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Environmental Issues in Bangladesh: An Overview

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Introduction

Over the years, the country has undergone a process of environmental degradation, which is cause for great concern. These are illustrated by deforestation, destruction of wetlands and inland fisheries, soil nutrient depletion and inland salinity intrusion. Furthermore, natural calamities like floods, cyclones, tidal surges and tornadoes have resulted in severe socio -economic and environmental damage (MoEF, 1992: 5) by a combination of factors. These factors include: a large and rapidly growing population; industrial development without sufficient controls on industrial pollution; improper use of agricultural chemicals and pesticides; poorly designed flood control, drainage and irrigation works; over cutting and indiscriminate felling of forests and artificially lowered stumpage prices and royalties for forest products; lack of community control over open-access resources; inadequate land use planning; and institutional weakness among the public agencies in charge of environmental protection and natural resource management (WRI report, 1990:2). The major root of man-made problems is lack of understanding of ecological principles, poverty and lack of adequate alternate resources (MoEF, 1992). The single most critical factor that will increasingly hamper development in Bangladesh, if not addressed properly, is the size and rate of growth of an already overwhelmingly large population. High growth rate with an existing large population will tremendously strain the country's limited land resource for development in the years ahead. The predominance of children and adolescents in the present age structure of the population is also likely to have substantive bearing on the environment and sustainable development of the country. As women constitute about half of the population, they are also a potentially important agent of socio-economic dynamics and sustainable development (MoEF, 1992:5). Furthermore, poorly designed development activities, misguided policies, flawed development models, global changes and inequitable access to these resources can also contribute to the degradation of natural resources, as much or more than population pressure. Bangladesh is facing a number of serious environmental issues. These ranges from global warming that can have potential devastating effects on the country's people and its resources, to a variety of regional and national issues. This article is an overview of different national environmental issues facing Bangladesh.
The following discussion concentrates on the environmental issues sector-wise.

Land Resources: Land resources have been defined as all soil resources other than minerals. In Bangladesh, soil resources mainly include yield crops, forest and pastures (Siddiqi, 1994: 10). The total area of Bangladesh is approximately14.40 million hectares of which 13.46 million hectares are land surface and 0.94 million hectares are rivers and other inland water bodies (MoEF, 1991: 8). The total land area of 14.40 million hectares is distributed according to different form of land use. The agricultural land is classified into following categories: Very good agricultural land (1.5%), good agricultural land (34.2%), moderate agricultural land (39.3%), poor agricultural land (16.0%), very poor agricultural land (9.0%). There are four classes of agricultural land owners as follows: people who own homestead land only; people who have some agricultural land and take additional land on lease from others for cultivation; people who lease out part of their agricultural land because they cannot cultivate the whole; people who have their own land but lease out whole of it to others on consideration of cash or share of the product (MoEF, 1991:69-70).

Key environmental issues of land resources can be listed in the following way:
Despite general land shortage much derelict and unused land exists in urban areas.
In several coastal polders land is being converted to shrimp farming and this has adversely affected agricultural production, caused loss of productive trees and has led to substantial shrinking of mangrove forests.
Agricultural land is being lost to the expansion of urban settlements, for sand and gravel mining, transport, brickfields and industrial development.
Land fragmentation continues to render many families functionally landless.
Short term leasing and share cropping precludes the right to land purchase over the long term.
Land tenure and ownership patterns are unclear in many areas preventing long-term investment in land productivity.
Unregulated encroachment into forestlands leads to unsustainable agricultural exploitation of the land (short-terms) due to uncertainty.
Use of pesticides for crop protection causes toxicity in soil and affects adversely the aquatic fauna particularly fish production (MoEF, 1994:83-84; MoEF, 1991:76).

Forest Resources: Forest resources have a great contribution to the economic and ecological stability. The Chittagong Hill Tracts, greater Khulna district, greater Sylhet district, Dhaka, Mymensingh and Tangail districts are the main districts where most of Bangladesh's forests are located. In fact, half of Bangladesh does not have public forest at all. In rural areas, homestead forests are seen around almost all households on which the rural communities depend quite heavily. The moist or dry deciduous type is found in Dhaka, Mymensingh and Rajshahi districts. In the coastal areas, plantations have been established on the newly accreted *char land*. According to a recent estimate, total forestland in Bangladesh is about 2.6 million hectares, or 18 percent of the land surface of the country. In Bangladesh both public and private sectors are controlling forestland, of which 2.2 million hectares are estimated as state forestland where as 0.4 million hectares are categorized as private forestland. Of the state forestland, 1.3 million hectares of natural forests and plantations are under the jurisdiction of the forest department and 0.9 million hectares are administered by the ministry of land through local authorities, termed as unclassified state forest. Included in the forestland are also village forests and homesteads throughout the country; and tea estates and rubber plantations (Gain, 1998:69).

There are officially three forested areas in Bangladesh under the jurisdiction of the forest department.
a) The hill forests -eastern districts of Sylhet, Chittagong, Chittagong Hill Tracts and Cox's Bazaar- are classified as tropical evergreen/ semi evergreen (640,000 hectares).
b) Tidal mangrove forests along the coasts- the Sundarbans in the southwest of the Khulna and the Chakaria mangrove forest near Cox's Bazaar (520,000 hectares).
c) The *Sal* forests- in the central plain north of Dhaka and between the present and the old main channels of the Brahmaputra- are classified as moist/dry deciduous (122,000 hectares) (Treygo and Dean, 1989: 15).

Hill forests account for 40% of the commercial timber production. In these forests bamboo covers approximately 0.13% hectares. Besides providing raw materials for pulp and paper, timber for construction, firewood and other materials, the hill forests provide protection for the Karnaphuli River Watershed and for the remaining elephant population (about 400) in Bangladesh (MoEF, 1992:14). Bangladesh has one of the largest mangrove ecosystems in the world and this ecosystem provides the country with a number of services: food source and nursery for the offshore fishery; coastal protection from storm surges and cyclones; domestic and commercial forest products; recreation and tourist spots; essential element for onshore shrimp cultivation; habitat for the Royal Bengal Tiger and other national heritage (Treygo and Dean, 1989: 17). The plains forests are largely composed of two remnant tracts of "*Sal*" woodlands; the Madhupur tract which extends over one 114,000 hectares. In the districts of Tangail and Mymensingh and the Barind Tract and in the northwestern districts, there are scattered patches of some 14,000 hectares (MoEF, 1992:14). The village forests provide most of the timber and fuel wood requirements of the country (70% and 90% respectively). Species contained in these forests include mixed fruit trees, shrubs, timber trees, bamboo and palms. They contribute to farming systems and increase their income generating capability (MoEF, 1992:14).

Key environmental issues in Bangladesh associated with forests include the following:
Top dying of *sundri* in the Sundarbans.
Encroachment of forestland for agriculture and human settlement.
Uncontrolled depletion of forest resources and replacement by commercial forest stands cause not only the loss of forests, but lead to increased soil erosion, increased possibility of flash-flooding and diminishing bio-diversity.
Salinity intrusion due to reduced fresh water flow in the Ganges system, owing mainly to withdrawal of a large quantity of water in the upper riparian reaches, is affecting the vegetation of the Sunderban mangrove forest.
Inadequate resources and enforcement mechanisms for the protection of designated areas is leading to their inexorable degradation.
Inadequate protective mechanisms to maintain unclassed state forests is leading to their decline in area and bio-diversity due to exploitation and encroachment (MoEF, 1994: 73).

Agriculture: In general, we can say that in Bangladesh one third of the gross domestic product is being produced in the agriculture sector, two thirds of which are crop output and the remaining one third is equally shared by fisheries, forestry and livestock output. Agricultural is central to the economy and the society of Bangladesh, but, perhaps more importantly, it represents the basic sectors from which overall future economic growth must emanate. In terms of recent growth trends, the performance of agriculture seems to be disappointing with progressive decline in the growth rate over the years. Given the importance of agriculture to the national economy, it is clear that a slow growth in agriculture will impose effective constraints on achievement of major macro-economic objectives like generation of

income and employment, poverty alleviation and human resource development. Moreover, due to the existence of important linkage effect of agricultural growth, a satisfactory growth in agriculture is a necessary precondition for accelerating overall economic growth (Government of Bangladesh, 1990:73). Agriculture is the most important component in the use of land and economy. The agro-ecological environment of Bangladesh has been classified into 30 major regions and 88 sub-regions. This regional diversity of topography, parent materials, soil conditions, flooding and moisture regimes coupled with local variations enable a broad range of cropping practices. While economic need is the optimum use of the potential land resource to produce economic crops, the political slogan is food autarky. Traditionally, rice is the staple food of the population and more than 80% of the cultivable land is under paddy cultivation. In an attempt to grow more rice, all the infrastructure have been developed for increasing production of rice at the expense of other food items of more nutritional value like pulses, oilseeds, fruits and vegetables. The major cash crops are jute and sugarcane. It is to be accepted that growing all the agriculture-based food items from limited land resource for the growing population will be increasingly difficult and the attempt at intensive cultivation of rice by using improved technology and HYV seeds, flood control, drainage and irrigation development, increased use of fertilizers and pesticides will be associated with conservation and environmental hazards which are being felt at varying degrees at different localities at present. However, it is imperative to use advanced technology and other aids to agricultural production, including credits to farmers for using minimum land for maximum food production, thereby making more land available for cash crops, forest and other purposes.

Most pressing environmental issues:
Indications of decrease in soil fertility and organic matter.
Loss of bio-diversity through the conversion of land to agriculture.
Depletion of soil resources due to intensive cropping, principally a reduction in soil nutrients and organic matter.
Desertification (in the Barind Tract for example) has resulted from deforestation for agricultural development.
Increased (and often inappropriate) use of agro-chemicals raises the possibility of pollution.

Fisheries Resources: 'Inland fisheries' and 'marine fisheries' are two main divisions of the Bangladesh fisheries sector. Of the total inland water of 4.3 million hectares, 65.3% are flood plain, 3.8% are ponds and 3.3% are coastal farms (Alam, 1996: 262-263). Bangladesh's rivers and other inland water bodies are the habitats of 260 indigenous fish species (belonging to 55 families) and 150 species of birds. The inland water bodies now are also the habitat of 12 exotic species and 24 shrimp species. Several species of snails and shells also grow in the inland waters. The inland fisheries are divided into two broad categories: open (or capture) and closed (culture). The open or capture fishery is "self sustaining and self-reproducing". On the other hand, closed or culture fishery is not "self-sustaining and self-reproducing" and needs direct inputs and human care for its sustenance (Sarker and Sarker, 1988). The marine water bodies covering an area of 166,000 sq. km is also remarkable for being habitat to 475 fish species. There are also at least 16 species of marine shrimps. In addition, several species of crabs and 31 species of turtles and tortoises of which 24 live in freshwater are found in Bangladesh (Sarker and Sarker, 1988). The marine fishery, a renewable resource, is totally open. Marine fisheries are of two categories: industrial (trawig) and artisanal. The contribution of the inland fisheries is 77 per cent to the total catch while the marine's contribution is 23 per cent (industrial 6% and artisanal 17%) (Gain, 1998:96). The fisheries sector is estimated to provide full-time employment to about two million people. This is equivalent to 7% of the total employment. About 1.2 million people are engaged in full-time commercial fishing (Karim *et al.*, 1989). The rest work in such areas as fish transportation, processing and marketing. The number of part-time fishermen and women are estimated to be around 10 million (World Bank, 1989).

Key issues related to fisheries resources are as follows:
Water abstraction from permanent water bodies, like *beels* and *haors,* during the dry season reduces the available habitat for fisheries.
Inadequate regulation of shrimp culture in the coastal belt has contributed to increased soil salinity and damage to sensitive ecosystems like mangrove forests, apart from the socio-economic impacts.
The auction of freshwater bodies on a lease basis has lead to over-exploitation of fish resources to maximize short-term profits.
Over-fishing and harvesting of small fish fries are contributing significantly to depletion of fish resources (MoEF, 1994:87; Treygo and Dean, 1989:23; MoEF, 1991).

Industry: The industrial sector in Bangladesh is small, but has potential for growth. From 1985 to 1990, this sector achieved an average annual growth rate of 4.02%. Production of major items, however, was low due to a depressed

demand for manufacturing goods in the domestic market. In their place, non-traditional exports such as garments and frozen foods have become important sources of industrial growth (MoEF, 1992:20). Industries in Bangladesh are broadly categorized as (BBS, 1993) (a) Manufacturing; (b) Mining and (c) Electricity production (BBS, 1993). The major types of industry include jute, pulp and paper, textiles, fertilizers, rubber and plastic, leather, food and beverages, sugar, pharmaceuticals, tobacco, distilleries etc. Of these, the main polluting industries are tanneries, pulp and paper, fertilizer, distilleries, sugar and chemicals (Gain, 1998:116). The main industrial locations of the country are concentrated in three metropolitan areas: (i) Dhaka (main concentrations are in Tejgaon, Hazaribagh, Demra, Tongi, Joydevpur, Narshingdi and Narayanganj). (ii) Khulna (main concentrations are in Shiromoni, Khalishpur, Boyra, Rupsha and (iii) Chittagong (main concentrations are in Kalurghat, Nasirabad, Sholashahar, Patenga, Kaptai, Bhatiary, Barakunda and Fauzderhat) (Gain, 1998:116). The agrarian nature of the economy and the availability of local agricultural raw materials influenced the initial effort for industrialization. Subsequently forests, livestock, natural gas and import based industries got preference. The industrial sector has yet to record growth in terms of output, market sales, employment and contribution to national GDP.

The sections concerned identified the following environmental issues related to industrial sectors:
Pollution arises from various industrial processes and plants throughout the country causing varying degrees of degradation to the receiving environment (air, land and water).
Concentration of industries results in pollution in specific areas, which exacerbate localized environmental degradation and leads to exceeding of the carrying capacity of the receiving environmental.
Unplanned industrial development has resulted in several industries being located within or close to residential areas, which adversely affects human health and the quality of the human environment.
Setting up of industries at the cost of good agricultural lands and in the residential areas is another negative development (MoEF, 1994:53-54).

Energy: Among its energy resources, Bangladesh has a vast deposit of natural gas, some hydroelectricity and coal and large amount of fuel wood, crop residue, cow dung etc. Fifty-five percent of the total energy consumed in Bangladesh is collected from the traditional organic fuels. Natural gas meets 24% of the country's total fuel needs, while hydroelectricity provides 2% of the needs. Nineteen percent of the fuel consumption in the country comes from imported coal and mineral oil (World Bank, 1995). In Bangladesh, annual per capita energy consumption is approximately 100 kgoe (kilogram of oil equivalent). This is among the lowest energy consumption in the world. The per capita consumption of commercial fuel is 45 kgoe, which is increasing gradually (Gain, 1998:148).
A brief description of the known energy sources of Bangladesh is presented here:
Natural gas: It is treated as the most important of all the commercial energy resources in Bangladesh. The total storage of natural gas in the country is estimated at 22.899 trillion cubic feet of which 13.597 trillion cubic feet, is feasible to extract.

Electricity: In Bangladesh electricity is generated in power plants run by natural gas, petroleum fuels and by hydropower (MoEF, 1991:129).

Solar Energy: Of all the non-traditional energy resources, sunlight is the most pollution free. Solar energy is used at present as a convenient means of drying crops and fish and for producing salt (MoEF, 1991:130).

Oil: Bangladesh depends almost totally on imported oil (Rahman et al, 1994:266).

Hydropower: Total hydropower resources of Bangladesh are limited to around 1,500 GWh per annum. So far, about 1000 GWh potential has been utilized at Kaptai (Rahman et al, 1994).

Commercial Energy: Commercial energy sources comprise of 4% hydro, 68% natural gas and 25% imported oil and 3% coal as only 300 bbls of oil are being produced locally. Among commercial sources of energy, oil, coal and peat reserves are not yet developed. Only natural gas is being extracted commercially (MoEF, 1992:16).

Biomass Fuels: Biomass is a major source of fuel in Bangladesh and is available from trees, field crops and livestock. It plays an important role in meeting the total energy demand.

Minerals: Different types of mineral resources discovered in Bangladesh are: whiteclay, limestone and hardrock. At present, whiteclay and limestone are extracted on an ad hoc basis without proper assessment of the total deposits.

Extraction of hardrock to replace brick as building material has a positive role (saving of fuel to burn bricks) in supporting sustainable development of energy resources (Rahman et al, 1994:267-269).

Key issues related to energy resources are:
The great demand of biomass fuels is depleting soil nutrients and forest reserve.
The use of livestock manure for fuel in rural areas deprives the soil of natural fertilizer and leads to nutrient depletion and the loss of soil organic matter.
There has been a general reluctance to develop alternative renewable rural energy sources (such as solar energy, wind and micro-hydropower) and the technological base in Bangladesh for developing such sources is inadequate. Air and thermal pollution of water bodies arises from power stations. This affects human and leads to loss of aquatic diversity and fish productivity (Treygo and Dean, 1989:24;MoEF, 1994:65).

Biodiversity: Diversity, frequency and variety in genes, species and ecosystems in the biosphere are termed as Biodiversity (Khan, 1998:115). In spite of threatened wild fauna and flora, there is a great potential in Bangladesh for biodiversity based sustainable development. The country has a rich fauna (both land and aquatic) and flora and it contributes to the international biodiversity pool, particularly with its rich genetic pool of rice varieties and with one of the world's few surviving tiger populations. The rural population relies heavily on the economic benefits gained from the productivity and variety of the natural base (Ambrose and Ali, 1995: 11). It is mentionable here that there are nearly 10,000 species of plants, animals and microbial organisms, a good percentage of which is found in superabundance. Estimated vertebrate fauna of Bangladesh are between 1500 and 2000 species, mammals (c.130+), birds (c.650+) reptiles (c.145+), amphibians (c.15+) and Pisces (c.783+) (Khan, 1998:119). Diversity is mainly observed at three levels: at the species level, at the ecosystem level and in animals. Species are described as a population of organisms, which in natural conditions are able to interbreed freely and represent a group of organisms, that have evolved with distinct inheritable features and occupy a unique geographical area (Khan, 1998:116). Ecosystem means a dynamic complex of plant, animal and macro-organism communities and their non-living environment interacting as a functional unit (Groombridge, 1992). Animal biodiversity has got several important values such as direct economic benefits; environmental services as indirect benefits; education and research values; cultural and aesthetic values (Khan, 1998:118). It is clear from different studies that many wildlife species have been exterminated in Bangladesh and many more are threatened with extinction. It was revealed that the country has lost 10% of its mammalian fauna, 3% avifauna and 4% reptiles over the last 100 years. More than 50 species are critically endangered in Bangladesh, of which 23 species are already declared as endangered in the red data book of IUCN. In addition, 83 species are commercially threatened. Elephant, tiger, wildcat, leopard, serao, dolphin among mammals; white-winged duck, comb duck, stork and crane, pheasant and partridge among birds; and crocodile, python, monitor lizard, tiver terrapin, roofed turtle, soft turtle and all marine turtles among reptiles are identified as most endangered species of the country (Khan, 1998: 119).

Key environmental issues associated with bio-diversities are:
Inadequate protective mechanisms to forest, fisheries and agriculture are leading to their decline.
The protected areas of Bangladesh, where economic interests are high and biological knowledge poor, are poorly protected and managed due to the absence of any organization.
There is a great apathy towards nature and its conservation because of large-scale ignorance about the importance of protecting genetic resources (MoEF, 1991:118-120).

Natural Disasters: Bangladesh is a disaster- prone country. The physiography, morphology and other natural conditions have made her vulnerable to disasters and environmental hazards. The major elements in the process are: floods, cyclones and storm surges; droughts; abnormal rainfall, hailstorm and lighting; nor'westers and tornadoes; earthquakes; saline intrusion; industrial and other pollution; deforestation and depletion of forests. Environmental degradation and hazards associated with ecological imbalances cause emission of greenhouse gases, global warming, sea level rise and depletion of ozone layer (Rahman et al, 1994:134). Cyclones, floods, droughts, riverbank erosion, tornadoes and earthquakes are most devastating.

Cyclone: Every year, there are some eighty tropical cyclones occurring around the globe, out of which about 4 to5 percent form in the Bay of Bengal (Crane, 1988). In the last fifty years, cyclonic storms have been responsible for the largest number of deaths and devastations. The four most damaging cyclones in the recent past occurred in November 1970, may 1985,April 1991 and1997 (MoEF, 1991:163).

Floods: Bangladesh is a land of rivers and heavy monsoon rains. It is subject to inundation by over bank spills due to drainage congestion, rainfall run-off and storm- tidal surges (Hossain *et al.* 1987 and Milliman *et al.*1989).

River Bank Erosion: River bank erosion and changing river courses are continuous processes that have been taking place for centuries in this delta. Human activities such as agriculture, grazing, forestry, roads and embankments affect the stability or otherwise of riverbanks and courses of rivers (MoEF, 1991:164-165).

Drought: Drought is an abnormal condition where there is lack of sufficient water to meet various requirements and to support satisfactory plant growth without enough soil moisture (Rahman et al, 1994: 160). There were severe droughts in 1979, 1981,1982 and 1989.

Tornadoes: Tornadoes may be described as " local monsters". They are sudden and fearsome. The death and injury rate can be awesome (Gain, 1998:208).

Earthquakes: An extensive earthquake zone exists along the Himalayan region from the Hindukush in northwest to Sadiya in the north-east (Sharma, 1990). During the last 150 years seven major earthquakes have hit Bangladesh (Gain, 1998: 208).

Key Environmental Issues are:
In all cases of disasters, the poor who are the prime sufferers do not have their own means of rehabilitation.
Sometimes it is not possible to take preventive measures and sometimes it is not economically viable.
There is no permanent body or well coordinated network within the government system on disaster management (MoEF, 1991:166-167).

Health and Sanitation: In Bangladesh, surface water is abundantly available through the major part of the year for most people. It is used for domestic purposes such as cooking, bathing, washing and sometimes drinking. But it is heavily polluted with faecal matter. Coliform count of most of the surface water sources is beyond the acceptable limits for any domestic use (Rahim, Aziz and Islam 1985 and Ahmed 1988). Bangladesh has not yet been able to provide sanitation facilities to its entire people. According to a WHO report, 50% of Bangladeshis do not have hygienic sanitation facility. The sanitation condition in the rural areas is worse in general than it is in urban areas. But the condition of sanitation in urban slums is the worst. A UNICEF survey reveals that sanitation in schools is worst in Bangladesh, Nepal and Maldives compared to other countries. In rural Bangladesh, there is only one latrine for every 90 students and most of these are unhygienic. Forty percent of these toilets are not cleaned regularly (Gain, 1998:233). The poor health status of the people of Bangladesh is related to poor environmental condition. A high rate of mortality and morbidity exist in the country. The common diseases prevalent are mostly due to unsanitary conditions, paucity of safe drinking water and malnutrition, initiated and complicated by poverty and illiteracy. Diarrhea diseases occur frequently and spread through polluted water. Infectious diseases are common among people living in unsanitary conditions. Infant and child mortality rates are alarmingly high at 110-125 deaths out of 25,000 live births respectively. Only 30-50% of the children in the country are immunized. Maternal mortality in Bangladesh, quoted as 6 per 1000 live births caused by hemorrhage, infections and toxemia, is one of the highest in the world (MoEF, 1991:142). Medical facilities in Bangladesh are extremely poor. Except for a few facilities offered by the government, the common people cannot afford medical treatment as required. In Bangladesh, a person requires 2039 calories per day; but per capita daily calorie intake is 1868. However, the average calorie intake is better in rural areas than in the urban areas.

Key environmental issues related to health and sanitation:
Protein caloric intake is extremely low in rural areas and it contributes to high infant mortality rate and a low level of disease resistance amongst the population in general.
Low literacy rates greatly impede the dissemination of information on environmental health.
Unplanned urban development (particularly in traditionally rural areas) has resulted in acute shortage of provisions for water supply and sanitation.
In most towns, the disposal mechanism for human and industrial waste is inadequate.
A major portion of the ever-increasing population remains deprived of health care facilities.
Poor sanitary condition all around and paucity of pure drinking water generally cause spread of diseases and create health problems.
There is lack of hygiene and environmental education and awareness among people in general about protection,

maintenance and improvement of their surroundings for a better life for present and future generations (MoEF, 1994 and MoEF, 1991).

Water Resources: Water is the most essential resource for sustenance of life. In Bangladesh the rapid population growth and increasing demand for water have seriously strained the availability of water resources (Rahman et al, 1994). A contrasting feature in the annual water cycle dominates life in Bangladesh: excessive water during the monsoon causing flood and insufficient water during the dry season creating a drought-like situation. These two extremes influence the planning for water resources development in Bangladesh, requiring effective measures in flood control, irrigation and drainage. Development of the irrigation sector together with flood control and drainage infrastructures, in areas where it has already been completed, has created a regime when other agricultural inputs may be effectively utilized to enhance the yield rate. But this trend in water resources development with the single objective of increasing production level in agriculture has led to neglect of other water sectors e.g. fisheries, navigation, control of salinity level in the coastal areas, etc. Concerns are being expressed about the various adverse aspects of present day water development activities in the country (MoEF, 1991). Each year about 26,000 sq. km or 18% of the country is flooded by monsoon rains (BARC/IUCN, 1987). The floodplain ecosystem has adapted to this flooding regime over the millennia. The waters seep into the soils and percolate down to recharge the underground aquifers. *Haors, beels* and *baors* (ox bow lakes, abandoned water courses largely in the south west) are filled providing spawning habitat for fish, winter habitat for migratory birds from frosty zones and groundwater recharge well into the dry season. The silt load carries nutrients to fertilize the soils. The onset of the floods initiates spawning cycles in fish, each species seeking out a specific habitat. Finally, as the pressure of the fresh water reaches the coastal areas, both on the surface and underground, it pushes back the inland intrusion of salt water (Treygo and Dean, 1989).

Some of The key issues of concern are as follows:
The status of aquifer recharge is not certain. There are signs that the water table (or water tables) is (are) being lowered.
Increased salinity in coastal areas due to insufficient dry season river flow.
Wetlands are being modified through drainage schemes and have important uses, which compete, usually unsuccessfully, with agricultural production.
Reductions in freshwater fish populations and harvest as a result of habitat loss or spawning interruption.
Dieback of the Sundarbans forest from saline intrusion.
Increase in water pollution from industrial and domestic sources.
Major changes in the watersheds outside Bangladesh could drastically reduce the minimum water volumes used as present day baseline data for planning and development.
Finally, although environmental issues related to housing and urbanization, transportation and communication, education and awareness are still secondary; they are expected to increase and gain importance rapidly. Early anticipation and prevention of major upcoming environmental crises in these areas will undoubtedly produce enormous benefits in the long run (MoEF, 1992).

Conclusion

In conclusion we should say that 'key sectors of the Bangladesh economy are linked through the ecological system'. Each of the sectors can be said to have major impacts on one another and other sectors through the environment: that is, trends in these sectors directly affect trends in other sectors. As for example, the agriculture sector has multiple linkages with nearly all-major sectors in Bangladesh economy. The scale and ubiquitous nature of agricultural practices mean that trends within the sector are generally substantial in their effect. Agricultural inputs and agricultural land use practices are linked to the following trends in other sectors: decreased production in the fisheries and forestry sectors; negative impacts on water quality and nutrition in health sectors; increased urban migration in the human settlements sector; decreased availability of fuel woods in the energy sector as well as decreased tree cover and decreased supply in the water sector because of lowered water tables and increased salinization. The industrial sector has significant impacts on the water, health, fisheries and human settlements sectors. Trends toward increased industrial production contribute concretely to the following trends in other sectors: decreased water quality in the water sector; increased morbidity and mortality in health sector; decreased production and quality of production in the fisheries sector; decreased quality of community life in human settlements sector. The human settlements sector, with its trends toward increasing population and increased density in urban areas, will have significant impacts on the fisheries, forestry, agriculture, water, energy and health sectors. The forestry sector with its increasing trends toward deforestation will have significant impacts on agriculture, urban settlement, water level and coastal areas. The

above discussion point to the urgency of addressing environmental issues that presently hamper sustainable development. In view of Bangladesh's limited resources, it is essential to focus on parallel efforts to slow down population growth on the one hand and adequately address the problems of depletion of forest, loss of inland wetlands, over exploitation of fisheries, destruction of fish habitats and larvae and poor land and soil symptoms of environmental disequilibrium that already exist in the country. It is especially applicable for the prevailing nature of rural economies in Bangladesh, as most households are still directly dependent on the continued productivity of soils, forests and fisheries resources. These resources are becoming increasingly vulnerable to overuse and degradation. In such a densely settled environment, heavy-handed interventions, which affect the resource base, can also have an impact on a large number of households. Overuse and destruction of natural resources are already, negatively impacting the welfare of millions of people in Bangladesh and threatening their food security and quality of life. In Bangladesh, because of the inherent environmental vulnerability of the country and its overwhelming population size, sustainable development will be jeopardized unless linkages between the sectors are well integrated into the planning process (WRI report, 1990; MoEF report 1991). To face these environmental challenges the government has taken a number of initiatives:

The government has declared 1990 as 'the year of the environment' and the following decade as the 'decade of the environment'; in the five year plan environmental protection has been given due importance to make development projects environmentally sound; the government has created a new Ministry called the Ministry of Environment and Forest and renamed earlier 'Department of Environment Pollution Control' as 'Department of Environment' and placed the Department under this newly formed Ministry; the Minster in charge of Ministry of Environment and Forest has been made a permanent member of the Executive Committee of the National Economic Council, to look into environmental soundness of major projects; to make development programs environmentally sound, it has been declared that EIA would be required for all development projects; to make the present environmental legislation more effective and comprehensive a revised updated ordinance named 'Bangladesh Environment Preservation Ordinance' was approved; the government has prepared National Conservation Strategy; the uses of fuel wood in brick building and further cutting in forest reserves have been banned; a Forestry Master Plan was prepared and the Forest Act of 1927 has recently been amended as a part of natural resources conservation programs; the government formulated an integrated improvement project for Barind area-central northwest part of the country-where traces of desertification has been observed; Master Plan Organization was constituted to help the government to better manage and improve the water resources; 'Coastal Environment Management Plan' was formulated for Bangladesh; the government has banned export of frogs as step to protect frogs, which act as a natural pesticide. Government has also banned export of all kinds of birds and animals to preserve the wild life of the country; it has undertaken elaborate action program to solve squatter problems and provide safe drinking water and sanitation facility to the rural people, as a part to curb faecal pollution and improve their living environment; following the devastating foods of 1989, the government prepared a Food Action Plan incorporating 26 different components to combat the vagaries of floods in Bangladesh; the government has also formulated National Environmental Policy and prepared National Environmental Management Action Plan; introduced environment as a separate subject in school; environmental protection bill has been passed; set up the environmental court; imposed ban on polythene shopping bags. Initiatives also have taken for curbing air pollution, addressing the industrial pollution, river cleaning, conservation of ecology, creation of forest resources, social afforestation and poverty reduction, conservation and development of medicinal plants, biodiversity conservation and conservation of plant species.

A strong institutional set up with skilled and honest human resources and strong commitment of the government are the prerequisite for effective implementation and enforcement of these initiatives.

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