

**Bangladesh**

***Policies for Mainstreaming Strategic  
Environmental Assessment in the Urban  
Development of Greater Dhaka***



**June 2008**



## **ABBREVIATIONS**

ADB	Asian Development Bank
AQMP	Air Quality Management Project
BLD	Billion Liters per Day
BOD	Biological Oxygen Demand
BSCIC	Bangladesh Small & Cottage Industries Corporation
BUET	Bangladesh University of Engineering & Technology
BWDB	Bangladesh Water Development Board
BWTA	Bangladesh Water Transport Authority
CETP	Centralized Effluent Treatment Plant
COD	Chemical Oxygen Demand
DAP	Detailed Area Plan
DCC	Dhaka City Corporation
DEPZ	Dhaka Export Processing Zone
DIEWRMP	Dhaka Integrated Environment and Water Resources Management Project
DITP	Dhaka Integrated Transport Project
DMDP	Dhaka Metropolitan Development Plan
DND	Dhaka Narayanganj Demra
DOE	Department of Environment
DMP	Dhaka Metropolitan Police
DPHE	Department of Public Health Engineering
DTCB	Dhaka Transport Coordination Board
DUTP	Dhaka Urban Transport Project
DWASA	Dhaka Water and Sanitation Authority
ECA	Environment Conservation Act
EPZ	Export Processing Zone
FAP	Flood Action Plan
GDP	Gross Domestic Product
GoB	Government of Bangladesh
HSD	Housing and Settlement Directorate
IDA	International Development Association
IEE	Initial Environmental Evaluation
IGES	Institute of Global Environmental Strategies
IPCC	Intergovernmental Panel on Climate Change
IWM	Institute of Water Modeling
JICA	Japan International Cooperation Agency
JNURM	Jawaharlal Nehru National Urban Renewal Mission
LGED	Local Government Engineering Department
MLGRDC	Ministry of Local Government, Rural Development and Co-operatives
MoW	Ministry of Housing & Works
MSL	Mean Sea Level
MSW	Municipal Solid Waste
NWRC	National Water Resource Council

PM <sub>2.5</sub>	Particulate Matter <2.5 Micron
PM <sub>10</sub>	Particulate Matter <10 micron
PSRP	Poverty Strategic Reduction Strategy Paper
PWD	Public Works Department
RAJUK	Rajdhani Unnayan Katripakkha
REHAB	Real Estate Housing Association of Bangladesh
RHD	Road and Highways Department
RMG	Readymade Garment Industry
SEA	Strategic Environment Assessment
SMPA	Strategic Metropolitan Planning Authority
SPZ	Special Planning Zones
STP	Strategic Transport Plan
TAPP	Technical Assistance for Plan Preparation
TMC	Technical Management Committee
UAP	Urban Area Plan
UDD	Urban Development Directorate
UGI	Urban Governance Index
UNDP	United Nations Development Program
UNCHS	United Nations Centre for Human Settlement
WASA	Water and Sanitation Authority
WARPO	Water Resource Planning Organization
WTP	Water Treatment Plant

The policy note was prepared by a team led by Adriana Damianova, Lead Environmental Specialist, Task Team Leader, including Fernando Loayza, Senior Strategic Environmental Assessment Specialist, Sunanda Kishore, Economist (Consultant), K. Minnatullah, Senior Water Specialist, and Dr. Nandini Dasgupta, Institutional Economist (Consultant). The inputs from other Bank staff such as Grazia Atanasio, Communication Specialist and G. M. Khurshid Alam, Private Sector Specialist, during the consultation processes were of great value. The policy note draws on a series of consultations carried out during the preparation of the Strategic Environmental Assessment of Dhaka Area Development Plans (SENAS Consult, Canada, and TCL Bangladesh) and several other background documents, including the Note on Lessons Learned from the SEA, the Report on Institutional and Economic Analysis of Dhaka Industrial Pollution and other relevant published materials. The team benefited greatly from the guidance and inputs of Karin Kemper, Sector Manager Environment and Water Resources, the peer reviewers Anthony Bigio, Senior Urban Planner, Dan Hoornweg, Lead Urban Planner, and Catherine Signe-Tovey, Water Resources Economist. Valuable comments and contributions provided by Mr. A S M Rashidul Hya, Secretary of Ministry of Housing and Works, Mr. C.S. Karim, Honorable Advisor, Ministry of Environment and Forests, Prof. Ainun Nishad, Country Representative IUCN, Prof. Feroze Ahmed, Tapan Kumar Nath, DAP Project Director, and RAJUK's Chairman K A M Haroon are greatly acknowledged. Administrative support was provided by Swarna Kazi, Priya Chopra, and Poonam Rohatgi. Amy Evans (consultant) edited the note. The generous support of BNPP grant provided by the Government of Netherlands to support the SEA is greatly acknowledged.

The findings, interpretations and conclusions expressed here do not necessarily reflect the views of the Executive Directors of the World Bank or of the governments they represent.



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## **Executive Summary**

This policy note focuses on analyzing critical institutional and planning issues affecting Dhaka's Metropolitan Area, and suggests policy recommendations for introducing sound urban environmental planning to improve the quality of life by mitigating and reversing environmental degradation. The recently completed Country Environmental Assessment found that while Bangladesh has a reasonably well developed set of environmental policies and regulations, the country does not have a comprehensive policy on urbanization. The CEA acknowledges that enforcement is enormously weak, and the challenges cannot be addressed by environmental authorities alone. Against Dhaka's rapid development, changing urban landscape and critical environmental and governance challenges, the need for institutional strengthening and requisite city planning is becoming increasingly important. This policy note also builds on the Strategic Environmental Assessment of Dhaka Area Development Plans, carried out in 2007. The Policy note draws on the SEA consultation process and conclusions. It provides an overview of Dhaka's urban development challenges – the first such in some time – and recommends a series of options for enhancing environmental planning aspects for consideration by policy and decision-makers in the Government. The key objectives of the note are to:

- Identify the key environmental issues in the Dhaka metropolis with a focus on urban development planning and supporting institutional systems.
- Inform strategic planning and overarching national sectoral strategies relevant to the development of Dhaka City.
- Gauge the strengths and weaknesses in government policies and relevant institutions for urban environmental management.
- Provide policy recommendations for strengthening urban planning and institutional capacity building in Greater Dhaka.

The SEA is a decision making tool being used for the first time by the Government of Bangladesh (RAJUK and Ministry of Housing and Urban Planning) to strategize and provide direction to the preparation and implementation of the Detailed Area Plans (DAPs). It was also a key policy instrument which enabled the World Bank team to engage with the Government of Bangladesh in a focused policy dialogue, provide recommendations for institutional strengthening, and address political economy governance concerns in the context of the implementation of DAPs in the Dhaka Metropolis. The SEA underscores the importance of strengthening the urban planning process by highlighting the integral link between environmental quality and economic



growth, on the one hand, and environmental degradation and unplanned and under-regulated urban development, on the other hand.

Environmental impacts on land-use and management, water resources and quality, solid waste management, flooding and drainage are examined. The analysis of environmental conditions reflects the views and concerns expressed by the stakeholders, including vulnerable groups, in the process of SEA preparation, and describes how they are impacted as a result of unmanaged urbanization. A summary of the main policy recommendations is provided in Chapter 8.

Implementation of urban and regional plans needs considerable coordination among all agencies responsible for sector planning and investments. Currently, there are no well-defined mechanisms for coordination, nor an over-arching planning framework which would enable agencies to collaborate and coordinate their plans. This limitation has resulted in a fractured, haphazard and environmentally unsustainable urban sprawl and inadequate infrastructure. To ensure that these issues are adequately addressed and mitigated, the Government should establish an institutional framework for effective inter-agency coordination. The continuing piecemeal planning and uncoordinated infrastructure development needs to be reconciled urgently with the long-term environmental sustainability of the urban ecosystem.

The following are the most urgent recommended actions to begin addressing gaps in urban planning and environmental management:

- **Develop DMDP Land Use Map, Demarcate and Publish Notification of Ecologically/Environmentally Sensitive Areas.** Lack of stringent planning guidelines and loopholes in the Structure and Urban Plans have allowed encroachment on environmentally sensitive areas, including flood flow zones, wetlands and low-lying areas which act as sinks for storm water runoff, natural drainage channels and canals.
- **Resolve Conflict Arising From Multiple Functions of RAJUK.** RAJUK's undeniable strength has been to actively promote and participate in the development of commercial properties. While these developments have been lucrative, they have often overlooked planning guidelines and have encroached on environmentally sensitive areas. The underlying reason for the encroachment is the conflict of interest between RAJUK's dual role as a promoter of development and as the principal agency for urban planning.

- **Strengthen the DAP Planning Process.** Real value will be added to the process if the capacity for environmentally sustainable and socially sensitive planning is enhanced in RAJUK. This includes a knowledgeable team with technical know-how, a sound understanding of the complexities of urban planning, and a clear roadmap to plans' execution.
- **Engaging Stakeholders in Urban Planning.** More substantive involvement of key stakeholders in the planning of regional areas is highly recommended. This can be achieved for example by engaging the “ward committees” in the Pourashavas and publication of the DMDP regional land use plan with demarcation of ‘no development zones.’
- **Bring Other Actors on Board.** The participation of local authorities, DWASA, RAJUK, LGED and other principal organisations responsible for management of water resources to work together with the DAP team is crucial to the success of formulating local area plans.

In addition to the urgent actions recommended above, policy initiatives are needed in the medium term to develop strategic planning directives for urban growth and improve decision making procedures for local development projects. Development projects currently are funded without an effective mechanism to appraise their environmental impact or the sustainability. Mainstreaming environmental issues will be a prerequisite to initiating any systemic change.

Specific priority recommendations for land use and housing include preserving open spaces, making provision for housing for lower income groups, and ensuring more effective institutional coordination in transport master planning.

Water supply in Dhaka City is predominantly based on ground water extraction. More than 75% of the water supply of the city comes from ground water resources. In the fringe areas, nearly the entire supply is from ground water. The rampant extraction of ground water has resulted in depletion of ground water levels by the alarming rate of 2-3 m/year. Rapid deterioration of ground and surface water quality is also cause for huge concern. In order to address the increasing requirements for water supply in Greater Dhaka, the following policy measures should be incorporated into the planning systems or the DAPs:

- **Identify the source of “main” water supply** based on discussions with DWASA, DPHE and other agencies, in order to foster a comprehensive approach to planning and development. The maximum water supply from the

water main can be matched against the projected water demand based on the population growth expected in the supply area.

- **Estimate the supporting infrastructure and land required** for supply of water to a neighborhood, based on the land use proposed in the DAPs.
- **Prevent contamination of water sources** through effective regulation and appropriate land use.

The lack of adequate system for collection and treatment of sewage generated within the city and adjoining urban areas has had serious impact on surface water bodies including the ground water resources, especially the upper aquifers that form the DMDP watershed. The absence of a sewage and drainage system is also responsible for poor sanitary conditions throughout the Dhaka urban area. Upkeep and maintenance of sewers and treatment plants is neglected. Overflows from septic tanks, in areas which are not covered by the sewer system, end up in the khals and rivers. This situation creates a serious health hazard to the population living close to the khals and rivers, as these waters are commonly used for domestic bathing, washing and irrigation. Key recommendations for improving sewage management include:

- **Inputs from DWASA and DPHE in formulating plans** for areas within DMDP that were not covered by the initial sewage network plan; and planning **secondary sewage networks**, taking into account the trunk sewer network prepared by DWASA and location of the proposed STP.
- Collaboration between DWASA, DPHE and Pourashavas to decide arrangements for localized **low cost sanitation methods** and community sewage treatment systems.
- **Profiling of the existing discharge points** to identify the nature of pollutants discharged and sources of contaminants to meet sewage and sanitation standards; and develop options for **preventing discharge of untreated industrial effluents** into the sewer network.
- Identify low-lying/wetland areas where **pilot projects for non-conventional treatment of sewage** can be undertaken.

Dhaka city area generates approximately 3,500<sup>1</sup> tons/day of residential, commercial and institutional municipal solid waste (MSW), while the DMDP area generates approximately 7,000<sup>2</sup> tons/day. By 2015 more than 10000 tons/day of MSW will be generated in the DMDP area. Inadequate disposal of solid waste in lowlands and sewers is a persistent problem. There are limited dumping sites and sanitary landfills in DCC area. There is no comprehensive system for collection and management of bio-medical waste and industrial waste. Key recommended actions include:

- **Strengthen the regulatory framework** for solid waste management, with incentives for entrepreneurs for pre-treatment of industrial wastes.
- Provide an **incentive system for sanitary landfilling, waste collection and waste-to-energy** projects.
- Develop the **solid waste collection network**, in consultation with DCC and the Pourashavas; and to identify environmentally sound sites for the **location of future landfills** based on collaboration between the relevant government agencies.

With respect to drainage and flooding, the urbanized part of the main city and the immediate peri-urban areas are bounded physically by a number of smaller rivers which are tributaries of the larger rivers, and form an intricate system of rivers and natural drainage channels. With rapid urbanization, the Metropolitan Planning Area now encompasses areas beyond the physical boundaries set by the rivers. The flooding problem has been further compounded by the fact that the city has lost its ability to drain out due to clogging of natural drainage channels within the city. This has been primarily caused by the pressures of urbanization resulting in both private and public sector organizations encroaching on land, which together with low lying areas that serve as sinks for excess water, was previously a part of an intricate drainage system.

The onset of potential climate change effects in near future, as predicted in the recently published IPPC report, may result in a number of interrelated adverse impacts in Bangladesh involving complex interactions between physical processes. The combined effects of subsidence and sea level rise could result in increasing vulnerability to flooding events and serious drainage and sedimentation problems, in addition to coastal erosion and land loss. A combination of such effects will have immense socio-economic impacts in the region. In quantitative terms, for example, a one meter rise in sea level could flood almost

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<sup>1</sup> It is to be noted that solid waste is not weighed in the city and estimates of generation have been based on sampling of a relatively small number of generators and are likely to be subject to a high margin of error. The population of the DCC area was assumed at 6.3 million

<sup>2</sup> The population of the DMDP area was estimated at 12.6 million

30,000 km<sup>2</sup> of Bangladesh, affecting over 13% of the population, mostly in the lower deltaic regions of the south. Key recommendations with respect to flood prevention include:

- Develop a **comprehensive Watershed Water Resources Management Strategy and Action Plan** that accounts for climate change impacts and adaptation measures and which would inform future urban development plans.
- **Demarcate and notify areas of flood retention ponds as “no development zones”** as a high priority<sup>3</sup>.
- RAJUK should initiate steps to **integrate the findings of the Eastern Bypass study into the DAP preparation process**. The land use and development of other infrastructure investment should be coordinated with the construction of the Eastern Embankment.
- Foster linkages between DWASA and DPHE plan for future infrastructure **planning on storm water drainage** to reduce the severity of urban floods; and develop a drainage network for low lying areas to mitigate urban floods.

With respect to industrial pollution, the Greater Dhaka area has emerged as a major hub for industrial activities. Even though there are no heavy industries in the vicinity, a large number of medium and small scale industries, e.g., jute, tannery, dyeing and textile printing, metal, cement, rubber, chemicals and pharmaceuticals, petroleum refining, distillery, plastics and brick manufacturing are present. Institutional and regulatory failures have led to acute water pollution from small and medium scale industries. The wastes from these industries are often dumped along roads or into drains, while effluents are drained untreated into ditches. Key recommendations include:

- Develop **proper zoning and land use plans and siting regulations** for new industrial development to reduce future problems.
- Develop strategies and plans for **rehabilitation and relocation of existing polluting industries from densely populated areas**.

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<sup>3</sup> As part of the DAP preparation process, the surveys of water bodies (ponds, wetlands, canals, etc.) have already been completed.

- Prepare and implement **cluster plans** for industries for treatment of discharges, to reduce environmental health hazards; consider increasing the density of existing industrial areas for more effective land use development and treatment of industrial pollution.

The main causal links leading to environmental degradation are institutional failures, lack of enforcement, policies that provide disincentives for environmental conservation, and governance constraints. These are explored in some depth in the main body of the note.

## **Chapter 1: Introduction**

Dhaka is one of the ten mega cities in the world. Growing at a very fast rate, Dhaka's population is predicted to increase from today's 11.3 million to about 21 million by 2015. Dhaka's rapid expansion has resulted from both high population growth and rural-urban migration. Like other developing countries, the urban population in Bangladesh has grown much faster than the rural population. Notwithstanding Bangladesh's impressive progress toward achieving the Millennium Development Goals, about 55% of Dhaka residents still live below the poverty line and 4.2 million people are estimated to live in slum areas. There are 1,925 slums in the Dhaka City Corporation (DCC) area, many of which are located in low lying areas near rivers and prone to flooding<sup>4</sup>.

Because of its central location, potential for economic activity and easy accessibility from other parts of the country, Dhaka continues to attract rural migrants. Population growth has typically sprawled along major highways and water bodies, without appropriate consideration of land-use management, urban environmental issues and transportation planning. The large population, rapid industrialization, city topography and the scale of environmental deterioration<sup>5</sup> pose tremendous urban development challenges which policy makers need to address as a top priority. The deteriorating environmental conditions of the capital city may jeopardize future economic growth and negatively impact the quality of life in the metropolitan area for many years to come. Consequently, there is public concern and a growing realization of the importance of adopting urban planning practices that take stock of the critical environmental challenges.

The findings of the CEA intimate that while Bangladesh has a reasonably well developed set of environmental policies and regulations, the country does not have a comprehensive policy on urbanization. The CEA acknowledges that enforcement is enormously weak and the challenges cannot be addressed by environmental authorities alone. Against Dhaka's rapid development, changing urban landscape and critical environmental and governance

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<sup>4</sup> Bangladesh Dhaka: Improving Living Conditions for the Urban Poor, World Bank Report no.35824-BD, April 2007

<sup>5</sup> The Bangladesh Country Environmental Analysis<sup>5</sup> (CEA) found that all Dhaka residents are being affected by untreated waste and poor water quality. Economic costs associated with inadequate water supply and flood control amount to some US\$400 million, linked to poor surface water quality, loss of agricultural and fisheries production (17%), cost to industry (22%), lost amenity value (21%) and health costs (40%). The CEA also points to the need for a sub-basin authority with comprehensive responsibility and decision making power for all water quality and urban habitat issues in the Dhaka Statistical Metropolitan Area, and to serve as an effective coordinating mechanism between the many concerned agencies.

challenges, the need for institutional strengthening and requisite city planning is becoming increasingly important. This policy note builds on the Strategic Environmental Assessment of Dhaka Area Development Plans and provides an overview of Dhaka's urban development challenges – the first such in some time – and recommends a series of options for enhancing environmental planning aspects for consideration by the Government.

Bangladesh has only a recent record of planned urban development. The first Master Plan for the Development of Dhaka was prepared in 1959 covering roughly 830 sq. km with a target population little over 1 million, and assumed an average annual population growth rate of 1.75%. A new Dhaka Metropolitan Development Plan (DMDP) was prepared for the years 1995-2015 and provided zoning for various activities in the urban areas. Since then, Dhaka's urban planning issues have been addressed at three geographic levels: sub-regional (Dhaka Structure Plan), urban (Urban Area Plan) and sub-urban (Detailed Area Plans - DAPs). The Dhaka Capital Development Authority (RAJUK)<sup>6</sup> is the key agency responsible for the further development of the DMDP and the Detailed Area Plans (DAPs), which should supersede the Urban Area Plans and were conceived as the third and lowest tier of the DMDP urban plans.

The DAP preparation process, overseen by RAJUK, unfortunately was delayed over 10 years. For the purpose of DAP preparation, the DMDP area was sub-divided into 26 Special Planning Zones. These were then consolidated to form five planning areas. There are four main reasons for the Strategic Environmental Assessment of DAPs that was carried out during the period January – August 2007:

- (i) Greater Dhaka is the economic driver of Bangladesh, and the lack of institutional mechanisms for incorporating environmental considerations in the formulation of the DAPs was identified as a critical aspect warranting the institutional focus of SEA;
- (ii) Undertaking a strategic environmental assessment of planning and environmental management systems for urban development in Greater Dhaka was beyond the scope of the DAPs. The DAPs' inability to incorporate environmental planning has been exacerbated by the ineffective inter-institutional coordination, thus providing further rationale for an institutionally centered SEA;

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<sup>6</sup> RAJUK was established in 1987. The present jurisdiction of RAJUK includes three districts (Dhaka, Narayanganj and Gazipur), five municipalities (Pourashavas of Savar, Kadamrasul, Narayanganj, Tongand Gazipur) and the Dhaka City Corporation Area.



- (iii) While individual DAPs provide important inputs to the SEA, they would not identify and assess cumulative environmental effects; and
- (iv) Highlighting key institutional planning issues and including an analysis of the political economy dimension through an SEA was suggested by RAJUK as adding value to the detailed and technically-oriented expected output of the ongoing DAPs, particularly to facilitate their future implementation.

Against this background, and given the complex and weak institutional framework for management of the city environment, the policy note focuses on analyzing critical institutional and planning issues affecting Dhaka's Metropolitan Area and the requisite policy recommendations for introducing sound urban environmental planning focusing on mitigating and reversing environmental degradation. The policy note is intended to provide just-in-time support to the Government of Bangladesh and urban planning authorities by building on the process and outcomes of the SEA, and has the following objectives:

- To identify the key environmental issues in the Dhaka metropolis with a focus on urban development planning and supporting institutional systems.
- To inform strategic planning and overarching national sectoral strategies relevant to the development of Dhaka City.
- To gauge the strengths and weaknesses in government policies and relevant institutions for urban environmental management.
- To provide policy recommendations for strengthening urban planning and institutional capacity building in Greater Dhaka.

The SEA is a decision making tool being used for the first time by the Government of Bangladesh (RAJUK and Ministry of Housing and Urban Planning) to strategize and provide direction to the preparation and implementation of the DAPs. It was also a key policy instrument which enabled the World Bank team to engage with the Government of Bangladesh in a focused policy dialogue, provide recommendations for institutional strengthening, and address political economy governance concerns in the context of the implementation of DAPs in the Dhaka Metropolis.

The SEA was launched in late November 2006 upon the request of the Ministry of Housing and Public Works and RAJUK. It has identified areas for capacity development; options for informing and possibly reforming the planning process, and suggestions for improving the institutional links so that planning at DAP level can successfully complete the tasks assigned. Finally, the SEA underscores the importance of strengthening the urban planning process by highlighting the integral link between environmental quality and

economic growth, on the one hand, and environmental degradation and unplanned and under-regulated urban development, on the other hand.

**BOX 1.1: STRATEGIC ENVIRONMENTAL ASSESSMENT**

The Strategic Environmental Assessment (SEA) describes “analytical and participatory approaches that aim to integrate environmental considerations into policies, plans and programs and evaluate their inter-linkages with economic and social considerations.” (OECD (2006, p: 30). As compared to project level environmental impact assessment, SEA supports high-level strategic decision making such as policies or development plans and requires an understanding of institutional settings and associated “political economy” factors. A SEA is also a decision making tool that provides a platform for policy dialogue and interaction between policy makers, planners, stakeholders and civil society at large on sector reform and associated environmental priorities.

The principal audience of this SEA was the Government of Bangladesh and RAJUK, which benefited from strategic planning directions emerging from the study and the development of an overall environmental management framework that takes into account the environmental opportunities and constraints within which the DAPs have been prepared. Other Government agencies (Department of Environment, Ministry of Housing and Urban Planning), sectoral agencies (DWASA, BWDB, etc.) and local government bodies (Dhaka City Corporation, Pourashavas) benefited by developing a better appreciation of the environmental challenges and opportunities associated with the implementation of urban plans on different levels. The SEA was developed as a strategic decision-aiding instrument for planners, decision makers and stakeholders to enable them to take planning decisions in a transparent manner, to achieve the common objectives of improving the quality life of city residents and reconciling development planning challenges with environmental protection and sustainability.

The policy note is organized in chapters that provide a situation analysis of the major urban sectors where coordination at the institutional and planning level is a key challenge, followed by a summary of main conclusions. Environmental impacts have been considered in subsections on land-use and land management, water resources and quality, solid waste management, flooding and drainage. The analysis of the present environmental conditions reflects the views and concerns expressed by the stakeholders, including vulnerable groups, in the process of SEA preparation, and describes how they are impacted as a result of unmanaged urbanization. Chapter 2 identifies the shortcomings and gaps at the strategic planning level, and highlights the challenges and risks for urban plan development and implementation. Each subsequent chapter discusses the relationship between sector planning and development issues and environmental degradation in Dhaka. Considering the institutional factors, policy measures are identified. Finally, this analysis is completed by formulating concrete policy adjustments to strengthen mechanisms and institutions for

effectively addressing Dhaka's main environmental problems. A summary of the policy recommendations is provided in Chapter 8.

## **Chapter 2: Urban Development Policies and Overall Planning in Dhaka**

Urban planning is closely linked with the quality of life of urban space. Thus, quality of life has a direct relationship with the state of urban environment, reflecting the footprint that intense development leaves on the environmental resources in the absence of requisite safeguards and comprehensive and effective policies. Hence, the soundness of the overall urban development strategies, plans and programs has critical implications for Dhaka's livability.

In the past, the Bangladesh *Planning Commission* through the *Five Year Development Plans (FYPs)*<sup>7</sup> set the overall planning direction for growth and development of the urbanized areas in the country. These were complemented by Annual Development Programs (ADPs). Responsibility for the ADP for Dhaka City rested with several ministries (See Box 2.1). The Five Year Planning mandate has been discontinued in favor of a long term perspective plan under Bangladesh *National Strategy for Accelerated Poverty Reduction*.

### **BOX 2.1: URBAN PLANNING IN DHAKA CITY**

Several ministries and associated departments are involved in the planning and administration of Dhaka city. As many as 55 organizations at the national, sectoral and local levels are in effect involved in planning and development of urban affairs in Dhaka Metropolitan Development Area. However, the key functions of urban planning and development are with two ministries - Ministry of Housing & Public Works (MoW) and Ministry of Local Government, Rural Development and Cooperatives (MLGRDC).

Physical planning, development, control, and housing functions are under the MoW, while urban utilities, infrastructure and urban administration are the responsibility of the MLGRDC. Urban programs of the MoW are implemented through the Public Works Department (PWD), the Urban Development Directorate (UDD), and the Housing and Settlement Directorate (HSD).

Among institutions involved in urban planning and implementation in Dhaka city, the Rajdhani Unnayan Katripakha (RAJUK) and Dhaka City Corporation (DCC) are key. Other organizations have specific sectoral roles and responsibilities like the Dhaka Water Supply and Sanitation Authority (DWASA).

Municipalities (locally called pourashavas) or Corporations form the urban local body and are responsible for planning, operation and management of city infrastructure in the peri-urban areas of Dhaka City and other urban areas in Bangladesh. They share responsibilities with the other departments and agencies for urban planning and plan implementation.

Source: Dhaka Strategic Environmental Assessment (SENES Consultants), 2007

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<sup>7</sup> After the fifth Five-Year Plan covering 1996–2001, the five-year development planning has been discontinued and planning has been guided by a poverty reduction strategy paper or PRSP that was adopted in October 2005 for 2005–2015. However, unlike the Five-Year Plans, the PRSP does not make any provision for urban and regional planning nor does it place any emphasis on comprehensive development of cities.

The Rajdhani Unnayan Katttripakha (RAJUK) was established as a development and planning authority for Dhaka in April, 1987 by replacing Dhaka Improvement Trust (DIT). RAJUK was given responsibility for the metropolitan area of Dhaka City, covering an area of 1,528 sq km. Its mandate includes the preparation of master plans, and exercising legal powers for planning and execution. RAJUK is responsible for planning infrastructure works and land development, together with estate management of commercial and residential schemes. During the early nineties, RAJUK delineated a broad-based Dhaka Metropolitan Development Plan (DMDP). The DMDP prepared in 1995 was based on a three-tier structure and included:

- i) The Structure Plan<sup>8</sup> - a long-term development strategy (1995 – 2005)
- ii) The Urban Area Plan - an interim mid-term strategy (1995 – 2005), and
- iii) Detailed Area Plans - detailed planning proposals for specific sub-areas.

The Structure Plan and the Urban Area Plan form the higher and middle level plans, respectively, of the DMDP planning framework. The two plans were completed with the objective of recommending measures for promoting balanced growth within the DMDP area.

In Bangladesh, the concept of regional planning co-existed with primary sector planning. Regional plans in the form of Master Plans were first developed for large metropolitan regions like Dhaka and Chittagong in the late 1950's and 1960's, followed by the formulation of an extensive set of micro level detailed area plans (DAPs) for different zones of the city.

The intent of the Structure Plan was to provide a long-term strategy (20 years) for the development of the DMDP area with a population target of 15 million. It formulated policy guidance at two levels:

- **Spatial Policies:** These include policies for geographic zones such as pre-established areas, urban fringe areas and territory demarcated for new development. The policies assessed the optimal land use ranging from agriculture, flood flow zones, flood retention ponds, special areas, etc. However, the Structure Plan could

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<sup>8</sup> The nature and functions of the Structure Plan as spelled out in the DMDP (1995-2015) from December 1995 are defined as 'an appropriate way of detailing the physical form of an urban development strategy at the city level' which term is derived from the British planning practice. Its principle components are: the build up area of the city, divided into broad zones of different land use, character and density; the main lines of communication; the principle institutional uses which serve the whole city and its main fictional areas. As such the Structure Plan differs from the older style city master plan by concentrating on the broader structure of the city. The Structure Plan is not concerned with the details of the physical layout of individual development areas. The functions of the Structure Plan are to interpret national policies, establish aims policies and general guidance to Dhaka's metropolitan long term growth and development.

benefit from a consolidated and realistic delineation of specific land use zoning and other policy prescriptions to direct subsequent urban development. While a series of guidelines have been drafted, in order to ensure their enforcement, it is advisable to make them legally binding and to detail the specific instruments for their implementation.

- **Sectoral Policies:** This includes a set of policies designed to inform and direct priorities for key sectors such as water, energy, agriculture, industry, public administration, transportation, etc.

The Urban Area Plan was subsequently prepared as a strategic document providing mid-term directions, i.e., a 10-year horizon for the development of Dhaka. As such it aimed to encapsulate an interim development management solution until the Detailed Area Plans were prepared. The UAPs covered the areas of Flood Action Plan (FAP) as well as the Tongi-Gazipur and Savar-Dhamsona areas. As recommended under the UAP, the DAPs were initially to be prepared under RAJUK's oversight. However, as a result of limited in-house planning capacity, external consultants are hired to prepare the DAPs as stand alone projects.

The Detailed Area Plans<sup>9</sup> are expected to forge close linkages with various sectoral plans as relevant to the specific area. Methodologically, the entire DMDP area has been divided into 26 Special Planning Zones (SPZs), which are consolidated into five planning areas (See Map at Figure A). For the purpose of the SEA, the area of Dhaka has been spatially clustered into three distinct zones<sup>10</sup>:

- **Developed Areas**, which include the core of the city, mainly comprising the older parts of Dhaka, where the population density is very high and has reached near saturation. However, certain pockets within these densely urbanised parts of the city are undergoing redevelopment.

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<sup>9</sup> The Detailed Area Plan (DAP) was conceived as the third and lowest tier of the DMDP planning hierarchy. As per the design laid down in the document for "Preparation of Structure Plan, Master Plan and Detailed Area Plan for Dhaka: (BGD/88/052)" prepared with assistance from UNDP in 1990, the DAPs were to be prepared in house within RAJUK after building adequate capacity planning in the planning department. However, due to institutional failures and inability to develop internal capacity, the DAP preparation process had been set back by more than ten years. Ultimately, the DAP preparation was outsourced to consultants and is expected to be completed by late 2008.

<sup>10</sup> **Developed Area:** Old Dhaka city area covering about 186 sq. km; **Developing Areas:** Extended areas in the DCC (part of the 6 Thanas: Demra, Sabujbagh, Uttara, Kamrangirchar, Badda, Shyampur) and Paurashavas (Narayanganj, Kadamrasul, Savar, Tongi and Gazipur) covering an area of 310 sq. km; **Fringe Area:** Rural Areas under Union Parishad (part of Demra Thana, Sabujganj Thana, Uttara Thana, Badda Thana, Shyampur Thana, Kamrangirchar Thana, Savar Upazila, Keraniganj Upazila, Gazipur Sadar Upazila, Rupganj Upazila, Bandar Upazila and Narayanganj Sadar Upajila) covering an area of 1032 sq. km.

- **Developing Areas**, adjoining the core of the city and falling under the administrative jurisdiction of the DCC and Pourashavas. These have been developed as suburban areas and still have some space available for further urbanization; and
- **Fringe Areas**, on the fringe of the DMDP area and falling under the administrative jurisdiction of the Union Purashads. Fringe areas consist primarily of low lying lands (flood plains) with agricultural land use. These areas are charted for urbanization in future.

### Shortcomings and Gaps at the Strategic Level

**TABLE 2.1: POPULATION DISTRIBUTION AND DENSITY IN DHAKA**

	Area (sq km.)	Population 2001	Density 2001 (Pop/sq. km)	Population <sup>11</sup> 2006	Density 2006 (Pop/sq. km)
Developed Area	186	5,333,571	28,657	6,439,341	34,598
Developing Area	310	1,551,891	5,007	1,873,633	6,045
Fringe Area	1,032	3,190,930	3,089	3,852,482	3,730
<b>Total</b>	<b>1,528</b>	<b>10,076,392</b>	<b>6,590</b>	<b>12,165,456</b>	<b>7,956</b>

Until the DAPs are prepared for each sub-area, land use management functions are supposed to be governed by the policies, guidelines, and rules in the Structure Plan and the Urban Area Plan. In addition, the Structure and Urban Area Plans can benefit from streamlined, consolidated and practical land use zoning principles which could be easily applied to subsequent development projects. The Plans do demarcate broad areas for future developments, but unfortunately lack a clear definition of development principles. This has led to loopholes for manipulation and subsequent encroachment on the demarcated land. The Guidelines that have been provided in the Plans require clear directives on land use planning and implementation. This is critical for the monitoring of implementation and enforcement by the relevant agencies. By introducing the necessary changes to the guidelines and by drafting enforceable directives, the plans can be updated to resolve the current urban management problems.

The Structure Plan provides policy level guidance and highlights the following aspects: (a) characteristics of different areas and preferred densities; b) main lines of communication;

<sup>11</sup> Population Data : 2001 (Source : Bangladesh Bureau of Statistics, 2001); 2006 : Estimated on Projected Growth rate of 4.15% per annum as per BBS projected Growth Rate

c) institutional aspects of service for the city; and d) main functional areas of the city. However, there is a need to more closely integrate sectoral policies into the Structure Plan with respect to detailed area planning. Most sectoral plans concentrate on finding local and short-term solutions to urban problems, particularly within the DMDP. According to RAJUK's institutional mandate, it has the power to coordinate with the sectoral agencies whose plans affect the urban area. However, its leadership role in fostering greater coordination between sectoral agencies for urban planning has been limited, given its dual responsibility for planning and development. Furthermore, the Structure and Area Plans do not have adequate provisions for effective vertical and horizontal transmission of decisions. Opportunities should be further explored to provide additional guidance on how best to plan and implement critical decisions to meet the challenges at the intersection of sectoral and urban planning.

Implementation of urban and regional plans needs considerable coordination among all agencies responsible for sector planning and investments. Currently, there are no well-defined mechanisms for coordination, nor an over-arching planning framework which would enable agencies to collaborate and coordinate their plans. This limitation has resulted in a fractured, haphazard and environmentally unsustainable urban sprawl and inadequate infrastructure. To ensure that these issues are adequately addressed and mitigated, the Government should establish an institutional framework for effective inter-agency coordination. The continuing piecemeal planning and uncoordinated infrastructure development needs to be reconciled urgently with the long-term environmental sustainability of the urban ecosystem.

The strategic level plans need to tackle the problem of multiple administrative authorities within the DMDP and how their developmental efforts can be cohesively planned and managed at the regional level. However, the resolution of this issue is complicated by the fact that DMDP is divided into smaller administrative units (municipalities and Pourashavas), which lack the institutional capacity to block unplanned and environmentally destructive development.

Additionally, the national funding mechanisms for Annual Development Programmes, which include urban projects, are approved by the relevant ministries or the Planning Commission based on budgetary criteria. The outcome of this procedure is that there is limited urban overview of what is happening on the ground, and a lack of adequate coordination and sanctions mechanisms.

As such, it is advisable for effective DAP preparation to:



- Provide consultant teams with additional guidelines for local area plan formulation and adequate levels of information on the framework for developing a coherent regional approach; and
- Establish better mechanisms to coordinate the plans of adjoining local / sector authorities; and establish processes to support and coordinate their work with RAJUK to deal with large sectoral organisations like DWASA and with local authorities.

### **Plan Development and Implementation Problems**

The problems at the implementation level relate to:

(i) **Inadequate Planning Capacity:** RAJUK's planning capacity instead of being strengthened, had gradually deteriorated over time, resulting in the Planning Department becoming technically understaffed. While increasing the number of urban planners is an effort in the right direction, it would definitely serve RAJUK well to have its current planners and other professionals update their skills and qualifications. Unfortunately, as a result of this skills limitation, RAJUK has been ill-equipped in the early stages to design the DAP preparation process, resulting in overambitious Terms of Reference and inadequately allocated resources. Similarly, the move from the notion of urban planning which is techno-centric and dated would require professionals understanding the complexities of environmental and social planning.

(ii) **Lack of strategic planning framework:** The planners were unable to provide guidelines to the consultants for demarcation of environmentally-sensitive areas where urban development should be restricted. These include wetlands, flood flow zones, retention ponds, canals and natural drainage channels. There is thus the danger that the DAPs could further exacerbate the problems of urban environmental management, which need to be addressed urgently.

In the absence of any directives, and generally low environmental awareness, the DAP consultants appear to have limited understanding of the pollution-intensive nature of industrial growth in the watershed, which is responsible for the water resources degradation. Consequently, there has been limited effort geared towards spatial zoning of industries, and inadequate consultation with industry.

DAP preparation needs to be guided by a stronger strategic-level planning framework. This means that the DAP consultant teams who are currently working within their individual planning zones must gain a larger regional perspective.

**(iii) Leadership of the Technical Management Committee:** The planning process was found to have a very weak interface with the sectoral planning agencies and, as a result, is unlikely to produce plans that can be integrated with the sectoral strategies and plans. This is because: (a) the Technical Management Committee (TMC), which is charged to oversee plan preparation, has been ineffective in bringing sectoral inputs to the draft DAPs; and (b) the DAP teams have also been unable to establish effective contacts with sectoral agencies to address the sectoral issues of the local level plans. Even though actions in the right direction have been initiated to overcome the dissonance of sectoral plans, dissemination of outcome-oriented information to the requisite parties and harmonization of sectoral strategies and plans must remain high on the agenda of TMC.

### **Recommended Measures**

Recommendations for addressing the shortcomings and gaps at the strategic level and for plan development and implementation have been organized in two groups, indicating the urgency of action required.

#### **a) Immediate Action**

- **Develop DMDP Land Use Map, Demarcate and Publish Notification of Ecologically/Environmentally Sensitive Areas**

Lack of stringent planning guidelines and loopholes in the Structure and Urban Plans have allowed encroachment on environmentally sensitive areas, including flood flow zones, wetlands and low-lying areas which act as sinks for storm water runoff, natural drainage channels and canals. Local area plans cannot progress unless these areas are clearly identified, demarcated and publicized. While the proposals and plans on the demarcation already exist with the requisite agencies, the problem remains that the development of DMDP Regional Land Use maps need to be implemented as a priority in order to limit urban expansion. These maps can clearly demarcate eco-sensitive areas and notified through a government gazette as “no-development zones”.

- **Resolve Conflict Arising From Multiple Functions of RAJUK**

RAJUK’s undeniable strength has been to actively promote and participate in the development of commercial properties like shopping centers and malls. While these developments have been lucrative for both RAJUK and the private developers, unfortunately, they have often overlooked planning guidelines and have encroached on

environmentally sensitive areas. The underlying reason for the encroachment is the conflict of interest between RAJUK's dual role as a promoter of development and as the principal agency for urban planning. Introduction of sound urban environmental planning practices and enhanced transparency in RAJUK's development functions would help to mitigate this conflict. The process does not end here and it has to be followed by a continuous monitoring and evaluation of the implementation. Serious consideration could also be given for the government to reassess RAJUK's role as a promoter.

- **Strengthen the DAP Planning Process**

The planning process continues to remain in its interim stage, therefore there is still an opportunity to improve the process and achieve the stated objectives. Real value addition to the process will take place if the capacity for environmentally sustainable and socially sensitive planning is enhanced in RAJUK, as it remains the lead agency.

Plan formulation needs a knowledgeable team with technical know-how, better understanding of the complexities of urban planning, and a clear roadmap to project execution. Teams with technical strengths can be appointed to build on the work that has already been completed in the last two years.

RAJUK's limited involvement in comprehensive urban planning for the DMDP over the course of several years led other agencies to take their own independent planning initiatives. While constitutionally RAJUK is vested with considerable power, it has been unsuccessful in motivating strategic and systematic urban plans. RAJUK can still intervene and assist by redirecting its efforts to foster better coordination with the requisite sectoral agencies and other local authorities. The leadership of RAJUK can be more proactive in the planning process, forging liaisons with other agencies on the DAP process.

- **Engaging Stakeholders in Urban Planning**

As will be discussed in subsequent sections of this policy note, political economy<sup>12</sup> has played a huge part in the haphazard development of the City of Dhaka. Further, vested

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<sup>12</sup> Addressing urban environmental problems is generally very complex due to the multispectral nature of the problems and contingency on strategic decisions being taken at institutional level. The SEA has identified areas for institutional capacity development and provided pointers to inform/reform the governance process; as well as to improve the sectoral and institutional links so that planning at DAP level can raise public and government debate on the environment and development issues. While the main concern of the SEA was the environment, some emphasis on inter-relationship among environment, social and economic issues complemented its usefulness as evidenced during the public consultations.

interests have had the opportunity of hijacking the process of planning due to a lack of coordination and transparency.

It is recommended that during the reform of the planning process, in addition to resolving the conflicted mandate within RAJUK, a process for engaging key stakeholders in the planning of regional areas be fostered. This can be achieved in the following way:

- ⌚ The “ward committees” in the Pourashavas have been quite effective at engaging local communities in local planning initiatives. Similar initiatives are important and can be developed for Dhaka and at the municipal level.
- ⌚ Transparency can be achieved if the DMDP regional land use plan with demarcation of ‘no development zones’ is published. The public can use this information and stave off illegal development. The public can also approach the judiciary if necessary to stop development in no-development zones.

- **Bring Other Actors on Board**

The participation of local authorities is crucial to the success of formulating local area plans. An entry point for dialogue with these authorities could be programs for capacity building in environmental planning and regional development. Additional thought needs to be given to what would be the most efficacious way of doing this. DWASA is one of the biggest players in the provision of urban infrastructure. There is currently little communication between the DWASA and the local authorities. As such, it will be important to bring DWASA, RAJUK and the DAP team to a common platform.

On the positive side, flood management strategies already have a regional approach. However, measures need to be put in place and actions taken at the local level to achieve an overall reduction in vulnerability to flooding. In order to incorporate such measures in DAPs, it will be necessary for RAJUK, LGED and other principal organisations responsible for management of water resources to work together to assist the DAP team.

#### **b) Short to Medium Term Actions**

- **Develop Strategic Planning Directives for Urban Growth**

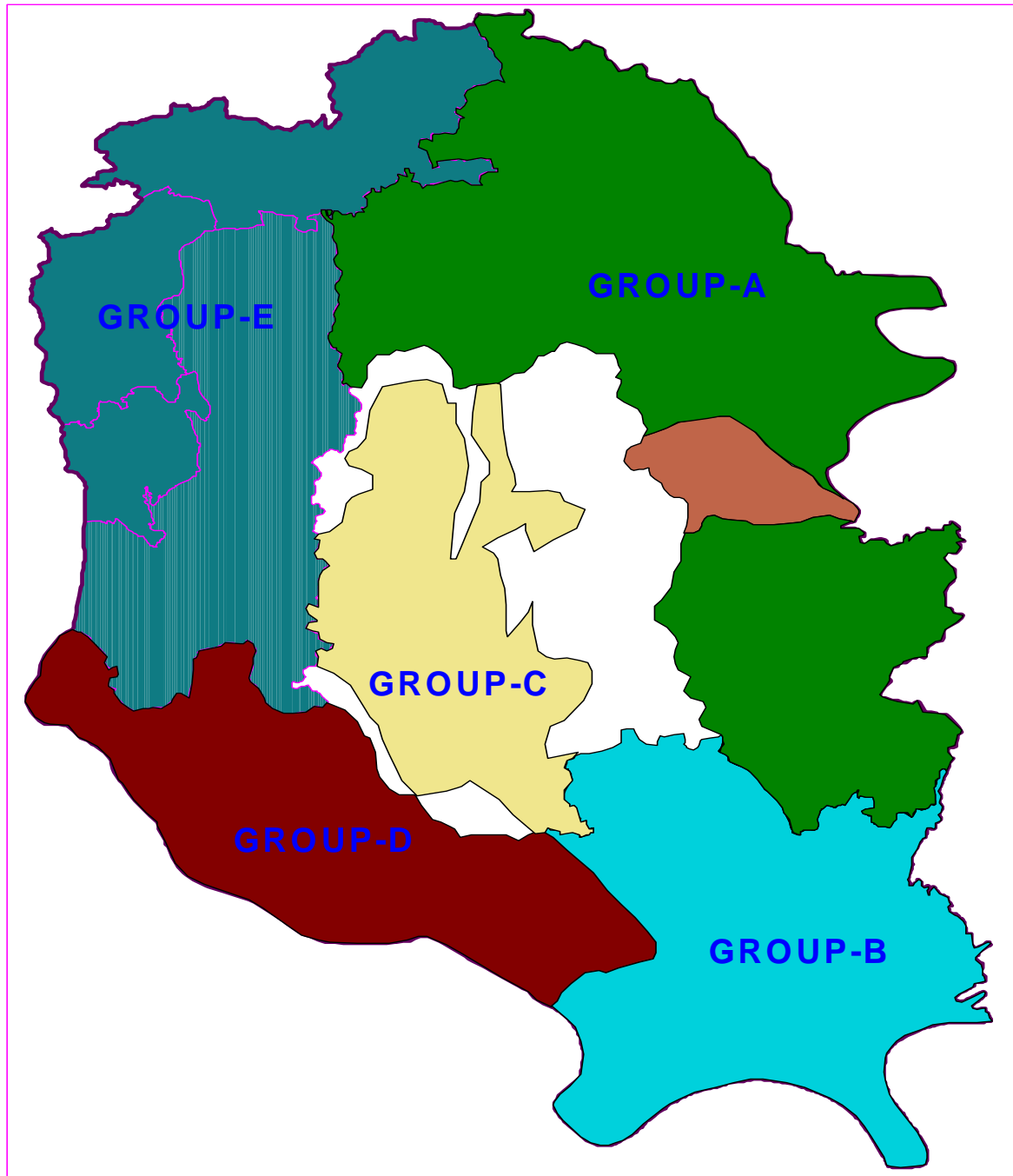
The DAP process will ultimately rely on a strategic planning framework to provide the directives, tools and guidance. While the local area plans will be important working tools, changes are inevitable and new plans will need to be formulated. This strategic framework will be a good reference point for local authorities for future urban growth. It is

recommended that the new planning framework be coherent, tight, and address the inadequacies of the past and current urban planning approaches and processes.

- **Funding Procedures for Local Development Projects**

Development projects, which include urban projects initiated by local governments and local level sectoral agencies, are funded by the ministries or sometimes the Planning Commission based on strict budgetary criterion. There is no effective mechanism to appraise the environmental impact or the sustainability of such projects. For long-term environmental sustainability, it will be important to address this problem. However, mainstreaming environmental issues will be a prerequisite to initiating any systemic change.

FIGURE A: BOUNDARIES OF THE AREA DEVELOPMENT PLANS



Source: RAJUK DAP (2007)

FIGURE B: DHAKA STRUCTURE PLAN 1995-2015



Source: RAJUK (2007)

## **Chapter 3: Urban Settlement, Land Use and Housing**

Urbanization as a natural process of Bangladesh's economic development has been taking place over the last few decades. The urban population grew by 4.7% annually, between 1981 and 2002, much faster than Sri Lanka (2.981%), Thailand (2.03%) and Vietnam (3%).

Rapid population growth in the urban areas is caused by push and pull factors, resulting in migration of people to urban areas in pursuit of economic prosperity. The huge influx of population stressed an already weak housing stock, infrastructure, and amenities, causing a deterioration of living standards. In Bangladesh, 70% of the total population lives on only 20% of the residential land, largely in Dhaka city. This shows large unequal distribution of residential lands (*Akash & Singha, 2003*), and is reflected by the increasing number of slums in the city. In 1998, there were 1,125 slums and squatter settlement in Dhaka. The number increased to 3,007 by 1996 (Islam, 1996 and DCC 2004), and to 4,966 slum clusters by 2005 (CUS 2006). The slum pollution in Dhaka in 2005 had grown to 3.4 million, with a population density as high as 10,400 people per hectare enjoying little or no urban infrastructure such as drinking water supply, sewage collection, and legal power supply. The main problems related to urban settlements in Dhaka are the following:

***High population density and strain on urban services.*** One of the key environmental priorities identified in the SEA analysis and stakeholder consultation process pertains to the high density of population in already developed areas, while fringe areas are left out of planned development. Because of the weak implementation of higher level strategies and absence of proper land use plans, growth within the already developed areas has taken place in a random manner, sometimes in contravention of existing development control legislation, or using loopholes. As a result, land resources within the city have been put under stress, wetlands within the city have been filled in, and drainage channels have been obstructed in favor of unplanned development. This skewed development pattern has put the urban services under severe stress, resulting in a consequent strain on environmental resources.

***Slums are a massive problem.*** Spatial analysis of the survey<sup>13</sup> shows slums are located all over the DCC<sup>14</sup> area, with older Dhaka having the highest proportion (11 percent slums of area) (see Box 3.1).

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<sup>13</sup> LGED Slum Survey, 2004-2005

<sup>14</sup> The DCC area has been divided into 10 zones Zone 1 –Zone 5 in old Dhaka and Zone 10 is Uttara township newly developed by RAJUK.



**BOX 3.1: SLUMS IN DHAKA – A GLIMPSE**

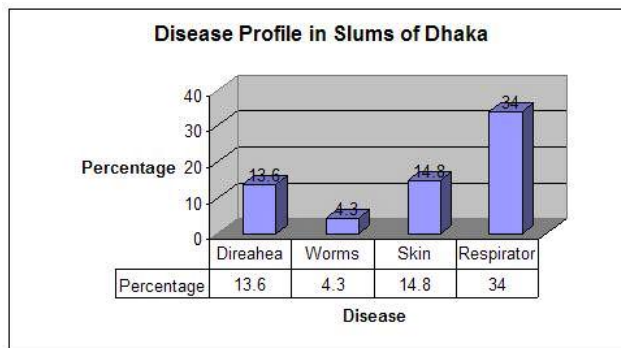
The common slum dwellers of Dhaka mostly comprise migrants from rural areas in Bangladesh in search of a better livelihood and quality of life. Because of the high land prices and the unavailability of housing infrastructure for low income groups, the migrants take shelter in one of the slums within Dhaka, preferably close to their place of work. Most of the slum dwellers work as garment industry workers, rickshaw pullers, household helps, rag pickers, etc., and make an important contribution to Dhaka’s economic growth by contributing labour to business or by providing necessary urban services. The income level of slum dwellers varies between US\$ 17 – 50 per month (for men) and US\$ 4- 21<sup>15</sup> (for women).

Even though approximately 30% of the Dhaka’s population lives in slums, access to urban services in squatter settlements are poor. Amongst the poorest people in the slums, only 9% of households have a sewer line, and only 27% obtain water through piped supply (compared with 83% of the wealthiest). Spatial mapping shows that only 43 of the 1,925 identified slums are within 100 meters of a public toilet. Only 7% of slums have a public health clinic and 26% have a government school. Many of the slums have developed gradually mostly in marginal areas of the city, and in many cases in low lying areas adjoining rivers and drainage khals, or on filled in wetlands. Therefore, they are vulnerable to flooding and associated risks. Additionally, some of the slums are considered to be illegal, and inhabitants are often evicted by government agencies and not provided with replacement housing.

Consultation with the residents of the Karail Basti slums revealed that a parallel informal system for providing basic urban services to slum dwellers has developed. Such services are mostly provided by local toughs who are called *mastaans*. As a result, slum dwellers, in spite of being economically disadvantaged, often end up paying higher prices in terms of rent and other services like drinking water supply and electricity.

These highly dense slum settlements often have a degrading effect on the quality of adjacent water bodies and the cleanliness of surrounding areas. The slum dwellers area also more prone to various vector borne diseases because of the lack of good quality drinking water and proper sanitation facilities.

Sources: SENES Consultant Lmt., SEA (2007)



**Vulnerable populations live on fragile lands.** The initiatives of the government in providing housing service for the lower income groups have been limited to a few slum upgrading projects in the City. The non availability of secure tenure right and disparity of distribution of residential lands has resulted in the lower income groups, especially migrants, to settle in marginal and fringe areas, e.g., flood plains of rivers, along drainage channels, on land created by filling in of inland water bodies, and also in public places and open spaces.

<sup>15</sup> 1 USD =TK 70

**BOX 3.2: LAND USE AND MANAGEMENT OF ENVIRONMENTAL CONCERNS**

Main concerns include:

- Incompatible development patterns leading to environmental stresses
- High urban population density in slums, resulting in strain on urban services and environmental and health risks
- Selection of environmentally unsound solid waste dumping sites due to non availability of suitable land parcels
- Low ecological diversity as a result of degraded habitats

***Dhaka City has limited open spaces.*** The city has very little open space in the form of parks<sup>16</sup>, gardens etc, (approximately 310 hectares). Of the total land area only 14.5% is open space. A large city like Dhaka with high intensity flooding events should retain more open spaces to maintain city's natural drainage channels. Larger open spaces such as municipal parks, greenbelts and natural landscape corridors help maintain the functional ecosystem integrity. Some of the parks have been occupied by encroachers who have set up temporary markets, bus stops, slums, etc. The situation had worsened since 1990's when private developers came into the business of construction of houses and serviced<sup>17</sup> land, which further increased the demand for land for development. The indiscriminate and illegal land creation by filling in low lying areas and use of marginal land for development caused further destruction of the natural systems. Though the new National Building Rules (2006) recommend important changes for protection of the green areas and open spaces, implementation is yet to be seen.

***Urban Roads and Transportation System.*** The transportation system in Dhaka is predominantly road based. However, the roads of Dhaka still occupy only 8%<sup>18</sup> of the total area, even after the implementation of the Dhaka Urban Transport Project (DUTP) and the Dhaka Integrated Transport Project (DITP), whereas ideally at least 25% of the total city area is required as road space to facilitate a smooth transport system in a mega city. Further, the growth of road space has been slower than growth of vehicles (80% in the last decade). In addition, the mixing of different modes of transport, i.e., both motorized and non-motorized transport (with nearly 300,000 rickshaws<sup>19</sup> accounting for 15.2% of the traffic and occupying 73% of the road space) has been cited as a major reason for congestion in the city.

Congestion is further aggravated by incidences of on-street parking in absence of adequate off-road parking spaces in the city. The problem is acute in the old high-density sections of

<sup>16</sup> Some other important open spaces in the city are Osmani Uddayan, Bahadur Shah Park, Botanical Garden, Suhrawardi Uddyan, Ramna Park, etc

<sup>17</sup> Areas set aside for urban services and infrastructure

<sup>18</sup> National Encyclopedia of Bangladesh (Banglapedia),

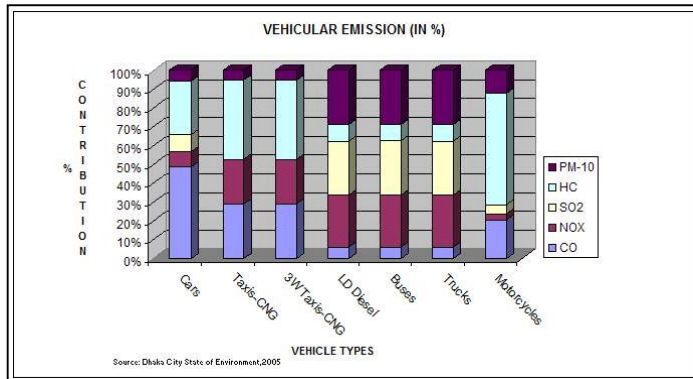
<sup>19</sup> Officially records with DCC indicate the total number of rickshaws in Dhaka to be around only 88,000

the city such as Dhanmondi and the Central Business Districts, causing severe congestion in these areas. It has also been reported that the tendency to construct multi-storey buildings along the major transport corridors without adequate arrangements for parking of construction vehicles, storage of construction materials etc., in contravention to building rules<sup>20</sup>, has aggravated congestion in certain important corridors.

In addition to the road-based transportation, there are two other major transport systems operating in the city. A railway line operates in the north-south direction of the city. Bangladesh Railway operates standard gauge passenger trains on this route, but the frequency of operation of this mass rapid transport system is relatively low. The BWTA operates ferry service to transport passengers from areas south of Dhaka to Sadar Ghat, but this system has no extensions in the north. The potential of these two modes of transport has not been fully utilized. Further, the inter-linkages between the three modes of transport (rail, roads and waterways) is poor. As a result, the passenger dispersal system from the railways and waterways is poor, resulting in localized problems. This also contributes to these systems not being used as a preferred mode of transport in Dhaka.

The main points emerging from this analysis are the lack of collaboration and coordination between different transport agencies, and an absence of an integrated transport planning approach. Traffic and congestion also contribute significantly to deteriorating air quality and noise pollution in Dhaka.

**BOX 3.3: AIR POLLUTION FROM VEHICLES IN DHAKA**



Deterioration of air quality in the Dhaka area is a key environmental concern. Though considerable policy level initiatives were undertaken during the last decade to improve the air quality of Dhaka, improvements achieved through initiatives like the baby-taxi ban are being rapidly offset by increasing urbanization.

The results from continuous monitoring of the air quality obtained from the AQMP project indicate that PM<sub>10</sub> and PM<sub>2.5</sub> levels are considerably above standards, especially in the dry season, and they also show an increasing trend. Studies<sup>21</sup> have revealed that while motor vehicles, re-suspended dust, biomass burning (in brick kilns and by low income groups as fuels), and fugitive emissions are major contributors to PM<sub>10</sub>, transport is the major source

<sup>20</sup> The Building Construction Rules 1996, and The Building Construction Rules 2006

<sup>21</sup> Begum et al 2005

of PM<sub>2.5</sub>. Unplanned industrial developments in areas adjoining residential locations and brick kilns adjacent to the DMDP area have aggravated the situation.

Analyses of the emission inventory presented in Box 3.3 indicate that the diesel vehicles contribute approximately 80% of the air pollution from mobile sources. The ageing fleet of diesel vehicles and the high sulphur content in diesel are considered the prime reasons for such high levels of air pollution. CNG taxis and 3-wheelers also contribute to the NO<sub>x</sub> load. Poor maintenance coupled with poor fuel quality, traffic congestion, poor transport infrastructure planning and lack of coordination between the agencies involved in planning and executing of land use and transport planning add to the vehicular air pollution in the city.

### **Sectoral Analysis and Institutional Arrangements**

*The National Strategy for Accelerated Poverty Reduction (PSRP)* considers the housing problem of the poor as an integral target for the poverty reduction program. Even though the apex plan lays considerable stress on the housing problem and especially in urban areas, there have been no specific programs to address the requirements for housing for the urban poor and vulnerable segments of the society. Since 1990's the government has largely ceased providing built houses, while focusing on creating the legislative framework for urban settlement and housing. There has been an effort to control land development, especially in the fringe areas, through the *Land Development Act*<sup>22</sup>.

The Town Improvement Act (1953) vests the Capital (Dhaka City) Development Authority-RAJUK to control land use and building plans within its demarcated city limits. While the DMDP area is under RAJUK, the Building Construction Act (2006) empowers RAJUK to be the sole approving authority for building plans in the DMDP area, but does not nullify the powers provided to the Pourashavas. As a result, the Pourashavas are still approving building plans within their jurisdiction, using the Building Construction Rules (1996). Furthermore, despite the authority vested in RAJUK under the Building Construction Rules (2006), given its centralized operational set up there is very little scope for effective supervision and implementation of the plans by RAJUK.

*The Bangladesh Open Spaces and Wetland Protection Act 2000* mandates that parks, open spaces and wetlands covered under the legislation should not be converted for any other use. However, the planning agencies have failed to publicly identify such spaces, including water bodies. In addition, neither the Act<sup>23</sup> nor any other legislation provides any guidance for wetland

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<sup>22</sup> Land Development Act (For Private Housing) (2004)

<sup>23</sup> *ibid*

filling. A large part of the Dhaka where future growth is projected is characterized by low lying land, and the absence of such guidelines is a factor leading to haphazard in-filling of low lying areas. This may lead to the change of topography and drainage patterns, with potentially serious consequences.

The Government has also initiated a housing scheme through the Housing Fund with the intent of improving the quality of life of poor people by providing loans to construct safe and durable houses. However, there has been no follow up at the action plan level to address the requirements of housing for the urban poor and other vulnerable groups. NGOs and civil society groups have also not taken up any worthwhile programs in this regard. In several Asian countries and in the UK the problem is being tackled more directly and effectively, whereby real estate developers are required to allocate a specified proportion of land being developed for low income housing. RAJUK, as the main urban development authority, has set no such stipulations on developers.

The Strategic Transport Plan (STP) documents, i.e., DITP and DUTP, have stressed the need for development of a road-based transportation system for the city. Similarly the Structure Plan in 1995 also stressed a road based transport system, but considering a long-term strategy it also highlighted the need for development of inland water transport as a parallel mode of transportation.

Moreover, in 2005 the apex planning document<sup>24</sup> recognized the major role played by the road sector in expanding<sup>25</sup> passenger transport in Bangladesh, stressing the need for shifting the focus from road based surface modes in urban areas. It pointed out the limitations of expanding surface modes of transport in an urban center like Dhaka, where the ownership of vehicles is increasing more rapidly than the population growth of the city. Taking into consideration the regional focus, the Strategic Transport Plan was developed for the entire Greater Dhaka Region<sup>26</sup>. The plan was formulated to coordinate development of the transportation sector in the region. The plan has stressed development of a multi-modal transport system for the city with a combination of roads, rapid bus system, and a rail-based mass rapid system. A number of new roads have been proposed, including a major east-west link and peripheral roads which would reduce the transportation problems in the city. However, due to the high cost involved in developing an underground metro rail, it is not presently considered a priority.

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<sup>24</sup> Unlocking the Potential, The National Strategy For Accelerated Poverty Reduction, October 2005

<sup>25</sup> Passenger movements have increased from 35 billion passenger km. in 1984/85 to 72 billion passenger km. in 1996/97

<sup>26</sup> The Greater Dhaka Region consists of the area between the Padma and Meghna Rivers. This V-shaped area formed by the confluence of the two rivers is wholly contained within the Dhaka division, and is comprised of six districts: Dhaka, Ghazipur, Narsingdi, Manki ganj, Munshiganj and Narayanganj.

**BOX 3.4: THE HOUSING FUND**

The Government has started a housing loan scheme, called the Housing Fund, to improve the quality of life of the poor people by providing loans to construct safe and durable houses. The Housing Fund program was introduced in 1997-98 all over the country. Till now, the Government has allocated Tk .980 million for the Housing Fund. The Housing Fund is a small program. The project provides (i) housing loans to low-income households to construct houses through partnership agreements with NGOs; and (ii) micro-credits to the loan takers through implementing agencies/NGOs for income-generation purpose. The target groups of the Housing Fund are the rural poor, the landless, small and marginal farmers, people who are rendered homeless because of calamities.

**Recommended Measures**

- *Demarcate and Preserve Open Spaces:* Open spaces such as parks and water bodies should be demarcated on the new urban plans and maps. RAJUK could take action for notification of these under the Bangladesh Open Space Protection Act<sup>27</sup>. Since there is very little scope for development of new open spaces in the older part of the city, RAJUK, during the process of preparation of the DAP, could identify large areas in the newly developed areas which can be set aside for public parks and open spaces to compensate for the lack of open spaces in the older parts of the city. Simultaneously, both the open spaces within the city and those in the newly developed area may be developed into community use areas.
- *Make Provision for Housing Schemes for Lower Income Groups.* As there is no specific government or municipal scheme for housing of the poor and vulnerable population, the DAPs could identify the land and infrastructure requirements for such housing. The baseline data provided by the SEA could help RAJUK to initiate a dialogue with funding agencies and other departments for specific housing programs for the poor.
- *Ensure Institutional Coordination in Transport Master Planning.* Even though the transport sector has developed a regional approach in planning with the development of the Strategic Transport Plan and formulation of the Dhaka Transport Coordination Board, some of the municipalities in the DMDP region have developed their local transport master plan<sup>28</sup> without any interaction with the DTCCB. Such misdirected planning would severely affect the gains from regional plan.

<sup>27</sup> The Bangladesh Open Spaces and Wetland Protection Act 2000

<sup>28</sup> Under the UGI Project funded by the ADB

## **Chapter 4: Water Resources and Water Supply**

Water supply in Dhaka City is predominantly based on ground water extraction. More than 75% of the water supply of the city comes from ground water resources. In the fringe areas, nearly the entire supply is from ground water. Cumulatively more than 83% of the total water requirement in the DMDP area is dependent on ground water. The strategy proposed for the water sourcing in the short term (till 2010) is primarily dependant on ground water sources. To address the problem in the medium term (to 2015), DWASA intends to rehabilitate and augment the Saidabad WTP to increase treatment to 675 ML/D from the present 275 ML/D. As a long term strategy, the authority plans to source water from Meghna (17 km) and Padma (45 km) rivers by 2015 and 2020 respectively. In an effort to manage the water resources, DWASA also intends to reduce the operational losses from leaks in pipes and has made roof top rainwater harvesting mandatory in the permit provided to private housing and land developers.

It is estimated that approximately 1,326 privately owned tube wells operate in the fringe areas. These areas are also witnessing a spurt in urbanization and construction activities. As a water supply network is not available in these regions, the private real estate promoters are also using tube wells to meet their water requirement. The rampant extraction of ground water has resulted in depletion of ground water levels by the alarming 2-3 m/year<sup>29</sup>.

Rapid deterioration of ground and surface water quality is a cause for huge concern. Groundwater is contaminated by chemical (mainly heavy metals) and dissolved solids, strongly indicating contamination from industrial sources. The problem is compounded by the fact that clay layers as a result of the geology in Bangladesh prevents rainwater from infiltrating easily into deeper aquifers, and therefore does not allow for sufficient recharging to make up for the loss of the extracted groundwater. It has also been noted that shallow aquifers have been contaminated with dissolved solids and bacterial contaminants as a result of unsanitary conditions and unsafe practices for discharge of industrial wastes. Areas along the Buriganga River near Hazaribagh are the most affected. In addition, given the high rate of urbanization with little open spaces, as well as the subsurface geological setup, it takes a very long time for natural percolation to make up for the rapid loss for groundwater resources.

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<sup>29</sup> Dhaka State of Environment Report 2005 and the Industrial Environmental Compliance and Pollution Control in Greater Dhaka ( IWM, 2007)

DWASA is currently in the process of drawing up plans to gradually change the dependence of urban water supply from ground water to surface water resources. Plans are being drafted to source water from one of the perennial major rivers (Padma, Jamuna or Meghna) which can meet the water requirements of the city. This is a step in the right direction, given the wide prevalence of surface water resources in the country. However, the changeover of water supply source primarily from groundwater to surface water for a city as large as Dhaka will take considerable time. The lag time before water is available from surface sources mean that there is a huge possibility of an increase in illegal boreholes. Serious concerns exist about the state of the water quality in the Dhaka rivers and canals, which deteriorates dramatically during the seven months of the year during the dry season from November to May. The dissolved oxygen (DO) level in peripheral rivers falls below 1mg/l during dry months in Bangshi River. The situation with quality of Lakhya river, which is an important drinking water source processed at the Saidabad water treatment plant, further highlights the problems with planning.

Plans are also being drawn up to source groundwater from a highly productive deep water aquifer which is located to the west of the city and under an area which is not immediately charted for urbanization. As the water from such aquifers will be sourced from sufficient depths, as indicated by studies, such water should not be contaminated.

The quality of urban water supply services is also affected by the arsenic contamination<sup>30</sup> of the groundwater which constitutes a serious health threat. The poor, with limited options in terms of access to safe water are most susceptible. Therefore any future plans for Dhaka's water service delivery should factor in the issue of access to safe water and arsenic mitigation. This includes the role of local authorities and commitment to undertake necessary institutional coordination and policy measures for better management of Dhaka's water resources management.

## **Sectoral Analysis and Institutional Arrangement**

As directed in the NWMP, the sector agencies along with local bodies are responsible for the preparation and implementation of the sub-regional and local water-management plans. *The urban local bodies in the DMDP region intend to extend the coverage area of the water supply network to the entire municipal/jurisdictional areas. However they need to develop a master plan for carrying out this activity.* Also, in areas falling within the Pourshavas and the

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<sup>30</sup> In Bangladesh, arsenic was first detected in groundwater in 1993; however it was not until 1998 that a coordinated effort was made to address this issue through a Bank –supported Arsenic Mitigation Water Supply project. Bangladesh Country Water Assistance Strategy (World Bank, December, 2005) provides pointers to the institutional context and policy coordination for implementation of systematic response to arsenic mitigation and improved service delivery.



Union Parishads and outside the DWASA service area, the lack of institutional capability is likely to prevent them from planning for a water supply-system and relevant infrastructure based on surface water sources. They are likely to continue with their dependence on ground water through borewells / tubewells unless requisite capacity building, financial planning and technical support are strengthened and/or extended. This increases the risk of pollution of groundwater for a city like Dhaka. The problem is that the city does not have the resources to bear the cost of any efforts to treat or remediate groundwater, once it is contaminated.

DWASA is also planning to include Gazipur, Savar, Tongi Ruganj and Purbachal in its service area. This would bring approximately 50% of the area under the DWASA supply network from the present coverage of 30%. To meet the additional supply requirement and also reduce its dependence on ground water, DWASA plans to develop four new treatment plants at Purbachal, Khilkhat, Keranigonj, Pagla I and source water from Padma and Meghna. However, *DWASA service area currently does not cover all the fringe areas. There is a need to reconsider the possibility of such areas being included under DWASA jurisdiction or present future planning alternatives that can extend water supply in these fringe areas.*

Administratively, RAJUK has little or limited control on the regional level planning formulated by DWASA. The short to medium term water supply strategy drafted by DWASA continues to explore groundwater sources. DWASA has already drawn up a Master Plan for this purpose and funding support for implementing some aspects of plan has been secured from donor agencies. The National Water policy and the DMDP structure plan specifically emphasize that the ground water resource should be protected and the main source for water supply to urban areas should be surface water. It also directs the government to identify the scarce ground water zones and restrict abstraction in such areas. *In spite of such stringent policy level guidelines, no regional plans demarcating the ground water conservation areas have been developed in the DMDP.* Given RAJUK's limited jurisdiction on water related issues, there is need for a single planning authority in the DMDP, which can, among other decisions, also assist in overseeing a comprehensive water supply master plan for the entire area.

### **Recommended Measures**

In order to address the increasing requirements for water supply in Greater Dhaka, the following policy measures should be incorporated into the planning systems or the DAPs:

- Identifying the source of “main” water supply based on discussions with DWASA, DPHE and other agencies, in order to foster a comprehensive approach to planning and development. The maximum water supply from the water main can be matched against the projected water demand based on the population expected in the supply area.
- Estimating the supporting infrastructure required for supply of water to a neighborhood based on the land use proposed in the DAPs is crucial.
- Through effective regulation and conforming to land uses, prevent contamination of water sources.
- Developing guidelines for the type of development which should be restricted in areas where water supply infrastructure is planned.
- Institutionalize and define responsibilities for actions against activities causing pollution of ground water.
- The DAP has to provide an estimate of the water requirement in newly developed areas i.e. Pourashavas and Union Parishad areas, based on the land use plan developed by the respective municipalities and the DAP. The estimates would facilitate in the development of a realistic strategy for water supply coverage for the entire DMDP area, based on an increasing reliance of surface water resources. The future plans should also examine the nature and extent of water requirements for the entire urban watershed, including institutional coordination between local government departments to ensure balanced use of watershed resources.

## **Chapter 5: Sewage and Sanitation**

The lack of adequate system for collection and treatment of sewage generated within the city and adjoining urban areas has had serious impact on surface water bodies including the ground water resources, especially the upper aquifers that form the DMDP watershed (Turag, Tongi, Sitalakhya and Buriganga). The absence of a sewage and drainage system is also responsible for poor sanitary conditions throughout the Dhaka urban area. The underground sewer network covers only 30% of the area of the existing urban areas of the city, and 20% of the population residing in it. For the remaining areas of the city, especially the fringe areas which are witnessing rapid development recently, no provisions exist for installation of sewer networks.

Upkeep and maintenance of sewers and treatment plants is neglected. In addition, due to lack of maintenance of the existing sewer network resulting in blocked sewers, leaking and broken sewer lines, etc., only a small portion of the collected sewage is treated in the Pagla Sewage Treatment Plant. Overflows from septic tanks, in areas which are not covered by the sewer system, end up in the khals and rivers. This situation creates a serious health hazard to the population living close to the khals and rivers, as these waters are commonly used for domestic bathing, washing and irrigation.

The city generates 1.3million m<sup>3</sup>/day of sewage of which approximately 40,000-50,000 m<sup>3</sup>/day are treated. The Pagla Treatment plant presently uses no more than 30% of its installed capacity. Localized sewage treatment facilities remain grossly inadequate. Sewage treatment is left to localized sanitation facilities like septic tanks and soak pits, though sometimes their design is inadequate. In some cases, ineffective and low cost sanitation techniques have been resorted to, particularly in poor and low income neighborhoods. The small percentage of sewage that is collected by the underground sewer network, mostly in the southern parts of the city, is transported to the Pagla Treatment Plant which runs on a non-conventional treatment technology of facultative ponds aided by “duckweeds”. However, the efficiency of treatment in this particular system is low. Biological treatment is hindered by toxic wastes which flow into the system from industrial units, especially tanneries in the Hazaribagh area, and by effluents that are discharged without treatment into the sewer system.

The Tejgaon industrial area is a particular problem, with a large number of industrial units of many types. The location of such an industrial area, in the very central part of the city, is definitely not suitable. Many of the industries discharge wastewaters, which are toxic, odorous and unaesthetic. These wastewaters in the main part are discharged to Begunbari

Khal, and further to Balu River / Lakhya river. Although existing environmental law does not allow industries to discharge wastewater untreated, very few industries have treatment plants today.

In other areas in the central part of the city (Mirpur and adjacent areas), in spite of having an underground sewer network, no treatment is provided to the collected sewage and it flows directly into natural drainage systems, which subsequently drain into the rivers. About 80% of the sewage generated in the Dhaka urban area is directly discharged without adequate treatment into the water bodies and channels, resulting in high organic pollution load to the rivers. There are 19 primary discharge points to the rivers and at least 41 secondary discharge points within the city<sup>31</sup>. Many of these discharge points drain mixed effluent including untreated wastes from industrial units like tanneries, dying and bleaching units.

The quality of the water in the DMDP river systems is further deteriorated by contamination from untreated sewage reflected by high levels of e-coli bacteria in the water bodies.

### **Sectoral Analysis and Institutional Arrangements**

In Dhaka city and its adjoining areas, the main institutions responsible for sewage and sanitation are the same as for water supply: DWASA, pourashavas, Department of Public Health (DPHE) and the Department of Environment (DoE). The DWASA Sewerage Master Plan recently formulated strategies to extend coverage of the DWASA service area by increasing sewer networks and also constructing five new STPs, which however would still cover only 30% of the entire DMDP area.

Areas outside DWASA service area (developing and fringe areas), under the local bodies<sup>32</sup>, do have *ad hoc* plans based on low cost sanitation facilities. However, the institutional constraints in formulating plans for sewerage of the area under the jurisdiction of local bodies need to be addressed. Large areas of the DMDP (partly the developing and the fringe areas) do not have comprehensive plans for sewage treatment, indicating that translation of written policies into implementable plans in DMDP requires strengthening. The lack of a single coordinating agency responsible for oversight, planning and environmental management, for the entire area, exacerbates the sewage and sanitation conditions. Finally, DAPs plans have to be supported by realistic estimates of the necessary treatment capacity and land requirements to ensure implementation.

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<sup>31</sup> IWM report (2007)

<sup>32</sup> Kadam Rasul, Gazipur Pourashava and the Union Parishads in DMDP area

In terms of providing low cost sanitation for the economically disadvantaged section of population, the sanitation policy<sup>33</sup> recommends the development of individual and community latrines for providing sanitation facilities in slums and other informal settlements. Such efforts need to focus prominently in the DMDP areas. The development of such sanitation facilities have been further emphasized in the National Water Management Plan, 2001. However, major initiatives have yet to be taken in the city or in the peri-urban areas for development of community latrines and other sanitation facilities.

The limited capacity of regulators (in this case the Department of Environment) needs to be strengthened. Otherwise the lack of enforcement of standards for discharge of sewage in surface water bodies would remain an impediment to the implementation of sanitation and sewage plans. *DoE has failed to ensure that agencies like DWASA and DCC, in implementing requisite economic instruments, ensure that private real estate developers build the sewage lines.* This issue needs to be addressed at the policy level first, followed by definition of the institutional mandate for monitoring implementation.

### **Recommended Measures**

- DWASA and DPHE can assist in formulating plans for areas within DMDP that were not covered by the initial sewage network plan;
- It may serve well to plan secondary sewage networks, considering the trunk sewer network prepared by DWASA and location of the proposed STP. Additionally, it may be useful to assess the adequacy of the receiving sewer network of based on the land use proposed by the DAP;
- Collaboration between DWASA, DPHE and Pourashavas is recommended to decide arrangements for localized low cost sanitation methods, keeping in view the long-term impacts and environmental risks;
- Carrying out profiling of the existing discharge points to identify the nature of pollutants discharged and sources of contaminants is suggested as critical for meeting the sewage and sanitation standards;
- It is necessary to develop options for preventing entry of untreated industrial effluents into the sewer network;
- It is important to undertake an assessment of the requirements of sanitation facilities in the slums and suggest a model for achieving effective sanitation through community sewage treatment systems.

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<sup>33</sup> National Policy for Safe Water Supply & Sanitation, 1998

- RAJUK, DWASA, Ministry of Fisheries, Ministry of Land and the communities may be inclined to identify low-lying/wetland<sup>34</sup> areas where pilot projects for non-conventional treatment of sewage can be undertaken.

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<sup>34</sup> The wastewater from Kolkata Municipal Area enters the East Calcutta Wetland system through a network of drainage channels which flow into the canals and feed the fish ponds. On the way, the sunlight acts as a purifying agent on the sewage, this triggers biochemical reactions. For example, BOD is reduced through a symbiosis between algae and bacteria. Each hectare of a shallow water body can remove about 237 kg of BOD per day. This helps in the reduction of coliform bacteria prone to be pathogenic which even conventional mechanical sewage treatment plants may not be able to fully eliminate. The effluent from the fishponds is then made to drain further southeast where the paddy fields have been strategically located to benefit from the use of the effluent.

## **Chapter 6: Solid Waste Management**

Dhaka city area generates approximately 3,500<sup>35</sup> tons/day of residential, commercial and institutional municipal solid waste (MSW), while the DMDP area generates approximately 7,000<sup>36</sup> tons/day. By 2015 more than 10000 tons/day of MSW will be generated in the DMDP area. The composition of MSW in Dhaka shows a similar trend as in the Indian subcontinent, with biodegradable organic matter constituting approximately 60% and the remaining constituting recyclables, inert and some hazardous materials.

Inadequate disposal of solid waste in lowlands and sewers is a persistent problem. There are limited dumping sites and sanitary landfills in DCC area. It has been reported<sup>37</sup> that approximately 50% of the MSW is removed from the city each day; rest of the waste either disposed into neighborhood lowlands, canals and sewers clogging them, or are burnt. Till recently DCC had one authorized dumping site at Matuial (3 kilometers south-east of the DCC central office), and with remaining waste dumped on private land in Berri Bund and Uttara. DCC has acquired a new site at Amin Bazar and has converted the open dumping at Matuial into a sanitary landfill. Even though the “Clean Dhaka Master Plan”<sup>38</sup> recommended upgrading of the newly acquired Matuial and Amin Bazar sites, their siting remains an issue<sup>39</sup> on account of their proximity to populated areas, even though these sites have been authorized by DOE and RAJUK.

There is no comprehensive system for collection and management of bio-medical waste and industrial waste. The SEA through a survey concluded that the DCC area generates approximately 1,050t/d of which 850t/d is from commercial establishments e.g. offices, hotel, restaurants small shops. The amount of tannery waste generated in this area is estimated to be 150 t/d while other industrial waste is approximately 25 t/day. In addition, most of the wastes coming out of the nearly 500 clinics and hospitals located in different parts of the city are not segregated to separate bio-hazardous waste from the other medical wastes. There are also several hundred industries of different sizes and categories, including nearly 300 tanneries within the DMDP area, and there are no official estimates on the amount of industrial waste generated in the DMDP area. Most of the waste is either disposed into the public waste bins or in open areas and in watercourses. The DCC has initiated a

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<sup>35</sup> It is to be noted that solid waste is not weighed in the city and estimates of generation have been based on sampling of a relatively small number of generators and are likely to be subject to a high margin of error. The population of the DCC area was assumed at 6.3 million

<sup>36</sup> The population of the DMDP area was estimated at 12.6 million

<sup>37</sup> Prior to the implementation of the Clean Dhaka Master Plan

<sup>38</sup> JICA

<sup>39</sup> DMDP Urban Area Plan questions the feasibility of the site considering the spatial growth projections suggested in the Structure Plan. These areas would be inhabited as per the estimates of the plan.

system for collection and disposal of “bio-medical waste,” but this system still needs to be developed.

### **Sectoral Analysis and Institutional Arrangements**

Under the *Dhaka City Corporation Ordinance, 1983* and *The Pourashava Ordinance, 1977*, DCC and the Pourashavas are responsible for the removal and disposal of solid waste in their respective jurisdictions. Current regulations need to be made binding upon these institutions to undertake house-to-house collection, transportation, treatment and disposal of waste. In addition, an integrated approach to management of municipal solid waste, bio-medical waste and industrial wastes (hazardous/non-hazardous/liquid) in Dhaka is critically necessary to meeting the larger urban environmental management objective. The national regulatory framework for management of Municipal Solid Waste and Hazardous and Bio-Medical waste needs strengthening.

The Dhaka City Corporation and the urban local bodies (the Pourashavas and Union Parishads) in the fringe areas are responsible for removal, collection & disposal of refuse. DCC has established a Solid Waste Management<sup>40</sup> Division for this purpose; unfortunately the Pourashavas are still dependant on the conservancy-based approach<sup>41</sup>. With the present financial and human resources capacity, it would be difficult for the Pourashavas to undertake solid waste management on their own. It would serve the Pourashavas well to have their capacity strengthened in order to meet the SWM responsibilities in their jurisdictions.

#### **BOX 6.1: PRIVATE SECTOR INITIATIVE AND DONOR SUPPORT FOR SOLID WASTE MANAGEMENT**

As a part of the JBIC-funded Clean Dhaka Project being implemented by the DCC, efforts to initiate primary waste collection from households had been started as a pilot in some city areas and have been quite successful. The involvement of a private sector operator was tried for this purpose, and the model has worked out quite successfully. As a result, the organic component of the waste is being converted into compost and then being sold to farmers to be used as a soil conditioner. The collection of wastes directly from households has also reduced littering in these areas. Similar models can be tried out in other parts of the city as the DCC and the Pourashavas are not in a position to undertake primary collection of wastes themselves.

Also, under the same project, an integrated approach to municipal solid waste management, including the upgrading of landfills, is being tried out. The project will also augment infrastructure at the Matuial site for disposal and treatment of medical waste generated by the city’s hospitals.

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<sup>40</sup> Solid waste management refers to all activities pertaining to the control, collection, transportation, processing and disposal of solid waste in accordance with the best principles of public health, economics, engineering, aesthetics, and environmental considerations. Its scope includes the entire spectrum of administrative, financial, legal, planning, engineering and technological functions.

<sup>41</sup> The conservancy based approach primarily depends on collection of solid waste from secondary locations and disposal at another location.



The Asian Development Bank Regional Technical Assistance (RETA) program is now working with the South Asia Sub-regional Economic Cooperation (SASEC) organization to formulate and harmonize hazardous waste management handling rules for Bangladesh, Nepal, Bhutan & India. The MOEF & DOE will be responsible for preparing a waste inventory report, draft policy and regulations to manage hazardous waste in Bangladesh.[0]

### **Recommended Measures**

- The regulatory framework on solid waste management can be strengthened and implemented strictly, with provisions for adequate incentives to entrepreneurs to ensure that all industrial wastes are properly treated before disposal.
- An incentive system supported by government policies for sanitary landfilling and using the waste to produce energy can be a useful resource for the city.
- Developing the solid waste collection network in consultation with DCC and the Pourashavas, considering the internal road network, is likely to have a definite positive impact.
- Collaboration between the relevant government agencies and DCC and DOE is needed to identify environmentally sound sites for the location of future landfills.
- Consulting with medical facilities and industries to develop a system for collection, treatment and disposal of hazardous waste (incinerators for each new hospital are built into the cost) can help achieve the desired result through public private partnerships in Dhaka City; and
- Another suggested option for consideration is waste collection by private entities, overseen by the relevant public authority, and supported by an incentives-based mechanism whereby the private entities are paid based on weight.

## **Chapter 7: Drainage and Flooding**

The city of Dhaka is situated in the Indo-Gangetic delta region in central Bangladesh, and is part of the watershed of three major river systems: the Padma, Jamuna and Meghna. Consequently, the area in and around the city can be considered to be extremely rich in surface water resources. The urbanized part of the main city and the immediate peri-urban areas are bounded physically by a number of smaller rivers which are tributaries of the larger rivers, and form an intricate system of rivers and natural drainage channels. With rapid urbanization, the Metropolitan Planning Area now encompasses areas beyond the physical boundaries set by the rivers. The areas on the other banks of these rivers, including the municipal areas, are charted for urbanization in the planning period extending to 2015.

Topographically, only a small portion of the city is on higher elevations. Due to its location in the flood plains of three major river systems, the present urban areas of Dhaka, most of which except for the Mirpur highlands are low lying areas, have historically been flooded during periods of heavy rainfall in the upper catchments of these rivers. Once the rivers reach their hydraulic draining capacity, they tend to backflow into the city through the interconnected drainage channels and the peripheral rivers (Turag, Tongi, Sitalakhya and Balu) thereby flooding the low lying areas in and around the city. As a result, the Dhaka urban area has been repeatedly witnessing flooding events over a long time. Severe river floods have occurred periodically in 1954, 1955, 1974, 1987, 1988 and 1998. In 1988, most of Dhaka City was inundated by the flood except for the DND area, which was protected by an embankment constructed earlier, and another small portion of the city near Mirpur, which is on higher elevations.

The flooding problem has been further compounded by the fact that the city has lost its ability to drain out due to clogging of natural drainage channels within the city. This has been primarily caused by the pressures of urbanization resulting in both private and public sector organizations encroaching on land, which together with low lying areas that serve as sinks for excess water, was previously a part of an intricate drainage system. Large parts of the area comprised of low lying wetland systems which acted as natural sinks and reduced the intensity of flooding from the peripheral rivers when they flooded. However, pressures of urbanization has caused blockage in many of the drainage channels as a result of filling up, and conversion of low lying areas into higher lands for residential/commercial purposes (filling up to 2-3 meters), thereby taking away their intrinsic ability to retain or store excess water during floods. The efficiency of storm water drainage is also compromised due to the dumping of wastes into these drains.

The poor sanitation conditions caused by floods tend to affect vulnerable sections of society more because their settlements are often built close to water bodies or in low lying areas which are prone to floods, and therefore are not considered suitable for other kinds of development. It is estimated that 7,600 households in 44 slums live within 50 meters of the river and are at risk of being flooded.

To protect the city against floods, a number of plans and programs have been prepared<sup>42</sup>. After the floods of 1988, the western embankment was built under the Dhaka Integrated Flood Protection Project. In addition to the embankment, three pumping station were constructed and one retention pond has also been developed. However, the eastern embankment has not yet been built, due to lack of funds. To update the project, the BDDW has recently conducted a study that looks at the integration of the Eastern Bypass Multipurpose Project with the Eastern Embankment Project.

The city of Dhaka lies at the focal point of three of the largest rivers of the Indian subcontinent in South Asia. Lying in the lower flood plains of the rivers Bramhaputra, Ganga and the Meghna, this area in central Bangladesh itself forms a part of a dynamic and active delta system. Such deltaic systems involve complex interaction between climate, catchments, deltaic deposition, tectonic subsidence and coastal regimes. At the same time, this region in Bangladesh supports an immense human population and contributes strongly to the regional and national economy.

However, being a part of such a complex natural system also means that this region is extremely vulnerable to natural events like floods, cyclones and coastal surges. The vulnerability in case of Dhaka is heightened because of the large and concentrated population that it supports, and the rapid urbanization that has already caused immense stress on environmental resources. Climate change effects are anticipated to add to such stress with possible adverse impacts on city's population, especially the economically disadvantaged sections of the society.

The onset of potential climate change effects in near future, as predicted in the recently published IPPC report, may result in a number of interrelated adverse impacts in Bangladesh involving complex interactions between physical processes. The combined effects of subsidence and sea level rise could result in increasing vulnerability to flooding events and serious drainage and sedimentation problems, in addition to coastal erosion and land loss. These changes may result in more frequent tidal surges which may potentially affect many coastal areas, causing salinisation of the inland fresh water resources and serious drinking water supply concerns and limiting irrigation over large areas because of

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<sup>42</sup> Prominent among them are FAP-8A and FAP-8B prepared for the BWDB by consultants in the early 1990's.

the reduced flow of fresh water from the rivers having sources in the Himalayan glaciers. A combination of such effects will have immense socio-economic impacts in the region. In quantitative terms, for example, a one meter rise in sea level could flood almost 30,000 km<sup>2</sup> of Bangladesh, affecting over 13% of the population, mostly in the lower deltaic regions of the south.<sup>43</sup>

In Dhaka, the height of the DMDP area varies between 2- 6 m above sea level. The area is also known to be undergoing tectonic subsidence at an average rate of 0.62 mm/year, but can reach up to 20 mm/year<sup>44</sup>, thus effectively lowering the elevation above sea level. In addition, a large part of the fringe areas of Dhaka comprising about two-thirds of the DMDP area are characterized as flood flow zones. These areas are extremely prone to flooding and remains under water for most parts of the monsoon season due to overflow of the channels of the rivers as discussed before.

As a result of climate change effects, Dhaka may be adversely impacted in the following ways:

- Increase in flood vulnerability in the surrounding low-lying areas would act as a disincentive for the city to expand spatially to accommodate the growing urban population, thereby hindering expansion of the city, which may in turn impede economic growth;
- The increase in flooding potential would aggravate flooding problems within the city. It has been established during earlier flood events that the aggravation of the flood situation in the city has been as a result of backflow from the larger rivers which could not drain excess water because of tidal influences. In the case of an increase in sea water levels, this problem may get more severe, thus putting the present and proposed flood management systems of the city under risk; and
- The associated problems of climate change leading to loss of land and livelihoods for economically disadvantaged people residing in the surrounding regions of Dhaka is expected to create a large inflow of refugees into Dhaka, which is the only large city in the area that can provide them alternative livelihood opportunities.

Climate change effects are anticipated to add significantly to Dhaka's vulnerability to flooding. This situation could also be aggravated if climate change leads to an increase in rainfall in the region. A watershed management strategy and action plan for the Greater Dhaka area is urgently needed to address the acute development conflicts that affect the

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<sup>43</sup> Source: IPCC Special Report on The Regional Impacts of Climate Change An Assessment of Vulnerability, Bert Bolin, Robert Watson, Marufu Zinyowera, Narasimhan Sundararaman, Richard Moss, 1996

<sup>44</sup> Alam, 1996

quality of water and sustainability of land resources, taking into account climate change adaptation measures.

### **Sectoral Analysis and Institutional Arrangements**

Planning for flood prevention and mitigation has been a high priority in Bangladesh because of the country's pronounced vulnerability to floods during the monsoon season. Proper planning coupled with implementation of flood protection measures can largely reduce the intensity of flood events. The National Water Management Plan<sup>45</sup> clearly indicated that gravity-based drainage should be given preference for draining storm water in complex urban centers like Dhaka. The same principles have been reiterated in the DMDP Structure Plan<sup>46</sup>, where special emphasis has been laid on the protection of the natural drainage systems, e.g., water channels and ponds, thereby reducing dependence on mechanical systems such as pumping out after flooding, which is a reactive response to the problem.

The loss of natural flood retention ponds around the main city, especially in the eastern side, has resulted in further aggravation of the urban flooding situation in Dhaka. In spite of different planning studies undertaken from the 1990's<sup>47</sup> having identified large natural water bodies and low lying areas as flood retention ponds in the fringes of the city, very few of them could be protected from urbanization. Even today, large tracts on the eastern fringes can be visibly observed being filled up by sand so that housing and real estates can be developed.

The loss of the flood retention ponds due to the urbanization process has taken place primarily because of the inability of the plans to demarcate these areas as "no-development zones" based on land use control regulations. Existing regulations like the Urban Area's Open Space and Natural Wetland Protection Act, 2000 does prevent the change of land use of low lying wetland areas, but in this case the areas demarcated for such retention ponds were not notified by any directive from any agency as wetlands, and consequently development in these areas could not be restricted. This illustrates the inability of the relevant agencies, including RAJUK, BWDB and DWASA, to collaborate to implement plans, due to the lack of adequate supporting mechanisms to overcome compartmentalized planning, and take into account the extent of urbanization, land availability and requirements for such retention ponds.

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<sup>45</sup> National Water Management Plan, 2001, WARPO

<sup>46</sup> The DMDP Structure Plan (1995-2015)

<sup>47</sup> An example would be FAP 8A

Though legislation provides for removal of development that has encroached on water bodies, channels and other open spaces, very little action has been taken in this regard, mainly because of institutional inefficiencies. Some initiatives were taken by different agencies to clear the encroachments, but these efforts have overall been very cosmetic. Concerted efforts are required by all agencies involved in urban planning and development to prevent encroachments. Overall, the institutions responsible for planning and implementation of projects for protection of the city against floods are described below (Box 7.1). In addition to these institutions, the other organizations responsible for urban flood protection are DWASA, Pourashavas and DPHE, as they are involved in the storm water management for their jurisdictions. Coordination can be fostered by setting up an apex level organization to oversee urban environmental planning and management at the national level.

#### **BOX 7.1: WATER RESOURCES POLICY & PLANNING**

**National Water Resource Council (NWRC):** The council is the apex body in the water sector chaired by the Prime Minister. It is the highest for formulating water policy and ensuring interagency coordination.

**Water Resource & Planning Organization (WARPO):** WARPO was established under the Ministry of Water Resources as the secretariat to the NWRC and serves as a multi-disciplinary water management planning organization. The organization is involved in water policy formulation, national water planning, monitoring, formulation of water legislation and regulations, inter-sectoral coordination of water plans, and the central data system. Under the FAP (Flood Action Plan) 16 project, WARPO had developed EIA guidelines.

##### *Development Institutions*

**Bangladesh Water Development Board (BWDB):** The BWDB is responsible for projects exceeding 1000 ha in size. The main activities of the Board are project planning and implementation, flood control and watershed management, maintaining water channels for transportation, and regulating water channels.

**Local Government Engineering Department (LGED):** The LGED is responsible for projects smaller than 1000 ha in size. The main activities are planning, designing, and implementing rural infrastructure development projects, Thana/Union drainage and embankment planning, irrigation planning, land and water use planning, small-scale water schemes, canal digging programs, and town protection schemes.

**Rajdhani Unnayan Kartripakkha (RAJUK):** This is the apex planning organization and is responsible for planning in DMDP. It is responsible for protection of the natural water bodies, which can be used as flood retention ponds.

**Directorate of Land, Records and Survey (DLRS):** The directorate is responsible for maintenance of land records and reclassification of land.

**Ministry of Environment & Forest (MoEF):** The ministry is responsible for preparation of guidelines for environmental assessment, pollution prevention and control, and monitoring climate change impacts

##### *Research & Data Management*

**Institute of Water Modeling:** This is the major institution responsible for conducting hydrological modeling studies. The major activities of the institute include drainage improvement to protect flood.

### **Recommended Measures**

- Develop a comprehensive Watershed Water Resources Management Strategy and Action Plan that accounts for climate change impacts and adaptation measures and which would inform future urban development plans.
- Demarcate and notify areas as flood retention ponds as “no development zones” as a high priority. As part of the DAP preparation process, the surveys of water bodies (ponds, wetlands, canals, etc.) have already been completed. These water bodies and channels can be demarcated on the urban plans and maps by the DAP planners and handed over to RAJUK. RAJUK will be able to subsequently initiate the process of notification of these water bodies as per the Urban Area’s Open Space, Natural Wetland Protection Act, 2000.
- RAJUK is in a strategic position to initiate steps to integrate the findings of the Eastern Bypass study into the DAP preparation process. The land use and development of other infrastructure investment should be coordinated with the construction of the Eastern Embankment. In consultation with BWDB and Ministry of Land, the land required for construction of the embankment and the ancillary infrastructure will need to be notified and restricted against any development.
- Collaboration between DWASA and DPHE plan can foster linkages for future infrastructure planning on storm water drainage to reduce the severity of urban floods.
- Planning and implementation of a drainage network for low lying areas to mitigate urban floods will serve the area well.

## **Chapter 8: Industrial Development**

The present DMDP area has emerged as a major hub for industrial activities due to its proximity to markets as well as the presence of industrial trading houses and the government complex. Even though there are no heavy industries in the vicinity of Dhaka, a number of medium and small scale industries, e.g., jute, tannery, dyeing and textile printing, metal, cement, rubber, chemicals and pharmaceuticals, petroleum refining, distillery, plastics and brick manufacturing are located within the Dhaka urban area.

Traditionally, the industries were located in old Dhaka. Recently, industrial units have also developed on the eastern and southern side of the DMDP area and along the Dhaka-Chittagong Highway. In addition to these, a number of designated industrial areas have also been developed, e.g., the Tejgaon Industrial Area promoted by the former DIT (Dhaka Improvement Trust) and the Savar EPZ promoted by DEPZ Authority for small and medium industries. The industrial units operating from these areas include dyeing/printing factories, edible oil factories, paper and pulp mills, chemical industries, jute mills, textile mills, soap factories among others.

Institutional and regulatory failures led to acute water pollution from small and medium scale industries. The main industrial clusters and effluent hotspots include the tanneries at Hazaribagh which pollute the Buriganga River, the Tejgaon Industrial Area which drains to the Balu River, the Tongi Industrial Area which pollutes Tongi Khal, the Sayampur and Fatullah industrial clusters in Dhaka South and Narayanganj which discharge waste water to the Buriganga River, and also the currently developing heavy industry strip along the Sitalakhya River. Some of the industries also drain effluents into nearby crop fields, irrigation canals and water bodies, thereby polluting them. DWRMP study of 1998 listed 2,179 industries in and around Greater Dhaka<sup>48</sup>. Presently it is estimated that there are over 7,000 industrial units in the Dhaka Metropolitan area alone, most of which have been developed in an unplanned manner. The wastes from these industries are often dumped along roads, lanes or into drains, or the effluents being drained out into ditches.

Air pollution from the use of brick kilns has increased. To cater to the increasing demand of building materials for the development of Dhaka, a large number of brick kilns<sup>49</sup> have

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<sup>48</sup> Data from the Bangladesh Board of Investments

<sup>49</sup> The brick burning rules prohibit brick kilns within 3 km of the municipal or city corporations. Lack of effective enforcement in implementation has resulted in brick kilns all around the city, especially in the northern parts.



developed on the eastern side of Turag and Tongi Rivers and in the northern parts of the city. Almost all of these kilns use coal and wood (even though use of wood as fuel in brick kilns is banned) as their prime sources of energy, resulting in the emission of particulate matter, oxides of sulfur, and volatile organic compounds. In addition to these usual sources of fuel, rubber from tires is also burnt, which emit black carbon particles and toxic gases. The operations of these units peak in the dry winter months when the city is down-wind to the sources of pollution, raising serious air pollution concerns. Additionally, the city has been witnessing increased construction activities. This has resulted in increase in air pollution, especially suspended particulate matter in areas which are experiencing this construction boom.

### **Sectoral Analysis and Institutional Arrangements**

*The Environment Policy 1992 and the Environment Conservation Act 1995* have laid strong emphasis on the control of industrial pollution. The policy states that a systematic environmental assessment has to be undertaken before carrying out any industrial operation. Likewise the EIA Guidelines were established in the Environmental Conservation Rules, 1997. The DoE has initiated some modification to the legislation e.g., *Environment Court Act 2000* (amended 2002) to ensure stricter compliance of the environmental legislation.

On review, it is evident that the environmental clearance provided by the DOE of new industrial developments requires a higher level of transparency, in part because of existing legal loopholes and limitations in EA laws and regulations. There needs to be a process that legitimizes public consultation during the Environmental Assessment (EA) process, and allows for providing information to affected people when conducting these assessments. DOE can be encouraged to strengthen its public disclosure policies.

Under the environment clearance process, a project proponent is required to obtain a site clearance before initiating any activity. However, comprehensive environmental guidelines regarding the actual siting of industries with regard to cumulative impacts of the proposed development need to be developed. Similarly, for effluent discharge, the discharge standards are not exhaustive and do not cover all types and categories of industries. Lack of transparency has and can result in unfair practices that exacerbate low compliance with environmental regulations and standards.

A lack of clear guidelines has also resulted in poor implementation of the rules and regulations. *The Brick Burning Rules 1989* (amended 2001) is an example. The legislation was intended to control brick kilns in and around the cities, but has lost its effectiveness due

to ambiguity over the siting of brick kilns, which has resulted in a large number of brick kilns in the periphery of the cities. Large construction projects with environmental clearance are required to implement environment management plans. The high concentrations of suspended particulate matter in localities where construction activities are carried out clearly indicate poor implementation and enforcement of the environment management plans.

Inadequate resources at the DOE have also weakened the enforcement mechanism, which need to be strengthened. The cooperation of other departments and sector agencies (See Box 8.2), e.g., Ministry of Industries, RAJUK, and an integrated approach towards industrial pollution control is needed to make any perceptible improvement in industrial pollution management. Further, the National Council for Industrial Development (NCID) was instituted in 1999 to provide effective guidance for implementation of the Industrial Policy and is headed by the Prime Minister. However, the executive committee of NICD does not have any representation from MOEF.

### **Recommended Measures**

- Developing land use plans and proper zoning for new industries can considerably impact the potential pollution problems.
- Developing strategies and plans for rehabilitation and relocation of existing polluting industries from densely populated areas in consultation with the industries can have significant improve the soundness of urban planning initiatives for DMDP.
- It is crucial for the government to consider developing cluster plans for industries for treatment of discharges, to reduce environmental health hazards.
- Consider increasing the density of existing industrial areas for more effective land use development and treatment of industrial pollution.
- Consider land remediation and urban redevelopment as part of industry relocation plans for effective land use and reducing health hazards from industrial pollution.

The analysis above has helped to formulate the environmental priorities discussed below. It was also clear from the above discussion that main causal links leading to environmental degradation are institutional failures, lack of enforcement, policies that provide disincentives for environmental conservation, and governance constraints.

**BOX: 8.1: INSTITUTIONS**

The institutions responsible for implementation of environmental safeguards, in addition to the institutions responsible for approval of industrial investments are,:

**The Board of Investment (BOI):** The board deals with investments relating to the medium and large industries having investment above 10 crores. It assists entrepreneurs in obtaining plots for setting up industries in the designated industrial estate after they have obtained the required clearances from other departments.

**Bangladesh Export Processing Zone Authority (BEPZA):** The Authority was established with the objective to manage the various export processing zones in Bangladesh. BEPZA currently oversees the operations of six export processing zones (EPZ). BEPZA is responsible for infrastructure support, especially pollution control measures like ETP, land fill sites for non-hazardous and hazardous waste and also maintenance of the zone. There are two EPZ's in DMDP at Savar & Gazipur.

**Bangladesh Small & Cottage Industries Corporation (BSCIC):** The BSCIC has been operating 79 industrial estates in different Districts of Bangladesh. Industries involving investment up to 10 crores and below are being established in these estates. Mainly industries of the food and allied products, chemicals, engineering and textiles sectors are established in the estates. Before allocating land to a new enterprise, BSCIC ensures that the entrepreneur obtains environment clearance from DoE based on an Initial Environmental Evaluation (IEE). The industrial estates owned and operated by the corporation are Tongi and Konabari in Dhaka, and the Hosiery Estate at Narayanganj.

**Department of Environment (DoE):** The department is responsible for ensuring that the industrial activities do not cause any adverse irreversible impacts on the environment. It is responsible for continuously monitoring environmental quality and enforcing regulatory measures. The department is the agency entrusted with providing environmental clearance to the industries.

**Rajdhani Unnayan Kartripakkha (RAJUK):** The agency is the planning authority in the DMDP area and is responsible for preparing land use plans for the entire area of DMDP. It is also responsible for preparation, implementation and monitoring of master plans and development.

## **Chapter 9: Summary of Conclusions and Recommendations**

Dhaka, the capital city of Bangladesh, has emerged as the main economic nerve center contributing about one-fifth of the nation's total GDP. However, with no alternative economic growth centers emerging, the expansion of the city in the last few decades has been very rapid and has been marked by huge influx of population from rural areas of the country. Urban planning in Dhaka City has been unable to keep pace with the increasing urbanization, despite the development of the Master, Structure and Urban Plans. The findings of the Strategic Environmental Assessment help identify key environmental challenges and institutional weaknesses for priority sectors and urban planning at the strategic level for the Dhaka Metropolitan Area. The SEA reviewed Dhaka's environmental issues associated with urban development based on secondary information, visual surveys and discussions with stakeholders. The issues were analytically assessed against the following criteria:

- spatial and temporal extent of pollution;
- reversible/irreversible depletion of environmental resources;
- impacts of environmental degradation on vulnerable groups;
- existence and effectiveness of pollution control mechanisms.

In this chapter drawing on the analyses of the SEA, the policy note looks at the institutional gaps and the measures needed for strengthening of regulatory mechanisms, improving governance, expanding infrastructure development, and addressing the needs of vulnerable groups.

### **Regulatory Mechanisms**

Urban planning will benefit from the integration of key sectoral policies and clearly delineated area plans. The ongoing attempts of the agencies to develop coordinated area plans for Dhaka City and its peri-urban area have had limited success as a result of weak capacity, overlapping mandates and lack of good coordination. These limitations can be attributed to the lack of coherent planning system as regulatory weaknesses across key sectors leave loopholes for unplanned development. This situation could be reversed if the following actions are considered and implemented:

- ***National level regulator -strengthening can be achieved through a constitutionally mandated set of policy directives for urban planning, with a corresponding set of instruments for implementation of specific land use directives.*** The Structure and Urban Plans developed in the 1990s provide long to medium term guidance on urban planning. Without having to adhere to a strict code of directives for land zoning and land use planning, RAJUK and other sectoral agencies had allowed land development without consideration of environmentally sensitive zones, the need for open spaces or wetlands protection. In addition to the update of land use guidance based on the recent demographic and planning information, a set of directives for land use development, demarcation of open spaces and wetlands protection needs to be drafted so that it becomes constitutionally binding for the regulatory agencies in charge.
  
- ***In order to garner harmonized planning, there is need for preparation of a regional Master Plan whose objective is to provide oversight for the middle-level urban plans and the five detailed area plans.*** The initial intent to prepare a plan to harmonize the spatial development of the DAPs was not actively pursued. The originally prepared Urban Plans did not incorporate the requisite regional harmonization that is necessary for integrated planning and development. The first possibility of creating a harmonized Master Plan can evolve from updating the originally drafted Structure and Urban Plans. The second possibility is to draw on the DAPs and existing sectoral plans to create a thorough and comprehensive regional Master Plan.
  
- ***Several cross-cutting sectoral policies need an update to incorporate practical guidelines for urban planning and development.*** Sectoral policies that are directly linked to urban planning in Dhaka include – water, sewage, sanitation, housing and urban settlements, waste management, drainage and flood management, and industrialization. The critical priorities requiring attention are identified below:
  - The *DWASA water supply strategy* proposes a short and long term plan for increasing water supply to the Dhaka Metropolitan area. While the short-term plan is based primarily on mining groundwater, the long term plan based on a shift to surface water requires developing a formalized set of plans to pursue such an initiative. In addition, the short and long term plans geared towards extending the water network to the entire municipal jurisdiction need a comprehensive set of guidelines for undertaking such initiatives.

- Under the *Groundwater Management Ordinance 1985*, DWASA mines and supplies ground water resources from 400 boreholes. However, there are about 1,300 illegal boring holes supplying water to industry and residents in Dhaka City. The enforcement of the ordinance thus remains grossly underserved. An appropriate regulatory instrument needs to be considered, examined, proposed and instituted to discourage excessive mining of ground water, given the long term and needed strategy of switching to surface water extraction.
- The *Sewerage Master Plan* prepared by DWASA has become redundant on account of its projections based on two-story housing. As such, development of a Wastewater Management Master Plan for Dhaka City is critical.
- In the absence of any tangible initiatives and based on the importance of a *Sanitation Policy* underlined in the National Policy for Safe Water and Sanitation, concrete development plans on extending sanitation facilities in the urban areas need to be developed for Dhaka City.
- The *National Water Management Plan*'s recommendation to use a gravity based drainage model requires effective implementation in the Eastern Embankment by isolating water channels and drainage channels from further urban development.
- The *Dhaka City Corporation Ordinance, 1983 and the Pouroshova Ordinance, 1977* need to be updated in clearer terms to specify a stricter responsibility for solid waste management. In addition, adequate incentives must be built into the regulatory regime for effective collection and disposal of waste, with consideration for public-private collaboration.
- In order to foster the enforcement of the *Environmental Policy, 1992, and the Environmental Conservation Act 1995 on industrial pollution*, the legislation requires incentives to be built in and specific effluent based economic instruments to be assessed and adequately mandated to ensure compliance by polluting industries.
- *Guidelines for hazardous waste management and bio-medical waste disposal* need to be developed.
- The guidelines pertaining to *Siting of Industries* need to be clarified based on the updated Regional Plans, and *Effluent Discharge Standards* require examination of existing legislative and regulatory mechanisms on how best to make them enforceable. Correspondingly, the EIA process needs to be reviewed and strengthened to ensure compliance of the industrial regulatory regime.

- *Enforcement of environmental regulations needs strengthening.* Public-private monitoring mechanisms should be considered to enforce compliance

## **Governance**

Good governance translates into strategic decision making and the existence of processes within government structures that encourage implementation of these decisions. Several factors are a prerequisite for good governance and urban planning in Dhaka including: institutional strengthening, mitigating the scope for corruption, reinforcing sectoral and cross agency coordination and bolstering capacity building. Each of these factors is discussed in detail below:

***Institutional Strengthening:*** The key urban planning responsibilities in Dhaka City are shared between RAJUK, DWASA, DCC, DPHE, BoI, DoE, Union Parishads and Pourshavas. Clarification of and decisions about the roles of municipalities, Pourashavas, the key administrative planning agencies, and the overall planning and coordinating role for RAJUK are crucial with regard to planning and implementation of DAP and the developed Master Plans for water supply, waste management, transport and effective pollution management.

The policy directions for addressing specific governance weaknesses can be as follows:

***Urban planning mandate needs to be separated from land development to avoid conflict of interest under RAJUK.*** RAJUK's role of being the planner and implementer has led to severe inconsistencies with land development in Dhaka City. Its overall coordination role has been weakened. While opinions are still divided on whether to allow RAJUK to continue indefinitely with its existing planning and development responsibilities by strengthening it through capacity building and better management, there seems a general agreement that the conflicting mandate of RAJUK will require examination and adequate measures. The government may need to consider the proposition of establishing an independent apex agency or reforming RAJUK to coordinate overall urban planning in Dhaka City.

- ***There is a need to reconcile the multiple administrative authorities for urban planning as well as sectoral planning in the DMDP.*** A severe limitation in the success of Dhaka's urban planning initiative has been the lack of coordination between key agencies and stakeholders. Coordination is required at several levels - national to regional to local, and the interface between sectoral ministries and key planning agencies at each of these three levels could be based on the scope of their

plans and programs for development. With the exception of planning of water supply and sanitation projects, all planning and land zoning for the entire city is mandated under RAJUK. However, under the Pourashava Ordinance, the fringe and certain developing areas are covered by the Pourashavas. Revisions of the two Ordinances will be needed to clarify the responsibility for urban planning between Pourashavas and RAJUK for fringe areas and land development as each institution has the regulatory mandate to undertake urban planning. There could be a possibility that the Pourashavas, lacking capacity, may need to rely on RAJUK for urban planning, while they take on the responsibility of implementing the urban plans once they have been approved and undertaken. This needs to be assessed. While most planning and implementation of water supply and sanitation projects is undertaken by DWASA, planning for water supply and sanitation responsibility are referred to DPHE in areas that are not covered by DWASA. However these are in conflict again with the mandates set for the Pourashavas. In addition, responsibilities for planning water supply and sanitation of DWASA do not extend to fringe areas. Similar inconsistencies need to be addressed for other sectoral level planning in Dhaka City. Otherwise, implementation of the DAPs remains a challenge in the face of uncoordinated sectoral development and unregulated land use development.

- ***There is a need for an autonomous planning and coordinating authority, likely housed under the Prime Minister's Office, whose mandate extends beyond the Dhaka Watershed to include an intra-regional planning and development agenda.*** There is general consensus during the SEA consultations of the need for a planning and coordinating authority for the Dhaka Watershed. An Apex/oversight body could effectively fulfill this function, provided specific adjustments in the mandates of the existing agencies for removing overlaps, conflicts and responsibility gaps. For the Apex planning institution to be able to accomplish its objectives, the critical factors will be political will for reform, transparency and accountability. Regarding its functions and its coordinating role, the apex body will need to liaise with the government agencies to highlight the emerging priorities; participate actively in the reform of existing departments; and engage with community groups to build up a critical mass of awareness which would influence decision-making at policy level.
- ***Weaknesses in the development of plans and regulatory mechanisms can be countered by reforming and restructuring existing institutions.*** Whether it relates to water supply, sanitation, sewage, drainage or flooding, industrial pollutants institutional reforms are key to better urban development practices.
  - Reform for national funding procedures of local development projects under the Planning Commission is deemed important for water supply projects,



sewage, drainage, waste water management and infrastructure investments for pollution control. The plans must be assessed regarding how to make them most effective, efficient and environmentally sustainable.

- Identify the best suited ministry for the development of a regional plan for Waste Water Management.
- Develop a private-public partnership board comprising of members of the private sector, NGOs and the government under the DoE to oversee such collaborative schemes for solid waste management and suggest other possibilities for collaboration.
- Clarify, identify and outline the best opportunities for the management of the EIA process either housed within or outside the DoE.

**Capacity Building:** The overall capacity of planning, regulatory and sectoral agencies is weak in Bangladesh. With the exception of the land development authority, RAJUK, all others seem strapped for cash, and limited in their technical capacities to oversee the implementation of their own sectoral plans. Between the national and local institutions, the latter including Pouroshavas and the Union Parishads seem to have little clout, cash or capacity. A few recommendations are identified below:

- Update and enhance qualifications of urban planners irrespective of the decision relating to the planning/implementation mandate of RAJUK.
- Upgrade to the use of GPS and GIS to identify and demarcate boundaries for urban planning.
- Consider possibilities for improving capacity for planning and project implementation for sectoral agencies and the local Pourashavas once the responsibilities for planning and implementation are delineated.

**Transparency:**

- ***Improving transparency of institutions by making internal planning, procurement, acquisition and development procedures available to the public under a mandatory disclosure of Access to Information Act.*** Irrespective of the mandate of the institution, all government agencies must be required to disclose information that is linked to urban planning.
- ***Consider more efficient mechanisms of undertaking EIA, either housed within the DoE or elsewhere.*** DoE's reputation with regard to industrial investments illustrates weak Environmental Impact Assessments along with the agency's

inability to enforce the annual renewal of environmental permits. This has a direct bearing on pollutant management.

- ***Involvement of other stakeholders including civil society may discourage the influence and extent of corrupt practices.*** Efficiencies may result from the combined involvement of civil society and the private sector as has been illustrated by the Solid Waste Management initiative in Dhaka. Similar initiatives need to be explored.

### **Infrastructure Development**

Infrastructure development is at the core of urban planning initiatives for Dhaka City. The need for water supply pipes, sewage lines, sanitation facilities, waste water treatment plants, land fills, and incinerators are some of prerequisites that are critical for the growing city. In this regard, the study makes the following recommendations:

- Identifying pourashavas, municipalities, key planning and sectoral agencies that have existing plans for urban development may be helpful across:
  1. Land development
  2. Water supply
  3. Waste management
  4. Pollution management
  5. Transportation
  6. Industrial development
- Updating the existing plans and harmonizing them horizontally with the DAPs and vertically to the regional Master Plan can create a more cohesive and comprehensive urban development plan. In areas where plans are unavailable, providing assistance to the requisite agencies to develop new plans with a regional focus may be necessary.
- For each of the six sectors above, it may be useful to identify areas for development with updated information on encroachment and land use, by combining sector plans, regional Master plan, and the DAPs.
- Implementing the land use guidelines for the remaining areas that are not as yet developed and encroached upon should be viewed as a priority. Implementing strict guidelines for longer term development under RAJUK's mandate for urban planning with RAJUK or the apex body functioning as an independent regulator is definitely necessary for a sound urban development plan.

- Revising institutional mandates of Pourashavas for implementing plans in developing and fringe areas with the higher oversight responsibility accruing to DCC, RAJUK, DWASA, or DoE, depending on the sector in question, is also crucial.

### **Vulnerable Groups and key stakeholders**

*There is a perception that engaging members of the weak and vulnerable communities dominated by big players may not adequately address the issues of the poorer sections.*

Alternative tools need to be developed for engagement of vulnerable stakeholders over critical issues pertaining to them. An option may be to encourage “ward committees” at the Pourashavas for including key stakeholders at the Dhaka and municipal levels. These have been successful in identifying concerns of vulnerable groups.

*In the preparation of urban development projects, the private sector is unwilling to accommodate the needs of lower income and vulnerable groups or comply with environmental regulations.*

Identify and close institutional and regulatory loopholes which enable the more powerful groups to engage in skewed urban development. Another option may be to assess the feasibility of using economic instruments across different sectors to improve compliance with environmental regulations. While at the same time create mechanisms to “reward” environmentally and socially responsible/compliant stakeholders by earmarking the revenue generated from these instruments, to be recycled back as tax rebates and tax breaks.

**References:**

1. Bangladesh Water Development Board, Ministry of Water Resource, Government of Bangladesh, Updating/Upgrading the Feasibility Study of Dhaka Integrated Flood Control Embankment cum Eastern Bypass Road Multipurpose Project, 2006
2. Bangladesh Census, Bangladesh Bureau of Statistics, 2001
3. Centre for Urban Studies (CUS), Slum Studies, 2005
4. Department of Environment, Government of Bangladesh, UNEP, BCAS, Dhaka City State of Environment Report, 2005
5. Dhaka City Corporation, The People's Republic of Bangladesh, Japan International Cooperation Agency, Clean Dhaka Master Plan, 2005
6. DWASA, Interim Workshop Presentation, 2007
7. Green City, Green City Report Dhaka, 2005
8. Ghazipur Pourashava, Municipal Infrastructure Development Plan with Update Landuse Plan, 2006
9. International Protocol for Climate Change (IPCC), Special Report on the Regional Impacts of Climate Change – An Assessment of Vulnerability, <http://www.grida.no/climate/ipcc/regional/282.htm>
10. Institute of Water Modelling, Concept Paper on Improvement of Sewerage System In Dhaka City, Sewerage Master Plan for Dhaka City, Dhaka Water Supply and Sewerage Authority, 2004
11. Industrial Environmental Compliance & Pollution Control in Greater Dhaka –Phase I, IWM March 2007
12. Japan International Cooperation Agency, Updating Study on Storm Water Drainage System Improvement Project in Dhaka City( Main Report), 1990
13. Ministry of Communications, Government of Bangladesh, Strategic Transport Plan, 2005
14. Mappa Publications, RAJUK Plan (Future Dhaka City), 2006
15. National Encyclopedia of Bangladesh (Banglapedia),
16. OECD, Applying Strategic Environmental Assessment: Good Practice Guidance for Development Cooperation, DAC Guidelines and Reference Series, 2006
17. Planning Commission, Government of Bangladesh, Unlocking the Potential , The National Strategy For Accelerated Poverty Reduction, October 2005
18. Rajdhani Unnayan Katripakahha, Dhaka Metropolitan Development Plan (1995-2015), Volume I (Dhaka Structure Plan), 2005
19. Rajdhani Unnayan Katripakahha, Dhaka Metropolitan Development Plan (1995-2015), Volume I (Urban Area Plan), 2005

20. Rajdhani Unnayan Katripakahha, Bid Document for Preparation of Detailed Area Plan (DAP) for Dhaka Metropolitan Development Planning (DMDP) Area, 2003
21. Scottish Executive, Welsh Assembly Government, A Practical Guide to the Strategic environmental Assessment Directive, 2005.
22. Slum Studies: Centre for Urban Studies, 2005.
23. UN Report, World Urbanization Prospects: 1999
24. United Nations Development Program, Technical Assistance for Plan Preparation: Detailed Area Plan for Greater Dhaka and Chittagong, 1990
25. United Nations Center for Human Settlement (Habitat), Tools to Support Participatory Urban Decision Making, Urban Governance Toolkit Series.
26. UNIDO and Government of Bangladesh, Techno-economic Study for Setting up a Common Effluent Treatment Plant in the Tannery Cluster of Hazariabagh, 2001
27. Water Resource and Planning Organisation, Ministry of Water Resources, Government of Bangladesh, National Water Management Plan Development Strategy, 2001
28. World Bank, Bangladesh Country Environmental Assistance, Bangladesh Development Series Paper No 12, 2006.
29. World Bank, Bangladesh Country Water Resource Assistance Strategy, 2005.
30. World Bank, Dhaka: Improving Living Conditions for the Urban Poor, 2007.