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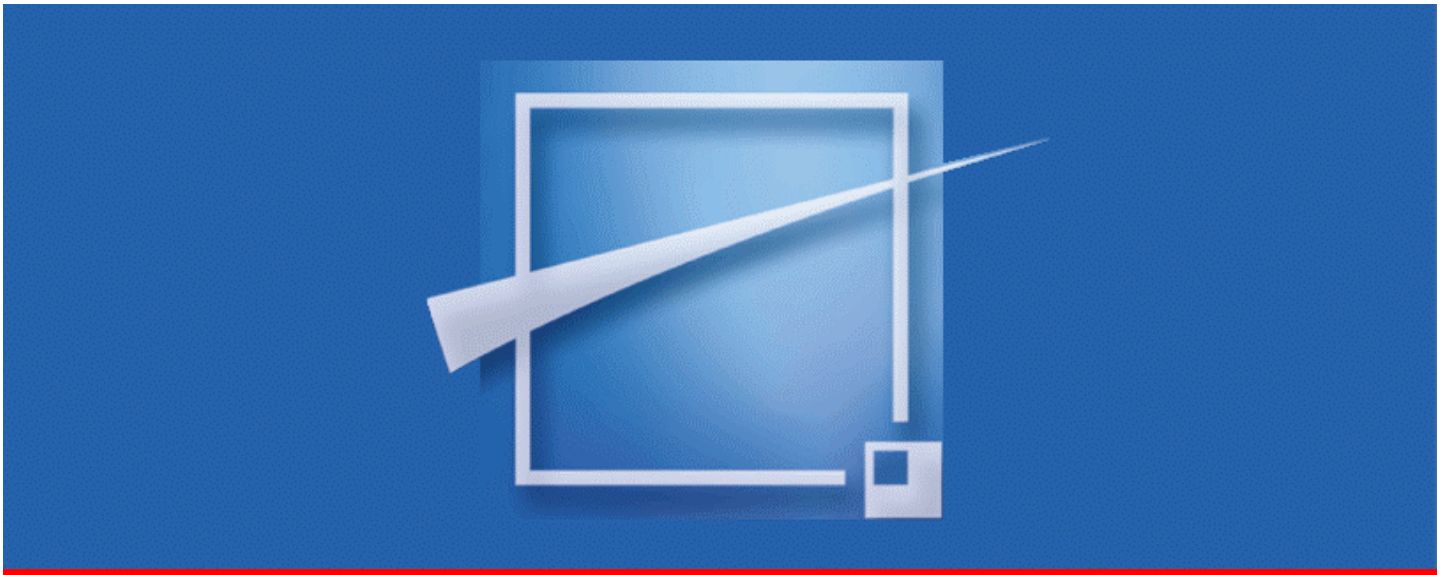
Bangladesh
(Cluster 3)



FINAL REPORT

COUNTRY ENVIRONMENT PROFILE

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ABBREVIATIONS

ADB	Asian Development Bank
CIDA	Canadian International Development Agency
CDM	Clean Development Mechanism
CNG	Compressed Natural Gas
CS, CSP	Country Strategy (Paper)
DANIDA	Danish Development Co-operation
DFID	Department for International Development, UK
DG	Directorate General
EC	European Commission
ECNEC	Executive Committee of National Economic Council
ECP	Environmental Country Profile
EEA	European Environmental Agency
FSRD	Food Sector and Rural Development Programme
GDP	Gross Domestic Product
GoB	Government of the People's Republic of Bangladesh
GTZ	German Technical Co-operation
IDA	World Bank International Financial Association
HYV	High Yield Variety
IUCN	World Conservation Union
JICA	Japan International Co-operation Agency
LCG	Local Consultation Group
MFA	Multi Fibre Agreement
MoE	Ministry of Environment
(M)toe	(Million) tons of oil equivalent
MTR	Mid-Term Review
NGO	Non-Governmental Organisation
NORAD	Norwegian Development Co-operation
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PM	Particulate Matter
PRC	People's Republic of China
SACEP	South Asia Co-operative Environment Programme
SME	Small and Medium Sized Enterprise
SPM	Suspended Particulate Matter
TOR	Terms of Reference
UN	United Nations
UNDP	UN Development Programme
UNESCO	UN Educational, Scientific and Cultural Organisation
USAID	United States Aid Agency
USEPA	United States Environment Protection Agency
WB	World Bank
WHO	World Health Organisation
WRI	World Resource Institute

BANGLADESH COUNTRY INDICATORS:

Economy	
GDP/capita	≤ 310 €
EU_{25} GDP/capita	≈ 1,5%
Bangladesh Taka exchange rate	85 BDT/1€
US Dollar/ Euro	1,3 $/1€
Composition of GDP	
Agriculture	22-25%
Industry	24-27%
Service	51%
Land Use	
Urban population	28-30%
Arable land	62-65%
Pesticide consumption	5 €/ha
Arable land waterlogged	no data
Arable land saline	≈ 33%
Forest	≈ 9%
Forest annual rate of change	-1,3 – -3,3%
Biodiversity	
Protected sites	0,5 – 1,5%
Threatened Species	78
Water	
Population with access to:	
Safe/improved water	< 75%
Sanitation, rural - urban	33 – 75%
Water use intensity	8999 m^3/ha/year
Energy	
Primary energy sources:	
Biomass incl. Firewood	58%
Fossile	42%
Hydro	< 1%
Energy intensity	103 toe/1000 US$
Waste	
Waste generation, urban	0,5kg/capita/day
Waste collected	40 – 50%

1 SUMMARY

Bangladesh is located in South Asia within the deltas formed by the Ganges and Brahmaputra rivers, bordering the Bay of Bengal. The country is mostly surrounded by India and has a short border with Burma. Its size is 144,000 km^2, similar to Greece. Arable land comprises around 62% of the country. Important regional divisions are Chittagong Hills in the east, the central alluvial plains, and the Sundarbans. The Sundarbans, as the world's largest mangrove forest and home of the Bengal Tiger, are of particular ecological significance and are listed as a World Heritage site.

Bangladesh has a subtropical monsoon climate, characterised by wide seasonal variations in rainfall, moderately warm temperatures, and high humidity. Because of its low lying topography, around 20% of the country is prone to annual flooding, and disastrous floods and tidal waves can inundate up to 60% of the country.

Bangladesh has about 1,100 people/km^2, the world's most crowded state. Its population is growing by 2million, or 1.5% per year, with its estimated population approaching 150 million. Up to 30% of the population lives in urban centres.

Industrial growth of 7% is more than double the growth in agriculture (about 3.3%). Whilst still an agricultural country, industry contributes more than agriculture, at 25% of the overall GDP. An expansion of industry is supported by GoB, and is likely to continue because no space for expansion of agricultural lands is available. As a result of the country's limited natural resources and space, and because it is prone to frequent natural disasters, environmental and sustainability themes are long established issues within GoB's development planning. However, despite such awareness, the overall physical environment continues to degenerate, although some success in improving air quality in the cities has been achieved.

Water resources, although in principle abundant, are mismanaged, and groundwater levels are falling throughout the country, whilst higher regions are starting to show symptoms of desertification. Surface water quality is appalling, as urban residential and industrial effluents are discharged untreated. Annual flooding of agricultural land adds pesticides and fertilisers to this cocktail. Inland fisheries have consequently declined to insignificance. As rivers discharge their noxious load into the sea, the mangrove ecosystem is adversely affected, with severe economic consequences for the coastal fisheries sector.

A particular problem is faced with naturally occurring groundwater contamination from Arsenic. Surface waters no longer being consumable, millions of tubewells were drilled throughout the country. Unfortunately, ground water frequently contains concentrations of Arsenic at least 5 times higher than WHO guidelines. Around 40 million people are affected by chronic Arsenic poisoning.

Because of the over utilisation and mismanagement of natural resources, including arable land and soils, the area of agricultural land is declining. At the same time, competing land uses for aquaculture, urbanisation and industrialisation lead to a reduction of land available for the growing rural population. Encroachment onto the remaining natural regions is a logical consequence, further reducing the protected areas, which anyway only comprise a maximum of 1.5% land area. This entails deforestation and species loss.

Climatic Change poses yet another threat to low lying areas of Bangladesh, with up to 18% of the country at risk of being flooded, and 11% of the population affected with a 1m rise in the sea level. Higher precipitation, as well as severity and frequency of tropical cyclones, will further reduce the productivity of agricultural land and eventually destroy sensitive ecological regions like the Sundarbans.

Despite successes in tackling city ambient air pollution, the areas of sanitation, access to safe water, waste collection and disposal, and indoor air pollution require urgent attention, to steer current development trends towards sustainability.

Although Bangladesh has significant reserves of natural gas, more than 80 million people still cook and heat with firewood or other primary biomass. Only one third of the population, or 15% of households, are connected to the electricity grid. Hence there appears to be ample scope for renewable energy utilisation with regard to solar, wind and hydro energy. However, renewable energy has no commercial significance in Bangladesh, because of financial and technical capacity constraints.

The government's environmental policy has correctly identified the environmental challenges listed above. Basic environmental legislation has been enacted, and further legislative developments are planned. However, GoB's financial resources and technical capacity fall far short of the needs to efficiently address these environmental issues. Focusing on industrialisation and economic growth will provide additional financial resources to the government. Experience shows that the more rapid the growth in industrial production, the more serious the related environmental problems are likely to be. Time is required to identify and act on problems, to develop a legislative basis for pollution control and institutional structures to implement it.

Because of these challenges, around 40 multilateral and bilateral donors provide support to GoB, covering more than 50% of the government's current capital expenditure. Many co-financed interventions and projects address environmental issues. However, whilst sectoral integration of national environmental policies is not yet effective in Bangladesh, the same can be stated for the mainstreaming of environmental issues in development co-operation. Bangladesh has, with the Local Consultation Group structure, one of the world's most extensive donor co-ordination networks. Because of the severity and cross-sectoral significance of already manifest and upcoming environmental problems in Bangladesh, this network needs to develop own capacity and structures to mainstream cross-sectoral issues into ongoing development co-operation.

Environmental priorities within development co-operation need to address current environmental, social and economic dynamics in Bangladesh. In particular, the further degradation of productive land needs to be halted and reversed, to provide rural livelihoods for the growing population. The remaining natural regions need to be protected, with the co-operation of local communities, by valuing intact resources as potential means for sustainable incomes.

Urban pollution in Bangladesh results in huge costs for the economy, not only in terms of health cost and productivity lost, but also via deterring foreign direct investment. This nexus needs to be demonstrated, and assistance provided to improve the urban environment and manage industrialisation.

Special attention needs to be given to the widespread Arsenic contamination of ground water. Surface water resources pose an even more severe health risk. Technology to mitigate the problem is available. However, 7 years of addressing the Arsenic problematic has so far not produced acceptable results. The rural poor continue to suffer from Arsenic poisoning. A way forward could include technology transfer and capacity building for small, locally produced, well-head oriented and community managed solutions.

2 BACKGROUND

2.1. Physical Environment

2.1.1 Geographical Settings

2.1.1.1 Borders

Bangladesh is in South Asia, situated between 88°-92.5° East and 21.5°-26.5° North, bordering the Bay of Bengal, mostly surrounded by India and with a short border with Burma. Its total land area is 133,910 km^2 -144.000 km^2, including water bodies - similar in size to Greece. Around 62% of the country is arable land. The borders with India and Burma (Myanmar) measure approximately 4,053 km, and 193km, respectively. Only a small portion of the boundary with India remains undelimited; discussions to demarcate the boundary, exchange 162 miniscule enclaves, and allocate divided villages remain stalled; skirmishes, illegal border trafficking, and violence along the border continue.

2.1.1.2 Regions

Most of Bangladesh lies within the wide delta formed by the Ganges and Brahmaputra rivers and is exceedingly flat, low-lying, and subject to annual flooding. Much fertile, alluvial soil is deposited by the floodwaters. The only significant area of hilly terrain, constituting less than one-tenth of the nation's territory, is the Chittagong Hill Tracts District in the narrow southeastern part of the country (see map in Annex I). There, on the border with Myanmar, is Mowdok Mual, with an altitude of 1,003 m, the country's highest peak. Small, scattered hills lie along or near the eastern and northern borders with India. The eroded remnants of two old alluvial terraces - the Madhupur Tract, in the north central part of the country, and The Barind, straddling the northwestern boundary with India - attain elevations of about 30 m. The soil here is much less fertile than the annually replenished alluvium of the surrounding floodplain.

The ecologically significant Sundarbans region covers around 10,000 km^2 of the southern Ganges river delta. This marshy region stretches across both India and Bangladesh to the Bay of Bengal (see map) The Sundarbans is possibly the world's largest mangrove forest. The Hooghly River marks the western border of the Sundarbans; the Sandwip Channel, which runs west along the Chittagong Hills, acts as the eastern border. Due to both the salinity and the instability of the islands, many consider this region uninhabitable. Therefore, aside from the mangroves, approximately 400 plant species still populate the Sundarbans. Also, many rare animal species reside within the Sundarbans. In particular, this area is home to many endangered species, including the Royal Bengal tiger.

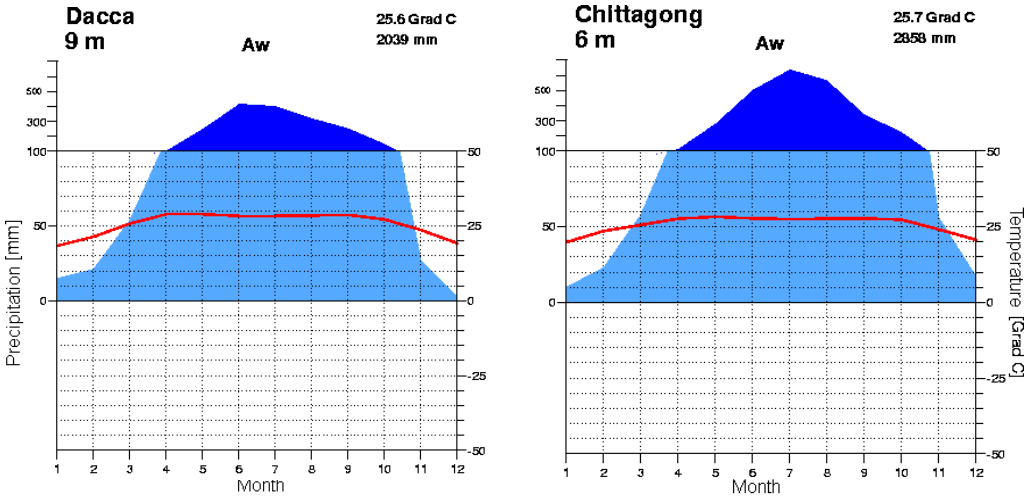
2.1.2 Climate

Bangladesh has a subtropical monsoon climate characterised by wide seasonal variations in rainfall, moderately warm temperatures, and high humidity. Regional climatic differences are minor. Three seasons are recognized: a hot, humid summer from March to June; a cool, rainy monsoon season from June to October; and a cool, dry winter from October to March. In general, maximum summer temperatures range between 32°C and 38°C. April is the warmest month in most parts of the country. January is the coldest month, while the average temperature for most of the country is 10°C.

During intense storms of the early summer and late monsoon season, southerly winds of more than 160 km/h cause waves as high as 6 m in the Bay of Bengal, and this results in disastrous flooding to coastal areas.

Heavy rainfall is a characteristic of Bangladesh, where about 80% of the annual rain falls during the monsoon season. With the exception of the relatively dry northwestern region of Rajshahi, where the annual rainfall is about or below 1,600 mm, most parts of the country receive at least 2,000 mm annual precipitation.

Figure 1: Climate of major cities in Bangladesh[1]



2.1.3 Rivers, Water Resources

Rivers are the most important geographical features in Bangladesh, since the rivers created the vast alluvial delta, which accounts for 90% of the country. The discharge of fresh water from Bangladesh's Ganges and Brahmaputra system is the third highest in the world, after the Amazon and the Congo systems. Some rivers are known by different names in various portions of their course. The Ganges, for example, is known as the Padma below the point where it is joined by the Jamuna River, the name given to the lowermost portion of the main channel of the Brahmaputra. The combined stream is then called the Meghna below its confluence with a much smaller tributary of the same name. In the dry season, the numerous deltaic tributaries, which lace the terrain, may be several kilometres wide as they near the Bay of Bengal. At the height of the summer, monsoon season they coalesce into an extremely broad expanse of silt-laden water. In non-monsoon months, the exposed ground is pocked with water-filled borrow pits, or tanks.

In addition to surface water, ground water is the other major source of water in Bangladesh for agricultural, drinking, municipal, and industrial uses. Ground water plays a vital role during the dry season and drought periods. Unconsolidated sediments ranging in age from tertiary to recent underlie Bangladesh. There are two aquifers in the country, the upper aquifer being the main one. In most areas, these two aquifers are probably hydraulically interconnected. The estimated total annual renewable ground water resources are about 21,000 million m^3 which are used for dry season irrigation, drinking, municipal and industrial requirements.

[1] from: http://www.klimadiagramme.de/Frame/indexeu.html
A: Tropical Rain Forest Climate; w: dry winter with driest month below 60 mm precipitation

The estimated global, renewable, surface water resources are 1,174,000 million m^3 of which the total average annual runoff generated within the country is 165,000 million m^3.

2.1.4 Natural Disasters

Bangladesh is a country prone to a range of natural disasters. Floods, tropical cyclones, tornadoes, and tidal bores, destructive waves or floods caused by flood tides rushing up estuaries, ravage the country, particularly the coastal belt, almost every year. Because of its low-lying topography, being essential a large river delta system fed by rivers from the Himalayan mountains, at least 20% of the area of the country is flooded in a normal year. Up to 60% of Bangladesh's surface, and more than 30 million people, can be affected in some years. Annual monsoon flooding results in the loss of human life, damage to property and communication systems, and a shortage of drinking water, which leads to the spread of waterborne diseases.

Table 1: Natural Disasters in Bangladesh

Types of Disaster	*Areas Affected*
Flood	Floodplains of the Brahmaputra-Jamuna, the Ganges-Padmaand the Meghna river system
Cyclone and Storm Surge	Coastal areas and offshore islands
Tornado	Scattered areas of the country
Drought	Especially the Northwest region of the country
Flash Flood	Haor Basins of the North-east region and South-eastern hilly areas
Hail Storm and Lightning	Any part of the country
Erosion	Banks of the Brahmaputra -Jamuna, the Ganges-Padma and the Meghna river systems
Landslide	Chittagong and Chittagong Hill Tracts
Earthquake	Northern and central parts of the country

2.2. Population

Bangladesh's estimated population stands currently at <150 million, with an annual growth rate of around 1.5%.

The area which is now Bangladesh has a rich historical and cultural past, combining Dravidian, Indo-Aryan, Mongol/Mughul, Arab, Persian, Turkic, and west European cultures. Despite these varying influences, the population is ethnically homogeneous, 98% being Bengali with the remaining 2% Biharis and tribes. With an estimate of more than 1,100 people/km^2 Bangladesh is, apart from some city and small island states, the most densely populated country. Despite ethnic homogeneity, large numbers of people have been internally displaced in Bangladesh due to conflict and religious persecution, particularly in the Chittagong Hills. In 1997, a peace agreement granted a higher degree of self-governance to this region. However, in this densely populated country, the question of land ownership for this region still threatens to derail the peace process. The still ongoing conflict has to be seen in the context of the demographic profile of the country, which has experienced both strong population growth and a significant decrease in the minority populations. Also, several parts of Bangladesh are overpopulated and good land is scarce, due to chronic flooding.

Migration is one of the major contributors to urban growth in Bangladesh. In the past, urban populations grew by about 40 million, an increase of more than 30-fold. In contrast, the population of rural areas increased 4-fold, from around 28 to103 million. Rural areas are still home to the majority of the population, with urban population accounting for around 28%. The large size of the Bangladeshi population and the high rate of its growth, in addition to poverty and other related social problems, place a tremendous strain on the country's natural resources and on the socioeconomic fabric of the society, and pressure on land, forests, and fisheries. The situation is compounded by inequalities in wealth distribution and access to productive resources.

2.3. Economy

See main country report for detailed discussion of the economy.

Despite some years of economic growth, the national poverty rate is still above 40%, with more than 75% of the population living on less than €1.5 per day (US$ 2). The Government has formulated its interim poverty reduction strategy paper, called the National Strategy for Economic Growth, Poverty Reduction and Social Development, which seeks to reduce by half the incidence of income poverty by 2015. The medium-term (Financial Years 2004-2006) macroeconomic framework seeks to raise economic growth to 6.5% and bring down inflation to 4.0% by FY2006, as well as contain the fiscal deficit to below 5% of GDP during the period. Towards these objectives the GoB embarked on a programme of reform measures aimed at maintaining macroeconomic stability, while addressing structural constraints on faster economic growth.

Economic growth is driven by export-oriented production, particularly garments and knitwear. Unless further improvements in competitiveness[2] are attained in the garment industry, the end of the multi fibre agreement (MFA) era may result in a substantial shift to strong, large competitors such as the PRC and India. Such a shift would have a highly adverse impact on the balance of payments, currency, price stability, and employment generation in Bangladesh. Frozen food, in particular shrimp, constitutes another major export sector. The increase in prawn cultivation appears in many instances not to be environmentally sustainable.

2.4. Environmental Policy

In a country with limited natural resources and space for its growing population, and which, at the same time, is prone to frequent natural disasters, environmental and sustainability themes are long established issues within GoB development planning. Table 2 provides an overview of recent and current policy objectives and measures.

Despite environmental awareness and a planning framework, the physical environment continues to degenerate. In addition to the GoB lacking capacity to implement policies, these policy failures may be attributed to the need to address short-term calamities and to deal with fallouts from high population density and related urban growth.

[2] Bangladesh has been reported to be the most corrupt country (together with Haiti), Transparency International Corruption Perception Index 2004, http://www.transparency.org/cpi/2004/cpi2004.en.html#cpi2004

Table 2: Environmental National Policy and Programmes

Policy	*Formulated*	*Purpose*
Fourth Five Year Plan (1990-95)	1990	1) Control pollution and degradation related to soil, water and air 2) Promote environment friendly activities in the development process 3) Preserve, protect and develop natural resources base 4) Strengthen the capabilities of public and private sectors to manage environmental concerns as a basic requisite for sustainable development 5) Create people's awareness for participation in environment promotion activities
National Environmental Policy	1992	1) Maintenance of the ecological balance and overall progress and development of the country through protection and improvement of the environment 2) Protection of the country against natural disaster 3) Identification and control of all types activities related to pollution and degradation of the environment 4) Environmentally sound development in all sectors 5) Utilization of all natural resources with long-term environmental sustainability 6) Active involvement to all environmental fields with international initiatives
National Environment Management Action Plan (NEMAP)	1992	The Action Plan presents actual actions to achieve the objective mentioned in the National Environmental Policy covering 17 fields of the environment with emphasis on the people's participation in the process for formulating the plan.
Fifth Five Year Plan (1997-2002)	1997	To protect and preserve the environment by putting in place adequate regulatory regimes and effective institutions, keeping in view the need for regeneration, recycling and optimum exploitation of natural resources consistent with sustainable development

3 STATE OF THE ENVIRONMENT

3.1. Water Sector

3.1.1 Water Balance

Rivers and water are the dominant features of the Bangladesh landscape. Hence it may not be obvious to write about water stress, especially lacking water in a country which annually experiences severe flooding. However, while abundant rain falls during the summer up to September, the rainfall during October and November is very irregular and often inadequate, failing to meet water demand for rainfed crops. Drought prone areas make up almost one third of Bangladesh, particularly in the northwest. Evaporation rates in most of those areas are higher than the precipitation rate, for more than 7 months.

Around 90% of Bangladesh's surface water enters the country via more than 50 rivers from India. India construction of the Farakka barrage on the Ganges during 1974-76 reduced its annual minimum flow into Bangladesh nearly to half, with severe economic consequences. The drying-out of Bangladesh's northwest and the silting of the Sundarbans are related ecological changes which will result in further economic damage in future. Hence in 1996 India and Bangladesh negotiated and signed a 30-year water sharing agreement for the Ganges, which stabilised Ganges low water flow. However, this water sharing agreement covers only the Ganges and not the other rivers entering Bangladesh. Negotiations in the Joint River Commission (JRC) for an agreement covering further 7 important rivers have not resulted in an agreement yet. Hence, early 2003 India tabled a proposal to link 37 of the rivers entering Bangladesh upstream and divert water to dry Indian states Uttar Pradesh and Karnataka. These plans are in a still early state of development and India agreed to involve Bangladesh in further planning. Based on the situation outlined above it is obvious that such plans could spell disaster for Bangladesh's economy and environment.

With its growing population, Bangladesh finds it more difficult to manage its limited water resources. The average Bangladeshi uses roughly 40 litres water per day for household use, and the demand for irrigation water is gradually increasing, as the growing population causes an increase in the demand for food. This has led Bangladesh to expand the irrigated lands, which in turn increases the demand for more water. Rice production requires over 800 m^3 of water per capita. Multiplied by Bangladesh's population, water demands can become enormous. In this context, one of the other major concerns in water resource management related to increasing population is the problem faced by the poor in gaining access to safe water.

The contribution of groundwater to total irrigated area increased from 41% in 1982/83 to over 75% today (compare Table 3). Since 30 -40% of the arable land is under irrigation, the annual extraction of ground water for irrigation purpose is not adequately recharged. Consequently, groundwater levels are falling, threatening sustainable agriculture in irrigated regions.

Table 3: Summary of change in use of irrigation technologies, expressed as a percentage of the overall irrigation volume[3]

Mode of irrigation	*1982–83*	*1996–97*
Groundwater		
Shallow tubewell	24	56
Deep tubewell	15	13
Manual operated pump unit	1	1
Surface water		
Low-lift pump	22	15
Traditional	28	5
Canal	10	10

3.1.2 Water Quality

3.1.2.1 Surface Water

Surface water used to be the primary source of water supply in Bangladesh, but this is no longer the case. Surface water in Bangladesh is extensively polluted by sources such as industrial and urban wastes, agrochemicals, sewerage wastes and seawater intrusion.
Surface water bodies are used for disposal of untreated industrial wastes and this is one of the main sources of pollution. Apart from industrial sources, human faeces heavily contaminate surface water in the country, as sanitation is poor. A prominent example and representative of the overall surface water pollution trend in Bangladesh is the Buriganga River near Dhaka. According to the Environment Department, up to 40,000 m^3 of tannery effluent flow into this river daily, along with sewage from Dhaka, a city of about 10 million. Human waste is responsible for 60% of pollution in the river, followed by industrial waste at 30%. The rest is solid waste. There is only 1 sewage treatment plant in the whole country, serving only a part of Dhaka. This sewage system covers only 15% of the city, with 40% served by septic tanks, 15% by pit latrines, and 30% has no access to sanitation, and uses roadside drains and other spaces.

Statistics indicate that, in 2002 within urban areas, about 75% of the population has no access to any form of improved sanitation, and only 6% were connected to a sewer network. In rural areas, around ⅓ of the population has access to improved sanitation. Connections to sewer systems are virtually nonexistent.[4]

The most problematic industries for the water sector are textiles, tanneries, pulp and paper mills, fertiliser, industrial chemical production and refineries. A complex mixture of hazardous chemicals, both organic and inorganic, is discharged into the water bodies from such industries, usually without treatment. The indiscriminate use of pesticides and herbicides, consumption of which currently stands at around €5ha, adds an additional pollution load to surface waters during the regular inundation periods over large areas of arable land. Due to withdrawal of water from the Ganges, during times of low flow, seawater intrudes a long way upstream from the coastline and causes river water salinity.

[3] BGS/DFID/GoB: The groundwater arsenic problem in Bangladesh, 2001: Chapter 4: Hydrogeology, http://www.bgs.ac.uk/arsenic/Bangladesh/Reports/ChapHydrogeology.pdf
[4] WHO / UNICEF Joint Monitoring Programme for Water Supply and Sanitation; Bangladesh Coverage Estimates Improved Sanitation, Updated in July 2004; http://www.wssinfo.org/pdf/country/Bangladesh_san_02.pdf

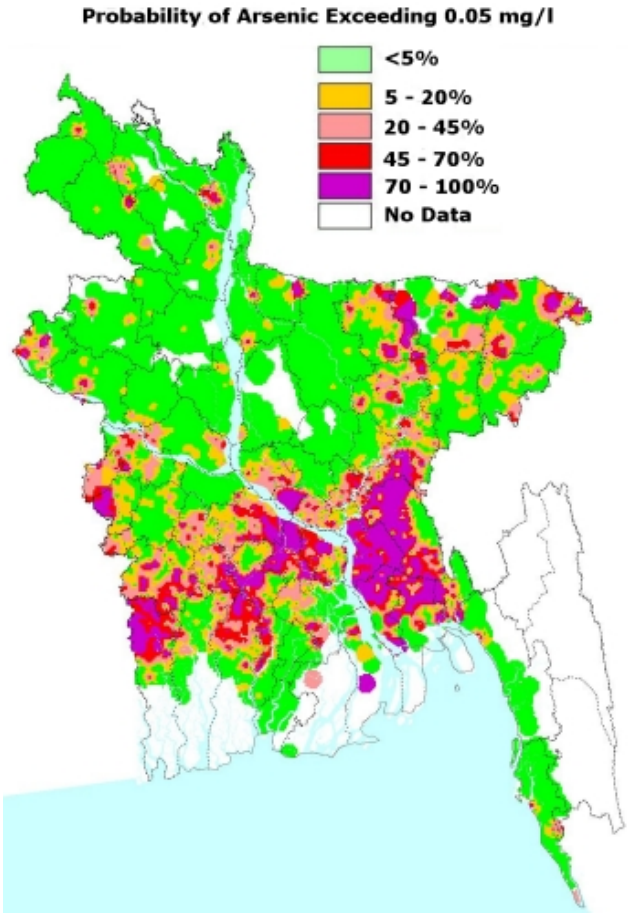
3.1.2.2 Ground Water

One major success of recent decades was the population's reduced reliance on disease-prone and contaminated surface waters. This achievement was made possible by the drilling of millions of tubewells around the country. Today, nearly all the rural population has access to these wells. This effort initially brought the access to safe water in Bangladesh up to 97%. Unfortunately, this situation is reversed today. The discovery of naturally occurring Arsenic[5] in many wells has greatly reduced the availability of safe drinking water. Today, Bangladesh continues to top the list of 23 arsenic affected countries, with 85 million people exposed to Arsenic, despite a 7-year effort to tackle the issue. According to recent estimates, around 40 million people in Bangladesh drink Arsenic-contaminated water. With little less than 150 million people in Bangladesh, this reduces safe water access to a rate of less than 75%.

The WHO established a provisional guideline value for drinking water as 0.01 mg/l[6], which is frequently exceeded as the following map indicates:

[5] The origin and mobilisation of Arsenic is dicussed here. Arsenic traces in fertiliser may also contribute to the problem
[6] http://www.who.int/mediacentre/factsheets/fs210/en/

Figure 2: Probability of Arsenic concentration in Bangladesh' tube wells[7]



3.2. Land Use

Land utilisation in Bangladesh is under constant change, as the growing population requires urban living space and resources for rural livelihoods. Urban sprawl, and encroachment onto natural habitats, is therefore common. The figures presented in table 4 below present only a snapshot in time. Notwithstanding the eventual effects of climate change-induced sea level rises, agricultural lands in the traditional sense will decrease. Soil degradation, urbanisation & conversion to aquaculture are the main reasons.

[7] http://bicn.com/acic/

Table 4: Area distribution of different land use categories[8]

Land Use Category	*Area ('000 ha)*	*%*
Arable Land	9.500	62-65
Irrigated Land	4.800	30
Rainfed Agriculture	4.700	
State Forest		
Classified	1.500	10,5
Unclassified	750	4,5
Private Forest		
Homestead	270	2
Tea/Rubber Garden	70	0,5
Total Forest GoB estimate	*2.520*	*17*
WRI Natural Forest	710	5
WIR Plantations	625	4
Total Forest World Resource Institute	*1.330*	*9*
Urban	1.200	1-8
Water	900	6-11
Shrubland, savannah, and grasslands	500	3

3.2.1 Land Degradation

Land degradation is one of the consequences of mismanagement of land, and results frequently from a mismatch between land quality and land use. It is clearly a human phenomenon, and it impacts large areas, with considerable numbers of people. The main causes of land degradation in Bangladesh are:

- Severe soil degradation by erosion, contamination, compaction, loss of organic matter through improper farming practices, salinisation and waterlogging;
- Soil degradation mainly through land transformation and deforestation;
- Deterioration of natural landscape by artificial replacement for cultivation, urbanisation
- Loss of biodiversity and fragmentation of ecosystems by intensive farming methods, and urbanisation

The other causes of land degradation include drought, population pressure, poverty, constraints imposed by recent international trading agreements, and local agricultural and land use policies. Intensive agriculture with High Yield Variety (HYV) cereals, along with imbalance in fertilisation, contributes to soil degradation.

Because of degradation of cultivated lands, the per capita availability of arable land is gradually declining. An inelastic net cultivated area of about 9million hectares, meanwhile, has a cropping intensity[9] of around 175%. Such intensive agriculture involving exhaustive HYV of cereals has led to significant soil nutrient loss. The fertiliser consumption remains below the estimated removal. This gap between nutrient removal and supplies through fertilisers is likely to keep widening, further resulting in soil degradation.

[8] source : http://www.bforest.gov.bd/land.php together with WRI and other estimates
[9] ratio between crops areas, where double or triple cropping areas are counted twice or three times respectively, and the actual physical areas

The lowering of the groundwater table by unsustainable abstraction rates coupled to agricultural intensification in the drier north and north-western parts of the country leads to symptoms similar to desertification, which otherwise should not be expected in this humid environment:

- thinning of the vegetative cover of the soil;
- reduction of soil organic matter content and deterioration of its structure;
- dispersion of soil aggregates and surface sealing;
- water runoff and soil erosion.

As in other Asian irrigated lands, waterlogging of soils occurs due a lack of flood protection and inadequate drainage of low lying, irrigated lands. Salinisation occurs in particular in the southern coastal belt, where around ⅓ of the arable land is located. Here, upstream seawater intrusion in rivers utilised for irrigation damages the otherwise fertile soils. According to SACEP estimates, much of this land is not utilised for crop production, owing to increased soil salinity[10].

3.2.2 Conversion to Aquaculture

Rapid development of shrimp farming in the extensive coastal and brackish-water areas of Bangladesh has made a very significant contribution to the growth of national export earnings, and shrimp farming is now an important element in both the local and national economies. However, the expansion of shrimp farming has raised important issues regarding land and water use in coastal areas. The contrasting demands of rice farmers and those involved in shrimp farming have generated frequent conflicts – often to the detriment of poorer social groups in shrimp farming areas. Shrimp farming development has, on occasion, led to degradation of agricultural land, thus negatively affecting the livelihood of local people. Resolution of these conflicts is of key importance if the industry is to continue to grow.

Conversion of rice paddies to shrimp farming ponds is done by building small, low dams around the former fields and opening the levees along estuaries, which hitherto protected the rice fields, herewith allowing brackish water to flood the former fields during high tide. This brackish water infiltrates the soils and increases the salinity. Once soil becomes saline, rice cultivation with the traditional varieties becomes impossible, although saline-resistant varieties exist. Currently, the area under shrimp aquaculture approaches around 3% or 150,000 –200,000 ha of the total area under rice production.

3.2.3 Deforestation

Population growth causes increasing demands on forest resources, resulting in the country's forests being rapidly depleted. Estimates of actual forest cover vary widely: GoB estimates forest land as 17% of the total land area. 9-12% are declared as forest by WRI, and tree cover is only 5-7% according to present estimates. Actually, ½ of the 'Forest' managed by the governmental Forest Department lacks tree cover.

In 2002 a Tree Plantation Campaign was initiated by the Government of Bangladesh where over 56 million tree plants free or at nominal cost were distributed from hundreds of government nurseries across the country. This campaign was continued in subsequent years. Earlier the Government of Bangladesh imposed a moratorium on tree felling in 1989 and declared that it would increase the protected area from 5% of total forest area to 10%. Bangladesh envisages raising forest area to 20%. Currently, approximately 730,000 ha of land, i.e. ≥ 5%, are forest reserves, which can be classified as mangrove, hill, or plain land forests. The mangrove

[10] http://www.sacep.org/html/regional_environment.htm

forest, the Sundarbans, is an inter-tidal area in the southwest of Bangladesh. (see 2.1.1.2). The Sundarbans is the largest productive mangrove forest in the world, and is home to the endangered Bengal tiger. This mangrove forest is rapidly disappearing, mainly as a result of wood harvesting industries, salinisation of the mangrove ecosystem caused by water development and irrigation projects upstream[11], and encroachment by the expanding shrimp culture industry.

Large hill forests remain in the Chittagong Hill Tracts, which are being depleted primarily because of unregulated logging and the expansion of agricultural land and shifting cultivation caused by population pressure. The plain forests in central Bangladesh are being depleted as a result of encroachment by surrounding populations. The annual deforestation rate is estimated between 1.3 and 3.3%[12].

3.3. Biodiversity

3.3.1 Critically Threatened Ecosystems

In a densely populated country like Bangladesh not much space is left for protection of natural biodiversity. Exceptions may be areas attributed as inhabitable, e.g. the Sundarbans (see 2.1.2. and 3.2.4 above). The Sundarbans were declared a World Heritage Site in 1997, because of the region's significance "as one of the largest remaining areas of mangroves in the world, which supports an exceptional biodiversity with a wide range of flora and fauna, including the Bengal Tiger, and provides a significant example of on-going ecological processes: monsoon rains, flooding, delta formation, tidal influence and plant colonisation."[13]

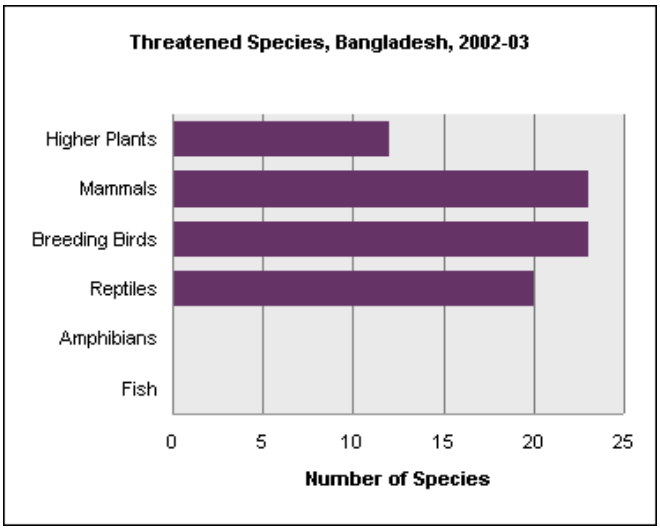
Satellite imagery shows that the sea level in the Sundarbans has risen at an average rate of 3.14 *centimetres* a year over the past two decades - much higher than the global average of 2 *millimetres* a year. A number of outer islands have already been lost to the sea. Human interference with this ecosystem plays a role, through destabilising the fragile balance between erosion and sedimentation.

[11] Construction of the Farraka barrage over the upstream of the Ganges by India in West Bengal, reduced the water flow significantly during dry season which increased the salt intrusion from the sea water and disturbed/changed/altered/modified the ecosystem
[12] http://www.sacep.org/html/regional_environment.htm
[13] http://whc.unesco.org/pg.cfm?cid=31&id_site=798

Species Loss

With Bangladesh's depleted natural habitats, the survival of many species is severely threatened.

Figure 3: Number of Species threatened in Bangladesh[14]:



[14] http://earthtrends.wri.org/text/biodiversity-protected/country-profile-140.html

3.3.2 *Protected Areas*

Despite the large extent to which natural ecosystems and species are threatened, only 0.5%-1.5%[15], or 66,000–228,000 ha, of the country are protected to any degree. In addition, 2 areas, the already mentioned Sundarbans, and the Tanguar Haor, are listed under the Ramsar Convention as Wetlands of International Importance.

Table 5: List of Wildlife Sanctuaries, National Parks, and Game Reserves in Bangladesh[16,17]

Name	*Status*	*Area '000ha*	*Forest type*
Sundarban East	WS	31.2	Mangrove
Sundarban South	WS	37	Mangrove
Sundarban West	WS	71.5	Mangrove
Rema Kalenga	WS	1.8	Mixed evergreen
Char-Kukrimukri	WS	0.04	Mangrove
Pablakhali	WS	42	Mixed evergreen
Chunati	WS	7.8	Mixed evergreen
Hazarikhi	WS	2.9	Mixed evergreen
Teknaf	GR; Elephant	11.6	Mixed evergreen
Himchari	NP	1.7	Mixed evergreen
Bhawal	NP	5	Deciduous
Modhupur	NP	8.4	Deciduous
Lawachara	NP	1.3	Mixed evergreen
Kaptai	NP	5.5	Mixed evergreen
Total		*227.7*	

The overall area of protected sites in Bangladesh falls far short of the average of its Asian neighbours with >8%.. Because of endemic corruption, these already limited conservation efforts are easily abandoned for short-term economic benefits.

3.3.3 *Alien Invasive Species*

The introduction of alien invasive species of flora and fauna were deliberate in Bangladesh, primarily in order to increase productivity. However, some of them were introduced for decorative or ornamental purposes. Almost all the alien invasive species in Bangladesh possess high growth rates, i.e. high turnover rate.

The introduction of alien species has a long history in Bangladesh. Perhaps the first widely introduced alien species brought into Bangladesh for decorative purposes is Water Hyacinth *(Eichhornia crassipes),* which was brought from Brazil during the British period. At that time, it was not realised that this species could turn into an

[15] Compared with the potential forested area of Bangladesh, which the Forest Department estimates at around 25%, the protected areas represent around 2-6%

[16] http://www.moef.gov.bd/html/state_of_env/pdf/bangladesh_biodiversity.pdf

[17] For the categories of protected areas in Table 5 the following definitions apply:
WS: Wildlife Sanctuary means an area closed to hunting, shooting or trapping of wild animals and declared as such under Article 23 by the government as undisturbed breeding ground primarily for the protection of wildlife inclusive of all natural resources such as vegetation soil and water"
NP: National Park means comparatively large areas of outstanding scenic and natural beauty with the primary object of protection and preservation of scenery, flora and fauna in the natural state to which access for public recreation and education and research may be allowed.
GR: Game Reserve means an area declared by the government as such for the protection of wildlife and increase in the population of important species wherein capturing of wild animals shall be unlawful.

aquatic weed. Now it has invaded almost all the wetlands of Bangladesh. Introduction of *Acacia* and *Eucalyptus*[18] during the 1980s, from Australia, has created controversies and problems. They produce leaves which are not easily degradable. Consequently, the soil becomes less fertile. In addition, they absorb large amounts of water and so indigenous trees cannot properly grow around them. These trees do not support indigenous wildlife, since no edible fruit are produced.

Some introduced fish spread throughout the wetlands because of regular flooding. As they are predatory carnivores, they are fed from cultivators with all available resources including collected animal cadavers. This practice in turn threatens the indigenous vulture population.

3.3.4 Crop and Livestock Genetic Diversity

In Bangladesh, as in other developing countries, genetic diversity in rice and wheat has steadily eroded, due to the dominance of a handful of high-yielding varieties. In Bangladesh, for example, such wheat varieties covered about 96% of the wheat area in 1984 with 67% of the wheat land planted to a single variety.

During the 1990s, Nayakrishi Andolon, the New Agriculture Movement, was introduced as a community-based system of organic farming. The local species, varieties and breeds are always preferred to those that are introduced. The strategy of Nayakrishi Andolon, for the maintenance and regeneration of biodiversity and genetic resources, is based on simple rules and obligations between members. The strategic importance is in the conservation and regeneration of species, and the genetic variability of the cultivated crops and homestead forestry. Around 65,000 families[19] from all over Bangladesh now follow Nayakrishi principles, and the movement is spreading fast. Most important is the general confidence among farmers that Nayakrishi is “economically viable”, but the ecological situation is also improving, the land is regaining fertility and biodiversity is being strengthened

3.4. Coastal and Inland Fisheries

Fisheries in Bangladesh, and in particular marine and brackish-water fisheries, are faced with a dilemma. On the one hand, fisheries provide the people of Bangladesh with protein at a reasonable price, and generate employment, income and foreign exchange. On the other hand, fisheries – particularly the in-shore marine and estuarine fisheries – are under stress, due to overfishing, environmental and habitat degradation, and competing uses of water systems. The largest share of fish supply in Bangladesh comes from open-water inland fisheries. Due to overfishing, indiscriminate use of insecticides and pesticides, the building of flood control dams, siltation of rivers and other open waterbodies, pollution by industrial effluents, lack of effective conservation policies and capture of brood stock and juveniles, open-water inland fish production has decreased dramatically. Its contribution to total fish production dropped 80% in earlier days to 60% in 1984/85 and 50% in 1993/94. The decline in inland fisheries has been compensated by an increase in production from aquaculture[20] and marine fisheries, and in particular from coastal fisheries. However, marine and in particular coastal fisheries are now again under stress from

[18] Information of the ‘Invasiveness’ of Eucalyptus species can be found here : http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/Eucalyptus_globulus.html

[19] Data from: Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries, FAO 200w,

[20] The development of aquaculture was mainly donor driven, yields increased from around 100.000 t on 1980 to 400.000 t or 30% of production today.

overexploitation, environmental constraints, competing use of coastal areas and resources for different economic activities.

3.5. Urban / Industrial Environment

3.5.1 Air Pollution

During dry seasons, air pollution in Bangladesh's cities is serious. Air pollution is mainly caused by industrial and vehicular emissions. Mainly 2-stroke, diesel-run vehicles emit exhausts which are highly contaminated with respirable sooth particles and hydrocarbons. Larger cities, because of industrial concentration and the higher number of vehicles, experience considerable air pollution. However, poor and inadequate road conditions, high traffic density and management, inadequate maintenance of commercial vehicles, lack of proper monitoring and control of industrial emissions, and non-implementation of existing rules and regulations, contribute to the pollution of ambient air.

SPM and ambient SO2 levels in Dhaka were about 4 to 5 times higher than the levels prescribed within Bangladesh Air Quality Standards. These concentrations are 12 times and 10 times higher than the WHO Standards. Recent measurements indicate a considerable fall in $PM_{2.5}$ concentrations at the Dhaka Farm Gate measurement station between 2002 and 2004 (see figure 4 below). This could be partly due to the ban on 2-stroke engine 3-wheelers which went into effect in January 2003. No corresponding decrease in $PM_{2.5}$ concentrations is observed at semi residential sites.

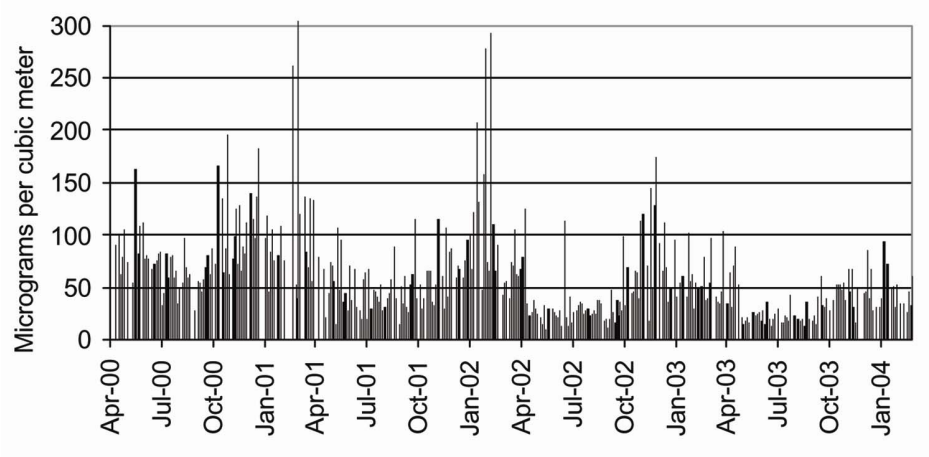
Table 6: Ambient PM_{10} and $PM_{2.5}$Concentrations (µg/m³) in Dhaka[21]

Size fraction	*Urban*	*Rural*	*Limits 24hø- annual ø*
PM_{10}	123±82	56±35	40-50 EEA
$PM_{2.5}$	51±43	21±11	15-65 USEPA
$PM_{2.5–10}$	72±69	35±33	—

According to a WB study, Elevated PM10 concentrations in Dhaka were found to be responsible for an estimated 6,000 premature deaths and 50,000 cases of chronic bronchitis[19]. BAPA, a Bangladesh NGO, cites a WB study indicating that the four major cities in Bangladesh - Dhaka, Chittagong, Khulna and Rajshahi - lose about 15,000 lives each year from air pollution. An estimated 6.5 million people in these cities suffer from acute respiratory infections caused by air pollution. BAPA cites an ADB sponsored report, showing that 3,850 premature deaths could be avoided had there been a reduction of SPM concentrations in Dhaka to the level of Bangladesh Air Quality Standard. Economic costs, because of such deaths and illnesses in Bangladesh, may reach more than €600 million per year.

[21] http://www.worldbank.org/html/fpd/esmap/pdfs/253-02_1.pdf

Figure 4: 24-Hour Average PM2.5 Data at Farm Gate, Dhaka, Bangladesh[22]



Within rural areas, similar severe air pollution problems have not yet been reported, mainly because of fewer of motorised vehicles and polluting industries. In the rural environment, the principal air pollution sources include the stack emissions from brick kilns and the smoke from industrial and household use of firewood, coal and biomass as the source of energy.

The GoB set up an Air Quality Management Project, which monitors relevant parameters in 6 cities, and published, to June 2004, an Air Quality Index online. Since the project appears to be no longer operational, monitoring results are no longer available online. Within the scope of the project, a detailed list of Emission Quality Standards for vehicles has been proposed. The actual implementation status is not known. A GoB success has been the phase-out of leaded gasoline in 1999.

Poor households in Bangladesh, whether in urban or rural areas, depend heavily on wood, dung and other biomass fuels for cooking. New monitoring data for respirable airborne particulates PM_{10} in indoor air, within a large number of Bangladeshi households, indicates that concentrations of 300 $\mu g/m^3$ or greater are common. Such observation implies widespread exposure to a serious health hazard from polluted indoor air, in addition to the hazards posed by polluted ambient air.

3.5.2 Urban and Industrial Waste

3.5.2.1 Municipal Solid Waste

Comprehensive waste characterisation studies have not been conducted in Bangladesh. Consequently, there is limited reliable information related to quantity of wastes generated in the urban areas of Bangladesh, and estimates are based on sampling and experiences in similar countries. Solid waste generation in Bangladesh is growing proportionately with the growth of urban population. Table 7 shows the actual and projected growth in solid waste generation over the years:

[22] Tackling Air Pollution in South Asia, http://lnweb18.worldbank.org/sar/sa.nsf/Attachments/Chapter1/$File/Chapter+1.pdf

Table 7: Total Urban Solid Waste Generation in Bangladesh

Year	*Total Urban Population*	*Urban Population (%Total)*	*Waste Generation Rate (kg/cap/day)*	*Total Waste Generation (t/day)*
1991	20,872,204	20.15	0.49	9,873.5
2001	28,808,477	23.39	0.5	11,695
2004	32.765.152	25.08	0.5	16,382
2025	78,440,000	40.00	0.6	47,064

Major waste sources are: 46.8% households, 21.8% street sweeping, 19.2% commercial, 12.9% industrial, and 0.5% clinical. The collection efficiency of the formal waste management system is around 40%-50%. The informal system (waste scavengers) recycles approximately 10-15%, whilst self-disposal, or illegal dumping of uncollected waste, amounts to 35%-50%.

The problem of uncollected waste in urban areas is most prevalent in low-income neighbourhoods, where 20% to 50% of the urban dwellers live. Middle-income and high-income neighbourhoods take matters into their own hands, hiring their own neighbourhood waste collectors, and covering the necessary costs. A safe disposal of wastes collected is, of course, not included in such services. Due to scarcity of land in Bangladesh local authorities have been resorting to the practice of dumping garbage at certain selected locations without any consideration of the adverse effects of such dumping. Despite this alarming situation, there is no adequate legislation in the country to address the growing problems of solid waste. Solid waste management is entrusted to urban local government bodies. The responsibility of removal and disposal of municipal solid waste lies with City Corporations and municipalities.

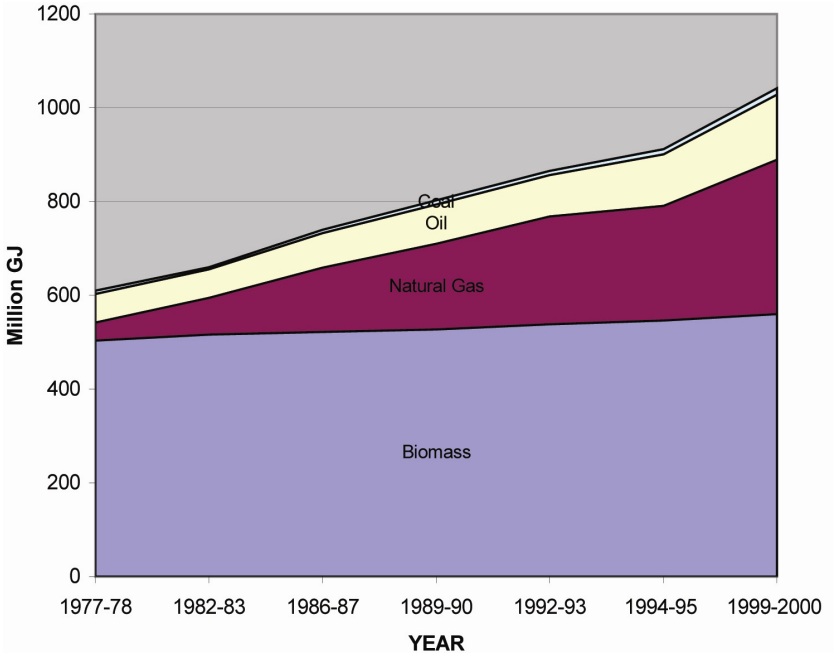
3.5.2.2 Hazardous Waste

Toxic and hazardous waste from different sources end up in communal bins. There is no separate collection system for these wastes in the city, causing health risks for the population. Industrial units in the manufacturing sector cover a few areas, such as textiles, tannery, fertiliser and cement. Most of these industries discharge waste into the river, after some treatment as required by the regulatory agencies. In practice, regulatory rules are not strictly followed or monitored. There are about 250 tanneries in the Hazaribag area of Dhaka city, where millions of pieces of hides are processed and most toxic chemicals used in processing are discharged into the river untreated.

3.6. Energy

Bangladesh has large reserves of natural gas and some petroleum deposits. Natural gas is piped into Dhaka and Chittagong for industrial use. There are large deposits of low-grade coal at Jamalpur. Bangladesh is nevertheless an energy-starved country. Only around ⅓ of the population currently enjoys access to the electricity grid. Per capita energy consumption remains at around 0.1 toe, one of the lowest in the world. Fossil fuel accounts for 58% of the Total Primary Energy Supply, whereas Hydropower accounts for less than 1%, and the remaining demand is supplied with primary solid biomass, e.g. firewood, dung, biogas, etc. At present, the only relevant domestic energy resource of the country is natural gas, which represents 68% of commercial energy requirements.

Figure 5: Total Primary Energy Supply Bangladesh 1971 - 2000[23]



3.6.1 Carbon and Energy-Related Emissions

Table 8: CO_2 Emissions in the Year 1999-2000 (in Magatonnes)[20]

Sector	*Coal*	*Oil*	*Natural Gas*	*Total Commercial*
Power Generation		0.90	7.94	8.84
Residential		1.76	1.67	3.43
Commercial	0.10	0.09	0.21	0.40
Industrial	0.89	0.52	2.20	3.61
Transport		3.83		3.83
Agriculture/Others		1.72		1.72
Emission from Urea Production Plants			3.22	3.22
Losses and Own Use		0.14	1.32	1.46
Total	0.99	8.96	16.56	26.51

Over 80 million rural people cook with biomass, which does not contribute to CO_2 emissions. Hence Bangladesh's overall and per capita CO_2 emissions from fossil fuels are amongst the lowest in the world. Satisfying future commercial energy demand with the best available technology will offer abundant opportunities for projects under the CDM mechanism.

[23] http://www.pembina.org/pdf/publications/cdm_bangladesh_new.pdf

3.6.2 Renewable Energy

Bangladesh's Ministry of Energy and Mineral Resources in 2002 formulated a Draft Renewable Energy Policy[24]. There, GoB describes its vision to provide electricity to the whole country by the year 2020. At the same time, the Ministry states that a major electrification through grid expansion would not be a 'viable option for most parts of Bangladesh in the foreseeable future, mainly due to inaccessibility and low consumer density.' The power grid reaches about 15% of households. Therefore, renewable energy sources will have to take on a vital role in off-grid electrification. Favourable natural conditions, like sufficient sunshine and wind-speed, exist for promotion of renewable energy in the country. However, prior attempts to develop renewable energy in Bangladesh were a limited success, due to policy, institutional, financing, market, information, technical and human resource barriers. In Bangladesh, efficient utilisation of renewable energy resources is yet to assume commercial dimensions and hence rational policy dissemination on renewable energy usage is essential.

3.7. Impact of Climatic Change

With its high population density, low level of development, and low lying deltaic mass, Bangladesh has already been facing a number of natural and man made problems. Natural hazards, like cyclones, floods and droughts, and socio-economic problems such as poverty, low literacy, poor health delivery systems and high unemployment are some of them. In the future, Bangladesh may also have to face the adverse impact of developments across its border, which among other things, are expected to reduce the availability of water during the dry season, and to deal with the impact of climate change and sea level rises.

Climate change poses significant risks for Bangladesh, yet the core elements of its vulnerability are primarily contextual. Around 20% of the country is normally flooded each year. Extreme events can inundate as much as 70%. Many projected climate change impacts for Bangladesh, including sea level rise, higher temperatures (mean temperature increases of 1.4°C and 2.4°C are projected by 2050 and 2100 respectively), evapo-transpiration losses, enhanced monsoon precipitation and run-off, potentially reduced dry season precipitations, and increases in cyclone intensity, would reinforce many of the baseline stresses described above, and pose a serious impediment to the economic development of Bangladesh. Key climate change impacts and vulnerabilities for Bangladesh are within the water and coastal resources sectors, concerning urgency, and severity of impact, as well as the importance of the resources being affected. Impacts of Climate Change on Bangladesh comprise[25]:

- Increased flooding, due to glacier melt and higher precipitation
- Increase in frequency and intensity of cyclones, in particular peak intensity may increase by 5% to 10% and precipitation rates may increase by 20% to 30%
- Sea level rise, with estimates varying widely at 9-100 cm by 2100
- Ecosystems – loss of Sundarbans by inundation and salinisation
- Degradation of near coastal infrastructure, 1 m rise in sea level would inundate 18% of Bangladesh's total land. Based on current population distribution it would directly threaten 11% of the country's population with inundation, ⅛ of the country's agricultural land and 8,000 km of roads.

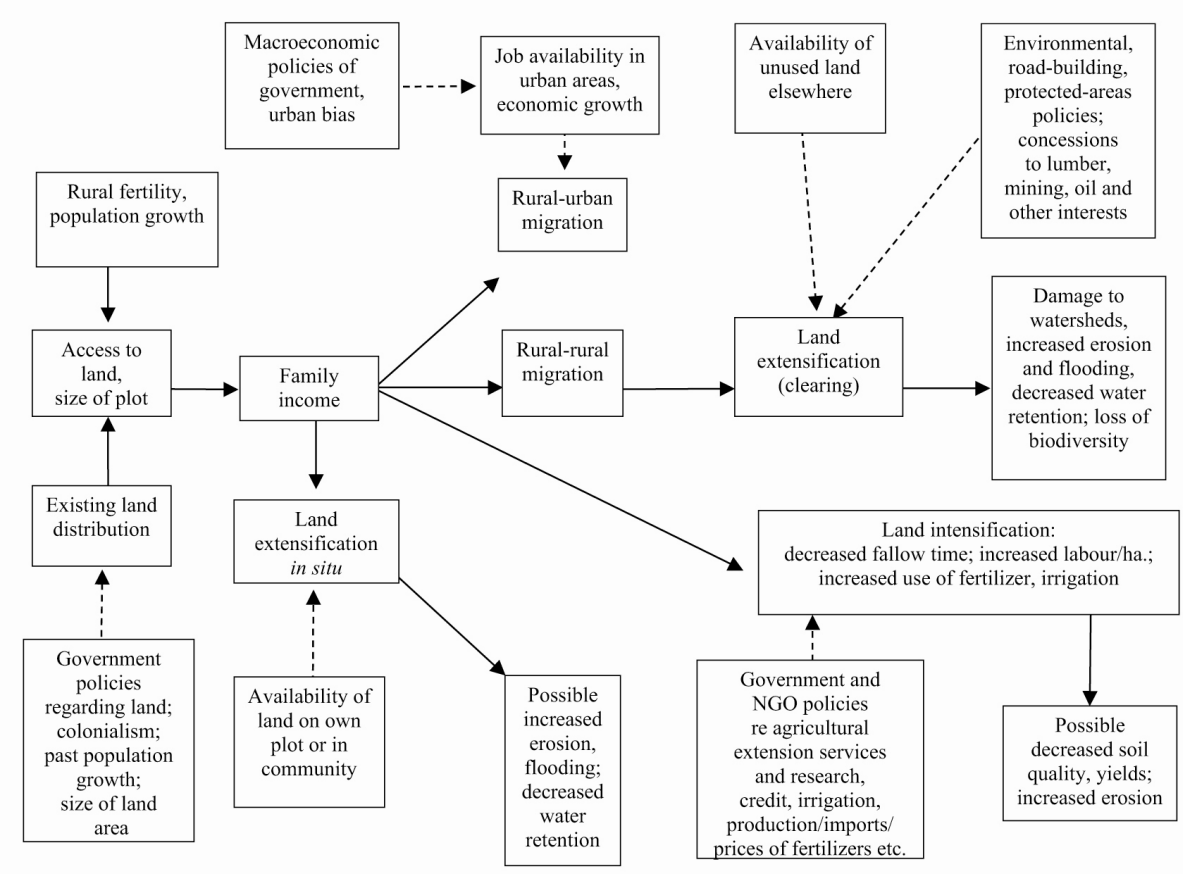
[24] http://www.sdnbd.org/sdi/issues/energy/national-policy/
[25] World Bank, 2000 : Bangladesh - Climate Change and Sustainable Development

Bangladesh is too poor to be able to adapt to a rise in sea level. The costs of protection would be substantial. An estimated 4,800 km of existing coastal defences would need upgrading, and an additional 4,000 km of new defences would be needed. It should be noted that 22–53%, and up to 7% of emergency measures, of current donor investments are put at risk by potential climate change impacts. The implementation of Bangladesh's Interim Poverty Reduction Strategy, National Water Policy, National Environmental Management Action Plan, National Land Use Policy, National Forest Policy and National Tourism Policy would need re-definition.

3.8. Population and Environment

Most environmental impacts described in the preceding chapters are caused by human activity. Bangladesh, apart from some city and small island states, is the most densely populated country. Population density adds a further dimension to environmental problems. Certainly not all environmental impacts are caused from Bangladesh's population. Climate Change is a prominent example. A 2001 UN report[26] emphasises that 'there is a special situation with respect to population when the issue is one of preserving a unique, biologically rich, or fragile ecosystem. Such preservation is inherently incompatible with dense human settlement or heavy exploitation of the resources of the protected area. Population growth within and near the preserve can be a factor, among others, placing such areas at risk of degradation.' The continued destruction of natural resources resulting from attempts to extend the agricultural frontier is very likely to continue in the future leading 'to overuse, misuse and quality degradation.' This cause effect relationship will further drive rural>urban migration and migration to other countries (see fig 6).

Figure 6: Linkages among rural population growth, migration and the rural environment[22]



Even where sheer population size may not be the root cause for environmental stress, population pressure is definitively an aggravating factor. Development related impacts within urban areas, such as waste generation, and water and air pollution, are aggravated by high population density. In most cases, the poorer residents of large cities then bear the human cost of environmental degradation.

Population and development policies related to population size, growth and distribution via interventions in e.g. the health and education sectors are therefore vital components in development cooperation, which intends to ensure sustainable development and safeguarding the environment.

4 ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

4.1. Environmental Policy and Legislation

4.1.1 Policy and Action Plans

The Constitution of Bangladesh asserts that 'it shall be a fundamental responsibility of the state to attain, through planned economic growth, a constant increase of productive forces and a steady improvement in the material and cultural standard of living of the people' (Art. 15). Environmental policy and planning in Bangladesh thus have longstanding traditions. Table 2 in section 2.4 provides an overview of past and current planning.

The latest Five Year Economic Development Plan addresses environmental themes, which are in general congruent with the assessment contained in this Country Environment Profile:

- *"Agricultural resource base*: To allocate limited supplies of water to its uses for agriculture, salinity control, fisheries, navigation and a growing urban population for sustained development. Reverse the current trend of severe pressure and environmental strain on land resources. Rebuild, and where possible, augment the productive capability of scarce and essential agricultural resource base.
- *Biodiversity*: In making a breakthrough in agricultural technology, it is necessary to preserve the variety of life. Hence, the preservation of biodiversity is both a matter of insurance and investment, necessary to sustain and improve agriculture, forestry, and livestock and fisheries production systems in order to keep future options open as a buffer against harmful environmental changes and as a raw material for scientific and industrial innovations. The importance of species and ecosystems will be considered in the formulation of development policies and programmes. Institutions assigned responsibility for conserving biodiversity will be supported by necessary financial and organisational resources.
- *Biomass:* At the moment, there is an acute crisis of biomass fuel, which constitutes 73 per cent of total energy consumed. The per capita supply of biomass fuel is declining. There is an increased use of crop residues and dung as fuel which is depriving soil of valuable nutrient and organic matter.
- *Impact of chemicals*: Modernisation of agriculture has led to an extensive use of fertilisers and pesticides.
- *Industrial pollution:* The growth of industries in the country has generally been unplanned without keeping the issue of environmental protection in careful

consideration. There are many industries in the residential areas causing air and water pollution through smoke emission and dumping of untreated effluent.

- *Deforestation:* Bangladesh has a classified natural forest area of around 6-8% of the total land area which is far below the desired level.
- *Wetland and fisheries:* Bangladesh has a high proportion of wetland area, which has, of late, been declining.
- *Mangrove ecosystem:* The Sundarbans, located in the southwestern part of Bangladesh is the largest single expanse of mangrove forest in the world. The degradation of environment in the Sundarbans has been taking place due to rapid deforestation, top-drying, saline water intrusion, killing of wild life, inadequate reforestation and lack of efficient conservation programmes.
- *Coastal and marine water:* Disposal of chemical fertilisers, insecticides and industrial effluent into water are leading to a severe pollution of the coastal and marine environment."[27]
- *Salinity:* Diversion of the Ganges water has thus far drastically reduced the downstream flow of its distributaries. Consequently, saline seawater entered into the mainland rivers. It has adverse effects on agriculture and sweet-water shrimp cultivation, and also on availability of sweet water for domestic and other uses.

Having identified these issues, the commitments to action are vague and no action plan has been devised to date. The results of Bangladesh's Environment policy centre on raised awareness for environmental issues and showing tangible results. The depletion of the environment seems to continue unabated.

4.1.2 Legislation, Current and under Preparation

Bangladesh has developed the basic legislation necessary to control environmental developments, to some extent. No legislation concerning solid waste management has been developed yet. Legislation currently enacted is only partially available in English translation; therefore a more detailed overview or analysis is not possible.

Table 9: Environmental Legislation in Bangladesh; Acts, Ordinances, Rules and Regulations[28]

Major Environmental Legislation	*Year*
The Environment Ordinance	1977
Forestry Act	1927
Factories Act	1965
Bangladesh Wildlife (Preservation) Act	1973
Marine Fisheries Ordinance	1983
Pesticide Rule	1985
Marine Pollution Ordinance	1989
Environment Conservation Act	1995
Environment Conservation Rules	1997

[27] Five Year Plan 1997 -2002, Chapter X ; http://www.sdnbd.org/sdi/metadata/fifth5-yesr-plan/54.htm
[28] http://www.rrcap.unep.org/country/cp/sasia/cp_Bangladesh.cfm

Recently, Noise Pollution Control Rules have been proposed, but are not legislated yet. A recently enacted regulation bans polyethylene shopping bags. The present government formulated an action plan, discussing control of vehicular air pollution, and improvement of transport systems. For example, The Environment Conservation Rules 1997 has been amended and, under this, the use of Catalytic Converter and Diesel Particulate Filters for Petrol and Diesel driven vehicles respectively have been made mandatory.

The Ministry of Communication banned 2-stroke 3-wheelers in Dhaka City from January 2003. A ban has also been imposed in Dhaka City from 1 January 2002 for public transport vehicles older than 20 years, and commercial vehicles older than 25 years. Other activities concern the introduction of 4-stroke CNG run-autorickshaws, use of low sulphur content coal as fuel, installing chimneys with a minimum height of 40 m in the brick kilns, and promoting the manufacture of concrete blocks as alternative to bricks.

To preserve the ecological balance of hilly areas of the country, the government has taken various regulatory and non-regulatory measures to curb indiscriminate cutting. In addition, the government is considering issues like wetland conservation, electricity generation and fertiliser production from municipal wastes; reducing river pollution and improving the environmental performance of ship scrap yards. All such activities are, however, severely constrained by inefficient control and enforcement.

4.1.3 Public Participation

In principle, Bangladeshi law includes provisions for public participation. For example: on application from a local environmental group, the High Court Division of the Supreme Court also intervened to judge on the legality of a development project called the Flood Action-Plan-20. The petitioner accused the authorities of violating a number of laws that ensure people's participation in the decision making process, provide for compensating affected people for all sorts of loss and protecting the national heritage. The Court delivered judgment on 28 August 1997 and observed, "... in implementing the project, the respondents (government) cannot with impunity violate the provisions of law". The Court directed the authorities to execute the work in compliance with the requirements of law that guarantee right to participation and compensations. It remains nevertheless questionable to what extent legal rights to public participation in Bangladesh are adequately considered in day-to-day administrative practice. It can reasonably be assumed that, as the international donor community extends considerable support to Bangladesh via local NGOs, civil society has a chance to voice concerns and forward proposals via NGOs.

4.1.4 Government Approach to Key International Environmental Conventions

Bangladesh is a Party to:

Convention:	*Signature/ Accession*
• Convention on the Prohibition of Military or any Other Hostile Use of Environmental Modification techniques, 1976	3.10.1990
• Vienna Convention for the Protection of the Ozone Layer, 1985	2.08.1990
• Montreal Protocol on Substances that Deplete the Ozone Layer, 1987	2.08.1990
• Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, 1990	18.03.1994
• Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989	1.04.1993
• United Nations Framework Convention on Climate Change, 1992	15.04.1994
• Kyoto Protocol, 1997	22.10.2001
• Convention on Biological Diversity, 1992	3.05.1994
• United Nations Convention to Combat Desertification, 1994	26.01.1996
• Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, 1997	27.07.2001
• Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), Paris, 1972	03.08.1983
• Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, D.C., 1973	18.02.1982
• Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), Ramsar, 1971	21.09.1992

Bangladesh is not party to:

- Convention on the Conservation of Migratory Species of Wild Animals (CMS), Bonn, 1979
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Helsinki, 1992

4.2. Environmental Institutional Framework

4.2.1 Institutional Structure and Responsibilities

Table 10: Environmental Responsibilities in Bangladesh

Institution	*Created*	*Responsibilities*
Ministry of Environment and Forest	1989	Permanent member of the Executive Committee of the National Economic Council
Department of Environment	1989	environmental planning, management, monitoring and enforcement
Department of Forest		research on deforestation, soil erosion and other
International Institute of Environment Studies	1989	possible causes of flooding

Environmental responsibilities are also found within a number of other Ministries responsible for:

- Agriculture,
- Flood and Disaster Management,
- Housing and Public Works
- Fisheries and Livestock
- Communication
- Industries
- Water Resources
- Local Government, Rural Development.

4.2.2 Capacity and Financial Resources

The capacity to analyse environmental issues and to develop adequate policy responses seems to be available within Bangladeshi institutions concerned with environment. The capacity to develop and implement action programmes, which halt or even reverse the deterioration of the physical environment, is lacking. The non-development and development budget for the Ministry for Environment and Forest for 2004 -05 is about €32.5 million.

4.3. Sectoral Integration

According to the GoB's State of the Environment Report, integration at the policy level needs to be pursued to promote sustainable development in the country, as well as improve the environment and quality of life as integral parts of the process. The integration of Climate Change issues into National Water Policy are cited as a 1st success. Table 11 presents 2 themes identified by the GoB for which sector integration will be pursued.

Table 11: Sectoral Integration Policy in Bangladesh[29]

Policy and Policy Level Integration	*Process and Requirements*	*Actors and Participants*
Land use Policy	A consultative process is required for integrating sectoral policies and bringing coherence among the policies Resources are required for integrating sectoral policies and developing a comprehensive land use policy	Ministry of Environment and Forest can take coordination role for integrating sectoral polices, in association with Ministry of Land Ministry of Water Resources, Ministry of Agriculture, Ministry of Industry, and Ministry of Trade and Commerce will be the other major participants in this exercise Non-government research and policy institutes, academicians, and participation of civil service organizations will make it more acceptable to society

[29] GoB, State of the Environment Report, 2001

Policy and Policy Level Integration	*Process and Requirements*	*Actors and Participants*
Integrating Environment and Climate Change into Sectoral Policies	A consultative process is required for integrating environment and climate change issues into sectoral policies Resources are required for integrating these issues into the sectoral policies	Department of Environment under the Ministry of Environment and Forest can take the lead in integrating environment and climate change issues into sectoral polices. Climate change issue is already incorporated in the National Water Policy, which could be used as an example for other sectoral policies Non-government research and policy institutes, academicians, and participation of civil service organizations will make it more acceptable to society

Further sector integration is pursued via permanent membership of the Minister of Environment in the Executive Committee of National Economic Council (ECNEC). The ECNEC's tasks comprise:

- to consider and approve development projects costing above €5.5 million;
- to consider and approve investment projects in the private sector costing above €1.5 million;
- to review the progress of implementation of development projects;
- to consider proposals for investment companies as private or joint ventures or with foreign participation;
- to promote the economic situation and review overall performance of the economy and related policy issues;
- to consider financial performance of statutory corporations and especially their financial results;
- to consider rates, fees and prices of public utility services or products of public enterprises.

In the light of the actual distribution of environmental responsibility over a wide range of ministries, as described in 4.2.1, these intentions for sectoral integration are laudable, but only constitute a start.

4.4. EC and other International Development Assistance

4.4.1 EC Co-operation with the Country from an Environmental Perspective

For the preparation of this CSP no travel to Bangladesh was foreseen from the Commission Services. Inquiries with the EC Delegation to Bangladesh concerning environmental relevant projects in development co-operation have not been answered. Hence this chapter is based on an assessment of published strategy and project documents as well as documents on the EC Headquarters', the EC Delegation's and other websites and indirect information sources.

Current EC cooperation with Bangladesh as described within the EC's National Indicative Policy for Bangladesh comprises the following priority interventions:

- *Basic Health*: €120 million to tackle problems such as HIV/AIDS, urban areas (i.e. expand basic health coverage beyond the rural areas), arsenic (supply with safe drinking water which is seriously imperilled by the discovery of widespread arsenic contamination of the ground water which leads to arsenic poisoning of the population in whole regions of Bangladesh), nutrition and regulatory issues (improved public sector efficiency, through structural reforms, de-centralisation, revised drug policy, as well as regulation and governance in the sector).
- *Education:* €135 million allocated to the Government of Bangladesh's primary education and development programme, support for NGOs in providing quality education outside the State system and support for access to education for children with disabilities.
- *Food security and rural development co-operation:* €95 million to improve food security for the poor, particularly for women, improved nutritional practices (food preparation, awareness of nutritional value in traditional foods and better management of very limited natural, human and financial resources by targeted resource poor farmers).
- *Trade development:* In line with the new emphasis given to trade and economic co-operation, €23 million are allocated for actions specifically aimed at enhancing the government's capacity to take part in the trade negotiations of the Doha Development Round, and support the export oriented sectors of the economy.

A summary of environmental aspects and opportunities related to the above priority activities and potentially to be considered in project development and management is presented in Table 12 below.

Table 12: Environmental aspects and opportunities of the EC NIP priority activities for Bangladesh

Priority area in Bangladesh NIP	*Associated environmental aspects*	*Potential opportunities to mainstream environmental issues*
Basic Health	increase of hospital and medical wastes: infected materials and tissue, one-way medical equipment as syringes etc., packing materials, obsolete medication for which hitherto no safe collection and disposal structures and facilities exist	- introduction of collection, sterilisation and safe disposal of hospital and medical waste - utilisation of health facilities as environmental showcases with regard to better use of and environmental compliance of building materials and specifications, safe water supply, sanitation, renewable energy utilisation - vehicles purchased within projects should not use polluting Diesel but rather cleaner Petrol or CNG and sufficient maintenance assured - include environmental themes in basic health education as e.g. indoor air pollution from open fire cooking and insufficient ventilation, population and environment in family planning (link to Gender issues) - address issues related to occupational health and safety as e.g. unhealthy working conditions in Chittagong ship-wrecking yards - develop capacity building measures for local officials and representatives within the health sector to integrate environmental issues and concerns into policy development
Education		- utilisation of education facilities as environmental showcases with regard to better use of and environmental compliance of building materials and specifications, safe water supply, sanitation, renewable energy utilisation - include basic environmental awareness and information in education programmes, including the population-environment nexus - vehicles utilised/purchased within projects, e.g. school busses, should not use polluting Diesel but rather cleaner Petrol or CNG and sufficient maintenance to be assured. - develop capacity building measures for local officials and representatives within the education sector to integrate environmental issues and concerns into policy development

Table 12 cont'd:

Priority area in Bangladesh NIP	*Associated environmental aspects*	*Potential opportunities to mainstream environmental issues*
Food security and rural development	- reduced bio and genetic diversity due to the potential introduction of monoculture, cash crops for export and genetically engineered crops - over-utilisation of water resources - stress on soil fertility and stability - storage, handling and disposal of agrochemicals and chemical fertilisers, obsolete chemicals, livestock medication - air and water pollution from livestock farming, leaching pesticides and fertilisers during periods of floods - disposal/ utilisation of livestock manure - loss of agricultural land for shrimp farming	- support genetic diversity by promoting local adapted plants and livestock - capacity building for farmers regarding sustainable utilisation of natural resources - optimisation of fertiliser and agrochemical input, handling and disposal of obsolete chemicals and packaging - address surface water pollution to secure inland open water and coastal fisheries - support Nayakrishi Andolon principles (see 3.3.4 above) - develop capacity building measures for local officials and representatives within the agricultural and food sectors to integrate environmental issues and concerns into policy development
Trade	- changed composition and scale of production and consumption leads to more and often more hazardous industrial and consumer waste, pollution and energy consumption - overexploitation of natural resources for export opportunities - discrimination of local production patterns - reduction of genetic variety in agriculture - forced rural to urban migration, informal settlements etc.	- transfer of best practice related to environment to exporting industries and farmers - promote optimised utilisation of natural resources and renewable energy where appropriate - opportunity to influence national policy with trade related measures based on multilateral agreements as e.g. Basel Convention, Montreal and Kyoto Protocols, SPS and TBT - promote the development and implementation of improved environmental legislation and enforcement - develop capacity building measures for local officials and representatives within the trade, agriculture and industry sectors to integrate environmental issues and concerns into policy development

In addition to these priority activities the NIP identified a number of projects in other areas such as peace building measures, community development activities, small projects in local communities and a longer term plan of action in the area of water and natural resources in Chittagong Hill Tracts (€7.5 million).

The NIP further includes actions to strengthen election procedures, promote democratic functioning of the parliamentary system of Bangladesh and support government activities for the improvement of the human rights situation and access to justice for vulnerable groups (€31.5 million). This list includes environmental projects related to groundwater contamination and for the water and natural resources sectors. From the co-operation projects listed on the Delegation's website some (see Table 13) include environmental components.

Whether, within these projects, opportunities for environmental mainstreaming always have been utilised could not be assessed remotely. In this context, the evaluation of the EU-Bangladesh[30] co-operation strategy notes that 'commitments in the second and third strategies to mainstreaming crosscutting issues into all interventions have not been sufficiently carried through into practice' although 'large infrastructure projects have protected the environment'. Nevertheless, in projects such as the Coastal Embankment Rehabilitation, 'environmental components tend to be given less priority where they are not seen as falling within the core remit of the implementing agency'. In the Food Sector and Rural Development (FSRD) Programme, environmental mainstreaming was assessed as a 'relative success in most projects.'

Notwithstanding these particular efforts and actions, it was found that EU 'Strategies promote crosscutting issues but no systematised action resulted'. For considering environmental themes during project preparation, according to EC Delegation's staff an Environmental Impact Assessment is required but no methodology or tool for fulfilling the EC's requirement that crosscutting issues be mainstreamed was available. Nevertheless, there are some achievements today, notably on gender and environment mainstreaming in the education, FSRD, in trade and economic co-operation, and rural development programmes[31],.

Table 13: EC- Bangladesh cooperation projects with environmental relevance

Project Title	*Volume €*
Coastal Embankment Rehabilitation Project	15.000.000
Water Supply, Sanitation and Hygiene Promotion for Communities in Difficult Rural Environments	817.313
Empowering the poor to become environmental stewards	650.000
Integrated Pest Management for Cotton in Asia	700.000
South Asia Enterprises Development Facility	10.000.000
Haor Rural Development Programme	500.000

[30] Evaluation of the European Commission's Country Strategy for Bangladesh, 2003

[31] See ‚Manual Project Cycle Management' § 4.1.6 and 4.2.4:
http://europa.eu.int/comm/europeaid/projects/ong_cd/fichiers/rapp_pcm_manual_en.pdf
and here:
http://europa.eu.int/comm/development/body/theme/environment/env_integ/env_integration/envman-30.html#pgfId-341153 including references to various (unfortunately incomplete) sector specific checklists.

4.4.2 *Other Funding Agencies*

Around 40 bilateral and multilateral donors are active in Bangladesh, with external assistance accounting for about 53 % and 58 % of current and capital expenditure of the Government respectively. In total, development assistance accounts for 2.1% of GNP. Despite this substantial amount of external assistance, and given the country's large population, per capita aid was only around €10 in FY1999. The World Bank-International Financial Association (IDA), Japan and the Asian Development Bank are the key development partners/donors in Bangladesh. They constitute over 50% of ODA. Activities of some bilateral donors are listed below:

Japan's International Co-operation Agency, JICA, is the largest bilateral donor to Bangladesh. Its main environmental activities comprise:

- Agriculture / Rural Development and Productivity Improvement
- Improvement of the Social Sector
  - Integrated Approach for Mitigation of Arsenic Contamination in Drinking Water
  - Master Plan Study on 'Solid Waste Management in Dhaka City'
- Disaster Prevention and Management

The UK Department for International Development, DFID, was the second largest bilateral donor in Bangladesh in 2002. The Country Assistance Plan 2003-2006 proposes a budget of > €110 million each year for the next 3 years. Priorities are:

- Pro-poor economic growth for ensuring income and employment of the poor;
- Human development of the poor for raising capabilities through education, health, nutrition and social interventions;
- Participatory governance, enhanced voice of the poor and improved non-material dimensions of well being, including security, power and social inclusion.

The Canadian International Development Agency, CIDA, supports Bangladesh as one of its focus countries, and is increasing aid support. CIDA contributes to poverty reduction and sustainable development in Bangladesh through the following three priority sectors:

- Social development (health and education);
- Governance; and
- Private sector development.

The United States Aid Agency, USAID, has been one of the top aid donors in Bangladesh since independence. Key US national interests in Bangladesh include encouraging stable democratic governance and human rights, promoting market-oriented growth and economic prosperity to help raise living standards and reduce the large bilateral trade imbalance, and advancing national security. ODA disbursement for Bangladesh totalled around €100 million in 2002.

Danish Development Co-operation, DANIDA, concentrates its development efforts on three sector programmes, phasing out project-oriented assistance:

- Water and sanitation;
- River transport; and
- Agriculture.

Norwegian Development Co-operation, NORAD, supports Bangladesh with around €9 million for:

- Health and education
- HIV/AIDS
- Economic development and trade
- Good governance
- Environment and energy (around 20% of expenditure)

- Emergency relief and other cooperation

The Netherlands share in Bangladesh overall ODA was approximately € 33.8 million in 2003. The Netherlands plays a central role in the priority sectors:
- Education,
- Health care and
- Water.
-

German Development Cooperation, GTZ, sees Bangladesh as a priority partner country. GTZ focus on the following three priority areas:
- Health care, including family planning;
- Economic reform and development of the market system, promotion of private sector, especially SMEs;
- Renewable energies.

Overall donor supported projects in the environment sectors are focussed on the Sanitation/ Health, Water Management/ Quality and Pollution Abatement/ Control sectors. An indicative overview of the type of environmental activities from 1998 onwards is provided with Figure 7 on page 39. The classification applied is based on the Local Consultation Group's (see 4.4.3 below for more information) matrix of environmental projects. It appears that the sectors of Climate Change/ Energy, Governance/Policy/Capacity Building, but also Pollution Abatement/Control are relatively under funded compared to these sectors significance for Bangladesh's future sustainable development, challenges of which have been outlined within the previous chapters.

Figure 8, page 39, provides an alternative breakdown of donor supported projects according to donor agencies. As to be expected the large development banks and the UK, because of its historic ties with Bangladesh, bear the largest financing share of development activities in the environmental sector, whereas the EU appears as one of the smaller donors in this field. Compared to other small donors the EU operated a relative large number of activities in this sector, i.e. 15 projects with an average funding volume of around 0,75 Million €. This number of projects is equally large compared to the just 11 projects supported from the World Bank. This imbalance between overall funding and number projects – even considering that the EC does generally not fund physical infrastructure - could eventually indicate a focus on "short term [and] quick delivery rather than long term on solving the problems, which is exactly wrong for solving poverty and sustainability issues."see reference of paragraph below

Any interpretion of the LCG data set needs to be cautious however, because of the intrinsic weakness of the LCG Environment Sub Group. The LCG Environment Sub Group sees its dataset as incomplete and attributes this to a governance failure on the side of the donors regarding communication, aid co-ordination and mainstreaming of environmental issues into development co-operation projects[32].

[32] Compare LCG Environemnt Sub Group Meeting Minutes at : http://www.lcgbangladesh.org/meetings.php?s=4

Figure 7: Donor supported environmental activities in Bangladesh (1998 – onwards)[33]

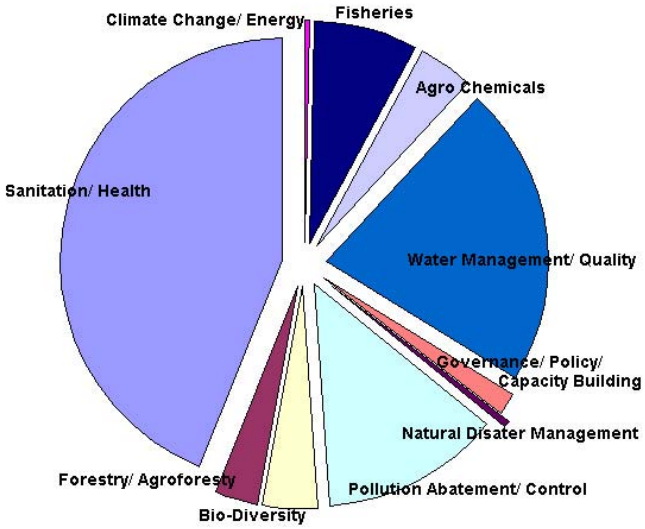
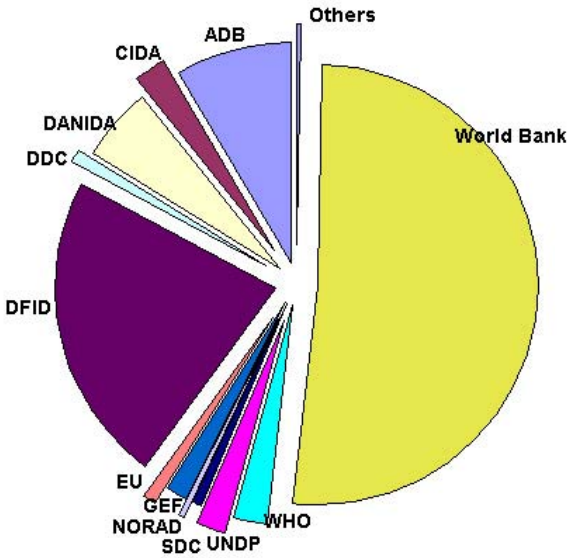


Figure 8: Share of donors in Bangladesh environmental activities (1998 – onwards) dataset as in Figure 7



[33] Data from LCG Bangladesh Sub Group on Environment: http://www.lcgbangladesh.org/inventory/4_inventory.pdf

4.4.3 Procedures for Co-operation between Funding Agencies

External assistance will continue to be essential for supporting economic development and poverty reduction in Bangladesh. The many funding agencies and large amount of aid to the country requires aid coordination, to ensure the most effective use of external assistance. Consequently, Bangladesh has the world's most extensive donor coordination network due to the relief-based nature of aid. The Local Consultation Group (LCG) provides a formal forum for coordination among the major funding agencies. ADB chairs LCG subgroups on energy, urban development, railways, and project implementation, whereas the EC Delegation currently chairs the Environment LCG.

The Environment LCG noted in particular the 'weak position of environment on the donor agenda', which is reflected in the preceding chapter, and evaluates the impact of its own work on the LCG plenary as 'non-existent'[34]

In addition to the LCG an EU circle meets monthly at ambassadorial level. At these meetings, the primary topics are political, but the process of democratisation and observance of human rights are included. The group does not discuss development assistance at the programming level.

International partners of Bangladesh met in Washington in February 2005 with the aim of agreeing how best to assist Bangladesh to address its fundamental and increasing governance challenges. Senior staff of the World Bank, Asian Development Bank, European Commission, UNDP, and of the governments of Canada, Denmark, Japan, Germany, Italy, Luxembourg, Netherlands, Norway, United Kingdom and United States participated.

[34] LCG Environment Meeting 24th March 2005

5 RECOMMENDED PRIORITY ACTIONS

Environmental priorities within development co-operation need to address the current observed and projected environmental, social and economic dynamics in Bangladesh. At the same time future EC development co-operation will be oriented within the Millennium Development Goals, in particular contributing to Poverty Reduction. Both objectives can deliver synergy as foremost the poor either directly depend on the depleted natural resource base for their survival by farming marginal lands or living from natural resources like fisheries. Or, at the same time the poor are directly affected from rural, urban and industrial development because their living as (near-) landless workers or within urban slums without adequate housing, water supply and sanitation facilities directly exposes the poor to environmental pollution and degradation. This situation is further aggravated by the poor's lacking access to medical services.

The challenge is to support the Poverty Reduction target with activities designed to safeguard or improve the environment within the current, i.e. Basic Health, Food Security and Rural Development, Education, and future priority sectors of EC co-operation. As a first step it is recommended to perform Strategic Environmental Assessments for these current, respectively the future selected priority sectors in the Bangladesh context. This is deemed to be a prerequisite for an effective mainstreaming of environmental issues into development co-operation actions.

Many donors have actually withdrawn from stand-alone environmental projects because they perceive environment as a cross cutting issue, which needs to be addressed in a wider scope. Experience shows on the other hand that hitherto neither donors nor partner governments comprise of sufficient expertise to effectively mainstream environmental issues into supported development activities. Hence, one may reasonably state that mainstreaming the environment as cross cutting theme into development co-operation did not yet develop much beyond mere rhetoric. With directly targeted environmental interventions reduced, the environment in developing countries continues to deteriorate. In this context the poor have to carry the brunt of the environmental impacts. It is therefore recommended to select the Environment as one priority action field within future Country Strategy Papers in addition to integrate environmental concerns into other selected areas of development co-operation, as Environment is indeed a cross-cutting issue.

At the same time, synergy with the objectives and programmes of the GoB and donors is desirable. This may require a rethinking of project design. Instead of a larger number of relatively small and short term projects oriented on 'visibility', activities in development co-operation should be designed and planned to be implemented within an adequate long-term timeframe as well as financed to make a difference. The current shift in development co-operation from project funding to budget support and programme funding addresses this concern to some extend. However, the success of budget support depends very much on the capacity of partner governments to design and implement effective development programmes. Therefore extensive capacity building measures concerning environmental issues, concerning programming, project management, implementation and monitoring need to complement any budget support approach. Parallel partner governments should be encouraged to reform public sectors and administration to combat corruption, which often renders local government programmes ineffective.

Donors should also build safeguards into budget support programmes enabling the continuing participation of civil society and NGOs in the implementation of development projects as empowering these organisations promotes democracy and local ownership.

The following more specific recommendations should be read with these general considerations in mind.

5.1. Priorities in the Rural Context

The per capita availability of arable land in Bangladesh is declining. This is a consequence of population growth on one hand, but also of land mismanagement. Further degradation of productive land needs to be halted and eventually reversed to provide rural livelihoods for the growing population. Proposed activities in this context comprise rural development programmes, integrated watershed management, improvement of farming practices, safe handling of agrochemicals.

As a cross cutting issue such actions can be integrated into land reform programmes and into activities related to the Trade priority. In particular by showing trade opportunities for products from alternative farming practices and demonstrating market response to unsustainable practices, like currently the negative image of SE Asian shrimp in Europe, both, livelihoods can be improved and the local environmental degradation halted, if not reversed. Teaching basic environmental knowledge within Education programmes and demonstrating health impacts from improper handling and application of agrochemicals will support such actions.

Special attention needs to be paid to widespread, naturally occurring Arsenic contamination of ground water. Bangladesh's polluted and contaminated surface waters pose an even more severe health risk. Technology to mitigate the Arsenic problem is available. However, 7 years of addressing the Arsenic issue has not so far produced acceptable results. In particular the rural poor, without access to bottled drinking water, continue to suffer from Arsenic poisoning. Integrating the theme of water pollution and contamination into activities within the Health Sector could be a way forward. Specific actions may include technology transfer and capacity for small, locally produced, well-head oriented and community managed solutions.

Activities within the Health Sector offer further opportunities to mainstream environment and gender issues by addressing unsustainable population pressure within the scope of family planning.

Stabilising the rural environment, including the provision of electricity based on renewable sources – eventually linked to micro-credit schemes -, will contribute to safeguard the few remaining natural regions. Their protection, preferably by the provision of protection status under Multilateral Agreements and Conventions should involve co-operation with local communities which may directly depend on such natural resources as a means of sustainable income or subsistence.

5.2. Priorities in the Urban Context

Urban pollution in Bangladesh results in huge costs for the economy, not only in terms of health costs and productivity lost, but also via deterring foreign direct investment. This nexus needs to be demonstrated within Trade oriented actions.

Direct assistance should be provided to improve the urban living environment for the poor. Themes to be addressed comprise land tenure issues within informal settlements, minimal housing and shelter, basic water supply and sanitation facilities for the poor.

Urban industrial developments need to be managed and controlled. Pressing issues include waste management and the provision of sanitation, municipal waste and industrial water treatment.

There may be still a need to develop management capacity in the waste sector. However, waste management needs a physical infrastructure for collection, treatment and final disposal of wastes, which appears currently to be grossly inadequate within Bangladesh's cities. Moreover, it is not only the inadequateness of infrastructure for waste management, but also the incapacity to operate such facilities in an economic, hence technological, sustainable manner. Actions within the Trade sector could demonstrate opportunities for public service privatisation, i.e. waste management, water supply, waste water treatment etc. Experience indicates that with growing affluence the willingness to pay for public services improves. However, guaranteed access to and long-term funding of such services for the poor are indispensable elements of any successful privatisation strategy and needs to be considered from the onset. The current shift from short term project to medium and long term budget and programme funding would in principle allow to long term subsidise public services for the poor.

5.3. Priorities in the Industrial Context

The environmental performance of Bangladesh's industries is below acceptable levels. Not only are environmental legislation and limiting emission values inadequate, but enforcement and control of existing legislation are ineffective. Interventions in the Trade and economic co-operation sector should expose Bangladesh's industry to international levels and standards of acceptable environmental performance, and provide support for enhanced environmental management capacity. GoB should be supported in developing adequate national standards and effective institutions to enforce them.

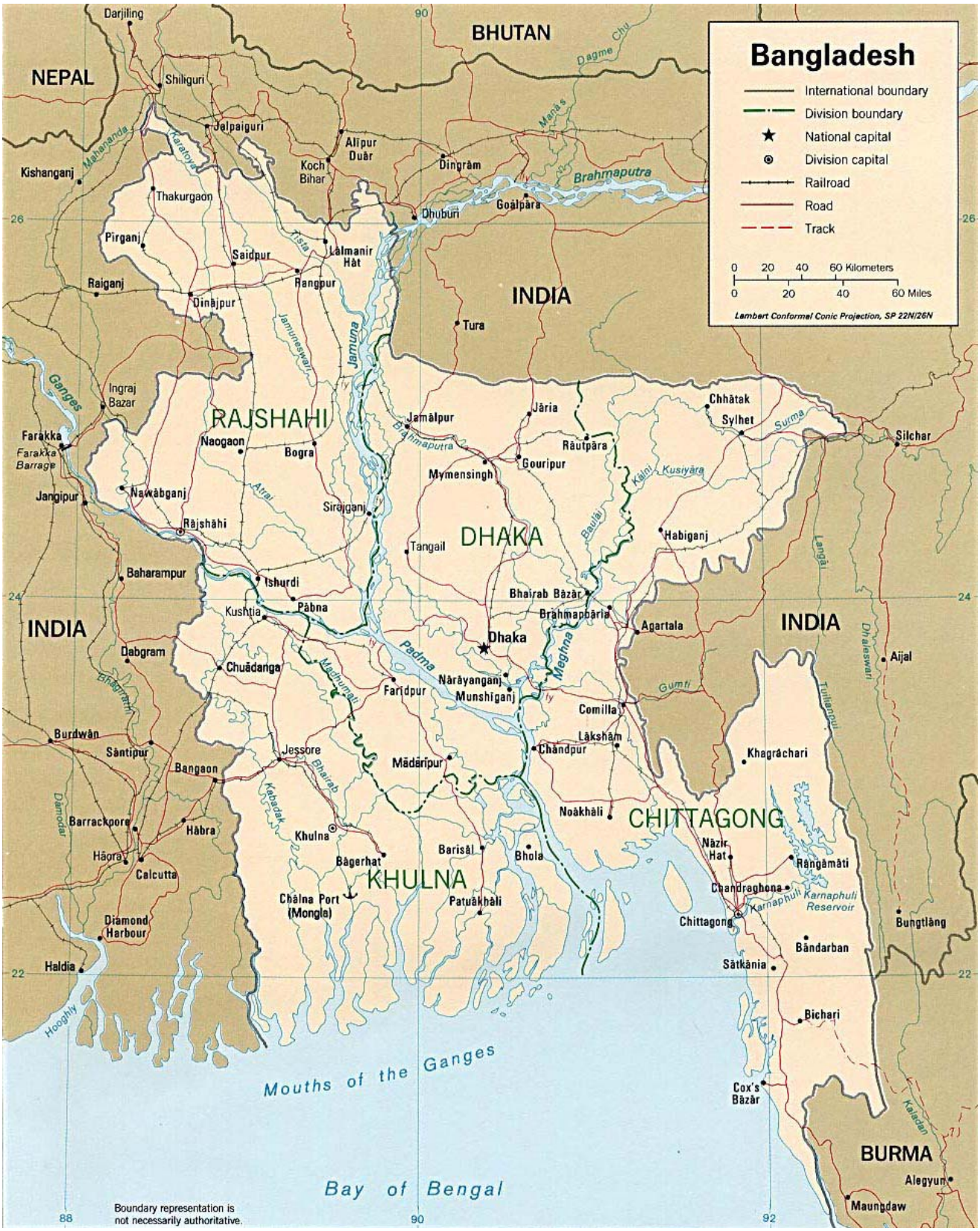
Relevant industrial sectors known for their notoriously low environmental standards comprise tanneries, chemical industry and the ship-breaking yards. Such low environmental performance industries do not only affect the surrounding environment, but directly the people working within such facilities. Activities developed under the Basic Health priority may be designed to address unacceptable working conditions and help to at least comply with WHO guidelines, resulting in improved environmental performance as well.

The Environment and Trade issue is politically highly sensitive. Keeping this in mind within the Trade priority a link with multinational agreements like the Basel Convention, Montreal and Kyoto Protocols, Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) in the frame of the WTO could be

established to demonstrate local polluting industries and agribusiness like shrimp farming trade opportunities for improved products and services on one hand but also possible sanctions related to product safety and consumer protection on the other.

6 TECHNICAL APPENDICES

I. Map of the project area[35]



[35] http://academic.reed.edu/english/Courses/Lit505/map/bangladesh/bangladesh_pol96.jpg

II. Reference list of environmental policy documents, statements and action plans

European Commission	Bangladesh Country Strategy Paper 2002-2006
European Commission	Bangladesh National Indicative Programme 2003 – 2005
Government of Bangladesh, 1992	National Environmental Policy
Government of Bangladesh, 1992	National Environment Management Action Plan
Government of Bangladesh, 1997	Fifth Five Year Plan 1997 - 2002
Government of Bangladesh, 1999	National Water Policy
Government of Bangladesh, Ministry of Energy and Mineral Resources, 2001	State of the Environment Report
Government of Bangladesh, Ministry of Energy and Mineral Resources, 2002	Draft Renewable Energy Policy

7 ADMINISTRATIVE APPENDICES

I. Study methodology/work plan

Study methodology and work plan were oriented on the terms of reference attached, which provide for a basic division of work in desk research and in-country study.

I.i Desk research

Desk research is performed mainly via the Internet and also via evaluation of documents and literature received from the EC Headquarters/ Country Desk Officers after inception meeting. The EC Delegation to Bangladesh did not support research for this Country Profile.

Desk research comprises the review of evaluation reports with respect to environmental issues on development and economic co-operation produced by Pakistan government, EC or other agency sources. Further the review of environmental policy and legislation framework, legislation and regulations and enforcement relating to environmental issues, action plans, and progress in implementation

The desk research establishes an overview about the environmental issues in Bangladesh according to the topics listed in the ECP TOR and the attached Standard Reporting Format for an ECP.

An in-country study was not planned for the preparation of this ECP as the EC Co-operation with Bangladesh underwent an extensive evaluation during 2002. Results of this evaluation as far as relevant will be considered in the Bangladesh ECP. However, the Bangladesh' environmental situation is only addressed marginally within the cited evaluation, hence the input from this study very limited.

Further desk research comprises contacting main stakeholders located in Bangladesh, EC Delegation, national organisations and agencies and local authorities, key international funding agencies operating in the country, key national and international development, environmental, and civil rights NGOs operating in the country in order to validate and update desk study results obtained and to mobilise additional information sources.

Within such communication particular emphasis is placed on the identification of trends in the physical, social and economic environment as well as future development co-operation policies and plans. These trends, seen together with the identified major environmental challenges should allow formulating priorities for future actions which are at one hand relevant to the environmental issues and provide for co-ordination, complementarity and coherence in development co-operation.

The Bangladesh ECP being the result of desk study only, the significance of recommendations given and priorities identified is constrained by the limited research opportunities.

I.ii Environmental Performance Indicators

Within the baseline report the country's key characteristics and environmental performance was described with a set of indicators.

Calculation and assessment of environmental performance indicators is performed via selecting a representative cross-section of appropriate indicators from those suggested by the following organisations: EEA, Eurostat, OECD, World Bank.

Overall indicator selection was opportunistic in the sense as it followed the availability of actual data.

II. Consultants' Itinerary

18.01.05 Travel Residence/Brussels/Residence for Inception Meeting with Commission Services respectively responsible Country Desk Officers

Within the scope of this study no travel to Bangadesh was planned from the contracting authorities.

III. List of persons/organisations consulted

EC Headquarters Brussels

DG/Unit:	*Contact Person(s):*
EXTERNAL RELATIONS/ DG RELEX Horizontal Co-ordination Unit	Gilles Bertrand Ramon Mestres Brugada
Desk Pakistan Desk Bangladesh Desk Afghanistan Economic analysis - environment & sustainable development	Heino Marius Beatriz Martins Jonathan Hatwell Elina Bardram
EUROPAID/ DG AIDCO Co-ordination for Asia	
Multi-sector thematic support	Joachim Knoth André Chalmin Irene Giribaldi Sanne Jaegersborg
DG TRADE	Peter Sturesson
DG ENVIRONMENT	Jan-Peter Mout Matti Salminen
Environment Help Desk	Mr Ledant

IV. List of documentation consulted:

Asian Development Bank, 2002	Country Strategy and Programme Update, 2003-2005, Bangladesh
Asian Development Bank, 2002	Project Performance Audit Report, Second Aquaculture Development Project, Bangladesh
Asian Development Bank, 2004	Report on the Bangladesh Development Forum Meeting, 2004
Department for International Development, DFID, UK 2000	Arsenic contamination of groundwater in Bangladesh
Department for International Development, DFID at al, 2001	Water Resource Management in Bangladesh, A Policy Review
European Commission, DG Development, 2000	Rural Development Policy and Strategic Framework, Bangladesh Pilot Study
Government of Bangladesh, Ministry of Environment and Forest, 2000	Preliminary National Report on The UNCCD Implementation for COP4
Government of Bangladesh, Department of Environment, 2004	SAARC Workshop on Solid Waste Management, Country Paper Bangladesh
IUCN Bangladesh, 2002	The Status of Alien Invasive Species in Bangladesh and their Impact on the Ecosystems
Japan International Cooperation Agency, 1999	Country Profile on Environment, Bangladesh
MHW SA, 2003	Evaluation of the European Commission's Country Strategy for Bangladesh, Volume I: Final Report
Nazrul Islam Department of Economics Emory University, Atlanta USA,	The Broader Significance of the Environment Movement in Bangladesh
OECD, Environment Directorate/ Development Co-operation Directorate, 2003	Development and Climate Change in Bangladesh: Focus on Coastal Flooding and the Sundarbans
Swedish International Development Cooperation Agency, 2001	Country Analysis and Strategy Bangladesh, 2002 -2005
Swedish International Development Cooperation Agency, 2003	Semi-annual report, October 2002–March 2003, Bangladesh
TERI/ Pembina Institute, 2002	Clean Development Mechanism Project, Opportunities in Bangladesh
UNDAF, 2000	Common Country Analysis, Bangladesh
United Nations Population Fund, 2002	Country programme outline for Bangladesh
World Bank, 2000	Bangladesh, Climate Change and Sustainable Development
World Bank, 2003	Bangladesh Development Policy Review, Impressive Achievements but Continuing Challenges
World Bank, Development Research Group, 2004	Indoor Air Quality for Poor Families: New Evidence from Bangladesh
World Bank, 2004	Tackling Air Pollution in South Asia

In addition to the documentation above various Internet based articles and data sources have been consulted which are referenced in the ECP's core text.

V. Curriculum vitae of the consultant

Dr. Uwe Weber

Current Position:	Managing Director European Forum for Economic Co-operation
Professional Experience:	2002 – today, Kenzingen/Germany: Development and management of international co-operation projects supporting sustainable development. 1998 – 2002, EU Commission, Brussels in Singapore: Management of EU Project supporting Economic Co-operation and Technology Transfer in the environmental technology sector with Asia 1994 – 1998, TÜV Rhineland, Cologne in Osaka: Management of Environmental Services in Asia for international Inspection and Certification Company 1991 – 1994, TÜV Rhineland Academy, Cologne: Manager of Environment and OHS section. Design and implementation of professional training courses 1986 – 1990, Aachen University of Technology, Aachen: Research on Urban Hydrology and Climate, Soils, and Geomorphology. Lecturing Physical Geography, Mapping and Statistics 1970 – 1973: Apprenticeship in Business Administration and Accounting
Regional Experience:	European including former Accession Countries; Developed Countries, Economies in Transition and Low Developed Countries in South, South-East and East Asia; Mexico and US
Qualifications:	Lead Auditor for Environmental and Quality Management Systems, Environmental Management and Technology Expert, International Co-operation, Programme Management, Human Resource Management
Education:	1978 – 1985: Studied Physics, Geography and Philosophy in Düsseldorf/Germany and Aachen Technical University, Aachen/Germany 1991: PhD, Doctorate in Geography
Languages:	English, German, intermediate Italian and basic Spanish

VI. Terms of Reference for the Country Environmental Profile

TERMS OF REFERENCE

Country Environmental Profile

This standard format is to be used in preparing Terms of Reference for a Country Environmental Profile. Using this standard format together with the sector guides will ensure that all issues are formulated clearly and concisely. For more information and understanding of the issues, see how to address environmental issues and sector guides.

BEFORE STARTING WORK!
This is a master file. Before you start work, you need to create your own file by downloading the word document, then click on SAVE AS and save your file under a separate name in any directory.
While working in your own file:

- *Move the cursor to the appropriate help file to identify the specific requirements for each section of the Terms of Reference, These support functions are always available when you open your file but will not be printed with your document.*
- *Consider each of the items listed in each section of the ToR and add to, modify or delete the item in order to meet the specific requirements of the country profile*
- *Wherever possible, use the standard text provided below, adding project specific information as indicated.*

Study background

The European Commission requires a Country Environmental Profile within the framework of the ongoing preparation of country strategies and indicative programmes for (name of country).

As background to the study state briefly:

- previous country profiles undertaken by the Commission;
- specific environmental concerns and make reference to any evaluation reports (listed in an appendix to the TOR);
- recent projects undertaken and/or planned in the country or region.)

Study objective

The Country Environmental Profile study will provide decision-makers in the European Commission and the partner countries with sufficient information to identify EC cooperation activities with specific environmental objectives and to establish environment safeguards for other activities.

Study results

The study will deliver the following:

- An assessment of the environmental situation in the country covering the key issues and responses to these, environmental policy and legislation, institutional structure and capacity, the involvement of civil society, and international development assistance.
- Recommendations for priority actions.

Issues to be studied 🗁

The consultants will study the following issues:

4.1 The state of the environment

Including key issues (current status, pressures and trends), responses (objectives set, action taken /planned, regulations) and environmental performance in meeting objectives/plans and targets in the following areas (as applicable):

- **Physical environment** including climate/micro-climate, air quality and odour, water quality and resources, noise and vibration, topography and soils, geology and hydrogeology and natural disaster risks;
- **Biological conditions, biodiversity, ecology and nature conservation** including rare, endangered and protected ecosystems, habitats and species, species of commercial importance or with potential to become nuisance or dangerous;
- **Socio-economic conditions, socio-cultural conditions and human health** including archaeology and cultural heritage, values and aspirations, recreational, landscape and visual aspects, socio-economic aspects (population, employment, income revenue),and land use, access/transportation, infrastructure facilities (power/fuel sources, water supply. Sewerage, flood control) agricultural development, mineral industry, tourism and other commerce and economic activity (formal and informal) and health aspects (public health). human health and access/transportation.
- Where possible, make reference to internationally recognised indicators and quality standards to establish a consistent basis for comparison of environmental performance.

4.2 Environmental policy and legislation

The assessment should include:

- policy and action plans (such as such as National Environmental Action Plans, sustainable development plans, Agenda 21) for natural resource protection and pollution control, and the effectiveness of enforcement;
- legislation, current and in preparation, covering development control, requirement for EIA/SEA, environmental auditing, natural resource protection and pollution control, and provisions for public participation and access to environmental information and the effectiveness of enforcement of legislation;

- government approach to key international environmental conventions such as climate change, biodiversity and desertification;
- efforts in harmonising national legislation with European legislation (Phare countries only).

4.3 Environmental institutional framework

The assessment should include:

- institutional structure and responsibilities of national/federal regional to local authorities and agencies in dealing with environmental issues in policy making, the legislature, planning, environmental protection, monitoring and enforcement;
- formal structures and procedures for public participation in development control and environmental planning;
- capacity and financial resources of authorities responsible for environmental management.

4.4 Integration of environmental concerns into the main economic sector

The assessment should cover the following sectors:

- agriculture, fisheries and forestry;
- mineral resources;
- utilities including power, energy and water;
- industry (from heavy industry to tourism)
- transport
- any other sector relevant to the specific country.

4.5 EC cooperation with the country from an environmental perspective

This should cover experience relating to interventions with specific environmental objectives, and the integration of environment into programmes with other primary objectives, including the application of environmental assessment procedures.

4.6 Other funding agencies

This should cover:

- involvement of other funding agencies and their experience in the country and include a list of recent and planned projects;
- procedures for co-operation between funding agencies.

Work plan 🗁

The work plan should include but not necessarily be limited to the following activities:

- Consultation with EC country desk officers, EC country delegation, national organisations and agencies and local authorities, key international funding agencies operating in the country, key national and international development, environmental, and civil rights NGOs operating in the country;

- Review of evaluation reports with respect to environmental issues on development and economic co-operation produced by government, EC or other agency sources

- Review of environmental policy and legislation framework, legislation and regulations and enforcement relating to environmental issues, action plans, and progress in implementation

- Review of environmental performance indicators selecting appropriate indicators from those suggested by organisations such as EEA/OECD/Eurostat.

On the basis of the proposed work plan and time schedule outlined in this Terms of Reference, the consultants must detail their work plan for the Country Environmental Profile study in their offer.

Expertise required 🗁

The qualifications and experience of each specialist to be assigned to the study should be specified. For each specialist proposed, a curriculum vita must be provided of no more than four pages setting out the relevant qualifications and experience.

Reporting 🗁

The study conclusions must be presented in the Country Environmental Profile report in the format given in Appendix 1.
The draft report in [***number***] copies is to be presented to [***name and organisation***] for comments by [date]. Within [***number***] weeks, comment on the draft report will be received from [***list the authorities***].
The consultants will take account of these comments in preparing the final report (20–40 pages excluding appendices). The final report in English in [***number***] copies is to be submitted by [***date***].

Time schedule 🗁

(If appropriate, insert the time schedule for the consultants)
The consultants should respond to this time schedule in their offer.

Appendices

I. Report format for a Country Environmental Profile

II. Supplementary data and information

STANDARD REPORT FORMAT

Report Format for a Country Environmental Profile

Maximum length (excluding appendices) 20 – 40 pages.

INSTRUCTIONS FOR REPORTING

The report must be organised using the same headings set out below (chapters, sections and subsections). Under each of these headings, a list of key words and explanatory notes is given to indicate the topics to be handled. You will need to tailor each of these lists to the specific requirements of the Country Environmental Profile.

The following text appears on the inside front cover of the report:
This report is financed by the [……] and is presented by the [name of consultant] for the Government of [……] and the European Commission. It does not necessarily reflect the opinion of the Government or the European Commission.

1. Summary

This is an executive summary of the key aspects of the Country Environmental Profile referencing to the priority areas for action.

2. Background

This chapter will provide a brief overview of the country and include:

- Physical conditions – geography and climate;
- Current economic trends and social conditions;
- Environmental awareness, education, population, politics
- Overall administrative and legal context for environmental protection – including basic justice, human rights, equal opportunities and democracy aspects

3. State of the environment

This chapter will set out an assessment of the state of the environment including key issues as outlined in Section 4.1 of the TOR.

4. Environmental policy, legislative and institutional framework

This chapter will provide an assessment of the country's environmental policy, regulatory and institutional framework for pollution control, natural resource use and sustainable development. It will be divided into sections as follows:

4.1 Environmental policy and legislation

This chapter must include an assessment of the key issues outlined in Section 4.2 of the TOR.

4.2 Environmental institutional framework

This section must include an assessment of the key issues as outlined in Section 4.3 of the TOR.

4.3 Sectoral integration

This section must include an assessment of the key issues as outlined in Section 4.4 of the TOR.

4.4 EC and other international development assistance

This section must include EC and other donor assistance within the country from an environmental perspective covering the issues outlined in Sections 4.5, 4.6 and 4.7 of the TOR.

5. Recommended priority actions

This chapter will set out recommendations for priority actions.

6. Technical appendices

I. Map of the project area

II. Reference list of environmental policy documents, statements and action plans

7. Administrative appendices

I. Study methodology/work plan (1–2 pages)

II. Consultants' Itinerary (1–2 pages)

III. List of persons/organisations consulted (1–2 pages)

IV. List of documentation consulted (1–2 pages)

V. Curricula vitae of the consultants (1 page per person)

VI. Terms of Reference for the Country Environmental Profile