MAIN VOLUME

PART I : CURRENT CONDITION

CHAPTER 1:   INTRODUCTION

1.1   Background of the Study

Dhaka city is the capital of People's Republic of Bangladesh. Dhaka is located geographically in the center of the eastern sub-region of South Asia, including India (West Bengal, Meghalaya, Assam and Tripura provinces), Nepal, Bhutan and Myanmar. Among these countries and provinces, Nepal, Bhutan, and Meghalaya, Assam and Tripura provinces in India are located in inland and there is no direct accessibility to the ocean. Thus, seaports in Bangladesh, such as Chittagong and Mongla as well as proposed deep sea port of Cox's Bazaar have a great potential to be international gateway in the sub-region. The Dhaka Metropolitan Area (DMA) has a population of 10.7 million (7.5% of the total population of the country in 2006). Currently the urban transportation in DMA mostly relies on road transport, where car, bus, auto-rickshaw, rickshaw, etc. are coexistent. This creates serious traffic congestion in addition to health hazard caused by the traffic pollution including air pollution.   With the national economic growth the urban population will also increase, and at the same time the number of privately owned automobiles will also increase significantly. So, the improvement of urban public transportation system for DMA has become a pressing issue to improve its traffic situation and urban environment.

Considering this situation the government of Bangladesh formulated a 'Strategic Transportation Plan' (STP) in cooperation with the World Bank in 2005. The implementing agency was Dhaka Transport Corporation Board (DTCB) under the Ministry of Communication. The STP prepared 'Urban Transportation Policy' for 20 years (2004–2024), and identified priority issues such as improvement of mass transit system (buses and rail transportations), development of urban expressway and establishment of organization in implementation and maintenance/operation of the projects.

Since the STP has already received the official approval of the government of Bangladesh, it is expected that each donor will hereafter provide the assistance based on this STP for the improvement of the situation of urban transportation.

The JICA Study Team will conduct the study with DTCB as our counterpart (C/P) agency with the aims of formulating the basic concept of urban development for DMA in 2025 as well as formulating the projects for the JICA assistance program required in the medium- to long-term.

1.2 Objectives of the Study

The objectives of the study are as follows;

a) To formulate the Urban Transport Network Development Plan integrated with urban development plan of DMA for the period up to 2025.

b) Based on this plan, to draw general outline of the urban transport projects to be implemented on priority basis.

c) To clarifying the roles of the project implementation agency and the operation/maintenance/management agency, and to propose the development of their implementation capability.

d) To draw an outline of the feasibility study plan for construction of the urban transport system.

1.3 Study Area

The study area is a Dhaka Metropolitan Area (DMA) within the area surrounded by Turag River, Balu River and Buriganga River, which is located on the east side of Dhaka District and encompasses Dhaka city, northern side and east district of outer edges of Dhaka city. It may include in the adjacent administrative areas relevant to the aforementioned area, if necessary for the study (Refer to the Location Map).

1.4 Work Schedule of the Study

The entire work period of the study is thirteen (13) months, beginning with the domestic preparatory work in March 2009 and terminating with submission of the final report in March 2010. The follow up study for prioritized project selected in the Phase 1 study is expected to start from May 2010.

Table 1.4-1   Study Schedule

1.5 Study Approach

The Study has been conducting to propose the transport infrastructure development plans which are likely to be realized on the basis of in-depth analysis on the present issues and proposals of development.   The general flow of the study is shown in Figure 1.5-1.
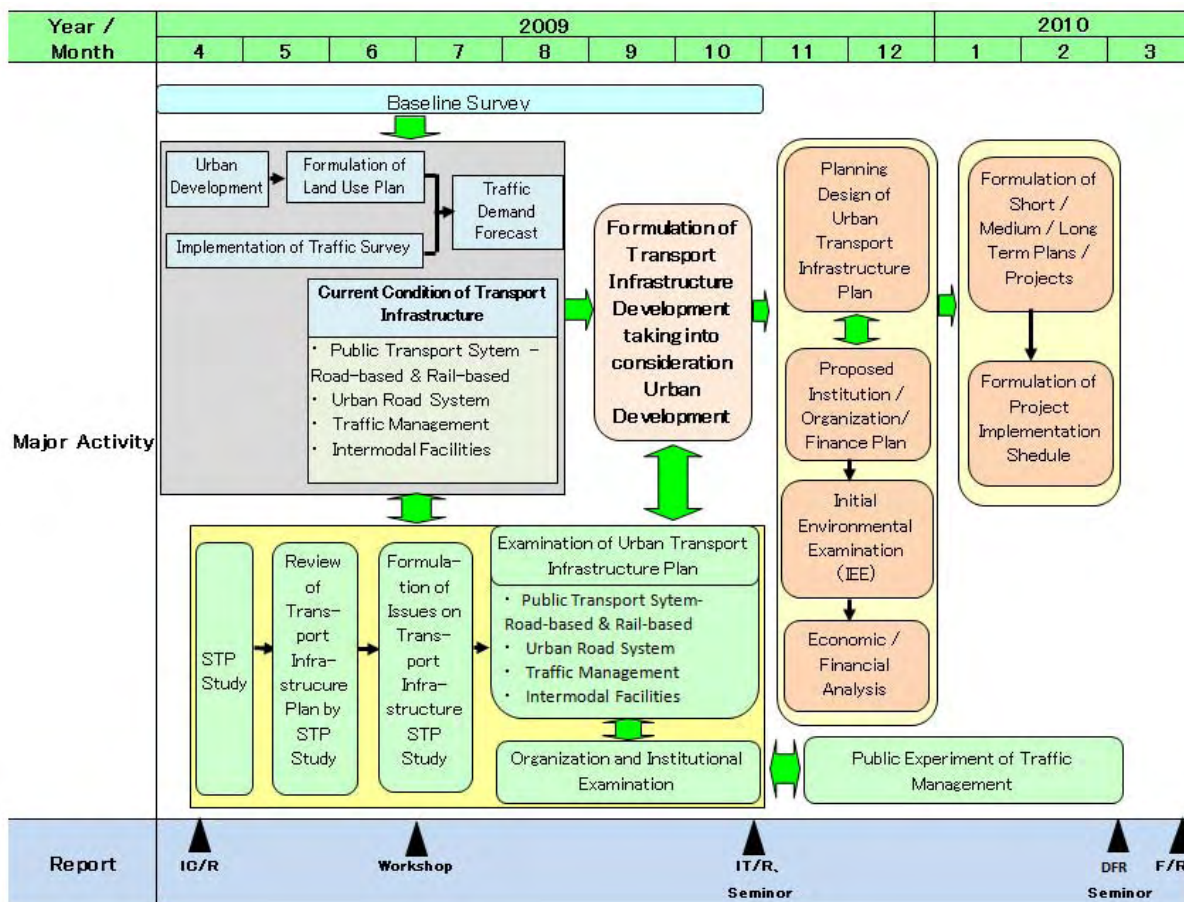
Figure 1.5-1 Flow Chart of JICA Study Team

1.6 Organization of the Study
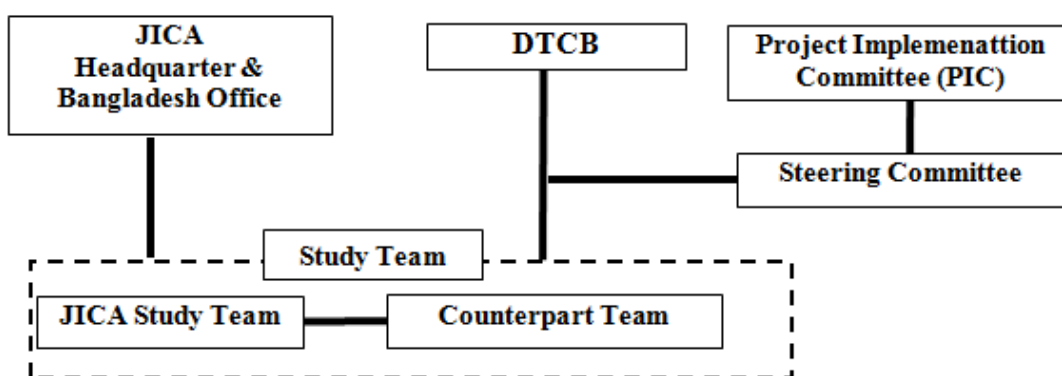
The study is organized as shown below:

Figure 1.6-1 Organization Chart for the Study

1.7 Study Implementation

Discussion with counterparts, coordination and involvement of the Bangladesh side were significant during the course of the study. Table 1.7-1 and Table 1.7-2 show the lists of

conducted meetings and workshops/seminars.

(1)   Steering Committee

Table 1.7-1   List of Meetings

Title	Date	Venue	Number of Participants	Contents
Steering Committee Meeting				
1st S/C	20 April 2009	MOC Conference Room	22	・ Discussion of Inception Report
2nd S/C	4 November 2009	Sheraton Hotel	15	・ Discussion of Interim Report
3rd S/C	4 March 2010	MOC Conference Room	23	・ Discussion of Draft Final Report
Traffic Management Committee (TMC) / CP Meeting, etc.				
C/P Meeting	6 June 2009	DTCB Conference Room	7	・ Traffic survey and its analysis
C/P Meeting	18 June 2009	DTCB Conference Room	25	・ Mogh Bazar flyover project
Ministerial Meeting	2 September 2009	MOC Conference Room	21	・ Report to minister regarding to Mogh Bazar Flyover project
C/P Meeting	28 October 2009	DTCB Conference Room	10	・ Mass Rapid Transit System Development
TMC	27 December 2010	DTCB Conference Room	24	・ Public experiment on traffic management
TMC	26 January 2010	DTCB Conference Room	10	・ Public experiment on traffic management
Public Consultation Meeting	1 February 2010	BRAC Center Auditorium	87	・ Public consultation on Initial Environmental Examination (IEE)
TMC	14 February 2010	DTCB Conference Room	18	・ Public experiment on traffic management

(2)   Seminars and Workshops

Table 1.7-2   Seminar and Workshop Schedule

Title	Date	Venue	Number of Participants	Major Agenda
Seminars				
1st Seminar	11 March 2009	Pan Pacific Sonargaon Hotel	60	・ Future Direction of Dhaka Urban Transport
2nd Seminar	3 November 2009	Pan Pacific Sonargaon Hotel	78	・ Regional development plan ・ Report of Interim Report
3rd Seminar	7 March 2010	Pan Pacific Sonargaon Hotel	82	・ Report of Draft Final Report ・ MRT Development, etc
Workshop				
1st Workshop	5 July 2009	Pan Pacific Sonargaon Hotel	68	・ Urban Transport Policy, etc ・ Progress of JICA STUDY TEAM Study
2nd Workshop	22 Oct 2009	Pan Pacific Sonargaon Hotel	73	・ Transport development in Dhaka and Panel discussion

1.8   Reports

The following reports were prepared n the course of the Study:

- Inception Report   (April 2009)
- Interim Report   (October 2009)
- Draft Final Report   (March 2010)
- Final Report   (March 2010)

The Final Report is composed of the following:

- Main Volume
- Appendix Volume

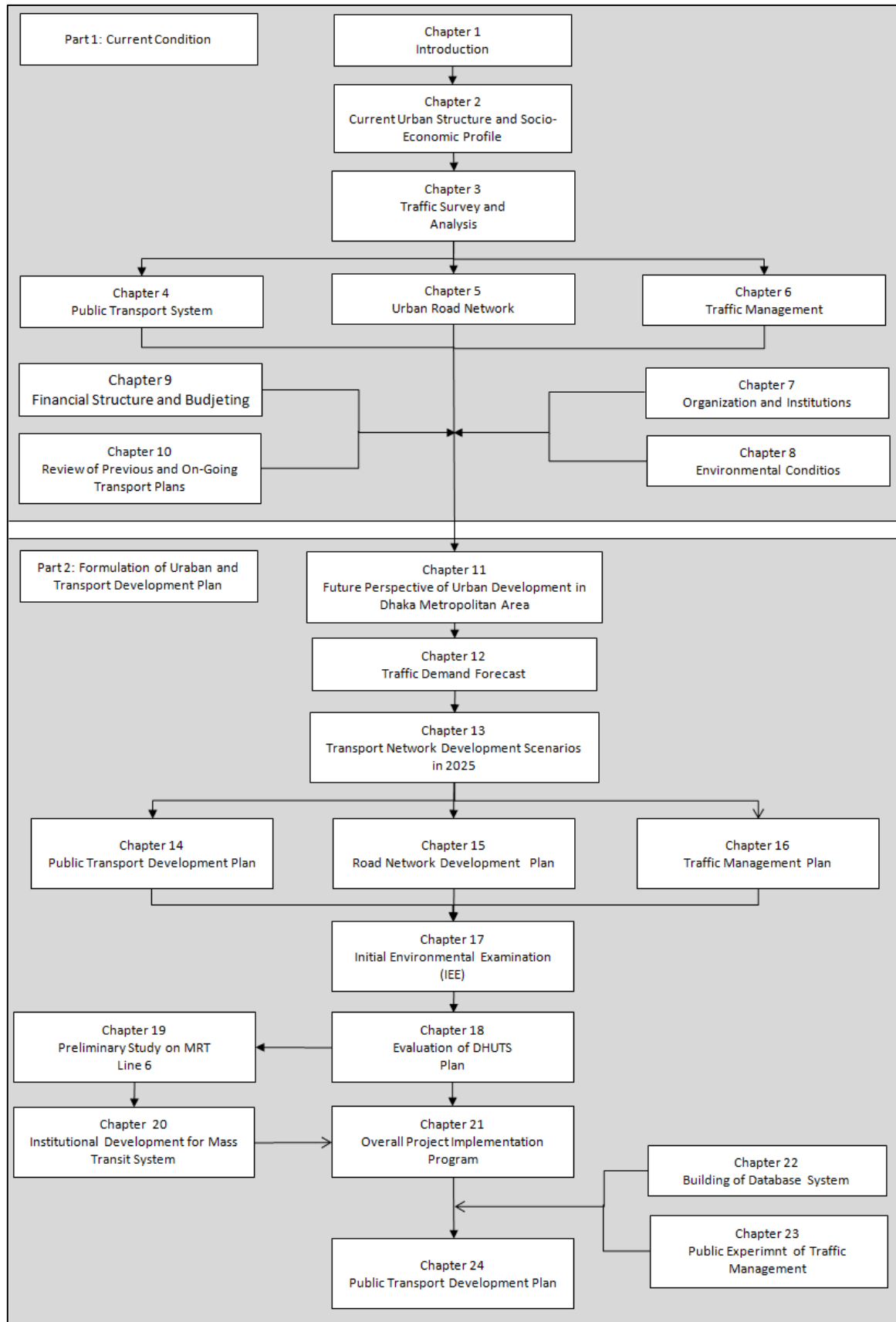The structure of the main volume is shown in Figure 1.8-1.

Figure 1.8-1   Structure of the Report

CHAPTER 2:   CURRENT URBAN STRUCTURE AND SOCIO-ECONOMIC PROFILE

2.1   The Study Area

2.1.1   Administrative Structure in Bangladesh

Bangladesh has the total population of 124.35 million persons in 2001 with the land area of 147,776 square kilometer[1]. The country is administratively divided into 6 divisions: Barisal, Chittagong, Dhaka, Khulna, Rajshahi and Sylhet. Table 2.1-1 shows the number of population and households in 2001 by division.

Administratively, each division is headed by a Commissioner. Division is further divided into districts called Zila in Bangali; there are 64 districts in the country and each district is administered by Deputy Commissioner. The districts are further divided into smaller administrative unit called Upazila headed by Upazila Nirbahi (Executive in English) officer. Currently, there are 481 Upazilas[2] in the country. These systems are central government administrative system and commissioner, deputy commissioner and Upazila Nirbahi officer are appointed by the Ministry of Establishment. Along with the central government administration, there are police jurisdiction units called Thana. There are 599 Thanas[3] in the country, as of December 2007. In urban areas, Thana is commonly used as a name of administrative unit.

Besides, there are local government administration systems; they are City Corporation, Municipality or called Pourashava, Ward and Union. As a place of Division Headquarter, there are six (6) City Corporations; one of them is Dhaka City Corporation (DCC) which has the largest population among the 6 City Corporations. The City Corporations are mandated to provide urban services to the residents living in their jurisdictions4. Mayor is administrative head of City Corporation and elected by the people in the jurisdiction. As urban status, there are 308 municipalities in the country. In the municipality, Municipality Chairman is administrative head and elected by the people in the jurisdiction. For local administrative purpose, the areas of City Corporation and Municipality are subdivided into wards, headed by Ward Commissioners.

These central and local administrations are complicated dual systems. For example, some Thanas with large population have been periodically subdivided into several Thanas. In the case of DCC, there were 12 Thanas in 1981, which increased to 14 Thanas in 1991and to 21 Thanas

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[1] *Statistical Pocket Book of Bangladesh 2008, Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning.*
[2] *Ditto*
[3] *Ditto*
[4] *Dhaka City Corporation Ordinance, 1983.*

in 2001. Administrative boundaries of Thana are also complicated and not coherent with the boundaries of local administrative units. More significantly, administrative limits of Dhaka City Corporation have expanded every year due to new housing development and urban expansion.

Table 2.1-1   Administrative Area and Population by Division, 2001

Division	Area (sq. km.)	Population in 2001(1,000)	Household in 2001 (1,000)
Barisal	13,644	8,174	1,648
Chittagong	33,771	24,290	4,472
Dhaka	30,985	39,044	8,236
Khulna	22,285	14,705	3,119
Rajshahi	34,495	30,202	6,627
Sylhet	12,596	7,940	1,388
Total	147,776	124,355	25,490

Source: BBS, Statistical Pocket Book of Bangladesh 2008

2.1.2   Definition of Dhaka Metropolitan Area (DMA)

As seen in the previous section, Dhaka is a common name of Division, District and City Corporation. Then, a question arises regarding definition of Dhaka Metropolitan Area (DMA). First, we need to clarify Dhaka Metropolitan Area as the study area for Dhaka Urban Transport Network Development Study (DHUTS). According to the Terms of Reference of the DHUTS, Dhaka Metropolitan Area (DMA) is described as "the area surrounded by Turang River, Balu River and Buriganga River, which is located on the east side of Dhaka District with DCC and its immediate environs."[5] This definition of DMA, however, differs from other usage, particularly Bangladesh Bureau of Statistics (BBS) and RAJUK[6] under Ministry of Housing and Public work.

There are at least three definitions of DMA. One is physical and administrative definition, i.e., DCC and its direct adjacent areas surrounded by Balu, Turag and Buriganga rivers within Dhaka District. Second, Bangladesh Bureau of Statistics (BBS) provides a definition of Statistical Metropolitan Area (SMA), which includes 27 Thanas/Upazilas in Dhaka, Narayanganj and Gazipur Districts. Third, from planning perspective, the RAJUK administrative area covers wider area including 30 Thanas/Upazilas in Dhaka, Narayanganj and Gazipur Districts. In other planning studies, such as Strategic Transport Planning (STP), Dhaka Metropolitan Area is essentially same area defined by RAJUK. Accordingly, the study area of the DHUTS covers the geographical area similar to the metropolitan area defined by the RAJUK, which includes 24 Thanas/Upalizas in Dhaka District, and 4 Upazilas in Narayanganj District and 2 Upazilas in Gazipur District. In order to avoid confusions, we define DMA as the area of DCC and its direct adjacent areas within Dhaka District and we call RAJUK

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[5] *Dhaka Urban Transport Network Development Study, Inception Report, April 2009, p.2*
[6] *RAJUK is the agency under Ministry of Housing and Public Work to be responsible for planning and development for Dhaka Metropolitan Area.*

administrative area as "Greater Dhaka Area" (GDA). These boundaries of DMA and RAJUK administrative area are illustrated in Figure 2.1-1.

Figure 2.1-1   Administrative Boundary of the Study Area

Source: JICA Study Team

2.2 Present Population

2.2.1 Population Trends in Bangladesh

Population Census has been carried out in Bangladesh since 1872 and the latest Population Census was carried out in 2001. Figure 2.2-1 shows the population growth in Bangladesh since the beginning of the twenty century. After the World War II, the significant population growth can be seen in the 1950s, 1960's, 1970s and 1980s. During these decades, the average annual growth rates in the country were more than 2%. The population growth rate dropped to 0.5% in 1951 may be attributed to the independence from United Kingdom, many Hindu people migrated to India. Then the population growth rate has been decreased to 1.59% p.a. during the period from 1991 to 2001. The recent population Census shows that the total population of Bangladesh was 130.5 million in 2001 and estimated to be 144.5 million in 2008.
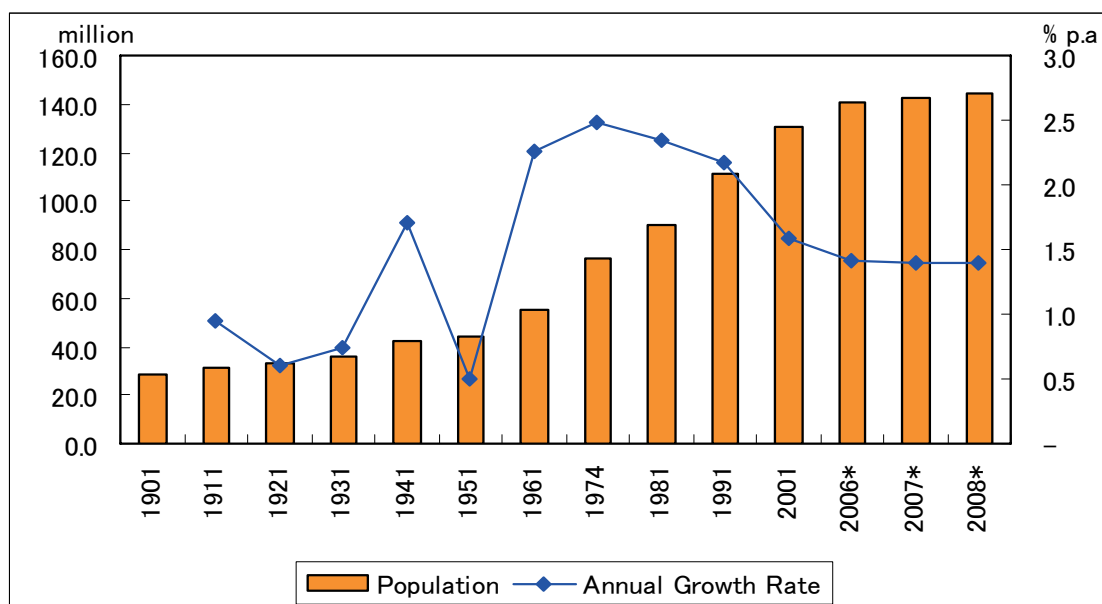
Figure 2.2-1   Population of Bangladesh from the beginning of 20th Century

*: estimated by SVRS, others are from the Census
Source: Population Census 2001 Analytical Report and statistical Pocket Book Bangladesh 2008

The urban population has been growing rapidly in recent years. It increased from 22.5 million persons in 1991 to 31.0 million in 2001 and to 36.7 million in 2008 (Table 2.2-1). The average annual growth rates of urban population were 3.26% from 1991 to 2001 and 2.44% from 2001 to 2008, while the rural population grew with 1.12% and 1.15% during the same period. Percentage share of urban population in the country increased from 19.6% in 1991 and 23.5% in 2001 and reached 25% in 2008. The rapid growth of urban population was a result from large population migration from rural to urban areas.

Table 2.2-1   Urban and Rural Population in 1991, 2001 and 2008[7]

	Population (million)			Annual Growth Rate (%)	
	1991	2001	2008 (estimation)	1991-2001	2001-2008
Urban Population	22.5	31.0	36.7	3.26%	2.44%
Rural Population	89.0	99.5	107.8	1.12%	1.15%
Total Population	111.5	130.5	144.5	1.59%	1.47%

Source: Population Census 2001 Analytical Report, 2007 & Statistical Pocket Book Bangladesh 2008, BBS

2.2.2   Population Growth in Dhaka Metropolitan Area

Dhaka Metropolitan Area (DMA), is located on the east side of Dhaka District with DCC. Population of DMA, is nearly 10 million and its growth of population is much higher than annual growth rate of the country. In other words, quite a number of people have been shifted to DMA from rural area in Bangladesh in addition to natural population increase (national birth rate). This has been happened, because Dhaka is the capital and center of the country in terms of politics, commerce and industry. Due to very serious congestion occurred in DCC area, population will be increased in RAJUK Area in future.

Dhaka Division had a population of 39 million in 2001, which occupied about 30% of the total population in the country. Dhaka Division consists of 17 districts, 141 Upazilas/Thanas, 1 City Corporation, i.e., DCC and 64 Municipalities. Among the 17 Districts in Dhaka Division, Dhaka District had the largest population of 8.5 million in 2001, which occupied 22% of the population in the Division (Table 2.2-2).

In terms of population density by district, Dhaka District shows the highest density with 5,829 persons per sq. km, followed by Narayanganj District with 3,160 persons per sq. km, and Narsingdi District with 1,662 persons per sq. km. These districts are located in the eastern part of Dhaka Division and adjacent to the DCC.[8]

Bangladesh Bureau of Statistic (BBS) designates a Statistical Metropolitan Area (SMA), which is defined as a distinguishing urban area[9] with the population of 500,000-4,999,999. Among the 4 SMAs in Bangladesh, including Dhaka, Chittagong, Khulna and Rajshahi SMAs, Dhaka SMA had the largest population of 9.67 million in 2001 and 12.8 million in 2008, which occupied 73% of the total SMA population in 2008. Dhaka SMA is the fast growing area in population with more than 4.0% per annum from 1981 to 2008.

When we look at the population distribution in Dhaka SMA, DCC had a population of 5.3 million in 2001, which occupied 55% of the SMA population. There are 5 municipalities

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[7] *Urban/rural: Basically classification of urban and rural in the report is to follow the classification adopted in the Bangladesh Bureau of Statistics.*

[8] *People flowing into Dhaka for job opportunities intensify the increase of population in Dhaka.*

[9] (*RAJUK Administration area)*

outside DCC, which had a total population of 0.9 million (9%) and another 3.4 million people lived outside of DCC and municipalities. Among the municipalities, Tongi had the largest population of 283,000 persons in 2001, followed by Narayanganj with 241,000 persons (Table 2.2-3).

Table 2.2-2   Area and Population by District in Dhaka Division

	District	Area (sq. km.)	Population in 2001 (1,000)	Population Density in 2001 (persons/sq.km)	Household in 2001 (1,000)
1	Dhaka	1,460	8,511	5,829	1,797
2	Faridpur	2,073	1,756	847	349
3	Gazipur	1,741	2,032	1,167	448
4	Gopalganj	1,490	1,166	782	222
5	Jamalpur	2,032	2,107	1,037	481
6	Kishoreganj	2,731	2,595	950	535
7	Madaripur	1,145	1,146	1,001	232
8	Manikganj	1,383	1,285	929	277
9	Munshiganj	955	1,294	1,355	251
10	Mymensingh	4,363	4,490	1,029	965
11	Narayanganj	688	2,174	3,160	453
12	Narsingdi	1,141	1,896	1,662	385
13	Netrokona	2,744	1,988	725	410
14	Rajbani	1,119	951	850	192
15	Shariatpur	1,181	1,083	917	214
16	Sherpur	1,364	1,279	938	302
17	Tangali	3,375	3,291	975	723
	Total Dhaka Division	30,985	39,044	1,260	8,236

Source: BBS, Population Census 2001 Analytical Report, 2007
Note: 6 Districts, including Dhaka, Gazipur, Manikganj, Munshiganj, Narayanganj and Narsingdi, are the area for the study of STP.

Table 2.2-3   Population of Dhaka SMA in 2001

	Population	Share (%)
DCC	5,333,571	55%
Municipalities	903,394	9%
- Narayanganj	241,393	-
- Kadamrasul	128,561	-
- Savar	127,540	-
- Tongi	283,099	-
- Gazipur	122,801	-
Outside of Municipalities	3,435,798	36%
Total	9,672,763	100%

Source: BBS, Statistical Pocket Book Bangladesh 2008

Administratively, the study area of DHUTS includes 27 Thanas/Upazilas in Dhaka SMA and 3 additional *Upazilas* (Kaliganj, Rupganj and Sonargaon) which are included in RAJUK

administration area. The DHUTS estimated the population of 2009 by Thana and Upazila （Table 2.2-4). The total population in the study area (including RAJUK administration area) is 14,513,650 persons in 2009. The DMA (DCC and its direct adjacent area) has 9,151,455 in 2009, which occupies 63% of the total population of the study area.

Table 2.2-4   Population by Thana/ Upazila in the Study Area in 2001 and 2009

	Area (sq.km)	Census Population in 2001	Estimated Population in 2009	Population Density in 2009 (per sq.km)
Badda thana**	49.85	359,256	502,162	10,073
Bimanbandar thana**	4.47	5,079	6,080	1,360
Cantonment thana*	10.44	117,464	177,217	16,975
Demra thana**	39.66	427,972	645,678	16,280
Dhanmondi thana*	6.23	252,519	326,779	52,452
Gulshan thana*	10.29	190,590	301,470	29,297
Hazaribagh thana*	5.89	127,370	207,260	35,188
Kafrul thana*	8.85	289,986	471,872	53,319
Kamrangirchar thana	3.68	143,208	201,925	54,871
Khilgaon thana*	7.57	336,895	435,968	57,592
Keraniganj upazila	166.87	603,114	780,476	4,677
Kotwali thana*	1.93	253,558	291,880	151,233
Lalbagh thana*	4.08	346,204	414,464	101,584
Mirpur thana*	14.22	551,167	777,153	54,652
Mohammadpur thana*	12.14	456,058	643,048	52,969
Motijheel thana*	4.95	269,628	348,919	70,489
Pallabi thana*	17.96	431,257	701,752	39,073
Ramna thana*	7.71	257,288	362,780	47,053
Sabujbagh thana**	11.65	291,207	473,859	40,675
Savar upazila	280.12	587,041	759,676	2,712
Shyampur thana**	10.17	376,545	530,934	52,206
Sutrapur thana*	3.99	352,420	421,905	105,741
Tejgaon thana*	8.89	302,109	425,978	47,917
Uttra thana**	58.3	345,097	482,371	8,274
Bandar upazila	55.84	250,220	323,804	5,799
Narayanganj Sadar Upazila	100.75	882,971	1,234,203	12,250
Gazupur Sadar Upazila	446.38	866,540	1,089,148	2,440
Kaliganj Upazila	158.79	239,527	286,754	1,806
Rupganj Upazila	176.16	403,629	522,327	2,965
Sonargaon Upazila	171.66	305,562	365,808	2,131
Total	1,859.49	10,621,481	14,513,650	7,805

*Note: * full of Thana belongs to DCC,   ** part of Th*ana belong to DCC
Source: BBS, Population Census 2001and JICA Study Team

2.2.3   Literacy and Education

The literacy rate in Bangladesh is still very low. Only 52% of the people over 7 years of age

were literates in 2005, but it has been improved in recent years. In Bangladesh education is categorized in the following three levels: (1) Primary level: age group 5-9 years, (2) Secondary level: age group 10-14 years, and (3) Up to Graduation level: age group 15 -24 years. Although literacy rate has been improved recently, the number of students in primary school has decreased slightly from 17.6 million in 2001 to 16.2 million in 2005. This is probably caused by the increase of the poor population who cannot afford to attend primary school. On the other hand, the numbers of students in secondary schools, general collages and universities have increased in recent years, as shown in Table 2.2-5.

Table 2.2-5   Literacy Rate and Number of Students

	2001	2002	2003	2004	2005
Literacy Rate (7 yeas and over)	46.2%	48.8%	49.1%	50.0%	52.1%
Students in primary schools (thousand)	17,659	17,562	18,431	17,953	16,224
Students in secondary schools (thousand)	7,113	7,320	7,338	7,503	7,399
Students at general colleges (thousand)	1,535	1,569	1,449	1,291	1,637
Full time students at public universities (thousand)	79	92	105	112	116

Source: BBS, Statistical Yearbook of Bangladesh 2007

According to the Population Census in 2001, only 48.6% of the age group (5- to 9-years) attended primary school and 62.9% of the age group (10- to 14-years) attended secondary school. It is unusual because school attendance rate of primary school is generally higher than that of secondary school. In the case of Dhaka Division, the school attendance rates of primary school were 47.2%, while 50.87% in RAJUK area and 49.4% in DMA, which were slightly higher than the national average. In the school attendance rates of secondary school, Dhaka Division showed nearly 2 points lower than the national average. One of the reasons behind this was large number of immigrants from rural area to Dhaka Division and they were mostly poor people and could not afford to attend school.

Table 2.2-6   School Attendance Rate by Age Group, 2001

	Primary 5 to 9 year (%)	Secondary 10 to 14 year (%)	Higher Education 15 to 24 year (%)
Bangladesh	48.6	62.9	25.9
- Urban	51.5	62.7	29.8
- Rural	47.9	63.0	24.4
Dhaka Division	47.2	60.4	24.4
RAJUK Area	50.8	56.7	24.2
DMA	49.4	53.3	26.1

Source: Calculated from BBS, Community Series, Zila: Dhaka (P 237-282), Gazipur (P 104-117), Narayanganj (P 116-136)

2.3   Economic Condition

2.3.1   Macroeconomic Performance of Bangladesh

The latest National Account Statistics was published in May 2009, which showed that GDP (Gross Domestic Product) was around 6,149 billion BDT in the BFY 2008. Per capita GNI (Gross National Income) was US$690 for BFY 2008. The growth rate of GDP at constant price slightly decreased from 6.63% in BFY 2005 to 5.88% in BFY 2008 (Table 2.3-1). According to the database from World Bank, per capita GNI in Bangladesh was US$470 in 2007, which was half of India (US$950) and lower than Cambodia (US$550). Recent economic activity in Bangladesh has been glowing but the country is still one of the poorest countries in the world.

Table 2.3-1   Indicators of National Accounts

	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09*
GDP (billion BDT.)	3,330	3,707	4,157	4,725	5,458	6,149
GNI (billion BDT.)	3,505	3,896	4,429	5,078	5,943	6,832
Per capita GNI (BDT.)	25,926	28,443	31,915	36,116	41,728	47,373
Per capita GNI (US$)	440	463	476	523	608	690
Growth Rate at Constant Price (%)	6.27	5.96	6.63	6.43	6.19	5.88

: provisional estimates

Source: National Account Statistics, May 2009 (Atlas methodology in 2007)

Table 2.3-2   GNI per Capita in Asian Countries, 2007

Country	GNI per capita (US dollars)
Bhutan	1,770
Indonesia	1,650
Philippines	1,620
Sri Lanka	1,540
India	950
Pakistan	860
Papua New Guinea	850
Vietnam	770
Lao PDR	630
Cambodia	550
Bangladesh	**470**
Nepal	350

Source: World Bank Database, Atlas methodology in 2007

When we look at the GDP by sector, service sector produced nearly half of the national product in BFY 2008. Industrial sector produced 30% and agricultural sector produced 20% of the national product (Table 2.3-3). The annual growth rate of industrial sector was 9.7% in BFY 2005 but it dropped to 5.9% in BFY 2008. Other sectors also decreased their growth rates during the same period: agriculture sector from 4.9% to 4.6%; and service sector from 6.4% to

6.3%. More than half of the GDP in industrial sector was produced by manufacturing (18% in BFY2008), followed by construction (9%). In service sector, wholesale and retail trade produced 14% of the GDP, followed by transport storage and communication (11%), real estate, renting and business activities (7%).

Table 2.3-3   GDP by Sector at Constant Price (1995-96 Price)

		2005-06	2006-07	2007-08	2008-09*
Annual Growth Rate of GDP (%)	Agriculture	4.94	4.56	3.20	4.63
	Industry	9.74	8.38	6.78	5.93
	Service	6.40	6.92	6.49	6.25
Share of GDP(%)	Agriculture	21.84	21.37	20.83	20.60
	Industry	29.03	29.45	29.70	29.73
	Service	49.14	49.18	49.47	49.67

: provisional estimates

Source: BBS, National Account Statistics, May 2009

In the trading activities in Bangladesh, import value has exceeded export value over the last 5 years. In BFY 2007, the amount of export value was 985,931 million BDT, while import value was 1,496,722 million BDT. Both imports and exports values have been increasing in recent years. Major exporting goods are "readymade garments", which occupied nearly 75% of the total export value in BFY2007. Other export goods are shrimps and prawn (4%), vegetable textile fiber/yarn (4%), made up textile articles (3%). The largest import goods are "machinery equipment including electronic appliance", which occupied about 16% of the total import value in BFY2007. The trade deficit is supplemented by workers' remittances. The transfer by remittance was estimated 412,990 million BDT in BFY 2007, while the trading deficit was -510,791 million BDT.[10]

Table 2.3-4   Imports and Exports, BFY 2003-2007

	2003-04	2004-05	2005-06	2006-07	2007-08
Imports (million BDT)	630,363	769,954	962,345	1,118,664	1,496,722
Exports (million BDT)	437,098	532,831	691,950	850,309	985,931

Source: BBS, Foreign Trade Statistics of Bangladesh 2007-08

2.3.2   Role of Dhaka in National Economy

According to labor force by administrative Division, it is observed that the highest 15.6 million (31.6%) labor force exist in Dhaka Division, followed by Rajshahi Division with 11.3 million (22.8%) and Chittagong Division with 9.7 million (19.5%) in 2005 (Table 2.3-5). Among Dhaka Division, Dhaka District has the largest labor force with 3.5 million or 22.4% of the total labor force in the Division.

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[10] *Source: Statistical Yearbook of Bangladesh 2007, Original source: Bangladesh Bank*

Table 2.3-5   Number of Labor Force by Administrative Division, 2005

Division	Number of Labor Force (million)	Percent (%)
Chittagong	9.7	19.5
Dhaka	15.6	31.6
Khulna	5.7	11.6
Rajshahi	11.3	22.8
Barisal	3.5	7.2
Sylhet	3.6	7.3
Bangladesh	49.5	100.0

Source: BBS, Report on Labor Force Survey 2005-2006

The latest Economic Census (2001 and 2003) shows that there were 358,792 business (non-agricultural) establishments and 1,892,558 persons engaged in the non-agricultural sector in Dhaka District. Both the numbers of establishments and persons engaged increased double from 1986 to 2001. This rapid increase of non-agricultural economy was caused by growing economic activity especially in urban areas. Dhaka District is the economic center in the nation and non-agriculture sector (industry and service) in Dhaka District contributes about 80% of GDP and 70% of employment in the nation.

The major non-agricultural economic activity in Dhaka District was "wholesales and retail trades" that occupied about 70% of total number of establishments and 34% of the total persons engaged in 2001. "Manufacturing" was the second largest economic activity that occupied 9.3% of the total establishments and 36% of the total workers in the District. Both activities of wholesale and retail trade and manufacturing are textile-related industries, which occupied more than 70% of total work population in Dhaka District. High ratio of engaged women was significant characteristic in the manufacturing industry in Dhaka District and Bangladesh as a whole.

Due to recent global trend of information and communication technology, economic activities in many Asian countries have shifted from manufacturing to service economy, but Bangladesh economy heavily depends on textile-related manufacturing and trading until today.

Table 2.3-6   Types of Non-Agricultural Economic Activities in Dhaka District, 2001 and 2003

Activity	Establishments		Person engaged		Average size
	Units	%	Persons	%	Persons
Mining & quarrying	33	0.0%	908	0.0%	27.5
Manufacturing	31,344	9.3%	671,671	36.5%	21.4
Electricity, gas and water supply	178	0.1%	9,585	0.5%	53.8
Construction	858	0.3%	16,852	0.9%	19.6
Wholesale & retail trade	233,625	69.4%	619,393	33.7%	2.7

Activity	Establishments		Person engaged		Average size
	Units	%	Persons	%	Persons
Hotels & restaurants	15,412	4.6%	82,047	4.5%	5.3
Transport , storage and communication	9,009	2.7%	52,069	2.8%	5.8
Bank, Insurance and financial institution	2,061	0.6%	53,383	2.9%	25.9
Real estate and renting	6,309	1.9%	41,089	2.2%	6.5
Public administration and defense	2,474	0.7%	90,343	4.9%	36.5
Education	4,446	1.3%	55,918	3.0%	12.6
Health and social work	6,628	2.0%	44,959	2.4%	6.8
Community, social and personal services	24,173	7.2%	101,990	5.5%	4.2
Total (Urban)	336,550	100.0	1,840,207	100.0	5.5

Source: Economic Census 2001&2003, January 2008
Note: the survey was conducted in 2001 for urban areas and in 2003 for rural areas.

2.3.3   Industrial Activities in Dhaka

In order to stimulate rapid economic growth of the country, particularly through industrialization, the Government has adopted an Open Door Policy to attract Foreign Direct Investment (FDI) to Bangladesh. For this purpose, Bangladesh Export Processing Zone Authority (BEPZA) was established in 1983 under the Prime Minister's Office. Now there are 8 EPZs in the country; Among the 8 EPZs, 2 EPZs (Dhaka and Adamjee) are located in Dhaka Metropolitan Area.

Table 2.3-7 shows the number of establishments and persons engaged by sector in the study area in 2001 and **Figure 2.3-1** shows the locations of industrial establishments.

Table 2.3-7   Number of Establishment and Persons Engaged by Sector in the Study Area, 2001

Geographical Area	No. of Establishment			No. of Persons Engaged		
	Manufacturing	Service	Total	Manufacturing	Service	Total
DMA	21,556	209,964	231,520	562,090	928,908	1,490,998
% share	65.1%	66.8%	66.7%	65.4%	76.3%	71.8%
Outside of DMA	11,575	104,240	115,815	297,426	287,856	585,282
% share	34.9%	33.2%	33.3%	34.6%	23.7%	28.2%
TOTAL OF RAJUK AREA	33,131	314,204	347,335	859,516	1,216,764	2,076,280

Source: Economic Census 2001 Dhaka Zila. Gazipur Zila and Narayanganj Zila,
Bangladesh Bureau of Statistics 2001

Major characteristics of manufacturing and service industries are summarized as follow:

- There are total of 33,131 establishments and 859,516 persons engaged in manufacturing sector in the study area in 2001. The average number of persons engaged per establishment is 26 persons. About two third of the establishments and persons engaged in manufacturing sector are located in DMA area.

- Many manufacturing establishments in DMA were concentrated in old Dhaka area, such as Strapur, Kotwari and Lalbag, but number of persons engaged in the area was relatively

small. This reveals that manufacturing establishments in the old Dhaka area are relatively in small scale.

- The persons engaged in manufacturing sector are concentration in Mirpur, Gulshan, Kafrul and Pallabi, which amount to more than 40% of total engaged persons in the manufacturing sector in DMA.

- Tejgaon is a classic industrial estate founded during British period. But the numbers of establishments and persons engaged are relatively small. Because of limited accessibility, some of the factories in this area have shifted to outside DCC.

- Outside DMA, Gazipur Sadar *Upazila* including Tongi and Gazipur Municipalities has concentrations of manufacturing establishments. It has good accessibility to transport infrastructure, such as international and domestic airport and railway towards Chittagong and Mymenshing.

- Dhamsona in Savar *Upazila* is located in 10 kilometer west from Tongi connected by Ashula EPZ Road. There is Dhaka Export Process Zone (EPZ) with the area of 143 hectors, where national and foreign companies have been operating since its establishment in 1993. The Dhaka EPZ is quite successful and had nearly 10,000 employees in 2006-07.

- Narayanganj has a good accessibility to waterway connecting Chittagong and Mongla. Most of the manufacturing industries are located along the river. It has railway connection to Tongi. Recently Adamjee Export Processing Zone with the area of 119 hectors was opened in 2005. However, Adamjee EPZ is not yet fully operated and waiting for investments from foreign and domestic companies.

- There are total of 314,204 establishments and 1,216,764 persons engaged in service sector in the study area in 2001. The average number of persons engaged per establishment is 4 persons about two third of the establishments and more than 76% of persons engaged in service sector are located in DMA area.

- Major concentrations of service establishments are Strapur, Kotwari and Lalbag, which occupies more than 30% of the total establishments in DMA. On the other hand, persons engaged in service sector concentrate on Mothiheel, Kotwari, Dhamondi and Gulshan.

- Gulshan is one of the concentrations of service and business activity. Many offices, such as real estate and financial institutions are located in this area.
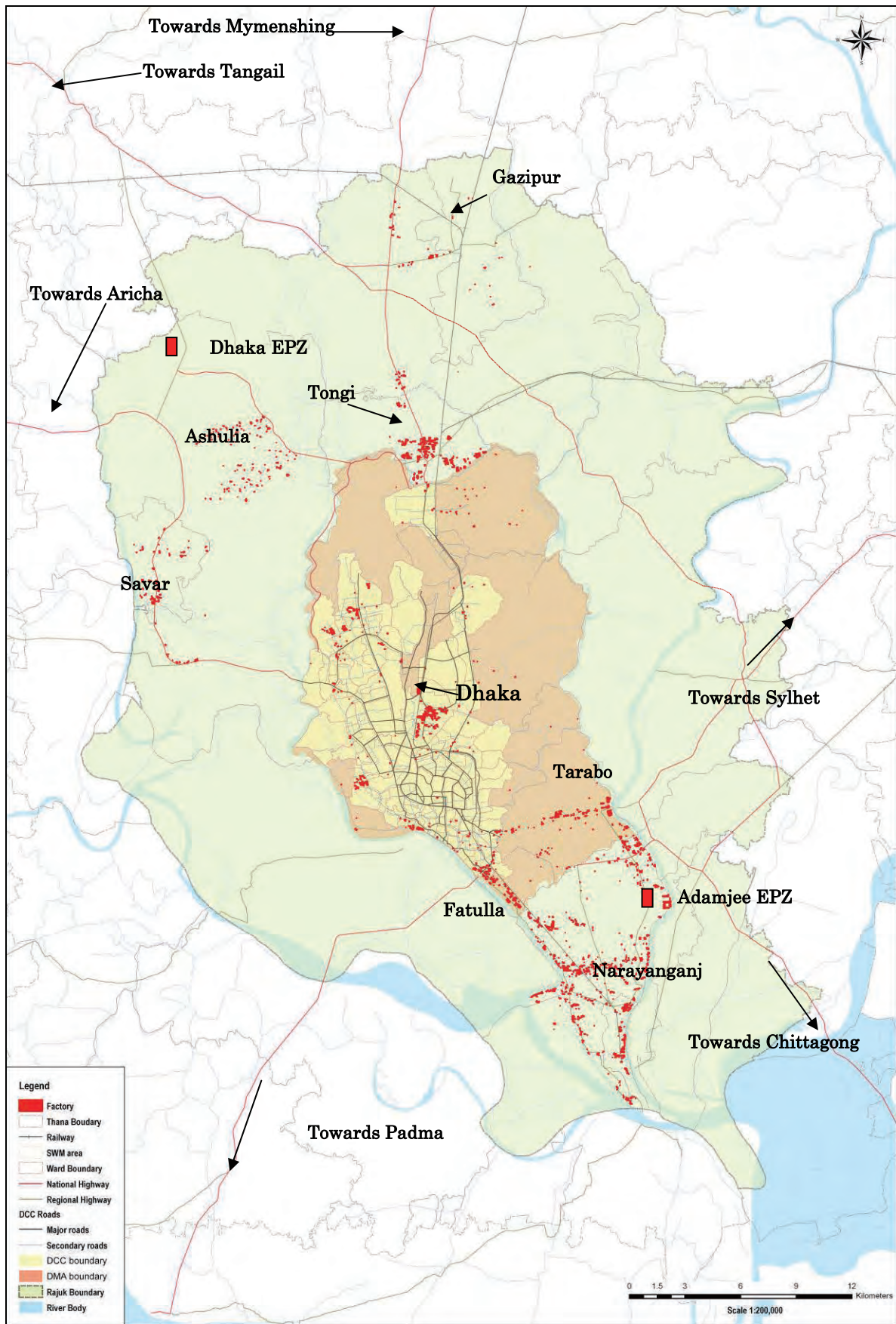
Figure 2.3-1   Location of Manufacturing Industries in the RAJUK Administration Area

Source: JICA Study Team

2.4 Existing Land Use

2.4.1 Urbanization Trends

Dhaka is one of the oldest major cities in South Asia, located geographically center of the country and has been developed as a political, economic and cultural centers in the country. It is considered that the origin of present Dhaka city was first established in the early 17th century as the capital of Subah Banglah. After the Britain took the rule, Dhaka city experienced expansion during the 18th century. Since the Britain established the East India Company in 1765, Dhaka developed as a trading center of cotton and jute and the city attracted many migrants from other parts of the country.

The population of Dhaka had increased since the first official population census in 1872, the population of Dhaka was around 62,000 at that time. Until early 20th century, however, the city did not extend beyond the Ramna area and it had a population of about 100,000 in 1901. When the British rule was ended in 1947, the city area was 65 sq. km from Briganaga area up to Tejgaon and its population was 250,000 at that time.

After independence from the British rule, Dhaka experienced rapid expansion and population growth during the 1950s and 1960s as the capital of East Pakistan. In that period, the urban area expanded along Buriganga and Turga rivers to the north from Tejgaon and it included present Mirpur, Kafrul and Abadar areas where they had relatively few flooding. Urban expansion has been accelerated and its population reached to 1,774,000 in 1974, which is 3 times of the population in 1961. The annual growth rate in the period between 1961 and 1974 was exceptionally high with 10.4% p.a. The urban area also extended to the area across Briganga, Turag and Balu rivers.

Today, Dhaka is one of the most congested cities, the third highest densely populated city in the world, about 44,000 persons per sq. km, following to Macao, 60,000 persons per sq. km and Hong Kong, over 50,000 persons per sq. km. Disordered urban development, insufficient infrastructure and high population density caused harsh traffic congestion, which are serious loss of national economy. Appropriate urban development of the city and its peripheral area and more effective transport development are the urgent tasks to recover the urban function of Dhaka as the capital city.

2.4.2 Major Characteristics of Existing Land Use Pattern

In order to understand general characteristics of land use pattern in Dhaka Metropolitan area, we prepared existing land use map of 2009, based on field survey and analysis of Satellite Image. The Study Area is divided six geographical zones: (1) DCC and Inner City Zone, (2) Fringe Zone, (3) RAJUK Northern Zone, (4) RAJUK Southern Zone, (5) RAJUK Eastern Zone, and (6) RAJUK Western Zone (Figure 2.4-1). The following are major characteristics of present land use by geographical zone.
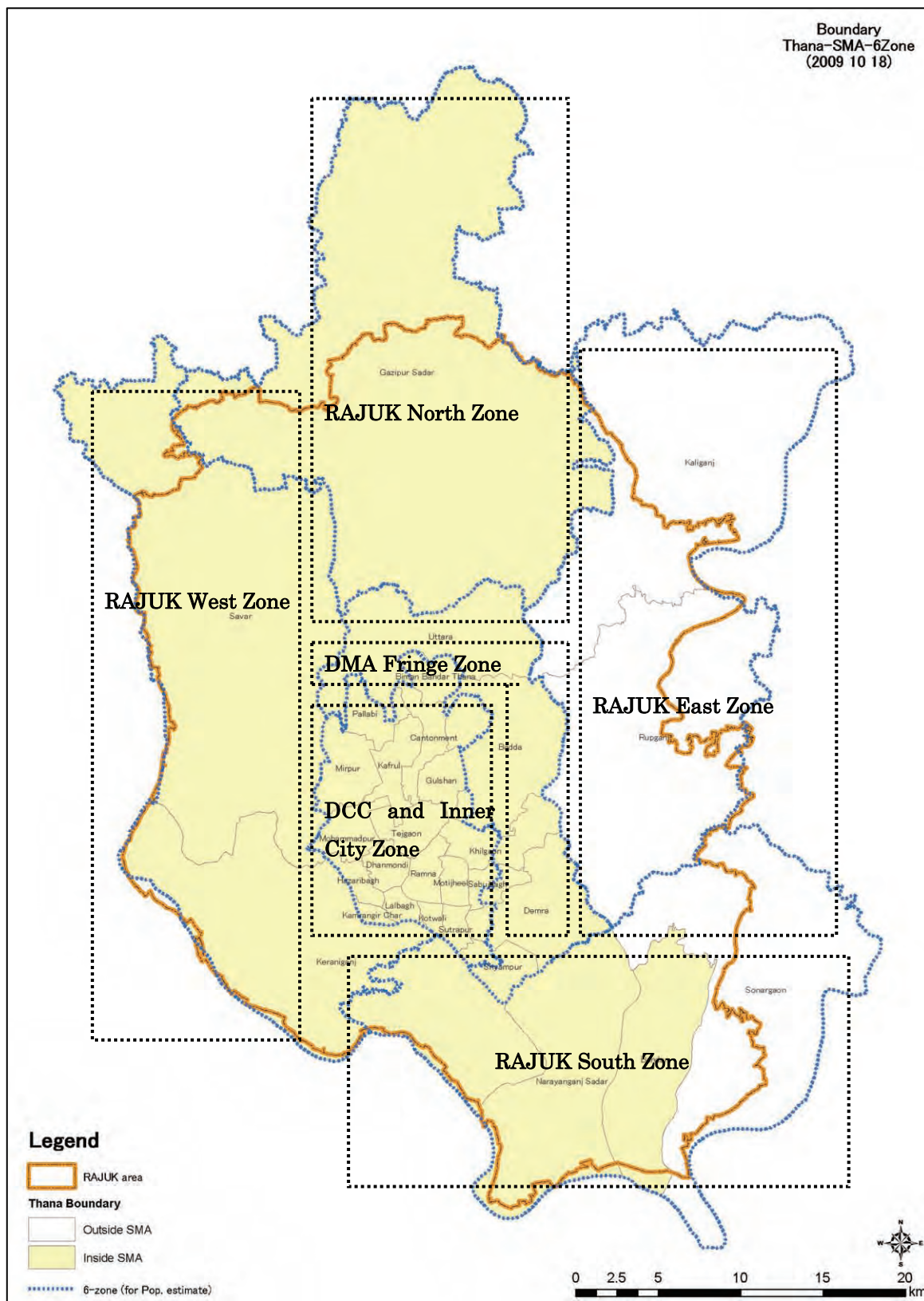
Figure 2.4-1   Geographical Zone in the Study Area

Source: JICA Study Team

(1)   DCC and Inner City Zone

Most of the areas in this zone are already urbanized and basic urban services are provided by DCC and also by other organizations. The total population in this zone reached 5,255,000 in 2001. About 65% of the land is already built up and the remaining parts are open spaces, parks, unclassified/restricted areas and water bodies. The build up areas are predominantly occupied by housing, commercial and mixed use areas. The planned residential areas initiated by the government are Dhanmondi, Gulshan, Banani, Baridhara, Nikunja, Uttara. Some other residential areas, such as Mohammadpur, Kallyanpur, Mirpur and Pallabi, were developed for low and middle income groups. Some private developers are also involved to create new housing area. CBD area such as Shaabag, Lalbag, Kotwali, Paltan, Motijheel, Sutrapur are highly populated and has serious traffic congestions. Mobility is very low at the peak hours in the main roads.

There are 550 hectare of commercial land use. Most of commercial areas are concentrated in the old parts of city, such as Kotwali, Ramna, Lalbagh and Motijheel. Now Dhanmondi, Gulshan, Banani and Uttara are growing as commercial block on both sides of the main roads High rise buildings are mainly situated in Motijheel, Gulshan, Banani, Uttata and Dhanmondi.

There is 260 hectare of industrial uses. A planned industrial area is the Tejgaon industrial area. In the old part of the city, there are small scale industries in a haphazard manner. There are tannery industries in Hazarbag and medicine industries in Gandaria. The garments factories are located hither and thither in DCC area. They are mostly located in Rokeya Sharani, Shewrapara, Mirpur, Pallabi, Mohammadpur, Badda Gulshan and Uttara.

For the transport infrastructure, it contains 9.3% of the total land area. In other major cities, transport infrastructure contains at least 20% to 25% of the total land area. Dhaka city area has very limited space for transport infrastructure. For the public facilities and restricted area occupies 7.1% and 16.1% respectively. Some Universities in the CBD area like Dhaka University, Bangladesh Agricultural University have covered a large area. On the other hand restricted area like Dhaka cantonment, Mirpur cantonment, old airport, and central jail are situated in the central part of the city. Those restricted area covers a huge valuable land in the center of the city.

(2)   DMA Fringe Zone

This zone includes Uttara, Badda, Khilgaon, Demra and Shyampur Thanas. This zone is outside of DCC but within the boundary of the Turag and Balu rivers. The population in this zone was about 1,048,000 persons in 2001. About 35% of the land is urbanized and other areas are mostly occupied by low lying land with agriculture, ponds or open space. Recently, some areas have been undertaken land reclamation to develop housing by private developers. Some of the private housing developments are United city, Xenovally Pink City, Shornali Abashik Prokolpo,

BDDL Natundhara Housing project, Relience Housing project, Green Model town, Brac Concord Rajdhani Abashik prokolpo etc. located in the Eastern fringe. In the north-west fringe Uttara Phase-3 housing project has been undertaken by RAJUK. The main problem in this zone is the low lying flood prone area with poor accessibility by road network.

(3) RAJUK Northern Zone

It includes most of Gazipur Sadar Upazila with two municipalities (Pourashavas), one is Gazipur pourashava and the other is Tongi pourashava. Gazipur Paurashava is situated in the northern part of Upazila and Tongi pourashava in the south. The total population was 866,500 in 2001. Most of the areas in this zone are high land. Many garments factories are located both sides of the Dhaka-Mymenshing road. Joydevpur Chowrasta is the major intersection between Dhaka City and Gazipur. The high land along the Dhaka-Mymenshing corridor enhances the development of industrial area. About 45% of the areas in this zone are already built up and another 49% of the areas are used as cultivated agricultural/open space/forest. Recently some private developers are developing new housing, especially in Tongi Municipality. There is only one major road connecting Dhaka and Gazipur, which causes heavy traffic congestions in almost all the time. Tongi Municipality is adjacent to Dhaka city, just crossing the Turag River, and it has been developed as important commercial and industrial locations in the metropolitan area.

(4) RAJUK Southern Zone

 It includes Narayanganj Sadar Upazila, Bandar Upazila and some parts of Keraniganj and Sonargaon Upazila. The population was 1.7 million in 2001. This zone is mainly low lying and flood prone area. Some 37% of the land has been built up, especially in Narayanganj and Kadamrasul municipalities along the Sitalakhya River. The southern parts of this zone are mainly low lying area along Meghna River, Shitalakhha River and Buriganga river. About 44.43% area belongs to the open spaces/forest/cultivable land. About 16.32% are belongs to char/island/swamp/marshy land. High land scarcity makes this area as a slow development area. Due to poor accessibility to the interior area, accessibility hindrance due to proper bridge structures to that area, except the Narayanganj Town. About 2.2% is the industrial area is mostly located along the river side of the major rivers and the road side area of the main roads twards Dhaka. Adamjee Export Processing zone is situated here at the road towards siddirganj. Now it is growing as an income generating source of the local people of this area. Narayanganj is nearest district town of Dhaka city, it is well connected by road and railways from the beginning, but the transport service is not up to the mark as of now.

(5) RAJUK Eastern Zone

This area comprises Kaliganj and Rupganj Upazilas. There were 0.6 million habitants in 2001. The Shitalakhha and Balu rivers are running through in this zone. About 32% of the land is the

built up area of this zone. It is agriculcure predominant area. About 61.19% of the total land belongs to the cultivated land/open spaces/forest. So in near future it will grow rapidly. Government initiated housing project "Purbachal" is situated here. Some private developer is also now developing several housing projects in this area namely Bestway Purbachal City, Purbachal Bestwood city etc. In that area, two main highways (Dhaka-Sylhet and Dhaka-Chittagong) pass this land. So this area has relatively good accessibility to the Dhaka City. But Only the Kachpur Bridge is not well enough to cater the whole traffic coming from north and South of Bangladesh. Only 1.7% lands used as industrial area in that zone. Some industrial activities along the rivers and road side have taken place. Road side unplanned development occurs from the beginning in that area.

(6)   RAJUK Western Zone

It includes Savar Sadar Upazila, Kamrangir Char Thana and part of Keraniganj Upazila. In this zone there is one municipality called Savar Pourashavas. The total population in this zone was 1.1 million in 2001. Only 35% of the land is built up and another 53% of the land is agriculture and/or flood prone area. Geographically, Keraniganj Upazila is low lying and flood prone area. Road network is very poor in this zone. Savar Sadar Upazila has high value. Most of the high land in Savar Municipality has been developed with various activities, such as residential, industrial and commercial uses. Many institutions, such as Jahangir Nagar University, Livestock Research Institute, Savar Cantonment and National Martyrs Memorial, are located along Aricha Highway. Dhaka Export Processing zone (EPZ) is located in Ashulia and there are 570 hectares of industrial use.

Figure 2.4-2   Land Use Map of the RAJUK Administration Area in 2009

Source: JICA Study Team

Table 2.4-1   Land Use Composition by Geographical Zone in the RAJUK Administration Area in 2009

Zone	Total Area (Hectare)	Land Use Category (Hectare)									
		Housing Area	Commercial	Industrial Area	Mixed use area	Public Facilities	Road/Railways	Park/Play ground/Urban/green area	Restricted area/Brick Field	Cultivated Land/Open Space/Forest	Swamp/Marsh/Char/Island/Water Bodies
DCC and Inner City Zone	14,078	5,676	549	261	523	999	1,315	153	2,266	1,083	1,253
% Share	9.52%	40.31%	3.90%	1.85%	3.72%	7.10%	9.34%	1.09%	16.10%	7.69%	8.90%
DMA Fringe Zone	15,791	4,567	105	211	63	214	428	3	104	7,189	2,906
% Share	10.67%	28.92%	0.67%	1.34%	0.40%	1.35%	2.71%	0.02%	0.66%	45.52%	18.41%
RAJUK Northern Zone	27,703	10,612	273	333	85	466	544	2	262	13,448	1,677
% Share	18.73%	38.31%	0.99%	1.20%	0.31%	1.68%	1.96%	0.01%	0.95%	48.54%	6.05%
RAJUK Eastern Zone	21,937	6,158	147	382	4	108	212	212	36	13,424	1,467
% Share	14.83%	28.07%	0.67%	1.74%	0.02%	0.49%	0.97%	0.97%	0.16%	61.19%	6.69%
RAJUK Southern Zone	31,586	9,596	296	698	135	377	493	10	792	14,032	5,156
% Share	21.35%	30.38%	0.94%	2.21%	0.43%	1.19%	1.56%	0.03%	2.51%	44.43%	16.32%
RAJUK Western Zone	36,837	10,343	185	570	74	1,048	577	79	532	19,524	3,905
% Share	24.90%	28.08%	0.50%	1.55%	0.20%	2.84%	1.57%	0.21%	1.44%	53.00%	10.60%
Total RAJUK Administration Area	147,933	46,952	1,556	2,454	885	3,211	3,570	459	3,992	68,699	16,366
% Share	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: JICA Study Team