecological economics. Government officers outside BBS should be encouraged for doing post-graduate specialized research on different valuation methods for non marketed goods and services provided by nature when they go abroad on study leave or deputation. Researchers from outside may be attached with BBS for doing their post-graduate research. Adequate provision for funds, especially foreign assistance, should be made. The purpose of all initiatives should be to develop in country high quality professional staff and experts.
- There should be a Natural Resource Accounting Advisory Committee which will give advice on the concepts, methods, plans, standards as well as results associated with BBS System of National Accounts. The Advisory Committee provides subject matter advice on environmental statistics and natural resource accounts (including natural resource valuation). The members of this committee should be selected based on professional qualifications.
- BBS should able to create a coordinated and demand-driven national statistical system and demonstrable government commitment to statistical system. In addition BBS should develop more partnerships with qualified civil society and private sector groups to increase local capacity for natural resource accounting. Mechanisms for partnerships should be defined and funding ensured to sustain such partnerships.
- Relevant statistical training programs on the operation of SEEA 2003 are to be conducted for enhancing the capabilities of BBS personnel. It should be ensured that BBS has the capability and capacity (adequate number of people, skills, tools, and financial resources), which is very important, and should not be sacrificed in the name of streamlining.
- To enhance transparency, information on sources, methods of statistical system and data collection itself should become more assessable to a broad rang of users. For example, information through user friendly websites with readily available, up-to-date statistics.

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<sup>38</sup> BCS stands for Bangladesh Civil Service

## 6

### Experiences in Countries Using NRA with Particular Emphasis on Developing Countries<sup>39</sup>

Juan Sève reports that since the early seventies, a considerable amount of work has been conducted in the field of environmental and natural resource accounting (ENRA). According to Seve (2000), at least fifty countries have participated or have shown a definite interest in such efforts.<sup>40</sup> He provides an overview of the accounting structures used by a number of developed and developing countries and notes that:

The evidence reviewed suggests that a large number of NRA studies can be found in developed and developing countries. A few are of a comprehensive nature, while most focus on a small number of specific sectors, no major official attempts are being made to develop comprehensive environmentally augmented national income accounts in monetary terms leading to adjusted overall national income indicators (e.g., green GDP or NDP). Much of this work is currently contributing to the preparation of improved policy decisions regarding trade-offs between economic expansion and environmental protection. However, a universally accepted comprehensive NRA approach (i.e., an environmentally adjusted equivalent of the SNA) has not yet materialized. The Costa-Rican, Indonesian, and Malaysian experiences are not quite as complete but they contain the interesting discussions on methodology and policy implications. The experiences of China, Mexico and the Philippines are thoroughness, their depth and their long-term vision leading to institutionalization of the NRA processes. (Juan Sève, 2002)

This study presents seven developed and seven developing countries' efforts to highlight the accounting structure of natural resources and approaches, emphases, amounts of funding, and levels of official commitment to NRA. Natural resources accounting projects have ranged from comprehensive efforts benefiting from official endorsement (e.g., ENRAP in the Philippines) to detailed physical or valuation work focusing on a limited number of specific sectors (e.g., Indonesia), to pilot studies, and even very preliminary attempts to consider the possibility of undertaking an NRA effort.

In the context of developed countries, Canada, Norway, Finland, Germany, Australia, Sweden and France have been reviewed.

Canada is one of a number of countries leading the development of NRA. The Canadian accounting program is run out of Statistics Canada and integrated into a single effort referred-to as "Econnections." This program includes a significant emphasis on resource accounting, plus work on environmental protection expenditures, the environmental protection industry, material flow accounts, and so on. Statistics Canada seems more concerned than many countries about organizing their accounting work within a single conceptual framework. The natural resource-stock accounts, the natural resource-use accounts have a meaningful link with the SNA. Overall, the project focuses on including marketable natural resources in the stock accounts of the conventional SNA, and on environmental expenditures.

Norway has the longest experience with natural resource accounting. During the period 1978 to 1986, accounts for energy, fish, land use, forest and minerals were developed. For each of the

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<sup>39</sup> This study based on Juan Sève, 2002; IUCN, 1994; Statistics Canada, 2006; OECD, 1995

<sup>40</sup> A set of summaries of national level experiences has been found in Juan Sève, IRG, 2002.

accounts, resources are recorded in physical units but where possible these data are complemented with market price information. Priority sectors have changed over time. The objective of the Norwegian system is not to adjust GDP and measure true income, although the system is linked to economic activity. Today the resource accounting work is part of an ongoing effort to integrate resource and environmental issues into existing economic planning procedures.

Statistics Finland has compiled pilot physical accounts for forests, with limited work devoted to the elaboration of monetary values for the forests. The Finnish approach to resource accounting has focused on specific aspects. Nevertheless, the approach has lent itself readily to linkage with components of the SNA, resulting in experimental macro-indicators for the environment.

The German Federal Statistical Office (FSO) appears to support a satellite approach, but it has not been specific about what it would include. The German initiative introduces natural asset accounts to the conventional German SNA. Some accounts of resources are elaborated in physical terms (e.g. land accounts), while other accounts employ a combination of physical and monetary measures. Physical input-output tables were constructed to allow natural resources to be traced through the economy as inputs, outputs and residuals.

A pilot project conducted by the Australian Bureau of Statistics (ABS) in 1995 and 1996, to investigate the implementation of SNA93 recommendations focused on timber (in native forests and plantations), subsoil assets, land, and livestock. It provides probably the most sound estimates of asset values of timber stocks. Australia is developing resource accounts in support of its *National Strategy for Ecologically Sustainable Development*. Australia follows the direction for satellite account development set out in the SEEA. Market values for stocks of natural assets are being developed for forests, inland water, fisheries, and subsoil assets. These estimates relate only to economically exploitable assets and exclude non-market services such as biodiversity or clean air. The standard Australian SNA is also disaggregated to reveal links to natural resource use. The other affected area is the expenditure estimates of the input-output accounts.

A Commission for Environmental Accounting was set up in Sweden in 1990 in response to a government directive. The call was for physical and monetary environmental accounts. The accounting frameworks used in Sweden is to a very large extent. The standard economic accounts are supplemented with physical data within the framework of the input-output accounts. Complete balance sheet estimates in monetary and physical terms for land, forest and sub-soil assets are under development.

In 1978 the French government established the Interministerial Committee on Natural Resource Accounts and decided to design a Natural Patrimony Account (NPA) within its overall environmental information framework “to assess both quantitatively and qualitatively the state and the development of the natural patrimony, as well as the causes and effects of its evolution”. The government wanted the accounts to be compiled in both physical and monetary terms, independent of the SNA, although links could be made between the NPA and the SNA. The main objective is to demonstrate trade-offs between the economic, ecological and social functions of natural resources. Although the French national balance sheet assesses in monetary terms all fixed and financial assets held by economic agents, the system focuses on physical units.

Although it is a comprehensive and visionary system, the NPA's complexity and limited budgetary resources have prevented the system from being fully implemented and having much policy impact (Juan Sève, 2002).

Among developing countries, Indonesia, Costa Rica, Philippines, India, China, Malaysia and Mexico have been selected based on the level of effort for NRA.

In 1989, a study by WRI was conducted independently of the Indonesian government, focusing on physical accounts for petroleum, timber, and soils. The value of their depreciation was deducted from GDP. The costs of erosion in terms of productivity losses were also estimated and deducted from GDP. Regarding asset accounts, it calculated the asset value of forests for timber production, but did not link it to asset accounts. This is the most widely cited study on natural resource depletion and national income accounts.

In Costa Rica, a study conducted by WRI and the Tropical Science Center in 1991 focused on Physical accounts for timber (natural forests), agricultural soils and fisheries for the period 1970-1989. The study used geographic information systems (GIS) to construct estimates of forest areas over time, and ecological relationships to construct estimates of growing stocks in those areas. Depreciations for these resources were calculated. A new project was started in 1995 focuses on information leading to economic policy decisions with environmental impact. The project has attained interesting partial results, but its scope has been reduced due to lack of funding.

The Philippines offers rich experience for other countries considering environmental accounting, because two separate, parallel projects were underway there for much of the 1990s. In 1991, the Department of Environmental and Natural Resources (DENR) set up the Environmental and Natural Resources Accounting Project (ENRAP). The first phase (known as "NRAP") focused on the forest sector and adjusted the GNP for the depreciation of forests. The second phase developed a more general accounting framework with the aim of supporting integrated environmental and economic policy formulation. The third phase started the institutionalization of the accounting process within government structures. Accounts were refined and updated to meet specific policy and management needs. In the mid-1990s, the National Statistical Coordination Board began implementing SEEA which has been referred-to as PSEEA.

They built resource accounts for forests, minerals, fish, and soil, and estimated the costs of preventing air and water pollution.

The existence of two separate projects using different methods, estimating different resource depletion figures, and calculating different values for green GDP has confused Philippine officials. An important aspect of the Philippine experience is that ENRAP was run by analysts (mainly economists), while statisticians ran PSEEA. Other countries may learn from this experience about the importance of involving both official statisticians and analysts in a collaborative effort from the start, instead of allowing an uncomfortable competition to develop.

In 1992 the Indira Gandhi Institute presented a report "Natural Resource Accounting: A Framework for India." Priorities are given to the assessment of physical environmental impacts of selected economic sectors, including the informal sector, and the compilation of physical accounts for soil, air, water, forests, biodiversity and a number of nonrenewable resources.

Monetary accounts are seen as a logical step after physical accounts are compiled so as to achieve an integrated system similar to the SEEA

In 1988, the Development Research Center of the State Council coordinated a project, “Chinese Resource Accounting and its Integration into National Accounts.” It focused initially on physical accounts, then monetary valuation, individual resource accounting, and then a comprehensive system. The integration of resource accounting into the national accounting system through legislation is explicitly stated as an ultimate objective. Monetary accounting has always been a major focus. A study sponsored by the World Resources Institute (WRI) and the Ford Foundation (1993) focused on forest resources. The study added value of timber growth to GDP and added net accumulation of timber to NDP. It also calculated the asset value of forests for timber production, but did not link it to accounts. Eight working groups have been focusing on: land, minerals, water, forestry, grassland, ocean, biological resources and recycled resources. Physical and monetary accounts for the eight resources have already been compiled on a preliminary basis.

In 1993, Malaysia published a short manual providing a procedure for compiling physical accounts and for calculating a resource-consumption allowance (depletion of natural resources) to be subtracted from NDP to yield an adjusted NDP (ANDP). 1993 study was sponsored by the Economic Planning Unit in the Prime Minister’s Department. The study focused on timber, carbon sequestration, biodiversity, game in natural forests, subsoil assets and agricultural soils. The concentration was on current accounts, but asset value of forests was not calculated. This was one of the first studies to include a range of nontimber benefits as well as timber

In Mexico, a case pilot study was conducted in 1990 and 1991. The study started with the existing SNA. It identified information related to three environmental aspects to be accounted for: oil depletion; deforestation and land use; and environmental degradation. The study concentrated on current accounts and did not calculate asset values. This is one of the few studies to treat deforestation as a process that not only reduced the stock of forestland but increased the stock of developed land Mexico is implementing a System of Economic and Ecological Accounts (SCEEM). The main innovation is the enlargement of the asset boundary. This has been a priority of the National Statistics, Geography and Informatics Institute (INEGI), which is responsible for the Mexican National Accounts. The project has been well received by Congress, which gives it a chance as a public policy formulation tool.

Lessons of the preparation and institutionalization of NRA from developed and developing countries would be of benefit to Bangladesh interested in pursuing NRA efforts.

## 7

### **Action Plan for NRA in Bangladesh<sup>41</sup>**

Some considerations (discussed in chapter 3 and 4) should be likely made before making proposals for action plans of NRA for Bangladesh. From the evidence reviewed (See chapter 5) it can be seen that a comprehensive NRA framework is totally absent. Juan Sève pointed out that

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<sup>41</sup> This study based on IUCN, 1994; Theys, 1989; Juan Sève, IRG, 2002

much of the NRA work in most of the developing countries has subsequently stopped or has received low priority due to insufficient funding. He suggests perhaps the governments of most developing nations do not see as a short-term priority examination of the trade-offs between economic growth and environmental conservation in the design of their development policies (Juan Sève, 2002). In addition he notes that advanced countries have normally established and funded their own institutional programs for NRA effort. In contrast, developing countries have invariably been supported by foreign funding agencies, both bilateral and multilateral. Dependence upon foreign support constrains NRA efforts in less developed nations (Juan Sève, 2002).

While environmental and natural resource accounting efforts, in one way or another, have been conducted in at least fifty countries, most of the activities in developing nations have been either research or “pilot” projects, without an institutional follow-on, and therefore have had very minor policy impact, if any. (Juan Sève, 2002)

Jacques Theys states that no natural resource accounting framework so far has made it possible to attain all of the NRA goals simultaneously or to cover the entire range of planning processes. He suggests that developing country may thus have to choose from the various possible approaches by referring to their own needs, level of development and environmental management problems (Theys, 1989).

Many academic and experimental studies pointed out that a feasible first step would be to start with physical accounting that showed current resource use in nonmonetary units as it is done in France, Canada and Norway (Repetto, 1989, Peskin, 1989, Theys, 1989, IUCN, 1994)

The initial steps at implementation should be viewed as a pilot project. The pilot project is probably best done by a non-governmental agency, such as a university, in cooperation with various ministries that could provide some of the supporting data (Peskin, 1989). The objective of the pilot project should be to construct a resource accounting system and develop resource accounting skill.

Although the signs of breakdown or discontinuation of the environmental statistics program due to funding and technical expertise has been found in Bangladesh, it is recommended that if Bangladesh is attempt to NRA, the endorsement and support should come from the national government, and most of the work must be done by country nationals not by foreign consultants in order to develop a core of capable in-country resource accounting skills and national professionals for long term, multiyear program. And more importantly, the substantial commitment of human and financial resources required for the NRA effort must be made clear, the feasibility of constructing an NRA system must be assessed, and the policy making users must be identified before proceeding with NRA data collection.

### **Action Plan:**

To launch a process of implementation it is necessary to go beyond a list of desirable activities and to propose a program with very specific stages and time scales. The following would be a series of steps for short and long term program of NRA in Bangladesh:

i) First, it is very necessary to raise awareness among political leaders, policy makers and data producers and to grow interest in creating NRA by offering seminars, and symposia. Non-governmental organizations like IUCN can take the opportunity to do so in cooperation with the Ministry of Environment and Forest (MOEF). Necessary warning should be given to policymakers and other users about the shortcomings of GDP and its indiscriminate use.

ii) For setting up a framework for NRA in Bangladesh, GoB should first consider the policy issues of immediate relevance. For example due to current status of natural resources, the effort should reflect several planning concerns and objectives:

- to diagnose the current state of the natural resources
- to analyze the effect of environmental policies on economic performance
- to assess the value of resources that can be exploited for development as well as the condition of their regeneration
- to identify the possible options among the social, economic and ecological objectives of development

iii) Four to five pilot studies should be launched on the basis of area of interest (land, water, forestry, fisheries, wetland, important water bodies etc.). It is recommended that at first, a pilot project on forest account can be started given that reliable data is retrievable from the forest department because recently they made an inventory of forest resources with the FAO technical assistance. The pilot project would be best done by a nongovernmental agency, such as a university (teachers and students could be valuable resources) in cooperation with BBS and various resource ministries that could provide some of the supporting data. In this project, faculties of economics and forestry of any national university could be involved. A faculty of forestry could be involved for physical accounting and a faculty of economics could be charged with valuation of forest resources. After completion of projects, experts can be adapted by national body or BBS. Simultaneously, other projects could be undertaken in the same manner. The project should seek the involvement of policy makers for continuously demonstrating policy relevance through a steering committee composed of high-level officials from various government agencies, the NGO community and international organization.

iv) The starting point should be to assemble a complete body of physical data covering the stock of natural resources, the demands for the services of these assets (for example, the demands for the waste disposal services by industry, the demand for recreation services by households and tourists, and the demand for potable water), and the negative physical consequences on final and intermediate demand from consumption of these services (for example adverse health effects from water pollution, damage to crop production from soil loss, and damage to electricity production from sedimentation). After, or better yet, while the physical data are collected, efforts should be made at monetary valuation. When the first draft of the accounting is created, it will be possible to test several methods of monetary evaluation concurrently. A sector specific account needs to be established experimentally. Then the result should be disseminated. Sector specific GDP losses should be counted. Early, preliminary sets of accounts can serve to point the way to more accurate and refined accounts to be developed in subsequent phases.

In the short term NRA can be constructed based on existing data. Then it is important to establish a precise inventory of all currently available data (mapping, scientific, statistical, survey). GoB needs to identify institutions that produce environmental data and then should take a step to harmonization of the data collection system.

v) An active effort should be taken to keep policy makers and the general public informed through workshops, briefings, organization of conferences in country, attendance at overseas conferences, mailing lists, and periodic newsletters. Such outreach activities are crucial to the institutionalization of the process within the Bangladesh policy making system. The aim of those efforts is to examine the efficacy of the work for expanding national accounts; and analyze the usefulness for NRA accounts for different resource sectors. A leadership role for such activities should come from the powerful ministry of planning and finance.

vi) After a pilot study is done, the important stage should be to set up the essential institutional structures (as discussed in chapter 4) responsible for the accounts with the launching of international training and research activities.

vii) Political support for a coordinated approach needs to be demonstrated in order to obtain international financial backing for technical support and the establishment of training programmes in NRA for all concerned agencies and government departments. In this context, the government of Bangladesh should take a strong leadership role by creating a national task force to fund and coordinate the comprehensive resource information system and NRA and to ensure traditional economic analyses and forecasting approaches are revised to properly account for the services provided by natural capital and integrate the true cost of its degradation with economic decision making.

## 8

### Conclusion

Accurate information about ecological systems of natural resources and economic efficiency are the building blocks for developing effective policy for sustainable development. Destruction and degradation of natural capital occurs continually across Bangladesh. Yet, the GoB may not recognize the full value of these losses until it is too late. This paper illustrates that government may be making inefficient choices in allocating natural resources to uses that destroy and degrade natural capital. Ignoring the value of natural capital in decision-making will likely result in the degradation and destruction of natural capital and lead to outcomes that are very costly to society. Consequently, traditional economic analyses and forecasting approaches based on the national accounting system are misleading policy decisions. So there is a need to provide essential data on the physical quantities and attributes of natural capital and their changes over time, properly account the services provided by natural capital, and integrate the true cost of its degradation with economic decision making. This paper illustrates the need for NRA in the BSNA with the focus on policy decisions. This paper also shows a way to construct a framework for NRA with an institutional dimension, and concludes with a final course of action for NRA.

Economic development with less negative effects on the natural resource base is a formidable task for Bangladesh. Of course, changes are needed in policies, programs, projects, institutions,



the distribution of income, and human behavior. Improvements in any one area can make only a partial contribution to an approach where many parallel activities are needed to achieve development that is both equitable and environmentally sound. Natural resource accounting is only one of many environmental management tools that are needed, and given the lack of past effort (Serafy, 1989). NRA has a number of useful policy benefits including the provision of a framework for analyzing and presenting detailed and diverse data in a manner which supports economically informed policy choices. It will take time to develop NRA into an effective tool to improve policy making in Bangladesh. Nevertheless, serious work in this area should now be pursued actively and vigorously.

Although iterative development of NRA is also a basic consideration, the economies and environmental conditions of Bangladesh are sufficiently complex that it would be unrealistic to believe that a complete set of accurate resource accounts could be established in the near future. Currently, enormous gaps exist in data compilation, information is seldom cross-disciplinary, and data rarely reflect relationships between environmental and socioeconomic dimensions. Moreover, the tasks of collection and compilation have become onerous, with the increasing complexity of environmental issues caused by an intensification of economic activity and production processes. With this in mind, Bangladesh needs to set priorities for collecting relevant data that could eventually be fed into NRA. It should be noted that many of the actions needed to undertake NRA within such a framework can be initiated simultaneously. Also, it is not necessary to complete everything before some sense can be made of the accounts. These can be built in steps and parts. This entire process will be more effective if a single agency, BBS, acts as the coordinating point, so that information on natural resources is properly and efficiently collected, compiled, and disseminated.

To sum up, mainstreaming of NRA requires high level of political commitment and sensitization of bureaucratic decision-makers and policy planners. They should demand modification of Bangladesh's national accounts to include goods and services provided by natural resources. If GoB cannot value natural capital, this will mean that GoB assigns a value of zero or infinite, neither of which are helpful for policy making. It is important to point out that the accounting framework, even without complete or perfect monetary valuations, can provide a data system that can be of tremendous use to those responsible for making sustainable development policy.

**Appendix 1 List of the Participants of Different Organizations Participated in Interview Process**

1. Director General, Department of Agricultural Extension
2. Member (Agriculture, Water Resource & Rural institution Division), Planning Commission, Ministry of Planning
3. Chief Conservator of Forest, Department of Forest, Ministry of Forest & Environment
4. Chief Planning, Bangladesh Water Development Board
5. Joint Secretary, Ministry of Environment and Forest
6. Joint Secretary, Finance Division
7. Joint Secretary, Ministry of Land
8. Joint Secretary, Ministry of Fisheries and Livestock
9. Joint Secretary, Ministry of Agriculture
10. Joint Secretary, Economic Relations Divisions
11. Deputy Secretary, Finance Division
12. Deputy Secretary, Ministry of Water Resource
13. Project Director, Monitoring the Situation of Children & Women Project, BBS
14. Director, National Accounting Wing, BBS
15. Deputy Director, National Accounting Wing, BBS
16. General Statistician, National Accounting Wing, BBS
17. Senior Research Fellow, Bangladesh Institutes of Development Studies
18. Senior Scientific Officer, Soil Resource Development Institute
19. Country Representative, IUCN, Bangladesh
20. Resident Representative, Asian Division, an International Centre for Soil Fertility and Agricultural Development
21. Environment Specialist, the World Bank Office, Dhaka

## Appendix 2 Questionnaire for Policy Maker

- 1Q: Do you use National Income Accounts to economic /environmental policy making?  
Yes/ No (If no, tell me why)
- 2Q: If yes, what kinds of information you use from National Income Accounts?
- 3Q: What kind of information you need further for making decision on natural resource sector?
- 4Q: Do you know that summary indicator like GDP has been criticized for its failure to appropriately address the depletion of natural resources?  
Yes or No
- 5Q: In your opinion, why resource dependent countries like Bangladesh need to account natural resources stock and depletion.
- 6Q: Did you require the information on changes in natural resource stocks and depletion before? (If yes, what were the policy issues?)
- 7Q: Do you think that, physical or monetary or both accounts are fruitful for environmental and economic policy making? For example water accounts which combine information on water quantity and quality with information about expenditure on water pollution abatement and mobilization of resources.
- 8Q: Could you please determine the policy implications of natural resources stock and depletion accounts?
- 9Q: In your opinion which institution (BBS, Department of Environment or Government affiliated research group) can take charge of this activity?
- 10Q: What institutional reforms should be adopted to ensure such efforts?
- 11Q: What seems to be the major constraints in implementing natural resource stock and depletion accounts in Bangladesh?
- The absence of the standards for generating, gathering, classifying, compiling and synthesizing the basic natural resource stock and depletion information.
  - The limit of the involvement of experts in the topic.
  - Funding continues to be a limiting factor to open new accounts
  - Methodology for addressing such accounts
  - Absence of political commitments
  - Lack of demand
- 12Q: What are your suggestions for “Strengthening Statistical Capacity” to address natural resource stock and depletion accounts in the national accounting system?

Additional comments:

### Appendix 3 Questionnaire for Statisticians

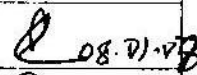
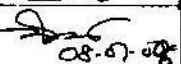
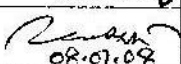
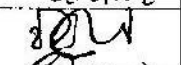
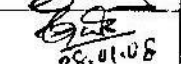
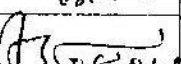
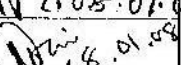
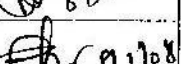
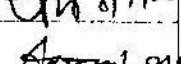
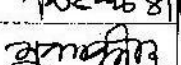

- 1Q. What types of national accounts have already been implemented in Bangladesh and for how long?
- 2Q. Are you aware of Accounting of Stocks of Natural Resources including Depletion of Natural Resources? (If yes, please describe why it is not implemented.)
- 3Q. Have you used or are you aware of any use made by others in your country of the handbook of National Accounting *Integrated Environmental and Economic Accounting 2003*, commonly referred to as SEEA-2003 and/or of the handbook of National Accounting *Integrated Environmental and Economic Accounting – An Operational Manual* (2000)?
- 4Q. Was the implementation of the environmental statistics driven from a policy demand or was it supply driven?
- 5Q. Please, describe the major difficulties/constraints that would be encountered during the compilation of such accounts (e.g., financial support, lack of human resources, training, etc.).
- Deficiency in data gathering
  - Restrictions in the environmental information
  - Statistical accuracy
  - Lack of financial resources
  - Lack of human resources & training,
- 6Q. Is there any demand for natural resource stock and depletion accounts for policy making? (If yes, what are the policy issues?)
- 7Q. Does BBS have future plans for starting/continuing and/or expanding the implementation of Accounting of Stocks of Natural Resources including Depletion of Natural Resources? Please describe.
- 8Q. What seems to be the major constraints in implementing natural resource stock and depletion accounts in Bangladesh?
- The absence of the standards for generating, gathering, classifying, compiling and synthesizing the basic natural resource stock and depletion information.
  - The limit of the involvement of experts in the topic.
  - Funding continues to be a limiting factor to open new accounts
  - Methodology for addressing such accounts
  - Absence of political commitments
  - Lack of demand
- 9Q: What institutional reforms should be adopted to ensure such efforts?
- 10Q: What are your suggestions for “Strengthening Statistical Capacity” to address natural resource stock and depletion accounts in the national accounting system?

Additional comments:

**Appendix 4 List of Participants Attended in Informal Briefing at Finance Division (FD)**

Date: 08 January 2008, Time: 10.00 a.m.

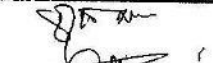

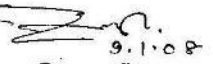
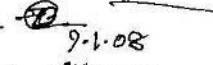
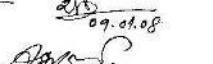
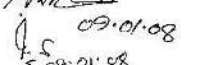
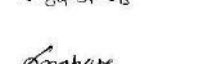
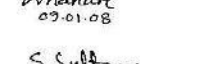
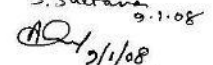
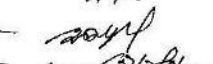
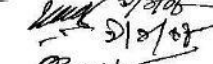
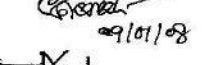
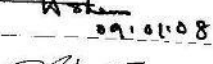

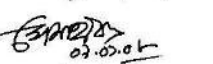
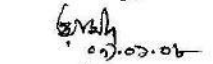
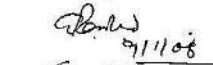
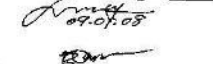

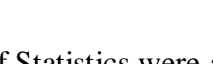
Attendance Sheet

Sl. No.	Name & Designation	Phone No.	Signature
1	Md. Atahs Rahim Khan, S.A.S. (B-1)	7160669	 08.01.08
2	Dipak Kumar Sarkar S.A.C	7166976	 08.01.08
3	Fatmaque Ahmed, Ac	7168726	 08.01.08
4	Md. Habibur Rahman	9558588	
5	Sheikh Mohammad Jalim Ullah SAS	9570642	 08.01.08
6	Mohammad Altaf- Ul Alam	7167314	 08.01.08
7	Nawaz Sultana.	7166585	 08.01.08
8	SHIRAZUJ LOK RAHMAN, SAS (B-2)	7162803	 8/1/08
9	S M Moir Uddin Ahmed SAS (B-10)	9557586	 8/1/08
10	Md. Saiehuddin S.A.S. (Law)	7160076	 8/1/08
	Mohammad Shabidat Hussain SAS	9563186	 8/1/08

Note: High level policy makers of Finance Division were also present but they didn't sign this sheet.

**Appendix 5 List of Participants Attended in Informal Briefing at Bangladesh Bureau Statistics**

Date: 09 January, 2008, Time: 11.00 a.m.  
Attendance

1. Abul Kalam Azad	SO	
2. Md. Dildar Hossain	SO	 09.01.08
3. Ekhtear Uddin	SO	 09.01.08
4. Mohammad Zulfikar Ali Khan	SO	 09.01.08
5. Md. Habibur Rahman	Programmer	 09.01.08
6. Abdul Khaleque	SO	 09.01.08
7. Md. Shahabuddin Sarker	SO	 09.01.08
8. Lutfon Nahar	DD	 09.01.08
9. Salima Sultana	DD	 09.01.08
10. Ashim Kumar Das	DD	 09.01.08
11. Atindra Kumar Ghosh	DD	 09.01.08
12. Sardar Sahabuddin (S.O)		 09.01.08
13. Tufail Ahmed (S.O)		 09.01.08
14. A.K.M. Fazlul Haque (S.O)		 09.01.08
15. Mohammad Hossain	S.O	 09.01.08
16. Md. Akhter Hossen Khan	SO	 09.01.08
17. Md. Abdul Wadud	S.O	 09.01.08
18. Abdur Rashid Hossain	Programmer	 09.01.08
19. Md. Mahbubur Rahman	Statistical Officer	 09.01.08
20. Ziauddin Ahmad	Deputy Director	 09.01.08

Note: High level policy makers of Bangladesh Bureau of Statistics were also present but they didn't sign this sheet.

**Appendix 6 Presentation Pictures of Informal Briefing at Finance Division(FD)**



**Photographer: FD Staff  
Date: January 08, 2008**

**Appendix 7 Presentation Pictures of Informal Briefing at Bangladesh Bureau of Statistics (BBS)**



**Photographer: BBS staff  
Date: January 09, 2008**



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