

# **International Forum on Monitoring National Development: Issues and Challenges**

## **Compendium of Environment Statistics of Bangladesh**

### *Country Paper*

#### **Background**

The ensuing International Forum on Monitoring National Development Issues and Challenges addresses the necessity of reliable and good statistics about forces of production and institutional environment. International standard are assumed to be pre-requisite to international; comparison. The national statistical offices (NSOs) are supposed to generate the data to meet the needs of the researchers and the policy makers of the national economies. Generation of reliable data on social and environmental changes are also required on continuous basis for timely intervention.

Good statistics are the eyes and ears of the planners and the policy makers. Adequate and up to date datasets on environments are the most challenging issues in Bangladesh.

#### **2. Bangladesh experience :**

##### **2.1 Prologue**

Bangladesh is the biggest delta of the world and is located in the tropics between 23<sup>0</sup>34' and 26<sup>0</sup>33' northing and between 88<sup>0</sup>01' and 92<sup>0</sup>41' easting. Bangladesh has the land area of 147,570 sq.km and about half of its surface is below the 10m contour line. Bangladesh is situated at the lowermost reaches of three mighty river systems-the Ganges-Padma river system, Brahmaputra-Jamuna river system and Surma-Meghna river system. The heavy monsoon coupled with low altitude of major parts of the country make floods off and on. Bangladesh has been classified into three physiographic regions- (a) flood plane; (b) terraces and (c) hills and 24 sub-regions. (Map-01:Physiographic divisions of Bangladesh).

According to the 2011 census it is an abode of 142.3 million population with population density of 964 population per sq.km. Its economy is characterized by per capita GDP of US 690\$ and contribution of agriculture, industry and service sectors to GDP by 21.6%, 28.9% and 49.7% respectively. Bangladesh with its low altitude from the sea level, a network of 230 rivers and rivulets and existence of Himalaya in the north and a long coast line of 710 km of Bay of Bengal in the south are very frequently exposed to flood, cyclone, tidal surges, draught, tornado, sidr, aila etc causing colossal damage to lives and properties.

It is envisaged that our unplanned economic growth in the past has increased environmental degradation and adversely affected both the renewable and non-renewable resources of the country. The country thus emphasizes on economic development with control of major environment elements- air, water, land and biota. Monitoring, evaluation and implementation of environmental issues are considered as the essential requirements to ensure sustainable economic growth in Bangladesh.

## **2.2 Policy related issues adopted in Bangladesh**

Water pollution control ordinance 1973 was promulgated in 1974, Bangladesh Wild Life (preservation )order 1973 was promulgated in the same year. Bangladesh has 35 laws that exclusively deals with of the environmental issues and also over a hundred laws that deal with various aspects of environmental issues. Some of the major legal instruments related to bio-diversity –Environmental Protection Act (EPA)1995, Environmental Court Act 2000 (Amendment 2002), Environmental Conservation Rules, 1997, The Wild Life (Preservation ) Order 1973 and Wild life Preservation Act 1973, The Forest Act , 1927 (Amendment 1990, 2000), Biosafety Guidelines of Bangladesh 2007, National Biodiversity Framework 2007and Bangladesh Biosafety Rules,2010. United Nations has declared 6<sup>th</sup> June as the World Environment Day. This year’s theme is “Many species, One planet, One future”.

## **2.3 Environmental Statistics in Bangladesh**

United Nations in collaboration with UNSTAT,United Nations Environment Program (UNEP) and International Union for Conservation of Nature and Natural Resources (IUCN) developed a framework for development of environment statistics (UN-FDES). The framework has recommended a list of environment statistics that a country will need to collect and maintain. Following the broad guidelines of UN-FDES Bangladesh Bureau of Statistics (BBS) has developed Bangladesh Framework for Development of Environment Statistics ( B-FDES) in 1998. Following this guideline BBS has prepared Environment Compendium 2004, Environment Compendium 2005 and Environment Compendium 2009.

### **2.3.1 Millennium Development Goals (MG)**

Goal 7 is “Ensure Environmental Sustainability of Millennium Development Goal” which is set up by UN Millennium Declaration 2000. It requires integration of the principles of sustainable development into policies and programmes and reverse loss of environmental resources. Table T1 shown at the section 2.4.13 shows Bangladesh progress of Goal 7.

### **2.3.2 Inter-agency collaboration for generation and achievement of sustainable Environment Management**

Environment is a vast concept and determination of its components are very much complicated. In recent days environmental protection and improvement has become a thrust sector of the government. Government has already ratified a number of conventions and treaties for protection of environment as a part of the global movement on sustainable environment. It has enacted laws for environmental protection and for making those more effective in preserving the elements of nature. Ministry of Environment and Forest along with department of environment and department of forest have taken several development programmes for improvement of environment and protecting natural elements of environment from degradation and depletion. A part of the multilateral project entitled “Sustainable Environment Management Action Plan (SEMAP) was implemented by the MoEF. As a followup of SEMAP Ministry of Environment and Forest has taken up a large umbrella project entitled ‘Sustainable Environment Management Programme’ (SEMP) which has 26 components and 22 sub-implementing agencies (Detail shown at table T2).

## T2. Source of Environment based on 26 SEMP components

| Sl.  | Name of the Project   | SEM P Com pont | Implementing Agency                                      |
|------|---|----------------|--|
| 01.  | Institutionalization of NEMAP   | 1.1            | MoEF/NIC   |
| 02   | Capacity building for Environment Legislation and policy analysis in MoEF, Planning Commission and other sectoral Ministries/Agencies.) | 1.2            | World Bank   |
| 1.6  | Main Streaming-environment in national planning: natural resource accounting and environment statistics                                 | 1.3            | Bangladesh Bureau of Statistics (BBS)                    |
| 04.  | Sharing of Common Regional Resources  | 1.4.1          | Bangladesh Unnayan Parishad(BUP)                         |
| 05.  | Improvement of Land Administration and Management   | 1.4.2          | Department of Land Record and Survey (DLRS)              |
| 06.  | Coastal Land Use Zoning in the South West   | 1.4.3          | Environment and GIS Support (EGIS)                       |
| 07   | Policy Analysis Studies   | 1.4.4          | Bangladesh Institute of Development Studies (BIDS)       |
| 08.  | Community based Haor Management   | 2.1            | IUCN Bangladesh  |
| 09.  | Community Based Flood Plain Resource Management   | 2.2            | IU Caritas   |
| 10.  | Sustainable Resource Management in Brackish water areas   | 2.3            | Gonchetona   |
| 11.  | Sustainable Livelihood in Riverie Char Lands  | 2.4            | NGO  |
| 12.  | Eco-system Management in the Barind Area  | 2.5            | Barind Multi-purpose Development Authority (BMDA)/NGO    |
| 11.6 | Participatory Upland Resource Management  | 2.6            | LGED   |
| 14.  | Sustainable Rural Energy  | 2.7            | LGED   |
| 15.  | Environment Fund: Supporting small , innovative grass roots initiatives   | 2.8            | MoEF/NIC   |
| 16   | Community based Water Supply and Sanitation   | 1.6.1          | Department of Public Health Engineering (DPHE)           |
| 17   | Community based Urban Solid Waste Management in Dhaka   | 1.6.2          | Waste Concern (WC)                                       |
| 18.  | Community based Urban Waste Water Treatment   | 1.6.3          | Prism Bangladesh /KCC                                    |
| 19   | Community based Rural Industrial Waste Management   | 1.6.4          | Department of Environment (DoE)                          |
| 20.  | Environmental Awareness and Monitoring at Grass Root Level  | 4.1            | Association of Development Agencies in Bangladesh (ADAB) |

|      |  |     |   |
|------|--|-----|---|
| 21   | Main-streaming Environment in the Media                    | 4.2 | Forum of Environmental Journalist of Bangladesh |
| 22   | Environmental Documentation                                | 4.3 | Unnayan Shamunnay (US)                          |
| 21.6 | Environmental Advocacy                                     | 4.4 | Bangladesh Environmental Lawyers Association    |
| 24.  | Sustainable Development Network                            | 4.5 | BIDS  |
| 25   | Environmental Education at the Non –formal Level           | 5.1 | Campaign for Popular Education (CAMPE)          |
| 26   | Environmental curricula at the Primary and Secondary Level | 5.2 | National Curriculum and Text Book Board (NCTB)  |

The component which is being implemented by BBS is entitled “Mainstreaming Environment in National Planning ; Natural Resource Accounting and Environment Statistics”

## 2.4 State of Environment

Like other developing countries Bangladesh faces the whole spectrum of environmental problems. MoEF has identified five areas of environmental issues as points of national concern which are-(1) land degradation; (2) water pollution; (3) air pollution; (4) bio-diversity loss and (5) natural disaster. BBS has reclassified them into 14 environmental issues. For this country paper summary of these issues are presented in short.

### 2.4.1 Biodiversity

Biodiversity means the variability among living organisms of terrestrial, marine and other aquatic ecosystem and ecological complexes. This includes diversity within species, between species and of ecosystem. Bangladesh is situated at the complex interface of the Himalaya and the south east asian bio-geographic region. Because of its climatic and fertility the country is well endowed with diverse complements of flora and fauna It has about 5000 species of flowering plants and 1500 species of fauna. But the number was much more a century ago. Bio-diversity is effected by over exploitation, deforestation, inefficient forest management, agricultural and industrial pollution shifting cultivation in the tribal areas, coastal shrimp farming large scale irrigation and flood control projects in Bangladesh. The most important habitat for bio-diversity in Bangladesh is the natural forest . At least 94% of the original natural habitat and vegetation has been lost to human settlements and agriculture. Deforestation during 1971-80 was 8000 hectare and during 1981-90 was 37000 hectares. From the destruction many species are now extinct and many more enlisted as threatened or endangered.

Government of Bangladesh has undertaken national biodiversity strategy and action plan for conservation of biodiversity. Some of the important rules and regulations are the protection and conservation of Fish Act and Rules, the marine fisheries ordinance, wildlife preservation act forest act, the environment conservation act and rules etc Bangladesh has signed the biodiversity convention at Rio de Janerio of Brasil on June 5, 1992 and ratified on May 3, 1994. Bangladesh has prepared national conservation strategy (NCS) and the national environment management action plan (NEMAP), 1995. Under the Bangladesh Wildlife preservation act, 1974 (amendment act 1994) three categories of protected areas have been established as national parks and wild life sanctuaries. Government has declared 19 protected areas constituting about 244 thousands hectares of forest in different parts of the country. Government has declared 6 forest areas

namely, Cox’s Bazaar, Technaf Sea Beach, St. Martin’s Island, Sonadia Island, Hakaluki Haor, Tanguar Haor and Marjat Bhaor. as ecologically critical area (ECA) under Environment Conservation Act 1994.

By signing the Ramsar convention government has undertaken development activities to conserve the biodiversity of wetland including Tanguar haor. Besides , a part of the Sundarbans (east,est and south sites) and the tanguar haor have been redesignated as the Ramsar sites.UNESCO has declared Sundarbans, the largest single mangrove forest as World Heritage Site in December 1997. The 1900 sq.km area of Sundarban is the biggest source of country’s wood, fuel, honey. wax, fish, crab, raw materials for paper etc, It also protect the country from cyclone, flood, tidal surge, sidr. Aia. In 2007 sidr had destroyed 31% of the forest resources of the country. In lieu of destruction of mangroves loss of human lives were as low as 3406 and loss of properties were the minimum. The mangrove forest also absorb carbon monoxide 3 times more than other forestry. In 2007, loss incurred by forest department due to Sidr was Tk.10419.965 millions. The velocity of the Sidr was 240 kilometer per hour. Biodiversity influences people’s economic, social and cultural development and hence their quality of life. Conservation of biological diversity is essential for keeping agriculture and forestry system healthy, generating income from tourism, establishing different ecosystem, widening the scope of biological investigation and protection of the overall environmental quality.

### **Bio-ecological zones**

Bangladesh is situated in the transitional point between the Indo-Himalayan Indo-Chinese sub-regions of Orient. As a result , it enjoys a number of diverse eco-systems and their associated richness of plants and animals. Bangladesh has been divided into twenty-five bio-ecological zones considering its physiography, climate, soil type, flooding depth, floral faunal distribution . The ecosystem represents a distinct combination of air, soil and water along with vegetation, animal and microbial life. It is divided into terrestrial ecosystems and aquatic ecosystems . The terrestrial ecosystem is divided into 10 divisions with distinct vegetation and crops and the aquatic ecosystem is divided into 8 distinct divisions with marine estuarine, flowing and standing water bodies.

### **Flora**

Recorded and estimated number of plant species are shown at table T02.

**T02. Recorded and Estimated Number of Plant Species**

| Categories    | Recorded | Estimated |
|---------------|----------|-----------|
| Algae         | 3600     | 6000      |
| Bryophytes    | 290      | 400       |
| Pteridophytes | 200      | 250       |
| Gymnosperms   | 5        | 5         |
| Angiosperms   | 3000     | 5000      |

According to latest account about 96 seed-bearing plant species are threatened. According to task force report 9 vascular plants are endangered and 27 are threatened.

Degradation of forest and loss of forest lands: The forests of Bangladesh are disappearing at a rapid pace quantitatively. According to Forestry master plan the actual forest cover of the country will not exceed 6% and per capita land has shrunk to a 0.022 ha, one of the lowest in the world. The annual deforestation rate is 3.3%. Government has taken some steps for afforestation.

### **Fauna**

Bangladesh possesses a wide range of invertebrates and vertebrates in its aquatic and terrestrial habitats. There are about 4469 animal species of major taxonomic groups in Bangladesh. According to IUCN Red Book 266 species of inland fishes, 442 species of marine fishes, 22 species of amphibians, 109 inland reptiles, 17 marine reptiles, 388 resident birds, 240 migratory birds, 110 inland mammals and 3 species of marine mammals exist in Bangladesh. According to IUCN red list 54 species of sea fishes, 8 amphibians, 58 reptiles, 41 resident birds and 40 mammals are threatened. Among the marine and migratory 4 fishes, 5 reptiles, 6 birds, and 3 mammals are threatened. Statistics related to fauna are shown in table T03, T04 and T05.

#### **T03. Vertebrate Fauna of Bangladesh**

| Group      | Total Number of Living Species |                | Total |
|------------|--------------------------------|----------------|-------|
|            | Fresh water                    | Marine         |       |
| Fishes     | 266                            | 442            | 708   |
| Amphibians | 22                             | -              | 22    |
| Reptiles   | 109                            | 17             | 126   |
| Birds      | 388                            | 240(Migratory) | 628   |
| Mammals    | 110                            | 3              | 113   |

#### **To4: Number of Extinct and Threatened Fauna of Bangladesh**

| Class      | Total Number | Number Extinct | Number threatened |
|------------|--------------|----------------|-------------------|
| Mammals    | 125          | 12             | 40                |
| Birds      | 579          | 4              | 41                |
| Reptiles   | 124          | 1              | 58                |
| Amphibians | 19           | 0              | 8                 |
| Total      | 847          | 17             | 147               |

#### **T05: List of Extinct and Threatened Species of Bangladesh**

| Extinct Species  | Threatened Species   |
|------------------|----------------------|
| Marsh crocodile  | Humped Featherback   |
| Common Peafowl   | Olive Barb           |
| Pink-Headed Duck | Tor Mahseer          |
| Wolf             | Gangetic Goonch      |
| Hog Deer         | Gangetic Gharial     |
| Swamp Deer       | Reticulated Python   |
| Nilgai           | Great Hornbill       |
| Wild Buffalo     | Pallas 's Fish eagle |
| Banteng          | Hoolock Gibbon       |

|                               |                      |
|-------------------------------|----------------------|
| Gaur                          | Asiatic Wild Dog     |
| Asiatic two-horned Rhinoceros | Bengal Tiger         |
| Javan Rhinoceros              | Bear                 |
| Onehorned Rhinoceros          | Ganges River Dolphin |

**T06: Mammals critically Endangered and Vulnerable in Bangladesh**

|            |                                 |
|------------|---------------------------------|
| Endangered | 1. Asian Elephant               |
|            | 2. Banteng                      |
|            | 3. Blue Whale                   |
|            | 4. Capped Langur                |
|            | 5. Fin Whale                    |
|            | 6. Ganges River Dolphin         |
|            | 7. Hispid Hare                  |
|            | 8. Hoolock Gibbon               |
|            | 9. Particolored Flying Squirrel |
|            | 10. Tiger                       |
| Vulnerable | 1. Asiatic Black Bear           |
|            | 2. Asiatic Golden Cat           |
|            | 3. Assam Macaque                |
|            | 4. Barasingha                   |
|            | 5. Blackbuck                    |
|            | 6. Clouded Leopard              |
|            | 7. Dhole                        |
|            | 8. Dugong                       |
|            | 9. Eurasian Otter               |
|            | 10. Fishing cat                 |
|            | 11. Gaur                        |
|            | 12. Humpback Whale              |
|            | 13. Irrawaddy Squirrel          |
|            | 14. Northern Pigtail Macaque    |
|            | 15. Sloth Bear                  |
|            | 16. Smooth-coated Otter         |
|            | 17. Stumptail Macaque           |

**2.4.2 Atmosphere**

Bangladesh has a tropical monsoon climate characterized by wide seasonal variations in rainfall, high temperatures, and high humidity. In Bangladesh there are six seasons, namely Summer, rainy, autumn, late autumn, winter, and spring.

**Temperature**

Daily maximum and minimum temperatures are measured by Bangladesh . The summer season spans between March and June. Minimum and maximum temperatures are measured by

the Bangladesh Meteorological Department (BMD) at 34 locations of the country. From these two temperature mean temperature is calculated. The mean annual temperature of Bangladesh is 26° C. Through analysis of last 60 years temperatures it has observed that there is an increasing trend of mean annual temperatures. The corresponding winter, summer and monsoon trends are 1.67<sup>0</sup>, 0.26<sup>0</sup> and 1.05<sup>0</sup> c per century respectively.

### Rainfall

The rainy season spans from July to October. Moisture rich south-western wind brings a lot of rain during this season which varies between 1300mm to 4000mm. The rain fall also measured by BMD from 29 stations . Heavy rainfall causes floods in Bangladesh. On analysis of 40 years data it has been observed that rainfall has increasing trend but the monsoon has a decreasing trend.

Wind, humidity and sunshine are the other components of atmosphere. Along with change of temperature and rainfalls wind, humidity and sunshine features of the atmosphere are also changing over time.

### 2.4.3 Air pollution

In Bangladesh atmospheric condition of both the urban area and rural areas are deteriorating due to air pollution. In urban area uncontrolled emission from motor vehicles and anthropogenic activities, slum areas and high population densities have generated severe atmospheric and other form of pollution. Unpaved sidewalls, industrial waste , uncovered trucks, construction materials and irregular garbage disposal have created significant suspended particulate matter (SPM) in the brick fields surrounding Dhaka City and other cities..

In rural areas the principal sources of emission are from brick kilns, cooking stoves and burning of wood, coal and bio-mass. Thus in rural area principal air contaminations are particulate matter and volatile organic compound. Major constituents of vehicular emission include carbon monoxide (CO), oxides of nitrogen (NOx ), oxide of sulphur (SOx), hydrocarbons (hc) and their derivatives, lead and particulate matter. Air pollution has the following effects on surrounding environments:

- 1) Air pollution has both acute and chronic effects on human health such as , chronic respiratory disease, heart disease, chronic bronchitis for adults , acute respiratory infection in children, lung cancer and death.
- 2) These are also taken up by the blood and pumped all round the body;
- 3) These pollutant are also deposited on soil, plants, and in the water, further contributing to human exposure. Health Effects associated with air pollution are shown at tables T07 and T08.

#### T07 Health Associated with Common Air Pollution

| Pollutant            | Population at Risk       | Health Impact  | Exacerbating Factors                                  |
|----------------------|--------------------------|--|---|
| Particulate emission | Motorist and pedestrians | Increase in illness, cancer and death from respiratory illness and | Especially PM10 of if there are high concentration of |



|                   |   |   |   |
|-------------------|---|---|---|
|                   |   | decrease in lung function   | diesel emissions.   |
| Lead              | Children, motorists and pedestrians                 | Damage the kidney, nervous system and brain   | Increases death rates from stroke and heart disease   |
| Carbon Monoxide   | Pedestrians, roadside vendors, and vehicle drivers  | Shortness of breath, increased blood pressure, headaches, and difficulty in concentration | Most significant in pregnant women, young children and those suffering from heart and respiratory diseases. |
| Nitrogen Monoxide | Urban commuters and dwellers                        | Respiratory infection, increased airway resistance and decreased lung function            | Most significant effects in children and asthmatics   |
| Ozone             | Urban commuters and dwellers                        | Irritation of the eyes and r tract and reduced lung function.                             | Long-term exposure may cause irreversible in lung structure   |
| High BOD          | Users of untreated public water supplies            | Gastro-intestinal illness   | Greatest impact through dehydration and diarrhea in young children  |
| Heavy metals      | Ingested through water supply or from exposed foods | Poisoning, increased and mortality  | Population on water courses close to gold mining at risk to mercury poisoning                               |

### **T08: Common Indoor Pollutants : Sources and Health Impacts**

| Pollutant   | Major Sources in the Home  | Possible Health Impacts  |
|---|--|--|
| 1. Radon-colorless, tasteless and odorless gas that come from radioactive decay uranium or radium | 1.Earth and rock under buildings.<br>2. Some earth derived building materials.<br>3. Ground water, well-water from private supplies  | No immediate symptoms<br>Lung cancer   |
| 2. Biological contaminants  | House dust Infected humans or animals Bedding Poorly maintained humidifiers<br>Wet and moist surfaces<br>Carpets and home furnishing | Allergies and asthma<br>Headache<br>Eye, nose and  |
| 3.Carbon Monoxide (CO)  | Heating equipments,<br>Wood and coal stoves<br>Fireplace Cook tops and ovens<br>Charcoal grill Engine<br>Tobacco smoke               | 1.Headache, drowsiness, dizziness<br>2..Impairment of human respiration, vision and brain function |

|  |   |   |
|--|---|---|
|  |   | 3. Symptoms of flu<br>4. Very high level may cause death  |
| 4. Nitrogen Oxide and Sulfur Dioxide       | Same as for Carbon Monoxide   | 1. damage to respiratory tract and lung<br>2. Irritation eye, nose and respiratory  |
| 5. Respirable suspended particulates (RSP) | Wood burning stove fireplace<br>Unvented kerosene and Gas-fired ranges furnaces, water heater<br>Vacuum cleaning and house dust<br>Tobacco smoke<br>Soap powder, cooking sprays | Eye, nose and throat irritation<br>Respiratory infection and bronchitis<br>Lung cancer  |
| 6. Environmental Tobacco Smoke             | Cigarettes<br>Cigars<br>pipes   | Eye, nose and throat irritation<br>Respiratory irritation<br>Bronchitis and pneumonia<br>Increased risk of lung cancer and heart disease. |

There are impact of Formaldehydes, Lead,, Asbestos and Volatile organic Chemicals on human health. A recent study shows that 10% of respiratory infection and diseases in Bangladesh, Bangladesh are attributable to air pollution.

#### 2.4.4 Sound Pollution

When sound crosses the normal audible limits, it becomes sound pollution .Sound frequency is measured by “hertz” human usually hear 15 to 20 kilo herz frequency sound. According to WHO generally 60 decibal(dB) sound can make a man deaf temporarily and 100 dB sound can cause complete deafness. In Bangladesh the main sources of sound pollution are the hydraulic horn of vehicles, blaring of microphones. Thus, sound pollution are derived from several sources such as street traffic, aircraft, railroads, industry, construction, consumer products and other sources of miking etc. There are four categories of industrial activities relevant to noise pollution. Some specific sources of industrial sound pollution in Bangladesh are shown in table T09 .

#### T09 Specific Sources of Industrial Sound Pollution

| Sl. | Level of Pollution | Specific Sources  |
|-----|--------------------|---|
| 01. | 130+dB             | * Testing a jet engine or turbine<br>* Riveting a large steel structure |
| 02. | 120-129 dB         | * Chain saw<br>* Riveting small structure<br>* Chipping operations      |
| 03. | 110-119 dB         | * Large drop hammer<br>* Power house<br>*Metal-forming machine          |

|     |            |  |
|-----|------------|--|
|     |            | *Gear-cutting machine<br>* Testing an internal combustion engine   |
| 04. | 100-109 dB | *Most mining operations<br>*Most operations using pneumatic tools<br>* Heavy excavation equipment<br>* large printing presses<br>* Boiler room<br>* Plastic and rubber –molding equipment<br>* Stone crusher<br>*All furnaces other than open hearths<br>* Punch presses<br>* Grinders<br>*Sawing , planning, surfacing , etc of large wood pieces |
| 05. | 90-99 dB   | * Food canning<br>* Food preparation<br>*Most textile operations<br>* Small printing presses<br>* Welding and cutting , both electric and oxy-acetylene<br>* Polishers<br>* Machinery assembly lines<br>* Strip mills<br>* Farm machinery<br>* Sawing, planning , surfacing etc of small wood pieces   |
| 06. | 80-89 dB   | * Textile dyeing<br>* Typesetting<br>* Warehouse operations<br>* Raw material processing, chemical   |

#### 2.4.5 Radio-active pollution

Radiation is a kind of invisible pollutant that originates mainly from the sun and outer space from where it reaches the earth. Most of the effects of radiation are due to radioactive materials especially from the fallout of nuclear weapons (radioactive dust), nuclear power plant and various electronic devices. Among them laser ray, X-ray machine, colored television set micro woven are worth mentioning. In its broader sense radiation is energy being propagated from one place to another through space . There are two types of radiations;  
Non-ionizing radiations;  
Ionizing radiation.

#### Radioactive pollution in Bangladesh

Solar radiation in Bangladesh-In Bangladesh daily average solar radiation varies between 4 to 6.5 kWh per square meter. Maximum amount of radiation is available in the month of March-April and minimum in December –January. At present solar insolation data is available from Renewable Energy Research Center, DU, BMD and department of mechanical engineering BUET.

Radio active mineral in drinking water specially arsenic contamination of drinking water is a serious threat to Bangladesh people.

Marine radioactivity and pollution from emission , industrial waste, ship breaking industry, radioactivity in the soil/fertilizer and X-rays and other medical appliances are also serious concern of Bangladesh.

When ionizing radiation pass through body tissue it can have direct effects as well as indirect effect causing acute sickness, cancer etc. Every body should take precautionary to keep away from radio-active sources.

#### **2.4.6 Water pollution and water resource management**

Water covers three –quarters of the earth surface in solid form (ice), in liquid form(water) and in gaseous/water vapor form. It estimated that 70% of the water is for irrigation, 15% for household use and 15% for industrial use. It has been observed that water demand has exceeded water supply. Salt water oceans hold 97% of surface water, glaciers and polar ice cover 2.4 %, river and lakes cover 0.6%. Water moves continuously through a cycle of evaporation or transpiration, precipitation and runoff, usually reaching the sea.

Bangladesh is the largest delta in the world. It is a land of rivers and canals. Annually the country receives between 1000mm and 5000mm of rain in various regions. Stock of water in Bangladesh by source is shown at table T10.

**T10 Volume of Water Occupied by Source, 2007**

| Source                       | Trans boundary | Rainfall | Ground Water |
|------------------------------|----------------|----------|--------------|
| Volume (Million cubic meter) | 1,050,000      | 343,000  | 23,000       |
| Volume in percent            | 74%            | 24%      | 2%           |

Bangladesh share 57 trans boundary rivers out of which 54 are coming from India and 3 from Myanmar. Water resources of Bangladesh includes the fisheries that lives in water, coastal zones resources that depends on water and the agriculture production that depends on water.

#### **State of water pollution**

Presently, most river basins of Bangladesh are heavily polluted. In the process millions of gallons of good quality water is transferred/transported from rural to urban areas every day. The surface water of the country is unprotected from untreated industrial effluents and municipal wastewater, runoff pollution from chemical fertilizers and pesticides and oil and lube spillage from sea and river ports. The ground water has been contaminated in several areas by arsenic. About 57 million people of Bangladesh drink water containing arsenic levels recommended by WHO (50 µg/l).. Arsenic contaminated drinking water is highly toxic and increases risk of cancer and nervous disorder. On the other hand Bangladesh is prone to water-related hazards such as, floods, cyclone, storms surges, sidr and intrusion of saline water and water logging. Statistics on top 5 polluters that causes water pollution in Bangladesh is shown below:

| Rank | Industrial sector     | Emission ((tons/year) | % Contribution |
|------|-----------------------|-----------------------|----------------|
| 1    | Pulp and paper        | 91768..10             | 47.4%          |
| 2    | Pharmaceuticals       | 30866.72              | 15.9%          |
| 3    | Metal                 | 27174.61              | 14.0%          |
| 4    | Food Industry         | 23403.39              | 12.1%          |
| 5    | Fertilizer Pesticides | 12715.00              | 6.6%           |

Drinking of polluted surface water causes diarrhea, hepatitis, malaria etc and is the reason or loss of millions of people and children. Efforts are being taken for treatment of arsenic contaminated water before drinking at both the public and private level. Treatment of polluted surface water before drinking is not enough. Thus, large number of people in Bangladesh are at the risk of water born diseases. Table T12 shows the estimated impact of arsenic to population of Bangladesh in 2001.

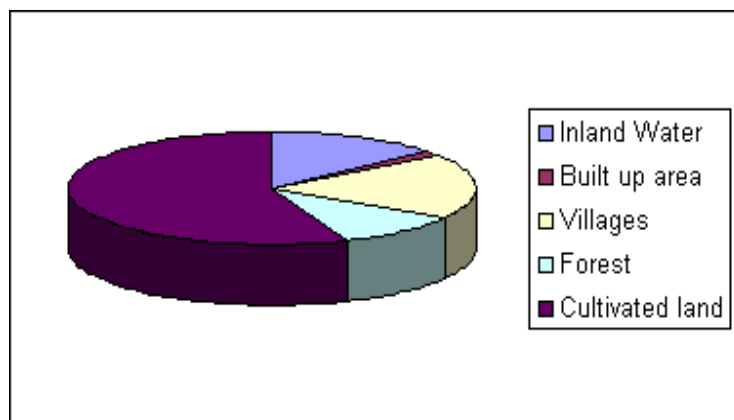
**T12. Population Exposed to Arsenic from Drinking Water in Excess of Bangladesh, 2001**

| Mode of Water Supply               | Population covered (m) | Tubewell(%pop) with as 50µg/l | Population exposed to 50 µg/l million |
|------------------------------------|------------------------|-------------------------------|---------------------------------------|
| Piped water supply                 | 13.1                   | -                             | 0.75                                  |
| Manually operated Deep Tubewells   | 8.2                    | 1                             | 0.08                                  |
| Manually operated Shallow Tubewell | 103.0                  | 27.4                          | 28.22                                 |
| Dug well                           | 1.3                    | 0                             | 0                                     |
| PSF, VSST, SST, RWH, etc           | 1.5                    | 0                             | 0                                     |
| Others                             | 2.15                   | 0                             | 0                                     |
| Total                              | 129.25                 |                               | 29.05                                 |

#### 2.4.7 Land resources

Land is the basic natural resource that provides habitat and sustenance for living organism as well as major forces of economy. Land use of Bangladesh is shown at the following Pie:

|                 |     |
|-----------------|-----|
| Inland Water    | 14% |
| Built up area   | 1%  |
| Villages        | 19% |
| Forest          | 10% |
| Cultivated land | 56% |



The delta is mostly a plain land and washed by the main rivers- the Meghna, the Padma, the Jamuna and the Karnafuli and their numerous tributaries. Tropical monsoon rains drench the

land and the rivers every year. The topography of the country is variable and is divided into five classes: high land, medium highland, medium low land, very low land and hilly land . The land use pattern of the country is influenced by agro-ecology, soil physiography and climatic factors. According to variations of all these factors and agricultural potential the total land are has been classified into thirty agro-ecological zones which are grouped into twenty major physiographic units. On the basis of reconnaissance soil survey conducted in 1969 the country has been divided into 19 soil type units.

Degradation of land refers to loss of its potential production capability as a result of degradation of soil quality and its effective use. In Bangladesh topsoil degrades due to natural processes and human activities. The functional capacity of soil degrades due to activities related to agriculture, forestry and industry. On the other hand urbanization occupies agriculture land and floods and cyclones erosion. Encroachment lad to loss of land. Human interference and water born actions are the two most important land degradation processes in Bangladesh.

### **T13: Pressures , state, impacts and responses of land degradation**

| Driving Forces Pressures                                  | State                                   | Impacts  | Responses   |
|---|---|--|---|
| Population and poverty                                    | Increasing poverty                      | Depletion of natural resource base   | Population control and poverty alleviation program  |
| Improper agriculture practices                            | Unscientific use of agricultural inputs | Yield reduction due to quality degradation of soil and thus decreasing land productivity | Integrated plant nutrient system (IPNS).Integrated pest Management (IPM) induction of green manuring crop biomass recycling |
| Agriculture practices in hill , terrace and piedmont area | Deforested area                         | Loss of top soil   | Restriction and ban on Jhum cultivation. Massive aforrestation.   |
| Improper irrigation                                       | Declining soil nutrient                 | Yield reduction due to quality degradation of topsoil                                    | Irrigated agricultural development strategies. Use of surface water for irrigation  |
| Development of rural road network                         | Increased length of road                | Loss of productive agriculture land  | Draft land use policy , integrated road, embankment and drainage system,  |
| Mining of sand and gravel                                 | Abandoned are is increasing             | Loss of productive agriculture land  | Draft land Use policy   |
| Land ownership and tenure                                 | Land fragmentation                      | Quality degradation  | Draft lade use policy   |
| River bank erosion and sedimentation                      | Erosion and accretion of land           | Loss of land and quality degradation   | River bank protection and embankment  |

|                       |                                     |  |  |
|-----------------------|-------------------------------------|--|--|
| Salinity              | Salinity intrusion                  | Quality degradation                              | Augmentation of dry season flow.                             |
| Industrial pollution  | Open discharge to land              | Quality degradation                              | Environment protection Act and Rules.                        |
| Rural housing         | Horizontal expansion                | Seizing of productive land                       | Vertical expansion of rural housing                          |
| Urbanization          | Increased unplanned landuse         | Loss of land                                     | Draft land use policy  |
| Brick making and kiln | Number of brick kiln are increasing | Loss of top soil. Destruction of productive land | Draft land use policy. Environment protection Act and Rules. |

Soil erosion, riverbank erosion and sedimentation, sedimentation sand on agriculture land, Desertification and salinisation , wind erosion and land accreditation are the reasons for loss of land . On the other hand , char formation is the main reason for addition of land.

#### **2.4.8 Soil Pollution**

The major part of Bangladesh soil is formed by the siltation of three major rivers – Brahmaputra, Ganges and the Meghna. These rivers and 51 other small rivers originated from outside the national boundary drains a basin of 1.76 million sq.km. and carries snowmelt water from the Himalayas and also runoff water from the highest rainfall areas of the neighbours. The sediments carried by these rivers has formed 80% of the Bangladesh delta. The remaining 20 % of the soil have been formed in tertiary and quaternary sediments of hills. The soil Resources Development Institute has identified 500 soil series in Bangladesh. The soil scientists have classified the Bangladesh soils into 21 general soil types.

#### **Soil Pollution/ Contamination**

Soil fertility is a complex but important indicator for sustainable agriculture. In modern agriculture due to use of inorganic fertilizers soil fertility is greatly affected. Soil reaction (pH). Organic matter (OM) and different macro and micronutrients are the main determinants of soil fertility. OM is the key quality factor for retaining nutrients in soil and pH is the deciding factor for the availability of essential plant nutrients. In Bangladesh 30 Agro-Ecological Zones (AEZs) have been identified and their crop species and fertility status vary considerably based on the combination of the nutrient and organic matter exist.

Bangladesh soils are suffering from chronic arsenic contamination and increasing salinity in the coastal region.

#### **2.4.9 Solid Waste Management**

In general waste is useless, unwanted, or discarded material resulting from agricultural, commercial, communal, and industrial activity. Waste is an integral part of our life . It is produced at all levels of human activities. In recent years , waste generation and its management is an important concern of the stakeholders due to its social and environmental impacts. Waste is generally by the households, commercial establishments, institutions and factories. Besides the human health impact, waste generation is also related to the social and economical aspects. According an estimate of 2004, approximately 16,380 tons/day of waste are generated in urban

areas of Bangladesh .The existing waste are collected and dumped in a crude dumping site and after that no action is taken for the ultimate fate of the waste. From the solid waste ‘leachate’ is produced and mix with the surface and ground water and poses the threat to the environment. Recently, Dhaka city corporation has established a Solid Waste Management cell to improve the waste management services in the city. The other city corporations and municipalities dump the solid waste in unhygienic and unhealthy tradition dumping way on a low land or water body like pond or roadside borrow-pits or ditches.

Basel Convention and Bangladesh Situation: Bangladesh is one of the signatory of the signatory countries of the Basel Convention Hazardous Waste Management and recently started recycling of waste management.

#### 2.4.10 Disaster Management

Bangladesh is a disaster prone country and very frequently experience tornado, cyclone, seasonal floods, tidal surges, earth sliding, sidr, earth quakes and incessant rains. The destruction and damages resulting from the calamities are so big that accounts for thousands lives and properties and hinder the economic growth development. Recent major floods in Bangladesh are in table T14.

**T14. Recent Major Disaster in Bangladesh**

| Year | Disaster  | Human Death |
|------|-----------|-------------|
| 1970 | Cyclone   | 300,000     |
| 1988 | Flood     | 2373        |
| 1988 | Cyclone   | 5704        |
| 1989 | Drought   | 800         |
| 1991 | Cyclone   | 138,868     |
| 1996 | Tornado   | 545         |
| 1997 | Cyclone   | 550         |
| 1998 | Flood     | 1050        |
| 2004 | Flood     | 747         |
| 2007 | Landslide | 127         |
| 2007 | Flood     | 1071        |
| 2007 | Cyclone   | 3406        |

Three types of floods occur in Bangladesh namely, Monsoon flood, Flash flood and Tidal flood. Floods in Bangladesh recur after certain interval which are shown in T15.

**T15: Flood Cycle in Bangladesh**

| Severity of Flood  | Recurrence Interval |
|--------------------|---------------------|
| Normal flood       | 2.25 Years          |
| Moderate Flood     | 4.00 Years          |
| Severe Flood       | 7.00 Years          |
| Catastrophic Flood | 33-50 Years         |



Drought is defined as the period when moisture content of soil is less than the required amount for satisfactory crop growth during normal crop growing season. Drought is common in the northwestern districts of the country. Severe drought results with famine. Some statistics on drought is shown at T16.

### T16. Droughts in Bangladesh

| Year | Percent of land affected | Percent of population affected |
|------|--------------------------|--------------------------------|
| 1950 | 13.7                     | 14.13                          |
| 1951 | 31.63                    | 31.51                          |
| 1957 | 56.54                    | 53.03                          |
| 1961 | 22.39                    | 20.76                          |
| 1966 | 18.52                    | 16.54                          |
| 1972 | 42.48                    | 43.05                          |
| 1979 | 42.04                    | 43.90                          |

Disaster management plan of Bangladesh is shown at table T17, T18 and T19

### T17: Disaster Management Model of Bangladesh , 2009

| Comprehensive Disaster Management Model of Bangladesh |  |
|---|--|
| Risk Reduction  | Defining Risk Environment                                    |
|   | Managing Risk Environment                                    |
| Emergency Response                                    | Warning, Evacuation, Search/Rescue, Emergency Relief         |
|   | Emergency Rehabilitation, Long Term ,Holistic Rehabilitation |

### T18: Agencies Under the Ministry of Food and Disaster Management

| Directorate                              | Responsibility   |
|--|--|
| Disaster Management Bureau (DMB)         | Promote public awareness, coordinate disaster management, review contingency plan, coordinate GO and NGO, Advice disaster management committees. |
| Directorate of Relief and Rehabilitation | Plan and execute relief and rehabilitation programmes, Direct disaster management at the zila, upazila and union levels.                         |
| Directorate of Food                      | Maintain and strengthen the national food security system; support relief and rehabilitation operation.  |

### T19 Warning Information System in Bangladesh

| Institution Responsible              | Warning System                              | Current Media                           |
|--------------------------------------|---|---|
| BMD                                  | Cyclone, storm , surges                     | Fax, email and telephone                |
| Bangladesh Water Development Board   | River bank erosion                          | Hardcopy map document                   |
| Cyclone Preparedness Programme       | Cyclone warning flag system in coastal belt | HF/VHF, radio, flag, signal , megaphone |
| Flood Forecasting and Warning center | River water levels                          | Fax, email, SMS, flag signals           |

Government has constructed 2975 cyclone shelters 137 killahs in the coastal districts with protection capacities of 1473,915 persons and 85,040 persons respectively.

#### **2.4.11 Human Settlement**

Bangladesh is 8<sup>th</sup> biggest country of the world in terms of population and living in an area of 147,570 sq.km Due to rise in urban migration there in an influx of population in the urban area. The high rate of urban population growth in urban population has increases pressure on the surrounding natural environment and its ecosystems. The demand for fuel, energy, water, transport, housing and cleanup services in each city has increased manifold over the past few decades. This has stressed the urban environment and has caused significant deterioration in quality of environment.

#### **2.4.12 Climate Change**

In recent years the earth's climate is changing due to fossil fuel burning, land use and land use change, livestock and waste management and agriculture. Bangladesh is a low lying deltaic country that experience high climate variability both spatially and temporally. Monsoon brings about 80% of the rainfall during June to October. The post monsoon months are drier. Floods, tornados, cyclones, droughts, and salinity ingress strike the and its population regularly. Due to population pressure people are forced to occupy more marginal and hazardous prone areas and they are becoming the victim of circumstances.

A recent studies shows that one meter rise of sea level will enundate 17% of the country . This will effect 7% of GDP. As a result wetlands and low lands will be enundated, accelerate coastal erosion and increase salt water intrusion into rivers ,agricultural and coastal forest lands and into ground water .This will create multiple problems in coastal urban areas, , cause damage to port facilities, coastal embankments /structures, destroy agriculture land, dislodge mangroves and fisheries and affect cyclone centers in the coastal areas.

#### **Cause of Climate change**

The earth's climate is a dynamic and always changing through natural cycle. The general statement of the earth's climate is dependent upon the amount of energy stored by the climate system, and in particular the balance between the amount of energy the earth receive s from the sun, in the form of light and ultraviolet radiation, and the amount of energy the earth releases back to space , in the form infrared heat energy. Causes of climate change involve any process that can alter this global energy balance. Scientists call this "climate forcing". Climate forcing forces the climate to change. There are two types causes for climate change, namely natural cause and created by man.

Natural causes are continental drift, volcanoes, ocean currents, the earth's tilt, and comets and meteorites. The human causes are industrial revolution, rise of greenhouse gases in the atmosphere, Fossil fuels supply most of the energy for vehicles and to generate electricity for industry and households etc, The energy sector is responsible for generation of ¾ of the carbon dioxide emission, 1/5 of the methane emission and large quantity of nitrous oxide. It also produces nitrogen oxide (NOx) and carban monoxide (CO) that is not greenhouse gases but do

have an influence on the chemical cycles in the atmosphere that produce or destroy greenhouse gases. Rapid global warming has caused fundamental changes to our climate, where Bangladesh is one of the severe victimized countries where millions of people are suffering from catastrophic floods that intensified. During the last ten years the country has experienced three floods in 1998, 2004 and 2007. Sea level rise in the coming decades will create over 25 million climate refugees. Recent study shows that climatic factors including temperature, rainfall and salinity have positive correlation on diarrhea, skin diseases and kala-azar in Bangladesh.

The increase in temperature in the lower atmosphere of the earth is due to effects similar to that of a greenhouse or a glass house used for growing delicate plants in cold countries. The solar radiation comes through the glass and warms the materials, the structures and the soils inside.

In roughly analogous manner the atmosphere acts like a greenhouse glass shield for the earth. Solar energy radiation penetrates the long columns of air and warms up the earth's surface. The earth then re-emits in the long wave infrared region which remains trapped in the lower atmosphere. This phenomenon is known as greenhouse effect. The trace gases in the atmosphere which largely absorb the reradiated INFRARED RADIATION ARE KNOWN AS GREENHOUSE GASES (GHGs). Greenhouse gases include water vapour, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), the chlorofluorocarbons (CFCs) and ozone (O<sub>3</sub>).

Because of human activities concentration of greenhouse gases (GHG) are increasing in the atmosphere. The changes enforce profound impact on population, environment and economy of Bangladesh. Figure 6 shows the climate system and the greenhouse effect in pictorial form.

### Diagram showing Greenhouse Effect

**Table 20. Factors Increasing Bangladesh's Vulnerability to Climate Change**

|              |   |
|--------------|---|
| Geography    | Bangladesh is a broad deltaic plain with most elevation less than 10 meters above sea level   |
| Climate      | Subject to severe natural disasters riverine and coastal floods, tropical cyclones, storm, surges, tornadoes and droughts. Most rainfall is confined to the monsoon season, causing major floods. The winter are dry. |
| Population   | Bangladesh population will reach 190m by 2050.  |
| Economy      | Bangladesh is one of the poorest and least developed country of the world with per capita GNP \$390 (1999)  |
| Education    | Bangladesh has the literacy rate of 53%, Compared to developed countries this low rate of literacy limits the country's ability to adapt to climate change  |
| Human health | Life Expectancy at birth 58 years., IMR=75, 56% malnourished and 84% has access to pure drinking water.   |

#### 2.4.13 Environmental Score Card Survey

This is a new concept and sample design and questionnaire design has been prepared in consultation with the experts of BIDS, BUET and DoE. With the environmental score card survey level of pollution will be measured or assessed in different places. For this survey environmental pollution and pollutant were divided into 6 themes, namely:

- i. Air pollution;
- ii. Water pollution;
- iii. Natural Disaster/Calamity
- iv. Encroachment/grabbing
- v. Noise pollution;
- vi. Soil pollution

For each theme 5 major factors were identified and were assigned weight so that the weighted average equals 100.

For pilot 10 sites were selected for each factor and 20 respondents were selected from each site for interview. Thus total number of persons to be interviewed in the pilot survey =  $5 \times 5 \times 10 \times 20 + 10 \times 20 = 5200$ .

**Sample Summary:**

- 1. Number of concern = 5
- 2. Number of environment factor =  $5 \times 5 = 25$
- 3. Number of sample sites =  $5 \times 5 \times 10 = 250$
- 4. Number of respondents =  $5 \times 5 \times 10 \times 20 = 5000$
- 5. Number of respondents for soil pollution = 200

.....  
Total = 5200

**2.4.14 Environmental sustainability towards MDG**

Sustainability or sustainable development is a topic of our age and by its nature is ambiguous and elusive. It started with the Brundtland Commission’s definition of sustainable development ; “Humanity has the ability to make development sustainable –to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” The exploration of sustainability identified these major components :economy and technology ;ecology and demography; and governance and equity.

Millennium Development Goals (MG): Goal 7 is “ Ensure Environmental Sustainability of Millennium Development Goal” which is set up by UN Millennium Declaration 2000.It requires integration of the principles of sustainable development into policies and programmes and reverse loss of environmental resources. Table T1 shows the Bangladesh progress of Goal 7.

**T1: Millennium Development Goals: Bangladesh Progress at a Glance**

| Goal                                       | Target   | Indicators   | Base year 1990-95 | 2006 | Target Year 2015 |
|--|--|--|-------------------|------|------------------|
| Goal 7:Ensure Environmental sustainability | Target 9: Integrate the principles of sustainable development into country policies and programmes and | Proportion of land area covered by forest                                      | 9                 | 11.3 | 20               |
|  |  | Proportion of protected area to surface area to maintain biological diversity. | 1.6               | 1.83 | 5.0              |

|  |   |       |       |       |     |
|--|---|-------|-------|-------|-----|
| reverse the loss of environmental resources.   | Carbon dioxide emissions ( metric tons per capita)                    | 0.14  | 0.3   | -     |     |
|  | Consumption of Ozone depleting CFCs.                                  | 280.6 | 195.5 | -     |     |
|  | Energy use (kilogram oil equivalent ) per USD 1000 DGP (PPP)          | 123.1 | 92.0  | -     |     |
|  | Proportion of population using solid fuels                            | 88.7  | 86.8  | -     |     |
| Target 10: Halve by 2015, the proportion of people with sustainable access to safe drinking water and basic sanitation | Proportion of population with sustainable to an improved water source | rural | 78.0  | 77.0  | 100 |
|  |   | urban | 76.0  | 71    | 100 |
|  | Proportion of households with access to secure tenure                 | rural | 15.3  | 81.5  | 100 |
|  |   | Urban | 61.2  | 80    | 100 |
| Target 11: By 2020, have achieved a significant improvement in the lives of at least 100 million slum dwellers         | Proportion of households with access to secure tenure                 | 31.18 | 36.4  | 39.74 |     |

Reaching the environmental goal is important for reaching the other goals. Linkage of MDG to environment are shown at table T21.

### **T21.Linkage of Environment Goal with other Goals of MDGs**

| SL | Goal                                    | Links to the Environment  |
|----|---|---|
| 01 | Eradicate extreme poverty and hunger    | Poor peoples livelihood and food depends on ecosystem goods and services  |
| 02 | Achieve universal primary education     | Time spent for collection of water and fuel reduces time and opportunities for education.   |
| 03 | Promote gender equality and empowerment | Women and girls are especially burdened by water and fuel collection , reducing their time for education and income generating activities.  |
| 04 | Reduce child mortality                  | Diseases tied to unclean water and inadequate sanitation and respiratory infection related to pollution are among the leading killers of children under five.                                       |
| 05 | Improve maternal health                 | Inhaling polluted indoor air and carrying heavy load of water and fuel wood hurt women 's health and can make them less fit to bear children.. with greater risk of complications during pregnancy. |

|    |                              |  |
|----|------------------------------|--|
| 06 | Combat major diseases        | Up to 20% of the disease burden in developing countries may be due to environmental risk factors as with malaria and parasitic infection. Preventive measures to reduce such hazards are as important as treatment and often more cost-effective |
| 07 | Develop a global partnership | Many global environmental problems – for development climate change , loss of species diversity, depletion of global fisheries can be solved through partnership between the rich and poor countries   |

## 2.5 Concluding remarks on impact of environment on socio-economic development

The overall Environmental impacts of human Activities are:

| Human Activity        | Environmental Impacts  |
|-----------------------|--|
| Deforestation         | Loss of habitat, loss of bio-diversity, changes in local ecology, changes in micro-climate, loss of carbon sink, Soil erosion, Less water retention, Increases flooding  |
| Industrialization     | Air, soil, and water pollution, thermal pollution, depletion of minerals, and fossil fuel, high demand for energy and water, Waste generation.   |
| Intensive agriculture | Water, soil, and water pollution, organic waste and GHG emission, Land degradation, Bio-accumulation of toxic substances due to use of herbicides and insecticides , Water logging and salinisation, Depletion of ground water.  |
| Upland cultivation    | Erosion of top soil and loss of soil productivity , Reduction of water holding capacity, Flooding in downstream areas.   |
| Urbanisation          | Loss of natural ecosystem , High population density and increased risk of disaster, Heat island, Large volume of solid wastes, Slum development, High demand for energy and water, Air and noise pollution, Ground water mining, and land subsidence.                                  |
| Development project   | Conservation of forest , agriculture land and wet land, Removal of human settlements, blockage of natural drainage and water logging , Morphological changes of the river, Increased demand for water, energy and transport, Destruction of unique natural features and scenic beauty. |

Bangladesh, its people and its economy are exposed to the great risk of climate change. Due to climate change and greenhouse effect, even with 1 meter rise of sea level 17% of the land area will be sea and the process will continue if no efforts are taken to control green house effect. And so will be the fate of the country as a whole.