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Local Government Division, Policy Support Unit

Sector Development Plan (FY 2011-25)

Water Supply and Sanitation Sector in Bangladesh

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Environment: Assessment of and Measures for the Water and Sanitation Sector

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Name of Theme: Environment

Assessment of and Measures for the Water and Sanitation Sector

1.0 Introduction

1.1 Extent of the Problem

Availability of water in adequate quality and sufficient quantity is a necessity for human survival, health protection, and social and economic development. Bangladesh is one of the most densely populated countries in the world, with a range of competing demands for water. Microbiological contamination of surface water is so pervasive that there is now no potable surface water available in the country except for a few natural springs in the hilly areas. Infectious diseases from microbiological contaminants such as viruses, protozoa and bacteria are likely to pose increasing challenges in the future due to increasing water pollution. Urban, agricultural and industrial systems interact with their immediate environment and may involve the release of treated or untreated effluents, fertilizers and other agricultural chemicals into water bodies. All these substances may potentially alter the quality of natural water making it less suitable or, indeed, unsuitable for consumption or even for recreational use. Discharges containing organic matter and especially municipal wastewater near large urban areas may cause deterioration in river water quality sufficient to make existing water treatment plants inoperative. Apart from anthropogenic contamination of water, naturally occurring problems, i.e., ground water contamination with high levels of arsenic affect a large section of the population in Bangladesh.

2.0 Key Environmental Concerns

2.1 Water Resources

Water is one of the main components of environment that has tremendous role in every mode of human life. It is unfortunate that the human activities everywhere in the world are continuously polluting water. Many of the rivers get polluted with industrial effluents, municipal waste, agricultural waste, sewage disposal etc. However, water resource is source of major serious concern, considering its contribution to the need of human beings and the natural environment. In fact, Bangladesh is one of those polluted countries, which currently holds 1,176 industries that discharge about 0.4 millions m^3 of untreated waste to the rivers in a day (UNEP, 2005). The water quality of many of the rivers, which are close to industrial districts or areas, were tested and found to be beyond the standard limit of water quality parameters.

Water resources of the country is the most important and is the burning issue in terms of extreme degradation of water quality of the surrounding water bodies, for example, rivers, lakes, ponds and canals.

Water Pollution is mostly concentrated in urban growth centers and industrial belts. Due to lack of adequate regulatory measures and institutional setup for proper monitoring and control, pollutants from municipal, industrial and agricultural waste enter into the inland water system. Major causes of pollution that aggravate water quality are industrial effluents, agrochemical, fecal pollution, spillage and low water flow in dry season.

2.2 State and Impacts of Water Pollution

Water pollution has two dimensions. One is surface water pollution and the other is groundwater pollution. Surface water pollution refers to pollution of flowing waters (river, canal etc), and open water (non-flowing) reservoirs (ponds, haors, baors etc.).Flowing waters are mainly polluted because of the disposal of untreated wastes into the river system from industries and also from cities whereas the non-flowing water pollution is caused by excessive use of pesticides and soil erosion. However, these two kinds of water bodies are related to each other. Water pollution of surface water affects the health of poor people who cannot afford to choose between contaminated and non-contaminated sources. Waterborne diseases are the major cause of

suffering for the poor people living in rural and urban areas. This combines with the problem of water supply for bathing in both rural and urban areas (especially for the poor families) as a major health problem for Bangladesh.

Contamination of arsenic in ground water provides a graphic picture of environmental degradation as well as its impact on poor population of Bangladesh. Women suffer from arsenic not only in terms of physical illness but also social consequences as they can't get married and become a burden to their families and their communities.

2.2.1 Inland Surface Water Pollution

The overall inland surface water quality in the monsoon season is within tolerable limits, with a few exceptions, including the rivers Buriganga, Balu, Shitalakhya, Karnaphuli and Bhairab. However, concerns over surface water quality are gradually emerging due to the dispersed locations of polluting industries, and the adverse effect on surrounding land and aquatic ecosystems, as well as subsequent impacts on the livelihood system of the local community.
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Dhaka City

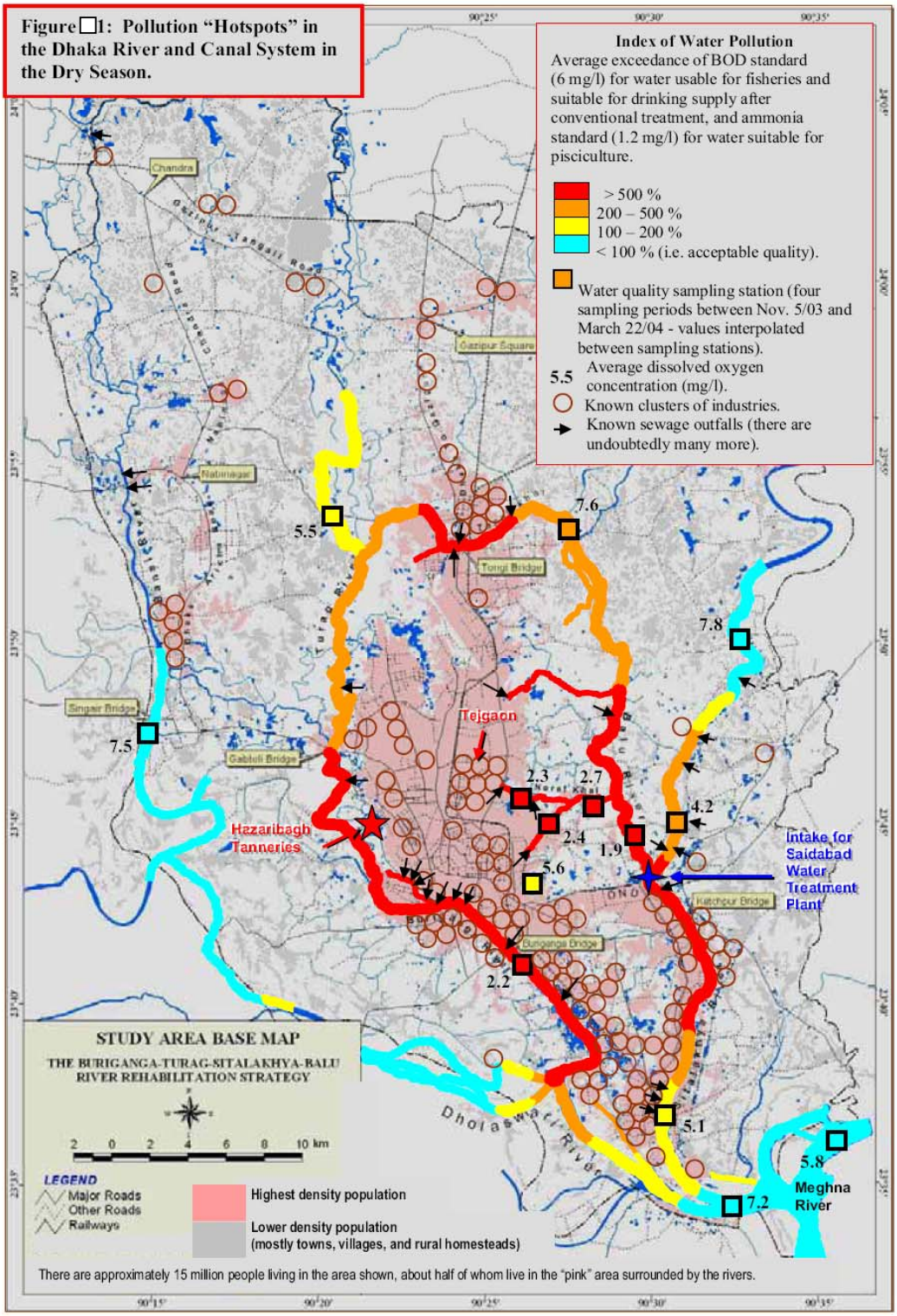
Dhaka surface water is in very poor condition, especially in the dry season. For some six months of the year, the flow rate of the rivers is negligible, often with only a tidal pulse, but the volume of effluent entering the canal and river system remains about the same as during the wet season. Consequently, dilution of contaminants is drastically reduced in the dry season. As Figure 1.1 shows, the most polluted areas are the Buriganga and Sitalakhya Rivers, Tongi Khal, and the canal system in Dhaka East, where very low oxygen levels reflect the breakdown of organic waste, principally domestic sewage and chemical residues from industry. The high levels of oxygen demand in the Buriganga and Sitalakhya Rivers, in particular, reflect the high density of industries discharging untreated waste into the rivers.

Some tidal backflow of relatively clean water from the Meghna and Dhaleswari Rivers results in dilution of contaminants in the southern reaches of both the Buriganga and Sitalakhya Rivers, as may be seen in Figure 1.1, but the extent of this positive effect is limited.

The very high ammonia levels shown in Table 1, particularly in the canal system in Dhaka East, in the Balu River, and in the southern reaches of the Buriganga River, reflect the discharge of sewage into these waterways. Most of this water is unfit for any human use, and is likely to be dangerous to livestock. Of particular concern in the dry season are the high ammonia levels in the raw water used by the Saidabad Water Treatment Plant, which now threaten the plant's ability to treat the water to drinking quality standards. The intake for the Saidabad plant is located at Sarulia, near the confluence of the Balu and Sitalakhya Rivers, one of the Dhaka water pollution "hotspots" (see Figure 1). Ammonia in this area increases from about 0.3 mg/l in October to greater than 10 mg/l in March-April, which is twenty times higher than the national environmental quality standard for ammonia in surface water. Ammonia binds to the chlorine in the treatment plant, forming mono, di-and tri chloroamines, which significantly reduce the bactericidal effect of chlorine. As a consequence, the chlorine inputs to the process have to be increased (sometimes from 0.2 ppm to 5 ppm). This increases the risk to human health, as well as increasing the cost of plant inputs and raising questions about the overall effectiveness of chlorine treatment. Moreover, the presence of excess amount of concentration of heavy metals including Al, Cd, Cr, Pb, Hg confirms the chemical contamination of water (Table 2).

The water quality problem is further reflected by high levels of e-coli bacteria, which are indicators of the potential for more harmful bacteria and viruses in the waterways, including hepatitis viruses, typhoid, dysentery, and various other infectious bacteria. Levels of e-coli bacteria higher than 10,000/ml of water have been recorded in Norai Khal in the last six years.

All Dhaka residents are impacted to some extent by deteriorating water quality, but the most vulnerable are the poor, who have few options for accessing clean water and little ability to move away from offensive locations next to polluted ponds, canals, and rivers.



Source: Country Environmental Analysis, World Bank, September 2006

Table 1: Water Quality in the River and Canal System around Dhaka, 2003-2004

Location	Season	Water Layer	Parameter (*all mg/l*)				
			Total Dissolved Solids	Dissolved Oxygen	Biological Oxygen Demand	Chemical Oxygen Demand	Ammonia
Postogola (Buriganga River)	Dry	surface	319	2.3	29.9	82.7	7.4
		bottom	319	2.0	35.4	113.3	7.3
	Wet	surface	69	8.3	0.9	67.3	0.4
		bottom	66	8.5	0.9	76.0	0.4
Convergence of Sitalakhya and Dhaleswari Rivers	Dry	surface	127	7.2	2.0	58.0	0.6
		bottom	129	7.1	1.4	75.3	0.5
	Wet	surface	63	8.9	1.3	70.7	0.7
		bottom	63	9.1	1.3	67.3	0.5
Narayanganj Ghat (Sitalakhya River)	Dry	surface	189	5.1	9.0	88.0	2.3
		bottom	194	5.0	9.2	97.7	2.3
	Wet	surface	63	8.6	1.0	73.3	0.4
		bottom	63	8.5	0.9	66.0	0.5
Kanchon	Dry	surface	193	7.2	2.0	72.3	0.6
		bottom	208	7.3	2.0	56.3	0.6
	Wet	surface	56	8.7	1.0	53.3	0.6
		bottom	56	8.6	1.7	50.0	0.7
Demra (Sitalakhya River)	Dry	surface	234	4.3	14.3	130.7	2.6
		bottom	236	4.1	15.4	114.7	3.0
	Wet	surface	56	8.8	1.4	74.7	0.6
		bottom	56	8.4	1.5	57.3	0.6
Balu River	Dry	surface	257	2.1	28.0	151.7	6.7
		bottom	258	1.6	30.5	215.3	6.7
	Wet	surface	76	6.4	1.4	81.3	0.7
		bottom	71	6.4	1.1	62.7	0.7
Singair	Dry	surface	220	7.6	1.6	16.7	0.6
		bottom	262	7.3	1.5	21.3	0.6
	Wet	surface	66	8.5	0.7	31.3	0.4
		bottom	65	8.3	0.8	33.3	0.4
Ashulia (Turag River)	Dry	surface	326	6.4	5.1	98.7	2.2
		bottom	344	6.6	4.5	85.3	1.6
	Wet	surface	62	8.2	0.9	58.0	0.4
		bottom	59	8.0	0.7	60.7	0.3
Uttar Khan	Dry	surface	356	7.3	12.1	41.7	4.5
		bottom	376	7.9	12.0	54.0	4.2
	Wet	surface	53	8.0	0.8	52.7	0.4
		bottom	62	8.1	0.7	44.0	0.3
Dholai Khal (Dhaka East)	Dry	surface	396	2.4	77.7	167.8	20.8
		bottom	388	2.3	94.9	199.0	19.5
	Wet	surface	-	-	-	-	-
		bottom	-	-	-	-	-
Begunbari Khal (Dhaka East)	Dry	surface	386	2.1	75.9	187.5	22.4
		bottom	385	2.4	71.2	163.3	21.8
	Wet	surface	-	-	-	-	-
		bottom	-	-	-	-	-
Norai Khal (Dhaka East)	Dry	surface	343	2.6	54.8	137.9	21.5
		bottom	316	2.9	53.9	135.1	22.0
	Wet	surface	-	-	-	-	-
		bottom	-	-	-	-	-
Saidabad Beel (Dhaka East)	Dry	surface	179	5.3	11.0	64.8	2.2
		bottom	181	5.8	10.2	65.8	2.3
	Wet	surface	-	-	-	-	-
		bottom	-	-	-	-	-
Hot spots (contaminated water) indicated as follows:			> 100	< 5	> 5	> 60	> 1

Source: Country Environmental Analysis, World Bank, September 2006

Table 2: Heavy metal concentration in river water of Dhaka City (Shamsuzzoha, 2002)

Sample ID	Concentration in mg/l						
	Al	Cd	Cr	Pb	Hg	Se	Zn
Buriganga River Friendship Bridge	3.27	0.014	0.036	ND	0.0021	0.001	0.56
Turag River: Amin Bazar	11.884	0.018	0.11	0.394	0.0058	0.0002	1.002
Buriganga River Chandni Ghat	5.396	0.006	0.006	0.25	0.0016	ND	0.984
Lakhya River: Sayedabad WTP Intake pt	2.952	0.006	0.028	0.074	0.0032	0.0005	0.246
Balu River Zirani Khal	2.1166	0.006	0.0224	ND	0.0010	ND	1.122
Recommended value For Drinking water*	0.2	0.005	0.05	0.05	0.001	0.01	5.0

Source: State of Environment, Dhaka City, 2005- UNEP

* Environmental Quality Standards (EQS) as per ECR' 1997

Chittagong City

The 170 km long Karnafully, a major river of Bangladesh, originates in the Lushai Hills and falls into the Bay of Bengal through Chittagong. Wastes discharged from numerous industries located on its banks, municipal and hospital wastes, and residues of agro-chemicals pour nonstop into the river in huge quantities. Oil spilled from ships and boats also cause pollution. Untreated industrial organic effluents including mercury, ammonia and various agricultural and municipal wastes pose serious threats to fish and other living organisms in the river. Chittagong city dwellers are also exposed to the pollution. The level of acidity and alkanity in the river water has gone unacceptably high. This causes decrease in the dissolved oxygen. The level of acidity and alkanity in the river water has gone unacceptably high. This causes decrease in the dissolved oxygen. Consequently the oxygen quantum required for the survival of the aquatic resources, including fish, has become inadequate.

Tanneries located at Battali Bazaar on Hathazari Road, the noxious industrial zone at Kalurghat and the hide and skin business zone of Aturar Depot discharge about 1,50,000 litres of liquid effluents every day. These effluents contain chromium compounds. The KPM discharge in Chondroghona discharge 0.35 tons of china clay every day (ADB, 2004). KPM also discharge chemicals such as mercury, black liquor, acids, chlorine etc. Besides, Cadmium from dyeing, printing and paint industry also flow into the river. The level of heavy metal concentration in river water is very high.

During the dry season, the river retains very little capacity to purify itself of the biodegradable waste. The total demand load of biological oxygen was estimated at about 3.5 tonnes every day. The fish catch is diminishing in the river due to depletion of dissolved oxygen. In the years 1975-76, 23 species of fish were found in the river, which has come down to 6-7 species recently. Effluents discharged from CUFL have ruined the Hilsha stock of the Karnafully. Community Development Centre (CDC), an NGO working with fishermen, complaints that many of the 20,000 fishermen in Rauzan, Rangunia and Anwara thanas, who were previously dependent on the Karnafully river, have given up their fishing profession because they do not have enough catches anymore.

Table 3 shows the Seasonal variation of metal concentrations (ppm) in water samples of the Karnafully River estuary (Hossain and Khan 2002).

Table 3: Heavy metal concentration in Karnafully River estuary (Hossain and Khan, 2002)

Stations	Season	Metal Concentration (ppm)							
		Cu	Pb	Zn	Ni	Cd	Mn	Fe	Cr
1	Pre-monsoon	0.311	0.507	0.452	0.392	0.073	0.780	4.20	0.513
	Monsoon	0.482	0.487	0.620	0.414	0.168	0.931	22.23	0.429
	Post-monsoon	0.312	0.319	0.531	0.282	0.091	0.913	8.07	0.442
2	Pre-monsoon	0.204	0.427	0.504	0.431	0.082	0.503	10.88	0.252
	Monsoon	0.376	0.540	0.887	0.332	0.093	0.783	8.17	0.517
	Post-monsoon	0.408	0.272	0.414	0.491	0.074	0.594	10.14	0.382
3	Pre-monsoon	0.125	0.170	0.294	0.139	0.008	0.511	9.43	0.132
	Monsoon	0.171	0.141	0.571	0.179	0.055	0.532	14.94	0.291
	Post-monsoon	0.251	0.251	0.206	0.159	0.052	0.282	6.07	0.195
4	Pre-monsoon	0.210	0.218	0.411	0.101	0.151	0.647	5.01	0.499
	Monsoon	0.395	0.319	0.985	0.572	0.131	0.821	19.92	0.421
	Post-monsoon	0.171	0.310	0.335	0.421	0.107	0.666	16.51	0.508
5	Pre-monsoon	0.217	0.033	0.252	0.276	0.012	0.638	18.25	0.132
	Monsoon	0.308	0.098	0.273	0.123	0.049	0.358	15.18	0.142
	Post-monsoon	0.344	0.144	0.294	0.307	0.053	0.498	21.78	0.151

Source: Chittagong Port Trade Facilitation Project, Volume 2- ADB, May 2004

In water, metal concentrations (ppm) were found to range from 0.125 to 0.482 for Cu, 0.033 to 0.540 for Pb, 0.206 to 0.985 for Zn, 0.101 to 0.572 for Ni, 0.008 to 0.168 for Cd, 0.282 to 0.931 for Mn, 4.20 to 22.23 for Fe and 0.132 to 0.513 for Cr (Table 3).

Residues of toxic agro chemicals from the crop fields add to the pollution of the Karnafully. Farmers on the both banks of the river use water from Karnafully that come through the canals. They are rarely aware of the water's pollution.

Crude oil is spilled into the water during transporting and handling, spilled oil from nearly 1200 ships and 40-50 oil tankers and 2500 registered and numerous unregistered mechanized vessels, technical workshops, refineries, etc. cause pollution of the Karnafully. Scientists say that the thin layer of oil on water prevents light penetration and exchange of oxygen and carbon dioxide across the air water interface. This also prevents phtosynthsis and cause depletion of dissolved oxygen (DO). The average DO of the water of the Karnafulis below the WHO prescribed standard. The decrease in fish stocks from fish diseases, particularly in the gills, indicates the severity of the pollution problems.

Khulna City

The major polluting industries in Khulna City area are Newsprint mills, Jute mills, Hardboard mills, Textile mills, fish processing, power plants and oil depot etc. The pollution potential of these industrial wastes arises from high concentration of organic and inorganic loads, presence of toxic substances, acids, alkalis, oils, odour producing and floating substances.

These industries are currently discharging about 10 million gallons[1] of liquid waste daily; mostly into the river Bhairab and Rupsha. The Khulna Newsprint Mills (KNM) alone discharges 4.6 million gallon of liquid waste into Bhairab river every day. Similarly Crescent Jute Mills alone

[1] Environmental Maps and WorkBook for Khulna City, August 1999

discharges 0.5 million gallon liquid waste daily. Most of the discharged wastewater contain chemicals which are potentially toxic and sources of serious health hazards and pollution.

The stretch of the Bhairab river flowing along Khulna city is reported to have been devoid of any fish species and not supported any fishing activities in the past two decades, most likely due to pollution by industrial wastes. These pollutants are causing serious damage to both fresh water and marine ecosystems of the region including those of the Sundarbans.

2.2.2 Ground Water Pollution

Recent reports indicate that ground water is rapidly depleting due to overdependence on ground water resources for water supply. Shallow aquifers are contaminated by chemicals (mainly heavy metals) and dissolved solids, strongly indicating contamination from industrial sources.

The major problems related to the ground water for drinking purposes are due to following reasons:

Arsenic in ground water: Contamination of arsenic in ground water provides a graphic picture of environmental degradation as well as its impact on poor population of Bangladesh. Arsenic is a naturally occurring element and usually presents in the form of compounds with sulfur and with many elements. The concentration of arsenic in drinking water in excess of permissible limits is toxic to human body. It can cause dermal changes, kidney and liver disorder, cancer, and ultimately death.

Excessive dissolved iron: Iron concentration in the ground water in many parts of the country, particularly the central parts, is much higher the WHO and EQS, but there are no known human health implications. People are reluctant to drink this water mainly due to bad taste and appearance (color). Water with high iron content is also not used for cooking, washing and other domestic purposes.

There are high natural occurrences of manganese (above the WHO guidelines for drinking water), particularly in the west, central and northern parts of the country. 30% of wells have high manganese levels, and this is harmful for human health (Bangladesh State of Environment, 2001). Concern also exists regarding the concentrations of manganese, boron, phosphate and nitrate from agricultural residues in ground water, some of which have already crossed the threshold limits, making it unfit for human consumption.

2.2.3 Coastal Water Pollution

The coastal morphology of the country is very dynamic, with a zone of freshwater and saline sea water interaction. There are two main problems existing in the coastal water bodies, namely water pollution in the marine zone and salinity in the estuary. The magnitude of these problems depends on seasonal freshwater flow from river systems, pollution load through runoff from land based activities, operation of seaports and other sea-based activities (Hossain, 2000).

The DoE has conducted a survey on ship breaking industries and seawater quality on the coasts. The survey results showed that about 50 ship breaking industries are operating in the Chittagong region, discharging effluents that are polluting both the land and water environments. Concentration of DO varies from 5.6 to 5.8 mg/l and the BOD varies from 2.2 to 2.5 mg/l (UNEP, 2001)

A recent survey nby the Marine Science Institute of Chittagong University indicated that the water of the coast of Shitakunda contains high concentrations of several heavy metals such as mercury, cadmium, lead, chromium, iron, etc. The findings of their study are presented in the following Table:

Table 4: Metal Concentrations at Sitakunda Area (near ship break yard)

Metal	Concentration (ppm)	Bangladesh quality standards (ppm)
Lead	0.5-21.8	0.05
Chromium	220	0.05
Cadmium	0.3-2.9	0.005
Iron	2.6-5.6	1.0

Source: Islam, 2004

There is a seasonally moveable salinity interface in the estuaries, with the threshold limit for agriculture (2 dS/m) moving inland in May in the southern part of Bhola and other southern islands. There are also salinity issues in the Southwest region, attributed to reduced dry season flows into the area from the Ganges system. During the 1990s dry season, salinity levels in the Khulna area rose, for which one of the likely causes was postulated to be the decrease in dry season surface flow from the Ganges(UNEP, 2001)

The major groundwater salinity problem lies in the coastal areas of the country. This causes a constraint on its use, but there are some localized fresh water sources close to the coast. Upstream abstractions of groundwater reduce the ability of fresh water to hold back salinity intrusion, and this is reported to be a major concern in the Khulna area and other parts of the southern half of the Southwest region (WARPO, 2000). Fresh ground water in most coastal areas has to be abstracted from a depth of over 150 m, up to 450 m. This can be relatively expensive to develop and operate. Although this does restrict the use of the deep aquifer for irrigation, compared to shallow aquifers it has the benefit of being free from arsenic. There are also residual salinity problems in Comilla, Brahmanbaria and Chandpur caused by old deposits, from the time when the areas were under a marine ecosystem

2.2.4 Fecal Pollution

The main problem poses in respect to water is the lack of sanitation facilities in the rural areas and inadequate facilities for urban wastewater treatment. There is one sewage treatment plant in the whole country, serving only a part of Dhaka. A major program for provision of sewerage is needed to arrest the increasing fecal pollution of open water courses around all urban areas in Bangladesh, particularly Dhaka. Outside the urban areas, there is a problem with designing adequately sealed latrine systems at the household level, which can cope with the annual flooding and prevent fecal pollution of the water supply. Poor management of wellhead areas may be the most significant source of fecal contamination rather than direct aquifer pollution.

The inter-linkage of pressures, state, and impacts to address water related environmental problems have been presented in Table 5.

Table 5: Inter-linkage of pressure, state, impacts related to water

Pressure	State	Impact
• Industrial effluent • Agrochemical • Fecal Pollution • Low water flow in the river system in dry season • Oil and lube spillage during normal refueling of ships at sea and river ports • Low water flow in the river system in dry season	• Decreasing inland water quality in dry season • Decreasing coastal water quality • Salinity intrusion in surface and ground water • Soil salinity increase • No primary or secondary measurement is available on discharge quantity	• Pressure on urban water source • Fish fingerling mortality, migration and quality of fish • Degradation of fish habitat • Yield reduction (soil fertility loss) • Increase in risk from waterborne diseases • Affecting marine aquatic life

3.0 Assessment of Present Policies

3.1 Legal Provisions

3.1.1 National Policies

The National regulations govern the environmental aspects of water resources and sanitation sectors in Bangladesh. The following Table summarizes some of the important national environmental policies, rules and regulations.

Table 6: Relevant laws and regulation on Water Supply and sanitation sector

Reference	Description
National Water Policy, 1999	The Policy makes provisions for planning and development of the water resources sector and include environmental and social provisions
National Policy for Safe Water Supply and Sanitation. 1998	The policy calls for nationwide access to safe drinking water and sanitation services at an affordable cost
EIA guidelines for Industries, 1997	The Guidelines includes EIA procedures for industries and also for water development projects
National Environmental Management Action Plan (NEMAP), 1995	The NEMAP outlines the policies relevant to health, sanitation and population control and identified the key environmental problems in this sector.
Environment Policy of 1992 Section 3.3: Health and Sanitation Section 3.5: Water Development, Flood Control and Irrigation	 Requires prevention of harmful impacts in all areas and development activities in the country (Sub-section 3.3.1) Requires environmentally sound utilization of all water resources (Sub-section 3.5.1) Requires prevention of adverse environmental impact of water resource development projects and irrigation networks (Sub-section 3.5.2) Requires sustainable, long term, environmentally sound and scientific exploitation and management of the underground and surface water resources (Sub-section 3.5.6) Requires conduct of Environmental Impact Assessment before undertaking projects for water resources development and management (Sub-section 3.5.7)
Environment Conservation Act of 1995 Section 12: Environmental Clearance Certificate (ECC)	Requires all industrial units or projects to obtain an ECC from the DOE prior to implementation
Environment Conservation Rules of 1997 Section 7: Procedures for issuing ECC	Spells out procedures and documentation requirements for obtaining ECC for different

Schedule 1	project category Classification of industrial units or projects based on location and impact on the environment
Schedule 3 Schedule 10	Standards for ambient water quality and drinking water quality Standards for effluent from industrial units and projects
The Groundwater Management Ordinance, 1985	An Ordinance to manage the groundwater resources for agricultural and drinking water purpose
Water Supply and Sewerage Authority Ordinance, 1963 Dhaka WASA Act, 1996	An Ordinance to provide construction, improvement, expansion, operation and maintenance of water and sewerage work, and Drainage system relating to environmental sanitation.

3.1.2 Gap Analysis

The present Policies, Acts, Rules & Regulations with respect to the Environmental issues are under the custodian of the Department of Environment (DOE). All these Policies, Acts, Rules & Regulations are old, which need to be updated to fulfill the present requirements.

The Environmental Conservation Act, 1995 as amended, speaks about waste only in general, and the Environmental Conservation Rules, 1997, made under this Act, do not suggest any specific measures for regulation of wastes, treatment of wastes and sludge management. Usually the environmental issues in the country are handled by different sectoral policies and legislation, such as land use, water and toxic chemicals, environmental health and sanitation. The sectoral laws dealing with different environmental issues in Bangladesh were enacted at different periods. They were useful at the time they were enacted, but many not completely answer present development need. Moreover, the environmental concerns and priorities of the country have changed considerably since the laws were passed. For environmental management in particular, updating of some laws is needed.

We feel, the following Policies, Acts, Rules & Regulations need to be amended, for which initiative should be taken by the concerned organization (s):

Table 7: Environmental Issues and Relevant Laws and Regulations need Revision

Issues	Laws/Regulations	Enforcing Agency	Upgrading/revision/comments
Surface Water Quality	• ECA, 1995 • ECR 1997 • Environmental Court Act, 2000 • National Policy for Safe Water Supply and Sanitation, 1998 • The Local Government Ordinance, 1983	MoEF/DoE MoEF/DoE MoEF/DoE MoLGRDC/DPHE/UPs	• More detailed surface water quality standards including more parameters then in the Schedule3 (ECR97) in view of chemical pollution in the Urban Water shed. • Hydrologic Unit Code (HUC) based surface water quality specification for urban watershed management
Water Pollution	• ECA, 1995	MoEF/DoE	• Revision of point source

	• ECR 1997 • Environmental Court Act, 2000 • National Policy for Safe Water Supply and Sanitation, 1998 • The Local Government Ordinance, 1983	MoEF/DoE MoEF/DoE MoLGRDC/DPHE/UPs	discharge standards (Schedule 9 & 10 of ECR97) including more parameters in view of changing characteristics of water pollution in urban watershed. • Measures to limit cumulative discharge in the watershed by introducing explicit polluters pay principle in ECA95.
Sewerage Discharge Management	• ECA 1995 • ECR 1997	MoEF/DoE MoEF/DoE	• Inclusion Sewerage Treatment Plants in the Industrial Emission Standards (i.e., Schedule-I I of ECR) • Sewerage Sludge management protocol development

4. Recommendations

4.1 Future Concerns

Notwithstanding the large number of rules and regulations to protect water from industrial effluents and other pollution, and the policies for enabling the environment through dry season augmentation of water, there is a lack of institutional capability to enforce them, and there are few action programs. There is also a lack of skills and expertise for taking appropriate action during project design and implementation, to ensure that environmental concerns should be properly addressed.

Future concerns prevail regarding the implementation of national policies, due to lack of institutional capability and awareness to properly address the policy objectives and goals. Earlier analysis of climate change scenarios show that water scarcity in the dry season would be aggravated, and low water flow in the river system would allow further saline water intrusion into it. Therefore, climate change and its impact on water pollution and scarcity need further integrated analysis. An analysis is presented in Table 8 on possible future concerns and implications of various national polices on water related environmental issues and required actions.

Table 8: Future Concerns regarding National Policies and Water related Environmental Issues

National Policy and Key Water related Environmental Issues	Future Concerns/Implications	Need to Address the Issues
Industry (1999): Raising industrial share of GDP from 10% to 25% in 10 years; encouragement of private enterprise; environmentally sustainable development, conforming to law; ISO 14000 certification encouraged	Increased production/dispersal could increase severity and spread of population problem	Institutional strengthening to enforce environmental rules and regulations. Coordination between DoE and Ministry of Industry is needed
Safe Water Supply and Sanitation (1998): 3Increased and sustainable basic water supply and sanitation; mitigation of arsenic	Surface water quality and groundwater arsenic mitigation are major concern for future	Institutional strengthening, coordination, awareness raising, and ensure community participation

problems; storm water drainage in urban areas; community participation and social awareness		

4.2 Institutional Arrangement

The institutional framework for management of the city and its environment is chaotic. There is a serious problem of overlapping jurisdiction between many Government agencies, which often leads to inaction.

The statutory responsibility for the water supply and sanitation sector lies with the Ministry of Local Government, Rural Development and Cooperatives (MoLGRD&C). Its Local Government Division (LGD) is responsible for policy making, planning, financial mobilization and allocations, framing of rules and regulations, as well as monitoring and evaluation. The Department of Public Health Engineering (DPHE) is responsible for planning, designing and implementing water supply and sanitation in rural and urban areas, except the cities of Dhaka, Chittagong and Khulna. The Local Government Engineering Department (LGED) undertakes water and sanitation related activities in municipalities (Pourashavas) and with City corporations on a project basis. City corporations are responsible for drainage, solid waste management, and maintenance of water supply and sanitation systems installed by DPHE or LGED. Dhaka WASA is responsible for water supply, sub-surface drainage and sewerage, while Chittagong and Khulna WASA deals only with water supply. The statutory responsibilities of Pourashavas include provision, operation and maintenance of water supply, solid waste management and sanitation, but most have limited technical and organizational capacity, and rely on DPHE or LGED for design and construction. Water Supply and Sanitation Committees (WATSAN Committees) have been established in Union Parishads (UPs), and are playing a key role in sanitation, in collaboration with Upazila Development Coordination Committees.

The primary institution for environmental management is the Department of Environment (DoE), under the Ministry of Environment and Forest (MoEF). The DoE is the authority with the mandate to regulate and enforce environmental management, and the setting and enforcement of environmental regulations, including the pollution control of water resources.

MoEF and DoE are burdened with the tasks of (a) setting standards, (b) evaluating and giving clearance to impact assessments, and (c) enforcing environmental rules and regulations. These are major tasks, and although institutional strengthening of DoE is underway to help develop its capacity to fulfill its mandate. The task would become easier if other agencies fulfilled their own environmental duties and responsibilities effectively. The role of civil society as a whole would be made significant by their meaningful participation in environmental issues, and help in tackling the problems, through public -interest litigation.

Major agencies with activities in the water sector, such as BWDB, LGED and DWASA, have environmental guidelines for developing and implementing their projects. However, there is a lack of relevant skills in these organizations. LGED has established an environmental cell. The Government has created Environmental Cell within DWASA, but many of the sanctioned posts of the Environmental Cell have been lying vacant for months together. DPHE has not done it yet where usually working on outsourcing EIA work for larger projects. A general training on environmental awareness, and empowerment to take action would contribute greatly to raise environmental standards.

Current legal frameworks require all implementing agencies to conform to environmental rules and standards, but without a strong support from DoE and proper resources, the quality of the EIAs undertaken cannot be assured.

6. Monitoring and Evaluation Indicators

The following table presents potential indicators that could be used to monitor the implementation of a water supply and sanitation project. The appropriate indicators for a specific project shall be

selected according to the project context, major anticipated impacts and the cost of data collection and processing.

Component	Indicators
Environment	
Water	• Groundwater static level and refilling capacity • Parameters of WHO Guidelines for Drinking water Quality for evaluating water quality at the sources and wastewater discharge sites • Quantity of water used compared to initial estimates
Soils	• Evolution of erosion signs
Ecosystems	• Surface of sensitive areas affected by the project (encroachment, sedimentation on spawning grounds, river banks erosion etc.)
Natural and Cultural heritage	• Natural and cultural sites affected by the project
Health Outcomes	
Communicable diseases	• Prevalence rates of diseases such as malaria, diarrhea and HIV • Water quality analysis results (coliforms)
Non communicable diseases	• Water quality analysis results (mineral excesses and deficiencies)

7. Risk Management

The main risk associated with water supply and sanitation projects is the following:

- **Water contamination**, jeopardizing the potable water supply of the population and increasing the risk of water borne diseases.

In order to prevent or minimize these hazards, appropriate risk management measures shall be designed and implemented.

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