CHAPTER 8: ENVIRONMENTAL CONDITIONS

8.1 Natural Environment

8.1.1 Air Quality

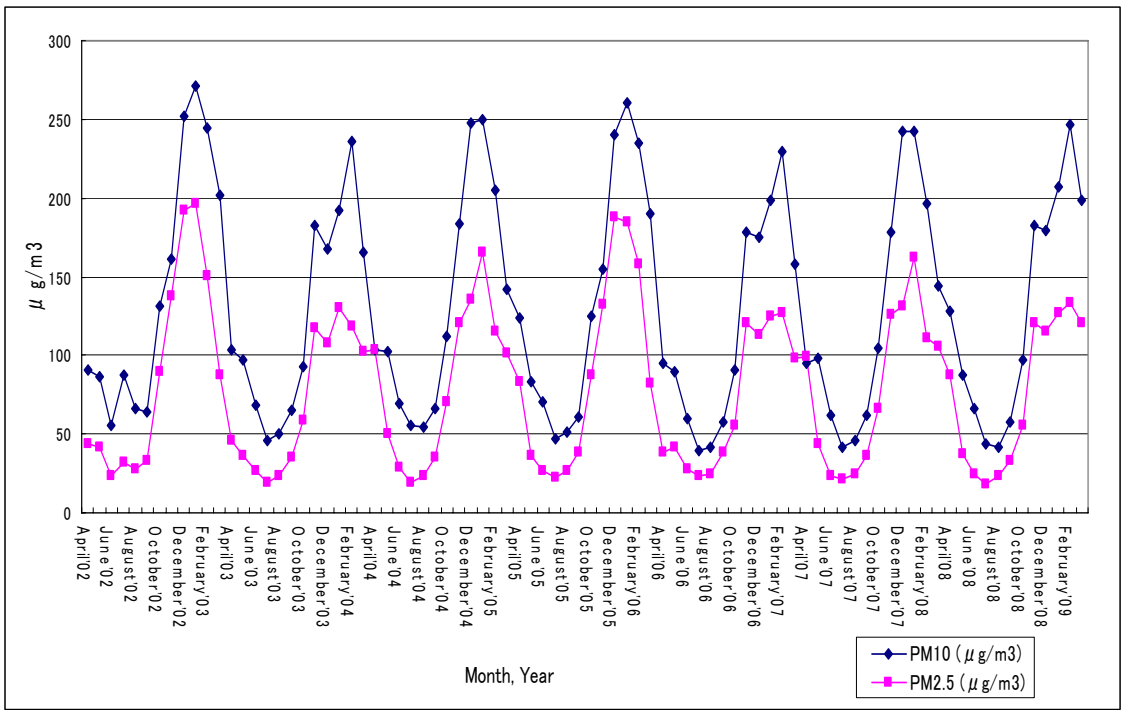
The main air pollutants in Dhaka are nitrogen oxides (NOx), sulfur dioxide (SO2), particulate matter (PM, usually expressed as PM with diameter of 10 microns or smaller: PM10, or 2.5 microns or smaller: PM2.5), carbon monoxide (CO), ozone, volatile organic compounds (VOCs), and lead. The motor vehicles and traditional brick kilns contribute predominantly to the air pollution. The motor vehicles are major source of PM pollution that contributes to the risk of developing cardiovascular and respiratory diseases, as well as lung cancer. Most of the PM pollution (> 80%) comes from the diesel-run vehicles. Hundreds of brick kilns operate during the dry season during November and April in the low agricultural land surrounding Dhaka city and generate smoke dust including SO2, NOx and hydrocarbons that contribute to worsening the ambient air and damage of public health.

Dhaka has grown rapidly in motorization in recent years. The total number of registered vehicles in Bangladesh has increased from 0.07 million in 1970 to 0.46 million in 2006. Dhaka has more than 3,000 old minibuses which run on diesel fuel. 80% of these buses are unfit to roll over on the city roads because of their high emissions. Even though aging trucks are not allowed to run into Dhaka city during day time, the trucks contribute significantly to worsening Dhaka's air particularly during the dry winter months. Despite the phasing out of two-stroke three wheeler baby taxis in 2003, the air quality benefit could not be sustained because of a great number of smoky diesel vehicles. Dhaka has witnessed a tremendous growth of compressed natural gas (CNG)-run vehicles in the recent years. A sizeable number of gasoline-run vehicles have been converted to CNG vehicles. The refitted engines which run on the dual fuel are posing a real threat to the already polluted city's air, and the safety and security of commuters.

Emission inventory of mobile sources in Dhaka show that contributions of different vehicles dominate specific types of pollutants. Petrol-fueled light-duty vehicles and auto-rickshaws contribute to most of CO, while diesel-fueled buses and trucks contribute to most of NOx. Two- and three-wheeled auto-rickshaws contribute to about half of hydrocarbon emission. PM emission comes mostly from diesel buses and trucks (45%), and auto-rickshaws (40%). According to a study conducted by the Bangladesh Atomic Energy Commission, approximately

55% of the PM10 are attributed to suspended soil and motor vehicle (31%), and PM2.5 is mostly attributed to motor vehicles (29%) and natural gas/ diesel burning (46%).

The average levels of PM10, NOx and SO2 has been increasing since 1990's. However, the annual average levels of NOx and SO2 are 40~60μg/m3 and 15~20μg/m3 respectively, and remained below Bangladesh national ambient air quality standards (NOx: 100 μg/m3, SO2: 80 μg/m3) in from 2002 to 2007. The most serious pollutant from the health point of view in Dhaka is Particulate Matter (PM). The PM10 and PM2.5 levels continue to exceed Bangladesh national ambient air quality standards (PM10: 24h 150 μg/m3 and annual 50 μg/m3, PM2.5: 24h 65 μg/m3 and annual 15 μg/m3) especially during the dry winter months which last about100 days per year.



Source: Department of Environment

Figure 8.1-1 Monthly Average Level of PM10 and PM2.5 in DCC

8.1.2 Water Quality

Dhaka is surrounded by rivers and inter-connected canals which have formed a life-line for city residents. In the last twenty years, migration from rural to urban area, encroachment of the rivers, unregulated industrial expansion, overloaded infrastructure, confusion about institutional responsibility for quality of the water bodies and ineffective enforcement of environmental regulations have caused serious water pollution on the surface water. There is only one sewage treatment plant at Pagla which is currently operating below the capacity because of the sewerage system failures, and few factories operating effluent treatment systems in DMA. Almost all waste from the residents, industry and millions of farm animals, pesticides and fertilizers are dumped into Dhaka's surface water. These wastes infiltrate to the ground and

pollute the groundwater.

Dhaka surface water is very poor condition, especially in the dry season. For some six months of a year, the flow rate of the rivers is negligible or often only a tidal pulse, but the volume of effluent flowing into the canal and river system remains about the same as during the wet season. Consequently, dilution of the contaminants is drastically reduced in the dry season.

Figure 8.1-2 shows the general condition of the water pollution in Dhaka on the basis of Biochemical Oxygen Demand (BOD) and Ammonia levels. The most polluted water bodies are the Buriganga and Sitalakhya Rivers, Tongi Khal and the canal system in Dhaka East, where very low devolved oxygen levels that are 1.5~4 mg/l reflect contamination caused by organic waste, domestic sewage and chemical residues from factories. These water bodies are biologically dead during the dry season. The high levels of BOD (Standard 6 mg/l) that are 10~30 mg/l in the Buriganga and Sitalakhya Rivers reflect mainly the high density of discharging untreated industrial wastewater into the rivers. Some tidal backflow of relatively clean water from the Meghna and Dhaleswari Rivers results in dilution of contaminants in the southern reaches of both the Buriganga and Sitalakhya Rivers, but the extent of this positive effect is limited. The very high ammonia levels, particularly in the canal system in Dhaka East, the Balu River and the southern reaches of the Buriganga River, reflect the discharge of sewage into these waterways. Ammonia in Dhaka East area increases from about 0.3 mg/l in October to greater than 20 mg/l in March-April, which is twenty times higher than the national environmental quality standard (1.2 mg/l) for ammonia in surface water.

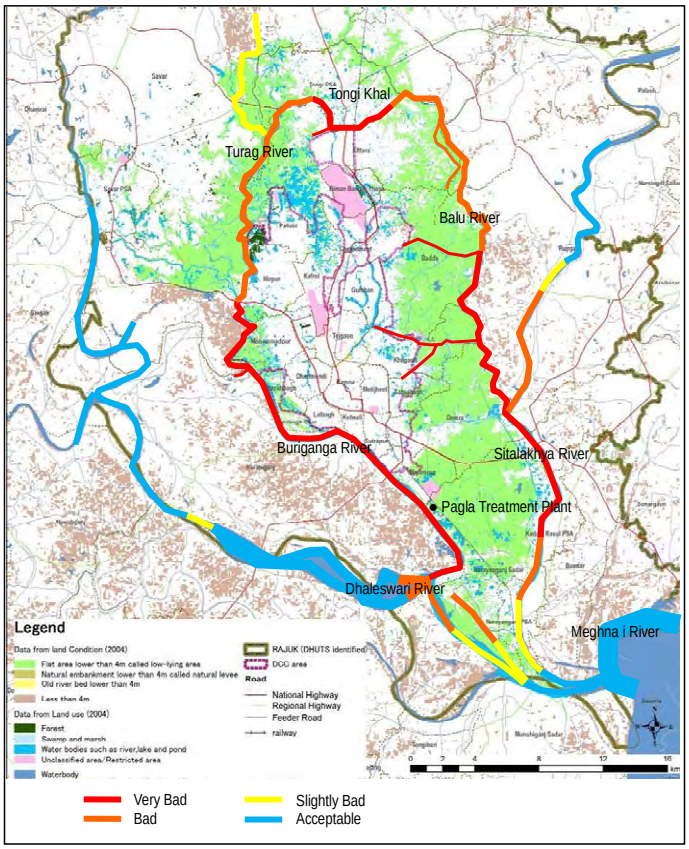


Figure 8.1-2 Water Pollution of the River and Canal System around Dhaka

8.1.3 Fauna and Flora

There are still few natural forest areas in DMA. Significant natural forest areas exist only in the limited northern part of RAJUK area, though DMA has urbanized well. However, the

vegetation of Dhaka city has a variety of indigenous and exotic species especially in parks and gardens. Approximately 310 hectares in DMA accommodate parks and gardens. It is estimated that there are nearly 41-46 parks/gardens such as Osmani Uddyan, Bahadur Shah Park, National Botanical Garden, Zia Uddyan (Garden), Baldha Garden, Suhrawardi Uddyan, Ramna Park. Baldha garden and National Botanical Garden have a wide variety of plants and trees. Besides local species, many exotic species were planted along the roadside, old secretariat area and in residential bungalows for the beautification of the city during 1905-06 when Dhaka was the capital of East Bengal and Assam. About 50 species were then planted, of which Aswath (Ficus religiosa), Debdaru (Polyalthia longifolia), Narikel (Cocos nucifera), Ashok (Saraca indica), Mahogany (Swietenia sp.), Shegun (Tectona grandis), Sissu (Dalbergia sissoo) were very common.

Many areas (Mirpur, Dhanmondi, Mohammadpur etc.) of DMA had been covered by natural vegetation during the earlier days. With increased population, industrial and commercial establishments, and construction of roads and highways, most of the vegetation have been cleared over the years. The Modhupur green area had been a habitat for many animals particularly elephants, tigers, leopards, boars, deer and buffaloes till the beginning of the nineteenth century. Monkeys had also been found in abundance till the mid-nineteenth century. Foxes, jackals, squirrels and otters have almost disappeared. Bats and rats are still seen sometimes within the city area. A large number of bird species were common in Dhaka, particularly pigeons, doves, kingfishers, parrots, jungle fowl, common pea-fowl, kite, fishing eagle, vulture etc. But many of these are now extinct and the rest are rapidly disappearing. One good point is that a large number of migratory birds are found in Dhaka (especially in the lake of the National Zoo) in winter. Various species including ducks, seagull, falcons, harriers, plovers, curlews and sandpipers are seen here during winter.

Many types of poisonous snakes and non-poisonous snakes were very common till 1960s. A few species including Cobra may still be found. The number of amphibians and fishes has gone down in the last few years.

In Ramna Park and its surrounding areas beside Minto Road, kingfishers were seen even during 1997-1998 which have almost disappeared. Some monkeys and mongoose were seen in old Dhaka even in the early ‘60s but their numbers have decreased considerably. They are almost out of sight now a day. The biodiversity of fish species has been reduced severely due to pollution of surface water. The land ecosystem is also threatened with rapid and unplanned urbanization.

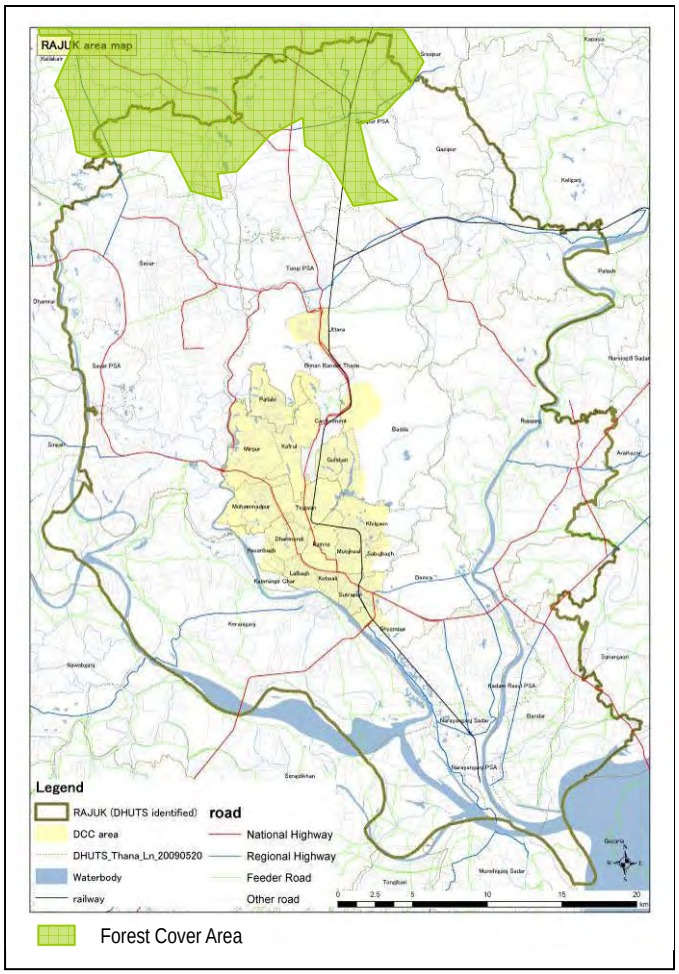


Figure 8.1-3 Forest Cover Area in Rajuk Area

8.1.4 Nature Reserve

There are no nature reserves such as national park or wildlife sanctuary in RAJUK area. Two botanical gardens as natural classified area exist in DMA and are managed by forest department.

National Botanical Garden, which is located at Mirpur in DCC, covers around 84 hectares of land with approximate 50,000 species of trees, herbs, and shrubs including a large collection of aquatic plants. Baldha garden with about 136 meters in length and 76 meters in width holds around 15,000 plants representing 672 species. Many of the species at Baldha garden were collected from over 50 different countries.

Table 8.1-1 Natural Classify Area in DMA

	Location	Area (ha.)	Established Year
National Botanical Garden	Ward 8	84.21	1961
Baldha Garden	Ward 77	1.37	1909

Source: Forest Department

8.2 Social Environment

In this section, social environments in the project area are discussed[1] as may be the affected by the project. Social environments include not only physical features but also government policy, cultures and life style of people. Among all, the vulnerable group such as slum people, women, street vendors and rickshaw pullers are focused, since those are the people who usually do not get much project benefit but suffer from impoverishment due to displacement by the implementation of the projects,.

8.2.1 Involuntary Resettlement

Based on the research made by the World Bank, Approximately 28% of Dhaka's population or 3.36 million people were classified as poor and 12% as extremely poor in 2000. For the Dhaka Metropolitan Area, the lower poverty line (extreme) is BTK.649 and upper poverty line is BTK 893 as daily incomes. Table 8.2-1 indicates the characteristics of residents in Dhaka, dividing to 5 quintiles.

Table 8.2-1 Characteristic of Residents in Dhaka

	1-poorest	2-poor	3-middle	4-rich	5-richest
Mean family size	5.50	4.99	4.84	4.86	4.53
Average room number	1.24	1.32	1.76	2.35	3.4
Mean number of children	2.62	2.11	1.83	1.87	1.74
Mean number of old (>64 years)	1.13	1.06	1.32	1.11	1.08
Mean age of household head	41.63	42.38	43.31	43.51	46.35
Graduated primary school only %	61	41	33	18	9
Graduated high school %	0	9	14	38	62
Size of housing, square feet	204	294	370	545	967
Pipe water provided	27	48	59	77	83
Electricity provided	88	91	96	100	100
Sewage provided	9	21	24	40	47

As shown in above table, poor are with larger family members, in smaller houses, headed with low educated household head, and with poorer infrastructures.

About 30% of total population of Dhaka lives in informal settlements with densities ranging from 1,700 to 10,400 per hector, which is highly overcrowded where no proper city water service or sanitation system is provided, causing hygiene issues. Distribution of slum is indicated a in the Figure 8.2-1. Many slums are located in low lying areas near the river and are prone to flooding.

[1] The data is based on "Dhaka City Environment 2005" other than specified and World Bank, Dhaka: Improving Living Conditions for Urban Poor, Bangladesh *Development Series Paper No.17*, June 2007

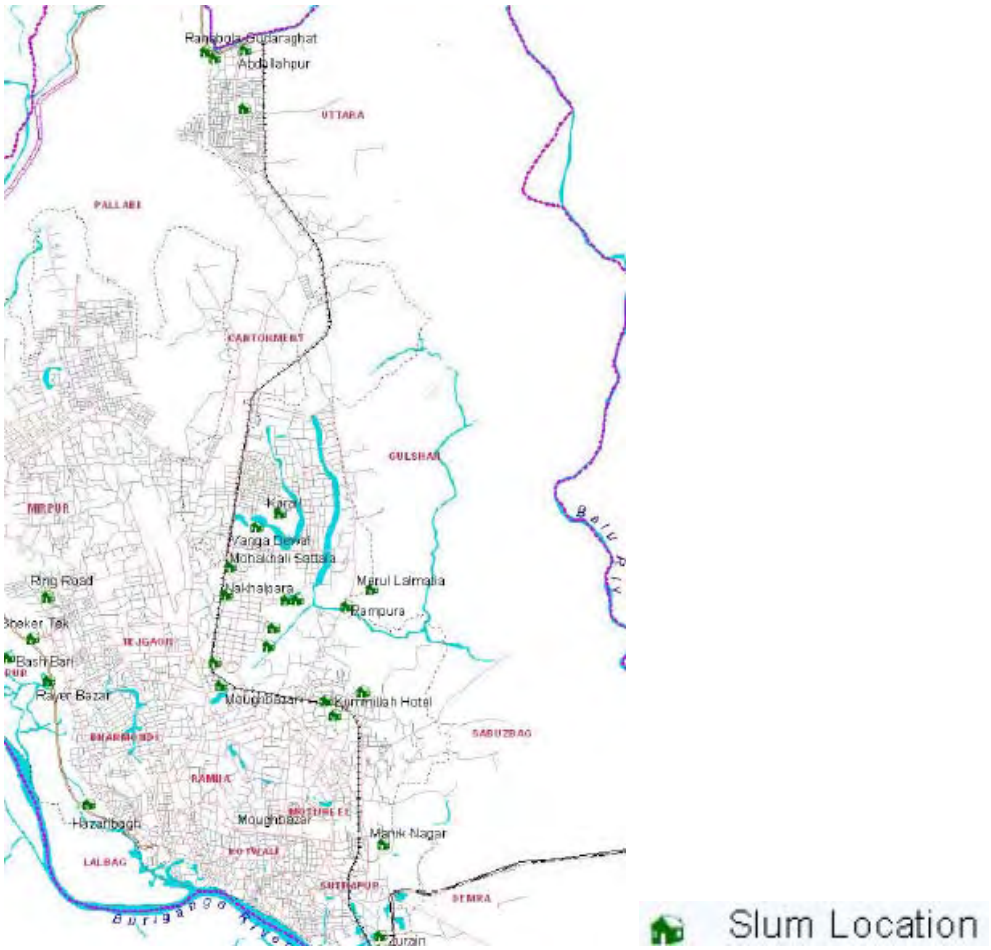


Figure 8.2-1 Distribution of Major Slums

In addition, in the down town of Dhaka, many of the open spaces wherever, including road/ railway side, are occupied by the people as their shelters for residing or working place for kiosks/ make-shift stalls. Most of these occupants are believed to be originally migrants (46% were migrant in 1991 survey) from rural area to get job/ make money staying in Dhaka long time. Usually their houses are very shabby, made up of plywood, tin plates, cloth and so on with the area of less than 2m x 2m.

Figure 8.2-2 Squatters Houses along Railway, Moghbazar

By the implementation of the projects, such people without formal land titles may be displaced out of the ROW (government land). Following laws are available in Bangladesh for land acquisition/compensation.

The first law on the land acquisition in the sub-continent was promulgated in 1870. It was amended by the Land Acquisition Act, 1894 (Act I of 1894). While the land acquisition Act of 1894 remained enforce, the East Bengal (Emergency) Requisition of Property Act was promulgated in 1948 after the partition of India and this Act was extended from time to time and finally modified by the Ordinance No. II of 1982, namely, the Acquisition and Requisition of Immovable Property Ordinance. This ordinance provided certain safeguards for the owners as far as payment of compensation is concerned and also against wastage and misuse of land. Therefore, Bangladesh Resettlement Policy is based on the Acquisition and Requisition of Immovable Property Ordinance of 1982 (ARIPO), and some provisions of which were subsequently amended in 1993 and 1994. The ordinance is the only law that governs all cases of acquisition and requisition by the Government of immovable property (land, crops, and built structures) for any public purpose or in the public interest. Mention may be made that some Rules have also been framed under the said Ordinance and Act to facilitate the operation of different provisions related to land acquisition.

Presently, the owners are awarded with compensation money by the DC for acquired property on the basis of its registered market value. The market value of the property (land, structure, pond etc.) is assessed on the basis of average recorded value for preceding 12 months, in addition, a sum of 50 percent premium on the market value. This value is known as Cash Compensation by Law (CCL). This law does not permit the affected persons to take the salvageable materials for which they are being compensated. In most cases, the compensation does not constitute the market or replacement value of the property acquired. Under the 1982 Act the government is obliged to pay compensation only for the assets under acquisition and

then hand them over to the requiring body. The ordinance does not cover project-affected people Non-titled people or ownership records, such as informal settlers or squatters. So, the government has neither any obligation to resettle the affected person nor any provision to restoring their income. But if someone lives in a private homestead with formal permission, compensation is generally paid to the owner for the structure only and not for the land. Under the provisions of the Land Acquisition Act 1994 the government of Bangladesh is liable to compensate the project affected persons of the following types:

- Compensation for loss of land by owners only;
- Compensation for houses and structures affected;
- Compensation for loss of crops, trees and perennial; and
- Compensation to sharecroppers, if applicable.

Thus in Bangladesh, when people lose their properties (land, building and other facilities), it is common that compensations are made to only those who have the formal land titles, that are written in the paper and registered in the cadastral office, by paying tax. No compensation is made for those occupants who don't have formal title written in paper even if they have been residing there more than 10 years peacefully without any claim to evacuate from anybody.

Another issue for resettlement is that the compensation prices made by the government is quite cheaper than the market prices and, as the results, they can not purchase the alternative for the land they lost with the money provided from the government. Resettlement issue can be the most serious problem for the implementation of the project.

8.2.2 Local Economy such as Employment and Livelihoods etc.

Main jobs for male and female are as follows:

Table 8.2-2 Main Jobs of Male Workers in Dhaka

	Poor male workers %	All male workers %
Messenger/office boy	4	3
Working proprietor/retail trade	10	15
Other sales worker	25	17
Latrine cleaner	4	2
Farmer	12	8
Rickshaw puller	10	5
Other transport worker	11	6
Production worker	23	18
Miscellaneous	2	26
Total	100	100

Table 8.2-3 Main Jobs of Female Workers in Dhaka

	Poor female workers %	All female workers %
Housemaid	16	21
Other service worker	9	7
Agricultural worker	27	20
Garment worker	32	28
Other production worker	15	5
Miscellaneous	1	7
Total	100	100

As shown above, ratio of poor male workers engaged in transportation services are higher, while ratios of poor female workers engaged in agriculture and garment/other production activities are higher as well. Following is the data of incomes highlighted for such vulnerable groups.

Table 8.2-4 Hours and Wages of the Poor by Occupation and Gender

	Poor male worker			Poor female worker	
	Rickshaw pullers and other transportation worker	Farmer	Vendor	Maid	Garment workers
Number of observation	111	70	136	38	79
Working time	54.9	46.9	50.7	43.5	38h
% of population working greater than 60 hours in a week	27	19	27	11	11
Monthly wage BDK	2,837	2,1,20	1,688	731	1,125

We made modest social interviews to people including street vendors and rickshaw pullers for preliminary data of draft resettlement compensation policy planning if necessary in the future. Following table is summary of our findings:

Table 8.2-5 Results of Interviews about Socio-Economic Conditions

	Not vulnerable	Vulnerable group		
	Shopkeeper	Street vendor	Rickshaw puller	Beggar
Number of interviewees	76	172	15	14
Age	26-65	16-65	25-50	26-75<
Number of family members	4-7	4-7	2-7	2-7
Illiteracy ratio	7%	50%	80%	100%
Working hours	11-18	12-16	8-14	7-11
Daily sales, BTK	3,000<	1,000-2,000	300-600	200

As shown in the above table, more than half of the vulnerable group is illiterate. Their income can be assumed very small compared to the non-vulnerable group.

Unemployment is major issue for the poor. Unemployment ratio is almost double of the non-poor as shown in below table.

Table 8.2-6 Unemployment and Underemployment in Dhaka

	Poor	Non-poor
Unemployment	10.0%	5.4
Underemployment	21.2	12.7

Not only the case for loss of shelters, but also the case for loss of business access is quite critical issue. International donor policy specifies that proper compensation shall be made so that their livelihood would not be worsened after the implementation of the project. Thus, "compensation" includes not only what are determined in the government law but with necessary assistance to maintain the life level and livelihood. This includes provision of money, food, assistance of free transportation of properties, job training and microcredit.

8.2.3 Land Use Utilization of Local Resources

Excessive population growth with formal and informal economic activities resulted in the growth of numerous informal and formal housing settlements, mushrooming shopping complex, retail markets etc., causing following problems:

- Reduction of open spaces
- Reduction of vegetation cover
- Loss of dignity of residential area
- Flooding
- Threatens environmental sustainability
- Increase health risk

Project area includes residential/ commercial zone in the downtown and agricultural zone surrounding. The ratio of residential/ commercial/ institutional areas is about 35% while that of agricultural area in DCC is about 50%. It is noted that is large area specified as restricted area.

8.2.4 Social Institute such as Social Infrastructure and Services

The ministry of health and Family Welfare implements all the health policies, plans and activities. Number of hospitals and diagnostic centers is about 300 with 12,000 beds in Dhaka. DCC has its own health service department with 9 hospitals and maternity clinics, 90 primary health service centers etc. The city has a demand of over 2 billions liters of water per day but WASA can provide only 75% of the demand. The city generates about 1.3 Million m^3 of sewage while only 3% is treated at the treatment plant at Pagla. The ratio of garbage collected is half only and the rest is indiscriminately dumped to anywhere.

Sensitive facilities vulnerable to the project include (1) school, (2) hospital and (3) mosque. Locations of such facilities are presented as below:

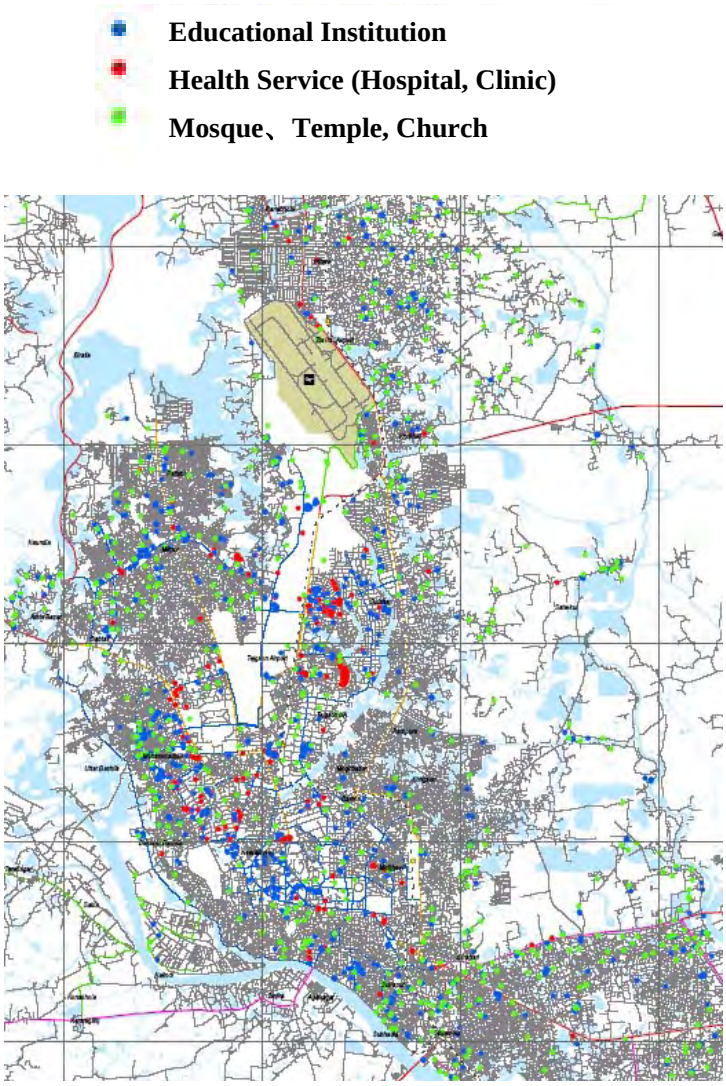


Figure 8.2-3 Locations of Sensitive Facilities

Locations of archaeological, historical and cultural importance are indicated in the Figure 8.2-4.

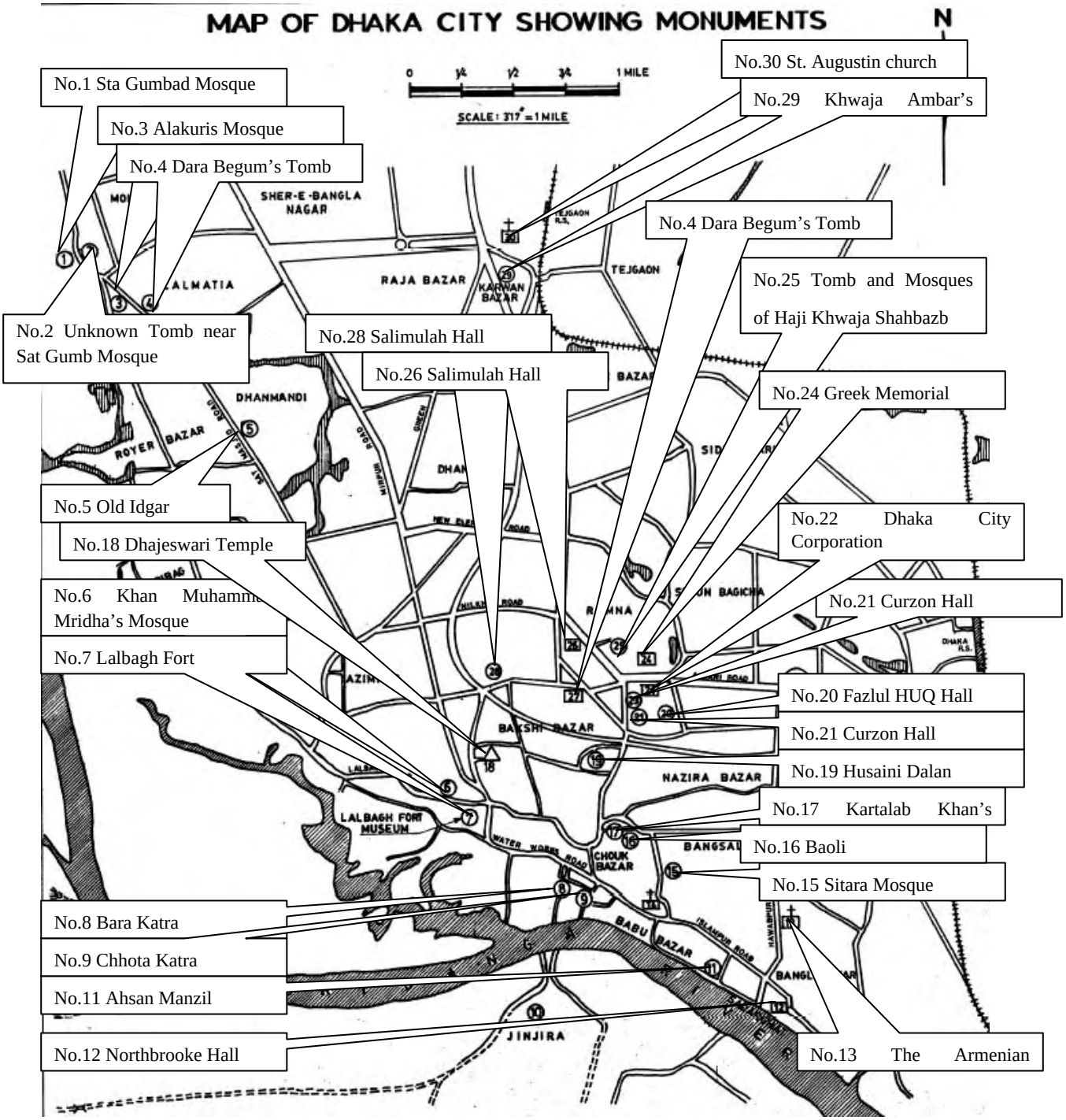


Figure 8.2-4 Locations of Archaeological and Historical Importance

8.2.5 Existing Infrastructures and services

Bangladesh Road Transport Authority (BRTA) is responsible for the control and management of road transport. The Dhaka Metropolitan Police (DMP) is in charge of traffic management. The roads of Dhaka city occupy 8% (2,230km) only on the total surface area in 2004 whereas at least 25% is required to facilitate a smooth transport system according to the standards. In addition, a large number of man-powered rickshaws running together with motorized vehicles make the congestion of roads serious. In this situation, closure of existing trunk road for

construction work can cause serious traffic jam.

The Bangladesh Railway is responsible for railway communication throughout the country. The Civil Aviation Authority of Bangladesh (CAAB), an autonomous body deals with all the aspect of aviation.

8.2.6 The Poor, Indigenous of Ethnic People

Most serious social impact predicted is impact to poor people as stated repeatedly. Many of them are vulnerable, engaged in informal economic activities such as street vending, rickshaw pulling, beggars, make-shift shop keepers, etc. Their living conditions are unstable, located in the slum or road/railway side without proper social service and, in any day, eviction can be ordered from government.

As for ethnic minorities, although there are 90,000 indigenous people in Bangladesh, most of them stay in CTG and border area with Myanmar/India and not much in Dhaka.

8.2.7 Misdistribution of Benefit and Damage

Most citizens in Dhaka will gain benefit from the projects while vulnerable groups without formal title (and therefore not applicable for formal compensation) may be lose their shelters and livelihood immediately by displacement. All the project affected people shall be provided with equal benefit through proper resettlement action plan.

8.2.8 Local Conflict of Interest

Due to the shortage of lands for living or making business in Dhaka, serious conflict can be caused if displaced people have to share the residential lands/business places (territory) where other people who have been already occupying.

It is reported in the newspaper "The Daily Star" that fierce battles are erupted between fixed shopkeepers and hawkers. They blame each other for the business territory. Fixed shopkeepers eventually put fire on the make-shift stalls of hawkers' while hawkers rampage the fixed shops in the extreme case.

Therefore it should be very carefully planned and properly compensated when such hawkers are displaced to other location.

8.2.9 Gender[2]

Including Gender issue, issues of Children's right, HIV/AID/Human trafficking are all caused by impoverishment. Usually mothers try to sustain their family member's life level and, especially their children's basic needs such as food and education, engaging in regardless of job type.

[2] JICA, Bangladesh Gender Profile 2007

The sex ratio in Bangladesh is 105 men per 100 women. In urban area, the ratio of men is much higher due to migration into cities. Generally the status of women in Bangladesh is quite low. Traditional culture, social and religious values and practices have limited women's access to economic resources, such as capital, skills and know-how. Women are often victimized by different violence. Most common acts of violence are torture, acid throwing, kidnapping, forced prostitution, suicide, rape, sexual harassment and trafficking. More than half of women in Bangladesh experience some form of domestic violence.

The government has enacted and amended laws specially prohibiting certain forms of discrimination against women and children as below.

Table 8.2-7 Laws about Women and Children

Enacted/amended	
1974	Muslim Marriage and Divorce Act
1974	The Correctional Homes for Juvenile Offenders
1980	The Downy Prohibited Act
1983	The Cruelty to Woman Act
1984	The Child Marriage Restraint Act
1985	The Family Court Ordinance
1991	National Women Organized Act
1992	The Anti-terrorism (to women and children))Ordinance
1993	The Suppression of Immoral Trafficking (to brothel) Act
2002	Acid Crime Prevention and Acid Control Act
2003	The Women and Children Repression Prevention Act

( ) supplements words of laws and explanation

8.2.10 Children's Right

According to some estimation[3], about 3,000 children were trafficked between 1990 and 1999. Into Dhaka, there are many flows of rural children yearly and many of them cannot find proper shelter and start living on the street. The traffickers have easy access to these hardcore poor and vulnerable children. They are brought to brothels in India and Middle East. Even if not trafficked, children may be forced to work to assist family's livelihood and become unable to attend school.

Impoverishment of mothers inevitably let their children lose various important rights they could have enjoyed.

8.2.11 Infectious diseases such as HIV/AIDS

There are about 13,000[4] of HIV/AIDS affected. Most of them are sex workers, their customers, and drug addicts by needle injection. This also can be caused mainly by impoverished mother

[3] ADB, Bangladesh Country Report 2002
[4] USAID, Health profile Bangladesh,2004

who have no other way to be engaged in illegal economic activities including prostitution and drug trafficking.

8.2.12 Human Trafficking

Number of trafficked adult women is assumed as about 1,000 in 1997-1999. Human trafficking means the recruitment, transportation, purchase, sale, transfer, harboring or receipt of persons by threat or use of violence, abduction, force, fraud, deception or debt bondage. A law was newly enhanced to strictly punish for trafficking of women to brothels.

8.3 Natural Disaster and Flooding

8.3.1 River Network

The local surface water hydrology around Dhaka is complex. The Dhaleswari River a tributary of the Jamuna River is located in the south-eastern part of the North Central Region of Bangladesh, close to the confluence of the Padma River (Ganzes) and Upper Meghna River (Figure 8.3-1). The Lakhya River joins Dhaleswari, 11 km downstream of the Buriganga confluence. About 5 km below the Dhaleswari-Lakhya confluence, the Dhaleswari meets the Meghna River, which in turn flows into the Padma River, a further 20 km downstream.

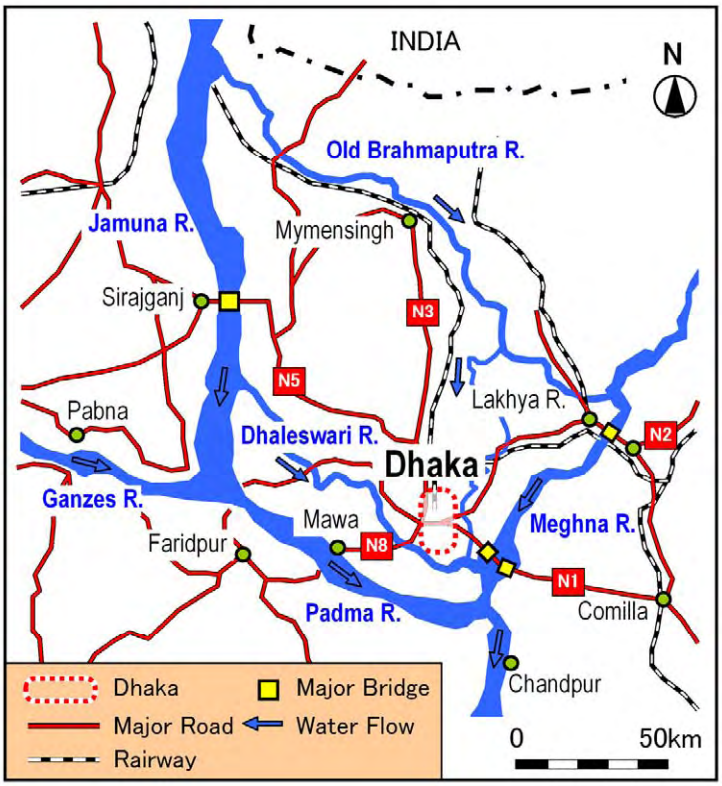


Figure 8.3-1 River Network in North Central Region of Bangladesh

The Buriganga is fed mainly by the Turag River, which receives flows from local rainfall and spill flows from the left bank of the Jamuna River. The Lakhya River drains a large catchment lying between the central forested areas and the Old Bramaputra. Additional inflows to the

system originate from the Balu which drains a small catchment to the west of the Lakhya (refer to Figure 8.3-2). The Dhaleswari-Buriganga-lakhya-Balu River system is tidal during the dry season when upstream inflows are minimal.

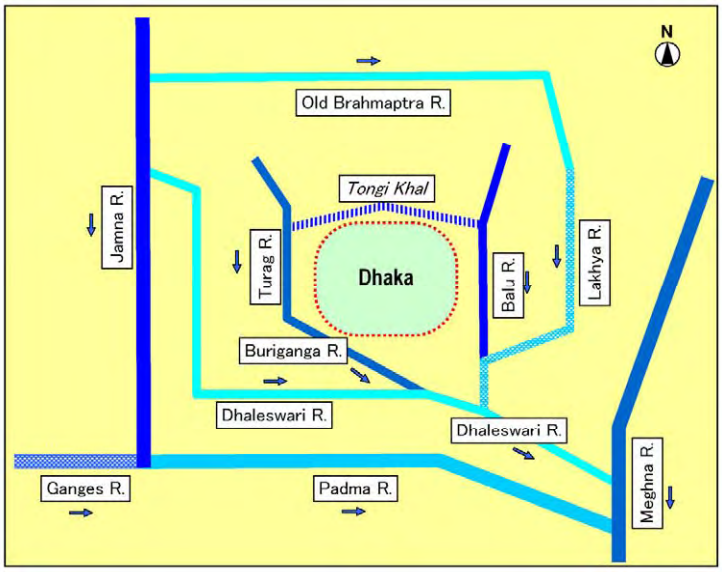


Figure 8.3-2 River Network around Dhaka Area

Average monthly rainfall in Dhaka is shown in Figure 8.3-3 below, which indicates that Rainy season in Dhaka is May to October and annual rainfall is approximately 2000 mm.

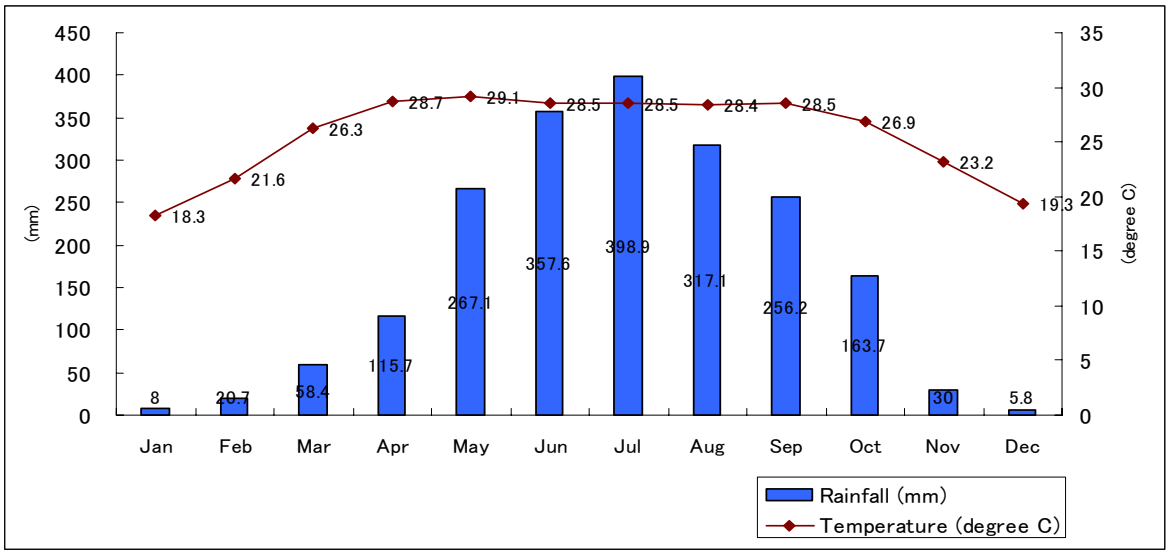


Figure 8.3-3 Average Monthly Rainfall and Temperature in Dhaka

Source: http://www.worldclimate.com/

8.3.2 Current Flood Protection and Drainage

Dhaka city was affected with severe flooding three times recently, 1988, 1998 and 2004 tabulated in Table 8.3-1.

Table 8.3-1 Outline of Severe Flood Damage

Year	Description
1988	85% of the city area was submerged with a water depth of 0.3 m to 4.5 m from the ground level and inundation continuous for 20 days. 60% of the city habitant was affected.
1998	Due to heavy rain and spring tide, 56% of the city area was submerged and inundation continuous for 2 months.
2004	Due to heavy rain and spring tide, flooding was continuous for 2 months. Commerce and industry area of the norteast Dhaka city was damaged for inundation.

The highest water level was recorded in the flood of 1988 (Figure 8.3-4).

The water level of Buriganga River in Dhaka is shown in Figure 8.3-5.

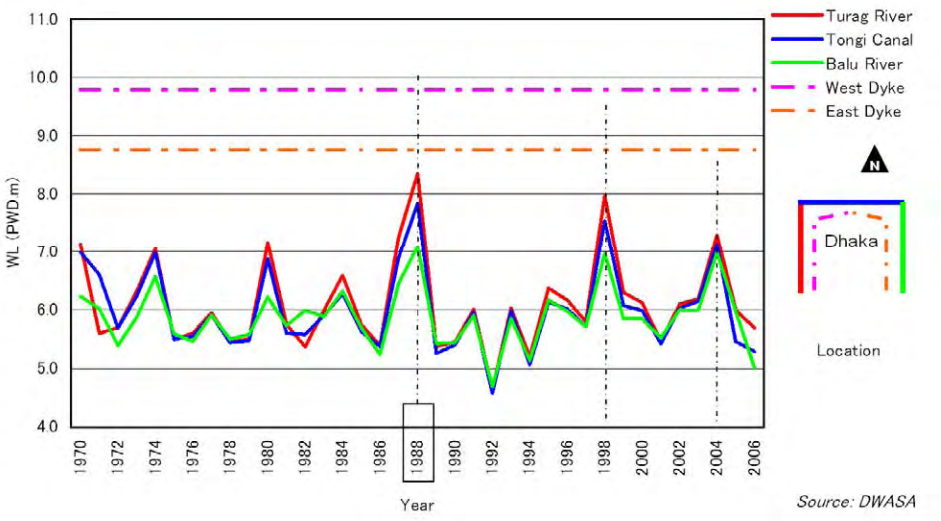


Figure 8.3-4 Maximum Water Level (1970-2006)

Source: Dhaka Water and Sewage Authority (DWASA)

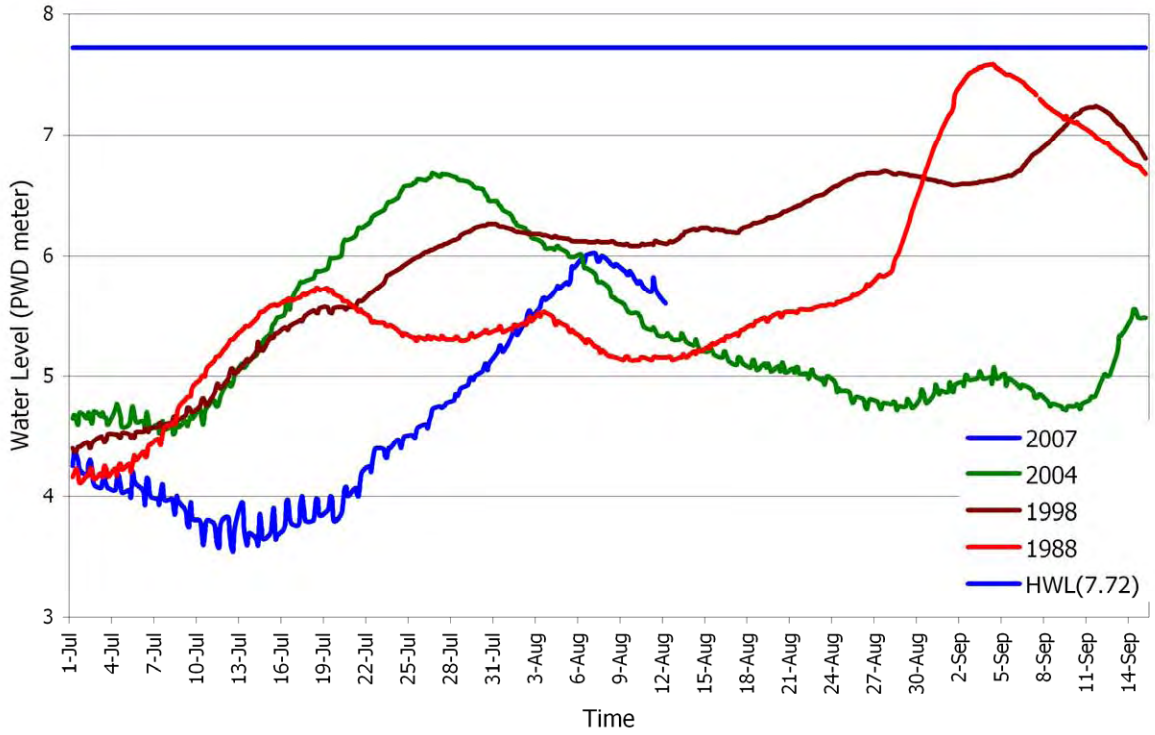


Figure 8.3-5 Water Level of Buriganga River in Dhaka

Source: Dhaka Water and Sewage Authority (DWASA)

After the devastating flood of 1988, an extensive study in the name of Flood Action Plan (FAP) was launched. The FAP had several components, of which Dhaka Integrated Flood Protection Project (DIFPP), namely FAP 8, was designed to look into the cause of and remedial measures against flooding of the capital.

The flood protection of the Dhaka City (260 km^2) was divided into two phases (DIFPP I & II). Phase-I was for the western side of the city having an area of 136 km^2 namely FAP 8B. Phase-II was for the eastern side of the city having an area of 124 km^2 namely FAP 8A (Figure 8.3-6).

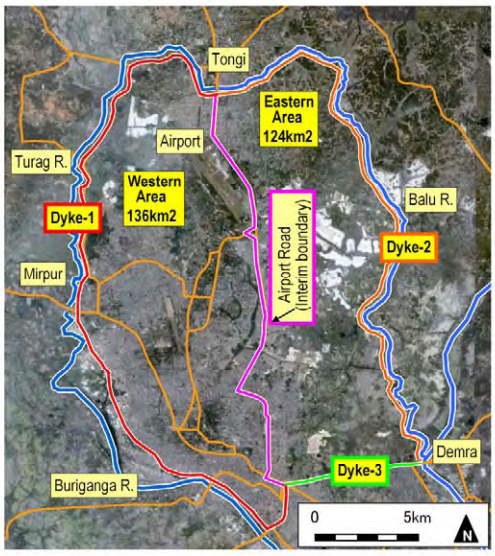


Figure 8.3-6 Current Flood Protection for Dhaka Area

In Phase-I, the Western Embankment cum Road from Tongi Railway Bridge to Keller Morth at Lalbagh was constructed along with the 3 pumping stations as a flood protection measure for the Western Dhaka City having an area of 136 km2 (Figure 8.3-6, Dyke-1). Existing road from Saidabad to Khilkhet railway crossing via Rampura/Badda and the railway line from Khilhet up to Tongi railway bridge is the interim Eastern boundary of the western landside water drainage area having 8 drainage block under DIFPP in Phase-I. After the above implementation under Phase-I, improvement of the western area against both flood protection and landside water treatment were nearly completed as of 2009.

Following design conditions were adopted in Phase-I.

- Embankment level: 100-years return period flood
- Landside Water level: 5-years return period rainfall

Design water level for the western drainage area was set at +4.00m PWD with the above conditions.

In Phase-II of the DIFPP, an Eastern Embankment along the Balu River from Tongi Railway Bridge up to Demra (DND Embankment) was proposed by FAP8A (Figure 8.3-6, Dyke-2, refer to 9.3.3 in this chapter).

The DND (Dhaka-Narayanganj-Demra) embankment was constructed by the BWDB in 1968 to protect an irrigation project area of approximately 57 km^2 in Narayanganj (Figure 8.3-6, Dyke-3).

Distribution of the ground level below PWD 4 m in Greater Dhaka Area summarized in Figure 8.3-7.

Nearly 70% of Western Area ground level is higher than PWD 4 m. There is no inundation in the area where the ground level over PWD 4 m based on the improvement plan implemented by

DWASA described hereinbefore. However, due to poor maintenance of the existing drainage facilities by DWASA, local inundation occurred frequently in the above area during rainy season.

Ground level profiles of WEST-EAST and NORTH-SOUTH of Greater Dhaka are shown in Figure 8.3-8 (A) and (B).

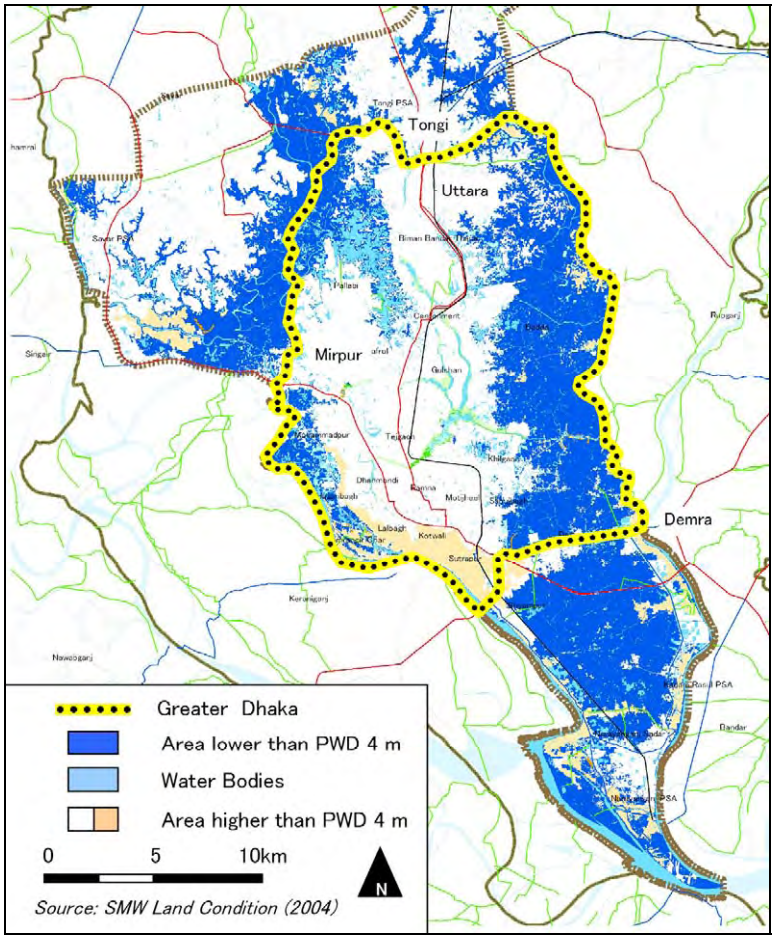


Figure 8.3-7 Land Condition (2004)

Source: SMW Land Condition (2004)

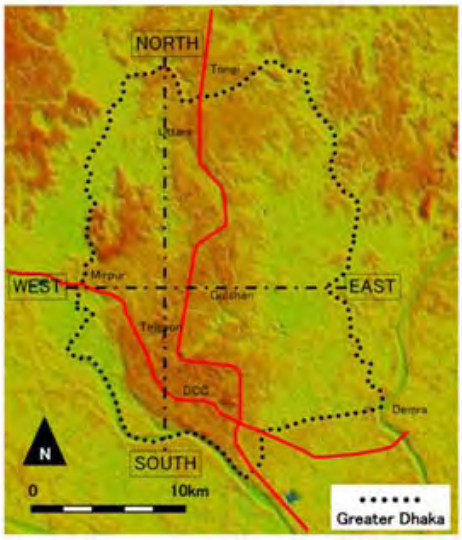


Figure 8.3-8 (A) Profile Index Map

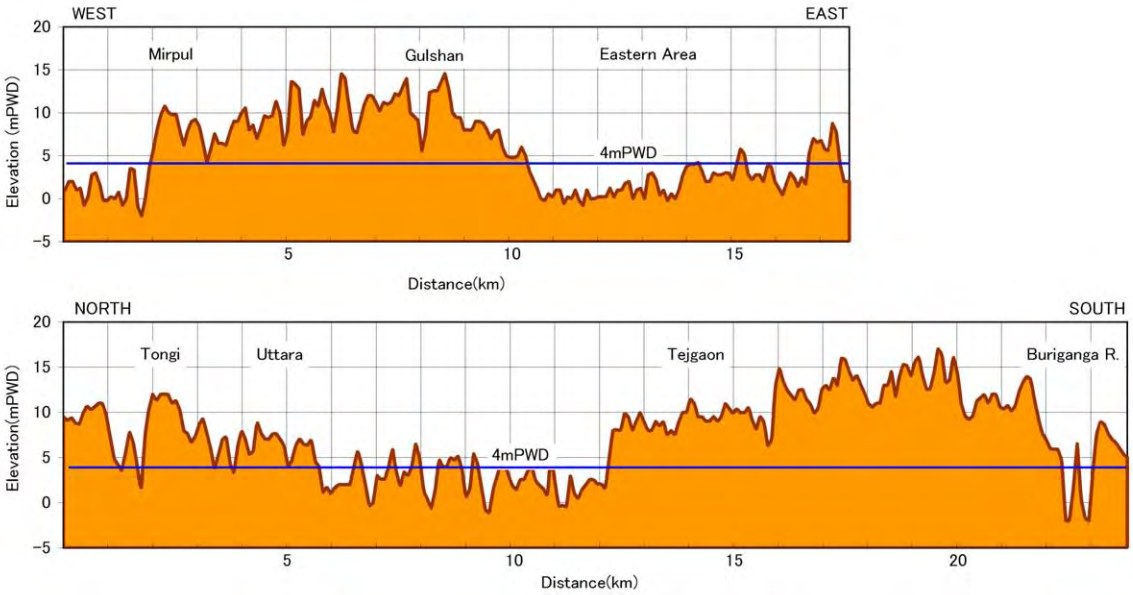


Figure 8.3-8 (B) Ground Level Profile

WEST-EAST

Ground level of Mirpul to Gulshan area is higher than PWD 4 m. But some area is inundated presently because the ground elevation of that area is nearly PWD +4.00 m of the design water level as shown in Figure 8.3-8 (B) above.

NORTH-SOUTH

Ground level of Tongi, Uttara and Tejgaon area is higher than PWD 4 m. Area between Uttara and Tejgaon is lower than PWD 4 m as shown in Figure 8.3-8 (B) below, so that the area is affected with local inundation frequently.

Flood Situation of Dhaka

Current flood situation of Dhaka is explained with Figure 8.3-9 below.

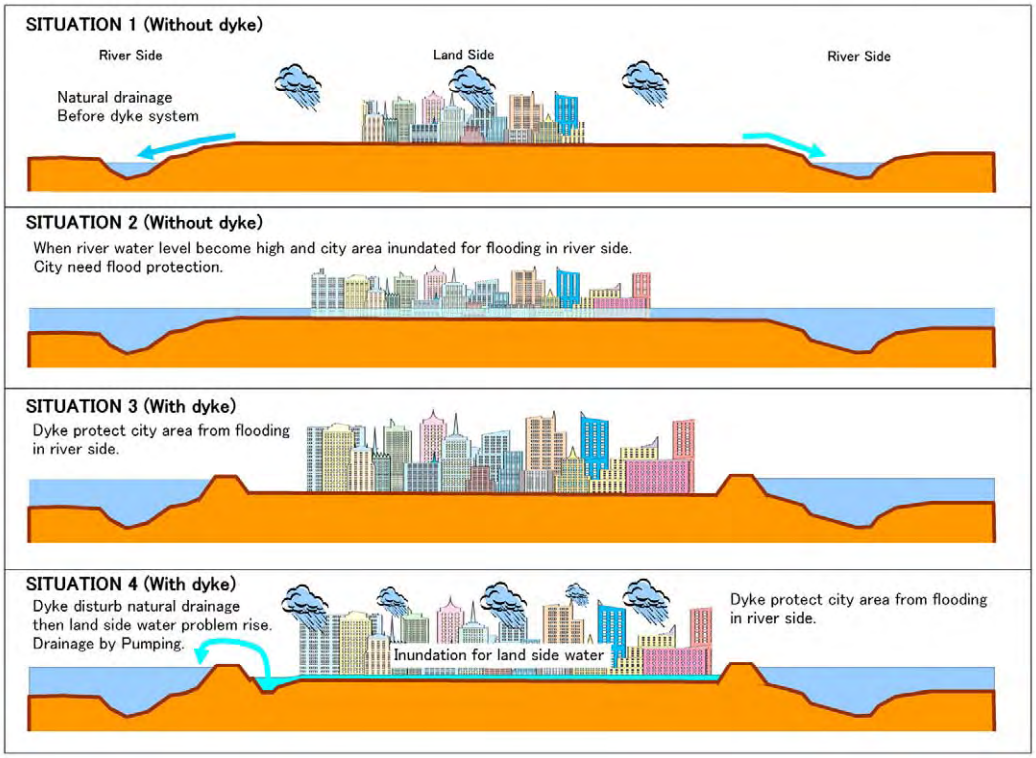


Figure 8.3-9 Flood Situation

Situation 1 and 2

City area is not surrounded with dyke. Land side water by rainfall drains to the river by natural surface drainage when the river water level is low. And city area is inundated when the river is flooding because no flood protection measures between city and the river.

Dhaka city condition of 1988 was in Situation 1 and 2.

Situation 3 and 4

City area is protected with dyke from flooding by the river. Land side water drains to the river thorough regulator structure along the dyke when the river water level is low. Land side water drains to the river by pumping drainage when the river water level is high. Capacity of the pumping drainage is insufficient to drain; city area is inundated for the land side water by rainfall not for flooding by the river.

After completion of FAP 8B, the western part of Dhaka is in Situation 3 and 4.

Dhaka Area	Situation	Flood Problem
Eastern Part	1 and 2	River side water
Western Part	3 and 4	Land side water

Current situation explained in the above was summarized in the Figure 8.3-10 below.

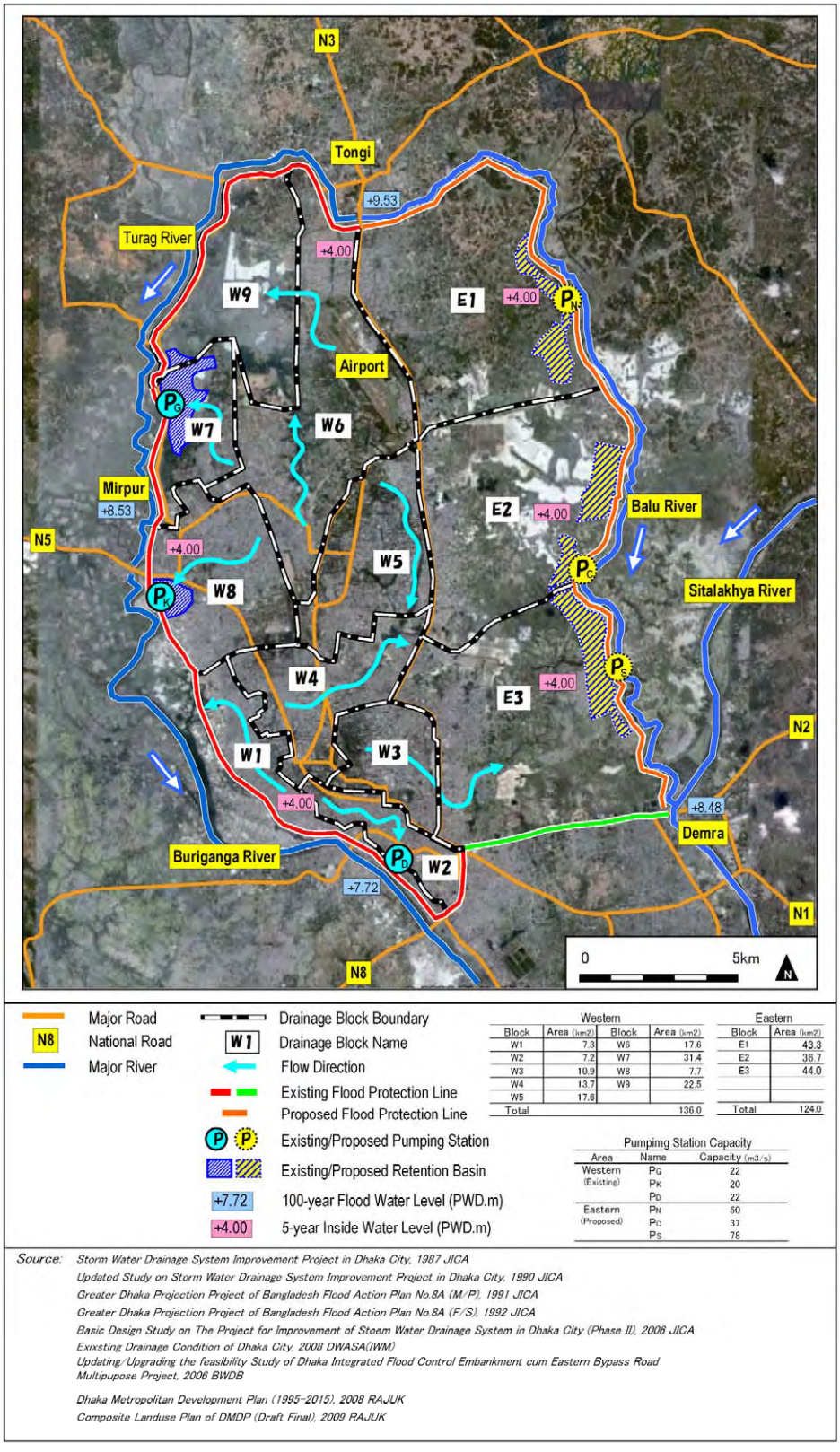


Figure 8.3-10 Summary of Current Flood Protection and Local Drainage Situation of DMA

8.3.3 Eastern Dyke Project

First Dhaka Eastern Bypass study was undertaken in 1998 under World Bank TA. The study was updated in June 2006 with a new name of "Updating/Upgrading the Feasibility Study of Dhaka Integrated Flood Control Embankment cum Eastern Bypass Road Multipurpose Project". The main objective of the project is to provide flood protection for the eastern part of Dhaka in order to mitigate damage and loss as a result of flooding by the Balu River and from internal flood water. The project will also deliver transport benefits, but they are secondary to those of flood defense. All the proposals under this project refer to Figure 8.3-11 as below. Total project cost at constant 2005 prices and excluding physical contingencies was estimated at BDT 19.0 billion (US$233 million) in the report.

Note: Project cost of BWDB portion was estimated at BDT 12,490 million in the report prepared in 2006. The cost was revised at BDT 19,175.33 million with the current prices in June 2009, nearly 1.5 times difference between the both costs.

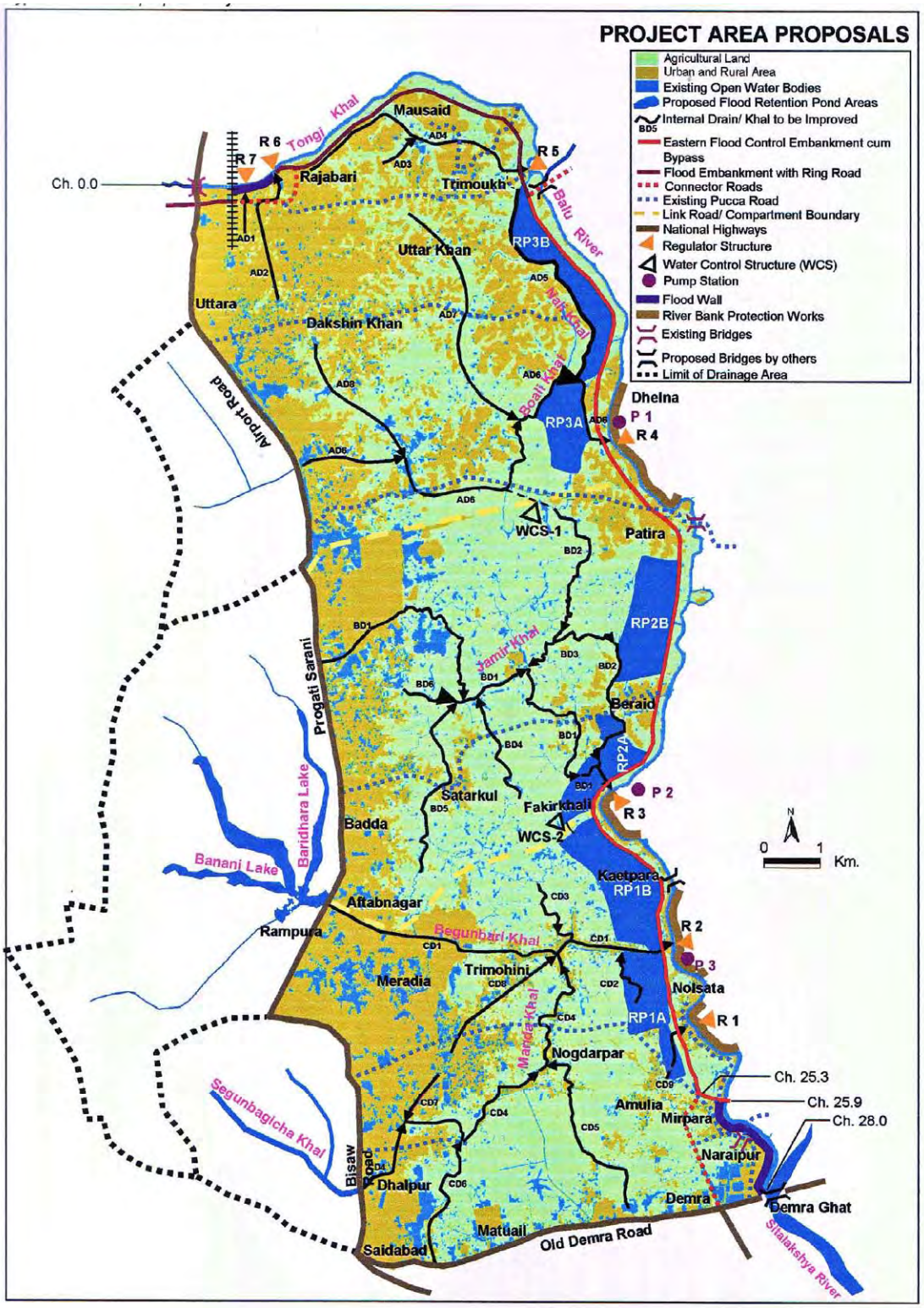


Figure 8.3-11 Proposals for Eastern Area from Updating/Upgrading the Feasibility Study of Dhaka Integrated Flood Control Embankment cum Eastern Bypass Road Multipurpose Project

Project description

Flood protection

- A 100 year standard of protection is adopted.
- 24 km flood embankment beside the Tongi khal and the Balu River
- Embankment of 5.4 km having crest width 10 m and 18.6 km, Bypass portion, having crest width 4m

Internal drainage

- The project area is divided into three compartments.
- The design standard of internal protection is a 5 year storm event.
- 80 km of the existing khal network, three pump stations and seven regulators
- Pump operation range is 2 to 4 m PWD and a water level of 4m is the design water level in the project area.

Inner bypass

- A 18.6 km long low level inner bypass with a design speed of 100 km/h and a maximum curve radius of 500 m
- 10 m crest width at the first stage and 22.0 m crest width at the second stage
- Crest level set at 5.10 m PWD having a freeboard of 1.10 m above the design water level (Figure 8.3-12).

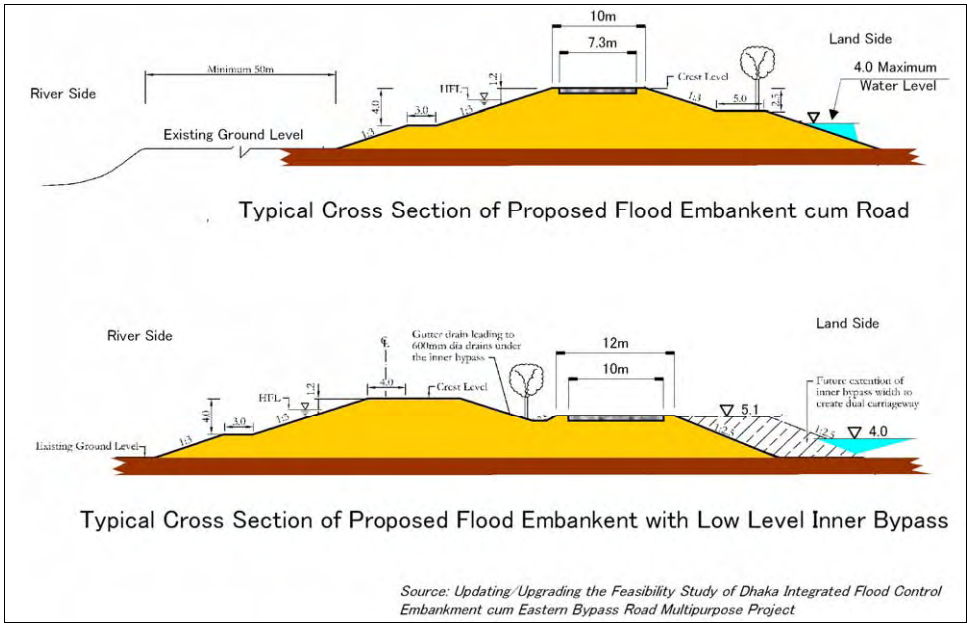


Figure 8.3-12 Cross Section of the Proposed Embankment

Source: Feasibility Study of Dhaka Integrated Flood Control Embankment cum Eastern Bypass Road Multipurpose Project

CHAPTER 9: FINANCIAL STRUCTURES AND BUDGETING

This Chapter deals with clarification of the government financial structures and budgeting of Bangladesh and identification of problems and issues. Based on the information collected in this Chapter, the government budget for transport projects in future is estimated in Chapter21.

9.1 Basic Structure of the National Budget

In this chapter, financial structure and budgeting are discussed. The data for national budget and expenditure have been collected by study team. However further information and analysis such as breakdown of budget and expenditure shall be required on Feasibility Study Stage.

(1) Consolidated Fund and Public Account

The Constitution requires that all receipts of government to be paid into the Consolidated Fund or the Public Account. The Consolidated fund includes all revenues, proceeds of loan and loan repayment to the Government. This fund shows receipts and payments of governmental money as authorized by the Constitution and each year's Appropriation Act. This fund is divided into Development Budget and Revenue Budget. Annual Development Budget is prepared through bottom-up procedure starting with the estimates prepared by government agencies. Revenue Budget is prepared on an incremental basis from the previous year's approved budget and culminating it in the presentation of the Budget in Parliament by the Finance Minister.

Another budget, Public Account, is a group of fund of "other money". So far no Act regulating this fund exists. President is principally ruling this fund. These are published annually together with a supporting statement of actual expenditures compared with budget authorizations and variances together with its explanations.

(2) Revenue Budget and Development Budget

Consolidated fund is separated into two different types of budget, i.e., Revenue Budget and Development Budget.

Revenue Budget is primarily administered by the Finance Division, while the Ministry of Planning is responsible for Development Budget. These budgets' legal framework impeded coordination of budgeting and auditing. There is no adequate mechanism for overall review of spending and revenue priorities. The Annual Development Plan (ADP) budgeting process is not clearly disciplined and has been undermined by the incorporation of a large number of projects,

which have often questionable priority and rationale, resulting in scarce budgetary resources being thinly spread over a large number of projects.

Revenue budget is largely prepared on an incremental basis from previous years' allocations. Such lack of a medium-term strategic framework, combined with extensive political interference in the prioritization of projects within sectors and little participation by line ministries in the planning process, has resulted in a situation where resources are widely spread thinly across a large number of projects. As for the separation between "Revenue Budget" and "Development Budget", there is no mechanism to ensure that project-related operating and maintenance costs are estimated and included in the revenue budget once these projects are completed.

9.2 Current Feature of Government Budget

(1) Current Status of National Revenue and Expenditure

Table 9.2-1 shows the revenue and expenditure of GOB budget during BFY 2001 to BFY2007. As shown in this table, nominal revenue of GOB since 2001 has been increasing with average annual growth rate (AAGR) of about 14.9 %. Taking account of Consumer Price Index (CPI) during the same period being 6.8 % per annum, real revenue growth rate was about 7.6 % per annum.

On the other hand, public expenditure consists of the revenue expenditure relating to "Revenue Budget" and development expenditure relating to "Development Budget". The former revenue expenditure includes wages and salary, commodity and services, etc, while development expenditure is expenditure for agriculture flood control, industry, infrastructure and other service development. The growth rate of revenue expenditure is higher than revenue receipts. Development expenditure is at the lowest rate among others. Such low development expenditure in the field of the transport infrastructure causes recent chronic transport congestion and conflict.

Table 9.2-1 Recent Trend of Consolidated Receipts and Expenditures

Unit: Million BDT

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	AAGR 2001-2007
Revenue Receipts	276,700	311,200	354,000	392,000	448,680	494,720	606,390	13.97
Development Receipts	148,970	172,390	206,740	216,110	222,320	212,290	373,350	16.55
Total Receipts A	425,670	483,590	560,740	608,110	671,000	707,010	979,740	14.91
Revenue Expenditure (Gross)	220,002	265881	274322	327736	351544	413551	521923	15.49
Development Expenditure	140,902	154,343	168,173	187,260	194,720	179,280	185,060	4.65
Total Expenditure B	360,904	420,224	442,495	514,996	546,264	592,831	706,983	11.86
GDP	2,732,010	3,005,801	3,329,731	3,707,070	4,157,279	4,724,769	5,419,188	12.09
% to GDP	13.2%	14.0%	13.3%	13.9%	13.1%	12.5%	13.0%	
% to Development Expenditure	39.0%	36.7%	38.0%	36.4%	35.6%	30.2%	26.2%	

Source ; Statistical Yearbook of Bangladesh 2008

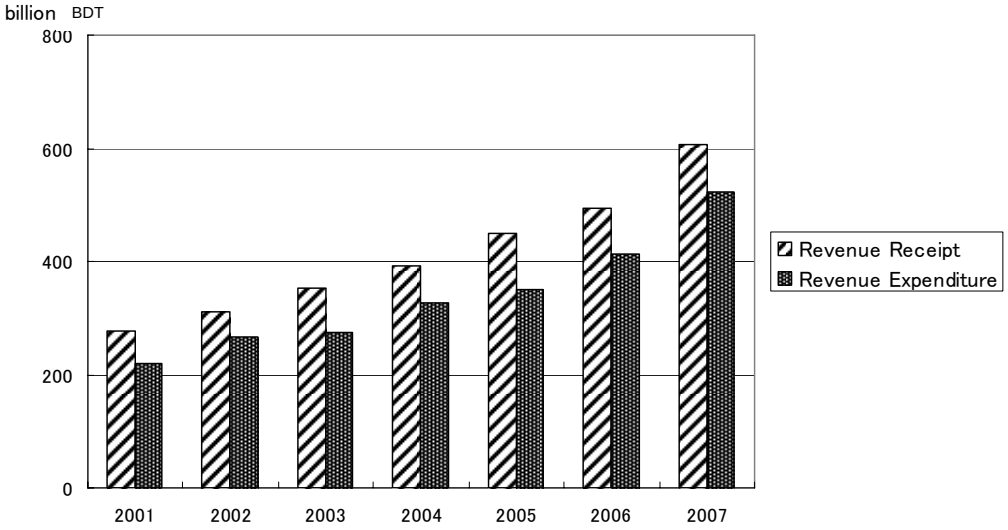


Figure 9.2-1 Recent Trend of Receipts and Expenditures in "Revenue Budget"

Source: Ministry of Finance, Annual Budget, 2008

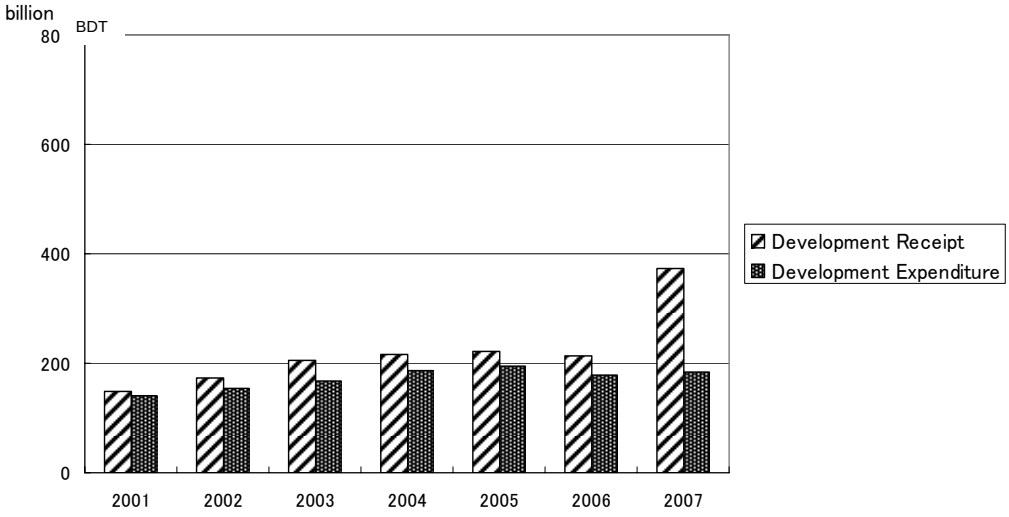


Figure 9.2-2 Recent Trend of Receipts and Expenditures in "Development Budget"

Source: Ministry of Finance, Annual Budget, 2008

(2) General procedure for management of the national revenue

Budget preparation is governed by the President, the Principal Accounting Officer (PAO), which includes the Finance Division and Secretaries of Ministry/Divisions concerned, the Controller General of Accounts (CGA) belonging to the office of the Comptroller and Auditor General (C&AG), the Chief Accounts Officers (CAO) belonging to the Ministries and other accounts officials concerned.

As for national revenue, Bangladesh has one of the lowest levels of tax revenues in the world. Bangladesh remains heavily dependent on trade-based taxes. Necessary policies are; (i) broadening the tax base, (ii) reducing tax exemptions, (iii) improving tax administration, (iv)

tightening billing and collection in the delivery of public services. As for national expenditure, Bangladesh has one of the lowest levels of government spending in the world. Such low level of expenditures results from the fact that the Government has not been able to mobilize large volumes of resources domestically with the government own tax. As a result, budget financing remains heavily reliant on domestic borrowing.

As for tax revenue management, the National Board of Revenue (NBR) has taken steps toward strengthening tax system. However, the legal basis for taxes continues to be undermined by the practice of the executive branch of granting exemptions to protect or to foster specific commercial activities. These extensive specific and ad hoc tax exemptions have reduced tax collection, impaired equity and transparency of the tax system, provided discretionary power for tax officials and encouraged rent seeking.

Table 9.2-2 and Figure 9.2-3 show the recent trend of national revenue. The structure of revenue is shared at 57 % by tax on commodities and transaction including VAT/ sales tax. Income tax is shared at only 19 %.

However, the growth rate of nominal Government revenue is higher than CPI and that of GDP.

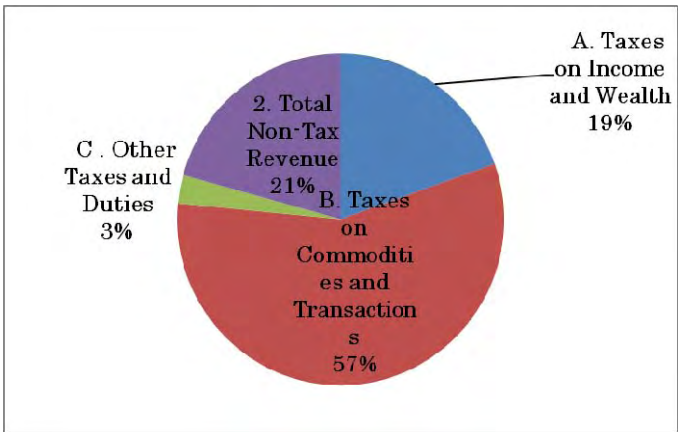


Figure 9.2-3 Breakdown of the National Revenue Component

Table 9.2-2 Recent Trend of Government Revenue Budget

Unit: Million BDT

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	AAGR 2001-2007
1. Total Tax Revenue	219,300	249,500	283,000	319,500	361,750	392,470	480,120	13.95
A. Taxes on Income and Wealth	40,544	53,100	57,710	64,430	76,750	96,389	118,375	19.55
B. Taxes on Commodities and Transactions	167,500	186,460	225,290	255,070	285,000	296,081	344,990	12.80
C . Other Taxes and Duties	11,256	9,940	10,540	11,520	13,100	12,581	16,755	6.85
2. Total Non-Tax Revenue	57,400	61,700	71,000	72,500	86,930	102,250	125,270	13.89
Total Revenue Receipts	276,700	311,200	354,000	392,000	448,680	494,720	605,390	13.94
GDP	2,732,010	3,005,801	3,329,731	3,707,070	4,157,279	4,724,769	5,419,188	12.09
% to GDP	2.1%	2.1%	2.1%	2.0%	2.1%	2.2%	2.3%	

Source ; Statistical Yearbook of Bangladesh 2008

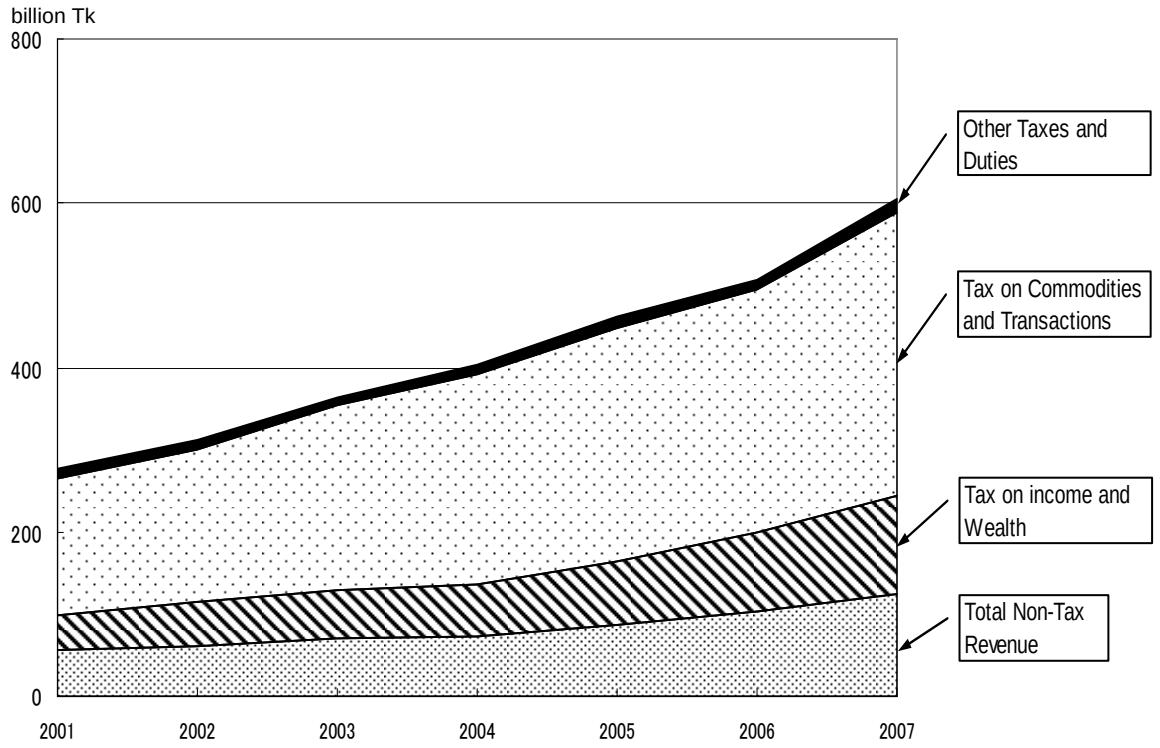


Figure 9.2-4 Breakdown of the National Revenue Component

Source: Ministry of Finance, Annual Budget, 2008

(3) General procedure for management of the national expenditure

National expenditures are subject to pre-audit by CAO belonging to the line Ministries. If there exists any irregularities, the CAO makes the payment but he can raise an objection and inform the CGA belonging to the C&AG office. CGA operates the account with the Bangladesh Bank for receipts and payments on both Consolidated Fund and public Account. And CGA prepares an annual receipts and disbursement accounts for central government on behalf of the C&AG. CGA publishes them annually as the Finance Account together with a supporting statement of actual expenditures compared with budget authorization as the Appropriation Accounts.

The preparation of the accounts for each Ministry/Division is divided between each Ministry's CAO, which is supervised by the secretary and keeps account only for transactions undertaken in Dhaka and is called as "Presidency Accounts", and C&AG office's CGA, which is supervised by the Finance Division of Ministry of Finance and deals with transactions in districts and thanas.

(4) National Development Expenditure

As previously discussed, development expenditure is managed within "Development Budget", which is separated from "revenue Budget". National development expenditure is closely related to the Annual Development Plan (ADP). The planning process of the ADP is as follows;

a) National development planning procedures were first introduced in 1960s, during East Pakistan period. The National Plan consists of the Five-Year Plan, the Three-Year rolling Plan and the Annual Development Plan.

b) The apex body for the planning process is the Planning Commission with the Prime Minister as chairperson and the Finance or Planning Minister as Vice-chairperson. The Planning Commission has five divisions i.e., Programming/Agriculture/Physical infrastructure/Industry and Energy/general Economics

c) The Planning Commission is responsible for;

   i. preparing annual, five-year and perspective national plans

   ii. preparing ADPs

   iii. periodic review of national development plan

   iv. continuous monitoring of plan implementation

   v. determining external aid requirements and negotiating with foreign governments and organizations

d) Steps in the planning is as follows:

   i. The National Economic Council (NEC) of the Planning Commission, with the Prime Minister as Chairperson and all Cabinet members, gives preliminary guidance for preparation of the Five-year Plan and ADPs.

   ii. In preparing the Five-year Plan, the General Economics Division (GED) first prepares a policy framework. GED then evaluates whether the demand matches the resource availability given by the Internal Resources Division (IRD) of the Ministry of Finance and Economic Relations Division (ERD) of the Ministry of Finance. Then GED prepares the Five-year Plan by coordinating the sectoral plans. The Five-year Plan is then submitted to the NEC for approval.

   iii. Development Plans are investigated on the basis of objectives of the Five-year Plan. Proposed investment projects are analyzed by the Planning Commission before approval by the authority concerned, which is the State Minister in case of projects not exceeding BDT 100 million, or Executive Committee of the National Economic Council (ECNEC) in case of projects exceeding BDT 100 million.

   In preparing the ADP, the Planning Commission first obtains resource estimates from "Resource Committee", which consists of members of Finance Division, IRD, ERD, GED and Bangladesh Bank.

   The Programming Division makes the sectoral allocation of resources in consultation with sectors and concerned Ministries/Divisions. Then project implementing agency i.e.,

the line Ministries/Agencies prepare Project Concept Papers (PCPs) and Project Performs (PP) and send them to the Planning Commission. PCPs are examined in a pre-ECNEC inter-Ministerial meeting at the Planning Commission. After revision, if any, PCPs are sent to the relevant sector division of the Planning Commission. Then the Sector Division prepares a summary of the PCP and submits it to the ECNEC Secretariat/Planning Ministry for consideration and approval by ECNEC/Planning Minister.

The approved PCP forms the basis of finalization of the PP. The Minister concerned then approves the PP on getting the recommendations of the Departmental Project Evaluation Committee (DPEC). The approved PP is then circulated to all concerned Ministries/Agencies. Given all approved PCPs, the Planning Commission finalize the draft ADP and sends it for approval by the NEC. The Finance Division of the Ministry of Finance prepares the Annual Development Budget in the light of ADP. Annual Development Budget is sent to the Parliament for approval.

iv. After completion of planning and budgeting, the Implementation, Monitoring and Evaluation Division (IMED) of the Ministry of Planning undertake routine monitoring of projects. IMED prepares quarterly overview report regarding expenditures and progress of the projects and submits it to NEC. The Budget Monitoring and Resource Committee (BMRC) headed by the Minister of Finance is the formal institutional structure for coordination of the overall resources.

It is found from the Table 9.2-3 and Figure 9.2-5 that over the years the transport sector is one of the major recipients of public sector allocations. The share of transport sector (road, rail, water and air) allocation was about 20% in the Financial Year 2001-2002, while 16% in the Annual Development Plan (ADP) 2009-2010.

Table 9.2-3 Development Expenditure by each Sector

[Unit: billion BDT]

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Agriculture	6.2	6.4	6.8	5.9	6.1	5.7	5.9
Industry	2.7	1.9	4.6	4.8	5.0	4.6	4.7
Food Control & Water Resources	7.6	7.3	6.8	9.1	9.4	8.9	9.2
Rural Institution	15.6	17.3	23.3	24.5	25.5	23.4	24.2
Power & Natural Resources	21.3	30.4	37.6	38.9	40.5	37.3	38.5
Transport	**28.0**	**29.1**	**30.3**	**30.8**	**32.0**	**29.5**	**30.4**
Communication	8.6	6.2	3.7	10.7	11.2	10.2	10.6
Education & Training	20.8	23.6	21.6	20.3	21.1	19.3	19.9
Health	11.1	11.5	13.9	13.4	13.9	12.7	13.1
Population Control & Housing	15.8	15.8	15.4	22.9	23.8	22.0	22.7
Others	3.3	3.9	4.1	6.0	6.2	5.7	5.9
Total	140.9	154.3	168.2	187.3	194.7	179.3	185.1

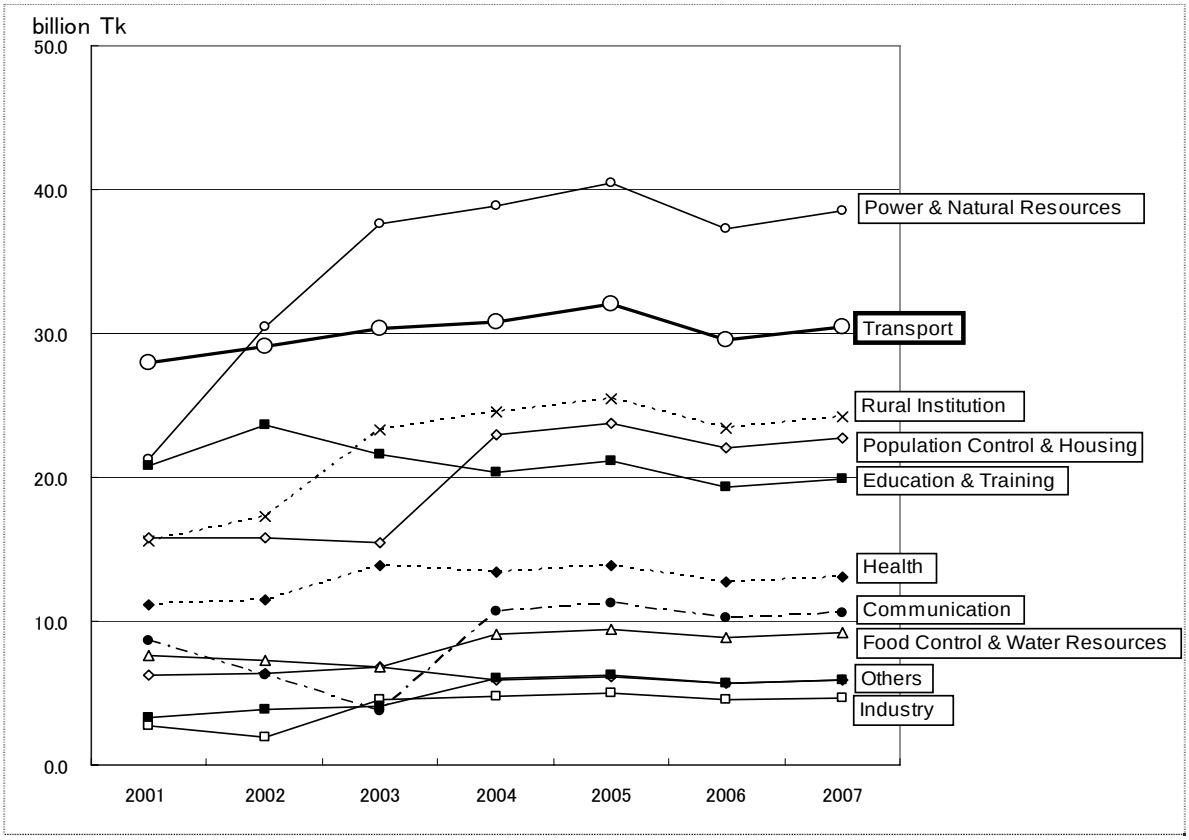


Figure 9.2-5 Development Expenditure by each Sector

Source: Ministry of Finance, Annual Budget, 2008

9.3 Institutional Structure of Public Accounting and Auditing

Government accounting is cash-based and follows "single-entry" accounting principles. A transaction is recorded at the time cash is paid or received. This leads to the recording of transaction only when the actual inflow or outflow of cash occurs. Major unexplained differences exist between the bank balances shown in the government's balance sheet and the balance shown in the bank statements of Bangladesh Bank. These are likely to include losses as well as irregularities.

Budget monitoring and reporting is generally ineffective. The CAO belonging to C&AG office uploads budget data from the Finance Division. It sends these data, combined with revenue and expenditure data from the district and thana offices, to the respective CAO on a monthly basis.

As for internal audit, Internal Audit Cells exist in only large ministries and major autonomous bodies.

To the contrary, as to external audit, C&AG is in charge. In theory, C&AG has constitutional independence and the appropriation of his audit directorates is not subject to parliamentary vote. In practice, the role of external audit is compromised by its simultaneous responsibility for both

accounting for and subsequently auditing the expenditures. C&AG's audit staffs are drawn from the same cadre as accountants. The C&AG is treated as part of the executive and in practice seeks approval from the Ministry of Finance and Establishment for financing and staffing decisions.

As a result of insufficient qualified auditors, public audit covers only 16-25 percent of the C&AG's mandate each year, and major areas of public activity including public revenues are not audited.

Separating the accounting and auditing functions must be made. The CGA should be given complete responsibility for accounting functions. The C&AG should be appointed as an officer of parliament for a fixed term of five years on the recommendation of the Public Accounts Committee, with the approval of the Prime Minister.

Principal institutions of parliamentary surveillance are the Public Accounts Committee, Public Estimates Committee, Public Undertakings Committee and other standing committees on individual ministries.

9.4 Local Authority

As more detailed discussion was given in previous Chapters, Bangladesh is divided into 6 Divisions, 64 Districts, 448 Upazilas (also known as Thanas) and 4,276 Unions, of which council is called as Union Parishad (UP) and UP constituency is divided into 9 wards and this is an elected body. A Union ordinary consists of 10 to 12 Villages.

At the Upazila level, UP relates to the Upazila Nirbahi Officer (UNO). At the District level, the Deputy Commissioner (DC) has oversight of the UPs. At the national level, the Ministry of Local Government, Rural Development and Cooperative (MLGRDC) supervises the Ups. UP budgets are routinely scrutinized and must approve by the UNO, DC and Assistant Director of the MLGRDC. National Ministers often issue directives to UP.

LGIs are entitled to ADP block grants from the national government. The block grant must be used specifically certain sectors determined by the central government. Such pre-determined sector allocation seriously limits the scope of local level planning and financial flexibility to meet immediate needs of community. This runs contrary to the concept of functional autonomy of local government units.

The Ups collect taxes from their constituents and taxes are shared with the Upazilas and District governments on the basis of percentage formula. The UP's role in the development field is limited. While the Union Parishad is authorized to mobilize local resources through tax, leasing of local space, they are obliged to share these resources with the central government (25 percent) and the Upazila (10 percent) and to allocate a portion for the maintenance of local infrastructure.

A lack of transparency leads to a corresponding lack of accountability. UP members and Chairperson sometimes accept bribes.

The extremely centralized form of government leads to constraint of good governance in local level. The central government often exercises substantial financial and administrative control over LGIs.

The powers of central government are prescribed in precise terms, while the local authorities are vaguely defined. The security and clerical staffs working at UP level are hired by Upazila level officials. As a result, they have little motivation to follow the directions of the UP chairman. Ups are subject to restrictive guidelines and regulations prescribed by the Upazila, District and Ministerial level of governments. Ups have little flexibility or autonomy to be responsive to the needs of their communities.

9.5 State-Owned Enterprises

The non-financial parastatal sector consists of some State-Owned Enterprises (SOEs) and boards and their many subsidiary enterprises. These were, in most cases, private enterprises nationalized after independence. Financial performance of SOEs have been deteriorated due to unrealistic pricing policies, particularly gas, petroleum, power and fertilizer sectors. SOE's benefit from several types of budgetary support and they take the form mostly of hidden subsidies and off-budget transfers such as equity financing, long-term loans, supplier's credits and interest subsidy. To the contrary, direct subsidies in cash basis to SOEs have been limited. Budgetary resources including external assistance have financed about 95 percent of the SOE's investment under the ADP.

SOEs have very limited operational autonomy, although they carry out commercial activities. In practice, they are suffering from considerable bureaucratic and political interference. Most have excessive staff but lack adequate professionally trained staffs with technical and managerial skills.

SOEs' weak economic performance is due to several factors in particular; (i) weak governance and accountability, leading to considerable investment misallocations, operational inefficiencies, over employment and inadequate revenue collection, (ii) inappropriate administered prices, many SOE products have been priced significantly above world market or competitive price level, (iii) insufficient disengagement of the public sector in commercial activities. SOEs remain a drain on public resources.

The government produces a Five-year Plan. Through allocation of budget to the plans, scarce resources are spread thinly across a large number of projects, many of which have very little public good content.

9.6 Budget and Expenditure of Transport Agency

(1) Transport Agencies

In Bangladesh, four ministries as listed below are involved in transport infrastructure operation in Dhaka area:

a) Ministry of Communications

i) Roads & Highway Department (RHD)
ii) Bangladesh Railway (BR)
iii) Bangladesh Road Transport Authority (BRTA)

b) Bangladesh Road Transport Corporation (BRTC)
i) Dhaka Transport Coordination Board (DTCB)

c) Ministry of Local Government, Rural Development and Cooperation
i. Local Government Engineering Department (LGED)
ii. Dhaka City Corporation

d) Ministry of Shipping
i. Bangladesh Inland Water Transport Authority (BIWTA)
ii. Bangladesh Inland Water Transport Corporation (BIWTC)

e) Ministry of Civil Aviations and Tourism
i. Civil Aviation Authority of Bangladesh (CAAB)

(2) Roads and Highways

The road network in Bangladesh consist of six categories roads, namely National Highways, Regional Highways , Zila Roads, Upzila Roads, Union Roads and Village Roads. The Road and Highway Department (RHD) manage about 20,782 kms of three higher categories of roads while the remaining three lower ones are Local Government Engineering Department (LGED). The budget of Roads and Highways consists of two categories; revenue budget and development expenditure.

Table 9.6-1 Annual Development Program Spending by Activities (RHD)

Million BDT

	2002-03	2003-04	2004-05	2005-06	2006-07
New Construction	7,226.3	7,191.8	8,283.5	7,126.2	9,549.3
Improvement/ Rehabilitation	11,765.8	10,264.5	11,088.2	10,393.9	7,519.4
Ferries	187.4	185.6	182.4	233.8	159.2
Others	795.3	662.2	411.8	237.6	215.5
Total	19,974.8	18,304.1	19,965.9	17,991.5	17,443.4
Growth Rate (%)	0.916	1.091	0.901	0.970	-

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007, Sep. 2007,

Table 9.6-2 Revenue Expenditure by Activities (RHD)

Million BDT

	2002-03	2003-04	2004-05	2005-06
Maintenance	2,541.6	4,207.8	7,020.1	6,768.2
Salary	420.5	435.8	40.0	517.1
Miscellaneous	576.2	717.6	1,186.3	1,251.8
Total	3,538.3	5,361.2	8,246.4	8,537.1
Growth Rate (%)	1.515	1.538	1.035	-

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007, Sep. 2007,

(3) Railway

Bangladesh railway (BR), a department under Ministry of Communications is sole agency responsibility for management and operation of railway service in Bangladesh. The financial performance of the BR is shown in Table 9.6-3. Br's operating revenues for 2004-05 was 4.5 billion BDT while operating expenses was 7.0 billion BDT, resulting in an operating deficit of 2.5 billion BDT. Thirty-six percent of BR's total operating expenditure is supported by the Government subsidy.

Table 9.6-3 Financial Performance of BR (2004-05)

	Amount (Million BDT)
Operating Revenue	
Passenger Revenue	1,661.0
Freight Revenue	1,262.2
Other Coach Earning	101.3
Revenue Fiber + Land Lease	1,431.7
Total Operating Revenue	4,456.2
Operaing Expenses	
Genral Administration	1,129.5
Repaire and Maintenance	2,461.1
Operational Staff	1,034.0
Operation Fuel	920.7
Operation other than Staff and Fuel	465.6
Miscellaneous Expense	940.0
Depriciation	-
Total Operating Expenditure	6,950.9
Deficit and Government Subsidies	
Operating Defisit	2,494.7
Working Ratio	156%
Public Service Obligatiion	860.0
Welfare Grant	133.2
Operating Defisit Subsidy for GOB	1,501.4
Total GOB Subsidy	2,494.6
Total Operating Revenue	4,456.2
Total Revenue (Operating and Subsidy)	6,950.9

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007, Sep. 2007,

Table 9.6-4 Annual Development Program Spending by Activities (BR)

Million BDT

	2002-03	2003-04	2004-05	2005-06	2006-07
New Construction	3,512.5	2,419.9	736.2	695.0	302.5
Upgrading	1,927.7	3,346.4	4,632.0	5,467.5	5,350.6
Rehabilitation	3,512.5	2,419.9	736.2	695.0	302.5
Total	8,952.7	8,186.2	6,104.4	6,857.5	5,955.6
Growth Rate (%)	0.914	0.746	1.123	0.868	-

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007, Sep. 2007,

(4) Rural Road

The road under the jurisdiction of LEGD play significant role to serve the rural roads. They are Upzila Roads, Union Roads and Village Roads.

Table 9.6-5 Annual Development Program Spending by Activities (LGED)

Million BDT

	2002-03	2003-04	2004-05	2005-06	2006-07
New Construction	11,213.0	16,015.0	18,121.7	18,849.4	18,935.5
Upgrading	0.0	0.0	0.0	0.0	0.0
Rehabilitaion	1,261.9	1,064.6	1,665.7	6,607.0	5,702.2
Total	12,474.9	17,079.6	19,787.4	25,456.4	24,637.7
Growth Rate (%)	1.369	1.159	1.286	0.968	-

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007, Sep. 2007,

Table 9.6-6 Revenue Expenditure by Activities (LED)

Million BDT

	2002-03	2003-04	2004-05	2005-06	2006-07
Maintenance	1,650.0	2,000.0	3,800.0	4,000.0	4,115.0
Salary	787.9	933.8	1,045.3	1,015.2	1,168.4
Miscellaneous	350.4	361.9	304.4	471.2	645.5
Total	2,788.3	3,295.7	5,149.7	5,486.4	5,928.9
Growth Rate (%)	1.182	1.563	1.065	1.081	-

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007 , Sep. 2007,

9.7 Financial Resources

(1) General Features

The financial resources for development expenditure consist of domestic resources and foreign assistance. As shown in Figure 9.7-1 , one half of development expenditure is the domestic assistance. Foreign assistance consists of project assistance resource come from Government Budget and the remaining

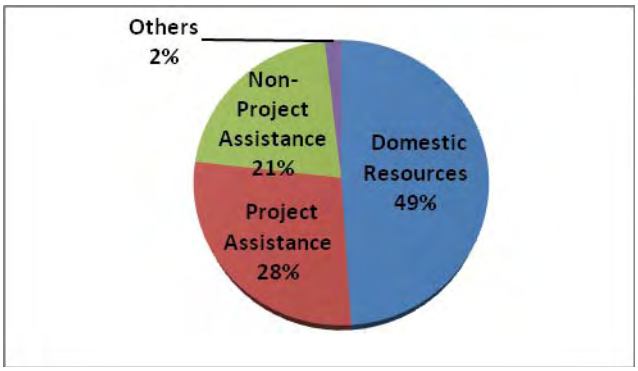


Figure 9.7-1 Share of Financial Resources (2007/08)

one half is foreign and non-project assistance. In the early 2000's, the project assistance is majority but recently non-project finance becomes bigger share.

Table 9.7-1 Historical Trend of Financing for Development Expenditures

Million BDT

	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	AAGR 2001-2007
Development Expenditure	140,902	154,343	168,173	187,260	194,720	179,280	185,060	4.65
Domestic Resources	63,930	73,580	95,900	152,110	182,030	174,390	167,100	17.37
Foreign Assiatance	87,940	82,410	110,840	115,410	115,320	111,980	174,120	12.06
Project Assistance	71,330	72,140	74,190	66,200	74,750	85,290	94,990	4.89
Non-Project Assiatance	11,240	8,760	33,180	45,570	36,170	22,730	72,800	36.53
Others	5,370	1,510	3,470	3,640	4,400	3,960	6,330	2.78
Total Resources	151,870	155,990	206,740	267,520	297,350	286,370	341,220	14.44
Balance	-10,968	-1,647	-38,567	-80,260	-102,630	-107,090	-156,160	

Source ; Statistical Yearbook of Bangladesh 2008

(2) Donor's Involvement in Transport Sector

Involvement of donors in transport sector can be seen in Table 9.7-2 . It lists the name s of agencies that provide project funds to different sub-sectors in the form of loan or grants.

The major donors are World Bank, ADB, DfID, JBIC (presently JICA) and KFAFD in highway sub-sector.

Table 9.7-2 Donor's Involvement in Transport Sector

Sub Sector	FY	ADP	Project Aid (Million BDT)			
			Loan	Donors	Grant	Donors
Roads and Highways	2003	23,609	10,433	Spain	485	ORET/ Netherland
	2004	24,629	9,643	KFAED, JBIC, ADB, WB, UK	1,312	DFID, DANIDA, JICA, Netherland, UK
	2005	23,613	6,391	KFAED, JBIC, ADB, WB, DFID, Swedish, CIDA	180	DFID, DANIDA, JICA, Netherland, UK
	2006	19,899	4,853	KFAED, JBIC, ADB, WB	731	DFID, DANIDA, JICA, Netherland, UK
	2007	22,454	3,030	KFAED, JBIC, ADB, WB, UK	3,577	JDCF/JBIC, JICA, Netherland DANIDA
Bangladesh Railways	2003	546	447	Korea, Netherland, ADB	-	
	2004	614	380	ADB , Netherland, Indea, Korea, China, France OPEC, Spain	-	
	2005	609	437	ADB , Netherland, Korea,	-	
	2006	666	487	ADB , Netherland, Indea, Korea, China, France OPEC, Spain	-	
	2007	652	605	ADB , Netherland, Indea, Korea, China, France OPEC, Spain	-	
Rural Roads	2003	17,222	839	IDB, IDA, JBIC, ADB, OPEC, etc.	658	SDC, DANADA, JICA, EEC, WFP, SIDA, GTZ, KFW, DFID, Japan, etc
	2004	21,333	1,005	IDB, IDA, JBIC, ADB, OPEC, etc.	252	SDC, DANADA, JICA, EEC, WFP, SIDA, GTZ, KFW, DFID, Japan, etc
	2005	25,654	1,086	IDB, IDA, JBIC, ADB, OPEC, etc.	235	SDC, DANADA, JICA, EEC, WFP, SIDA, GTZ, KFW, DFID, Japan, etc
	2006	25,654	2,748	IDB, IDA, JBIC, ADB, OPEC, etc.	235	SDC, DANADA, JICA, EEC, WFP, SIDA, GTZ, KFW, DFID, Japan, etc
	2007	29,158	4,491	IDB, IDA, JBIC, ADB, OPEC, etc.	193	SDC, DANADA, JICA, EEC, WFP, SIDA, GTZ, KFW, DFID, Japan, etc
IWT & Ports	2003	855	1	Spain	26	ORET/ Netherland
	2004	1,969	29	ADB	0	
	2005	1,860	1	ADB	0	
	2006	5,095	10	ADB	6	IDA/EMTAP
	2007	1,733	50	ADB	17	IDA/EMTAP

Source: Bangladesh Transport Sector Public Expenditure and Institutional Review 2007, Sep. 2007,

9.8 Private Sector Participation

The Government has adopted a policy to facilitate private investment to infrastructure and approved the Bangladesh Private Sector Infrastructure Guidelines in October 2004. The National Land Transport Policy (NLTP) also encourages Private Sector Participation (PSP) in infrastructure development in order to bring in finance, efficient operation technique and technological innovation.

Presently, it is identified some highway projects for possible private investments;

a) Dhaka – Chittagong Expressway Project
   Expressway project links Dhaka and Chittagong
b) Urban Expressway Project in Dhaka
   Urban expressway project runs north-south through Dhaka (ref. Fig. 15.7-1)
c) Flyover Project etc.

   Intersection improvement project in Dhaka (ref. Chapter 15 Section 15.6)

However the involvement of private sector to date has not been encouraged. This is because the Bangladesh Government has not shared its risks and financial status of the private sector is not strong enough to implement the projects.

The public private partnership in Bangladesh is further discussed in Appendix Chapter 15.

9.9 Identification of Issues

a) The Government has been financing most of the transport infrastructure development costs from its tax revenues. In recent years, share of development expenditure to GDP has been declining significantly. In order to promote economic development in the country especially in Dhaka, it is necessary to heighten share of development expenditure and to increase amounts of development expenditure.

b) During BFY 1997 – 2000 transport sector expenditure grew at 5.1 % a year in real term reaching around 5.2 % of GDP in BFY 2002. However, recent transport sector expenditure was stagnated due to government financial constraints. Taking into consideration future investment requirements and needs for transport infrastructure development in Dhaka, it is necessary to increase transport sector expenditure.

c) Despite Government's keen interest to attract private sector involvement in transport infrastructure, and adoption of private sector infrastructure guidelines in 2004. Government needs to consider more practical approach to attract private sector finances infrastructure projects such as measures as financial risk reductions, etc, particularly in roads and highways as well as urban transport.

CHAPTER 10: REVIEW OF PREVIOUS AND ON-GOING TRANSPORT PLANS

10.1 Introduction

The previous plans, relevant current plan and their success and failures were reviewed. These plans include Greater Dhaka Metropolitan Area Integrated Transport Study (DITS) of 1994, Dhaka Urban Transport Project (DUTP), Strategic Transport Plan (STP) of 2006, etc.

The DUTP included five (5) studies and projects, namely physical improvement projects in urban infrastructure, STP as long term transport strategic plan, and two (2) feasibility studies for Dhaka Eastern Bypass Project and Jatrabari Flyover Project. However, since these feasibility studies have been made, actual both projects have not implemented yet.

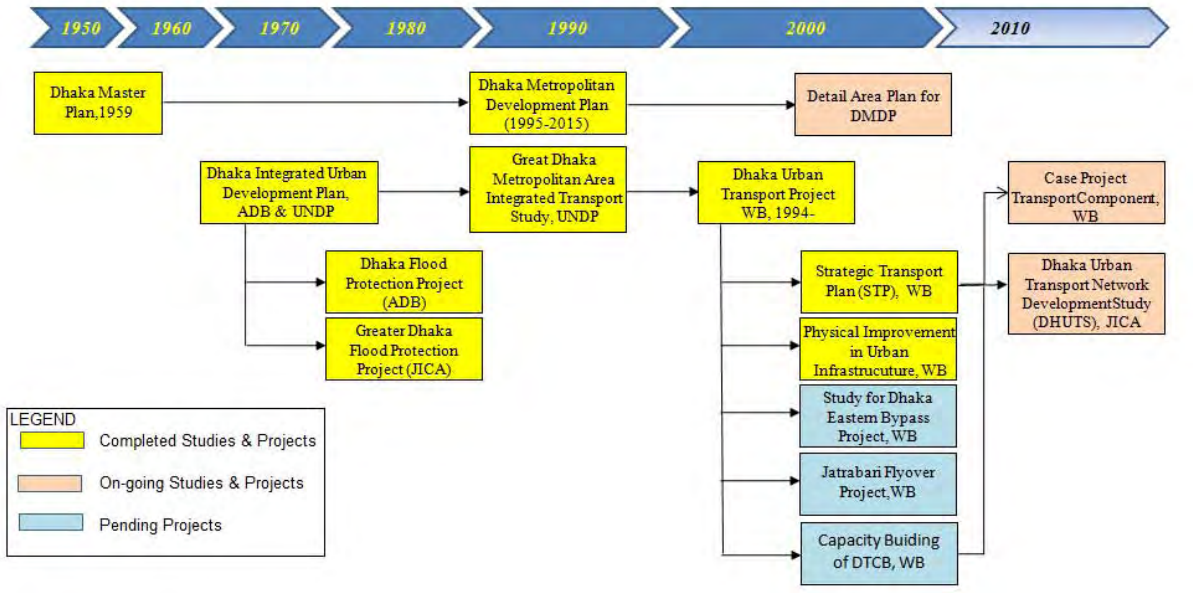


Figure 10.1-1 Historical Trend of Transport Study and Projects

In this Chapter, it is mainly described outline of transport development plans and projects. Regarding to the urban development, it is reviewed and discussed in Chapter 11.

10.2 Review of Transport Development Plans and Projects

10.2.1 Greater Dhaka Metropolitan Area Integrated Transport Study (DITS)

(1) General

The Greater Dhaka Metropolitan Area Integrated Transportation Study (DITS) was prepared in 1994 by an initiation of the Government of Bangladesh (GOP) with the assistance from UNDP.

The executing agencies are the Planning Commission of the Government and the Department of Support and Management Services (DSMS) of the United Nations.

The main aims of the DITS are to:

a) Collect information about the demand for transport services and the infrastructure to deliver these services in Greater Dhaka;
b) Prepare an immediate action plan for the effective management of the existing traffic and transport system; and
c) Prepare a sound basis for the development of policies and the strategic planning of longer term transport infrastructure investments in the Greater Dhaka Metropolitan Area.

(2) Immediate Action Plan (IAP)

Basic concept of the Immediate Action Plan (IAP) in the DITS is to make better, more effective use of the existing resources and avoid the need for capital intensive projects. Hence, the emphasis is on the management of the present system rather than identifying ways to expand the transport infrastructure. The management issues include:

a) Institutional strengthening
b) Road classification
c) Public transport services
d) Urban goods movement
e) Pedestrian and slow moving vehicles
f) Road user's education and safety
g) Enforcement and vehicle quality
h) Traffic management and engineering
i) Roadside management
j) Environment and Heritage

(3) Strategic Directions for Transport Development Strategy (TDS)

In the long term, there is a need to extend the existing transport infrastructure to meet the growing demands or services.

a) New road links, especially east-west link expands as a major and links to service new land development as Dhaka as a major city;
b) Relocation of the existing heavy rail line between Dhaka rail station and the international Airport and use the existing ROW to develop a bus way – possible electric trolley buses;
c) Development of waterways for water based transport of inter-urban person travel and goods movement;
d) Relocation of important generator/attractors of traffic such as major markets including an assessment of the suitability of the existing inter-city bus terminals;

e) Road/rail overpass/underpasses and grade separations at key intersections to form high capacity restricted access road corridor;
f) Low cost grade separations to reduce the conflicts between slow moving vehicles and motorized vehicles;
g) A ring road generally following the alignment of the flood protection embankment. Both the existing embankment of western and eastern edges; and
h) Urban rail within Greater Dhaka to connect the developing areas with the commercial zones in the city.

10.2.2 Dhaka Urban Transport Project (DUTP)

The Government of Bangladesh (GOB), with the assistance of the World Bank (WB) implemented Dhaka Urban Transport Project (DUTP) including major transportation improvement projects for Dhaka Metropolitan Area (DMA). The total estimated cost of the DUTP is USD 140 million, including USD 100 million for civil works. The development objectives of the DUTP are to:

a) Improve urban transport services in the Dhaka Metropolitan Area in an economically and environmentally sustainable manner;
b) Strengthen institutional and capacity building of the concerned organizations dealing with transport issues; and
c) Address long-term transport planning and coordination issues for the Greater Dhaka area.

Implementation of the DUTP is shared among different governmental organizations including Dhaka Transport Co-ordination Board (DTCB); Dhaka City Corporation (DCC); Rajdhani Unnayan Katripakkha (RAJUK); Bangladesh Road Transport Authority (BRTA); Dhaka Metropolitan Police (DMP); Roads and Highways Department (RHD) and Local Government Engineering Department (LGED). DTCB provides the overall coordination of the project preparation and implementation.

The DUTP includes a broad spectrum of projects, programs and actions organized into four project components: (1) Infrastructure Development; (2) Equipment Support; (3) Institutional Strengthening and Capacity Building; and (4) Policy Support and Future Studies.

The project of infrastructure development includes as follows:

a) Traffic Management Measures and System Improvements:
   Improvement of junctions throughout Dhaka with pavement reconstruction, better channelization, separation of motorized and non-motorized traffic (NMT), diversion of rickshaws at certain key junctions, protected right turn lanes, improved traffic control using modern traffic signal equipment or roundabouts, measures to reduce risks of pedestrians, increase traffic capacity and where appropriate implement special measures for buses to avoid traffic congestion.

b) Road Improvements:
Rehabilitation and improvement of the existing roads.

c) Bus Lanes and Lay-bys:
Provision of bus lanes along the selected bus routes that have been identified as a priority.

d) Rehabilitation of Existing Bus Terminals:
Rehabilitation of three existing inter-district bus terminals at Saidabad, Mohakhali and Gabtoli, including sidewalks, parking area reconstruction, covered sidewalks, toilets and passenger waiting arrangements.

e) Pedestrian Facilities Improvements:
Rehabilitation of the existing sidewalks, construction of about 40 km of new sidewalks along the existing major arterial roads, and construction of about ten pedestrian bridges.

f) NMT Network Improvements:
Improvement of the parking and traffic facilities for NMT on the secondary and local roads. Alternative routes provision on the secondary and local roads to reduce NMT on the main arteries. Provision of additional road links and three underpasses to facilitate a pilot NMT network. Separation of rickshaws from motor vehicles by suitable barriers in some routes.

g) Grade-separated Interchange Facilities:
Construction of two overpasses at Jatrabari and Mohakhali intersections.

h) Flood Damage Rehabilitation of Roads and Drainage:
Rehabilitation of about 200 km of existing roads and associated drainage damaged during the 1998 floods.

The location of these infrastructure development projects under the DUTP are shown in Figure 10.2-1.

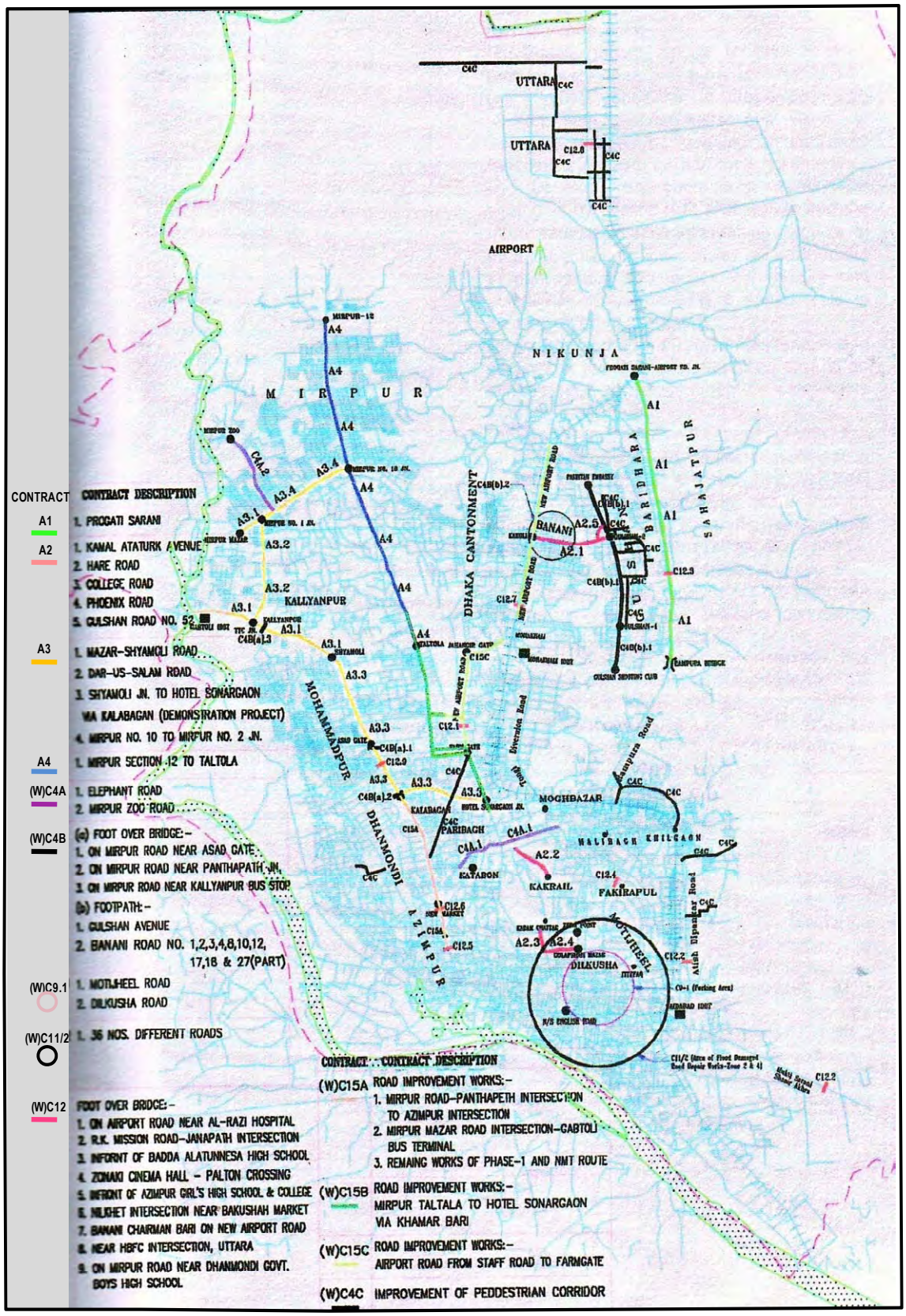


Figure 10.2-1 Project Location Map under DCC Contract

Source; DUTP, 1998, DCC

10.2.3 Strategic Transport Plan (STP)

(1) General

Strategic Transport Plan (STP) was prepared in 2004 by Dhaka Transport Coordination Board (DTCB) under the Ministry of Communication with assistance of the World Bank. A major objective of the STP was to establish a sound policy framework to ensure the sustainability of the current and future investments in transport sector. Critical to this objective is the preparation of a long-term (20 years) and a multi-modal transport plan for the greater Dhaka area, based on an assessment of the inter-relationship between land use and transportation.

(2) Outline of STP Study

The STP contains a description of the main activities leading to selection of the long term strategic plan for the greater Dhaka area. The following activities were undertaken:

a) Review and study of the previous relevant document;
b) Comprehensive survey of existing conditions in the areas related to strategic transport planning;
c) Creation of a computer simulation model to guide the analysis and to provide support to the evaluation of strategies and planning;
d) Forecasting of key parameters and the selection of a preferred scenario for land use development;
e) Development of transportation strategies to cater for the demand of the future and to assist in the encouragement of preferred land use development; and
f) Preparation of four 5-year programs over the next 20 years.

(3) Recommendations

Recommendation of the STP Study is as follows:

The STP recommended the strategy to create balance between public transport and individual transport to serve the future needs of Dhaka. It also offered the optimum flexibility in mass rapid transit bearing in mind full knowledge of the context of reasonably expected financial resources.

(4) The Action Plan

The implementation program has been divided into four periods of 5 years each beginning in 2005 and ending in 2024.

a) Phase 1

The first phase of the development is scheduled for five years covering the period immediately after the STP is approved by the Government. This is a critical time since the momentum gained by undertaking the STP study should not be lost. It is essential to move

forward immediately if the long term plan is to be achieved in a meaningful way. For this reason, efforts should be concentrated on those projects which are in an advanced state of readiness and which will bring immediate benefits from their implementation. As a result, the emphasis has been placed on the maximization of the existing resources and improved management of current transport service. In short, the first phase will impose some order on the existing situation before major investment is made. The first phase therefore includes the following aspects:

i. Design and construction of 6 road projects primarily to create much needed east-west connections and join the city to the Dhaka By-pass. These 6 projects are i) Zia Colony to Mirpur, ii) Panthapath to Rampura, iii) Tejgaon Airport Tunnel, iv) Merul Badda to Golakandail, v) Tongi to Ghorashal and vi) Malibag to Janapath.

ii. Planning, design, financing and preparatory work on three expressways in readiness for implementation in Phase 1 and 2.

iii. Planning, design and construction of an extensive Traffic Management system to re-capture the lost capacity on major routes.

iv. Preliminary engineering on 12 road projects for inclusion in Phase 2.

v. A comprehensive survey and inventory of the existing bus operations.

vi. Implementation of Traffic Management measure on major routes to incorporate the first BRT lines.

vii. Production of Design Guidelines for the mass rapid transit systems including both BRT and Metro systems.

viii. Implementation of some 30 km of the BRT line. These lines are suggested as being line 1 from Uttara to Saidabad and line 2 Gabtoli to Saidabad.

b) Phase 2

The second 5 year phase includes the following aspects:

i. Design and construction of 12 road projects creating a major advance in the city's infrastructure.

ii. Completion of three major elevated expressway projects following agreements on PPP arrangements and financing.

iii. Preliminary engineering on 16 road projects scheduled for Phase 3A.

iv. Continued development of the BRT network and opening of the Line 3 being 16 km.

v. Final design and financing plans for the first Metro Line – No.5.

vi. Complete rationalization of the regular bus services to complement the mass rapid transit system.

c) Phase 3A

The third 5 year phase includes the following aspects:

i. Design and construction of 16 road projects aimed at opening up the eastern and western fringe areas.

ii. Preliminary engineering on 17 road projects scheduled for Phase 3B.

iii. Final design and financing plans for the second and third Metro Lines – No. 4 and 6.

iv. Completion of construction on Metro Line No. 5.

d) Phase 3B

The final phase includes the following aspects:

i. Design and construction of 17 road projects aimed at completion of the city highway network.

ii. Completion of construction on Metro Lines No. 4 and 6.

The implementing situation of the projects proposed by STP is presented in Appendix Chapter 10.2.

(5) Costs

The costs quoted for the roads are obtained from the agency, which is currently developing the schemes. The costs for the BRT have been estimated at $5 million per kilometer. The costs for metro construction have been estimated at $50 million per kilometer on elevated structure and $75 million per kilometer in underground. It is noted that there are no land and property acquisition costs included in any of the scheme estimates. In summary, therefore, the costs for the preferred strategy are estimated as shown in Table 10.2-1.

Table 10.2-1 Estimate Cost by Each Phase

Phase	From	To	Road Cost (US$m)	MRT Cost (US$m)	Total
1	2005	2009	226	188	
2	2010	2014	900	1,200	
3A	2015	2019	338	2,550	
3B	2020	2024	117	0	
Total			1,581	3,938	5,519

Source: STP

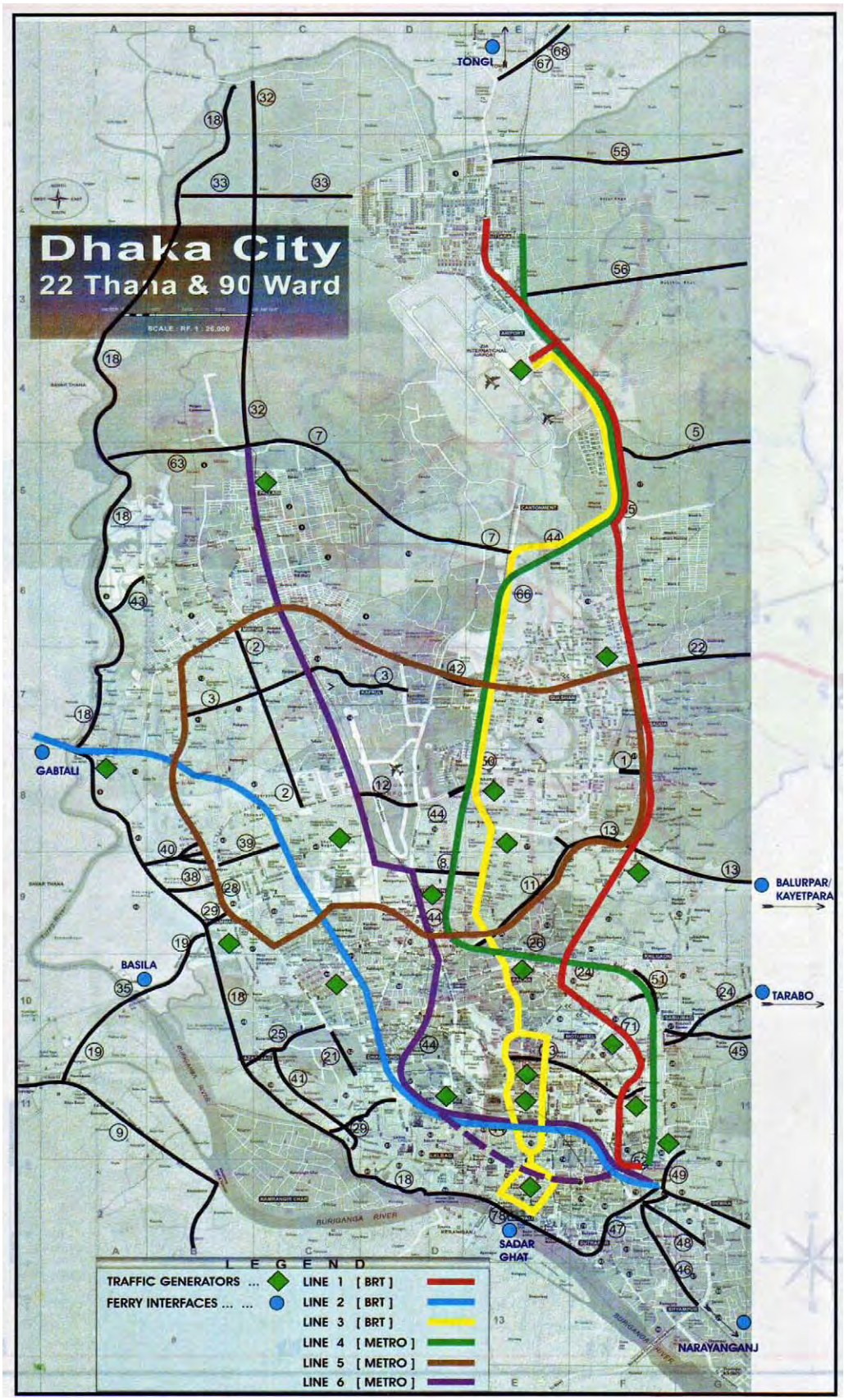


Figure 10.2-2 Selected Strategy for Mass Rapid Transit System

Source; STP, Dec. 2005, DTCB

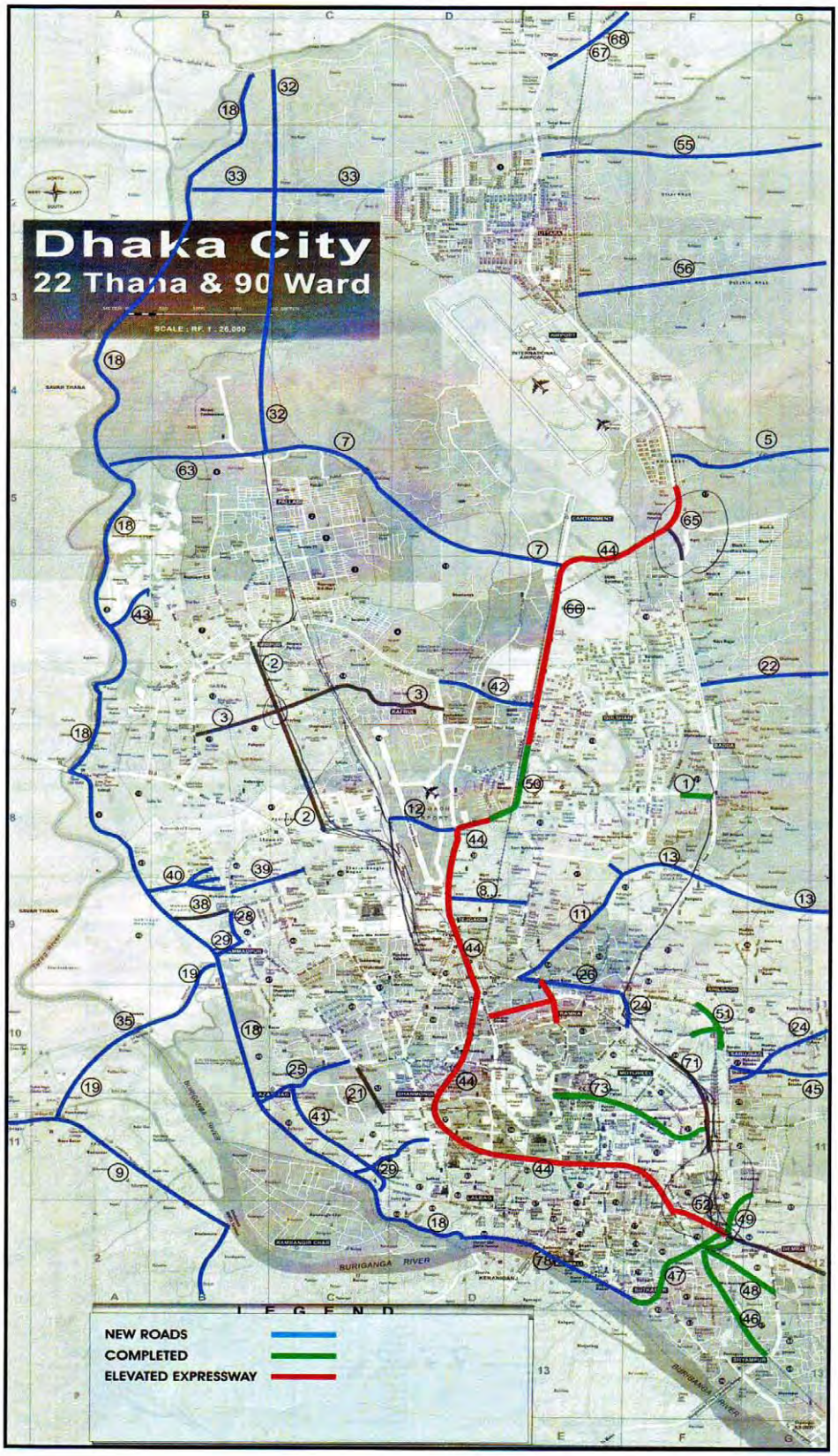


Figure 10.2-3 Roads Package under Selected Strategy B2

Source; STP, Dec. 2005, DTCB

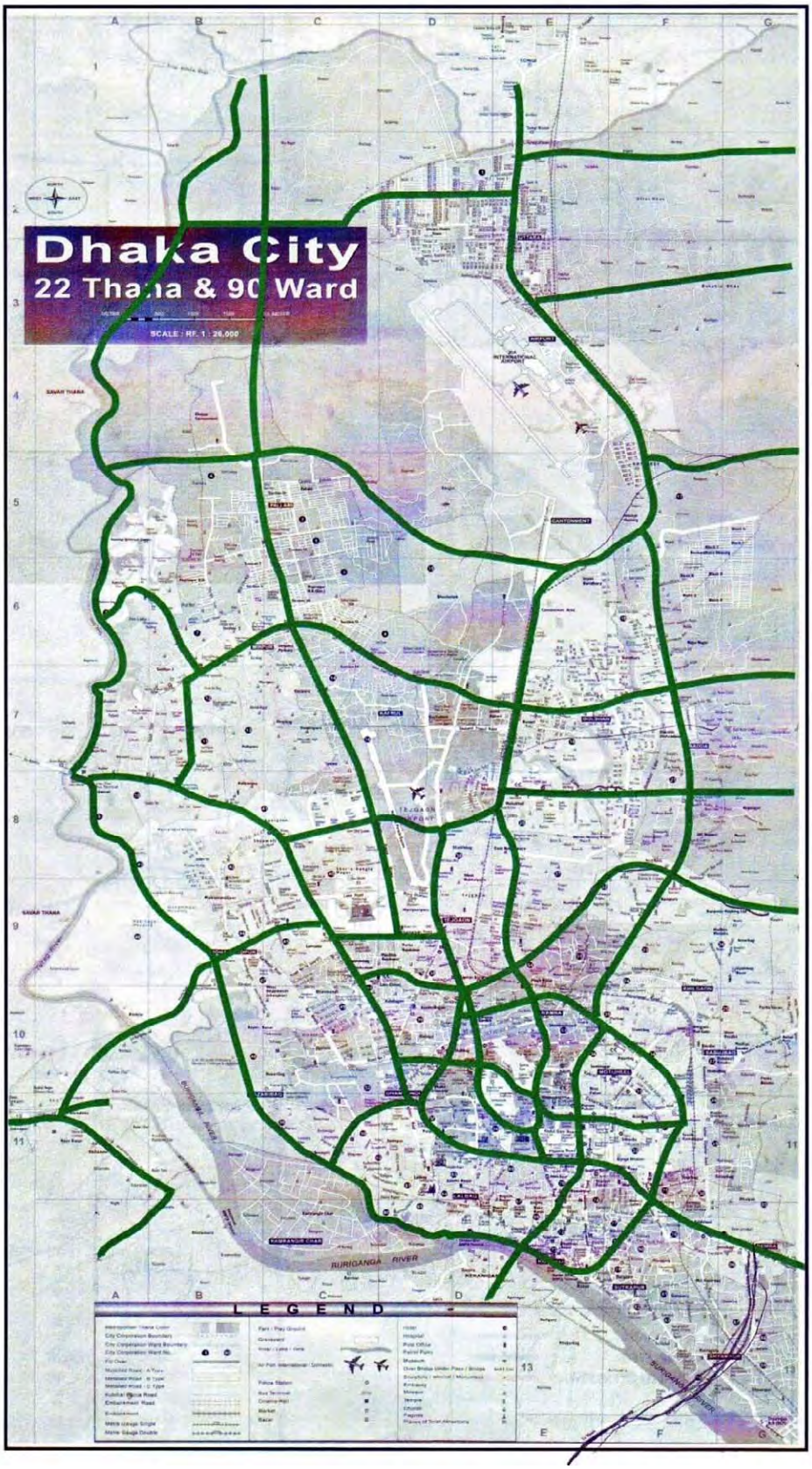


Figure 10.2-4 Road Network Plan in Inner Area

Source; STP, Dec. 2005, DTCB

10.2.4 Clean Air & Sustainable Environment (CASE) Project

(1) General

Clean Air & Sustainable Environment (CASE) Project started 2009 under administration of DTCB and DCC, with financial support of the World Bank. The objective of project development is to improve air quality and safe mobility in Dhaka city through the implementation of demonstration initiatives in urban transport and brick production.

The CASE project consists of two components: (1): Environment and (2): Transport. The environment component includes:

a) Sub-component 1A: Capacity building for air quality management
b) Sub-component 1B: Brick kilns emissions management
c) Sub-component 1C: Communication campaign and analytical studies
d) Sub-component 1C: Project management and coordination

The transport component includes:

a) Sub-component 2A: Transport measures to be taken by DCC
b) Sub-component 2B: Transport measures to be taken by DTCB

(2) Transport Sub-Components 2A: Physical Improvement of Traffic Flow and Pedestrian Mobility

The objectives of this sub-component are to:

a) Reduce congestion and improve traffic flow; and
b) Enhance pedestrian safety and mobility.

To achieve these objectives, the following measures will be taken:

a) Traffic safety campaigns;
b) New sidewalks with surface drainage, appropriate ancillary road improvements and removal of obstructions to safe walking;
c) Separation of motor vehicles (MVs) from non-motor vehicles (NMVs);
d) Defining new one-way streets;
e) Foot over bridges (FOBs);
f) Traffic signaling, improvement of intersection and related activities; and
g) Development for sustainable parking strategies and policies and their enforcement on the basis of parking study.

This sub-component will include investments in traffic engineering and management aimed at improved traffic flow and pedestrian movement, particularly where there is significant conflict between traffic flow and pedestrian movement. Investments will be made in foot over bridges (FOBS), traffic signals, one-way streets, separation of motorized and non-motorized traffic, and people-with disability (PWD) friendly sidewalks. Investment in sidewalks is expected to assist

in the reduction of re-suspension of particulate matter, a known problem in Dhaka, and one of the major contributors to local PM air pollution. This sub-component will also support the development of a parking strategy, capacity building efforts and institutional strengthening related to the investments. It must be noted that most of the interventions proposed in this sub-component have already proven to be instrumental in reducing GHG emissions from the urban transports. Various similar interventions have already been supported though GEF financing in a number of urban transport projects supported by the World Bank.

(3) Transport Sub-component 2B: Preparation of Bus Route Network Rationalization and Franchising

This sub-component 2B aims to lay the foundation for addressing these problems by encouraging the introduction of better quality bus operations. The latter could be made possible by offering exclusive access to bus routes/corridors to select the operating companies. Specifically, it will (i) assist with the rationalization of the bus route network in Dhaka and (ii) facilitate the introduction of bus rapid transit (the BRT) system on a pilot corridor in Dhaka.

The overall objective of this subcomponent is to encourage a modal shift from the existing transport modes to cleaner and safer transport modes in Greater Dhaka in the long term. This sub-component will finance the preparation of technical studies, namely: (i) a feasibility study for a bus rapid transit (BRT) system in Greater Dhaka; (ii) the BRT detailed design and (iii) a public transport network study for Greater Dhaka. It is envisaged that once the basic elements for bus route network rationalization and franchising (i.e. institutional strengthening, legal and regulatory reform, and stakeholder consensus building) are in place and detailed designs are available, the physical investments for implementation of franchised operations on a priority corridor, including the BRT on a pilot corridor, could commence as a follow-on project to be prepared on the fast track.

10.3 Relationship between DHUTS and STP

The JICA team has reviewed the STP study carefully from the physical planning view point. As the results of the review, the major findings can be pointed out in Table 10.3-1.

Table 10.3-1 Major Defenses between STP and DHUTS

		STP	DHUTS
Objective		Formulate compressive and long term urban transport policies and strategic plans for Dhaka Metropolitan Atria	Preparing effective measures and actions for implementation of urban transport projects; particular attention will be paid to mass transit development
Major Feature		Policy Planning	Integrated policy planning and physical planning
Contents of the Study			
	Traffic Study	Household interview survey of about 3,000 households, Cordonline Survey and Screenline Survey	Household interview survey of about 18,000 households, Cordonline Survey and Screenline Survey
	Traffic Demand Forecasting Model	Disaggregate model for EMME2	Aggregate model using JICA STRADA
	Traffic Demand Forecasting	In order to propose a policy application, traffic demand forecasting using disaggregate model was made. Trip generation and attraction, OD matrix, modal split and traffic assignment were not calculated or not clearly mentioned in the report	In order to formulate a physical plans of the transport infrastructures , traffic demand forecasting using aggregate model was made. Trip generation and attraction, OD matrix, modal split and traffic assignment are calculated.
	Policy Plan	Overall transport policies were proposed.	Based on the STP policy plan and existing government transport policy, practical transport policies are proposed.
	Urban Development	In urban development plan, land use concept plans are proposed.	Based on the STP land use concept plan ,deatiled area plan prepared by RAJUK and exsiting urbandevelopment trend, new land sue plan is proposed.
	Infrastructure Plan	There is no physical planning of the transport infrastructure projects.	Physical planning of the transport infrastructure projects is formulated..
	Implementation Plan	Overall implementation plan of transport infrastructure projects were were proposed from strategic points.	Implementation plan of transport infrastructure projects especially MRT Line 6 project is formulated.
	Organizational & Institutional Plan	Creation of Unitary Authority	Setting up organization and institution of DMTA (presently DTCB) and Proposal of MRT implemenatation organization

Source: JICA Study Team

a) As mentioned in the previous section of this chapter, the major objective of the STP was to establish a sound policy framework so the traffic surveys, made in the STP study, were designed towards formulation of the policy framework. Those are the household interview survey (HIS) and related surveys. The sample size of the HIS is only 3,000 and selected 17 wards in DCC to be applicable for disaggregate transport models. However, this sample size is too small and not high confident for formulation of the physical planning.

b) Regarding to the future traffic demand forecast, the STP was forecasted future transport demands using disaggregated transport demand models based on the above mentioned data. However, this model can be applicable for formulating policy framework and there is no aggregated forecast result either future OD traffic volume by purposes and modes or assigned traffic volume on transport networks.

Taking into considerations, the Scope of Work of the DHUTS Study was designed to be capable for formulation of comprehensive and long-term urban transport plans and projects for DMA particular attention will be paid to mass transit development (Figure 10.3-1) following the STP policy framework. DHUTS study can be located to be rather physical planning than

policy planning. So, both the studies are not contradictory, but integration is very important.

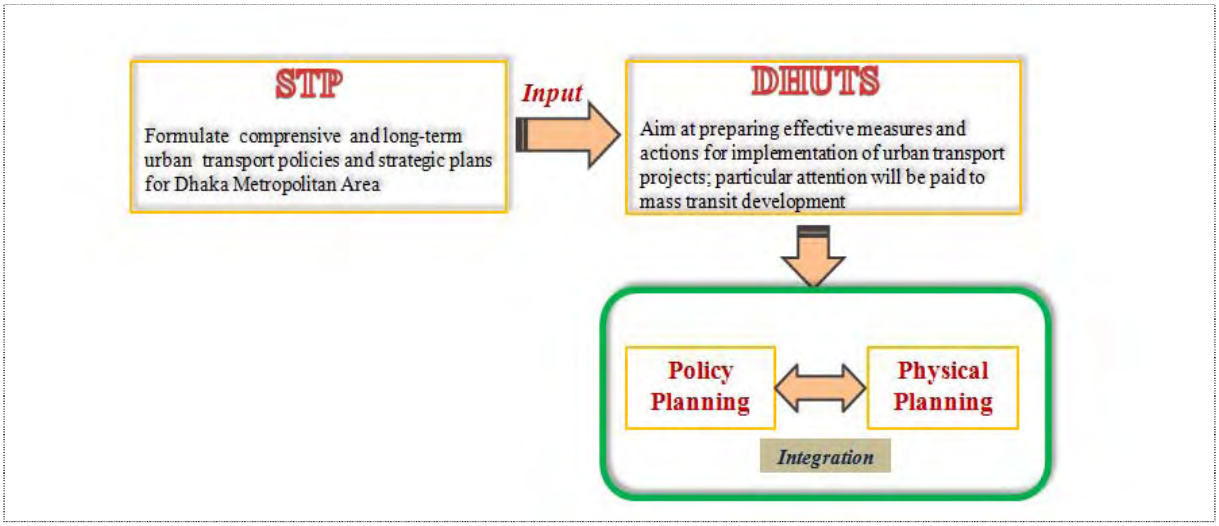


Figure 10.3-1 Relationship between DHUTS and STP