



STATE OF CITIES: Governance for a Liveable CHITTAGONG



BRAC Institute of Governance and Development
BRAC University



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BRAC Institute of Governance and Development (BIGD)

BRAC University
Dhaka, Bangladesh

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BRAC University**

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List of Acronyms

ADB	Asian Development Bank
AEC	Atomic Energy Commission
AQI	Air Quality Index
BAPEX	Bangladesh Petroleum Exploration & Production Company Limited
BCIM EC	Bangladesh-China-India-Myanmar Economic Corridor
BDT	Bangladesh Taka (currency)
BECR	Bangladesh Environmental Conservation Rules
BEPZA	Bangladesh Export Processing Zone Authority
BERC	Bangladesh Energy Regulatory Commission
BGFCL	Bangladesh Gas Field Company Ltd.
BIGD	BRAC Institute of Governance & Development
BR	Bangladesh Railway
BRT	Bus Rapid Transit
BRTA	Bangladesh Road Transport Authority
BRTC	Bangladesh Road Transport Corporation
BSTI	Bangladesh Standards and Testing Institution
BTCL	Bangladesh Telecommunications Company Limited
BWDB	Bangladesh Water Development Board
CBO	Community-Based Organisation
CCC	Chittagong City Corporation
CCO	Chief Conservancy Officer
CCORR	Chittagong City Outer Ring Road
CDA	Chittagong Development Authority
CEPZ	Chittagong Export Processing Zone
CGTG	Composting and Garbage Treatment Plant
CH4	Methane
CMMP	Chittagong Metropolitan Master Plan
CMP	Chittagong Metropolitan Police
CNG	Compressed Natural Gas
CO2	Carbon Dioxide
CPA	Chittagong Port Authority
CSMA	Chittagong Statistical Metropolitan Area
CSO	Civil Society Organisations
CUET	Chittagong University of Engineering and Technology
CWASA	Chittagong Water and Sewerage Authority

CWSISP	Chittagong Water Supply and Sanitation Improvement Project
DAP	Detailed Area Plan
DCC	Dhaka City Corporation
DEMU	Diesel Electric Multiple Unit
DoE	Department of Environment
DPHE	Department of Public Health Engineering
DPZ	Detailed Planning Zone
DSK	Dustho Shasthya Kendra
ECNEC	Executive Committee of National Economic Council
EIU	Economist Intelligence Unit
EPZ	Export Processing Zone
ETP	Effluent Treatment Plant
FGD	Focused Group Discussion
GO	Government Organisation
GoB	Government of Bangladesh
GTZ	German Technical Cooperation
IAP	Immediate Action Plan
IEB	Institute of Engineers of Bangladesh
IMSC	Inter Ministerial Steering Committee
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
KAFCO	Karnaphuli Fertiliser Company Limited
Kg	Kilogram
KGDCL	Karnaphuli Gas Distribution Company Limited
KII	Key Informant Interview
Km	Kilometre
LGED	Local Government Engineering Development
LGRD	Local Government and Rural Development
LIC	Low Income Community
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTDS	Long Term Development Strategy
m ³	Cubic Metre
MCF	Million Cubic Feet
MLD	Million litres per day
mmcf	Million cubic feet
mmscfd	Million standard cubic feet per day

MoHPW	Ministry of Housing and Public Works
MoU	Memorandum of Understanding
MW	Mega Watt
NBR	National Board of Revenue
NGO	Non-Government Organisation
NHA	National Housing Authority Bangladesh
NIMBY	Not In My Back Yard
PDB	Power Development Board
PPP	Public Private Partnership
RAJUK	Rajdhani Unnayan Kartipakkha [Capital(Dhaka) Development Authority]
SEC	Socio-Economic Category
SEZ	Special Economic Zone
SGFL	Sylhet Gas Field Limited
SMA	Statistical Metropolitan Area
SPM	Suspended Particulate Matters
Sq Km	Square Kilometre
SSC	Secondary School Certificate
TDM	Transport Demand Management
TMC	Technical Management Committee
TNUDF	Tamil Nadu Urban Development Fund
UN	United Nations
UNDP	United Nations Development Program
WB	The World Bank

Glossary

Bhagidari	Collaborative partnership
CNG Auto	Auto rickshaws run on CNG
Crore	Ten million
Harikela	Early name of Chittagong during pre-medieval era
Khal	Canal/Natural Drainage/Irrigation Channels etc.
Khas Land	Government owned lands which are unused/surplus lands acquired for public interest or historically owned by state or auctioned land etc.
Kutchra	Structures made of wood, mud, straw and dry leaves etc.; temporary
Mor	Turning point of a road/Cross section
Muazzin	Summoner for prayer in Mosque
Octroi	Local tax collected on various articles brought into a district for consumption
Paura Shava	Municipality/Local Government unit of towns/small cities
pH	Measure of the acidity or basicity of an aqueous chemical solution
Pucca	Structures made of concrete, stone, clay tiles etc.; stable
Santos	Major Australian oil and gas exploration and production company
Tempo	Small public transport, usually Vespa-based three-wheelers, capacity up to 15 persons
Thana	Police station/unit of Police administration jurisdiction boundary
Tokais	Waste pickers
Zamindar	Refers to slum owners here as they are locally called by this name

Preface

Chittagong, the second largest city and industrial and commercial hub of Bangladesh, has undergone steady urbanisation since independence. The most recent population census BBS (2011) shows that most districts of Chittagong Division have experienced higher urbanisation in the past decade relative to other divisions. The secondary cities and towns of Bangladesh will also experience urbanisation over the next few decades. Chittagong's growth potential is beginning to be recognised by some highly acclaimed global studies. The McKinsey Global Institute has identified it as one of the top 'hotspots' for growth between 2010-2025 driven by young-entry level consumers. However, studies also show that while population density in Bangladeshi cities notably Dhaka and Chittagong is exceptionally high, economic density is relatively low. This indicates that Chittagong and other major cities of the country have yet to exploit the benefits of urbanisation fully. More worryingly, Bangladeshi cities are becoming least liveable, as indicated in some influential global city liveability rankings. The country has been less than successful in managing its urban transition. This brings to the fore the importance of better urban governance, critical to foster agglomeration and to internalise externalities such as congestion, crime and pollution.

Given this reality as well as the greater focus on urbanisation in developing countries whereby cities rather than states are becoming the islands of good governance, BIGD has prioritised urban governance as one of its major research areas. The Institute's previous two reports studied the state of urban governance in Dhaka and Narayanganj. This year's report *State of Cities: Urban Governance for a Liveable Chittagong* examined the challenges that the country's second largest city and 'commercial capital' faces as well as the governance response in managing its urban transition. This report provides a comprehensive assessment of the historic, political and economic dynamics of the city. The role of both formal and informal 'actors' as well as institutions and intermediaries in providing services to the city dwellers are also examined. The report shows that coordination failure of local agencies, lack of horizontal accountability, dualism in service delivery, inadequate administrative and fiscal autonomy and the excessive dependence of the local government on the central government and other agencies, among other factors, are a constraint to effective governance. To foster urban agglomeration and, above all, to make Chittagong a liveable city, the report recommends providing greater operational and fiscal autonomy to the city's elected bodies who are eventually accountable to the city dwellers. At the same time, it underscores the importance of local governance innovation and learning from successful city governance models of developing countries to reduce the city's dependence on the central government. This report also offers broader lessons for Bangladesh's urban future. The choice that the authorities make with regard to managing urbanisation will have profound implications for the country's economic growth.

The report is the result of hard work of BIGD's research team, led by M. Shahidul Islam. The research underpinning the report was enriched by the contribution of many people and organisations who deserve to be acknowledged individually. Regrettably, this is not possible for lack of space. We would like to thank our external partners: Dr. Syed Naimul Wadood, Engineer Subash Chandra Barua, and Dr. Mohammad Nazmul Islam for their contribution to the report. Special thanks are due to Dr. Minhaj Mahmud, Head of Research, BIGD for his most valuable research guidance, reviews and comments at different stages of preparation of the report. We also thank our reviewers for their contributions which has improved the substance of the State of Cities: Professor Muinul Islam, Dr. Tofail Ahmed, Dr. Moinul Islam Mahmud, Professor (Eng.) Ali Ashraf, Dr. Shamsul Hossain, Professor M Manzurul Hassan, Professor Niaz Ahmed Khan, and Dr. Tamina M. Chowdhury. We would also like to express our gratitude to IDRC for supporting the research and publication of the State of Cities under the Think Tank Initiative.



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Chapter 1

Introduction

1.1 Preliminaries

State of Cities: Governance for a Liveable Chittagong is the third report of the *State of Cities* series published by the BRAC Institute of Governance and Development (BIGD), BRAC University (formerly Institute of Governance Studies). The previous two reports, published in 2012 and 2013, analysed the state of urban governance of Dhaka and Narayanganj. The institute launched the *State of Cities* series to promote research and analysis as well as to spur intellectual debates on city governance in Bangladesh.

This report is the product of a long-term research programme launched by BIGD in recognition of the challenges faced by local governments, city dwellers and numerous public and private organisations to respond effectively to the unprecedented changes happening in the urban discourse. Given the growing challenges that Chittagong City¹ faces with regard to its service delivery, transport provisions, environmental challenges, devolution of power, fiscal problems, *inter alia*, there is a need for extensive analysis on cross-cutting issues involving urban governance. The present report provides an in-depth analysis of the historical, economic and political dynamics which shape various facets of urban life and governance in Chittagong and aims to provide solutions in addressing the mounting problems that the policymakers face as far as urban governance is concerned.

1.2 The context

For the first time in history, more than half of the world's population resides in urban areas (UNFPA 2007). By 2030 an estimated 60 percent of people will live in cities. Nearly all of this growth is happening in developing countries, where as many as 66 million people migrate to urban areas each year (World Bank 2014a). The irreversible trend of urbanisation underscored the importance of cities both from economic and political imperatives. Cities are engines of growth and a channel to evolve into a middle and high income country. It is extremely rare to achieve per capita income above US\$10,000 (in purchasing power parity terms) before half of the population lives in the cities (Spence *et al.* 2009). The key reason for this relationship between GDP growth and urbanisation is that the increased density

1. In the report the term Chittagong denotes Chittagong City, unless otherwise stated.

of urban population produces scale benefits that boost productivity, which in turn enhances growth – a virtuous cycle (McKinsey 2010). It is estimated that almost the entire world economy is represented by approximately 400 cities.²

There are other important roles that cities are playing in the changing economic and geo-political settings. It is argued that the 21st century will not be ruled by superpower America or emerging power China, but by cities. This, according to geo-political experts, is largely due to time, technology and population growth, all of which have accelerated the advent of this urbanised era. Small states such as Singapore and Hong Kong have emerged as influential financial, technological and innovation powerhouses.³ Today, numerous cities have substantially more economic weight, international connectivity, and diplomatic influence on the world stage than dozens of nations (Khanna and Acuto 2014). Cities, rather than states, are becoming the islands of governance on which the future world order might be built (Khanna 2010).

Bangladesh is one of the most densely populated countries in the world. Its high population density, combined with rapid urbanisation, implies a large and rapidly growing urban population. It is the third most urbanised country in South Asia, after India and Pakistan. Bangladesh has one of the top 20 urban populations in the world, with an estimated 42 million urban residents (UN 2011). Between 1960 and 2010, Bangladesh's urban population grew at an average annual rate of 5 percent and the share of urban population almost doubled, from 15 to 28 percent (Muzzini and Aparicio 2013).

With a population of about 5 million, Chittagong is the second largest city, and the main sea port of Bangladesh. The city experienced rapid urbanisation in the past few decades. It is considered one of the top ten prospective cities of the world that could witness the fastest urbanisation in the years to come. McKinsey (2012) has identified the city as one of the top 20 hot spots for growth. Being the hub of trade, commerce, industry and shipping, the port city contributes significantly to the economy of Bangladesh. About 9.4 percent of the country's urban population live in Chittagong (CDA 2008a; BBS 2011). The city hosts 9.4 percent of top 50 urban centres and about 9 percent of urban economic establishments (Islam and Khan 2012). About 75 percent of the country's total exports and 80 percent of total imports are conducted through Chittagong port. The city contributes about 38 percent of the country's total revenue earnings and its contribution in terms of GDP share is about 12 percent.⁴ However, to understand Chittagong's contemporary urbanisation transition, its economy and governance structure, it is imperative to discuss the city's historic evolution.

1.3 Urban governance in Chittagong

Chittagong/*Chattagrama*, also known as *Chatigrama*, *Chatgaon*, *Chatgam* and *Chateegaon*,⁵ has been an important seaport on the Bay of Bengal for centuries.⁶ *Harikela*, a kingdom in un-unified Bengal, flourished in an area around today's *Chattagrama* during the pre-medieval period (c.7th Cent.–1340)

2. McKinsey Global Institute study, cited in Khanna and Acuto 2014.

3. New technologies, state-of-the-art infrastructure, innovation, openness, and good governance, *inter alia*, have made Singapore and Hong Kong preferred destinations for the global talent (Islam and Khan 2012).

4. For detail information on Chittagong's industrial and other economic structure see Chittagong Chamber Commerce Industry's website (<http://www.chittagongchamber.com/elc.php>).

5. These place-names are available in numismatics, archival and literary sources of the medieval and early modern periods.

6. Over the ages the city of Chittagong bore many adjectives, such as: *Pentapolis*, *Samandar*, *Sahare Sabj*, *Porto Grande* etc., beside its actual place-names in historical periods: *Harikela/Chatigrama/Islamabad*.

(Mukherjee 1975).⁷ It was located in the south-eastern tip of northern Bay of Bengal.⁸ Its favourable geophysical features accommodated a great sea port connected with a large hinterland and also neighbouring countries.⁹ Chittagong had been used as a sea port by the Chinese and Arabian traders from the beginning of the seventh century when the region was known as *Harikela*. After the seventh century, the locus of trade and shipping moved away from *Tamralipta*, the site of Tamluk in modern-day India, toward *Chattagrama* (called *Samandar* by the Arab geographers) in the south-eastern delta. The loss of *Tamralipta*, in particular, seems to have considerably contributed to the emergence of Chittagong as the premier harbour in the Bengal coast, to be ultimately given the status of *Porto Grande* by the Portuguese in the sixteenth century (Mukherjee 2011).

Thus, the development of Chittagong as an urban centre and eventually becoming the second largest city of Bangladesh owes a lot to its port. However, this is not unique in the case of Chittagong. Major rivers, seas and other waterways have historically played a key role in developing cities worldwide. It is hardly surprising that many of the largest cities of the world have the largest ports. This is particularly the case of many Asian cities, such as Shanghai and Osaka-Kobe, which are among the twenty largest metropolitan areas and also home to the twenty largest ports in the world. Other examples of very large Asian metropolises with very large ports are Guangzhou, Shenzhen, Tianjin and Hong Kong (OECD 2013) (see Table 1.1).

Table 1.1: Overlapping of world's largest metropolises and ports

	Top 20-metro areas	Top 40-metro areas	Top 60-metro areas
Top 20 ports	Shanghai, Osaka-Kobe	Guangzhou, Shenzhen, Tianjin, Hong Kong	
Top 40 ports	Sao Paulo-Santos, New York, Los-Angeles/ Long Beach	Madras	
Top 60 ports	Tokyo	Bangkok	
Top 80 ports	Mumbai		
Top 100 ports	Kolkata, Karachi	London, Jakarta	Barcelona
Top 125 ports	Manila, Istanbul		Ho Chi Minh City, Chittagong, Miami/Tampa, Philadelphia

Source: OECD 2013

The port based economy and large hinterland of Chittagong attracted hosts of invaders, traders, administrators, travellers and preachers. They played a significant role in developing the city's infrastructure and introducing various administrative norms and acts, particularly during the Sultanate, the Mughal and the Company and British regimes.

7. Before the unification of Bengal there existed small kingdoms, namely, *Pundravardhana*, *Vanga*, *Bangalah*, *Samatata* and *Harikela*.

8. There are two deltas in the Northern Bay of Bengal – the western delta, corresponding to present West Bengal in India and the south-eastern delta in present Bangladesh.

9. Evident from accounts of Arabs (Sulaiman, Ibn Khordadbeh, Al Masudi, Al Idrisi, Al Marvazi and Ibn Battuta), Persian (Hudud al Alam) and Chinese (Chau ju Kua and the voyages of Cheng ho).

Fakhr al-Din Mubarak (1334–1349) – the Sultan of Sonargaon – conquered the seaport of *Harikela* in c. 1340. Under the Sultanate period, for instance, the kingdom was divided into six administrative divisions namely *Iqlim*, *Arsha*, *Thana*, *Khitta*, *Qasbah* and *Shahr* (Table 1.2). While governors and high ranking officers in the civil and military administration of the district occupied the top positions at the pyramidal hierarchy, there were other low ranking officers who were appointed to look after different administrations. During the reign of Sultan Ghiyath al-Din Azam Shah, for instance, there were *Karkuns* whose main responsibilities were to look after the Hajj Pilgrims. The *Qazi*, on the other hand, was entrusted with various civil duties apart from judicial administration. Thus, although to a lesser extent, a division of labour as pressing requirement of urban governance was noticed during the Sultanate era.

Table 1.2: Institutions and administrators under Sultanate, Mughal and British rule in Bengal

Muslim regime (Sultanate) 1206-1538		Muslim regime (Mughal/Nawabi) 1576-1780		Company and British regime (1780-1947)	
Institution	Administrator	Institution	Administrator	Institution	Administrator
Iqlim	Wazir	Subah	Subadar/Nazim	Province	Governor
Arsah	Sar-e-Lasker	Sarkar/Chakla	Fauzdar/Chakladar	Division	Commissioner
Shahar/Town	Sar-e-Lasker	Pargona	Shikdar	Zilla/District	DM/DC/Collector
Qasbah/Khitta	Sar-e-Lasker	Thana/Mahallah	Thanadar/Mahallik/Mahalladar	Mahakuma/Sub-division	SDO
				Circle/Thana-Union/Village	CO/OC

Source: Ahmed 1999

Being attracted to the splendid port privileges of Chittagong in the Indian Ocean, the interest of Arakanese in this part in fact revolved around one hundred and fifty miles up the coast from the Mrohaung (Mrauk U), the capital of Arakan. Arakanese king firmly established his authority over Chittagong in 1575 and continued ruling up to 1666. Under the Magh kings, Chittagong was divided into three principalities e. g. Dianga, Chakrasala and Ramu (Ali 1967).

Enticed with the Portuguese trade in Chittagong, Dutch, British and the French also endeavoured to ensure their presence in this region. It was however the Mughals who finally occupied Chittagong in 1666. The Mughals had considered Chittagong to be primarily a military outpost, protecting from the Magh raids and had provided local ethnic groups like Chakmas with 'rent-free lands'. Moreover, increase of a landed clan was achieved through the introduction of new policy by issuing *Sanads*, or documents that permitted the caretakers of religious sites tax-free rights to the land in perpetuity.

It was during the British rule that the port city of Islamabad was renamed as Chittagong (Hashemi 2006). Chittagong was the only port in East Bengal (Islam 2009a) and its economy was mainly based on agriculture, which made it valuable to the East India Company (Lees 2010). However, the trade and commerce of East Bengal was entirely linked with the industrial and trade centres of India using Calcutta (now Kolkata) as the main port.¹⁰ Nevertheless, Chittagong came into prominence after the

10. During the British rule, the regional centres of trade and commerce, such as Chittagong, Khulna, Narayanganj, Rajshahi, Rangpur and Jessore in East Bengal became dependent on Calcutta for the flow of goods (Kemper 1989).

partition of Bengal in 1905 (Islam 2003). A new province was created with the Eastern Bengal and Assam and with the advent of the railway allowing Chittagong to be connected to its hinterland, the port began to be utilised and urbanisation started (Osmany 2007).

Chittagong underwent significant institutional changes during the British period (Also see Box 1.1). The Chittagong Municipality was established in 1864 (Ahmed 2004; Qanungo 2010). The sub-divisional system was introduced in 1854 (Qanungo 2010) and the 'Committee for the sanitary improvement of the town of Chittagong', formed in 1856, led to some survey works and activities related to drainage system (CCC 2012). In line with the 1875 Act 13 of Indian ports, the Chittagong port underwent marked reforms during the British period.

Box 1.1: Various acts and administrative development during the British rule in Chittagong

The administration of Chittagong signifies the management of public affairs under the executive, police and other agencies starting from the British rule. The British administration inherited some of the features left by the Mughals and revenue collection had been a major aspect of the administration. Although some important officers remained in their respective positions, some major administrative structure changed frequently (especially until the end of 18th century). However, the post of 'Chief' was created under the British rule and acted under the authority of the East India Company at Calcutta (Qanungo 2010).

Local government in East Bengal was introduced when the local self-government with the Deputy Commissioner of Sylhet was established in 1811. The Chittagong Municipality was established under the District Municipal Improvement Act in 1864. The Act prescribed a committee of seven nominated persons. They included the Divisional Commissioner, Magistrate, Executive Engineer and the Superintendent of Police among others. In the Act of 1864 the facilities prescribed in the Municipal Act, 1850 were added. They include road development, imposition of security system, health facilities and also the appointment of cleaners for a fair city. Holding tax at the rate of 5.5 percent, which included tax on transportation, could be imposed by the Town Committee under the Act (Ahmed 2004).

The enactment of the District Town Act, 1868 was made in the view to deliver more facilities to the town people. A five-member committee was prescribed in the Act. A Chairman and a Vice-Chairman were provisioned and one third of the membership was reserved for government employees. The holding tax collected by the committee was to be spent for the development of different urban facilities. The Local Government Act, 1873 prescribed two-thirds of the members for a Town Committee to be nominated through elections. The act was amended in the year 1876 and regulations were consolidated. The Municipal Corporation Act, 1899 was the rearrangement of Municipal Corporation Act, 1876. The regulations of all urban organisations were classified and provisions on the appointment of Chairman and Commissioner by the central government were made. The Municipal Taxation Act, 1881 enabled the government to prohibit the levy of municipal tax in special cases. These cases include taxes payable by persons in the military, naval and airforce service or by the government (ibid).

In 1884, the Bengal Municipal Act, 1884 was enacted where the regulations prescribed in different enactments were further re-arranged (ibid). The size of the Municipal Board was made bigger and the Chairman, Vice-Chairman and two-thirds of the members were to be elected through general election (Ahmed 2004; Qanungo 2010). Income of the municipality was made through holding tax, transport and animal tax, vehicles registration fee, toll on ferry and bridge, water and electricity tax and latrine cleaning fee (Ahmed 2004). This Act remained the basis of municipal government in Bengal and provided the municipality with a greater share of self-government and civic responsibilities. Furthermore, greater responsibility was assigned to the municipality for the improvement of the health services through the Bengal Municipal Act of 1894. The amendment of the Act in 1896 took important steps to improve the aesthetic surroundings of the

...Cont'd

urban area (Qanungo 2010). According to the Act, collected tax was considered to be government revenue and instructions were provided to build playgrounds, free libraries, veterinary hospitals, increased open spaces and maternity centres among others (Ahmed 2004; Qanungo 2010).

The enactment of Local Government (Regulation) Act, 1936 introduced the participation of the people. The composition of local government was rearranged through the enactment of East Bengal Local Bodies Act, 1948 (Act No. X of 1948). The then East Bengal was formed with 56 Municipal Boards through this Act (ibid).

During the Pakistan period, the city witnessed the establishment of a number of important urban governing institutions to govern with detailed plans. The Chittagong Development Authority (CDA) Ordinance (1959) was enacted establishing the CDA to start planned development in the city. The First Master Plan was adopted by CDA in 1961.¹¹ A number of utility companies were established. The Chittagong Water Supply and Sewerage Authority (CWASA) was instituted under the Chittagong WASA Ordinance of 1963.

Chittagong grew as Bangladesh's main sea port and industrial and commercial centres in the post-independence era. The city underwent marked reforms as well. CDA, which started its operation during the Pakistan period, prepared its second Master Plan for the city for 20 years spanning from 1995 to 2015. The second Master Plan consists of Structure Plan, Urban Development Plan, Detailed Area Plan, Long Term Development Strategy for Traffic and Transportation for Chittagong and Storm Water and Drainage Master Plan.¹² According to the 1995 Structure Plan, total area under the CDA's jurisdiction is 1152 sq-km¹³ and it sets out 76 strategies and guidelines with regard to the population, economy, spatial development strategy, housing, community facility, transport, infrastructure services etc. The Urban Development Plan (1995-2005) concentrated only on the urbanised area of 259 sq-km, focusing on land use zoning guideline for development control, development promotion and guided development.

Chittagong City's key urban authority, the City Corporation, also underwent significant reforms in the post-independence period. Chittagong Municipality (est. 1864) was renamed as Chittagong Paura-Shava in 1977, which was upgraded to Municipal Corporation in 1982. On July 31, 1990 it was renamed as Chittagong City Corporation (CCC) and the government appointed a Mayor of the city. The first direct election of CCC was held in 1994.¹⁴

Thus, Chittagong, that began its modern era as a tiny municipality in 1863 with a population of 25,000 only, expanded markedly with growing urbanisation. The initial area of the newly formed Municipality was only 6 Sq. Km. At present the 155 Sq. Km. city accommodates about 2.6 million city dwellers in its 41 wards (See Map 1.1).¹⁵

11. The then government sought British technical assistance for preparation of master plans for Dhaka and Chittagong cities under the Colombo Agreement. A British Consortium of consultants, M/S Minoprio Spensely and P.W. Macfarlane was engaged to carry out the assignment. In 1959 two master plans were produced simultaneously for the two major cities—Dhaka and Chittagong (Chaudhury 2010).

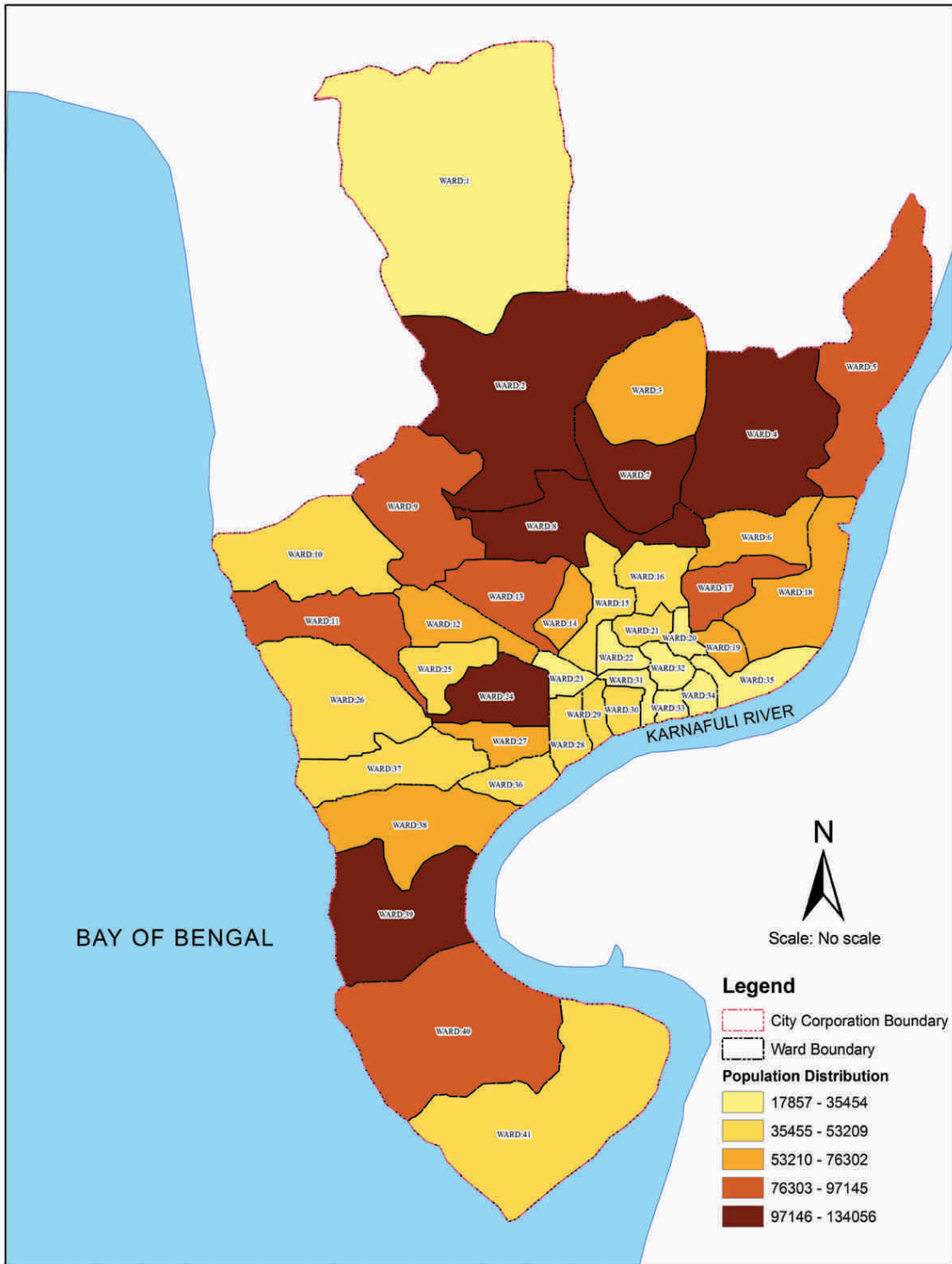
12. The Plan was prepared with UNDP and UNCHS financial and technical assistance in the year 1995, though it was approved by the Govt. in the year 1999 and it replaced the 1961 Master Plan.

13. In the North, Bashbaria of Shitakunda, Sangu River in the South, Ishakhali of Rangunia in the East, and Bay of Bengal in the West.

14. It is involved in carrying out the responsibilities of managing some basic civic services like street-lighting, conservancy, sewerage, city beautification, maintenance of city roads and mosquito eradication. In addition, CCC is heavily involved in the health and education sectors, as a supplement to the services provided by the government.

15. This number does not include the people living in slums.

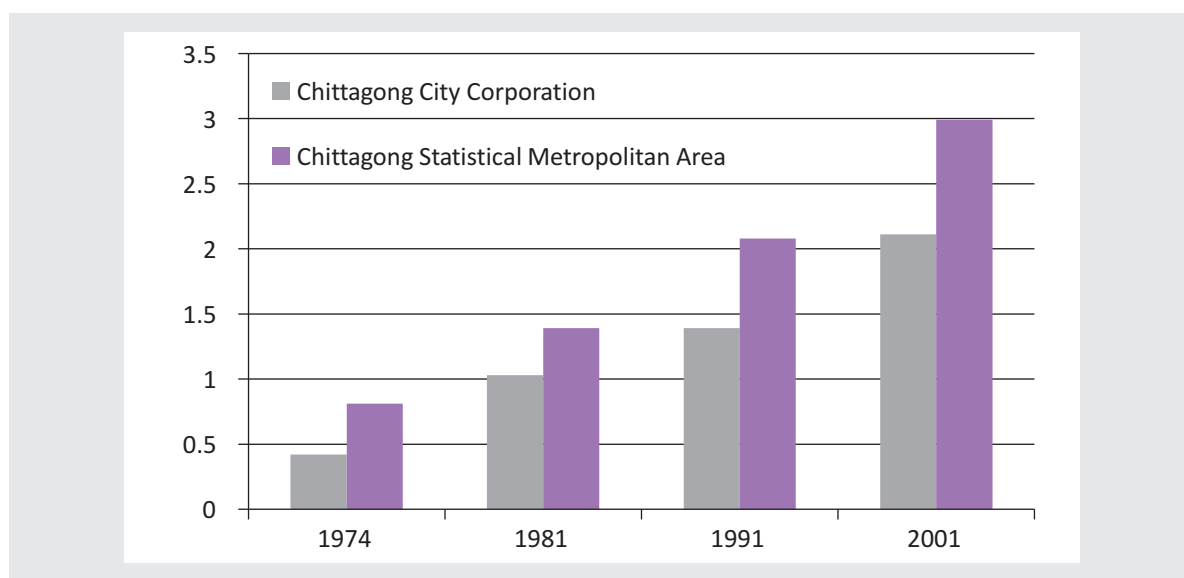
Map 1.1: Ward-wise distribution of population in Chittagong City Corporation



Source: Authors, based on BBS 2011

Chittagong witnessed marked urbanisation in the post-independence Bangladesh. Its urban population stood at 889,760 in 1974, compared to 364,205 in 1961. The increase in urban population between 1961 and 1974 (525,555) is attributed to in-migration (43 percent) natural increase (28 percent) and annexation (29 percent). The city witnessed rapid population growth in the subsequent decades (Figure 1.1).

Figure 1.1: Population of Chittagong City and Chittagong SMA



Source: BBS 2011

Moreover, Chittagong has become a cosmopolitan city of the country. BIGD Survey (2014) shows that about 62 percent of the inhabitants of Chittagong have settled in the city from other parts of Bangladesh.¹⁶

However, compared to Dhaka, Chittagong experienced a relative decline in terms of urban agglomeration. The gap between the first and second largest cities has increased since independence. Dhaka has been the largest city in the region since the sixteenth century. However, a comparison of the population ratio of Dhaka with Chittagong, the second largest city, shows that the dominance of the former had diminished by the middle of the twentieth century (Khan 1982).¹⁷

16. A large number of the population in the city migrated from areas, which include Comilla, Noakhali, Brahmanbaria, Bhola, Barisal, Chandpur, Feni, Cox's Bazaar and Kishoreganj.

17. Both Chittagong as a port and industrial-commercial centre and Narayanganj as an industrial-commercial centre grew rapidly after the creation of Pakistan in 1947. Since 1961 Dhaka has regained some of its prime status, and during 1961-1974 annexation of considerable territory increased the city's population by 222 percent. The other major cities, particularly Chittagong and Khulna, annexed territories recorded significant growth and emerged as regional centres.

Table 1.3: Chittagong city's population *vis-à-vis* the primate city of Bangladesh

	1961	1974	1981	1991	2001
Dhaka City Corporation (DCC), in million	0.37	1.40	2.48	3.61	5.33
Chittagong City corporation (CCC), in million	0.17	0.42	1.03	1.39	2.11
CCC's population share compared to DCC (in percent)	47	30	41	39	40
Dhaka mega city (DMC), in million	0.72	2.07	3.44	6.49	9.67
Chittagong Statistical Metropolitan Area (CSMA), in million	0.36	0.81	1.39	2.08	2.99
CSMA's population share compared to DMC	51	39	40	32	31
Population in Dhaka (the largest city), percent of urban population	21	31	27	32	33

Source: Based on BBS 2008 and World Development Indicators Online, World Bank

Since independence, Dhaka's urban primacy¹⁸ grew markedly *vis-à-vis* Chittagong (Table 1.3). In the Pakistan period, Chittagong, for instance, accommodated about half of Dhaka's population, now the corresponding figure is 33 to 40 percent for CCC and Chittagong SMA respectively. Similarly, in terms of economic establishment, in 2013, CCC hosted 182,737 units of economic establishments which is about one-third of DCC (572,687).¹⁹ The primacy of Dhaka and the centre's relations with Chittagong's key institutions have apparently affected the port city's governance significantly. The issue has been discussed in the report at some length.

1.4 Urban agglomeration: Importance of urban governance

Although Chittagong has emerged as Bangladesh's major urban centre, its potential largely remains underutilised. As observed by Muzzini and Aparicio (2013) 'the city has failed to capitalise on its natural comparative advantage as Bangladesh's largest seaport city.' While the population density in Bangladeshi cities is very high, the economic density is relatively low from an international perspective (ibid). This underlies that urban agglomeration has resulted in sub-optimal outcome for the country. Cities in the country are ill-equipped as far as infrastructure and service delivery are concerned.

This is hardly surprising. The common ills of rapid urbanisation, notably urban poverty, unemployment and squalor, are the apparent by-products of the rapid urbanisation in Chittagong and other major cities of the country. The urban centres concentrate a large pool of poor people — approximately 40 million people in Bangladesh live in urban areas, out of which 21 percent live below the poverty line (UNDP 2013).

This is a common trend in most cities in developing countries with the exception of China and a handful of East Asian cities. Unrestricted migration to the cities led to the rise of irreversible changes in the use of land, water, energy and other natural resources causing significant economic and environmental

18. Urban primacy is characterised by a high concentration of a country's urban population in a city or urban agglomeration (UN 2004).

19. For details see the Economic Census of BBS (2013).

challenges. Inadequate service delivery and infrastructure provisions and lack of affordable housing for low income group affect the quality of life of urban dwellers. Thus, instead of becoming an engine of growth, unplanned and chaotic urban sprawls²⁰ have become a challenge for the growth of cities and their liveability. It is no surprise that major cities of Bangladesh, notably Dhaka, is routinely recognised as one of the world's most unliveable cities.

Cities in developing countries are, in fact, not well prepared to embrace the flow of population that arrive from rural to urban areas, resulting in deplorable living conditions in cities. As UN-HABITAT (2007) claimed that in many cases economic circumstances of urban migrants are worse than those of rural peasants. When it comes to governance response in dealing urbanisation, a UN survey reported that the vast majority of governments that they surveyed would have liked to shift populations back to rural areas and to stem the tide of urbanisation (Quigley 2008). This clearly indicates that unable to address the by-products (externalities) of urbanisation, governments in developing countries face mounting challenges in managing urban transition.

To understand the role of governance in managing cities, it is imperative to discuss some basic concepts pertaining to city development.

1.4.1 Approaches to city development: Density, agglomeration, externalities and the role of governance

Higher level of urbanisation creates density which is considered the first of the geographic dimensions of development. Density, the economic mass or output generated on a unit of land, generally rises with urbanisation, rapidly at first, and then more slowly. These changes are associated initially with a divergence of living standards between places with economic density and those without and later with a convergence (World Bank 2009). Residents, workers, and firms are typically concentrated—or agglomerated—in urban areas, which gives rise to the notion of agglomeration economies. Clearly, people and firms agglomerate because there are benefits from doing so (Nelson and Uchida 2008). Literature on urban agglomeration provides at least three sets of theories. First, agglomeration economies emphasise the gains that come from reduced costs of moving goods across space (Krugman 1991); Second: labour market pooling and the benefits of moving people across firms (Marshall 1890); and Third: cities speed the flow of ideas that creates human capital at the individual level and facilitates innovation (Jacobs 1968). In short, people cluster in cities to be close to something. At their heart, agglomeration economies are simply reductions in transport costs for goods, people and ideas (Glaeser and Gottlieb 2009).

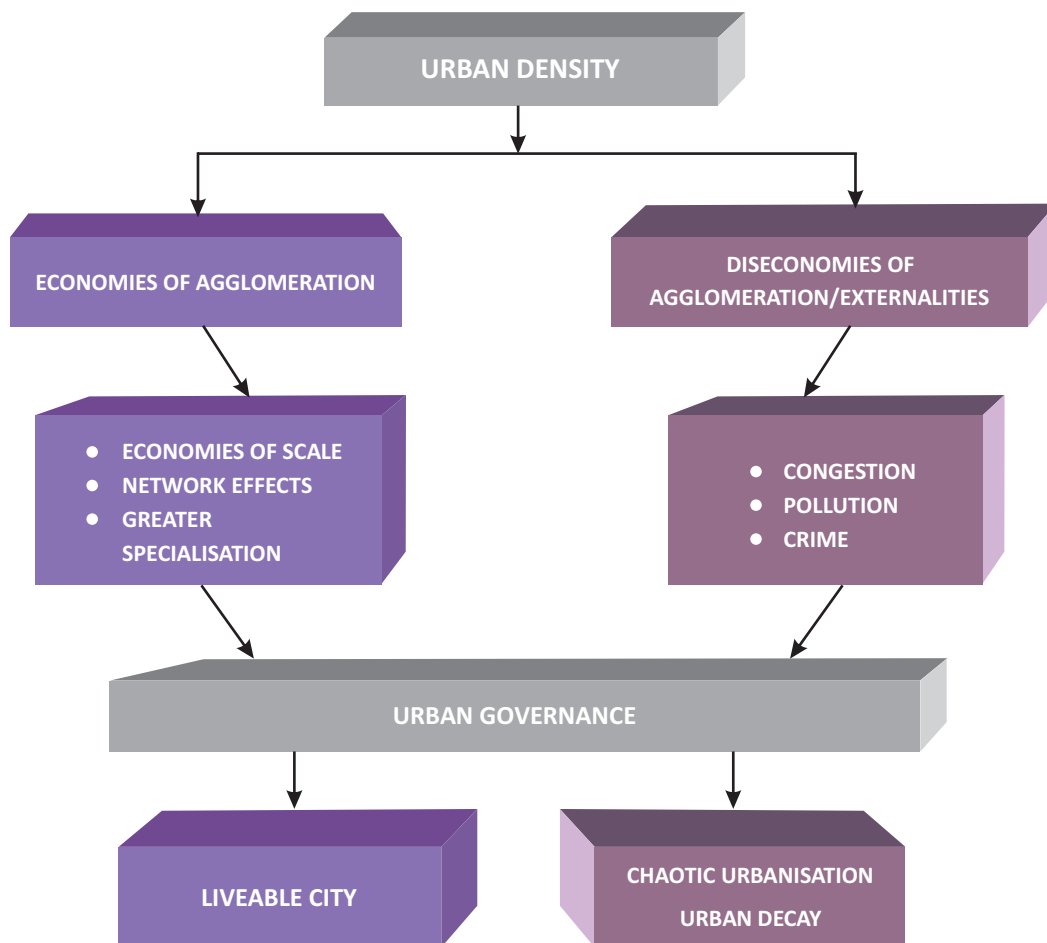
There are two types of agglomeration economies – urbanisation and localisation. Urbanisation can be defined as agglomeration economies accruing to a firm from the many different suppliers and producers located in a particular region, each of which takes advantage of the presence of banks, universities, labour, etc. that service diverse industries. Localisation is defined as agglomeration economies accruing when similar firms are located in one region, each of which takes advantage of the various facilities in the region (trade associations, training institutes, etc) (Hoover 1937; Polenske 2009).

20. Urban sprawl is referred as poorly planned urban development that changes land use patten, reduces green space, increases traffic, contribute to air, water and noise pollution.

Nevertheless, there is a cost of higher density. Rapid transfer of 'surplus labour' from agriculture to industry and services sector produce a host of problems such as congestion, pollution and crime in cities, known as diseconomies of agglomeration (Gomez-Ibañez and Ruiz Núñez 2009). This could further deteriorate the state of urban service delivery and degrade environment if the migration to cities is prompted more by push factors (agriculture stagnation, climate change etc.) than that of pull factors (economic opportunities, education facilities etc.). Cities start to sprawl around affecting land use and augmenting transportation costs limiting the benefits of density (Figure 1.2).

If the disadvantages of density outweigh its advantages, countries face a chaotic urbanisation and in the worst case scenario they could even face urban decay. Externalities arise when market transactions affect third parties and lead to market failures. This requires government or regulatory authorities to 'internalise the externalities' through the imposition of *Pigouvian taxes*²¹ set equal to marginal external cost.²²

Figure 1.2: Urban agglomeration, externalities and governance



21. Tax applied to a market activity that is generating negative externalities (costs for somebody else).

22. However, coercive solutions to environmental problems are often constrained by lack of political will, weak penalties, imperfect information or high transaction costs (Lyon forthcoming). It is even more complicated to find a coercive solution for the commons, natural resources belonging or affecting the whole of a community. Hardin (1968) felt that government coercion is needed to solve the 'tragedy of the commons.' However, Ostrom (2000) found numerous examples of common-pool resources that have been successfully governed by local people without reliance on government policy.

Nevertheless, the downsides of density have by and large been managed in the past few decades.²³ Cities in the west and in some East Asian countries became safe with massive investment in things like clean water, better transport and effective policing. Thus, cities require effective management to govern them well. In essence, governance is one of the important pillars of a city's urban operating model, in addition to planning, funding, sectoral policies and shape of cities (McKinsey 2010).

The narrow definition of urban governance underscores who will lead and be accountable (*ibid*). As far as the role of governance is concerned, urban reform needs political will, vocal citizens and active participation of the private sector, modernised service delivery structures including corporatisation of select municipal functions and leveraging targeted private sector participation. Transparency and accountability in city governments through city charters, MoUs between mayor and agencies, and through a state level urban regulator are also important factors (*ibid*). Thus, urban governance is not only a domain of city corporation or bureaucrats that typically run cities, it also demands contribution of numerous service delivery agencies, private sector, commitments from politicians, active role of citizens and communities.

1.4.2 Chittagong's agglomeration and liveability: Some critical issues

As discussed in preceding sections, higher population density and lower economic density in Chittagong indicates that urbanisation has not derived the desirable benefits for the city. Poor infrastructure and inadequate service delivery, *inter alia*, are blamed for this (Muzzini and Aparicio 2013). The existing literature (available reports, survey, newspaper archives on Chittagong and citizens' movements) also indicates that there is a discontent among the city dwellers about utility services, transport and infrastructure provisions and housing for low income people, environmental degradation, among others.

There are several formal institutions and authorities that provide (and regulate) services to the urban dwellers of Chittagong. Nevertheless, like many developing countries, the city's service delivery and infrastructure provisions are believed to be constrained by, among others, less than adequate coordination among numerous service delivery agencies.

The competition between key governance agencies, notably the CDA and CCC, to establish their dominance in terms of authority is also perceived as a constraint to the city having a single point authority ensuring horizontal accountability. Limited cooperation between the CDA and CCC is apparently affecting the city's day-to-day functioning and planning and implementing its long term plans. Apart from CCC and CDA there are a large number of agencies who are responsible for implementing the city's Master Plan. Due to either fund constraints or the concerned agency's lack of accountability, the city has witnessed little progress as far as its Master Plan implementation is concerned. The 20 year long CDA Master Plan (1995-2015) is about to expire, leaving most plans unimplemented.

Like in other major metropolitan cities of the country, despite installing elected Mayors, councillors and other representatives, administrative devolution in the city remains limited owing to both political and bureaucratic control over them. Moreover, the ruling party in the centre could influence the city's governance apparatus ignoring the elected urban authorities. In the case of Dhaka City, IGS (2011)

23. American cities, for instance, were very dangerous places to live in the 1960s and 1970s (The European 2011).

observed that 'there is a strong inclination for ruling parties to control local administration so that loyalty and support for the ruling party is maintained.'

The local governance authorities, including the elected bodies, often rely on the centre, the capital city, for fund and policy decisions which underlie their limited fiscal and administrative devolution. This also costs the local businesses dearly. Although Chittagong has been declared the commercial capital of Bangladesh, entrepreneurs find the business climate in the port city less than friendly for investment as they have to depend on the capital city for policy decisions that cost them time and money, ultimately affecting their competitiveness. This, nonetheless, is not unique in the case of Bangladesh. Developing countries in general, and developed countries to some extent, concentrate excessive administrative power to their capital cities compromising the development of peripheries.

Then there are issues pertaining to under-pricing of services. In most cases, service delivery model in developing countries do not even follow the cost-recovery pricing, lest market price. In the case of Chittagong, some utility prices have not been adjusted upward in line with inflation for a long period, forcing utility companies accumulating losses. Moreover, externalities, by-products of density, are often priced inadequately. Ineffective regulation gives leeway to polluters degrading air and water quality, among others. The city's life line, Karnaphuli River, is at stake. The rapid pollution and 'grabbing' of numerous feeder canals and rivers affect Karnaphuli's navigability and bio-diversity. Not to mention, the city is vulnerable to global climate change, perpetuated by rise in sea-level (IDS 2007).

Finally, given the limitations of formal utility and other agencies' to provide services to all sections of urban dwellers, intermediaries (informal channels) step in to fill in the demand-supply gap, notably in slum areas. They provide a low-cost but unsustainable, unreliable and unpredictable solution. These informal actors are generally slum-owners and local political leaders who liaise with numerous service delivery agencies, among others, to channel services to the slums. This has also created multiple authorities in the city. The slum owners do not only provide numerous services, they also are *de facto* governing authority for a large section of city dwellers who live in slums. All these constraints might have affected Chittagong's agglomeration costing its liveability.

1.5 Themes

Given the overarching focus of this report on a number of cross-cutting issues, at least five sets of issues are identified that have consequences for the city governance which are discussed in the report at length. While the eventual goal is to see how liveable Chittagong City is, it can be understood by looking at, among others, a) the accountability mechanism practiced by various urban service delivery and key governance agencies; b) to what extent various utility and other services are priced, and externalities concerning environmental issues are internalised; c) how intermediaries step in providing a low-cost solution amidst formal service delivery agencies' limitations to extent services to the low income group, and finally d) what role the centre-periphery relations play as far as administrative and financial devolution are concerned. All these issues largely define Chittagong's urban governance.

Liveability

At present, the reports on competitiveness, liveable cities and similar studies place greater emphasis on cities rather than countries, as there is a marked diversity in terms of growth, competitiveness and liveability of cities within a country. The Economist Intelligence Unit's (EIU) liveability ranking has set a

benchmark in terms of city ranking and the results are taken seriously by the concerned. The ranking considers availability of goods and services, low personal risk, and an effective infrastructure for ranking the cities around the world. Dhaka ranked as the least liveable city in 2014 among 140 cities that EIU surveyed, although Chittagong was not ranked in the study (Daily Star 2014a).

The news magazine Asiaweek (2005), ranked Chittagong at 31 (Dhaka at 33) in its list of top Asian cities. They considered a long list of variables of a wide range for their ranking, like, healthcare facilities, status of education, air quality, housing, open space, vehicles and traffic, mass transit, unemployment, GDP growth, urban inflation rate, vacation, criminal cases, access to telephones, commuting time, water supply and sewerage, and average income.

McKinsey (2010) identified four variables, which include scaled public infrastructure, reliable social services, good recreational and community infrastructure and sustainable environment that could be considered as benchmark criteria to see to what extent a city is liveable (Table 1.4).

Table 1.4: What good cities deliver: Some benchmark criteria

Sustainable quality of life	Scaled public infrastructure	<ul style="list-style-type: none"> - Uninterrupted access to clean water supply for every resident - 100 percent coverage, proper treatment of sewage and solid waste - 45 minutes maximum intra city travel time for all citizens
	Reliable social services	<ul style="list-style-type: none"> - Quality, affordable education and health care facilities for all - Access to affordable housing for all sections of the society; no urban slums
	Good recreational and community infrastructure	<ul style="list-style-type: none"> - Parks within 15 minutes of walking distance for every resident - Open spaces throughout all cities - Entertainment hubs and community spaces that celebrate diversity and foster innovation for all residents
	Sustainable environment	<ul style="list-style-type: none"> - Preservation of natural resources and ensuring access to clean air, water, and land - Matching national standards on climate change, emissions, and sustainability

Source: McKinsey 2010

Cities that offer an attractive proposition to business and people create a virtuous cycle that creates jobs, fosters talent, attracts capital, boosts productivity, and improves quality of life for residents. When cities are unable to comply with this they not only fail to leverage the potential economic benefits that urbanisation can confer, but also face a deteriorating quality of life, and eventually subpar economic growth (ibid). Thus, whether a city becomes liveable or undergoes chaotic urbanisation (in extreme cases face urban decay) largely depends on the governance structure put in place in the city in question.

Accountability

Accountability of service delivery and governance actors – either directly elected or appointed by the executive or other apparatus of the state – have important bearings as far as the city's service delivery and overall governance paradigms are concerned. Accountability ensures actions and decisions taken by public officials are subject to oversight, so as to guarantee that government initiatives meet their stated objectives and respond to the needs of the community that they are meant to be benefiting, thereby contributing to better governance (Stapenhurst and O'Brien 2008). However, urban agencies are generally accountable to their line ministries (not to local citizens or their elected representatives),

practicing a top-down governance model. This is a serious drawback with regard to conducting day to day activities as well as implementing a city's long term plans. This limits the empowerment of the elected bodies, notably the City Corporation, which are institutionally well-equipped to oversee the activities of utility and other service delivery agencies, thus ensuring horizontal accountability.

Pricing of services and externalities

Urban utility market is dominated by public sector entities. As the city accommodates diverse groups of people in terms of their income and other well-being, utility and other basic service cannot be left entirely to the private sector, more precisely to the market. Moreover, the state has wider social objectives to provide services to all citizens, irrespective of their income. However, state run utility providers' service delivery model often deviates from cost-recovery pricing, incurring huge subsidy by the exchequer. Moreover, studies indicate that the subsidy largely benefits the middle and high income group as low income people often do not even have access to those services. Consumers too prefer to stick to low price of services and even resist upward adjustment of price. Any attempts to price adjustment are often foiled by politicians who use urban middle-class as their vote banks. Unable to meet the cost-recovery pricing, utility companies accumulate losses that limit expansion of their services. Thus, the vicious cycle of low pricing and low service coverage persists.

Moreover, economic and political competition for the city's urban space leads to land grabbing and hill cutting, distorting its land use plan. Industrial pollution, traffic congestions and other by-products of density generate adverse externalities (external diseconomies). Externalities arising from environmental pollution are generally not priced properly (in some cases, not priced at all) either owing to patronage politics or polluters managing to evade law by paying informally to the concerned regulators, often below the market rate. Thus, pricing of utility and externalities are generally linked with the type of governance installed in a city, along with the behaviour of citizens and politicians.

Role of intermediaries

Given the limitations of formal service delivery models with regard to utility, infrastructure, housing, among others, intermediaries (informal agencies) step in to fill in the demand-supply gap. In the case of Dhaka city it was found that middlemen are an important link in the political organisation of the city, operating on the interstices between the imperfect official state and the informal world of access to entitlements and services. They purchase/lease land in order to exploit particular urban territories from municipal authorities, and then allocate plots to squatters, and provide electricity connection and access to latrine and water pumps in exchange of fees. On the other hand, these middlemen function as intermediaries between municipal officials and rent-seeking bureaucrats. They control the local population by collecting rent and loyalty from them in exchange for access to entitlements (IGS 2011). However, there are certain costs of this service delivery model. The presence of numerous intermediaries can spread corruption in public offices, distort land use, sprawl cities and create multiple authorities. All of these can have implications for a city's service delivery and governance system.

Primate city favouritism and centre-periphery relations

The local authorities, including the elected bodies, often rely on the centre for fund and policy decisions that underlie their limited fiscal and administrative authorities. The limited autonomy of the city's various service providers, administrative agencies and their dependency on the centre might also have cost the growth of the city. Developing countries have a tendency to concentrate on one city, known as 'primate city phenomenon'. With a population of about 15 million, metropolitan of Dhaka is the country's primate city — a city twice as large as the country's second largest city, Chittagong. Its

population is roughly three times the population of metropolitan Chittagong (Muzzini and Aparicio 2013). The degree of urban concentration in Bangladesh is higher than many of its comparators, with Dhaka's primacy rate (about 32 percent) much higher than its optimal (21 percent) level (World Bank 2007).

The concern here is not whether a primate city is too large, but how centralised bureaucracy favours the capital city at the expense of periphery (Muzzini and Aparicio 2013). More recent studies (Ades and Glaeser 1995; Nitsch 2006) suggest that political and institutional factors appear to be at the root of the primacy phenomenon. Some experts argue that the political economy associated with urban primacy may be very difficult to break (Henderson 2003). Cronies who benefit handsomely from their proximity to the political power are unlikely to easily accept a levelling of the playing field. Nevertheless, empirical evidence suggests that by giving political voice to peripheral cities, accountable democratic governments limit the ability of the capital city to favour itself. Fiscal decentralisation also helps level the playing fields across cities, by empowering peripheral cities to compete with the primate city. The theoretical findings of Henderson and Venables (2009) suggest that governments may play a role in anchoring expectations about which secondary cities will get developed. Their development may then alleviate primacy. However, anchoring expectations about future urban development may be subject to time-inconsistencies and subject to an inefficient political economy.

1.6 Chapter overview

After the Introductory chapter, the main body of the report begins with a chapter on *Political Economy of Urban Governance*. The Chapter analyses administrative and fiscal constraints in managing the city. It explores both institutional factors particularly their accountability, their capacity as well as the centre-periphery relations that largely define the governance structure of the city. Citing primary data, it shows that the city's development is not need-based. The lack of accountability of service delivery and governing agencies, patronage politics, limited autonomy of City Corporation and the centre's undefined policy to fund the local government, *inter alia*, constraint the city in implementing its Master Plan and other need-based projects. The chapter argues that unless an urban operating model through devolution of power and unity of governance is set out, the city might continue to be exposed to chaotic development, adversely affecting its agglomeration and liveability. The authors offer some recommendations to develop an urban operating model for the port city facilitating administrative and financial devolution.

The chapter on *Governance of Land Use and Housing* reviews the governance of housing and its essential corollary land use in Chittagong. It analyses the public, private and other housing provisions, including the state of rental housing market, available in Chittagong, followed by housing for the poor, informal settlements and slums. The chapter then reviews the institutional architecture pertaining to land use and housing governance and analyses the gap between institutional provisions and actual governance practices. The chapter draws some conclusions providing a set of recommendations for streamlining the governance of land use and housing of Chittagong.

Studying demand and supply gaps of basic utility services, the chapter on *Urban Service Delivery* explores how different income groups from those living in informal settlements to middle class residential areas and upper income neighbourhoods, access services from the state and privately through informal channels. It identifies the institutional bottlenecks as well as the limitation of the existing pricing model that constraint providing better services to the city dwellers. Finally, the chapter suggests a sustainable service delivery model for the city.

The chapter on *Transportation Governance* assesses the state of transportation sector analysing various facets of the city's formal and informal transport system. It argues that the proliferation of informal transport in the city is the result of the less than required supply of formal public transports, suggesting that the transport needs of Chittagong are not addressed in line with the transport plan of the city. Critically analysing the ongoing initiatives undertaken by the authorities to address the city's growing transport problems the authors argue that the current approach undermines the city's need-based transport development. Discussing the implications of the transport infrastructure on the city's liveability, the chapter provides a sustainable transport vision for Chittagong.

The chapter on *Environmental Governance* discusses different aspects of the city's environment — water quality, air quality, noise, waste management, drainage system — and the respective governance arrangements at length. It argues that while appropriate environmental governance arrangements are in place, externalities are not internalised adequately due to the lack of proper enforcement of environmental laws and patronage politics. It shows that the pollution and other environmental degradation of the city's lifeline — Karnaphuli River — is the outcome perpetuated by coordination failure of concerned regulatory authorities, non-implementation of Master Plan and the weak implementation of laws, among others.

The report ends with a conclusion that summarise the main contributions of the chapters in this report and proposes ways forward for further research on the issue of urban governance.

Chapter 2

Political Economy of Urban Governance

2.1 Introduction

Cities need good governance to foster agglomeration as well as to address issues of density (Glaeser 2013). Chittagong's poor urban management is reflected in inadequate utility services, poor transport, housing and infrastructure provisions, among other services.¹ Externalities are not taxed in line with economic principles, allowing industries to pollute the city's urban environment. Better service delivery is affected by capacity constraints, lack of coordination among various service providers and fund constraints.² Moreover, political considerations tend to derive the allocation of funds from the centre to local agencies that often ignore the city's need based development.³ The Chittagong City Corporation (CCC), which is an elected body accountable to its citizens, is apparently given less priority in terms of fund allocation.⁴ Political reasons are generally blamed for the preference.⁵ As a result, Chittagong has been less than successful in implementing its master plans (MPs) and Detailed Area Plan (DAP) designed to improve service coverage considering the growth of density over the years. Moreover, the projects that are prioritised on political considerations have apparently ignored the priority set by the master plans. Chittagong, for instance, does not have a sewerage system and it routinely goes under water during the rainy season as a result of non-implementation of the Storm-Water Drainage Master Plan. These priority projects have been identified by the city planning authority in its 1995 Master Plan. However, owing to fund and other constraints of CCC and Chittagong Water and Sewerage Authority (CWASA), the plans remained unimplemented.

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1. BIGD Survey 2014, Focused Group Discussion (FGD) and Key Informant Interview (KII) findings.
 2. FGD and KII Findings. Also see chapter 3, 4 and 5 of this report.
 3. FGD and KII findings.
 4. Prothom Alo 2014a.
 5. FGD and KII Findings.

On the other hand, Chittagong Development Authority (CDA), a nonelected body which is generally run by bureaucrats,⁶ received more funds to finance projects that did not even feature prominently in the city master plans. Moreover, projects that are executed often ignore the importance of detailed feasibility study.⁷ In many instances, delay in getting funds from the centre and lack of implementation capacity led to a few fold rise in the budget.⁸ More importantly, there is no effective mechanism put in place to make institutions accountable for not implementing projects. The centre, on the other hand, is less than enthusiastic to devolve enough power to local institutions in way of becoming financially independent and taking own initiatives to impose new types of taxes and financing their long term projects.

All these developments might have resulted in inadequate service provisions in the city opening the space for numerous intermediaries (informal market) to meet the demand-supply gap. However, as discussed in other chapters of this report, informal market is a poor substitute for formal service provisions leading to sub-optimal outcome. This underscores the importance of good urban governance that should be studied considering the factors stated above. In fact, urban governance is considered as one of the critical pillars of city management.⁹

The foregoing description provides a backdrop for the current chapter, which aims to investigate how Chittagong is governed politically as well as economically. In this pursuit it explores both local institutional factors as well as the centre-periphery (local) relations that define the governance structure of the city.

The rest of the chapter is organised as follows. Section 2.2 briefly discusses the research questions and methodology of the chapter. Section 2.3 looks at the current development model of Chittagong exploring to the extent it is need-based. The following section (2.4) identifies the constraints in implementing various projects prioritised by master plans and other initiatives to solve the city's problems. In particular, implementation constraints of urban plans, notably institutional issues and the centre-periphery relations are discussed at length. Section 2.5 discusses the city's urban operating model focusing on both administrative and financial devolution and the final section concludes the chapter.

2.2 Research questions and methodology

Based on the discussion in the previous section as well as other chapters of this report, it is necessary to explore at least three sets of questions to understand the city's governance.

- a) *Are Chittagong's developments need-based?*
- b) *What are the political and economic constraints to manage the city's day-to-day activities and implement the city's long-term development plans?*
- c) *What should be the urban operating model for Chittagong?*

6. Its current Chairman is, however, a politician affiliated with the ruling party Awami League.

7. KII Findings.

8. KII Findings.

9. The other pillars are funding, planning, sectoral policies and shape of cities (McKinsey 2010).

To study these issues the authors have used a qualitative method applying both primary and secondary data. The primary sources include key informant interviews with the City Mayor and ward councillors, CDA Chairman and other officials, urban planners, businessmen, social activists, journalists, academics, politicians and trade union leaders. A number of urban plans, journal articles, book chapters, newspaper archives, laws and acts and other documents have been reviewed thoroughly for the chapter.

2.3 Are Chittagong's developments need-based?

Given the growing urbanisation and the resulting pressure for a host of urban services, cities need to have proper plans with effective implementation authorities defining the roles and accountabilities of the respective stakeholders who are responsible to govern the city. Urban plans are critical policy instruments to manage trends of urbanisation, distribution of urban resources (e.g. land) and provision of services.¹⁰ The experience of city development around the world suggests that effective and systemic urban planning has been part of the fabric of successful cities for decades (McKinsey 2010). Chittagong currently has a Master Plan (1995-2015) to address its pressing needs. However, as indicated in the preceding sections, Chittagong's current infrastructure and other development have undermined the plan giving priority to political and other vested interests. By reviewing the city's past and present development activities and identifying the roles of the key governing agencies and actors, in this section we aim to discuss to what extent its development model is need-based.

CDA prepared two Master Plans (1961 and 1995-2015) for Chittagong. In fact, the city's development needs are best captured in these Master Plans. To support the 1995 Master Plan (MP), a structure plan, an urban development plan and a detailed area plan of the city were designed, to ensure that the city can accommodate the growth of population and economic activity expected in the future — with the ultimate goal to encourage the growth of the city.¹¹

In line with these objectives, the plan identified a host of projects involving land use, utility, housing, transport and other service and infrastructure provisions, flood control and drainage, etc.¹² The CCC and CDA were identified as primary institutions responsible for the plan implementation by 2015. The other institutions that also have a critical role in implementing the MP included CWASA, Bangladesh Water Development Board (BWDB), Power Development Board (PDB), Local Government Engineering Department (LGED), Roads & Highways Department, Chittagong Port Authority (CPA), Bangladesh Railway, Bangladesh Telecommunications Company Limited (BTCL, formerly BTTB) and Bangladesh Export Processing Zone Authority (BEPZA). There are other priority projects, particularly to address transportation and flood control, such as the Chittagong City Outer Ring Road (CCORR), spearheaded by Japan International Cooperation Agency (JICA) and approved by the Government of Bangladesh (GoB), which was expected to be implemented by CDA by end of 2015. Moreover, the structure plan made a phasing sequence of various projects based on a five year plan starting from 1995 (Table 2.1).¹³

10. The history of urban planning dates back to 1910s. Dhaka's first Master Plan was drawn up in 1917 by the Scottish town planner Patrick Geddes, romantically envisaging it as a garden city centred around the Ramna district's broad leafy avenues (IGS 2012). The first Master Plan for the port city Chittagong was prepared in 1961.

11. The other objectives of the plan include guiding the special distribution of urban development, extending the provision of urban services and facilities, improving decision making related to funding of urban services, and ensuring that the government, as enabler rather than provider, supports the private sector development role, gives priority to meeting the needs of the poor and takes environmental considerations fully into account in making decisions related to urban development. Also see CDA 2008a, CDA 2008b, CDA 2008c, CDA 2008d and CDA 2011.

12. *ibid.*

13. Implementation phases are short term (1995-2000); medium term (2000-2005) and long term (2005-2015).

Table 2.1: Major projects identified by Master Plan (1995-2015) and other high profile projects

Major projects and purpose	Implementing agency	Phase of works	Status
The Storm Water Drainage and Flood Control Master Plan Proposed development of the drainage system in five phases within the plan period of 1995-2015 to control floods and ease the city's water-logging problem. Funding Agencies: GoB and CCC	CCC and BWDB	Phase I (1993/94-1996/97) Phase II (1997/98-2001/02) Phase III (2002/03-2006/07) Phase IV (2007/08-2011/12) Phase V (2012/13- 2014/15)	Not implemented
Solid waste conservatory ground project	CCC	Phase I	Not implemented
Joint venture drinking water supply project in Karnaphuli	CWASA/CDA	Phase I	Not implemented
Karnaphuli River Link Road and Strand Road-Sadarghat upgrade	CDA		Not implemented
The Chittagong City Outer Ring Road (CCORR). The purpose of the project is to construct a part of the city's outer ring road with revetment functions in Chittagong's coastal region where the EPZ is located (total length 14.7km), and then to alleviate the traffic congestion of existing roads, and to mitigate damages caused by natural disasters, such as cyclones and high flood tides etc., thereby contributing to the promotion of the city and country's economic development. Funding agency: GoB and JICA	CDA	(i) Scheduled project completion: February 2016 (project is completed when the facilities are opened for use)	Not implemented

Note: For the complete list of projects identified by the CDA see CDA 2008b.

Source: CDA 2008b and JICA 2009

According to DAP, for the existing urban areas of Chittagong, priorities depend on the urgency of the problem such as drainage and sanitation, garbage disposal, traffic congestion, lack of safe drinking water, shortage of electricity and gas supply, industrial waste treatment plant, etc. However, most need-based plans remain largely unimplemented. Moreover, many projects that were not attached with greater priority in the Master Plan are being undertaken and implemented instead. The spending spree for the flyover projects or channelling funds for such projects, for instance, have apparently undermined the priority set by the Master Plan as early as 1961 but are yet to be implemented. Nonetheless, CDA is going ahead with the construction of several flyovers. None of these flyovers were recommended in the 1995 Master Plan. Experts and city dwellers questioned about the utility of flyovers that are being built in the city (See Box 2.1).

All the master plans as well as the DAP, for example, attached higher priority to constructing a road stretching from *Sadarghat* to the *Karnaphuli third bridge* in order to bring down the distance between *Barik Building* intersection and the *Karnaphuli third bridge* to 3.2 km from 17 km. This project has not been implemented.

Box 2.1: Opportunity cost of flyovers

There are debates in Chittagong as to what extent the flyovers are easing the city's traffic congestion. The CDA has constructed a flyover in Bahaddarhat area, one of the high traffic prone zones of the city. The 1.5km long flyover costs BDT 145 crore. However, the infrastructure has had little impact in mitigating Bahaddarhat's congestion problem. A study was conducted by the Southern University Bangladesh to understand the user characteristics of the flyover found that in peak hours, number of vehicles moving underneath the flyover exceeds the number of vehicles using the flyover by 3.85 times, as reflected in Table 2.2. The peak-hour of traffic count is based on maximum number of vehicles observed during a particular period both under and over the flyover.

Table 2.2: Details of vehicular movement under and over the Bahaddarhat flyover counted at Muradpur point

Vehicular movement under the Bahaddarhat flyover								
Peak hour	CNG auto rickshaw	Local rickshaw (motorised and non-motorised)	Bus/Truck/Minibus	Jeep/Car/Micro bus/Pick-up	Tempo*/human hauler	Motor cycle	Bicycle	Total vehicles per hour
7.00 pm to 8.00 pm	280	155	359	150	105	75	68	1192
In percent	23.5	13	30.1	12.6	8.8	6.3	5.7	100
Vehicular movement over the Bahaddarhat flyover								
10.00 AM to 11.00 AM	89	85	15	77	1	41	2	310
In percent	28.7	27.4	4.9	24.9	0.3	13.2	0.6	100

Note: Traffic count on 12.06.14 and 08.06.14.

*Tempo – Small public transport, usually Vespa-based three-wheeler, capacity up to 15 persons

Source: SUB 2014

The relatively lower usage of flyovers has not surprised the city's urban experts who are of the opinion that politicians are generally more interested in developing large visible infrastructure projects ignoring the city's need-based development. The money spent for the flyover could have been utilised better for other priority projects as far as the city's traffic management is concerned. Urban planning experts have suggested several alternative ways for mitigating traffic congestion other than construction of flyovers, which is only one of the options and often a very expensive choice in mitigating traffic congestion. Improving traffic management, construction of a new parallel road and widening of the existing road could be the other options.

The CWASA has been operating without a sewerage system since its inception in 1963. The CCC and other agencies' inability to implement projects devised to solve the city's water logging problems, largely owing to financial constraints, cause sufferings for the city dwellers during the rainy season. To address the problem, the Drainage Master Plan (1995-2015) proposed, among others, to excavate three primary new canals and a few secondary canals; construction of a navigation gate in front of *Chaktai Canal* and sluice gate in front of *Mohesh Canal*, and re-profiling and construction of silt-trap in some canals. According to an urban planner who was involved in preparation of the Master Plan, none of these proposals have been implemented (Dakhina 2014). Similarly, other priority projects, such as water purification and solid waste conservation, that are critical to meet the city dwellers' basic needs

as well as addressing the city's environment issues, have not been implemented. The tenure of the existing Master Plan is scheduled to expire in 2015. Similarly, despite conducting detailed feasibility study and allocating funds for the Chittagong City Outer Ring Road project by JICA, the work of the project is yet to begin, although it is expected to be open for use in February 2016.

However, it is not implied that CDA and other agencies have not implemented the projects prioritised in master plans at all. CDA has implemented a number of road expansion and other projects in line with the Master Plan, as discussed in the Transportation Governance chapter of this report. Nevertheless, the development projects that are undergoing in Chittagong undermined the city's need-based development.

2.4 Implementation constraints of urban plans: Institutional issues, (in)action of agencies and the centre-periphery relations

The preceding section suggests that the current development activities in Chittagong are not need-based. In this section, we discuss the reasons that constraint implementation of need-based projects identified by urban plans.

2.4.1 Institutional setting, authority distribution and accountability

There are 32 or more government agencies in Chittagong. Their coordination and horizontal accountability are critical in governing the city — both in terms of managing the city's day to day activities as well as developing its physical infrastructure. However, in reality, except for CCC, all agencies fulfil separate ministerial mandates following a vertical accountability structure. They undertake and implement projects based on central plans without proper horizontal linkage with each other, which is crucial for planned development in any city. Although all the key stakeholders are generally involved during the preparatory phase of the city's Master Plan, they are less than effective in implementing the plan. In the preparation of DAP, for example, nineteen development agencies of the government had high level representation in the Technical Management Committee (TMC) responsible for overseeing and vetting the plan before it was sent for final approval to the Inter Ministerial Steering Committee (IMSC). IMSC also has high level representation of nine ministries. Following these procedures, the plan was approved and published as a gazette by the government mandating all the agencies to implement the plan. However, most agencies have *de facto* disowned the Master Plan opting for their own *ad hoc* activities.

Nevertheless, horizontal linkage among some agencies is not entirely absent. The CCC, for instance, represents the governing boards of CWASA and CDA. However, this often does not allow the city corporation to play an effective role. A ward councillor of CCC observed that in many instances individuals or business houses violate the CDA's residential approval plans encroaching drains, canals and *commons* causing water logging problem in the city. Elected representatives are directly accountable to the voters, and if they cannot play a role in the planning phase of building structures they find themselves handicapped in addressing the problems arising from illegal grabbing of public properties or the *commons*.

The lack of coordination between CCC and CDA seems to have handicapped the city's development. CDA, for example, has taken four years to give permission to construct the CCC's new headquarters '*Nagar Bhaban*'. It also withheld the city corporation's Lake City Residential Project alleging that the project has not met the compliance conditionality, whereas, the CDA executed numerous construction, maintenance and extension projects without the permission of CCC (Prothom Alo 2014a). Experts

familiar with the issue believe that the political ideologies and other differences between the chief executives of the two crucial institutions compromised the coordination required to conduct the city's day to day functions as well as to provide its long term infrastructure and other service provisions. The lack of coordination is not limited to these two institutions only.¹⁴

At present, there is no structure or mechanism put in place to make the local agencies accountable for their performance. The CDA Chairman claimed that until 2009 no agency had even properly reviewed the Master Plan.¹⁵ According to a city planner, except for canal excavation and drainage projects, not many concrete proposals based on the Master Plan have been sent to the central government by the CCC. While the CDA submitted 35 projects to the government, the CCC concentrated only on a handful. Similarly, other agencies have also not taken any serious attempts to implement the projects prioritised in the Master Plan. Similarly, most of the construction works of the CCORR with JICA's finance (the government is also required to bear some cost of the project) was supposed to be complete by now. After completing the due procedures the project was awaiting implementation back in 2007. However, the change in CDA's leadership has apparently halted its implementation phases of the project. According to a former Member of CDA, 'discontinuity of development works' often happens following the change in government or leadership of agencies.¹⁶

The cost of non-implementation of a plan is enormous. Inflated project cost is an outcome of the inaction of various agencies operating in Chittagong. *Chaktai Khal* excavation, which was proposed in the Drainage Master Plan in 1995, had an estimated budget of BDT 9 crore. According to the CCC Mayor, it will now require more than BDT 300 crore to implement it.¹⁷

In fact, given the past experiences of constraints in project implementation, the Structure Plan observed that the implementation is dependent on the effective coordination between numerous government agencies responsible for urban development in Chittagong. To address this shortcoming, it recommended that an Urban Development Co-ordination Council should be established to effect coordination.¹⁸ Moreover, a coordination tool to govern the cities could be the idea of 'City Government' conceived by two former Mayors of Dhaka and Chittagong.¹⁹ The idea of city government underlies the importance of horizontal reporting of concerned ministries' local units to the mayor of city corporations. Their idea was seen as an affront and a move to weaken the government's control over the cities even by the political parties they were representing (i.e., Awami League and BNP). These issues are discussed in the subsequent section at length.

14. The conflict between the CDA and the District Commissioner (DC), for instance, forced the former to postpone a tender over a development and beautification project of DC Hill Park (Prothom Alo 2014b). The citizen groups stepped in opposing both the CDA and DC office's stance as the historic place is traditionally not only used to celebrate cultural programmes but also used as DC's residence. The CDA's development plan does not go with the interest of the people and the civil society organisations demand full-fledged cultural complex facilities on the Hill. This highlights the lack of coordination among government agencies in the city. Moreover, the citizens' opposition to the development works of both the agencies underlines the absence of citizen-centric urban development in the city.

15. He apparently sent the MP to the relevant agencies.

16. KII Findings.

17. KII Findings.

18. CDA 2008b.

19. Md. Hanif was the Mayor of Dhaka during 1994-2002 and ABM Mohiuddin Chowdhury of Chittagong for two tenures (1994 to 2010).

2.4.2 Centre-periphery relationship and politics in funding and policies for city's development

Chittagong's development is also affected by its excessive dependency on the centre for policy decision as well as financial resources — both are critical to speed up the activities of local agencies. This, nonetheless, is not unique to cities in Bangladesh, widely discussed in the literature on 'primate city favouritism' (Duranton 2008; Henderson 2003). Chittagong's financial dependency on the centre and the CCC's grant dependent and unpredictable development budget (Table 2.3 and Table 2.4) often cause delay in project implementation. The corporation's revised/actual annual development budget is largely unrealised owing to the yawning gap between the proposed and actual/amended budgets. The amount of grant receivable from the government varies from year to year and is always uncertain. The CCC does not know in the beginning of a financial year, the amount they can expect from the government as financial grant. As a result, the city cannot plan in advance, as is the case for all the other city corporations in the country. Thus city corporations always tend to submit inflated budgets in anticipation of getting large government grants.

Table 2.3: Development budget of CCC

	Total budget (proposed), Taka in crore	Actual/amended budget (revenue plus ADP), Taka in crore	Realisation rate
2012-13	425	99	23.3
2011-12	360	109	30.3
2010-11	325	112	34.5
2009-10	294	98	33.3
2007-08	208	47	22.6
2004-05	160	41	25.6
2003-04	127	21	16.5
2002-03	120	20	16.7

Source: CCC budget documents, various years.

Table 2.4: The centre's contribution to the development budget of CCC

	Proposed, Taka in crore	Actual/amended, Taka in crore	Fund realisation rate
2012-13	213	63	29.6
2011-12	248	92	37.1
2010-11	201	103	51.2
2009-10	2644	90	3.4
2007-08	151	48	31.8
2004-05	204	46	22.5
2003-04	210	27	12.9
2002-03	220	29	13.2

Source: CCC budget documents, various years.

In many instances, there have been no funds available from the centre creating much uncertainty in implementing long term development plans. The city's financial weakness is heightened by its limitations to mobilise own resources to finance various projects. These limitations are affecting the city's key institutions, notably the CCC, to implement their long term projects. The Drainage Master Plan (1995-2015), for instance, identified a host of projects to be implemented in 20 years. It also conducted activity-wise cost estimation and set a timeline to complete the plan in different phases (from 5 to 15 years). The estimated cost of the project was BDT 1,000 crore to be spent in various phases. The government's approval of the plan meant that it is committed to the agreement, including providing financial resources (and/or allowing the city to raise its own funds) required for implementation of the plan. However, the Master Plan saw no meaningful progress in the past 19 years (Prothom Alo 2014a; Prothom Alo 2014c).²⁰

Moreover, Chittagong is heavily dependent on the centre for policy decisions. Despite being the principal seaport and the gateway of the country, key decisions involving the port city are often not taken in Chittagong. The concerned agencies' headquarters including the Ministry of Shipping, Chief Controller of Export and Import and the Export Promotion Bureau are all located in Dhaka. Also, instead of instituting headquarters of key public and private organisations in Chittagong, a number of offices have been shifted from Chittagong to Dhaka over the years (Prothom Alo 2008). Hence, the city does not draw attention of policy makers for its development needs. The centre's inadequate attention to Chittagong's importance goes against the government's declaration of the port city as Bangladesh's 'Commercial Capital' in 1994 which was subsequently approved in the Cabinet meeting. However, the government has neither taken any serious measures to devolve the administrative power, nor has it allocated the resources required for the city to make it the country's commercial capital.

Amidst inadequate resource provisions for the port city's development, access to available funds varies from agency to agency due to the centre's preference that often does not serve the city's interest. This is evident from CCC and CDA's receipt of funds from the government. The corporation received BDT 348 crore (see Table 2.4) from the government in terms of ADP allocation, block grants and other government grants in the past four years, whereas the CDA was given BDT 4,400 crore in last five years (Prothom Alo 2014a). To get the fund, CDA submitted a total of 35 projects to the government, particularly in 2009 and 2010, and all the projects were approved by the concerned ministries and other agencies in the centre. The CDA has either implemented or is about to complete 31 projects at the cost of BDT 2,000 crore and the remaining three projects worth BDT 2,400 crore are scheduled to be completed by the end of 2014 (Prothom Alo 2014c).

In contrast, the CCC had to wait three years for the government's approval of BDT 289.44 crore project to excavate a canal from Baraipara of Bahaddarhat to the river Karnaphuli, which is one of three canals, proposed in the Drainage Master Plan in 1995 (Daily Star 2014b). According to the insiders of CCC, CDA's projects are approved at the directives of the government's highest authority whereas the centre pays less attention to the ones submitted by CCC. The quick approval of CDA's projects and delay in CCC's ventures underscore the political preference of the centre in terms of institutional choice undermining the elected body of Chittagong.²¹

20. Nevertheless, the ECNEC (Executive Committee of the National Economic Council) has approved some funds for the plan in June 2014 (Daily Star 2014b). The delay has already increased the budget a few folds.

21. The current chairman of CDA is the treasurer of the Awami League's (the ruling party) Chittagong Metropolitan Committee. The Mayor, who heads the City Corporation, is an adviser to the Chairperson of Bangladesh Nationalist Party (the former ruling party) who ceased his long-standing affiliation with AL securing the support from BNP for the mayoral position.

That said, there is no defined criterion or policy as far as fund or grant disbursement to the key agencies of the city are concerned (Dakhina 2014). As a result, the centre's individual choices with local agencies' executives appear to be a key determinant to access the centre's resources.

How Chittagong's dependency on the central government costs its growth is evident by CPA's limitations to spend its own fund for its development. On paper, CPA is an autonomous organisation capable of taking decisions. However, they can take very few decisions without prior approval from the concerned ministry headquartered in Dhaka. The Karnaphuli Dredging Project may be cited as an example of tedious and time consuming approval process that the CPA had to go through before getting the approval from the centre. The delay in decision making process escalated the cost of the project.

Chittagong's funding and policy dependency on the centre might have cost not only the city's interest but also the country as a whole. About BDT 4,000 crore worth of investment is lying idle in Chittagong. This is having a negative impact on Chittagong's contribution to national exchequer. Chittagong contributed about 50 percent of the total revenue collection by the National Board of Revenue (NBR) in the year 2000-2001, while Dhaka's contribution was only 37 percent in the same period. Since then, the scenario has reversed (Ashraf 2007).

Given these budgetary constraints and policy uncertainty, the city needs a devolved financial model which is discussed at length in the following sections.

2.5 Urban governance model for Chittagong: Devolution of power and accountability

The discussion in the preceding sections suggests that Chittagong lacks an effective urban governance system. The city, in particular, does not have an empowered single point authority. The lack of coordination among service delivery agencies, their vertical accountability and ambiguous centre-periphery relations cost the city's development badly. As far as financial independence is concerned, the city needs a sustainable model that ensures adequate power to mobilise its own resources and is not discriminated by the centre in terms of fund allocation as well as policy support.

In other words, Chittagong needs to have a devolved governance model that empowers the local leaders, including the CCC. Despite the fact that unlike many cities in South Asia, Chittagong (and most other Bangladeshi cities) have elected (democratic) representation which provides the opportunity to embed a bottom-up governance system rather than being run top-down by the centre. According to McKinsey (2010), building effective governance is about ensuring a suitable mandate, designing effective structures, delegating power, embedding accountability, and making sure cities have appropriate and sufficient capabilities at their disposal. McKinsey's global study on city governance shows that successful cities have implemented outstanding and proven practices across the following six areas: devolution of power to cities, appropriate balance between local and metropolitan structures, 'single point' empowered leadership, appropriate organisation structure for service delivery and fast decision making, access to managerial talents and key skills, and clear accountability and transparency mechanism. Issues concerning power devolution to cities both from political and administrative as well as economic perspectives are discussed in subsequent sections.

2.5.1 A unified urban governance structure with functional devolution

The choice between power devolution and concentration is political. Power was devolved substantially to the elected or politically appointed local governments during the military regime in early 1980s. However, it was the democratic governments in the mid of 1990s that introduced local elected governance in cities. Nonetheless, owing to political control over the system, the city governance has been less than effective creating tensions between the centre and the local elected bodies (Ahmed 2010). As a result, despite installing leaders through free, fair and participatory elections in city corporations, they could not fulfil city dwellers' expectations. This is largely due to the legal and operational dependency on the national government, as observed by an influential mayor.²²

Administrative devolution entails choice of the city on leadership and its empowerment through granting operational autonomy over city affairs. Leadership choice varies from directly elected mayor (e.g. in London) to political appointees (e.g. in China's major cities). Empowering local leaders, while at the same time holding them accountable, is a devolved governance model.

Unlike the cities of many developing countries (e.g. Shanghai, Jakarta, Mumbai, Kolkata and Delhi), Bangladeshi cities are generally governed by a directly elected mayoral system. Prior to 1994, the government used to appoint mayors to manage the cities. In 1993, the government made a drastic amendment to the Dhaka Municipal Corporation Ordinance, 1983 and the Chittagong City Corporation Ordinance, 1982 arranging direct elections to the Mayor and the Commissioners on the basis of adult franchise (IGS 2012; Islam 2013). The provision of democratic urban governance through direct elections to mayoral positions of cities is now guaranteed in the Local Government (City Corporations) Act, 2009. This Act has provided for appointment of Administrator only in the case of newly formed city corporations for a maximum of 180 days (Section 25).

Empowerment of these elected mayors begins with scope of functional jurisdiction devolved to them. The city corporations, presently, are responsible for 28 types of functions including public health, water supply and drainage system, market oversight, city planning, building and roads constructions, public safety, disaster management, forestation, education, social welfare, and development.²³ During the British period and Pakistan era, municipal administration was responsible for town development and planning, traffic control, sanitation, street lighting, and water supply and drainage maintenance to municipal committees (Siddiqui 2005; Khan 2009). In the post-British era, the functions of town planning and urban development and water supply services were taken away from them through introduction of issue-specific autonomous but unelected authorities under the national government (Islam 2013). The 'Dhaka Improvement Trust' currently known as RAJUK, was created in 1956 under the provision of the 'Town Improvement Act 1953' (TI Act 1953) and the Chittagong Development Authority (CDA) was established in 1959 (CDA Ordinance 1959) to take exclusive responsibility of developing cities in a planned manner and with this the planning functions of these municipalities were suspended. Similarly, Dhaka and Chittagong WASAs were created in 1963 under the East Pakistan ordinance XIX, 1963.

22. Mayor, Narayanganj City Corporation (NCC) in a roundtable discussion held on 18 June 2014 in Dhaka.

23. See Section 41 and herewith Third Schedule of the Local Government (City Corporation), 2009.

These special development authorities and special purpose authorities squeeze functional jurisdiction of city corporations, and thus reduce the latter's importance at one end and creates functional overlapping and duplication of role and authority at the other end (Table 2.5). This contributes, in absence of effective organisational and functional relationship between agencies, towards a chaotic governance situation in cities. One example of overlapping function is urban planning. The Local Government (City Corporation) Act, 2009 empowers the city corporations to formulate master plans including the provisions to develop land and regulate building construction in the city. Simultaneously, Rajdhani Unnayan Kartripakkha (RAJUK), or CDA is responsible for the formal physical planning and development activities for housing, commercial and industrial use in Dhaka and Chittagong.

Table 2.5: Transformation from current functional overlapping towards greater devolution of power to cities

	City Corporations	Simultaneous jurisdiction of other agencies		Full devolution
Functions	1. Public health	1. Civil Surgeon Office		• Urban planning
	2. Sanitation	2. WASA		• Regulation of land use
	3. Water supply & discharge	3. WASA		• Roads and bridges
	4. Food safety	4. BSTI, Dist. Admin., Metropolitan Police		• Water supply
	5. Bazaar management	5. Ministry of Commerce		• Health, sanitation, waste management
	6. Veterinary hospitals and dispensaries	6. Ministry of Livestock		• Fire
	7. Town planning (master plan, land development, construction control)	7. CDA/RAJUK, Ministry of Land		• Slum improvement
	8. Road construction, maintenance & control	8. CDA/RAJUK		• Urban poverty alleviation
	9. Transportation control	9. BRTA/BRTC		• 10 other discretionary functions
	10. Fire fighting	10. Fire service & Civil Defence Directorate		+
	11. Disaster management	11. Ministry of Disaster Management		- Police
	12. Tree planting & forestation, provision of open space, park construction	12. Ministry of Forest, Ministry of Land, CDA		- Sector based economic strategies
	13. Education & culture	13. Ministries of education & culture		
	14. Social welfare	14. Social Welfare Department		

Source: Authors and McKinsey 2010

At one end of the spectrum, the elected urban local government bodies have been assigned with a selected list of functions but at the same time, similar functional areas have been delegated to government agencies. On the other end, there is true devolution in which city corporations have complete control over all key functions (including police) (Table 2.5).

At present, city corporations' sole functional domains include garbage removal, collection and management, birth registration, issuance of death certificate and marriage registry, slaughterhouse monitoring, street lighting, and cemetery maintenance (disposal of carcasses). CCC, in addition, provides health and education services.

Shared and overlapping functional jurisdiction as shown in Table 2.5 creates tension between city corporations and numerous government agencies. CDA is allegedly executing works of construction, maintenance and extension of Corporation's roads without the latter's permission (Prothom Alo 2014a). Such prior approval is binding in the Local Government (City Corporation) Act, 2009 (Third Schedule 18.2). Violation of legal provisions and encroachment of functional jurisdiction by the government agencies continue to occur, specially in the case of the current Mayor, who is elected from the opposition political party and in absence of any collaborative structure in urban governance. Its extent is being manifested through the conflict between CDA and CCC leading to chaotic urban development in Chittagong.

Furthermore, while there is an argument for multiplicity of agencies to ensure checks and balances in governance, exercise of authority by multiple government agencies, in a noncooperative environment, hinders discharge of city corporations' delegated functions. Garbage management is a prime responsibility of city corporations that requires their access to land for dumping garbage. The centralised land administration policy and practice of the government, for example, does not allow city corporations to use large tracts of unused or underused *khas* land holdings within the city area and its peripheries (BUF 2012).²⁴

Moving the specialised services out of corporation's grip since the Pakistan era facilitated gradual establishment of government's coterie interests and that of vested interest groups (e.g. powerful real-estate groups) in service delivery. One recent example of serving privileged section of the society by the government's controlled agencies is housing projects of RAJUK for the police, bureaucrats and the military (Dhaka Tribune 2014). Since the specialised development body serves coterie interests through luxury residential development, the most affected are the lower income groups who were pushed out of the housing market, and to marginal locations of degraded physical environment (Islam 2013), undermining citizens' constitutional right to shelter (Article 15).

Similar to RAJUK's housing projects, the Chittagong Development Authority's flyovers have turned into individual visibility/demonstration projects rather than useful interventions to mitigate the traffic congestion in the city.

The dependency of local elected bodies on the national government agencies such as acquisition of land to dump waste and final discretion to hire personnel, *inter alia*, is the departure from theoretical underpinning of devolution. The purest form of devolution, as identified by Cheema and Rondinelli (1983; cited in Ahmed 2012), entails five characteristics: transfer of powers to autonomous units governed independently and separately without the direct control of central government; their control over a recognised geographical area; their corporate status and power to secure own resources to perform their functions; the need to develop local government institutions; and an arrangement of reciprocal, mutually beneficial and coordinative relationships between central and local government.

24. Narayanganj City Corporation, for instance, faced difficulties in utilising ADB's financial assistance of BDT 35 crore to set up garbage dumping station due to unavailability of land despite its efforts to acquire land in the last three years.

The quality of service delivery may or may not have improved with the establishment of special bodies but this occurs at the cost of accountability since they are not very transparent in terms of consultation, disclosure of information and participation (Painter *et al.* 1996; cited in Kjaer 2009). The special purpose bodies (i.e. CDA, WASA) are deliberately designed to be removed from the urban bureaucracy to enjoy semi-autonomous legal and/or financial status. Their semi-autonomous status often ignores the elected local government placing them beyond democratic control. Kjaer (2009) argues that this poses a fundamental challenge to urban governance theory.

The most desirable reform proposal in this regard could be absorbing these special bodies into urban local government. Additional democratic control can be introduced so that these special bodies would be, by law, subjected to public hearings to debate public issues, forcing them to acknowledge the community's interests.

Deliberative urban governance, by bringing the citizens and the government together, has evolved in New Delhi since 2003. It is called *Bhagidari* (collaborative partnership). The scheme seeks to promote a meaningful partnership between the government agencies and citizens, primarily on the provisions of utility and civic services.²⁵ With a 'Bhagidari Cell' in the Chief Minister's Office for the coordination of activities, the General Administration Department functions as a nodal agency to provide financial and administrative support. This partnership begins with a three days' workshop at the district level, followed by monthly review meetings regularly. In the Bhagidari workshops, the area officers of the Municipal Corporation of Delhi, Delhi Police, Delhi Jal (water) Board, Delhi Development Authority, Delhi Vidyut (electricity) Board and the Department of Environment & Forest interact with various citizen groups – the Residents Welfare Associations, the Market Traders Associations and other non-governmental organisations and try to find out mutually agreed upon solutions to the problems (Sinha 2013).²⁶

Following the introduction of this scheme, water supply improved in North, West and Central Delhi. As high as 74 percent of Delhi's citizens found that the scheme improved their quality of life (ibid). Revenue losses in utility were brought down from 52 to 20 percent. The Bhagidari was accorded with the UN Public Service Award in 2005 and it received an award for best practices in governance from the Commonwealth community (ORF 2008).

Citizens' involvement in urban governance has also been tried out in Bangladeshi cities. A former Mayor of Dhaka took an initiative to form ward level neighbourhood committees in order to provide residents' opportunities to assemble on a regular basis within themselves and with their commissioner, which was opposed by the then government (IGS 2012). The preceding Mayor of Chittagong, successfully engaged the *Muazzins* (the mosque officials who summon the faithful to prayer five times a day) to involve the public to turn the street lights on and off, which continues until now. These piecemeal initiatives to involve city dwellers are important in providing better service delivery.

25. Bhagidari scheme is to resolve the problems faced by the city's residents including water shortage and pipe leakages, choked sewers, power shortage and faulty electricity meters, solid waste heaps, broken roads and lanes, poor maintenance of parks, traffic congestion, crime, encroachments, slums, grievances related to collection and payment of taxes, issue of licenses, sales tax, weights and measurements used for commercial purposes (ORF 2008).

26. Also see the web portal of Bhagidary scheme (<http://www.delhi.gov.in>).

However, major reforms are needed to be undertaken, including establishment of a unified governance structure in cities and their empowerment through effective decentralisation. The Mayor-led unified urban governance model called 'city government' was floated by the elected mayors in mid 1990s but the idea was rejected by the government (irrespective of AL and BNP). In response to their demand for city government, the city mayors were made co-conveners in *ad hoc* coordination committees formed for their respective cities in 1996, with the Local Government and Rural Development (LGRD) Minister as the Convener (IGS 2012). In fact, in the case of Chittagong, even when an unelected mayor was at the helm of the city (1988-1990), it was mandatory for all the heads of agencies operating in Chittagong to be present physically in CCC's coordination meetings. Over the years, their representation has been replaced with that of low ranked (often junior staff) officers defying the legal stipulation of City Corporation Act that requires the presence of agencies' heads in CCC meetings (Dainik Azadi 2014a).

However, the chief executive of an influential government agency, in an interview with the authors, underscored the importance of working relationships between CCC and other agencies. To facilitate this, being the elected body of the CCC, the mayor has to develop both formal and informal relationships with numerous agency heads operating in the city. Moreover, institutionally, the CCC is viewed as the highest authority among all urban local bodies in line with the democratic principle and administrative norms of the country. The Mayor of CCC enjoys the status akin to a State Minister whereas the rank of the Chairman of CDA is equivalent to that of a Joint Secretary of the government.

Examples of successful city governance with an elected mayor are abundant. The Mayor of London, for instance, drives key city-wide strategic functions, including economic development, transportation, metropolitan planning, and police and emergency services. The Mayor appoints leaders for independent agencies to deal with key functions. Performance accountability of these agencies by the mayor ensures delivery on annual targets through the chief executives of the agencies. As a result of these reforms in UK's urban governance, London's GDP had grown at 5.3 percent annually between 2003 and 2008, higher than the national average (McKinsey 2010).

2.5.2 Financial devolution

Further to devolved functions, city corporations' capacity constraints in accessing adequate funds pose a formidable challenge to fulfil their mandates. While they have a degree of legitimacy by virtue of being democratically elected, continued financial dependence on national government means that, in the fiscal sense, they are not as accountable to their electorate as to the government (Harwich 2009; cited in Brackertz 2013).

In the case of CCC, its budget is grant dependent and highly 'unpredictable' as there is a large gap between proposed and amended/actual budget (what we call realisation rate). As seen in Table 2.3, on average only 25 percent of its development budget is realised. Similarly, there is a large difference between what the CCC expects and what it gets from the centre, reflected in realisation rate (Table 2.4). Income from CCC's own sources is also subject to volatility - it gets half of the funds at the end of a fiscal year *vis-à-vis* what it expects when the budget is announced, typically at the beginning of a fiscal year (Table 2.6). Only 60 percent of its holding taxes are generally collected.

Table 2.6: Mobilisation of internal resources of CCC

	Income from own sources, including all taxes (Taka, in crore)			Holding tax (Taka, in crore)		
	Proposed amount	Actual amount	Realisation rate	Proposed amount	Actual amount	Realisation rate
2012-13	522	201	39	58	39	67
2011-12	720	346	48	61	25	41
2010-11	641	244	38	49	23	47
2009-10	465	190	41	49	24	49
2007-08	218	148	68	21	14	67
2004-05	167	105	63	13	12	92
2003-04	159	93	59	29	15	52
2002-03	149	84	56	26	15	58

Source: CCC Budget, various years

CCC's unpredictable and volatile budgets are the outcomes of several factors.

Firstly, it lacks capacity to mobilise internal resources. CCC has 147,591 tax holdings, of them 1,650 belong to various government organisations. These public sector outfits are less than transparent in paying holding tax – CCC owes BDT 152 crore to these government entities and the remaining 66 crore to private businesses. Public entities and politically aligned business groups lead in terms of contribution to tax evasion in the city. Legal and political constraints are some of the barriers to collect taxes from these state-owned or politically influential business groups.

Secondly, there is discrimination by the centre in allocating funds to city corporations and the 'primate city favouritism'²⁷ is evident in allocation of funds when one compares the country's commercial city with its capital (Table 2.7).

Thirdly, limited fiscal autonomy also bars the CCC to find new avenues of income to increase its revenue. The city used to mobilise its own resources until 1980-81. CCC's collection from *Octroi* duty was a major source of income with as much as 45 percent revenue coming from this source. The government barred the city from collecting *Octroi* on the commitment of paying 75 percent of *Octroi* collection as grant. However, the centre's donation to the city has been far less than what was committed.

27. Urban primacy is often attributed to a dysfunctional political economy leading to primate city favouritism (Duranton 2008; Henderson 2003).

Table 2.7: Development budget of DCC (North), DCC (South) and CCC, 2012-13, Taka in crore

	Dhaka City Corporation (North)	Dhaka City Corporation (South)*	Chittagong City Corporation
Total	812	420	99
Key sources of development budget			
Own sources and government donation (Revenue and ADP)	319	187	99 (Revenue: 46, ADP: 53)
Government and donor funded project/PPP	493	233	No such projects

*Figures reported for DCC (South) for 2013-14 amended budgets.

Source: Budget documents of DCC (North), DCC (South) and CCC

Finally, there is little financial innovation in CCC's financing mechanism, reflected in its income sources of budget. Unlike DCC North and DCC South, CCC does not have projects implemented with public-private partnership (PPP). This reflects that the city either has inadequate initiatives or lack of capacity to involve donors and private sector (in the form of PPP) in long term development projects. Nevertheless, municipal financing in Bangladesh remains autarkic. Corporate debt market and other credit avenues for cities are virtually non-existent.

All these financial constraints mean that capital expenditure that largely determines infrastructure, utility and other service provisions in Chittagong has been very low. Table 2.8 compares capital expenditure in selected developing countries' cities. Per capita capital expenditure in Chittagong is barely USD 3 compared to Dhaka's 11. Nevertheless, Dhaka also does not fare well in this regard when compared with Chinese, Indian and other developing countries' cities.

Table 2.8: Capital expenditure in Chittagong vis-à-vis selected cities

Per capita spending on urban capital expenditure on services (in USD)	
South African cities	127
Chinese cities	116
Indian cities	17
Dhaka	11
Chittagong	3

Source: Based on McKinsey 2010 and development budgets of CCC and DCC

The city's financial constraints owing to lack of capacity and the dependency on the centre necessitate a thorough financial reform and demands financial devolution limiting the centre's power. Chittagong is one of the largest sources of revenue for the country. Even if a fraction of Chittagong's revenue is given to the CCC, it would be financially solvent to carry out its mandated functions. Granting CCC enough power to impose new taxes is in line with the constitutional provision (Article 60). Direct resource mobilisation by the city corporation could lessen the uncertainty in terms of availability of funds from the centre, eventually providing better services for both the city dwellers and the users of

Chittagong port and other facilities. In fact, recently there are some developments in terms of generation of new sources of revenue — the Chittagong Port Authority has started paying CCC a block amount worth BDT 40 crore annually for using its roads, meeting the long-standing demand of the Corporation which was settled during the Caretaker Government (2007-08).

More critically, to finance long-term projects CCC eventually has to access the debt securities market and other borrowing options. However, CCC has to undergo significant reforms developing financial infrastructure and capacity eventually increasing the city's credit worthiness. Experience in developed countries suggests that once the regulatory framework is built with guidance, procedures and institutional mechanism around borrowing clearly mentioned for sub-national governments to follow, credit system in developing countries might work.

Experts believe that locally raised funds make cities more accountable for their own development and one way to raise funds locally for cities is through PPPs. City leaders of developing countries can think of private participation in urban infrastructure projects. Adopting PPPs can also ensure the sustainability of selected projects, improve asset utilisation and favour cost recovery through user fees (World Bank 2013).

The success of the Tamil Nadu Urban Development Fund (TNUDF) is worth mentioning here. It is a public-private financial intermediation initiative aimed at providing long-term financing for urban infrastructure in the Indian state of Tamil Nadu. The TNUDF works to attract private capital and to facilitate urban local bodies in accessing the capital market. It has issued bonds, facilitated pool financing for smaller urban bodies to solve water and sanitation problems, and has securitised and organised PPP financing for urban infrastructures. The loan recovery rate of TNUDF is very high (98 percent), which has attracted support from various donor agencies (*ibid*).

Finally, many cities in developing and developed countries monetised land to finance large projects. However, lack of systematic land valuations that some developing countries are faced with could result in significant revenue loss. Thus successful land-based financing instruments require at least three kinds of rules to be in place. First are rules to assign and protect property rights. Second are institutions for the valuation and public dissemination of land values across various uses. Third is a strong legal framework, with a healthy judicial system to handle disputes and oversee the land-based financing system (*ibid*). Table 2.9 shows various financing mechanisms generally applied by city authorities irrespective of developed and developing countries.

Table 2.9: Financing mechanisms of cities

	Property taxes and other user charges (in percent)	Land monetisation, debt and PPP (in percent)	Grant from the central and state government (in percent)	Others (in percent)
Shanghai, China	50	19	31	0
Johannesburg, South Africa	48	12	17	23
London, UK	16	13	70	1
New York, USA	62	6	31	1

Source: McKinsey 2010

2.6 Conclusion and recommendations

The discussion in the preceding sections suggests that Chittagong is poorly managed, both politically and financially. Politics of urban governance and the centre-periphery (local) relations ignored the city's need-based development. The lack of coordination between the key agencies, notably CCC and CDA, affects the city's day to day activities as well as developing key infrastructure. Lack of accountability of most agencies largely owing to vertical accountability to concerned ministries, further centralised the top-down governance system undermining the elected bodies of the city, notably the CCC, and constrained the implementation of the city's long-term plans.

Inadequate capacity and lack of financial innovation in key agencies, electoral politics in tax collection and evasion, and the centre's lack of defined policies to finance cities made Chittagong fiscally weak, resulting in chronic underinvestment in the city. As a result, Chittagong's physical infrastructure and service provisions are ill-equipped to foster agglomeration.

However, Chittagong has some unique advantages to manage the city better if at least two conditions are fulfilled. First, its system of elected (democratic) representation provides the opportunity to embed a bottom-up governance system rather than being run top-down by the centre, provided the city is allowed to have a devolved administrative model. To make it happen, the elected body of the city should be empowered, making it a single point authority. It could lead to coordinate all the agencies operating in the city, ensuring horizontal accountability.

Second, being the country's main economic hub it has a lot of untapped resources to mobilise. CCC and other agencies should be allowed to mobilise their own funds lessening dependence on the centre. In doing so, the city has to undergo marked financial reform to access a wider pool of financial resources such as public private partnership and access to debt capital market, *inter alia*.

Finally, the city should be open to learn from global experience, notably in the area of administration and financial innovation. Examples that are cited in this chapter are worth looking at – deliberative governance system in Delhi, financial innovation in Tamil Nadu and how London is governed with a Mayor-led urban governance – are worth exploring. A unified model of urban governance with functional devolution should be the ultimate governance model for the city. As observed by Oommen (2012), functions, finance and functionaries are complementary and they have to be transferred simultaneously so that the transfer of political power from the higher level to the local governments can be real. In order to revamp a city's performance the mayor should have the powers to drive new investments, hire key personnel, fund projects, and reorganise departments. Major reforms in administration and performance can take place through the fusion between citizens' demand for change, i.e. better structure and more accountability and government's willingness to grant the city managers the needed autonomy.

Chapter 3

Governance of Land Use and Housing

3.1 Introduction

Urban space covers less than three percent of the earth's total land surface and rapid urbanisation is stipulating an increasing supply of that land stock in urban areas (Augustinus and Sorlie 2011). Bangladesh is no exception to this global phenomenon. Chittagong witnessed increasing economic agglomeration particularly since the 1960s with greater concentration of capital, labour, manufacturing and service industries. With marked agglomeration, land use changes in the city have been sweeping. Demands for housing units, factories, commercial spaces and public services have quickly overtaken their supplies. To meet that demand, there has been unplanned housing expansion into agricultural lands and open spaces. Moreover, in some areas, residential buildings were transformed into factories and commercial spaces. Quality accommodation for majority people has become scarce resulting in poor settlements like slums. Zoning violation, land grabbing and hill cutting are also common in the city distorting the land use plan.

All of these things are affecting Chittagong's geography markedly. The city is surrounded by the Karnaphuli River in the east, Bay of Bengal in the west and South and Tertiary hills in the north. High population density in the city exerts a tremendous pressure on its land use pattern. To accommodate the increasing population and infrastructure, the city's development approach is now sprawling to the north where the landscape is greener. The northern hilly area is now under threat where rapid and illegal landscape alteration is taking place mostly for constructing housing plots and illegal settlements as well as unplanned industrialisation (Islam 2009b). Inadequate attention has been paid to geomorphological¹ characteristics while assessing land quality for individual building construction and different land use zoning. The spontaneous growth of the city has been controlled by its physical settings, such as its undulating topography, location on the bank of a major tidal river (Karnaphuli), pathway of cyclonic events and effect of tides. However, when planning concepts such natural determinants have been either ignored or wrongly interpreted (Islam 2012).

1. Geomorphology - the study of the characteristics, origin, and development of land forms.

There are a number of institutions namely the Chittagong Development Authority (CDA), Chittagong City Corporation (CCC), Government Land Office and National Housing Authority (NHA), among others, who play a role to govern the land use, supply of housing and the housing market. However, the unplanned expansion of the city and dearth of housing provisions particularly for low income people indicate that issues involving Chittagong's land use and housing market are facing governance challenges.

Against this backdrop, this chapter reviews the governance of housing and its essential corollary land use in Chittagong. Section 3.2 and Section 3.3 outline the research questions and methodology of the chapter. Following a discussion of the state of land use and housing in Section 3.4 and Section 3.5, the housing provisions in Chittagong is discussed in Section 3.6. Section 3.7 reviews the institutional architecture for governance in this regard and analyses the gaps between institutional provisions and actual governance practices. By drawing some conclusions and giving a set of recommendations for streamlining the governances of land use and housing of Chittagong, Section 3.8 concludes the chapter.

3.2 Research questions

Given the change in land use patterns and the gap between housing demand and supply in Chittagong and associated governance issues, this chapter is guided by the following research questions:

1. What is the existing state of Chittagong's land use and housing?
2. What are the major gaps between institutional provisions and actual practices in governance of land use and housing in the city?
3. What explains the above gaps?

3.3 Research methodology

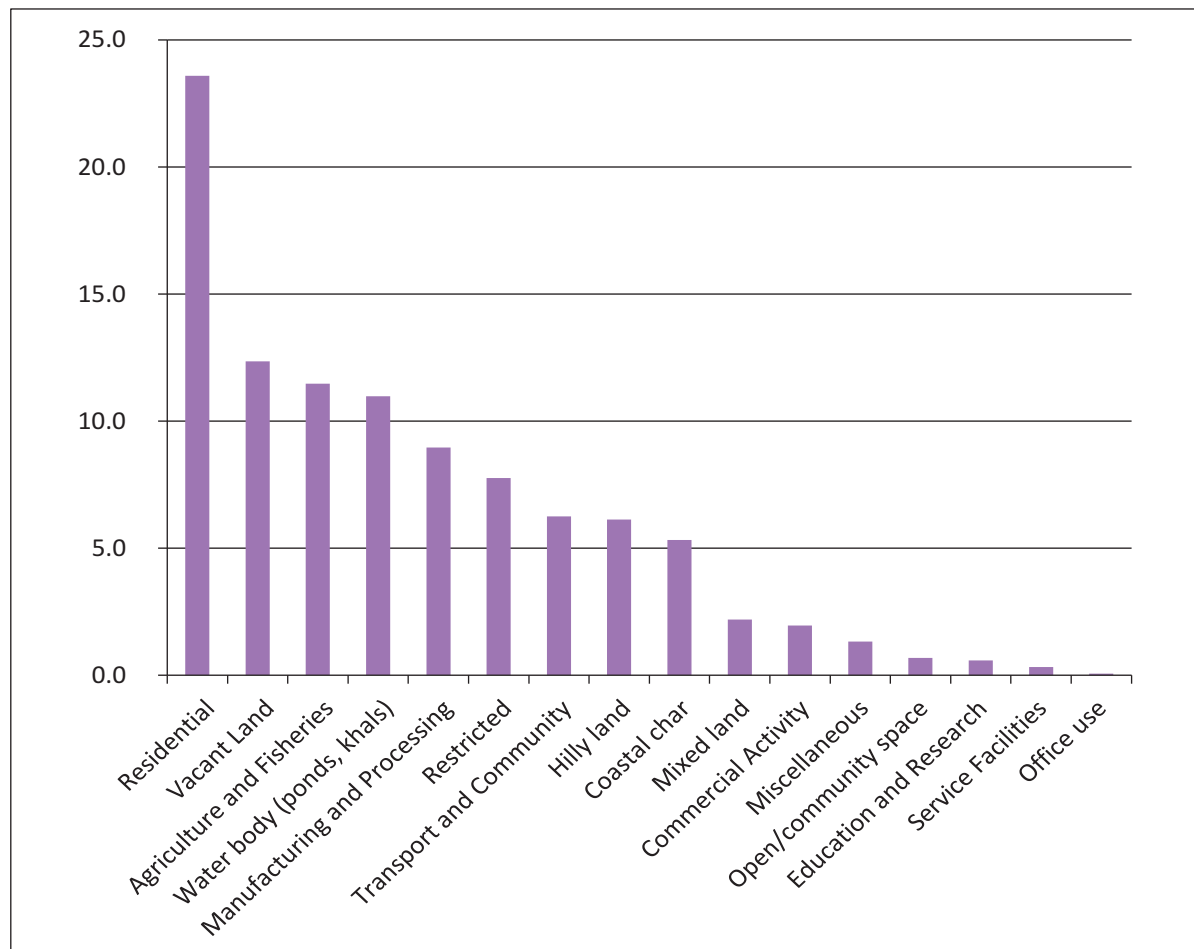
This chapter adopted a mixed method of both qualitative and quantitative approaches using primary and secondary data. For the housing section, a household level questionnaire survey was conducted on 1200 households in the Chittagong City (see section 4.2 of Chapter 4 for details). The secondary data were collected from CDA, CCC, NHA and Government Land Office. However, existing land use data is reconstructed from the details area plan (DAP) developed by the CDA. In this plan, there are 12 Detailed Planning Zones (DPZ) of which DPZ 1 to 6 covers the Chittagong City Corporation (CDA 2011). Summing up the six DPZ, the existing land use pattern of Chittagong is presented. To understand the stakeholders views tools, such as Focus Group Discussion (FGD) and Key Informant Interview (KII) are used. Geographical Information System (GIS) was employed to identify the spatial and temporal changes in land cover and land use in Chittagong City Corporation area. Land cover change is identified using the secondary images. Having no historical data on the change of Chittagong's land use pattern, the chapter attempts to understand the changing pattern of green land in the past 66 years. Hill cutting is considered as synonymous to green land reduction, though they are different in many ways. The land cover change map was reconstructed from the images available in Google and secondary literature. Though the map is not precise in estimating areas (hill disappeared or green land disappeared from 1948 to 2008), but this map can provide us with a sense of the extent and directions of changes taking place in CCC.

3.4 Land use pattern in Chittagong

The land use and spatial development of Chittagong is marked by *piecemeal interventions in scattered locations* both within the city and in its fringes. A planned consistent urban expansion through appropriate and systematic land use has been largely absent. Following the first Master Plan of Chittagong in 1961, spatial development has expanded from the old town to Agrabad and Patenga peninsula in the south and the west, along the Dhaka Chittagong Highway (erstwhile Dhaka Trunk Road) in the north-west and CDA Avenue and Hathazari and Cox's Bazaar roads in the north.

Existing land use pattern in Chittagong is shaped by the unique natural character of the city. The city is geographically dominated by hills. The city occupies about 179 square kilo metres (Sq Km) area, of which about one fourth (23 percent) of the available land is used for residential purposes. Out of the remaining three quarters, vacant area, agriculture and water bodies, manufacturing and processing activities occupies 50 percent (12.3, 11.8, 10.9 and 8.9 percent respectively). The remaining 25 percent of land hosts restricted areas, hills, transportation, commercial activity, open/community space, education and research, service facilities, coastal char, office use and other purposes (Figure 3.1).

Figure 3.1: Land use pattern in Chittagong (in percent)



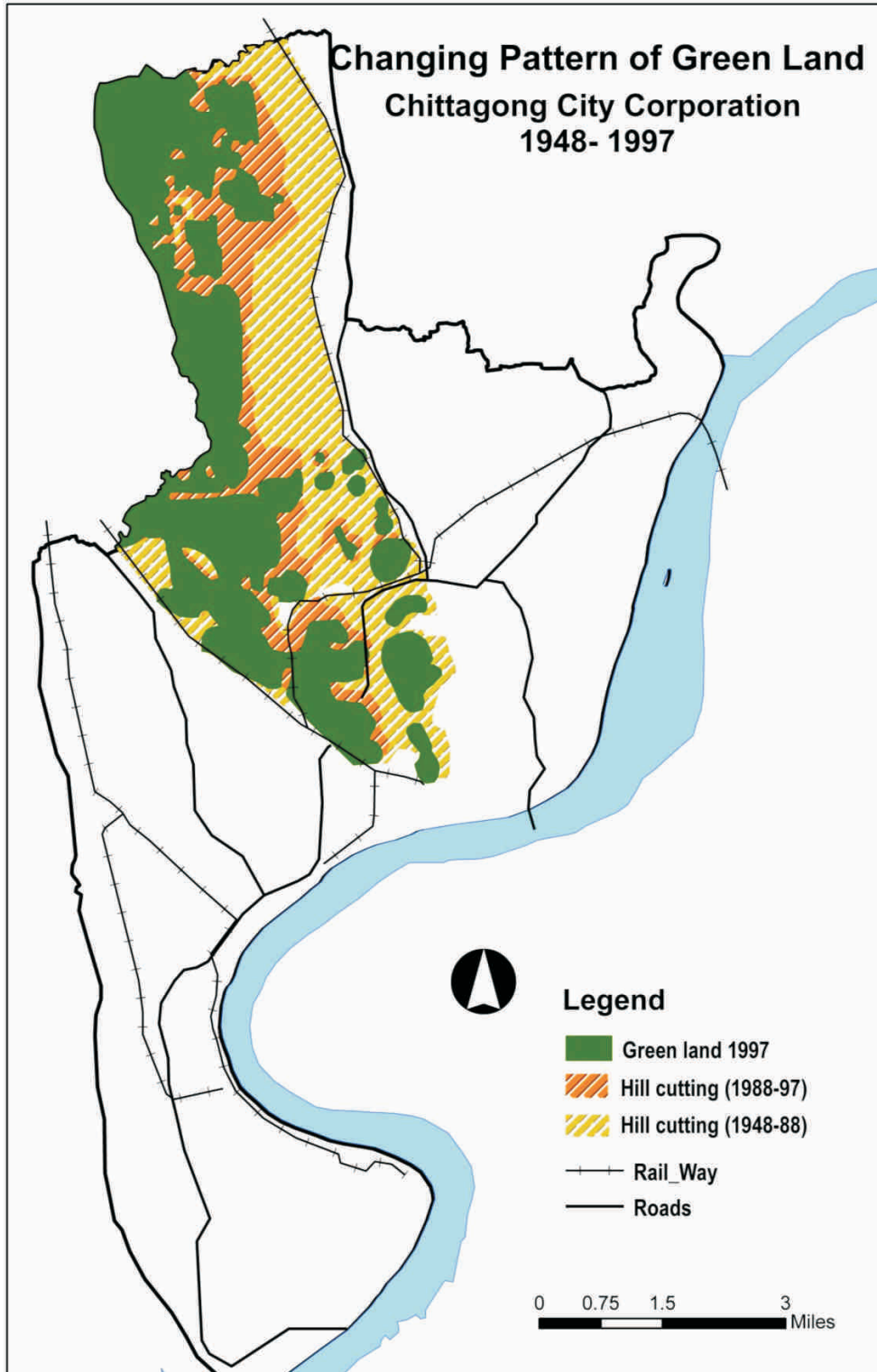
Source: CDA 2011

With the growth of Chittagong, the change in land use in particular has been historically dominated by a number of government organisations (GOs). It is observed by some knowledgeable city dwellers that modern Chittagong is borne of the railway and the port. The city became a railway hub since the British colonial period and is currently the headquarter of the Eastern Zone of Bangladesh Railway (BR). Many of the city's prime land, including significant parts of the downtown, are assets of BR. Some of the city's landmarks like CRB Hill and Foy's Lake are also part of BR land holdings. Again, bulks of the left bank in the downstream of Karnaphuli River and the adjacent lands are properties of the Chittagong Port that is managed by Chittagong Port Authority (CPA). Other GOs with large land holdings in and around Chittagong are: Bangladesh Telecommunications Company Limited (BTCL), Postal Department, Chittagong Water and Sanitation Authority (CWASA), Roads and Highways Department (RHD), Public Works Department (PWD), Power Development Board (PDB), CDA, CCC, Armed Forces and District Administration. As observed by a town planner of CCC, the above GOs together own roughly 60 percent of Chittagong's total land.

However, the city's land use pattern is changing fast, largely owing to demographic pressure. Growing population and resulting demand for housing, economic activities and other development are putting further pressure on the city's scarce land. Land use change is taking place towards hilly areas in the north. As the city's land is limited to the south by Bay of Bengal and eastward by Karnaphuli River, the expansion is taking place in the hills, transforming green land to built up spaces. Since 1948, the city has lost approximately 31 sq km of green land. The rate of change in land use increased during 1988 to 1997 — about 10 sq km of green land was taken for city development. Overall, from 1947 to 2008, the loss is estimated at about 40 sq km area (Figure 3.2).

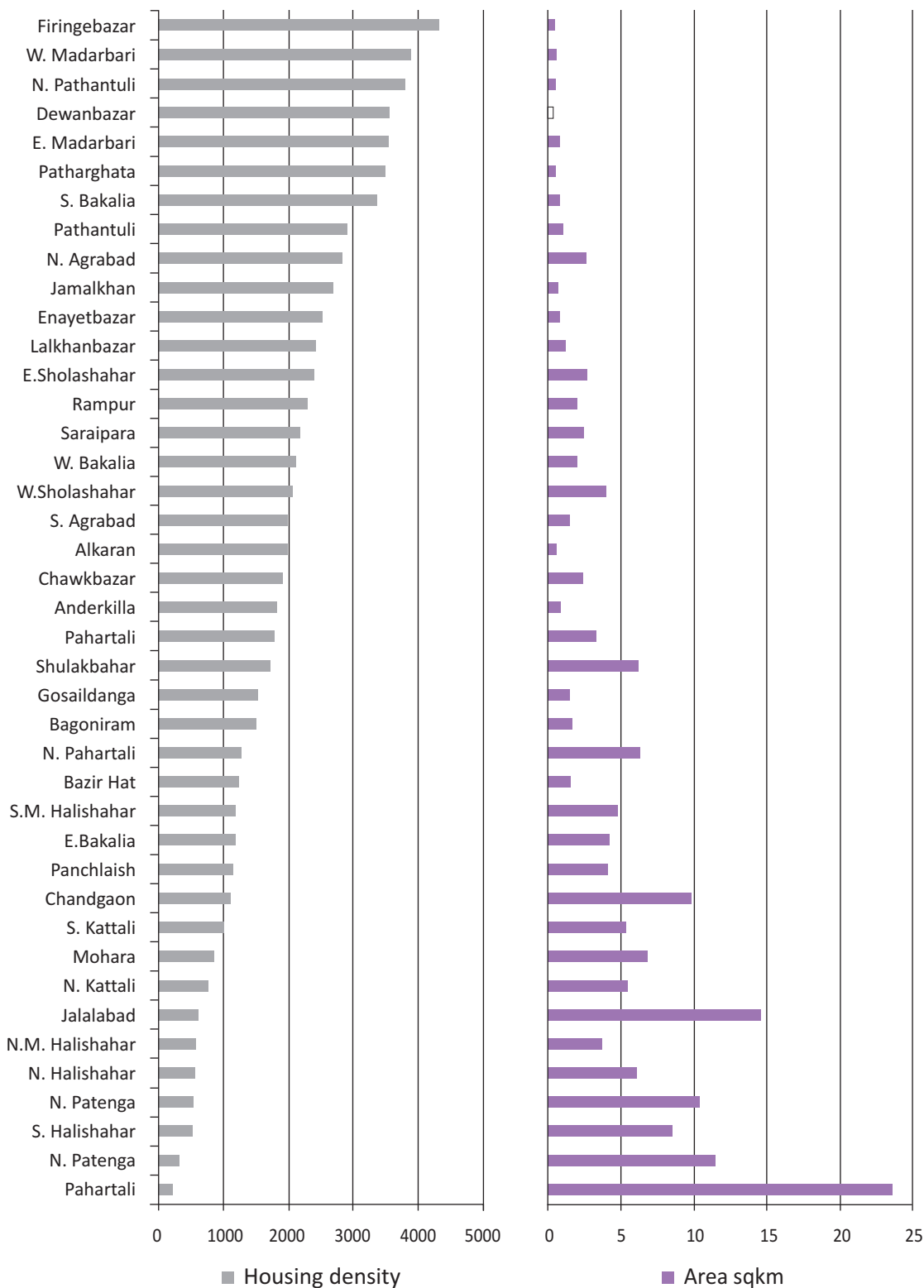
Planned land use that involved zoning compliance and access to utilities have been limited to: residential, commercial and industrial areas developed by CDA, some port facilities, government housing estates, military installations, some private residential areas and lately, Export Processing Zone. The rest of the city came to be characterised with unplanned development and inappropriate land use. In the city's periphery, the fringe areas are also witnessing undesirable ribbon development along regional roads and growth centres (CDA 2011). This set the context for a kind of urban agglomeration in Chittagong that is mostly leading to urban sprawl. This poses significant challenges namely expansion of utilities and amenities, greater exposure to water logging and flash flood, land grabbing and hill cutting, all accumulating into continuous deterioration of urban liveability and quality of life.

Figure 3.2: Changing pattern of green land in Chittagong: 1948-1997



Source: Authors, based on Google image and CDA 2011

Figure 3.3: Housing density in Chittagong, by area



Source: CDMP 2009

3.5 Land use and housing in Chittagong

In CCC, there are more than 1.9 million of settlement infrastructure, excluding slums. This includes, residential, commercial, industrial, and essential facilities (CDMP 2009). In city landscape, housing for residents is the major feature occupying almost 82 percent of land used for built infrastructure. Following residential, commercial purpose used about 16 percent followed by Industrial (1.1 percent) and essential facilities including educational, health and emergency services, as well religious establishments (0.7 percent). Housing density in CCC is distributed unevenly with high variation among wards (Figure 3.3). Wards with more than 3000 housing stock are South Bakalia, Patharghata, East Madarbari, Dewanbazar, North Pathantuli, West Madarbari and Firingibazar. These wards are highly dense in terms of population with land cover less than 1 sq km. Other wards including South Kattali, North Kattali, North Haliashahar, Shulakbahar, North Pahartali, Mohara, South Haliashahar, Chandgaon, North Patenga, Jalalabad and Pahartali occupy more than 5 sq km. This deviation is due to the unique geographical settings and concentration of business centring the sea port.

This unbalanced distribution of land use resulted in housing density, traffic jam, high house rent, unplanned building construction and environmental problems. Pahartali, for example hosts about 200 housing infrastructure in 23 sq km, whereas Firingibazar area is overloaded with more than 4500 in less than 1 sq km.

3.6 Housing provisions in Chittagong

Chittagong City is home to approximately 5 million people living in 1.9 million housing shelters. About 1.4 million residential structures were built till 2009 in the city. CDA has approved about 10 thousand house designs (plans) to be built between 2009 and 2014 (approval does not mean these houses are built). There is a sizeable demand for housing that is growing faster than the supply. The BIGD Survey (2014) shows that home ownership is predominantly a higher income group phenomenon. Among the higher, higher-middle and lower-middle income groups, 44, 37 and 40 percent respectively are homeowners. Only 22 percent homeowners are from lower income groups. On the contrary, an absolute majority of 76 percent from lower income groups are tenants. In general, there is a general shortage of housing in the city, which is particularly acute for the lowest income group. The housing is supplied by public authorities primarily, CDA, NHA and CCC, as well as by private real estate groups and informal low cost housing.

3.6.1 Public housing

As the port city and the second largest economic hub of the country, Chittagong has major presence of a number of Government Organisations (GO). Some of these GOs are also major provider of public housing in the city. Bangladesh Railway and Chittagong Port Authority provide housing for majorities of their officials and employees. CDA, NHA, CCC, PDB and CPA have built housing units for their officials, employees and a section of general city dwellers. About 35,000 plots were supplied by CDA, CCC and NHA from 1960 to 2007 (Table 3.1)

Table 3.1: Major residential schemes undertaken by different agencies in Chittagong

Sl.	Organisation	Scheme	Phase	No. of plots	Land development
1	CDA	Katalganj		51	1960 - 1961
2	CDA	Agrabad		774	1962-63
3	CDA	Chandgaon	Phase I	606	1962-63/1973-74
4	CDA	Chandgaon	Phase II	83	1978-80
5	CDA	Foujderhat		164	1962-63/ 1980-81
6	CDA	Chandrima		183	1999-2000
7	CDA	Halishahar		22	1963-64
8	CDA	Sholoshahar		98	1960-61
9	CDA	Silimpur		1029	1985 -90
10	CDA	Karnaphuli		516	1991 -1996
11	CDA	Kalpalok	Phase I	1700	2005-06
			Phase II		
12	CDA	Ananya		1521	2007
	CDA	Design approved		7500	2006-09
	CDA	Do		998	2009-10
	CDA	Do		2103	2010-11
	CDA	Do		2379	2011-12
	CDA	Do		2555	2012-13
	CDA	Do		2364	2013-14
13	NHA	Shershai		338	195051
14	NHA	Feroz Shah		944	1949-50
15	NHA	Halishahar		3327	1959-61
16	NHA			4144	1988-97
17	CCC	Sugandha		211	1968
18	CCC	Lake City Housing		520	2003
19	CCC			50	2004
20	CCC	Sayed Shah Road Bakalia Housing		15	1978
21	CCC			11	2003
22	CCC			15	2006
23	CCC	Port City Housing, Madarbari		118	2004
24	CCC	VIP Housing, Dakshin Khulshi		65	2002
25	PWD	Panchlaish		136	1950-51
26	The Chittagong Co-operative Housing Society Ltd	Nasirabad		165	1956-57
27	The Chittagong Co-operative Housing Society Ltd.	Khulshi		170	1961-62
28	The Chittagong Co-operative Housing Society Ltd.	Rosevally RIA, Pahartali		55	1994-95

Source: Authors, based on CDA 2008a, CDA 2011, CDA 2014 and NHA 2014

3.6.2 The private sector initiatives

Residential plots and flats are also developed by the private sector. Unlike comprehensive townships of CDA, the private residential areas are generally known as housing societies. In Chittagong, the housing society phenomenon first emerged in the 1950s in Khulshi and Nasirabad. From 1960s till today, about 50 housing societies received CDA approval. Chittagong has also witnessed the rise in multi-storied apartment houses. In addition to scores of real estate companies based in Chittagong, some of the leading national companies based in Dhaka are also making marked inroads into the city's housing sector. However, such market provision of housing is beyond the reach of lower income city dwellers. Only people of higher and middle income groups can afford the housing products offered by the real estate companies.

3.6.3 The poor's housing: Informal settlements and slums

There is also a growth of slum or slum-like poor settlements within the city. However, there is no updated data on slum population. A comprehensive study conducted by Angeles *et al.* (2009) showed that total slum population in the city in mid-2000s was 1.46 million, which is 35.4 percent of its total population.² According to the study slum communities were located all over Chittagong. However the larger ones, both in terms of area and population, were concentrated mainly in the Pahartali, Nasirabad and Kulgaon areas. There were a number of larger slums, in terms of population size, located in the central area of the city (such as Agrabad, New Market and Andarkilla areas).

According to CDA (2008a), over 50 thousand people live in the slums situated at the risky and treacherous slopes or bottom of hills where they can rent room at cheaper rates without being concerned about safety of lives. A primary survey conducted by CUS (2010) found that there are a total of 1,046,000 poor in the city who live in slums or slum-like settlements. This is over a fifth of the city's estimated population of about 5 million. The city has 1,814 slums and 5,778 poor settlements.

There have been three major initiatives in Chittagong for low-cost housing. While they have been few and far between, some initiatives even proved futile. First, the low cost housing in Halishahar, Firoz Shah Colony and Sher Shah Colony areas. They were used for settling of the Urdu-speaking migrants from India in the 1960s. As the original occupants left them following independence in 1971, most of these houses degraded, were illegally occupied or sold at low prices. Second, four thousand housing units were developed in the city's Koibalyadham area in the 1990s. Most of the houses are one- or two-storied which is not efficient vis-à-vis lack of space and high demand for low cost housing. Third, CCC is building low-cost apartments in the Tiger Pass foothills to replace an earlier poor settlement. Sometimes referred to as slum apartment, the 6-storied buildings will house 126 flats. Each flat is 250 sq. ft. in size with 2 rooms, 1 kitchen and 1 toilet/bathroom and will cost BDT 6 Lac. A tenant can pay the sum as rent in 15-year instalment and own the flat.

3.6.4 Rental housing market

With population pressure, rising demand for housing and its supply shortage combined, a rented housing niche has emerged to cater to the housing needs of lower and lower middle income city dwellers. This is atypical of other urban and semi-urban areas of the country especially Dhaka City. The

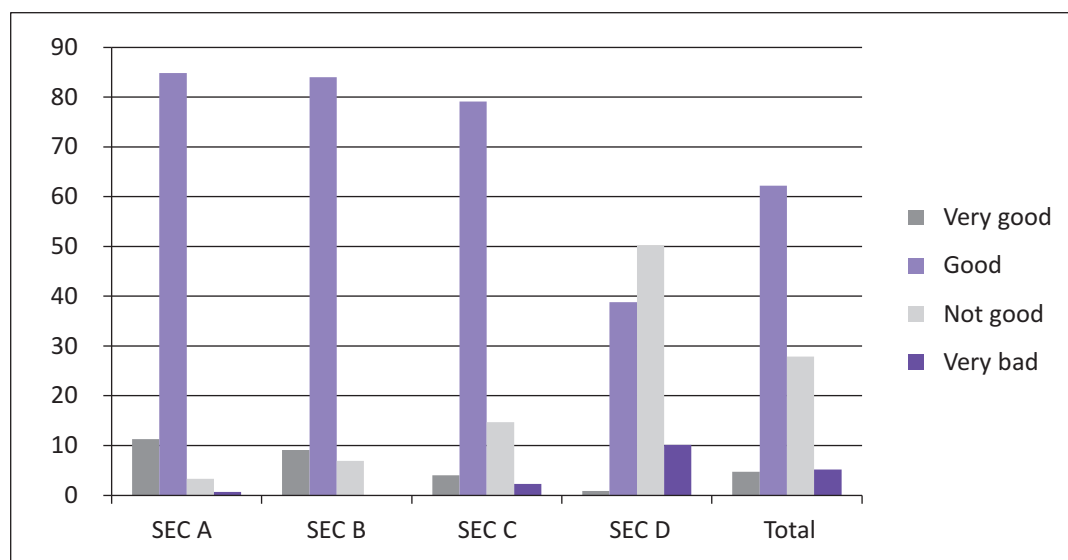
2. A slum was defined as a neighbourhood or residential area with a minimum of 10 households or a mess unit with at least 25 members with four of the following five conditions prevailing within it: predominantly poor housing; very high population density and crowded rooms; very poor environmental services, particularly water and sanitation facilities; very low socioeconomic status for the majority of residents; and lack of security of tenure.

BIGD Survey (2014) shows that 46.3 percent households find that rented houses in the city are sufficiently available while 48.6 percent reported their availability insufficient. The average monthly rent reported by all tenants irrespective of their level of income is BDT 5,597. However, average monthly rent paid by different income groups varies widely. As two opposite examples, the average monthly rent paid by high income group is BDT 9,721 and that of low income group is BDT 2,875. Majority of tenants (39 percent) reported total monthly expenditure of BDT 8,500-17,000. In that case, even the average house rent constitutes up to one-third or two-third of their monthly expenditure. So, it is not surprising that majority (60 percent) of respondents claimed house rents to be high.

Unplanned expansion of building activities that often violate laws and defy regulations have engulfed surrounding agricultural land, low lying areas and increasingly hills and highlands. The resulting residential blocks and mixed neighbourhoods are often sources of rented housing for low and middle income city dwellers. Haliashahar, Agrabad, Bayparipara, Pahartali, Kattali, Bakalia, Chawkbazar, Kapasgola, Bahaddarhat, Kalurghat and Modunaghat are among the major areas of the city that have seen hitherto agricultural or unused lands converted into unplanned and densely populated neighbourhoods full of rental housing.

The state of rented housing, however, varies for different income groups (Figure 3.4). In BIGD Survey (2014), two-third (67 percent) of the respondents identified their rental homes as either very good or good as opposed to the one-third (33 percent) who reported that conditions are either bad or very bad. The former are predominantly better earning city dwellers while the latter are principally from low income group. About 80 percent respondents from each of higher, high-medium and low-medium income groups reported good condition of their rental homes. On the other hand, about 60 percent of low income respondents claimed that conditions of their rental homes are either bad or very bad. Some of the major problems of rental housing according to the survey are insufficient space (42 percent), bad waste management (42 percent), irregular waste collection (28 percent), lack of utility (water/electricity/gas) (23 percent) and water inundation (23 percent).

Figure 3.4: Condition of rental house in different socio-economic clusters in Chittagong (in percent)



Source: BIGD Survey 2014

So in Chittagong, while the people who needs housing most are excluded from public provisions, they are also excluded from the private housing market. In BIGD Survey (2014), about 90 percent of tenants see little or no probability of ever owning a home due to high land cost, among other factors.

The slum dwellers who reported availability of rental home to be sufficient, is 46 percent. The average rent paid by slum dwellers is Taka 2,875 and about 70 percent of them alleged that the rent is high. About condition of their rental homes and surrounding environmental condition, over 70 percent slum dwellers identify them as very bad. About major problems of rental home, lack of basic utility (water/electricity/gas) and irregular waste collection is almost same for slum and non-slum households. However, problems of insufficient space, bad waste management and water inundation are more acute in slums.

3.7 Land use and housing governance: Gaps between institutional provisions and practice

Regarding land use and housing in the city, CDA, a statutory GO directly under the Ministry of Housing and Public Works (MoHPW) is the main governance actor. The next important authority in this regard is the District Land Administration, which operates under the Ministry of Land. The public utilities agencies namely CWASA, PDB and Karnaphuli Gas Distribution Company Limited, along with CCC are secondary formal governance actors for the city's land and housing. Their respective mandates – water and sewerage, electricity, gas and waste management – are the essential value adding services without which housing is least liveable.

While there is no dearth of necessary institutional components to govern land use and housing in the city, the effectiveness of governance does not reflect the richness of institutional architecture.

The CDA has so far developed about a dozen of residential areas in the city. The initial ones are *Katalganj* and *Agrabad* which were developed in the 1960s and the latest ones are *Kalpolok* and *Ananya*, developed since the 2000s. These residential areas are designed as comprehensive townships. They have become some of the most sought after suburbs of Chittagong. However, their collective contribution in meeting the city's housing needs is marginal. These plots were distributed either by criteria based allocation or by lottery. In case of the former, the allocation criteria generally privileged powerful sections of city dwellers like politicians and MPs, civil servants, military officials, business persons and cultural elite. About the lottery for plot distribution, lack of transparency and corruption is alleged. Therefore, those who are in need of housing the most, the middle income and low income city dwellers, can rarely get any plot from CDA.

The institutional limitations are also evident in construction rules stipulated for housing estates. The 1953 Building Construction Act stipulates that no one can construct or reconstruct or make addition or alteration to any building without prior sanction [Clause 3(1)]. Without prior permission, a building cannot be used for the purpose other than that mentioned in the sanction. If the government has evidence that the existing use of a land or building does not conform to the master plan, by a written order, it may order to discontinue such use or to remove or dismantle such building [Clause 3A(1-2)] (GoB 1952).

The terms and conditions of building construction stipulated in the 2008 Chittagong Building Construction Rules include provisions for mandatory open space, setback from boundary, maximum ground coverage and Floor Area Ratio (FAR) (Clause 44). The rules also state that each building shall have setback or mandatory open space in the front, sides and back in prescribed proportions. Only up to 50 percent of the mandatory open space can be paved and the remaining 50 percent space should be surface soil. Other than the exceptions in Clause 46(5), maximum ground coverage of a building, including basement areas, cannot expand into the mandatory open space. A building has to be in 4.5 metres distance from the middle of the adjacent road or 1.5 metres from the boundary wall of the plot. For individual and multiple residential plots, the adjacent road width should be minimum 3.65 metres and 6 metres respectively (Clauses 45-48).

The 2004 Private Housing Land Development Rules sets some general conditions for private residential areas. These conditions include: full development has to be completed according to final lay-out and development plans within maximum time of 10 years; surface level of the project land has to be above highest flood level; flow of any canal, wetland, river or any other water body cannot be interrupted; the total land ceiling for the project area has to cover a minimum of 5 acres within CCC and 10 acres outside CCC; highest 70 percent land of project area can be sold as plots while the remaining 30 percent land will be earmarked for public utilities and services; lands earmarked for public utilities and services cannot be converted into plots for allocation; and the per acre gross density of population in project area has to be 350 people (Clauses 6-10).

It is generally agreed by planning and housing experts interviewed for this research that the above legal provisions and rules are essential for ensuring quality and liveability of buildings and residential areas. However, in reality, their compliance in Chittagong is appalling. It is visible even in plain sight that building laws and rules are randomly violated or not complied with. Buildings are often modified or extended in violation of designs originally approved by CDA. In worst cases, buildings are constructed without CDA clearances and then the latter are contacted for necessary approval. Land uses for buildings are often changed without authorisation of CDA. There is a violation of zoning regulations. Maximum ground coverage of buildings are frequently extended leading to partial or total shrinking of mandatory open spaces. Sometimes, even if mandatory open spaces are maintained, they are paved beyond the maximum limit of 50 percent, causing surface soil cover of minimum 50 percent to shrink further. Buildings are often not constructed in sufficient distance from boundary wall or adjacent road. The required widths of roads are also violated at times.

Such violations of building laws and rules are commonplace for both individual buildings and real estates of housing companies. A number of observers of the city's housing sector including industry insiders argued that except for a dozen or so reputed companies, majority building products in the city fall short in meeting the legal standards. Regulatory non-compliance is also common for residential areas offered by land developers both private and public. The private housing areas do not always maintain required road width and full-fledged internal road networks. Surface level of project land – specially where low lying areas are land filled – are sometimes not above highest flood level. There is widespread tendency among many land developers to interrupt rivers, canals and water bodies running through project area to increase the number of plots. For similar reasons, the 70:30 ratio of plot lands and lands earmarked for public services are not maintained in many cases.

There are two main set of drivers perpetrating the gaps between institutional provisions and their actual practice in Chittagong's housing sector. On the demand side, there is explosive growth of the city year-to-year which defies all projections and subsequent rapid expansion of the housing industry. On the supply side, the authorities are ill-equipped (capacity limitations and institutional constraints) to manage the transition. There are allegations that even the construction of CCC, PWB, CWASA building in many instances do not conform to the CDA rules. The width of road requirement are reduced by CDA itself violating the CDA Master Plan. Phase order of the Master Plan is not maintained.

DAP has instruction for hill cutting and the guidelines for high rise building construction. But violation of these guidelines is common. Water bodies more than 0.5 acre are not allowed to be filled. If it is needed then special permission of Department of Environment (DoE) is a must, but in most cases the rule is violated. Almost 200 km natural *khal* (canal) was planned to be protected from illegal occupier by building 20 feet road both sides along the canals. The road was planned to be used as green space as well as transport purpose. However, the plan has not been implemented. Meanwhile, many land grabbers have occupied the land and falsified ownership claims in the settlement survey.

Similarly, owing to institutional constraints and patronage politics, a large part of estate land, particularly owned by various GOs are grabbed by a section of land grabbers. As mentioned earlier, large portions of Chittagong's total land area are *khas* land. Such *khas* or public land are often targets of land grabbing, eventually making commercial gains by their illegal use, directly rented out to people and building residential or commercial facilities. The grabbing is sheltered in the name of schools, religious establishments, offices of political parties and other social organisations. And the process of grabbing is not always illegal, they are done through irregular leasing of land and illegal extension of regular leasing through manipulation of legal loopholes. Using the existing land laws and relevant statutes for leasing, *khas* or public land (which are not in use or of which there were no plans to use in near future), can be leased out by the land owner for short-term to other private or public entities. One example can be the case of BR estate department, where 413 acres of land have been grabbed in Chittagong division alone and bulk of them are under control of private entities. In Chittagong division, 95 acres of land have been recovered from grabbers between January 2007 and November 2012. Therefore, on average, about 16 acres of grabbed land have been rescued annually. However, the pace of land recovery operation has slowed down to 6 acres annually until 2013.

However, due to lack of financial and human resources, BR could not properly manage and prevent their land from grabbing, initiate their recovery, making fences for recovered land and bearing costs for legal aid for pursuing cases. Currently, BR Eastern Zone has 400 court cases pending and there is only 1 law officer to deal with these, leaving no scope for hiring external lawyers.

One of the outcomes of poor governance in the city's land resources and the inability to address the housing problems of low income people is land grabbing in the form of hill cutting and settlements in numerous hills that distort the city's land use pattern and make it environmentally vulnerable.

Box 3.1: Hill cutting in Chittagong: Land grabbing, settlement of the poor and institutional failure

Chittagong's urban space is characterised by hills and undulated land. This constraint however, has not been deterring urban expansion through land use changes by hill cutting. With scarcity of plain land, hill cutting in a planned manner without distorting the city's geography much is sometimes desirable. The 1952 Building Act stipulates that no person can cut or raze any hill within the area

...Cont'd

unless the authorised officer is satisfied that the cutting or razing of the hill: shall not cause any serious damage to any hill, building, structure or land adjacent to or in the vicinity of the hill; silting of or obstruction to any drain, stream or river; loss of life or property; is normally necessary for construction of dwelling house without causing any major damage to the hill; and, is necessary in the public interest [Clause 3C (1)] (GoB 1952).

However, a criminal syndicate is at work destroying the hill forests and cutting hills with impunity (Daily Sun 2011). Hills are increasingly levelled off to make way for housing plots and commercial spaces. The drivers of hill cutting are often powerful group equipped with necessary finance and political connections. The process often ensues with leasing of the hills from government and then setting up shanties or informal settlements and renting them to the urban poor looking for accommodation or business spaces. Then hill cutting is abated behind the guise of such informal poor settlements. Sometimes, the hills and surrounding land are grabbed for hill cutting. Many of these hills are properties of GOs like BR, Forest Department and District Land Administration. They are leased out by politically powerful people like local ward councillors and local politicians. In consequence, the act of hill cutting completely violates lease conditions.

There is also a close connection between hill grabbing (cutting) and the settlement of poor people. In one FGD with a group of informal poor settlers in one of the city's foothills, evidence was found of the poor being complicit in hill cutting and land grabbing schemes of powerful land interest groups either willingly or unwillingly. Poor migrants particularly from other districts look for cheap accommodation in the city. One frequently available option is renting room in temporary or semi-permanent housing structures. Another popular option is to build such housing structures on own initiative if land is available to set them up. Such temporary or semi-permanent housing that also charge relatively lesser rent are often located in public lands including foothills and hill slopes that are grabbed directly or indirectly in the guise of lease. Otherwise, land grabbers allow poor settlers to build temporary houses on the land. In doing so, however, the land grabbers are doing no favour to the poor. Rather, such exchange is usually reciprocal. By building houses, the poor are helping land grabbers in consolidating their control on the land while there can be other returns for land grabbers as well, such as voting for their candidates of choice in local and national elections.

However, such settlement in risky slopes of hills and hill cutting exposes the settlers to fatal disasters often leading to large number of deaths and also causing environmental problems. Over the last seven years, a total of 179 people died in 11 separate incidents of hill slide. The worse spate of events was in 2007 when 127 people died in seven subsequent hill slides due to continuous heavy rain (Murshed 2013). A survey of District Administration in 2007 indicated the number of people vulnerable to hill slides at 200,000. A member of the Hill Management Committee (HMC) informed about 13 vulnerable hills and 1,300 families living in them (BDNEWS24.COM 2014). The environmentalists routinely warn about disasters due to the destruction of forests and rampant levelling of hills. The concerned departments like CDA and the Department of Environment failed to abate the problem as the powerful syndicate continues their activities managing stay order from the court. However, under the existing environmental law, there is a scope to file case with environmental court against environmental degradation (Daily Sun 2011).

3.8 Conclusion and recommendations

As Bangladesh's second largest city as well as the port city, Chittagong is now home to not only its natives but also for people from different parts of the country. Due to the city's higher population density and growing economic agglomeration, pressure on land use and housing is consistently rising. However, the city has been unable to meet the growing demand for land and housing which has led to urban sprawl compromising the benefits of agglomeration.

Neither the private housing market nor the public provisions have been able to cater to the growing housing demand in Chittagong. The real estate companies almost solely offer products for higher and higher-middle income groups excluding lower income city dwellers. The limited public provisions have catered to government employees and political, administrative and business elites. The rental houses are also not adequate and they fail to provide quality accommodation. Shortage of housing for poor people led to the development of slums and other informal settlements affecting the city's land use pattern and environmental quality.

While there is richness in the institutional architecture of land use and housing governance, the resulting governance quality is poor, reflected in capacity constraints in implementation of laws and regulations. In the void created by weak enforcement of regulation, patronage politics takes upper hand in land use change giving rise to land grabbing and hill cutting, among others.

In order to address the housing challenges and streamline the governance of land use and housing in Chittagong, the chapter puts forward the following recommendations:

- **Limiting the sprawling of the city:** Despite higher population density, economic density of Bangladeshi cities is comparatively low (World Bank 2013). Thus, Chittagong should confine its economic agglomeration in line with the land use plan proposed in the Master Plan. The authorities have to improve institutional quality by developing capacity as well as implementing the existing laws to address hill cutting, land grabbing and other problems.
- **Initiative for low income housing:** A strategic initiative has to be undertaken to address the housing shortage of Chittagong with emphasis on low income housing. This is also necessary to contain a number of by-products of density such as sprawling of the city, hill cutting, land grabbing and environmental problems.
- **Streamlining enforcement of regulations:** The gap between institutional provisions and their actual practices has to be bridged on an urgent basis through streamlining of regulatory enforcement. In this regard, coordination among the agencies such as CDA, District land administration, CCC and DoE are crucial.

Chapter 4

Urban Service Delivery

4.1 Introduction

Efficient delivery of utility and other services is essential to promote urban agglomeration and to make cities liveable. Bangladeshi cities do not fare well in global liveability index, largely owing to their poor performance in a host of urban services such as healthcare, education, infrastructure and other service provisions (Daily Star 2013a). The importance of better service provisions is even more important for faster growing cities like Chittagong, which is also the country's industrial and commercial hub. However, there are concerns about the city's utility service provisions among the city dwellers, highlighted in Focused Group Discussions (FGD), in depth-interviews of key informants and the media reports,¹ necessitating the in-depth study of demand side issues.

Services chosen to be studied in this chapter are water and sanitation, electricity, gas and waste management. The rationale for choosing these are that these being the basic utility services have a significant impact on the standard of living of the citizens. These services are not readily available to be provided by the private sector and are heavily dependent on the state. As taxpayers, it is the right of the city dwellers that these are provided to them by the government.

There are several authorities that provide services to the urban dwellers of Chittagong. These include Chittagong Water & Sewerage Authority (CWASA), Chittagong City Corporation (CCC), Power Development Board (PDB) and Karnaphuli Gas Distribution Company Ltd. (KGDCL) among others, which provide water, electricity and gas to the city's households and businesses. It is widely perceived that along with other factors, better service delivery in the city is constrained by lack of adequate investment to expand service delivery and lack of coordination among key service delivery agencies.² In developing countries, underpricing of services constrain the expansion of utility and other services and also limit the improvement of their quality. This prompts numerous intermediaries to step in, providing

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1. A focused group discussion on Chittagong's urban governance was organised in Chittagong on 27 February (by the BIGD research team).
 2. KII findings.

low-cost but inefficient solutions for service delivery to the low income people. This vicious cycle continues, undermining better service delivery and eventually affecting urban agglomeration and liveability.

These constraints are nonetheless not unique in the case of Chittagong. Utility service delivery literature indicates that political economy factors affect urban services in developing countries. The provision of public utility services focuses on three key objectives: long term sustainability of services,³ economic efficiency⁴ and safeguard quality⁵ (IDB 1996). However, as a large pool of poor people reside in cities, wholesale privatisation of public utilities in pursuit of efficiency is a difficult policy to adopt, as a state often functions with wider national objectives. The conflict of accessibility-efficiency trade-off requires a delicate balance and this is also highly context-dependent. The resolution of such trade-offs should be guided by the long-run achievement of the objectives, must be based on a thorough analysis of the problem and ought to be resolved via the use of transparent policy mechanisms that minimise any economic distortion (ibid).

Against this backdrop, this chapter aims to explore the state of service delivery in Chittagong. The chapter in particular focuses on basic utility services in terms of their availability, accessibility, affordability, reliability, and their level of satisfaction. The rest of the chapter is organised as follows. Section 4.2 discusses the methodology of the paper. Section 4.3 explores supply-demand gap of aforementioned utility services based on the household survey data, FGD findings, Key Informant Interviews (KII) and secondary literature. The section also discusses the role of institutions, both formal and informal in providing utility services. The subsequent section, which is Section 4.4, analyses some cross-cutting (institutional, consumer behaviour and political economy) issues involving the city's service delivery. The final section (Section 4.5) concludes arguing for an efficient and sustainable service delivery model.

4.2 Research questions and methodology

The brief discussion in the preceding section indicates that there is a demand-supply gap of utility services in Chittagong City. Inadequate service delivery by public or private agencies opens the room for informal channels to deliver those services, mitigating the supply-demand gap. However, this often leads to a sub-optimal solution. These prompt us to explore the following questions concerning the city's service delivery at length:

1. What is the gap between demand and supply of water, sanitation, electricity, gas and waste management in the city in terms of availability, accessibility, affordability, reliability and level of satisfaction?
 2. What are the institutional arrangements available to address the gaps?
 3. What should be an appropriate service delivery model for the city?
-
3. Contingent on the availability of resources to fund the operation and maintenance and investments that are required to improve and expand the services to existing and future consumers.
 4. When economic efficiency is achieved, prices can be kept at the minimum level compatible with the long-term sustainability of the service, and at the same time, they can provide consumers with incentives resulting in an optimal use of the services.
 5. Contingent on safeguarding the quality provided to the consumer.

The chapter used a mixed method of research by applying both qualitative and quantitative analysis. Both qualitative and quantitative data are used to examine the demand and supply side perspectives of the city's service delivery. This chapter used the primary data generated by the BIGD Survey (2014). A structured questionnaire survey was carried out among 1200 households of Chittagong. The survey was carried out in June 2014. In addition, two FGDs were conducted in the slum areas. Over 12 experts and stakeholders (CCC, WASA, PDB, BERC, KGDSL) were interviewed. Probit regression analysis is conducted to examine the probability of overall dissatisfaction regarding utility services.

4.2.1 Survey methodology

Source of data

The target respondents for the survey were any member(s) of the households eligible to respond to the query – male and female aged 18 years and above. Face-to-face interview was conducted through structured questionnaire throughout the survey.

Respondent categories

Following are the categories of respondents covered during the survey:

Category A: People of Middle and Upper SEC (Socio-economic category)

Category B: People of Middle and Lower SEC

Category C: People of Rich and Poor SEC

Category D: People residing in Slums.

Sample size

The sample size was calculated using standard statistical formula with 99 percent Confidence Level and with permissible margin of error 5 percent. Thus, taking 50 percent as p value (which yields maximum of sample size) and Design Effect at 2, the sample size has been calculated as 1,086. Further, considering 10 percent as non-response (there is no background data of non-response for similar type of study in Bangladesh or in Chittagong City, thus 10 percent has been taken as an assumption), the calculated sample size was 1,195 which was rounded to 1,200. Based on the experience of national level survey, the proportion of inhabitants of Chittagong was used to re-allocate the sample distribution for each category. Table 4.1 gives the category-wise sampling distribution for the study.

Table 4.1: Total sample size by socio-economic category (SEC)

Population Category	Percentage of inhabitants in each category in Chittagong City*	Sample distribution for the study
SEC – A	19.6	235
SEC – B	21.3	255
SEC – C	19.6	235
SEC – D	39.6	475
Total	100	1,200

Source: NMDS 2013

Selection of Sample

Households from different geographical locations in Chittagong (selected purposively) with three different categories (A, B and C) of socio-economic status (based on SEC grid) were intercepted for the interview. However, only the slum inhabitants were considered as SEC category D.

4.3 Service delivery in Chittagong City: Demand, supply and institutional arrangements

In this section, we discuss various facets of water and sanitation, electricity, gas and waste management services of Chittagong, particularly exploring their demand-supply gap and the institutional arrangements available to deal with the services. We also suggest some policy recommendations to deal with the existing gaps on service delivery.

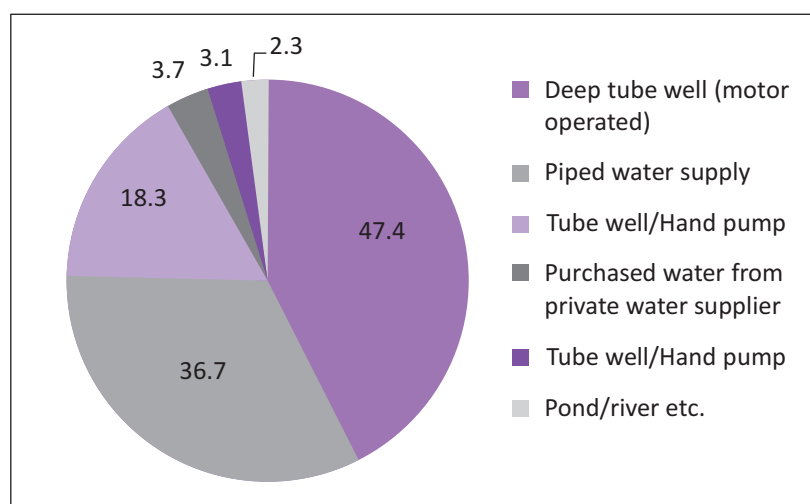
4.3.1 Water and sanitation services

4.3.1.1 Water and Sanitation services: Demand-supply gap and institutional arrangements

CWASA is the key authority for providing water and sewerage system of Chittagong. CWASA supplies water to about 3 million residents in Chittagong. It has a production capacity of 210 million litres per day (MLD), compared to a demand of 500 million litres (120 litre per capita per day), where 53 percent comes from ground water source and 47 percent from the surface water source. CWASA has 92 deep tube wells, 2 water treatment plants, 7 pumping stations, 14 reservoirs, 3 elevated water storage tanks, 689 public hydrants and 14 water carrying vehicles. The total water transmission and distribution pipeline length is 653 km (CWASA 2012). (See Table A4.1 in annex for the major projects on water).

The BIGD Survey (2014) that shows the demand side perspectives of service delivery suggests that among the respondents (N=1200), 68 percent households have water supply facilities inside their houses. Most city dwellers use deep tube well, piped water and hand pumped tube wells for water for all purposes. Around 47 percent respondents reported that they get water from deep tube well followed by piped supply water (37 percent) and hand pumped tube well (18 percent) (Figure 4.1).

Figure 4.1: Sources of water in Chittagong (in percent)⁶



Although 95 percent area of the city has pipelines, CWASA can supply water to about 40 percent of the city from its two water plants. More than one-third of all the respondents (36 percent) reported that they had inadequate water supply. Water scarcity becomes an acute problem during the summer, particularly from March to July, forcing citizens to borrow water from their neighbours and purchase

6. All the figures/graphs/tables reported in this chapter are drawn from the BIGD Household Survey (BIGD Survey 2014), unless otherwise stated.

water from various sources. Also, about two-thirds of all households experienced breakdown of water facilities more than once in the past one year.

Moreover, the pressure of water decreases as it flows through different pipes and most of the water is used by the areas which are closer to the source.⁷ Full time water cannot be provided with current limited capacity. Hence, people go for deep tube wells to meet their demand.

Due to the scarcity of water, people rely on both deep and hand-pumped tube wells, even though the latter is not recommended by WASA as these may have arsenic contamination or the quality of water may not be optimal.⁸ Nonetheless, people from lower income groups opt for hand-pumped tube wells as the cost is lower. Installation of deep tube well requires WASA's permission. Moreover, they are expensive to install.

With regards to affordability, water for households is subsidised. Pricing of water supply is still a centralised decision. CWASA cannot increase the price of water more than 5 percent per year without the central government's consent.⁹ After increasing tariff by 5 percent in February 2014, the price per cubic metre (m³) water for domestic and non-domestic usage are being set at BDT 6.9 and BDT 19.6 per m³ respectively (Table 2.2).

Table 4.2: Water pricing in Chittagong

User type	Quantity	Amount (BDT)
Domestic	1000 gallon	31.35
Non-Domestic	1000 gallon	87.87
Domestic	Per cubic metre	6.90
Non-Domestic	Per cubic metre	19.55

Source: CWASA website

At present, CWASA has 10 percent non-domestic and 90 percent domestic users. Production cost per m³ is BDT 9. For non-domestic users, the total bill (BDT 4,10,550 per day) exceeds WASA's cost of production (BDT 1,89,000). Cross-subsidised or higher tariffs are generally charged for non-domestic users for all utilities (World Bank 2014a). However, for

domestic users, CWASA incurs a loss of BDT 3,96,900 per day, accumulating in a loss of BDT 60 million per year (Dainik Samakal 2014).

The BIGD Survey (2014) shows that about 84 percent of the respondents pay bill for their water usage. Of them, 72 percent of respondents reported that they pay less than BDT 500 as tariff/usage bill per month (Figure 4.2).

Around 60 percent of the respondents mentioned that they were fine with the (current) water tariff, but the majority of lower income groups consider the water tariff to be already too much (53 percent). However, when asked whether they wanted to pay the bill as per usage, about 78 percent responded negatively (Table 4.3).

7. As CWASA sources mention, if the area is far from the source then it may get water 2 days a week and if it is closer it may get water 4 days a week.

8. See the chapter on 'Environmental Governance' that discusses the arsenic problem in slums.

9. KII findings.

Figure 4.2: Monthly water bill paid for water supply by domestic consumers

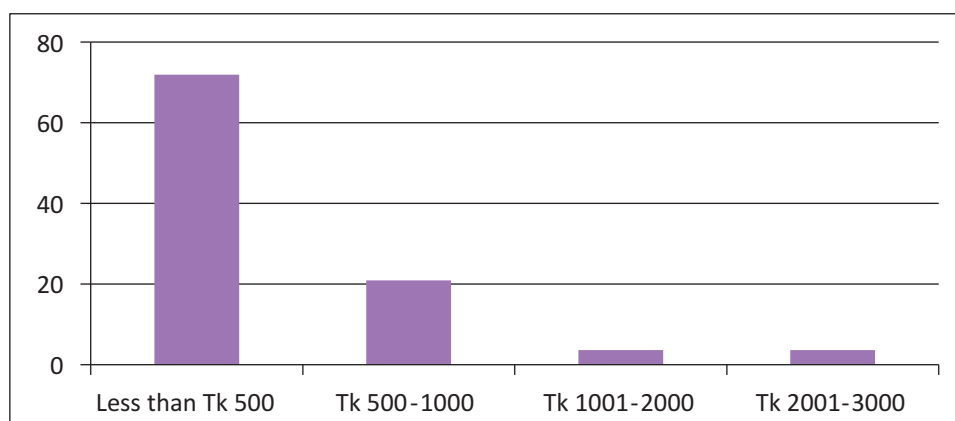


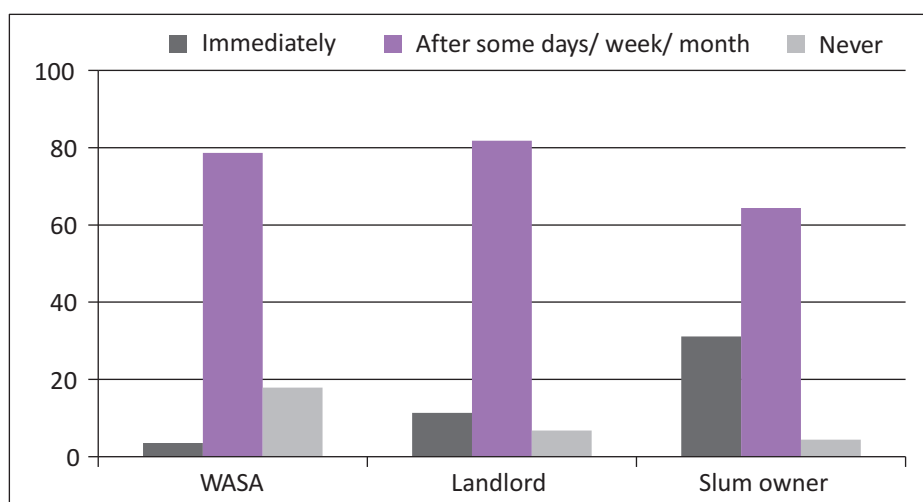
Table 4.3: City dwellers' preference to use water meter (pay as you use)

	Socio-economic category (SEC)				
	SEC A	SEC B	SEC C	SEC D	Total
Yes (percent)	30	30	28	11	22
No (percent)	70	70	72	89	78
Base (N)	235	255	235	475	1200

Note: SEC refers to socio-economic categories of respondents

As far as the redressal mechanism is concerned, the tenants in both slum and non-slum areas mostly complain to their landlords as they are the major supplier of water, particularly in slums. Others either manage themselves or complain directly to WASA, especially the land owners and people from the middle and higher socio-economic groups. In most cases, it takes days if not weeks or months, to get water supply related problems solved (Figure 4.3). Some households refrain from complaining as they believe that the problem would ultimately not be addressed. CWASA does not have any separate wing for a complaint redress system. However, people can lodge complaints by phone and email.

Figure 4.3: Frequency of water problem solved after complaint (in percent)



As far as satisfaction level is concerned, majority of the respondents are satisfied with water quality (80 percent in non-slum, 67 percent in slum). However, the reasons for dissatisfaction include not getting sufficient and regular water supply and low pressure of water.

4.3.1.2 Addressing demand-supply gap

To meet the current requirement as well as the growing demand for water, the existing water treatment plants are not enough. There are two ongoing projects with CWASA: 'Karnaphuli Water Supply Project' and 'Chittagong Water Supply Improvement and Sanitation Project' (CWSISP) (See Table A4.2 in annex). The Karnaphuli Project is jointly funded by the Japan International Cooperation Agency (JICA) and the Government of Bangladesh (GoB). The CWSISP is funded by the World Bank (WB). Initiated in 2006, only the first phase of Karnaphuli Project is under construction, but it was supposed to be completed by this year. However, the project has been extended three times already (Daily Jugantor 2014) and is not going into operation until next year.¹⁰ The second phase of the project has just been launched and has a tentative deadline of 2022.

Due to heavy contamination of iron in water, rapid water level decline and seasonal scarcity, every year new deep tube wells are being established by CWASA. They proposed a project named 'Emergency Water Supply & Rehabilitation Project' in April 2013 for setting up 20 tube wells and sent it for the concerned Ministry's approval. However, the Ministry reduced the number of deep tube wells to 15, and the project is at halt due to environmental issues by the Department of Environment, Dhaka (Prothom Alo 2014d).

System loss is another major constraint to extending water supply, which was about 17 percent as of 2013 (CWASA). Leakages in pipe lines, water theft or illegal connection are largely responsible for this. The existing pipelines of CWASA are very old. JICA is coming up with a project to replace approximately 500 km of the pipelines.¹¹ In 2009, JICA and the GoB started implementing the Non-Revenue Water (NRW) Reduction Initiative project 'PANI' for a period of 3 years. Later on, the project tenure was extended and a GIS mapping system was established in 5 pilot areas. NRW has been reduced from 33 percent to 28 percent in those pilot areas as reported and it will be further reduced to 20 percent. After project completion it is expected that the CWASA will be able to reduce NRW in new areas.¹² Nevertheless, JICA conducted surveys in some locations for their project and found that CWASA even did not have proper maps of the pipe lines.¹³ Hence, the system loss figure as reported by CWASA may be under stated.

Water bill is often levied as a fixed amount per month which the tenants find convenient. They want to stick to the existing subsidised system and are unwilling to pay as per use principle, which would maximise economic efficiency and enhance revenue. KII indicates that to reach the cost recovery point, the price of water per m³ for domestic use needs to be at least BDT 9. Thus, consumers should pay the cost recovery price for the service.

10. KII in CWASA.

11. KII in CWASA.

12. For details, see CWASA Web portal.

13. KII in World Bank.

There should be a more institutional (formal) approach to extend water services in slums. CWASA provides water in slums through community based organisations (CBO) and NGOs. Under the World Bank's Low-Income Community (LIC) scheme, slum dwellers are expected to get water in the upcoming CWSISP project. This initiative will include establishing 10 test tube wells, according to CWASA.

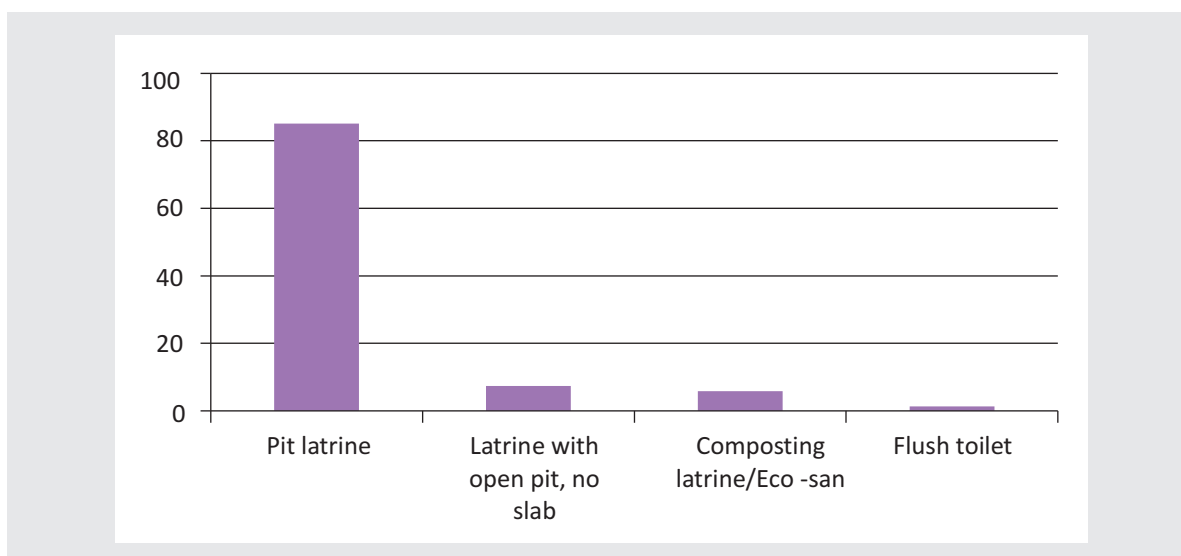
4.3.1.3 Sanitation services: Demand-supply gap and institutional arrangements

Sanitation in Chittagong has been neglected. Although it is the responsibility of CWASA to establish and maintain sewerage channels in the city, till date there is no proper sewerage system. The waste water generated by the existing connections (approximately 45,000 connections) goes untreated to different water bodies like ponds, canals and river and from there to the Bay of Bengal (CWASA 2010).

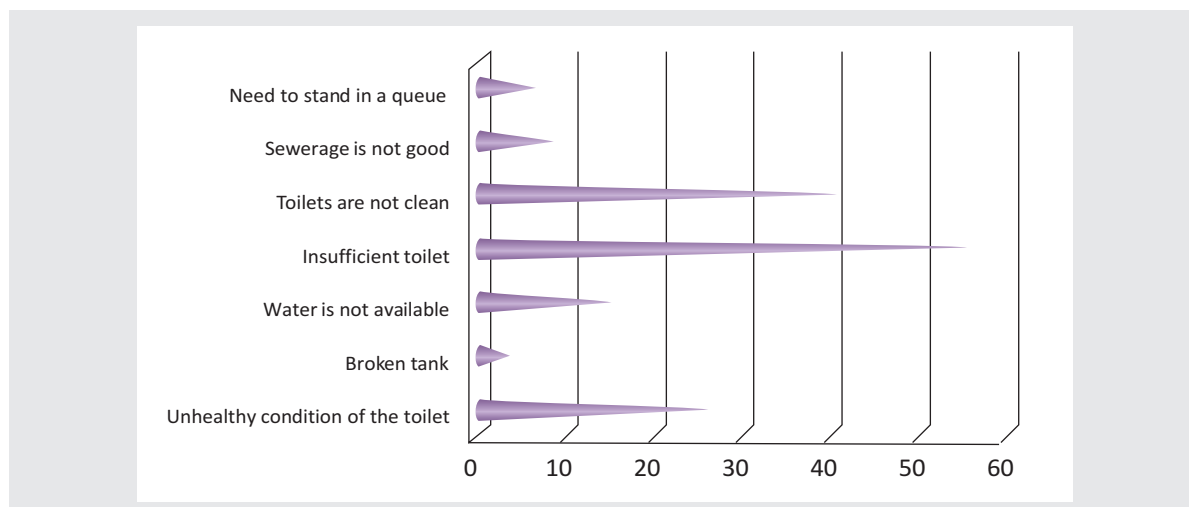
Waste water is disposed in septic tanks which is directly channeled into water drains. Lower income households rely on latrines. Large portions of the slum population have no access to adequate sanitation facilities. On the other hand, industries are required to treat effluents before disposal into drains or water bodies, but this regulation is seldom enforced (ibid).

As the slum and non-slum sanitation systems are markedly different, the situation is analysed focusing on both socio-economic clusters separately. Slum dwellers mostly (85 percent) use pit latrine (Figure 4.4). On an average, 19 people (4-5 families) share a latrine. Most of the respondents are generally fine with the location of latrines and availability of water facility. However, open drain, smelly ambience, prevalence of human excreta, leaked and broken tanks affect the environment of the latrines adversely. Slum owners provide latrine services in slum areas and they are free of usage charge. The users lodge complains to landlords if they face any problem.

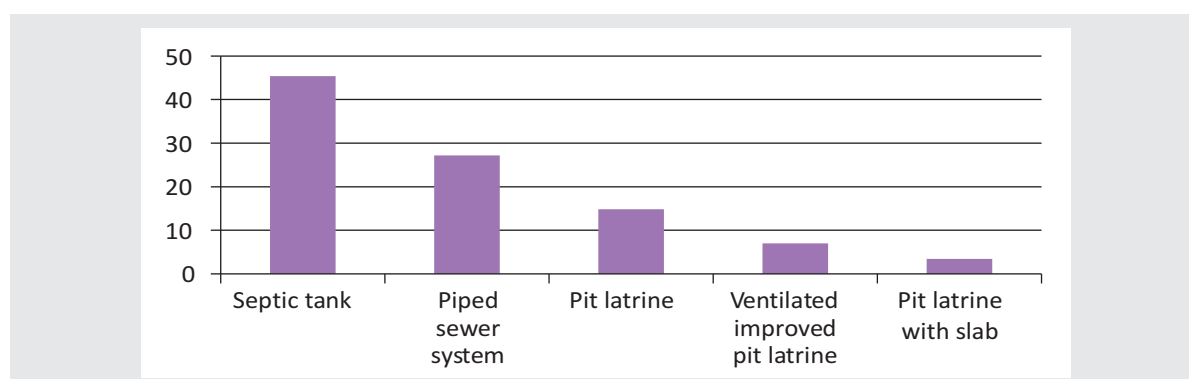
Figure 4.4: Types of latrines used by slum dwellers (in percent)



With regard to satisfaction, survey respondents complained about quality and environment of the latrines. The major reasons for dissatisfaction are insufficient number of toilets, unclean toilets, unhealthy environment and unavailability of water (Figure 4.5).

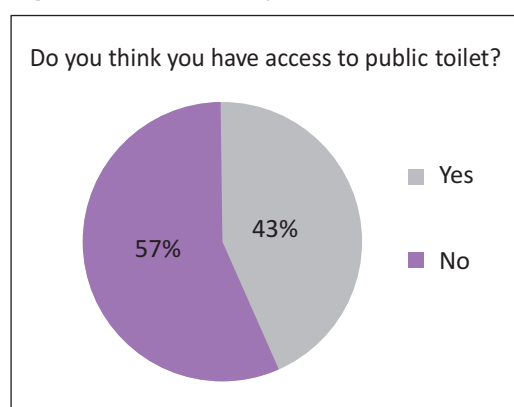
Figure 4.5: Major reasons for dissatisfaction regarding latrine in slums (multiple responses, in percent)

Residents in non-slums mostly use septic tanks and piped sewer system toilets; a sizeable number of households use pit latrines (Figure 4.6). The majority of the respondents from this group are satisfied with their sanitation system. However, they face problems in hiring people to clean the tanks as the institutional arrangement to deal with the service is inadequate.

Figure 4.6: Types of latrines used by non-slum people (in percent)

4.3.1.4 Public toilet: Demand-supply gap and institutional arrangements

Public toilets in Chittagong are under the jurisdiction of CCC. The survey indicate that public toilet facilities in Chittagong are far from adequate. Their quality is also a matter of concern. In the city, about 57 percent respondents reported that they did not have access to public toilets (Figure 4.7) and 80 percent of them had not used them in the past one year. About 44 percent households felt that the number of public toilets is inadequate and 44 percent of those who used reported that they often had to face long queues in using public toilets. The low access to public toilets is attributed to lack of cleanliness, no separate facility for children, and insecurity. Only half the respondents were found to be satisfied with public toilet facilities.

Figure 4.7: Access to public toilets

4.3.1.5 Addressing the institutional constraints

The lack of a centralised sewerage system is a fundamental constraint to the improvement of the overall sanitation system of the city, which is particularly at a more inferior condition in the slums and public toilets.

Human waste and solid waste are filling up the drains and canals and proper dredging is not being done regularly. Chittagong City Corporation (CCC) is responsible for removing solid waste and dredging the canals. As the maintenance of sewerage services are supposed to be undertaken by CWASA and the drains by CCC, their coordination is needed to deal with the city's sanitation problem. Health of the city's population is at stake until the CWSISP starts operating efficiently.

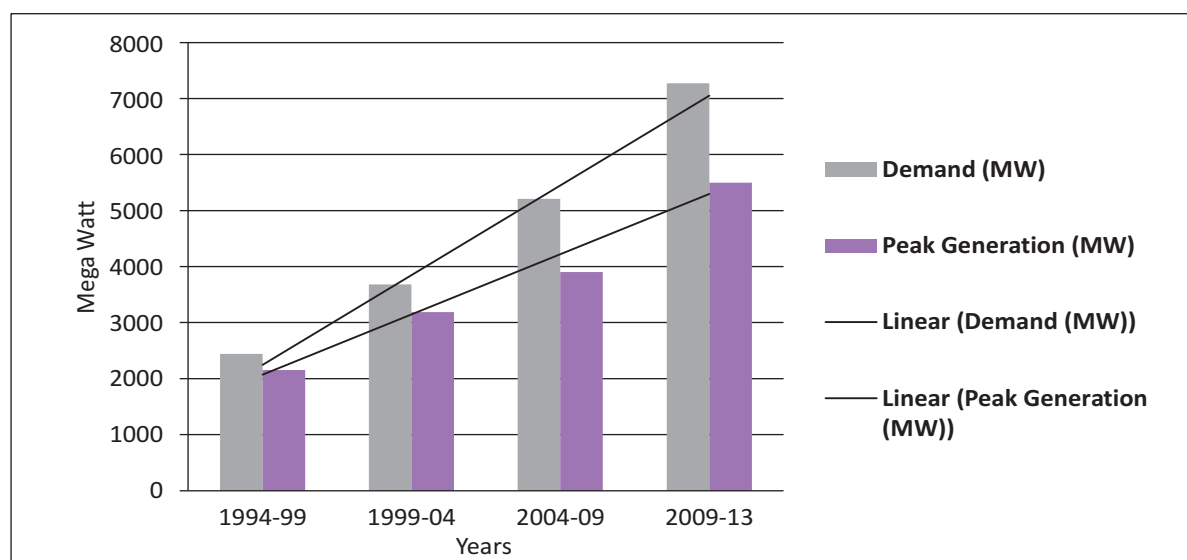
Projects for sanitation were initiated on several occasions but they have not been executed. The authorities' lack of sincerity is blamed for the non execution of the projects (Chattagram Protidin 2014). This can be addressed by implementing the concerned projects identified by the city's Master Plan. The World bank funded CWSISP project has a sewerage master plan. WB is likely to provide technical assistance for the identification and design of priority investments in sewerage and drainage. Priority investments will be given for canal rehabilitation when they are identified and designed, including engineering and construction supervision support.

4.3.2 Electricity services

4.3.2.1 Electricity services: Demand-supply gap and institutional arrangements

Despite having significant progress in power generation in recent years, constraints remain in the overall distribution of electricity throughout the country. Over the decades, the deficit between electricity generated and its demand has risen, as illustrated in Figure 4.8. Average difference between demand and supply remained approximately 1200 MW. This led to a substantial rise in load shedding. As of June 2014, total de-rated power generation consisted of 63.6 percent from natural gas and 19.7 percent from heavy fuel oil.¹⁴ At present, electricity demand is growing at the rate of 10 percent per year, which is expected to increase even more in coming years (BPDB 2013).

Figure 4.8: Power demand, supply and load shedding in Bangladesh: 1994-2013



Source: BPDB 2013

14. For details, see Bangladesh Power Development Board website
<http://www.bpdb.gov.bd/bpdb/index.php?option=com_content&view=article&id=150&Itemid=16>

City dwellers in Chittagong, particularly in Agrabad, Haliashahar, Pahartali, Bakalia, Nasirabad, Patharghata, Mehedibug, Alkaran, Chawkbazar, Patenga and Chandgaon, face power outages seven to eight times a day on average (Dhaka Tribune 2013a). The FGDs with slum dwellers also revealed a severe crisis of electricity, averaging at least 10 hours daily. PDB is the key provider of electricity in Chittagong. The electricity demand in the city was 680-700 megawatts (MW) in 2013, which increased to 739 MW in the summer against the supply of 510 MW of electricity from local power plants, and only 100-120 MW from the national grid (Financial Express 2013).

PDB Chittagong has 19 sub-stations which are of a maximum of 1436 Mega Volt Ampere (MVA) and a minimum of 1206 MVA capacity (Table A4.3 in annex). The distribution of energy is channelled through 8028 Km of distribution lines throughout the city. PDB Chittagong has served a total of 670012 consumers (mostly households and industries and irrigation consumption of power being too low).

The total load goes up by approximately 100 MW during peak time, from 682 MW to 781 MW (Table A4.4 in annex). Although the total load difference does not vary much significantly from off-peak to peak hours of the day, there seems to be a massive increase for industrial load from 191 MW to 607 MW whereas domestic load goes down to 174 MW from 491 MW.

However, information collected for a particular week day from PDB office suggests that daily electricity demand is estimated to be 823 MW and supply to be 645 MW roughly during the day peak hours (between 11-12 noon). This leads to a load shedding of 178 MW roughly (Table 4.4).

Table 4.4: Electricity generation and demand-supply gap (MW) as on 11 June 2014

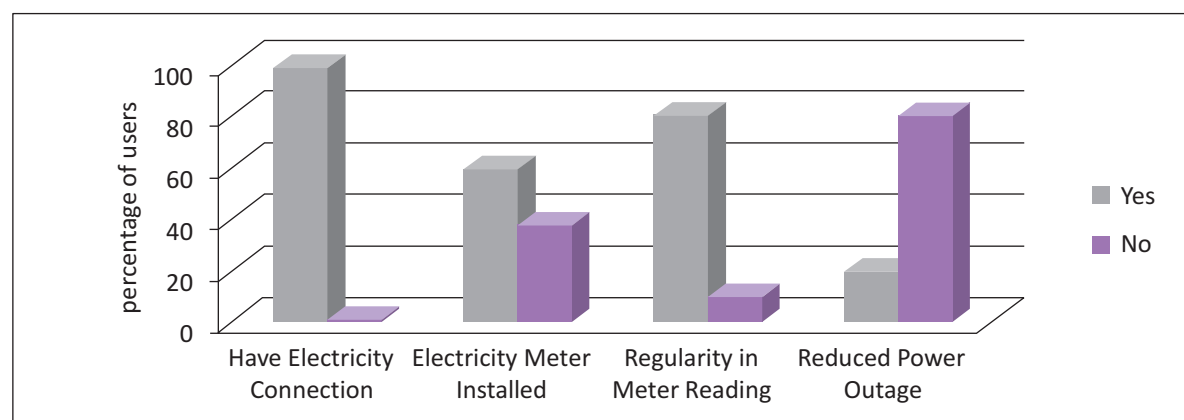
National	6387.2	
Chittagong	671.8	
	11-12 Noon	At 7:00 PM
Chittagong (Demand)	823	644
Chittagong (Received)	645	591
Chittagong (Load Shedding)	178	53

Source: BPDB 2013

Figure 4.9 shows some basic characteristics related to the city's electricity services. Electricity connection is available for most households in Chittagong (92 percent), most of which have electricity meters installed (56 percent) and have access to regular meter readings (78 percent). However, accessibility of electricity remains

relatively low, reflected by the fact that majority of the households have experienced reduced power outage in the past two years.

Figure 4.9: Selected features on electricity services

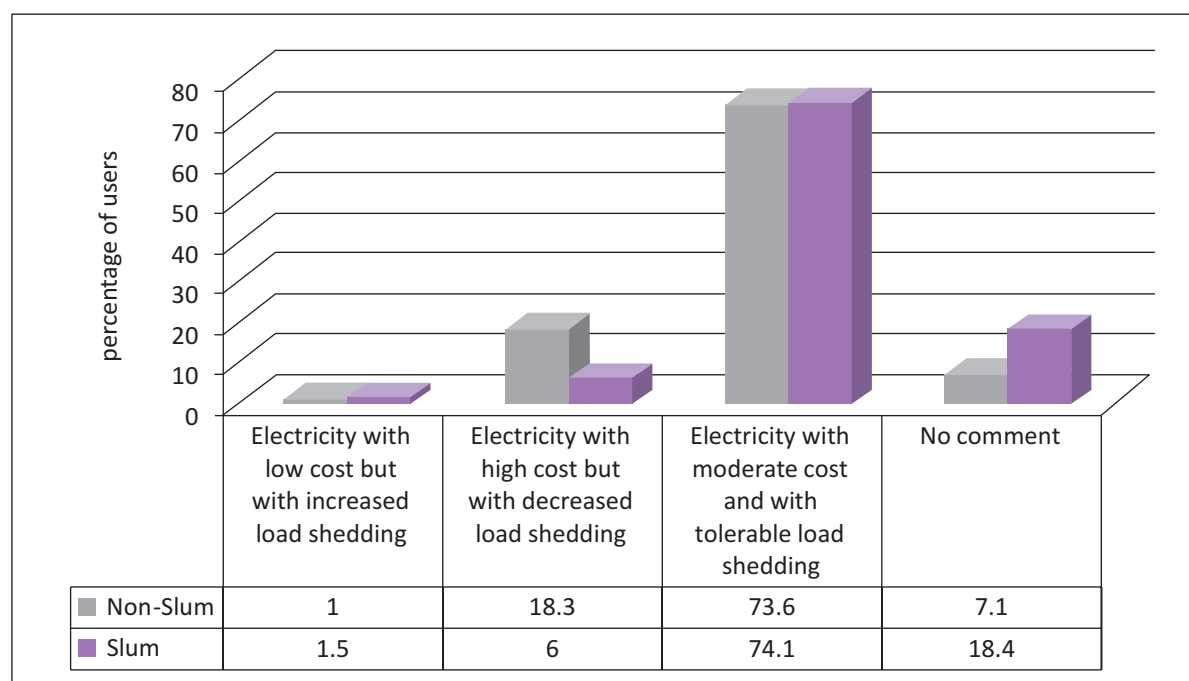


In the BIGD survey, questions relating to the contingent arrangement during power failure were also addressed. It was found that majority of the non-slum dwellers rely on battery light and IPS when they face power-cuts. The slum dwellers however were found to rely heavily on candle/lamp and battery light.

It is quite puzzling for many that despite adjusting electricity tariff several times in the past few years, power cut remains a major problem for the city dwellers, who pay on average of BDT 704 per month for the service. About 67 percent of the households in non-slum pay bill in line with meter reading, whereas in case of slums, the bill is absorbed with the rent. It is reported that 67 percent of the non-slum and 89 percent of the slum dwellers are unaware of the existing tariff structure for electricity. Those who are aware find the existing tariff structure to be too expensive, regardless of being part of slum (83 percent) or non-slum (73 percent).

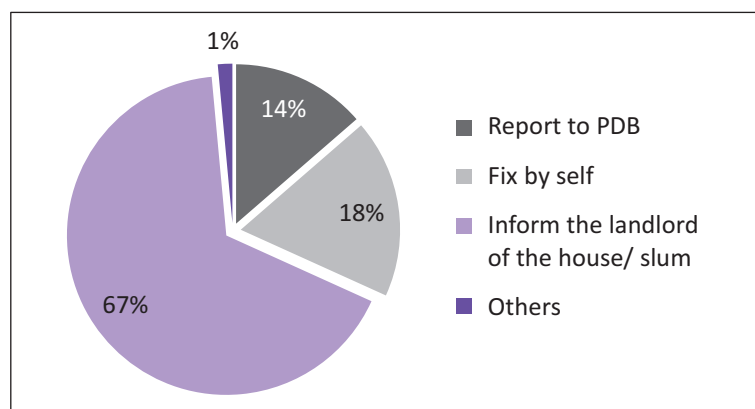
As the rising electricity bill is a major cause of concern for the city dwellers, the survey found that majority of the slum (74 percent) and non-slum (74 percent) dwellers would prefer electricity with moderately higher cost and with tolerable load shedding (rather than the other two options they were given: low load shedding with high electricity bill or high load shedding with low electricity bill) (Figure 4.10).

Figure 4.10: Electricity tariff-power cut (load shedding) trade-off

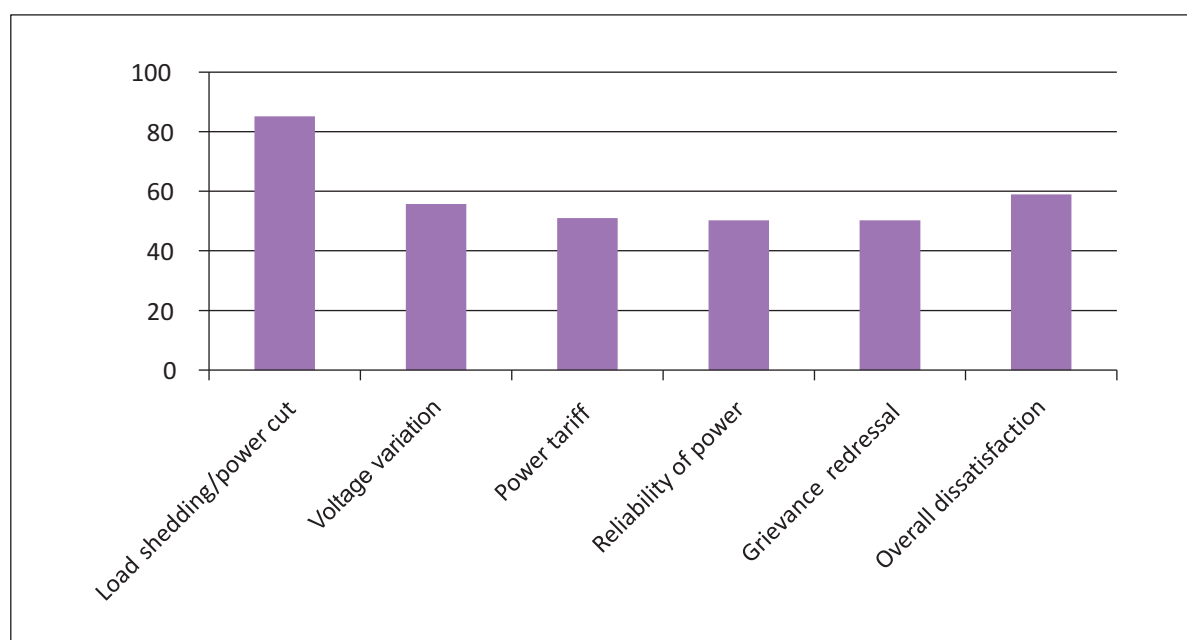


As far as the redressal mechanism is concerned, it was found that 67 percent of respondents preferred to complain to landlords/slum-owners (83 percent in the case of slum and 58 percent non-slum) regarding power-cut related problems and only 14 percent complained directly to PDB (Figure 4.11). About 72 percent reported that the electricity problem was solved after the complaint. Moreover, the system loss has been reduced to 9.2 percent by the fiscal year 2013 out of which around 6 percent is resulting from illegal electricity connection in slums.¹⁵

15. KII findings (PDB officials).

Figure 4.11: Households' preference for redressal mechanism

When it comes to satisfaction level of electricity services, load-shedding, reliability of power supply and grievance redressal, irrespective of slum and non-slum, adversely affect their satisfaction. Overall dissatisfaction was found high for electricity compared to other services save waste management (Figure 4.12).

Figure 4.12: Households' dissatisfaction over electricity services (multiple responses, in percent)

Note: dissatisfaction figures add up both completely and partially dissatisfied.

4.3.2.2 Demand-Supply gap of electricity: Addressing institutional constraints

Experts from PDB, Chittagong said that the power cut scenario has not improved in the city owing to the inequitable distribution of electricity and gas between Dhaka and Chittagong. Experts argue that while Dhaka is the administrative city, Chittagong is the country's commercial hub and should get an equitable distribution of power.¹⁶ PDB officials also claimed that electricity generation in local plants has also reduced due to insufficient gas supply as many power plants are run by gas turbine. This leads to continuous load shedding, approximating 200-250 MW in recent periods (Dhaka Tribune 2013a).

16. KII in PDB.

The city's power infrastructure needs modernisation. While the demand for electricity has increased in the region by 30 percent in the last 9 years, there are not enough transformers of PDB to supply this increased demand for electricity. Between 2005 and 2014, the number of clients increased from 500,000 to 700,000 and the demand for electricity increased from 500-600 MW to about 800 MW. However, the number of transformers barely increased from 3000 to 3500. These issues need attention by the government in terms of more investment towards infrastructural development in the greater Chittagong region. The consultation with PDB officials reveals that despite continuous proposals, the centre remains reluctant to invest in the region to cope with the growing power demand.

There have been reports that despite frequent load shedding, there are allegations of very high electricity bill, particularly during the summer. While PDB officials said that this is largely due to excessive consumption of power during the summer, many of these meters used in houses of the city are unable to take proper reading as suggested by PDB. A new project of JICA along with PDB is in implementation; 60,000 new pre-paid meters are expected to replace the old ones in the houses belonging to the Chittagong region.

Finally, despite having repeated hikes in power prices, supply of electricity remains short. A considerable portion of power comes from heavy fuel-based power plants. As a result, the cost of power generation has jumped from BDT 2.75 per unit in 2009 to BDT 6.12 per unit in 2013 (Daily Star 2014c). This increased energy production cost is not only resulting in a loss for PDB but is also directly affecting households.¹⁷ Even with rationalisation of prices in the power sector, the problem of power-cuts owing to large extent on the wrong fuel mix at the production stage (IGS 2011). Thus, policy-makers are debating that the domestic crisis of electricity could only be solved if more coal-based power plants come into operation that would promote greater production of electricity at a relatively cheaper cost (Daily Star 2014c).

4.3.3 Gas services

4.3.3.1 Gas services: Demand-supply gap and institutional arrangements

Karnaphuli Gas Distribution Company Ltd. (KGDCL) is responsible for the supply of gas in the Chittagong district including the Chittagong Hill Tracts. Since Chittagong is home to a large number of industries, KGDCL is designated to serve many large-sized industrial clients,¹⁸ 210 MW Thermal Power Station, Eastern Refinery, Chittagong Urea Fertiliser Ltd., Karnaphuli Fertiliser Company Ltd. and non-bulk customers like Captive Power, CNG, Industrial, Commercial and Domestic users (Guardian 2014). Till March 2013, a total number of 376,634 connections (Industrial, Commercial, Domestic) had been provided where new applications numbered around 15,727.¹⁹

KGDCL purchases gas from both national and international companies.²⁰ At present around 200 million cubic feet (mmcf) of gas supply is available for the city, against a daily requirement of about 400 mmcf. The production of gas at Sangu gas field was stopped and the gas supply of Bakhrabad-Chittagong transmission pipelines was restricted. Due to this huge shortage of supply, low pressure continues in the Chittagong distribution area. Therefore, gas is supplied to the fertiliser factories on a priority basis

17. Per unit cost for domestic users has increased by 6 percent this year up to consumption of 0-75 units of power consumption at household level (Dainik Azadi 2014b).

18. Including Shikalbaha Power Station (SPS), Usmania Glass Sheet Factory Ltd. (UGSFL).

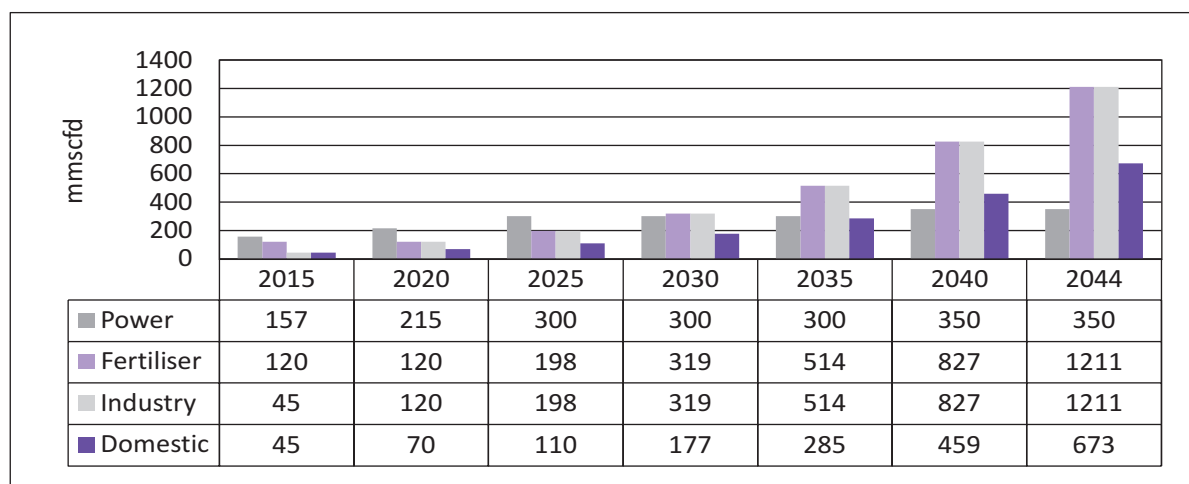
19. For details see Annual Report, KGDCL 2013.

20. Bangladesh Gas Field Company Limited (BGFCL), Sylhet Gas Field Limited (SGFL), BAPEX, Santos, Tullow and Chevron Gas Fields.

by cutting down supply to the power stations and vice-versa. On the other hand, for the rest of the customers, this problem is being tackled by rationing supplies.

A 30 year projection of gas demand in KGDCL suggests that demand for gas for industrial and fertiliser sector could surpass the demand for domestic and power sector by 2044. Given a linear growth projection of 10 percent annually, the data suggests that the demand for gas in industries and fertiliser may go up to 1211 mmscfd (million standard cubic feet per day) which is twice the amount of gas demand for residential use, 673 mmscfd by 2044 (Figure 4.13).

Figure 4.13: Projection of gas demand in Chittagong: 2015-2044



Source: KGDCL 2014

The BIGD survey found that 78 percent of respondents reported availability of gas supply, citing KGDCL as the major source of gas (90 percent) (Figure 4.14).

Figure 4.14 shows that among those residing in non-slum areas, majority (95.4 percent) of the population have access to gas service. However, there is marked difference in terms of accessibility of gas services when slum and non-slum areas are compared. In slum, five families share one gas burner.²¹

Figure 4.14: Access to gas services of KGDCL in Chittagong (in percent)

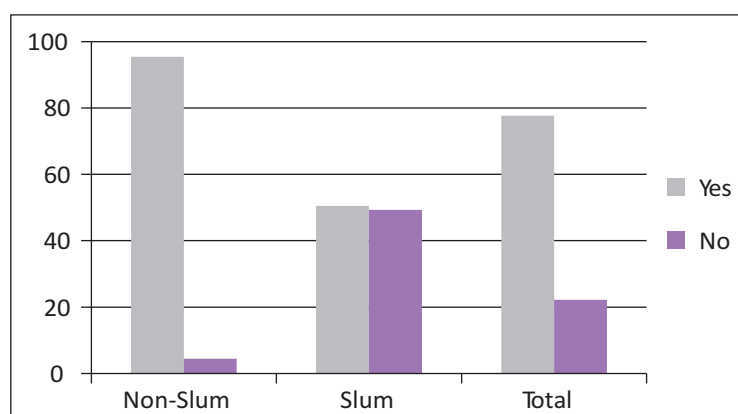
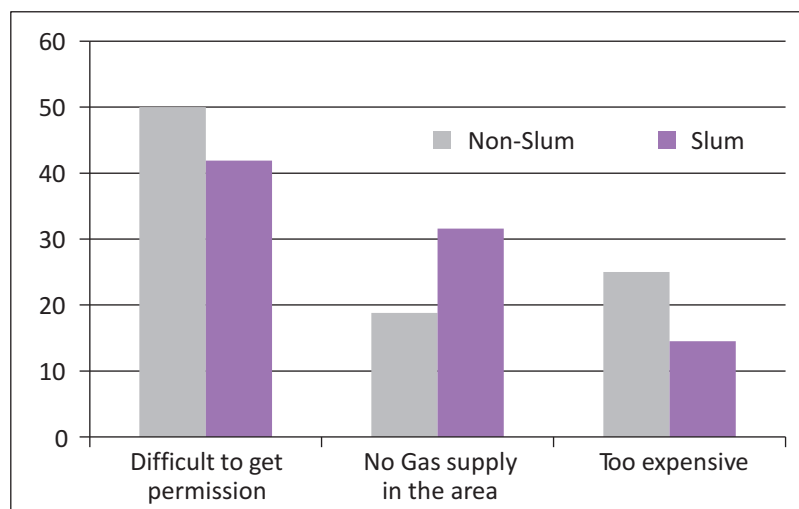


Figure 4.15 shows that among those who do not have gas supply, 50 percent of non-slum and nearly 42 percent of slum dwellers reported difficulty in getting permission as the leading cause. Following this, other dominant reasons are: service being too expensive and no gas supply in the area. It was also reported that gas prices are fixed at about BDT 453 on average.

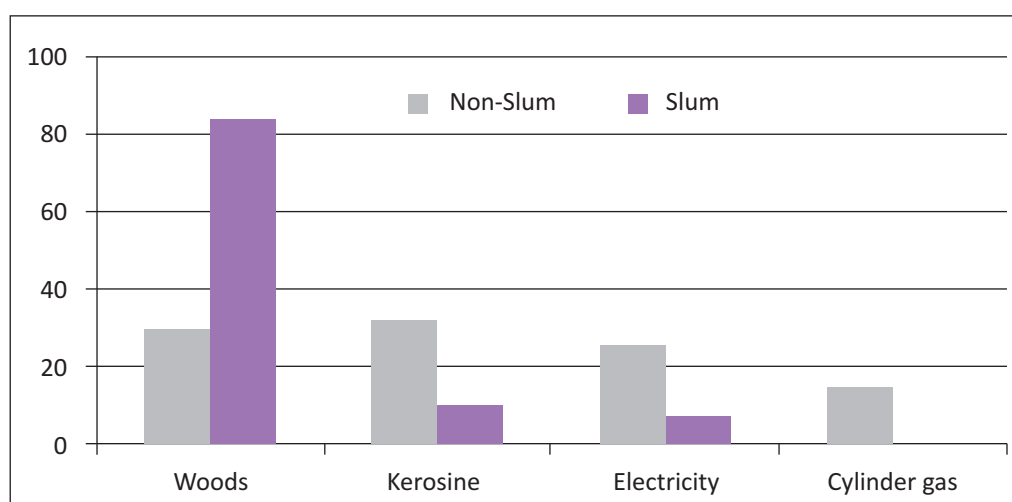
21. FGD Findings.

Figure 4.15: Reasons for no gas supply (in percent)



Following these, Figure 4.16 depicts that for slum dwellers, the major source of cooking in absence of natural gas supply is wood, and they have very low dependence on kerosene or electric heater. As for the non-slum households, the dependence is shown to be higher on the use of kerosene and electric heater as alternate cooking sources.

Figure 4.16: Alternative energy source for cooking (in percent)



The experts and the authorities said that low gas price is a constraint to expand the coverage as well as provide better facilities investing in the gas infrastructure. The survey captured the users' opinion on meter installation for gas which revealed that 64 percent of households are not willing to install meter or go for pay-per-use, depicting unwillingness of city dwellers to pay as per their consumption of gas services (Table 4.5).

Table 4.5: Households' willingness to install gas meter

	Socio-economic categories						
	SEC A	SEC B	SEC C	SEC D	Non-Slum	Slum	Total
Yes (percent)	43	37	41	23	40	23	36
No (percent)	57	63	59	77	60	77	64
Base (N): Those use KGDCL Gas	232	239	213	240	684	240	924

It is suggested that consumers' switching to cylinder gas from the current natural gas is a policy option from the perspective of efficiency gain. The survey findings suggest that nearly 90 percent of non-slum residents and 94 percent of slum dwellers give less preference to the use of cylinder gas.

A total of 78 percent of the non-slum dwellers and 84 percent of the slum dwellers report that they give less preference to LPG because it is too expensive. Also, about 20 percent of the non-slum and 10 percent of slum dwellers reported safety issues to be the next leading cause.

As far as consumers' satisfaction level for different indicators of gas supply is concerned, while the city dwellers are generally satisfied with the KGDCL, a greater proportion of non-slum dwellers were dissatisfied with low gas pressure and timeliness of gas supply, compared to slum dwellers who found these characteristics highly satisfactory.

4.3.3.2 Addressing the institutional and other constraints for gas services

The expansion of the coverage of gas services for both households and industries has been constrained owing to gas shortages. This requires large investment in pipelines to get gas from places where either existing or probable gas reserves are high. The existing gas transmission comes from Semutang gas field. Other gas supplies are sourced from gas fields via Comilla and Sylhet. Gas is channelled from Semutang gas field directly (6/7 MCF) but there are limitations of channeling gas from Comilla and Sylhet. Dhaka on the other hand is getting gas through 7 gas lines whereas Chittagong has only 1 gas line. Officials of KGDCL said that it is necessary to lay 30" diameter loop line from Ashuganj-Bakhrabad-Feni-Chittagong on an emergency basis to ensure smooth supply in Chittagong to overcome the current gas crisis. No progress has taken place in the Comilla-Chittagong 108 miles second pipeline establishment. Although national production in gas has increased from 1750 MCF to 2250 MCF, the allocation of gas supply to Chittagong has remained unchanged. Government must revise their gas allocation policy/quota for the city.

More importantly, as a long term solution, policymakers are recommending a switch to metered system (based on pay-per-use for gas supply) so that a more rationalised pricing of gas is made. Gas has remained underpriced for a long time²² and consumers have adapted themselves with lower (as well as fixed-amount) pricing of gas, as evident from respondents with access to natural gas supply, who do not wish to switch to cylinder gas. This requires a civic response from the citizens as well as to empower the local authorities, notably KGDCL, to rationalise gas price in phases. Installation of pre-paid metering is critical in this regard. Once the gas prices are rationalised vis-à-vis cylinder gas, the users' existing preference for KGDCL supplied gas might be reduced.²³

22. In Bangladesh, the economic cost of gas is equivalent to the opportunity cost of outage or the cost of imported fuel at the margin as there is natural existence of a deficit of gas supply. As of August 2009, new tariff structure in the gas sector suggests that despite having repeated price hikes in the last five years, sectors such as domestic (residential), power and fertiliser are exposed to low retail tariff rates compared to industry, commercial and captive power (See Annex table A4.5 for the present tariff Structure). Our interview with officials of BERC and KGDCL suggests that as of today, the exploration cost at the national gas field by international companies remain substantially higher regardless of government investment in this sector. Eventually repeated underpricing of gas, disregarding balancing out with international pricing, leaves services to be provided, but below the overall demand.

23. Consultation with experts from Bangladesh Energy Regulatory Commission depicts that LPG is debated to be the next generation's substitute for pipeline gas. However, even at the subsidised rate, cost per 12.5 kg remains too high to be substituted for domestic needs. Although government has fixed the cost of LPG per 12.5 kg to be BDT 700, it is sold locally at much higher retail prices to the customers at around BDT 1500-1600. Thus, price discrimination between pipeline gas and LPG plays a bigger role in restricting the greater use of LPG.

4.3.4 Waste management

4.3.4.1 Waste management: Demand, supply and institutional arrangements

Waste disposal, and consequently proper management of solid waste is a growing concern in almost all urban areas of Bangladesh.²⁴ The CCC is the major authority in providing waste management services in Chittagong. The Chittagong Cantonment and port areas carry out their own waste collection and disposal. According to the Chief Conservancy officer of CCC, the average amount of solid waste generated daily in the city is about 1,500 tonnes. These are mostly generated from residential, industrial and commercial sources. Food waste constitutes the major part of the mixed waste, probably indicating the predominance of residential source in the overall solid waste. Other important constituents include polythene/plastic, paper, cloth, garden wastes, and brick, stone, metal, glass, ceramic as well as dust and ash, vegetable and animal bones, and other non-combustible trash (Alam and Sohel 2008). Hazardous waste from industries and hospitals are frequently mixed with municipal waste, which in turn are poorly collected and disposed. Moreover, industrial waste is not separated in any way and is simply dumped along with the regular kind of waste. These include waste from tanneries, garments, steel mills, and brickworks, which are all heavy pollutants (Huda 2008).

Solid waste management in the city is organised and run by the Conservancy Department of the CCC that handles the collection of waste and also sweeping of the streets, but transportation of waste is done by a different department of the City Corporation. Of 1500 tonnes, about 1200 tonnes waste is cleared away daily by the City Corporation. The *tokais* (scavengers, often the children of slum dwellers) clear away another 200 tonnes approximately, while the remaining waste is not cleared and remains lying where they are thrown. Individuals deposit their waste in bins located at street corners at specific intervals. The CCC supplies movable dustbins made of corrugated sheets and fixed concrete bins all over the city for home and business owners to dump the waste (Alam and Sohel 2008). There are a total of 1350 dustbins in CCC, out of which 700 are concrete bins. The city also employs cleaners who collect the street sweepings and drain silts and deposit these in the nearest bins. Transport vehicles then take those solid wastes to designated landfills. There are two waste disposal sites in the City Corporation.²⁵ NGOs are involved in collecting waste from some medical facilities and transporting them to the landfill sites, where they are dumped in a separate section within the landfill site.²⁶

The health centres under CCC are handling their own waste. However, there are so many medical centres mushrooming all over the city it is not probable that medical waste is collected from them all separately and dumped separately as well.²⁷ So there is inevitable mixing of medical waste with general solid waste. This also shows that Chittagong suffers from a problem of improper collection of waste.

In the case of slum areas, waste management is an even more critical issue, as pathways, drains and water bodies are all invariably filled with waste. Some NGOs have taken the initiative to help out here.²⁸

24. The disposal of solid waste is a problem from many perspectives. Open dumping and burning of waste, which is a common practice in Bangladesh, leads to heavy pollution and health hazards. Dumping in low lying lands is another practice which again leads to severe water pollution. Uncollected disposal of waste on streets and other public areas, clogged drainage system by dumped wastes and water contamination near uncontrolled dumping sites all pose serious environmental degradation and public health risk (Hai and Ali 2005).

25. Both of them are open dumping sites, currently located in Halishahar and Arefin Nagar.

26. KII findings.

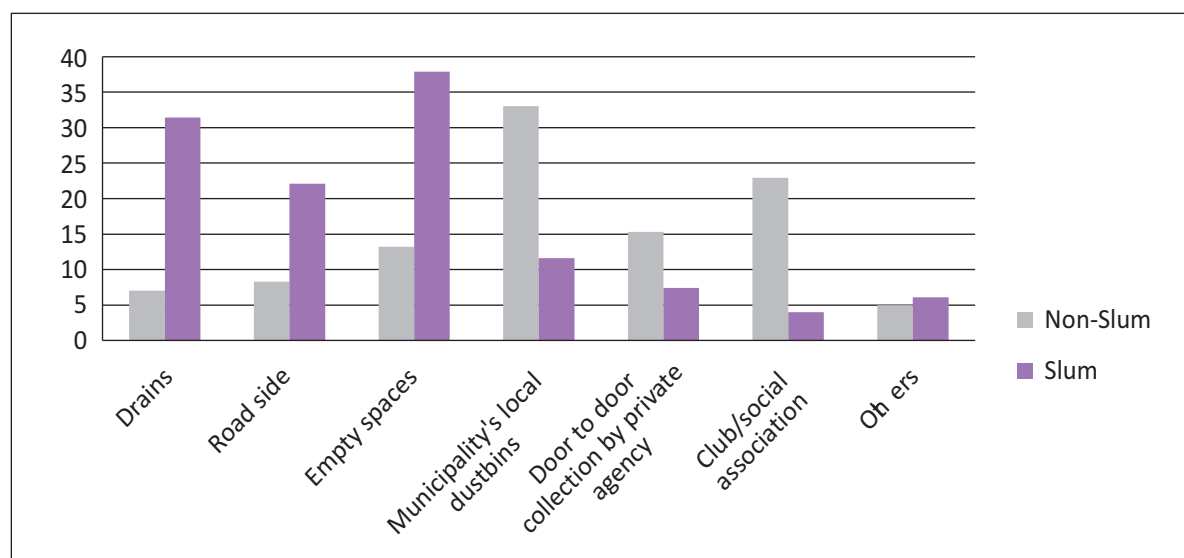
27. KII findings.

28. NGOs involved include DSK (Dushtha Shasthya Kendra) and PSTC (Population Services and Training Centre) who work in conjunction with WaterAid Bangladesh (Hanchett *et al.* 2013).

In some slum areas, small dustbins have been set up to collect waste from a small surrounding area, which is then collected by trolleys and transported to the municipality dustbins to be taken away by the City Corporation to the final dumping site.

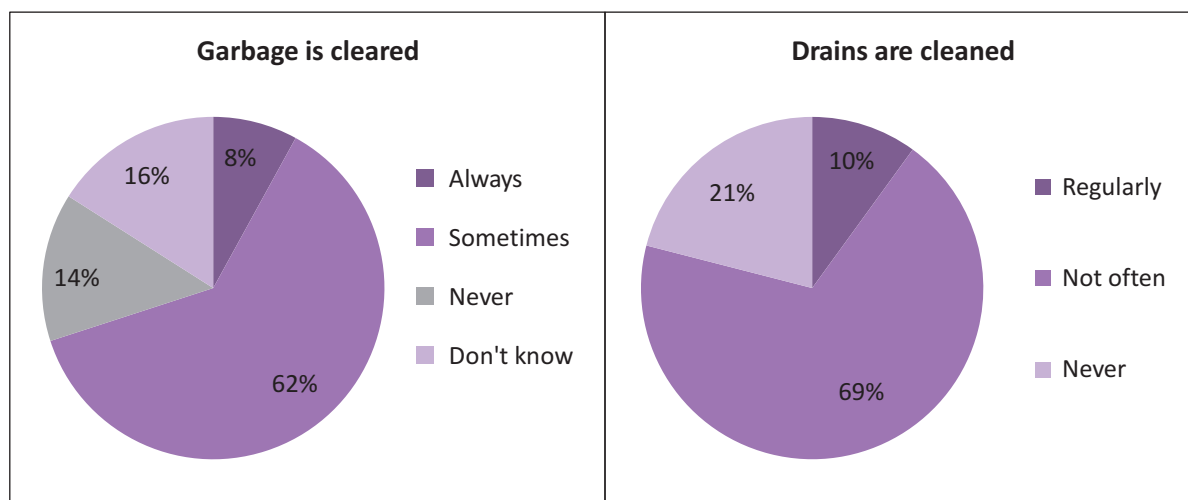
According to the BIGD Survey (2014), when it comes to disposing of waste from households, almost all non-slum residents, and more than 50 percent of slum residents discard their waste on a daily basis. Non-slum residents dispose their waste through door-to-door collection facilities, including those provided by local clubs and associations, or directly into the dustbins provided by the municipality. In contrast, slum residents mostly dispose of their waste in nearby opens and roadsides, as well as in empty spaces in their area (Figure 4.17). The results also show that although NGOs are involved in waste management, it is not adequate and there is a lack of civic responsibility in disposing of waste among this group.

Figure 4.17: Disposal of garbage by households (multiple responses, in percent)



The survey also shows that local dustbins provided by the City Corporation are only emptied once a week or even once a month in some cases. Neither roads nor empty spaces are swept regularly, and drains are not cleaned more than once a month (Figure 4.18). However, this is the perception of the surveyed citizens and need not necessarily depict the entire picture.²⁹

29. There is effort on the part of the CCC to maintain some cleanliness, but their lack of sufficient resources is a constraint. Added to this is the fact that instead of throwing their garbage within a designated time for the City Corporation workers to collect, citizens dispose of their waste intermittently throughout the day, and not always in the designated places. This may be the reason that leads to the perception that cleaning does not take place at all as there is always waste lying around.

Figure 4.18: Frequency of garbage cleared and drains cleaned

In case of those using door-to-door collection facilities (both slum and non-slum), all respondents said they paid a fee for this service. The average amount paid is BDT 64 per month. Our FGD in slums indicates that they pay a monthly amount of approximately BDT 30 for these garbage collection services.³⁰ There is overall a consensus (76 percent for non slum and 69 percent for slum) that this is a reasonable amount to pay for clearing of garbage from households. This indicates pricing is not a major issue in addressing waste management problems.

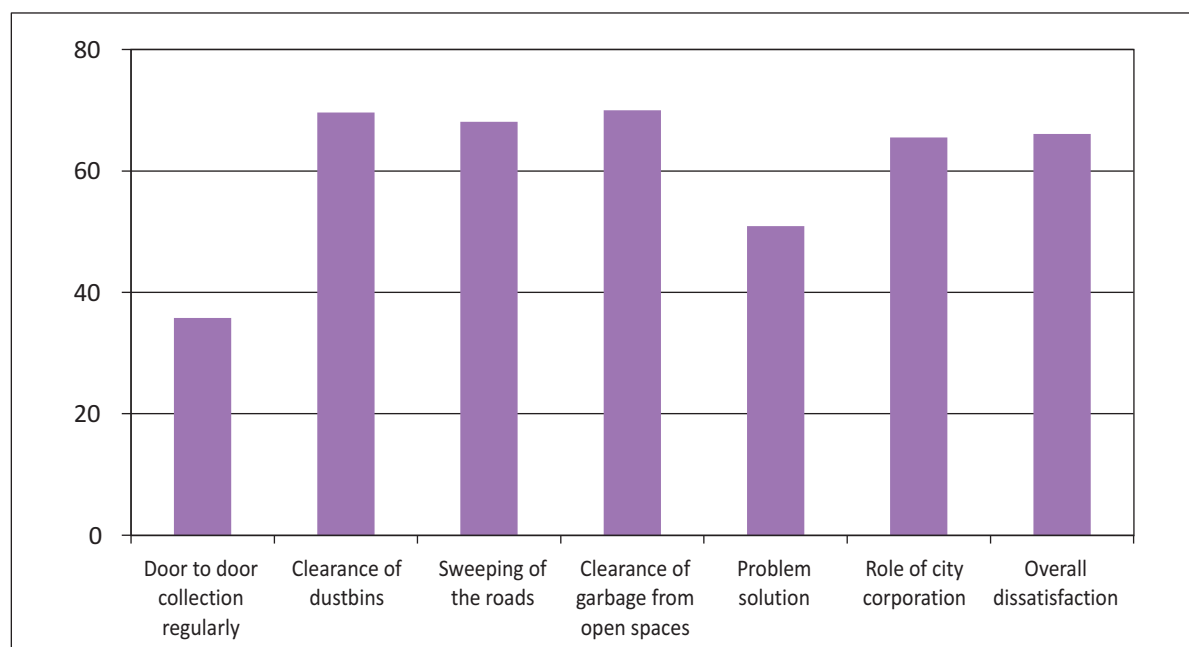
As far as redressal mechanism is concerned, the vast majority of respondents did not lodge any complaints to the CCC. The few who were found to lodge complaints did so mainly to their landlord. This is especially true for slum dwellers, who almost exclusively complained to their landlords, i.e. slum owners. CCC has a Monitoring Cell open 24 hours at their offices.³¹ Respondents further reported that complaining did not bring any results, which explains why they are discouraged to complain about the matter. When asked about their perception of the City Corporation's role in waste management, respondents were for the most part aware of the CCC's role in providing dustbins, transportation and final disposal of waste. As such, they also expressed dissatisfaction with the City Corporation's role, and felt there was a need for being more pro-active.

There is a general level of dissatisfaction for all the aspects of waste management services used as indicators of satisfaction (Figure 4.19). Respondents in slum areas expressed greater level of dissatisfaction regarding regular clearing of waste from local dustbins and surrounding areas. There was the general consensus that garbage was not cleaned properly from the dumping sites, followed by dissatisfaction regarding cleanliness of the streets and drains, especially during the rainy season.

30. FGD findings.

31. KII findings.

Figure 4.19: Households' dissatisfaction over waste management services (multiple responses, in percent)



Note: dissatisfaction figures add up both completely and partially dissatisfied.

4.3.4.2 Addressing institutional constraints of waste management

Various suggestions were given by almost all respondents of the BIGD Survey (2014) for improving the current situation of the waste management system which include more regular and speedy cleaning of waste, followed by the need for more dustbins in designated and convenient spots. Better cleaning of drains and sweeping of streets were the other suggestions. Slum dwellers especially expressed a need for better door to door collection facilities. Other suggestions included the need for creating mass awareness to improve civic responsibility as well as a more active role by the City Corporation.

The main hurdles to efficient waste management are a lack of personnel augmented by a shortage of resources, such as equipment and vehicles. There is a need for at least 4,000 personnel for managing solid waste on a day to day basis, but they only have a staff half the size, at approximately 2,000.³² The kind of vehicles used is also insufficient in numbers as well — 60 to 80 transport vehicles are available whereas about 200 are required. However, there are allegations that there lacks effective monitoring system to oversee the waste management activities of CCC.

The landfill sites are also not up to the standards (Table A4.6 in annex). These disposal sites are not ideal as access to them is difficult due to unpaved roads, making it especially inconvenient during the rainy season (BMDf 2012). There is a lack of proper equipment in the landfill sites, such as a weighbridge to calculate the number of vehicles entering each day.

32. KII findings.

Moreover, considering the hauling distances covered by the waste trucks and the travel time required, dependence on only two sites, eccentrically located at the northern and mid western ends of the city, does not seem to be justified on economical consideration (Ashraf *et al.* forthcoming). Several sanitary landfill sites at appropriate locations, evenly distributed within the city might be the answer to this problem. Ashraf *et al.* (*ibid*) identified four potential sites that could be developed as landfill sites for the proper management of garbage (See Table A4.7 in annex).

There needs to be greater public sector investment in solid waste management and serious consideration should be given for private sector investment as well. Recycling facilities need to be set up. Currently, a very minimal amount of recycling is practiced in Chittagong. 500 kilograms of fertiliser is produced per day from mainly food waste.³³ The capacity for this sort of recycling needs to be increased.

One of the measures planned to mitigate these issues is the building of secondary transport stations. These will be substituted for the local area dustbins and be used to collect waste from households before they are transported to the landfill sites.³⁴ Initiatives to construct these stations have already taken place, and a budget has been allocated as well. However, nobody wants a secondary station in their neighbourhood.³⁵

Another important issue is a lack of civic awareness among the residents of the city. As mentioned above, citizens engage in irresponsible behaviour by littering the streets and also dumping their garbage on open roadsides and gutters for the street cleaners to pick up, instead of disposing garbage properly in the designated dustbins. The problem is most acute in slums and low and middle income areas. The Chief Conservancy Officer points out that waste should be thrown out by the citizens within a certain time, otherwise the staff has to spend extra time, and even all day collecting the garbage, and often all the waste is not collected. The ideal time for throwing out garbage should be between 5 pm in the evening and 8 am the next morning.

Finally, the City Corporation is not all powerful in the decision making process, and has to rely on approval from the central administration body based in the Capital. It needs policy and funding support from the centre in implementing the Master Plan and other projects on waste management. An application for a sanitary landfill to the higher authorities was not approved. Proposals from private companies have been sent to the concerned Ministry by CCC, but the process is often delayed.

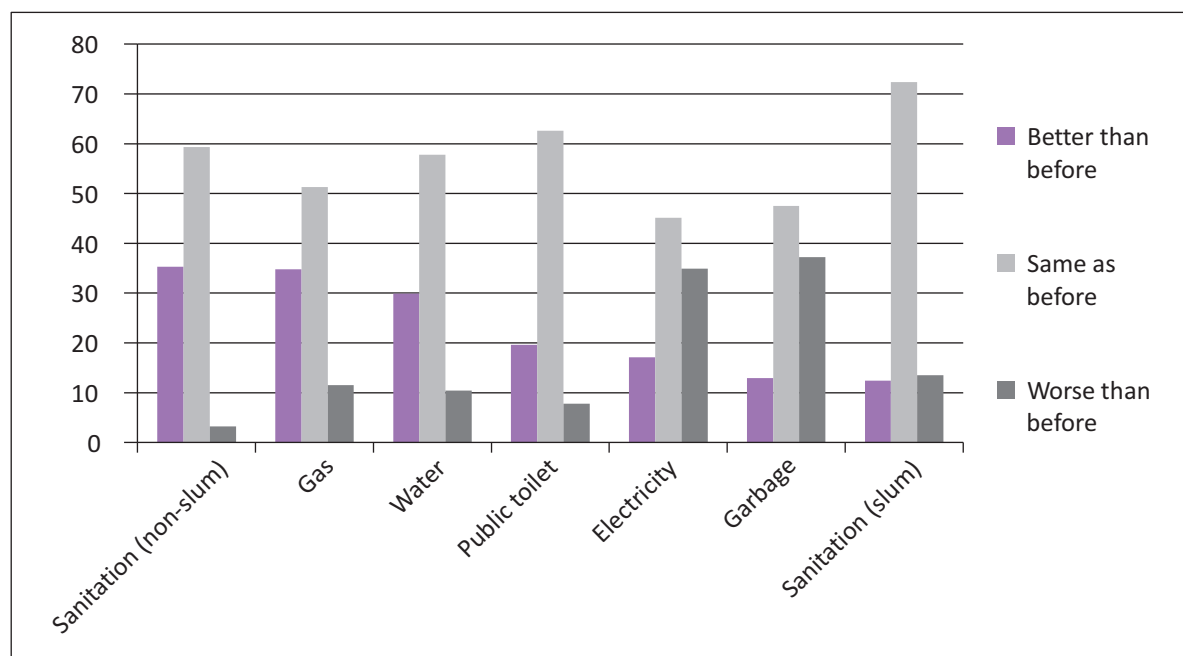
4.4 Service delivery in Chittagong: Summary observations

Chittagong's service delivery gives a reflection of mixed results. The BIGD Survey (2014) indicates that for almost all utility services, the general perception is that the quality of services has remained largely the same as before. Nevertheless, in the case of gas and water the quality was found to be improved, whereas when it comes to electricity and waste management, the city dwellers experienced deterioration in service delivery. Sanitation system in non-slum areas and the conditions of public toilets has improved, whereas in slums it deteriorated. The disaggregated data suggests that slum dwellers have been generally worse-off vis-à-vis non-slum people save in the case of natural gas (see Figure 4.20 and Table A4.8 in annex).

33. KII findings.

34. These stations will be useful as they will reduce the unsightly environment around dustbins in each area. This will also stop the current process of sorting through waste taking place at the dustbins in the street.

35. Two secondary station arrangements have been demolished by the police and the army, based on the NIMBY (not in my backyard) syndrome (Huda 2008).

Figure 4.20: The state of service delivery, compared to 2 years back (in percent)

To see whether any short term changes in service delivery have been brought, the BIGD Survey (2014) asked the respondents to compare the current situation of the utility services with the condition two years ago. These results have to be analysed carefully. A lot of differences are noticeable if one examines the services in terms of their availability, accessibility, affordability, reliability, redressal mechanism and satisfaction level. Households' perception indicates that water, electricity and gas services fare relatively well in terms of availability, whereas waste management, sanitation, particularly latrine (in slum) and public toilet are comparatively low in this regard.

Accessibility of gas is relatively high. The existing users are generally satisfied with the service. However, the extension of gas services is constrained by limited gas supply in the existing pipelines that prompted the authorities to restrict the permission for new gas lines. Thus, the results do not capture the view of households and industries that are deprived of the service. In case of water services, people are reducing dependency on CWASA, installing deep-tube wells by themselves, particularly in non-slum areas. However in slums, the dependency on shallow tube wells is overwhelming. Regarding electricity service, while households have adequate electricity connections, they experience frequent power-cuts.

Sanitation services in the city have been largely neglected. In the absence of a centralised sewerage system, the city is vulnerable to health risks. The situations in slums are particularly worrying where low income people are forced to live in severely degraded and unhygienic sanitary conditions. While the city dwellers reported an improvement in public toilet facilities, the city still lacks adequate public toilets. In the case of non-slum, the improvement in quality is attributed to households' awareness and affordability.

With regard to affordability, while greater number of households can afford water and waste management services, they found the current electricity tariff to be very high. Additionally, households who have gas supply prefer the existing monthly fixed bill payment system (one/two gas burner). Majority of them do not want to move on to metered payment system. They also do not intend to switch to cylinder gas system (LPG). The discrepancy in natural gas and cylinder gas prices needs to be addressed by gradually increasing the prices of natural gas. Similarly, greater share of households do not like to pay water bills based on pay-per-use principle. The city dwellers preference for cheaper services might have compromised the city's efficiency in service delivery. However, rationalisation of utility prices is critical for the extension of service delivery (sustainability). Nevertheless, the upward adjustment of utility price is not the panacea, as we learnt from the electricity services. Other related policies also need to function effectively in order to make the price adjustment useful.

When it comes to redressal mechanism, households showed higher level of dissatisfaction over waste management and electricity services. Dissatisfaction in this regard is found to be low on sanitation, water and gas services (Figure 4.21). The city's redressal mechanism is given as inadequate and the city dwellers are often deprived of prompt services that discourage them from lodging complains when faced with problems (Figure 4.22).

Figure 4.21: Households' dissatisfaction over redressal mechanism on utility services (in percent)

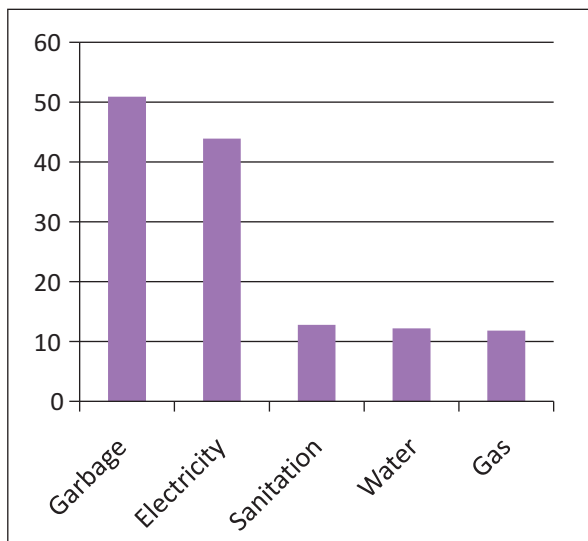
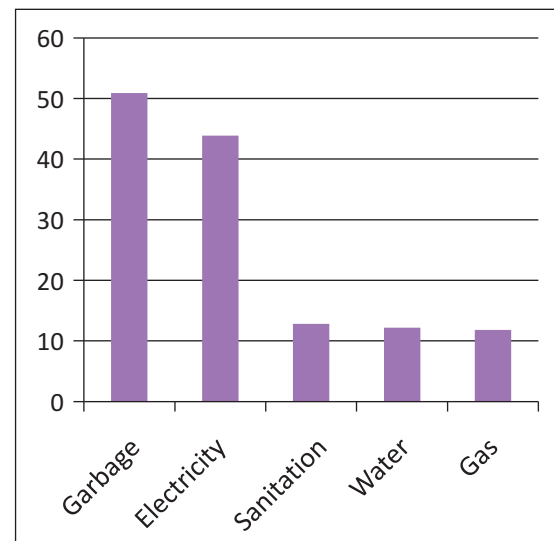


Figure 4.22: Households' unwillingness to complain about selected services (in percent)



As the formal utility and other services are scarce in low income areas, notably in slums, there are some alternative arrangements for these services. The FGDs with male and female slum residents revealed that service provisions are often provided by slum landlords. They arrange for service provision of shared gas, controlled electricity, water, shared toilet facilities, etc. This gives slum owners a monopoly control over service provisions, acting as a *de facto* authority. However, this informal arrangement cannot be a substitute of formal service delivery reflected by the fact that for all the services bar gas, slum dwellers are worse-off than of non-slum residents.

Box 4.1: Determinants of satisfaction over utility services

In order to understand the determinants of dissatisfaction over overall utility services (water, gas, electricity and waste management), we constructed a Probit regression analysis (binary construction, 1= household expresses dissatisfaction regarding utility services in question, 0= household does not express dissatisfaction regarding utility services in question). Hereby we examine the probability of a respondent household expressing dissatisfaction regarding overall utility services, and what are the determinants. The dependent variables are dissatisfaction on overall water supply, electricity, gas and waste management, respectively. The independent variables vary on different utility services, while we also included some household-specific variables (such as age and education of household head) and dummy variables for household's classification with regard to SEC categories. The objective of the Probit regression analysis was to examine utility-specific variables, household-specific variables as well as SEC classifications and determine which variables are statistically significant in terms of affecting probability of the household expressing dissatisfactions.³⁶

The first three rows of Table 4.6 reports the probability of dissatisfaction for variables SEC A, SEC B and SEC C respectively (the three socio-economic categories representing non-slum) where the reference variable is SEC D (the socio-economic category representing slum). It can be said that the level of dissatisfaction of households residing in non-slum areas is relatively lower than that of slums for the utility services in question (Also see Table A4.8 in annex). This heightened the argument that informal service delivery that is generally extended to slums is not a substitute of formal service delivery.

Controlling for different socio-economic clusters, the rest of the results report the determinant of water, gas, electricity and waste management. With regard to water, the probability of a respondent household expressing dissatisfaction is positively associated with whether the household has a SSC-passed (Secondary School Certificate) household head, is not local to Chittagong, faced any water-related problem during last one year, complained about finding smell in piped water and expressed dissatisfaction regarding obtaining sufficient water compared to need.

When it comes to gas service, the probability of dissatisfaction is lower if the household reported to have same gas pressure during the last year and higher whether the respondent was male, the household head had passed SSC, and the household had expressed dissatisfaction regarding gas prices.

...Cont'd

36. We select a limited dependent variable regression analysis such as Probit model in this case, since simple OLS (ordinary least squares) regression would be inappropriate in this case, as the dependent variable is "dissatisfaction" (question asked for ranking response: "completely satisfied", "partially satisfied", "neither satisfied nor dissatisfied", "partially dissatisfied" and "completely dissatisfied"). Probit is generally more widely used in this type of econometric specifications, compared to the alternative of logistic regressions.

Table 4.6: Regression results for water, gas, electricity and waste management

Dependent variable: Household Dissatisfaction on Overall Utility Services				
Independent variables	Water	Gas	Electricity	Waste Management
Middle & upper group (SEC A)	-.6777456**	-1.099833***	-.6495309***	-.5601808**
Middle and lower group (SEC B)	-1.016916***	-.8412243***		-.6976783***
Rich and poor group (SEC C)	-.7056819***	-1.064515***	-.3905077**	-.4462695**
Household head is SSC passed	.3764736*	.6382043***		
Respondent is male		.4600877***	.4942921***	.7272013***
Dissatisfied with price/tariff		1.443455***	1.366016***	
Non-local (origin is not Chittagong)	.2656601*			
Faced problem in last year	.3441905**			
Found bad smell in water	1.283185***			
Inadequate water supply received	2.276436***			
Same gas pressure in last year		-1.670413***		
Age of respondent			-.0092949***	
Household size			-.1334404***	
Dissatisfied with load shedding			.7699861***	
Dissatisfied with electricity voltage			1.196005***	
Education of respondent				.0533228***
Dustbins are cleaned regularly				-.7447462***
Drains are cleaned regularly				-.3077329**
Roads are cleaned regularly				.3437327**
Open trashes are cleared regularly				-1.40741***

Note: *** implies significance at 1 percent level, ** at 5 percent level and * at 10 percent level.

Source: Author's calculation based on BIGD Survey 2014

As far as electricity service is concerned, the probability of a household expressing dissatisfaction is higher if the respondent is male, faced and load shedding, and was dissatisfied with the tariff and variability in voltage. On the other hand, the probability of a household expressing dissatisfaction is lower when the respondent's age is higher and family size is large.

Finally, with regard to waste management, the probability of dissatisfaction increases when educational level of the respondent is higher, and the respondent is male. The probability of a respondent expressing dissatisfaction is lower provided dustbins are cleared regularly, drains are cleaned regularly and open trashes are cleared regularly.

4.5 A sustainable service delivery model for Chittagong

The analysis in preceding sections suggests that the city needs a better service delivery model by ensuring availability, accessibility, affordability and reliability of services. An efficient redressal mechanism to deal with service delivery related governance issues is also important. The following recommendations are suggested for an efficient service delivery model for the city.

1. The city's service delivery is constrained by the poor quality of infrastructure. The delay or non-execution of Master and other plans, owing largely to fund problems and lack of accountability of the concerned agencies are largely responsible for this. Both the issues have to be addressed: a) by making the respective service delivery agencies accountable, and b) the centre allocating (or offering devolution of power) the required funds for the execution of Master and other plans.
2. Some projects need to be executed on a priority basis, as highlighted by the city Master Plan. A sewerage system for the city, numerous water treatment plants and waste processing plants should be executed urgently to make these services accessible and reduce the health risk given their environmental linkages.
3. Limited autonomy of the service delivery agencies as well as consumers preference for cheaper services constrains rationalisation of utility prices. This has to be addressed by providing; a) greater autonomy to local service delivery agencies, and b) city dwellers have to be aware to provide cost-recovery price for utility services.
4. Formal institutional arrangements should be extended for low income people as well, particularly those living in slums. The presence of dual service delivery model (formal and various informal channels) have created multiple authorities in the city whereby landlord or slum owners enjoy *de facto* monopoly over a wide range of services but for almost all the services slum dwellers are found to be worse-off vis-à-vis non-slum residents.
5. While service delivery in cities is dominated by state agencies, in selected areas private provisions are desirable. Involvement of private sector in addressing waste management, particularly in door-to-door collection of waste and recycling has been proven effective. Moreover, some projects could be executed by public private partnerships. Greater involvement of multilateral agencies is also highly desirable.
6. Technology can help in addressing the governance issues such as discrepancy in billing, generating meter-based bills and payments etc.

Chapter 5

Transportation Governance

5.1 Introduction

Cities are ultimately nothing more than proximity, so the returns to urban concentration can be seen as reductions in transport costs (Glaeser and Gottlieb 2009). Nevertheless, most cities in developing countries face major challenges due to the continuous growth of urban population, private vehicle ownership, congestion and the fragility of public transportation systems (World Bank 2014b). In the case of Bangladesh, the denser concentration of economic activities generate higher growth in the country's top two cities – Dhaka and Chittagong, hosting about one-third of the economic establishments (Islam and Khan 2012).

The transportation system in and around Chittagong has evolved by the seaport-hinterland dynamics that historically shaped the supply chain solutions of the overseas shippers and the logistic support providers from as far as Assam (India). Apart from maritime trade, Chittagong's rise and decline have been highly associated with its hinterlands (Mukherjee 2011).¹ Chittagong is connected with the national capital and other key urban centres and towns through national and regional highways, railways and inland waterways.

However, transport and other infrastructure facilities of Chittagong, the country's commercial capital, main sea port, and industrial and commercial hubs (largest concentration of Export Processing Zones) are far from adequate. It is believed that the city could contribute to the national economy even more provided it is equipped with modern transport and other infrastructure facilities (Muzzini and Aparicio 2013). It's connectivity with Dhaka and other parts of the country has not been improved in line with growing demand for various modes of transportation services.² As a result, 'economic distance' (as

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1. Historically, it served as a hinterland for Northeast India, Nepal, Bhutan, Myanmar and Yunnan province of China. The city and the port stand to benefit from the changes that are taking place in the region under the aegis of Bangladesh-China-India-Myanmar Economic Corridor (BCIM EC).
 2. The travel time between the two cities have increased markedly limiting mobility of commuters (McKinsey 2012).

opposed to 'Euclidian distance') is apparently increasing between the capital and port city. Higher congestion costs could adversely affect liveability conditions of the city. Studies show that the economic and environmental costs of congestion are enormous.³

Transport provisions within Chittagong are inadequate and face difficulties in coping with the growing demand. The existing trunk road system is insufficiently developed compared to the volume of traffic in the city (JICA 2009). Non-integrated transport network, unplanned land use, inadequate transport facilities, poor traffic management and operational deficiency are generally blamed for the city's traffic congestion.

Chittagong does not have efficient public transport. Lack of mass transit and other transport facilities opened the room for various intermediaries to provide transport provisions for low and even middle income people. Like many developing cities, informal public transport (para-transit or Intermediate Public Transport), is an important component of Chittagong's overall transport services. In fact, para-transit system is an indispensable transport system in medium sized cities of South Asia. Nevertheless, the strong presence of informal transport in cities indicates that the transport needs are not being met sufficiently by city governments through formal public transport services. Therefore, the gap between demand and supply is met by the informal transport providers (GTZ 2010). For example, there are around 150,000 rickshaws in the city though only 35,000 have Chittagong City Corporation (CCC) license (Daily Star 2012a). Both motorised and non-motorised vehicles run in the city simultaneously (BIGD Survey 2014) restricting the city's mobility.

There are a number of institutions that provide transport provisions and govern the system. Chittagong Development Authority (CDA) has a long term development strategy for traffic and transportation in Chittagong that outlines both an immediate action plan and long term development strategy. The CCC has an important role to play in traffic management, road maintenance and public transport activities. The Traffic Division of Chittagong Metropolitan Police (CMP) is responsible for the city's traffic management. Bangladesh Road Transport Authority (BRTA) is the regulatory body to control, manage and ensure discipline in the road transport sector and road safety. The apparent lack of coordination and non-integration among institutions exacerbates the city's congestion problems - experts and civic groups often blame the Traffic Division of CMP and CDA for this and for their lack of initiatives (Daily Star 2012b).

That said, this chapter assesses the state of the transportation sector of Chittagong focusing on both supply and demand side aspects, exploring largely the formal transport system of the city. It also discusses the city's informal transport system. After introduction, the rest of the chapter is organised as follows. Section 5.2 discusses research objectives, rationale and methodology of the chapter. In Section 5.3 an overview of Chittagong's transportation system is presented. Section 5.4 discusses the city's transport bottlenecks. Initiatives to address transportation problems, the proliferation of informal transport, notably rickshaws and associated governance structure, is discussed in the subsequent sections (Section 5.5 and Section 5.6). The final section offers a sustainable transport vision for the city.

3. By estimating congestion costs, calculating travel time cost, cost of excess fuel burnt, revenue loss by passenger transport operators, environmental damage and cost of traffic accidents, a study, for example, found that traffic congestion in Dhaka eats up BDT. 19,555 Crore a year (Daily Star 2010).

5.2 Research objectives, questions and methodology

Rapid progress in transportation tends to reduce trade and transport costs significantly (Muzzini and Aparicio 2013). Moreover, better transport infrastructure provisions are critical to make a city competitive. Where cities and city neighbourhoods are disconnected, labour and product markets are not integrated. The results are forgone productivity and higher product prices, costs felt by producers and consumers alike. And as weak connections limit the growth of cities, so feeble cities stunt the growth of countries (World Bank 2013).

Scarcity concerns of transport solutions in Chittagong and reliability concerns of its governance could not only affected the liveability of the city dwellers, but also historically controlled the port's economics. Thus, the city's inadequate transport infrastructure could cost its competitiveness, affecting its agglomeration and liveability, as the city handles about 90 percent of the country's export and import in terms of volume and is home to a large number of industries. This demands a systemic study on the city's transportation system. The objective of this chapter is to study the city's transportation system, exploring the supply-demand gaps, institutional arrangements in addressing the city's existing transportation problem as well as planning for its future transportation needs.

Research questions:

1. What is the state of transportation system of Chittagong?
2. What are the institutional arrangements available to deal with the challenges and what constraints them to develop an efficient transportation system in the city?
3. What explains the proliferation of informal transport system in the city?
4. What should be the sustainable transportation model for the city?

The chapter followed a mixed method, i.e., both qualitative and quantitative analyses are conducted. The chapter used the BIGD Survey (2014) to explain the demand side perspectives of Chittagong's transport system. The authors also reviewed the Transport Master Plan of CDA and other resources involving the city's transport system. A total number of 10 Key Informant Interviews (KII) were conducted, including interviewing some policymakers.

5.3 Chittagong's transportation system: Existing arrangements

In this section we discuss the existing arrangement with regard to the city's transportation system focusing on transport connectivity, land use and transport networks, traffic characteristics and public transport.

5.3.1 Transport connectivity

A successful urban transportation system in the port city would create better accessibility if it was connected internally through an efficient road network, railway commuter network, river transport network and public transport system, as well as externally to the national and global economy. Industries and businesses located in a well-connected city find it easier to access networks of resources, including labour and components of supply chain logistics. Transportation networks multiply inter-business linkages and thus the flow of goods, people and ideas to create an integrated circulation system, where the city remains at the heart.

Currently, Chittagong is connected to Dhaka, Cox's Bazar and Rangamati by National Highways N1, N107 and N106 respectively and to Khagrachhari and Kaptai by Regional Highways, R160 and R163. Railways primarily connect the city with the capital but rail tracks also exist between the city and the port, Nazirhat to the north with a branch connecting the University of Chittagong, and a branch connecting Dohazari in the south. Detailed design for Chittagong-Cox's Bazar rail line is under way with the 'Sub-regional Transport Project Preparatory Facility' project. The waterways connect the Chittagong Port by Bangladesh Inland Water Transport Authority (BIWTA) Class-I: trunk route (depth 3.66 m- 3.96m, length about 683 km) Chittagong-Chowkighata-Chandpur-Shambhupura-Narayanganj. Main arteries of the city run mostly along the north south direction (e.g. Port Connecting Road, Dhaka Trunk Road, CDA Avenue, Bayezid Bostami Road) while a few fragmented historical roads run along the east west direction (Shahid Saifuddin Khaled Road, O. R. Nizam Road etc.)

5.3.2 Land use and transport networks

Land use planning is integral to transport planning, because land use largely determines transport demand (World Bank 2013). Mass transport generally suits compact areas, while private vehicles are appropriate for sprawling areas. Mixed-use plans can reduce the need for long trips by locating housing, shops, services and jobs all within a short radius. Studies also suggest that higher densities are good for efficiency and for environmental sustainability, reducing energy consumption and emissions by reducing vehicle miles travelled (Newman and Kenworthy 1989).

In the case of Chittagong, a city master plan was prepared in 1961 that provided guidelines for expansion and utilisation of city land. The 1961 Master Plan was a rigid zoning plan and lacked flexibility. Much of what we see in Chittagong today, like CDA Commercial Area, Panchlaish Residential Area, CDA Avenue, Kalurghat Noxious Industrial Area, Bayezid Bostami Industrial Area etc. were initiated by the 1961 Master Plan. But a lot of the elements in the plan were not carried out. A new Master Plan was prepared in 1995. The existing development and land use in much of the urban area is the result of piecemeal interventions in deviation from the 1961 and 1995 Master Plans by individuals and the government in scattered locations in the city and its periphery. In the areas outside the city, undesirable ribbon development along the edge of regional roads and along growth centres and *bazaars* are commonplace. Activities generated by these uses spill into the adjacent roads causing severe disruption to traffic.

The high class residential areas of Chittagong are primarily located at Khulshi, Panchlaish, Chandgoan and East Nasirabad area and the lower class residential areas are haphazardly located, mainly in the north-eastern part of the city fringe zone. The highest density of population is in the oldest part of the city, Panchlaish, Chandgoan, Kotwali and Double Mooring Thanas. The city's transportation system never has anything to do with the location of residential areas; even if the Master Plan considered a free flow of mass traffic from the residential to the business zones, it would have fallen apart since middle class residential areas are scattered all over the city, intermingled with retail commerce, small factories and in some cases shopping malls, as well as agglomeration of slums and squatters.

Agrabad has been designated a commercial area by CDA. Some sporadic commercial areas are also seen at CEPZ Gate, Lalkhan Bazar, GEC, Station Road, Dampara, Bahaddarhat and older parts of the city.

The traffic circulation is also higher in these areas than any other places of the city. The traditional wholesale business centres of the city are at Khatunganj, Asadganj, Korbaniganj and Chaktai, which have been developed without any systematic planning. These business areas have been characterised by narrow road network and high level of congestion.

Five major industrial zones of the city are Fouzderhat, Nasirabad, Kalurhgt, Patenga and Export Processing Zone (EPZ). The EPZ at Patenga is a well planned industrial zone designated for export quality productions by foreign entrepreneurs. Transportation network within the export processing zones is better equipped but severe congestion and traffic delays occur at the entrance.

5.3.3 Traffic characteristics

5.3.3.1 Statistics

According to BRTA, 11,321 trucks, 2,855 buses, 10,879 minibuses, 4,974 mini trucks, 25,292 cars, 1,503 human haulers, 56,995 motorbikes and 4,974 pickups ply the city streets every day. Moreover, based on traffic counts in 2009, about 20,000-25,000 motorised vehicles, up to 40 percent of them trucks, use the highway each day. The number of motorised vehicles is expected to grow to at least 35,000 in 2020, 66,000 in 2030, and more than 119,000 in 2040, depending on the section and selected scenario for the traffic forecast (ADB 2014). In addition, about 150,000 authorised and unauthorised battery and paddle run rickshaws operate in the city.

5.3.3.2 Traffic counts

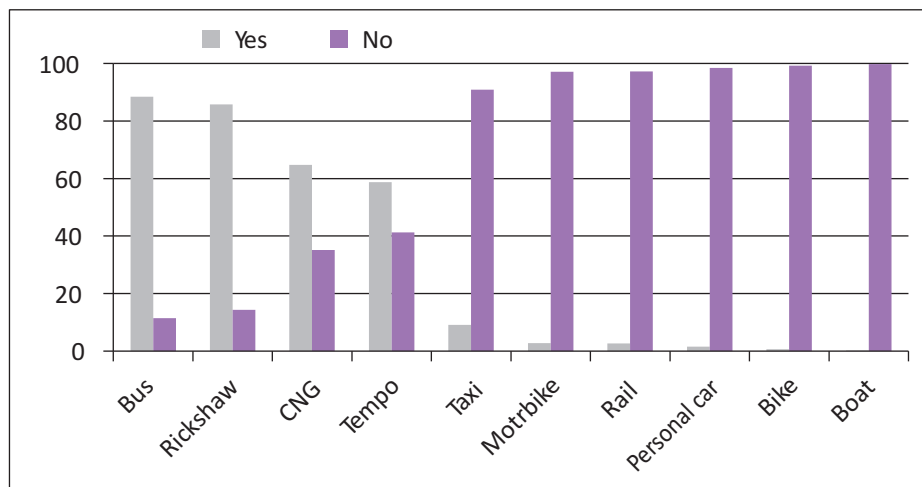
There were numerous traffic count attempts in Chittagong. For example, Al-Qadery and Muhibbullah (2008) concluded that Chawkbazar is the most congested area. Bahaddarhat is in second place, followed sequentially by New Market, Sholoshahar (Gate No. 2), GEC, Dewanhat, Agrabad and Oxygen.

The most methodical traffic count was however, conducted by JBIC (2005) carrying out roadside traffic counts at 10 locations along major roads in Chittagong. Utilising this data, the Sheikh Mujib Road has the greatest volume of traffic in Chittagong. The road's 12-hour traffic volume is as high as 44,000 vehicles (excluding non-motorised vehicles such as rickshaws). This is followed by the M.A. Aziz Road at 23,000 vehicles. The M.A. Aziz Road – Sheikh Mujib Road – CDA Avenue axis is the most important road transport axis in Chittagong. Traffic volume on this axis is high, and traffic congestion occurs frequently. The roads with the next highest traffic volumes are the Zakir Hossain Road, Dhaka-Chittagong Road, Arakan Road and Port Connecting Road, all of which experience over 10,000 vehicles of traffic every 12 hours (JICA 2009).

5.3.4 Public transport

The number of public transports plying the city streets is inadequate compared to the city's needs. When asked about their usage of transports in the city, most respondents replied that they generally use bus, rickshaws, CNG auto and *Tempo* (Figure 5.1). Very few people use rail and other modes of transport.

Figure 5.1: Citizens' preferred mode of transport in Chittagong, by type (in percent)



Note: Commuters use more than one type of transport, thus the percentages do not necessarily add up to 100

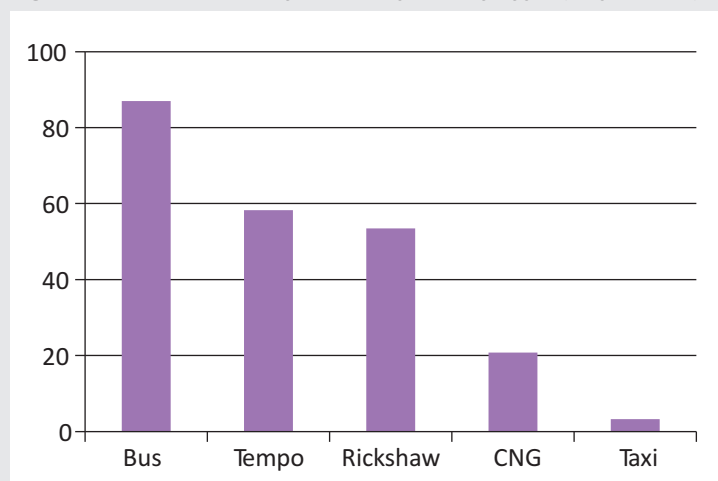
Source: BIGD Survey 2014

The only initiative to ease this immense public suffering was introduction of Diesel Electric Multiple Units (DEMUs) trains in Chittagong in October, 2013. The DEMU named 'Chittagong Circular Train' has a carrying capacity of 300 passengers and makes two round trips on two routes – Chittagong Railway Station-Saltgola and Chittagong Railway Station-Janaleehat every day. But lack of toilet facilities, inadequate space and poor ventilation made the DEMU service an 'uncomfortable' one. As a result, the city dwellers have to rely on Mini bus, CNG auto and *Tempo* as a mode of transport, apart from informal transport such as Rickshaw (Figure 5.1).

Box 5.1: Bus services in Chittagong: Level of satisfaction

The BIGD Survey (2014) suggests that bus is a preferred mode of transport for the city dwellers as it is affordable vis-à-vis other modes (Figure 5.2).

Figure 5.2: Affordability of transport, by type (in percent)



Satisfaction level on bus services indicates that while people are generally satisfied with bus fare, number of stoppages, and to some extent their availability, a large section is dissatisfied as buses are overcrowded, quality is poor and considered insecure to travel in (Table 5.1). Only 15 percent of users are fully satisfied by bus services, whereas 21 percent of people are not satisfied at all.

Source: BIGD Survey 2014

Table 5.1: Satisfaction level on bus services (in percent)

	Number of stoppage	Availability	Quality	Fare	Route	Crowd	Security	Reliability	Overall satisfaction
Fully satisfied	42	35	18	39	25	7	12	25	15
Partially satisfied	41	39	40	38	39	22	38	44	44
Moderately satisfied	6	13	17	10	14	17	18	14	17
Not satisfied	10	12	25	12	17	53	30	14	21

Source: BIGD Survey 2014

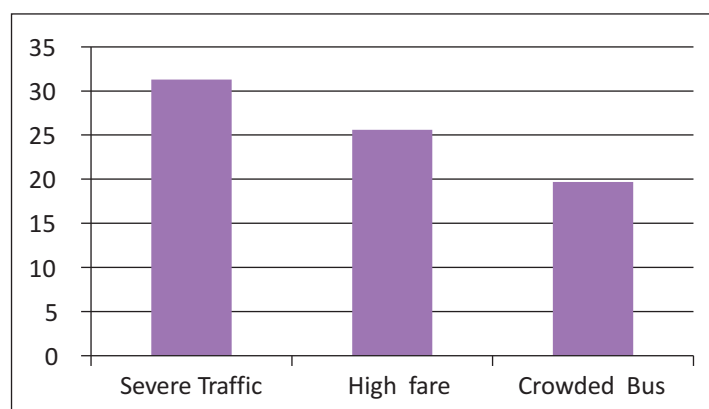
While the city does not have modern bus services, its existing bus services are constrained by less than adequate number of buses. Moreover, available public buses are mostly unfit and outdated, some are frequently sent to workshops for repair and some are requisitioned by government agencies. In addition, bus owners often rent out their vehicles for transportation of the workers in the Chittagong Export Processing Zone (CEPZ). Sources stated that most of the factories in the CEPZ have no vehicles of their own and hence rent buses (about 250 to 300 of them) to carry their workers and staff members every morning and evening. Bus owners rent out their vehicles because they find it more profitable than to have them ply through the city streets. Another reason, as a survey by the Regional Transport Authority of Chittagong showed, is that around 300 of the 856 buses, which have permits to ply the city's 11 routes, are not operating within their assigned areas (Dhaka Tribune 2013b). Conflict among the bus owners, shortage of transport and frequent clashes between the commuters and the transport staff on different issues have placed the public transport sector in the port city in jeopardy. A section of transport owners have grabbed the sector and the local administration is helpless to take action against them.

5.4 Transportation bottlenecks

In this section issues relevant to transport bottlenecks, namely traffic congestions, transport network, traffic characteristics, traffic management and weak development control etc. are discussed.

5.4.1 Traffic congestions

Figure 5.3: Three major transportation problems the city dwellers face in Chittagong (in percent)



Traffic congestion is identified by the city dwellers as the key bottleneck as far as Chittagong's transport system is concerned (Figure 5.3). Traffic congestion in the city is primarily attributed to the consequence of discrepancy between transportation demand and supply of infrastructure and vehicles. Various articles and reports attempted to analyse the root causes of traffic congestions of Chittagong, among which Al-Qadery and Muhibbullah (2008) and Shamsheer

Note: This includes all types of transport and overall transportation system of the city.

Source: BIGD Survey 2014

and Abdullah (2013) are worth quoting. Based on their findings, the following major reasons may be identified: i) transport network, (ii) pressure of population growth and (iii) weak traffic management.

5.4.2 Transportation network

The road network in Chittagong has been developed to connect the port to the highway. Major city roads that are 100 to 120 feet wide run along the north-south direction. Roads along the other direction are the inevitable consequences of traffic demand, but not integrated to the major roads with similar width. CDA has undertaken a good number of road widening projects and flyovers recently.

5.4.3 Pressure of population growth

Rapid growth of population has not been managed with proper land acquisition for expansion of transportation infrastructure. The deficit multiplied every year with urban development trends in other sectors (education, health, business etc.). On one side, higher purchasing power of one section of the society increased the number of private vehicles on streets, while on the other side, indiscriminate roadside land use by another section of the society made it unbearable for the real commuters to move around.

5.4.4 Traffic characteristics

Operation of mixed speed vehicles, absence of reliable mass transit, poor public transport system all contribute to the traffic gridlocks every day. Furthermore, illegal parking (particularly from Tigerpass to Barik Building Mor, and also at GEC, Muradpur, CDA Avenue, O.R. Nizam Road, Zakir Hossain Road, Station Road, Dhaka Trunk Road, Madarbari, Shuvapur Bus Stand, EPZ intersection), vendors and kitchen markets on roads and pedestrian walking on the street surface in the absence of footpaths would narrow down the effective right of way. In Chittagong, there is no restriction on the route of rickshaws. Rickshaws, being slow and manual vehicles and driven by rickshaw pullers with no knowledge of traffic rules are largely to be blamed for the vehicle entanglements on the streets leading to traffic congestion.

5.4.5 Traffic management

The number of traffic police has always been inadequate in Chittagong. Usually, only one to two traffic police are seen in an intersection where at least four are required. Absence and improper use of physical devices like road barriers, road marks and footpaths, poor enforcement of traffic rules and regulations, poor behavioural pattern of road users, unauthorised and indiscriminate parking, usage of road space for non transportation purposes and deficient bus route planning contributes to the traffic chaos.

5.4.6 Weak development control

Schools and other education institutions on the major arterial and primary roads cause congestion.⁴ Chaos and congestions created by rickshaws and cars in the school gates create a grid lock on the main streets. However, both the school authorities and the regulator (CDA) remain indifferent to the problem. Commercial developments have been allowed at intersections like GEC, Dampara, Muradpur,

4. Mahila Samity School on CDA Avenue, CGS School on Chatteshawari Road, Khastagir Girls High School & Ideal School on Saifuddin Khaled Road, Ispahani Public School on Jakir Hossain Road, etc. are all causing congestion in the city.

Bahaddarhat, Dewanhat on the spine road of Chittagong: CDA Avenue-Sheikh Mujib-Abdul Aziz Road. It is like luring traffic to the intersection causing unnecessary congestions which could have been avoided with judicious and conscious development control.

5.5 Initiatives to address Chittagong's transportation problems

5.5.1 The CDA Master Plan (1995-2015) and Detailed Area Plan (2008)

The Transport Master Plan (1995-2015) and Detailed Area Plan (DAP) formulated by CDA (2008c) and CDA (2011) respectively, identified and prioritised a large number of projects to address the city's short-term and long term transport challenges. The Immediate Action Plan (IAP) focused on traffic management and engineering, improvements to transport services and institutional strengthening in Phase 1. As a Long Term Development Strategy (LTDS), its principle recommendation to be implemented in Phase 2 includes highway improvements, provisions of railway over bridges, improvements of road transport services and improvements to other modes such as waterways and aviation. In this section, we discuss the principle recommendations of IAP (1995) and measures subsequently taken by the CDA.

The IAP (Phase 1) is the first phase of the implementation of LTDS. This does not require any large investment but demands effective enforcement. As shown in Table 5.2, the recommendations on traffic management & engineering, improvements to transport services and institutional strengthening are not implemented.

Table 5.2: The state of implementation of Immediate Action Plan (IAP)

Recommendations	Remarks
1. Traffic Management & Engineering	No measures taken till date
2. Improvements to Transport Services	No measures taken till date
3. Institutional Strengthening	No measures taken till date

Source: Authors

Traffic Management and Engineering includes (i) improvements of intersections on strategic networks, (ii) removal of indiscriminate parking and stop of bus, rickshaws, CNG Auto, car etc. from junctions, (iii) installation of proper signal systems, (iv) better police enforcement, (v) Improvement of pedestrian crossing, (vi) introduction of exclusive Bus lane from Bahaddarhat to CEPZ, (vii) enforcement and development control on the Port connecting road and other primary roads, (viii) restriction of Rickshaw from Bahaddarhat to Barek building, (ix) designation of off road Parking places and bus stop locations on roads, and (x) regular updating of data base.

Improvement of Transport Services includes (i) encouragement of higher quality bus services with higher fares, (ii) measures to improve market penetration of bus services, (iii) designation truck routes to and from the Port, and (iv) measures to improve access to the central railway station. The state of implementation of the Institutional Strengthening of Immediate Action Plan (IAP) is discussed in the subsequent section.

As far as Long Term Development Strategy (LTDS) (Phase 2) is concerned, the Roads & Highway division has improved highways and CDA has widened a large number of primary and secondary roads; however, the other major recommendations are not implemented (Table 5.3).

Table 5.3: The state of implementation of Long Term Development Strategy (LTDS)

Recommendations	Remarks
1. Highway Improvements	Being done after time frame by R & H
2. Primary & Secondary roads in City	Some roads widened – No footpaths & bus bays incorporated
3. Improvements of Road transport Services	No measures taken till date
4. Improvement to Other Modes	Nothing done till date
5. Provision of Railway Over bridges	Not done – but it needs feasibility study
6. Institutional Strengthening	Nothing done till date

Source: Authors

CDA has undertaken a number of road widening projects (Table 5.4). However, some basic requirements such as bus bay, footpath and parking space were not accommodated.

Table 5.4: Road extension projects of CDA

Completed Projects		
Road	Width Details	Length (km)
Sagorika Road	Port Connecting Junction to Johur Ahmed Stadium 100 feet	1.5
Sirajuddoula Road	Andarkilla Junction to Chawkbazar 60 feet	1.9
Bayezid Bostami Road	Prabartak Point to Oxygen Junction 52 feet	5.5
Link Road between Dhaka Trunk Road & Bayezid Bostami	Dhaka Trunk Road to Bayezid Bostami 90 feet	6
Sadarghat and Firingi Bazar Road	60 feet	3
Lal Dighir Par Road	Andarkilla Junction to Lal Dighir Par 60 feet	0.8
Ongoing Projects		
Dhaka Trunk Road	Dewanhat junction to Eidgah 72 feet and Eidgah to Alonkar Junction 62 feet	4.5
Oxygen Quaish Road	Oxygen to Anannya Residential area 100 feet and Anannya to Quaish 60 feet	5
Arakan Road	Bahaddarhat Junction to Kalurghat Bridge 100 feet	6.3
Pathantuli Road	Choumohoni to Kadamtali 53.5 feet	3.8
Kapasgola Road	Goni Bakery to Bahaddarhat Junction 60 feet	5.5
Hathazari Road	Ali Khan Mosque to Muradpur and Muradpur to Oxygen 60 feet	4
Chittagong City Outer Ring Road	Patenga to Sagorika 70 feet	14.5

Source: Based on the CDA website

In the CDA Master Plan (1995-2015) top priority was given to implement the Inner Ring Road and Outer Ring Road. The development of the inner and the outer ring roads and six radial roads have been advanced as part of the mid-term development plan of Chittagong's trunk road network system.

Inner Ring Road (Shah Amanat bridge to Sadarghat – Barek building): This project was the top priority in the plan as this connection is likely to serve two important purposes (i) flood protection wall and (ii) road link which could change traffic mobility of Chittagong. People from south of the Karnaphuli would be able to reach the centre of the city within 10 minutes from Shah Amanat bridge (North point). This project has been ignored despite placing top priority both in 1961 and 1995 Master Plans.

Outer Ring Road (East-West connection: Dhaka-Chittagong highway to Kaptai road-Shah Amanat bridge and Kalurghat bridge): This does not carry as much priority as the Inner Ring road. However, without prioritising the Inner Ring Road, CDA gave priority to construct the link between Kaptai road to Oxygen and from Oxygen to Dhaka-Chittagong road via Bayezid Bostami road.

The construction of flood control measures and the coastal road project was the next highest priority after the two ring road projects. Flood control measures such as (i) coastal embankment along Bay of Bengal (Mouth of Karnaphuli River to Faujdarhat) (ii) Retaining Wall/Sheet pile wall (Chittagong Port to Shah Amanat bridge), (iii) River Embankment-cum highway (Shah Amanat bridge to Kalurghat bridge) and (iv) River Embankment (Kalurghat bridge to Halda bridge) have not been given priority by the authority.

5.5.2 Flyovers

CDA has undertaken a number of flyover projects in the past few years. Bahaddarhat flyover was inaugurated to traffic in October 2013. The construction of Kadamtali flyover is currently underway. CDA got ECNEC approval to construct another flyover from Muradpur to Lalkhan Bazaar (5.2-Kilometre long and 15-metre wide) in the city. However, experts' opinions and media report suggest that 'the projects have already proved to be useless, ineffective and economically unfeasible for the city (Daily Star 2014d). Construction of a flyover at an intersection is usually required when more than 8,500 motor vehicles cross that junction in an hour. But, the JBIC (2005) found that only about 2,790 motorised vehicles crossed Bahaddarhat intersection in an hour. Instead of implementing top priority missing links, CDA is implementing non-recommended, technically unjustified and economically non-viable flyovers or overpasses.

Flyover is the last option for road infrastructures for uninterrupted flow of huge numbers of vehicles beyond intersection capacity. Not only that, during planning and designing of flyover, consideration of O-D (origin destination) survey and trip lengths are the determining factors for flyover effectiveness and usefulness. In urban areas, flyovers do not mitigate traffic congestion; rather they shift congestion from one point to other.

Any ordinary two-way urban road (24 feet wide) normally carries about 600 PCU (passenger car unit) to 700 PCU per hour. This capacity can be increased to about 1,500 PCU per hour just by stopping road side parking and cross-traffic. One way road capacity rises up to 2,400 cars/hr. Merely by good traffic management, it is possible to increase a road's capacity by 4-fold, without any significant expenditure.

The width of Chittagong roads suggests that almost all main roads (primary and district distributors) have dual carriageway. Each carriageway's width is sufficient to accommodate a minimum of 3-lanes (lane width more than 3.5 metres). The capacity of each lane is much higher than the present volume of traffic plying on the roads.

Intersection capacity of roads indicates that generally a roundabout can handle up to 5,000 vehicles per hour. A signalised intersection can handle up to 8,500 to 10,000 vehicles per hour.

In an intersection when vehicle flow increases more than 10,000 per hour then there is a need for flyovers. Table 5.5 shows the current traffic flow of Chittagong City in terms of percentage (average) of vehicle plying.

Table 5.5: The current traffic flow of Chittagong

Mode of transport	Share (in percent)	Passenger capacity
Bus + Mini bus	08	33 to 50
Car	10	Max 04 / av. 1.2
CNG Auto (three wheeler)	39	Max 03 / av. 2.2
Rickshaw (NMT)	43	Max 02 / av. 1.6

Source: Percentage from JBIC report and average passenger from the study of 1995 Master Plan of Chittagong and Dhaka

Although a bit dated, based on 12 hours count by JBIC (2005), traffic count in major intersections of the city is shown in Table 5.6.

Table 5.6: Traffic count in GEC, Muradpur and Bahddarhat intersections

Intersection	No. of vehicles per hour	Intersection capacity per hour	Necessity of Flyover
GEC	4,904	8,500 to 10,000	Not required
Muradpur	2,770	8,500 to 10,000	Not required
Bahddarhat	2,791	8,500 to 10,000	Not required

Source: Authors' calculation

Moreover, in support of flyover from Muradpur to Lalkhan Bazar (5.2km), CDA (2006) conducted a traffic flow analysis in their feasibility study report which is as follows:

1. WASA to GEC and beyond – 50 percent of 2250 = 1127 PCU
2. GEC to Gate No. 2 and beyond – 65 percent of 2196 = 1428 PCU
3. Muradpur to Gate No. 2 and beyond – 78 percent of 1219 = 950 PCU
4. Gate No. 2 to GEC and beyond - 53 percent of 1972 = 1045 PCU

For the purpose of designing, the peak hour PCU may have to be used which is around 1,428. By applying a 5 percent traffic growth per annum, the traffic level would have been around 1,735 PCU in 2010. This estimated flow figures do not justify the construction of flyovers. Given the scenario, construction of flyover in Chittagong road network was not recommended in the 1995 Master Plan.⁵

5. As quoted in the Plan, 'Intersection design: Grade - separated interchanges cater for very high flows of motorised vehicles of up to 100,000 vehicles per day and provide for uninterrupted movements. The cost is very high and they are unsuitable for Chittagong in the foreseeable future.'

On the contrary, based on the above traffic data and consultant recommendation, CDA constructed a 1.3km flyover at Bahaddarhat intersection connecting Cox's Bazar route with Chittagong spending more than BDT 150 crore. Construction of Kadamtali Flyover is currently under progress. Furthermore, without evaluation of performance, effectiveness and benefit of Bahaddarhat and Dewanhat flyover, CDA has rushed the tendering procedures to construct a 5.2km long flyover from Muradpur to Lalkhanbazar.

5.5.3 Elevated expressways

The project 'Development of Elevated Expressway from Dewanhat to CEPZ of Chittagong with an estimated cost of BDT 256 crore was aimed at mitigating traffic congestion in the main arteries of the city. The length of the expressway will be approximately 8 km (48 feet width, 4 lanes). Furthermore, looking for an alternative route amid increasing port activities, CDA and Chittagong Port Authority have jointly planned to take up an 18-kilometre elevated expressway project to connect Karnaphuli Bridge and Patenga beach with at least five landing stations.

Traffic count by JBIC (2005) from Cox's Bazar to Chittagong shows that the volume of motorised vehicles is 393 per hour. Traffic count by the Roads and Highway department (2012) in the same route amounted to 382 vehicles per hour. From Chittagong to Cox's Bazar, the volume of vehicles is also 400 per hour. This volume of traffic cannot justify the construction of an 18 km flyover. Moreover, the two-way passenger count between Dhaka and Chittagong by air is about 2,000, which accounts for only 0.02 percent of the city's population.

5.5.4 Karnaphuli tunnel construction

Bangladesh and China have signed a memorandum of understanding (MoU) for construction of a tunnel under the Karnaphuli River in Chittagong. As per the MoU, the Chinese government would construct the tunnel at an estimated cost of US\$ 1 billion (Daily Star 2014e). The proposed tunnel is supposed to promote integrated development of the south bank of the Karnaphuli River and benefit the underdeveloped southern part of Chittagong. Construction work of the proposed 3,400-metre multi-lane tunnel was supposed to start at the beginning of 2013-2014 fiscal year. It is reported that the tunnel could bring good results for the economy if the deep sea port is commissioned and Asian Highway Networks established in future.

However, the construction of tunnels is by all accounts the most expensive part of building road infrastructure. But in some cases, it is essential to overcome circumstances where other solutions cannot be applied. So, constructing a tunnel may be justified under the following circumstances: a) on new routes under densely developed urban areas where land acquisition costs are high; b) through mountains to avoid steep grades and longer routes; c) under rivers and large bodies of water to keep shipways clear; d) to avoid impact on cultural heritage or environmentally sensitive areas; and 5) where clearance requirements or land use prevent construction of bridges. Chittagong currently does not have such circumstances to connect south of Karnaphuli River with the north through a high capital cost of a tunnel under the Karnaphuli River. With much less investment, the city can have two more bridges near Kalurghat Bridge.

Before taking the final decision on tunnel construction, the following factors should be considered: a) the total human risk can be higher in tunnels; b) the chance of fatalities is greater in tunnels than on the alternative route; c) economic risks on the tunnel route are higher than the alternative route if the tunnel can be destroyed; d) Uninterrupted stable power supply for lighting and ventilation is to be

ensured; and e) the maintenance cost of tunnel is high. By the cost of a 3.5km tunnel, the whole Chittagong road infrastructures including two new bridges over Karnaphuli rive rear Kalurghat bridge and Rail lines up to Cox's Bazar can be constructed.

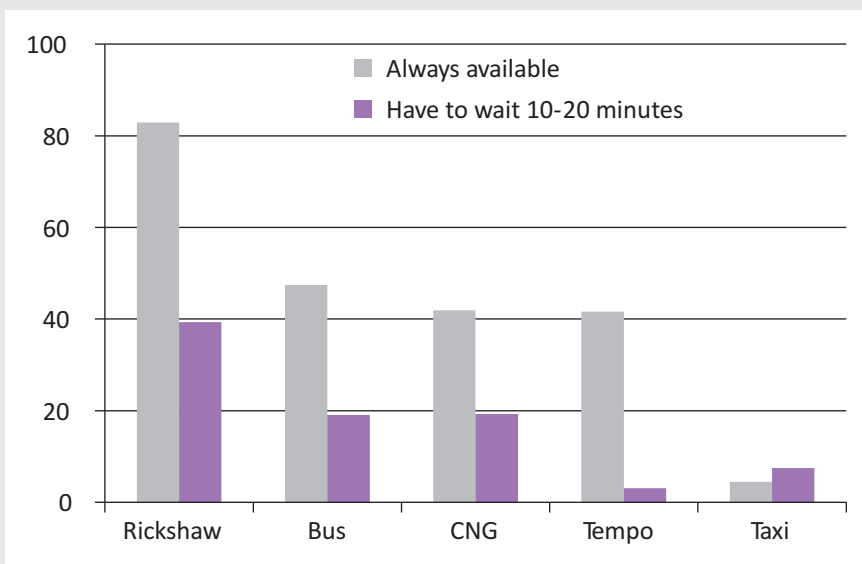
5.6 Informal transport arrangements in Chittagong

Transport system of the port city of Chittagong has been characterised in terms of poor public transport facilities, insufficient and far-from-modernised public transport, unregulated traffic and transports, operation of mixed speed vehicles, absence of reliable mass transit, dilapidated and environmentally unclean state of vehicles, narrow roads, illegal parking, poor and arbitrary behavioural pattern of drivers as well as road users, inadequacy and inefficiency of traffic police, overall traffic mismanagement, *inter alia*. Given this seemingly endless list of characteristics marking the failure of the formal transport system, city dwellers are somewhat forcefully triggered to move more and more towards informal transport system. Consequently, a few types of sub-modes of vehicles have hit the city streets competing for public transport customers and become popular among commuters; although variety of these are less, the number represented is large. However, these sub-modes of vehicles contribute significantly to the traffic congestion. Literature indicates that compared to formal public transport services, para-transit (informal) vehicles can be more accessible, faster, and at times cheaper and reliable. On the other hand, they are often unregulated, in oversupply and unaccountable; hence unpredictable (GTZ 2010).

Box 5.2: Informal transport governance: The case of Rickshaws

The traffic survey undertaken by JBIC (2005), found that CNG Auto and rickshaws together account for about 80-90 percent of the total volume of transport vehicle on the streets of Chittagong. Buses, including mini-buses account for only 8 percent on average, in terms of number of vehicles on the road. The BIGD household survey shows that in terms of availability, paddle and battery-powered rickshaws are among the most available transports in the city (Figure 5.4).

Figure 5.4: Availability of transport, by type (in percent)



Source: BIGD Survey 2014

Formal transport is essentially motorised, needing fuels to run and have a good degree of speed. Informal transport, on the other hand encompasses vehicles that are non-motorised, limited in size accommodating not more than two passengers and absolutely fuel free. Apart from traditional paddle rickshaws, there are other types of rickshaws known as battery rickshaws. Easy-bikes are also found in the cities which are popularly known as 'tomtoms'. In addition to these, bicycles and paddle vans on which three benches are installed to carry six persons also fall under the informal category. These modes of transport operate along the main roads with motorised vehicles as well as inner roads of the city and play a significant role in providing feeder services. But the sheer volume of informal transport particularly rickshaws raises questions of whether these have any legal approval, licenses or required documents to run and carry passengers.

According to different associations of drivers and owners of such rickshaws, around 50,000 unlicensed battery run rickshaws are now plying the port city streets. In 2012, the number was only 300 (Daily Star 2014f). In addition, according to labour organisations, currently 110,000 rickshaws, both human-powered and battery-powered are operating in the city. The number is virtually double according to the Traffic Division. Among them the number of registered or licensed rickshaws is 58,200 (Dainik Azadi 2014c). According to BRTA, all motor vehicles need six types of documents to be on roads but the motor-rickshaws and easy-bikes had none. These vehicles are illegal (Daily Star 2012b).

Nevertheless, in the face of severe crisis of public transport, what could mass commuters possibly do without using these informal modes of transport? However, mixture of both formal and informal transport systems are operating in the city. Both operate in chaotic ways and turn the situation into a mess on the roads of the city. Due to the presence of this large volume of rickshaws along the roads side by side with motorised vehicles, the major traffic intersections cannot function efficiently. As a result, traffic jams become an inevitable menace for the commuters every day.

If we look at what the concerned authorities and institutions have been doing regarding all these issues, we can see that BRTA has already denied giving approval for the use of battery powered rickshaws. CMP points at the High Court where the matter has been pending under a writ petition regarding which authority should license these vehicles. Following writ petitions filed by the owners (on different dates starting from March 2013) seeking the vehicles' unhindered movement, the High Court has put a stay order on any action against such rickshaws. The police also seek CCC's intervention in the eviction drives for rickshaws. CCC on the other hand looks for advice from the Ministry of Local Government and Rural Development regarding license giving authority. This entire hide-and-seek game-like attitude mark a sharp absence of coordination among institutions that are responsible for running the transport system as smoothly as possible (Daily Star 2013b).

Given the fact that there is no licensing authority for battery-powered rickshaws and easy-bikes, it is taken for granted that all of these hybrid rickshaws remain unregistered (thus illegal). The question is why the operation of unlicensed rickshaws is not being stopped. Severe manpower crisis has been shown by BRTA as a reason, though not convincing, of not being able to conduct drives against these illegal vehicles.

However, it is intriguing that the owner associations liaising with law enforcers attain financial benefits out of the operation of these problem creating informal transport. A newspaper report says easy-bike owners association charges BDT 5,000 from an owner to be initially listed for the

...Cont'd



The Communication minister himself removing a battery from an illegal battery-powered Rickshaw.

Source: Banglanews24.com 2014

desired route (Daily Star 2012b). Thereafter, a monthly charge of BDT 250 and a daily charge of BDT 10 are imposed to meet various costs to keep the vehicles on the road, including managing the law enforcers. The report also states that motor-rickshaw owners do not have any owner association and they have to pay the Police through showrooms selling these rickshaws. They have to pay about BDT 300 per month to keep the police content and to keep the vehicle on the road (ibid). So not only manpower crisis, inefficiency of traffic police and lack of coordination

between authorities, but illegal economic transactions between various stakeholders including law enforcers is also an underlying reason working as a barrier in removing illegal informal transport modes from the city streets.

Historically, rickshaws are a part of Bangladesh's culture and heritage. Rickshaws are available in all big cities of Bangladesh and it is a popular means of transportation. But as of the last two years, rickshaws have evolved both structurally and functionally, changing from human-powered to battery-powered. Greater presence of these vehicles along main roads has an adverse impact on the efficiency of the motorised vehicles which need to move faster for the city's productivity.

Rickshaws seem environmentally sound and readily available. However, rickshaw lanes need to be integrated in the transportation planning system to avoid adverse impact on the efficiency of motorised vehicles. Battery-powered rickshaws must be properly designed for safety. More importantly, the utilisation of rickshaws should be regulated with defined rules and norms.

5.7 A sustainable transport system for Chittagong

The discussion in the preceding sections indicates that the transport challenges of Chittagong are not addressed adequately. Moreover, the city's future transport system not only has to be efficient but it also needs to be sustainable. Sustainable development of WCED (1987) emphasised the inter-generational dimension (meeting the needs of present without compromising the ability of future generations to meet their needs), as most concepts for sustainable transport currently focus on intra-generational aspects of equity and welfare. This concept is developed by the Toronto-based Centre for Sustainable Transportation, which has been adopted by the European Conference of Transport Ministers.⁶

A more sustainable transportation system is one that focuses on at least four dimensions. Firstly, the social dimension allows basic access and development needs of the people to be met safely and promotes equity within and between successive generations. Secondly, the economic dimension is

6. ECMT working group members are from Australia, Canada, the Czech Republic, France, Germany, Greece, Japan, the Netherlands, New Zealand, the Russian federation, Spain, the United Kingdom and the United States.

affordable within the limits imposed by internalisation of external costs, operates fairly and efficiently, and fosters a balance in regional development; Thirdly, the environmental dimension limits emissions of air pollution and green house gas as well as waste and minimises the impact on the use of land and the generation of noise; and finally the peoples' participation dimension is designed in a participatory process, which involves relevant stakeholders in all parts of the society (OECD/ECMT 2007).

To achieve a sustainable transport system the city authorities should first think of traffic management as it involves best use of existing road network system. Traffic management is the first priority in any measure to mitigate traffic congestion of the existing road network. Before taking any decision for big investment for new road construction or grade separation (flyover), it must be ensured that existing roads are being used to their full capacity.

5.7.1 Strengthening the institutional system

CDA's role is limited to building control applications under the Building rules framed under the East Bengal Building Construction Act 1953. It has no local planning role and has no interaction with local government body – the City Corporation. So, restructuring of CDA is essential. It is proposed that CDA should hold its position as the planning authority for Chittagong and it will be strengthened, restructured and staffed to perform this role much effectively in the future (CDA 2008e).

To give planning an equivalent emphasis to development, CDA will be renamed the Chittagong Planning and Development Authority (CPDA) and a separate Planning Department created under the direction of a Chief Town Planner. The Planning department could be divided into four divisions covering: (i) strategic planning, (ii) local area planning, (iii) development control and (iv) investment planning along with a fully empowered Urban Planning and Transport Planning unit. CDA (2008e) also recommended (Institutional and Legislative Changes) to make changes to the CDA Ordinance in order to undertake both land and building control functions. However, the Report has not received any meaningful attention at the national level.

There is no fully empowered legal Urban Planning and Transport Planning unit in CDA, though the report is one of the most important components of the Master Plan. Planning is a continuous process, thus it is crucial to develop a sustainable environment that ensures a friendly liveable city through routine planning activities, which determines the changing needs of the city and aims to satisfy these technically. Without a permanent Strategic Transportation Planning Unit (STPU) (recommended in the master plan), it is not very difficult to develop an efficient transportation system to serve the city, port and regional traffic for present and future traffic demand. Thus unplanned, uncontrolled and uncoordinated development is costing the city's transportation development, among other issues.

Therefore, establishment of a permanent Strategic Transportation Planning Unit (STPU) within CDA is required. This unit could function as the Project Management Unit (PMU). PMU could undertake the role for LTDS. Some important functions of PMU include conducting periodical survey of all modes, making analysis of traffic conditions and problems, providing periodically review of transport networks, transport demand, traffic volume and mobility of passengers per hour; determining growth trends and identify future needs, preparing long- term schemes for development of highways, public transport and its management, studying the economic and technical feasibility of proposed schemes; to monitor and evaluate implementation of above schemes, developing planning standards for transport, road, road sections, off-street parking, developing transport networks in existing and new development areas, determining of causes of congestion and accidents, identifying congestion

locations, developing alternative strategies to mitigate congestion, evaluating the potential of different alternatives and coordinating with relevant transport agencies and organisations, and engaging in routine and meaningful public involvement. All the above steps are basic principles which have to be strictly followed by the authority - CDA- to make the city liveable.

5.7.2 Transport Demand Management (TDM) measures

The current philosophy of transport planning is to innovate the way how to carry maximum numbers of passengers per hour (per lane, per direction). TDM emphasises on the movement of people and goods, not just on motor vehicles, and gives priority to public transit and non-motorised modes especially in congested urban conditions. TDM is the need of the day for present and future uncontrolled growth of population and transport. This will increase mobility of people and goods and reduce volume of traffic. The simple example of TDM is explained Table 5.7:

Table 5.7: Number of vehicles and road space occupied by different modes of transport

Vehicle Type	Average Passenger	Number of Vehicle	PBE (Passenger bus equivalent)	Passenger carried	Space occupied (in feet)
Bus	33	1	1B	33	33
Tempo	10.2	3.2	2B	33	66
CNG Auto	2.2	15	3B	33	99
Rickshaw	1.6	21	4B	33	132
Car	1.2	27.5	14B	33	462
Total		67.7		165	792

Source: Authors' calculation

Table 5.7 shows that to carry 165 passengers the total number of vehicles required is 67.7 and space required is 792 feet under the mixed-mode transport. However, only five buses can carry 165 passengers occupying 165 feet space length. Application of TDM can reduce traffic volume, congestion, pollution and GHG emission and increase parking space and road space. TDM can help achieve a wide variety of planning objectives. Potential benefits of TMD are outlined in Table 5.8.

Table 5.8: Potential benefits of Transport Demand Management (TDM)

Congestion reduction	Reduced total volume of traffic
Road cost saving	Reduced costs to build, maintains and operate roadway system
Parking savings	Reduced parking problems and parking facility costs
Consumer savings	Transportation costs savings to consumers
Improved mobility options	Improved speed of transport and reducing travel time
Road Safety	Reduced per capita traffic crash risk
Energy consumption	Reduced per capita energy consumptions
Emission reduction	Reduced per capita pollution emission
Efficient land use	More accessible community design, reduced per capita land consumption
Public fitness and health	Increased physical activity and associated health benefits

Source: Broaddus *et al.* 2009

5.7.3 Bus rapid transit

Bus is the most efficient vehicle in urban roads. An estimated 60,000 persons can commute per hour on exclusive bus lane. In Chittagong (Bahaddarhat to CEPZ) it is possible to commute 6,000 to 9,000 passengers per hour (per lane/per direction) with simple modification of the existing system.

Advantage of use of Mass Transport – Exclusive Bus lane

Considering GEC intersection of traffic volume counted by JBIC (2005), we show in Table 5.9 that to carry 1,41,150 passengers about 77,006 number of mixed vehicle (CNG Auto, car and rickshaw) are required. If only buses are used to carry the same number of passengers (1,41,150) there is a need for only 4,277 buses. This strongly suggests that BRT is one of the most efficient modes of transport. The authority should introduce exclusive bus lane from Bahaddarhat to EPZ.

Table 5.9: The utility of BRT vis-à-vis mixed mode of transport

Vehicle type	Number of Vehicle	Passenger Capacity (Average number)	Passenger Carried (number)	Bus capacity (number)	Bus required to carry same Passengers (number)
CNG Auto	36,244	2.2	79,736	33	2,416
Car	9,511	1.2	11,413	33	346
Rickshaw	31,251	1.6	50,001	33	1,515
Total	77,006		1,41,150		4,277

Source: Author's calculation based JBIC (2005)

5.7.4 Railway mode

The current chaotic situation in highways in terms of congestion demands focus on the development of rail transportation for both present and future needs. Rail transport is the most effective way of handling increased passengers and cargo demand with low energy requirement, affordable fare, low land requirement, little air pollution, among others. Keeping these in perspective, the Dhaka–Chittagong Railway track should be converted to double line (Broad Gauge) and there is a need for improvement of Railway tracks and introduction of commuter services from (i) Chittagong to Nazirhat (ii) Chittagong to Dohazari, subsequently extended to Cox's Bazar.

Priority to (i) Railway (ii) BRT (Bus Rapid Transit) and (iii) NMT will be eligible for carbon emission reduction certificates (CERs), which can be traded with developed countries to reach the carbon emission reduction goals set out under the 'Kyoto Protocol'.

Chapter 6

Environmental Governance

6.1 Introduction

Economic agglomeration generates economic growth.¹ However, the benefit of agglomeration has a potential role in urban environmental degradation and impact on people's quality of life (Kennedy and Buys 2010). The existing feature in urban characteristics in most developing countries, notably in South Asia, is the continuous degradation of urban environments (OECD 2010). This includes, overcrowded housing and scattered settlement, inadequate and unsafe water supply, high incidence of disease, overloaded public transport and increase in traffic jam and accident, violence, crime and loss of green space (Rahman 2012). Due to various environmental problems in South Asian cities, the quality of life is degraded and liveability is adversely affected. To address these problems cities need good environmental governance.

Chittagong is no exception. High population density in this city exerts a tremendous pressure on urban land use pattern. To accommodate the increasing population and infrastructure the city is hosting unplanned formal and informal settlements and other infrastructure development in unmanaged manner. The unplanned settlement appeared in the form of slums and squatter housing create environmental problems, such as water contamination, noise pollution, improper garbage disposal, occupation of green space, water logging, landslide in hilly areas and so on. In absence of a sewerage system, urban waste water is channelled to the Karnaphuli River. Furthermore, the city is under challenge to manage ambient air² and noise quality. Land grabbing, water pollution, cutting of hills, and industrial pollution are exacerbating the problems. As a result, the majority of the city's population faces serious health problems such as diarrhoea, acute respiratory infections, and malnutrition along with some other minor health problems including sleeplessness, dizziness, headache, and other problems (Rahman 2012).

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1. The term 'agglomeration' refers to the clustering of economic activities. An agglomeration effect represents a certain type of positive externality that arises when firms share certain non-excludable inputs. Also see chapter 1 of this report.
 2. Ambient air is the outdoor air in which humans and other organisms live and breathe.

The impact of high population density produces negative externalities which exceed the natural regeneration capacity of the city (Finco and Nijkamp 2001). Such as the case of Karnaphuli River, the life line of the city. The river has been a dumping place for industrial waste as well as sewage. It has been loaded with sediments drained by the canals from upstream where land erosion is increasing due to hill cutting and deforestation. It is thought that the river could end up being polluted as much as the Buriganga River of Dhaka, in absence of natural tidal process.

The city is also vulnerable to climate change. As a coastal city, Chittagong is vulnerable to flooding, sea-level rise, and cyclone with frequent storm surge. It has already experienced a storm surge with an elevation of 9.0 metre in 1991 (Flather and Williams 1997) and projected sea level rise estimated for Bangladesh is 0.30 to 0.50 m for 2050 (GoB 1993). This projected elevation of sea level would directly impact on land cover change in two ways: submergence of land area and increase in salinity. Consequently, half of the existing 4,523 water bodies could be transformed into saline water bodies. The city has already lost more than 14,000 water bodies in the last 18 years (Daily Star 2009). The disappearance of these fresh water bodies would increase water scarcity for the city dwellers (Zuthi *et al* 2009). Moreover, land cover change would force dwellers to migrate or to find a new home around city. The migration could be possible to up-hill areas where land is still covered by forests. The influx of population in the north could accelerate and intensify problems of cutting hills and deforestation. All these environmental problems need to be equipped with an effective regularity framework to deal.

In governing environment, many agencies are functioning in Chittagong with plurality in their mandate and diverse objectives. Involvement of various government stakeholders and organisations often lead to confusion, contradictions, overlapping functions, and gaps in responsibility (Ahammad 2012). The Bangladesh Environment Policy 1992, the Management Plan 1995, the Conservation Act 1995, the Environment Conservation Rules 1997, for example, are mandated to safeguard the country's environmental quality. On the other hand, National Policy for Safe Water Supply & Sanitation 1998, National Policy for Arsenic Mitigation 2004, *Paurashava* Ordinance 1973, with many other institutions, is in place to deal with environmental externalities. However, these institutions and laws are often left underutilised in taxing externalities.

To discuss about the environmental quality of Chittagong seems difficult as it is related to various environmental components which can be looked at through the lens of local and ambient factors. Such component-wise approach to understand the environmental quality would require considerable time, resources and effort. Having limited time and defined report objectives, only the most important environmental problems faced by the city dwellers are addressed here in this chapter. Among all the environmental problems, waste pollution is found as the major concern for citizens followed by air pollution, noise pollution as well as drainage problems respectively (Rahman 2008). Delay in waste collection, among other factors, causes air pollution. Waste pollution is also blamed for water logging in the city. Water quality is also a threat perceived by many followed by noise pollution. In addition, citizens showed their concern on lack of green space and indiscriminate cutting of hills. The growing pollution in the Karnaphuli River also concerns city dwellers.

Considering the importance of all these environmental problems, this chapter concentrates on water, air and noise pollution as well as waste, drainage and water logging. These critical issues are discussed

along with the role of institutions that are responsible to combat adverse externalities keeping the city liveable.

That said, the rest of the study is organised as follows. Section 6.2 outlines the research aim and objectives. Research methodology is explained in section 6.3. The subsequent sections discuss water, air, waste, noise, water-logging, solid waste disposal and drainage-related pollution in the city. Given the growing environmental concerns with regard to Karnaphuli River, the lifeline of Chittagong, the study also shows how under-regulated environment problems could degrade this common resource. This also shows the complexity in governing the commons.³ The final section draws conclusions and recommendations.

6.2 Research objectives and questions

The study aims at understanding the state of the city's environmental quality as well as its liveability. The roles of concerned institutions are explored in this regard. The objectives are:

1. To understand the quality of environment of the city at length in the areas of water, air, noise, solid waste, and drainage pollution;
2. To understand the roles of institutions governing the environment; and
3. To understand the state of liveability of the city.

Research question

To what extent water, air, noise, solid waste and drainage quality of Chittagong is conducive to liveability and how various institutions are playing role in governing the environment?

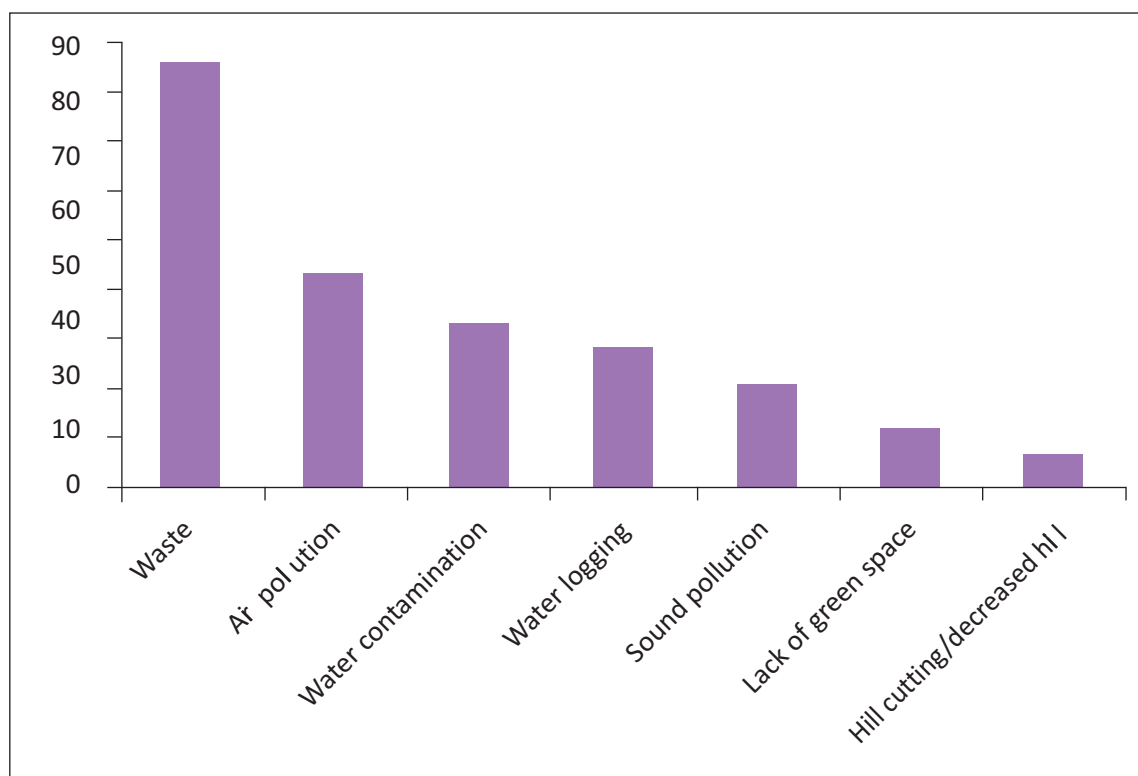
6.3 Data and methods

For this study, a mixed method approach is adopted, employing both qualitative and quantitative analysis. A qualitative survey comprising 1200 households was conducted in Chittagong City Corporation (CCC) area to understand the demand side perspectives of existing environmental problems. Moreover, two Focus Group Discussions (FGD) and 10 Key Informant Interviews (KII) were conducted in Chittagong. In addition, supply side data (secondary sources) on pollution and other aspects of environment was collected from the Department of Environment (DoE) and other government offices. Relevant literature, particularly policy and project documents were critically reviewed for this study.

6.4 Chittagong's environment quality and governance

The BIGD Survey 2014 suggests that while the city's waste is the major source of environmental problem (Figure 6.1), about 20 percent people reported that they are affected by air pollution and the same figure of respondents felt that the city's noise pollution is intolerable.

3. Natural resources belonging to or affecting the whole of a community.

Figure 6.1: Citizens' perception on environmental problems in Chittagong (multiple responses)

Source: BIGD Survey 2014

6.4.1 Water quality and governance

Drinking water is one of the important public health priorities. An estimated 80 percent of all diseases and over one third of deaths in developing countries are caused by unsafe drinking water (Zuthi *et al.* 2009). Ensuring a safe and adequate water supply for its citizen is critical for liveability (JICA 2013). In CCC, the water source for drinking and domestic use is mainly supplied by Chittagong Water and Sanitation Authority (CWASA) as well as by personal shallow tube wells and private deep tube wells (CWASA 2014). The CWASA provides water from river and deep tube wells. Though the piped water network reaches 90 percent of households, only one third of the demand is met by the authority (Rahman *et al.* 2010). At the water intake points such as Mohara treatment plant and Kalurghat Iron Removal Plant, water quality is safe from faecal coliform (Zuthi *et al.* 2009), acidity and alkalinity (CWASA 2014). In addition, water from some 36 deep tube wells of WASA is safe except from Ranadhir Dutta and Chawkbazar where the acidity and chloride is high (DoE 2014). Although the supply water source is safe, water becomes contaminated while distribution. In the four routes, except route 1, the acidity and alkalinity level is satisfactory as per the standard of Bangladesh Environmental Conservation Rules (BECR), 1997 and World Health Organisation (WHO). However, in Mohra-Batali hill route, there are high pH, chloride, and dissolved solids in water. In route 3, dissolved oxygen in water is found to be unsafe and in route 4, very high turbidity is observed (Zuthi *et al.* 2009).

At the user end, there are no traceable coliclonies (harmful microorganism) in tap water (DoE 2014). Whereas the bottled and jar water in restaurants is highly contaminated with coliclonies with five

times higher than the permissible limit.⁴ In addition to colicolonies, residual chlorine in water (chlorine is added to the water to inactivate the bacteria and some viruses that cause diarrheal disease) is found to be within permissible limit (CWASA 2014).

Although the water quality in Chittagong seems safe at intake points, however, at user ends the water quality is found to be unsafe and contaminated with harmful microorganisms. This indicates that the microbial contamination is happening due to cross contamination by leaking pipes in the distribution system, improperly treated septic and sewage discharges, leaching of animal manure, storm water runoff etc. However, no arsenic is found in the CWASA supply water and deep tube wells both at source (CWASA 2014) and user end (DoE 2014). However, the quality of river water, namely the Halda and the Karnaphuli, are satisfactory in terms of water temperature. But the dissolved oxygen level in both the rivers is low which implies that the water is unsafe for fish and other aquatic inhabitants. The salinity rate is high in the Halda River compared to the Karnaphuli (DoE 2014). In addition to the dissatisfaction on quality of supplied water, citizens' perception also shows a similar reading. About 20 percent users mentioned that they are not satisfied with the water quality in terms of colour, smell and taste of both the drinking and cooking water (BIGD Survey 2014).

In governing the water quality a number of organisations are involved: CWASA, DoE and DPHE. Among them CWASA is solely responsible for water supply. Both CWASA and DoE monitor the water quality of the city separately. CWASA is interested in the quality of water source and supplied water; whereas DoE's primary focus is river and lake water and industrial pollution. DPHE is inactive in CCC as the entity is not allowed to operate in WASA coverage area. However, working separately with different mandate shows a clear disintegration in water quality management in CCC. CWASA, for example, supplies water with good quality at source but the water becomes contaminated by the time it reaches the user. This is due to significant degree of deterioration in distribution pipes, water leakage, weaknesses in current water supply management, and lack of service provisions (Chowdhury *et al.* 2013a). However, despite the fact that CWASA's water is not safe to drink, about 55 percent of the water users drink their water directly. Among them 20 percent users purify their water with different options rather than boiling. About 10 percent respondents reported water related health problems of which slum dwellers are found to be affected mostly (about 17 percent) by diarrhoea, typhoid, jaundice and other water-borne diseases (BIGD Survey 2014). More worryingly a large section of slum dwellers is affected by arsenic problem (See Box 6.1).

River pollution, however, has not gained enough attention. Pollutant industries, such as paper mills, rayon mills, fertiliser factories, oil refineries, power plants, cement industries, dying and washing industries, tanneries, and other heavy industries have been fined several times. Since January 2014, nine industries have been fined almost BDT 65 million (DoE 2014). However, the penalty is too little compared to the negative externalities they produce and there is hardly any industry that has been punished effectively. Interestingly, the list of pollutants has many state-owned industries such as Karnaphuli Paper Mills, which largely contributes to pollution through dumping factory waste into the river. DoE's efforts were limited to just sending notice to them to stop pollution rather than taking any effective action. According to Bangladesh Environmental Conservation Rules (BECR 1997), every red colour industry should have Effluent Treatment Plant (ETP). In 2012, DoE recorded 12 heavy pollutant industries without ETP, most of which are dying factories and noticed many others with ETP discharge

4. Exceptional high contamination is recorded at a restaurant in Agrabad in 2012 (100 ML) and one sweet shop in Katwali (110 ML). See DoE (2014).

waste water with less dissolved oxygen and excessive suspended materials. Our field survey shows that a number of industries have been found with hidden discharge drainage pipes and some of them discharge polluted water at midnight when it is least noticeable. However, DoE's monitoring activities are not regular and it covers very few industries. It is apparent that ineffective enforcement has been promoting the negative externalities and is causing environmental degradation in the city.

There is also lack of coordination in monitoring water quality. As per National Policy for Safe Water Supply and Sanitation 1998, water quality monitoring for the purpose of ensuring an acceptable standard will be the responsibility of Department of Public Health and Engineering (DPHE), Department of Environment (DoE), Bangladesh Standards and Testing Institution (BSTI), Atomic Energy Commission (AEC) and Community-Based Organisations (CBOs). WASA and relevant agencies shall support and promote any collective initiative in slums and squatters in accessing water supply on payment as well as monitoring water quality (See Box 6.1). Both the DoE and CWASA monitor water quality each month randomly both in the intakes and user ends. With no integration among these entities, a systematic monitoring mechanism has been not been developed. As a result, it is difficult to understand the overall status of the water quality in the entire city.

Box 6.1: Arsenic affected slum areas: Land of no authority

A study, jointly conducted by the Chittagong University of Engineering and Technology (CUET) and the Institute of Engineers of Bangladesh (IEB),⁵ revealed that Chittagong City's shallow aquifer contains arsenic. Out of 41 wards of CCC, some 13 wards were found to be arsenic contaminated at various scale. Among the 13 wards, East Sholoshahar (Ward-6), South Kattali (Ward-11), and North Halishahar (Ward-26) were found with elevated levels of arsenic concentrations; while in the rest of the 28 Wards, arsenic concentrations were found to be very low. North Middle Halishahar (Ward-38), South Halishahar (Ward-39), North Patenga (Ward-40) and South Bakalia (Ward-19) are among those with minimum concentrations of 0.3 ppm of arsenic.

Shallow tube wells outside the CWASA water supply facilities were found to be arsenic contaminated. Without having any access to CWASA water supply facilities, shallow tube wells are privately instated by the low income community especially in the slum areas and these tube wells are provided by the slum owners (locally called Zaminder). Installing shallow tube well does not require any permission from CWASA, whereas installing deep tube well requires license with fees. Getting license is also difficult for slum dwellers, as slums are not recognised by formal authority. For users, it is expensive and time consuming to get approval. Hence Zaminders do not install deep tube wells. Having no alternatives, the poor slum dwellers are using the contaminated water, despite, in some places, being aware of the contamination of arsenic and its effects.

In respect to institutions for water governance, clearly defined policies exist. For example, the Policy for Safe Water Supply and Sanitation 1998 mentioned in section (8.3.7) that "Except Dhaka and Chittagong city areas, Department of Public Health and Engineering (DPHE) will be responsible for the water supply and sanitation of the whole country". Thus, DPHE does not take any action in the arsenic affected areas in the Chittagong City area. However, the National Policy for Arsenic Mitigation (2004), on the other hand, mentions that "access to safe water for drinking and cooking

5. Cited in Sengupta et al. 2012.

shall be ensured through implementation of alternative water supply options in all arsenic affected areas . . . DPHE shall implement the emergency programme in the area". Nevertheless, CWASA denies taking the responsibility arguing that they are not responsible for overseeing private tube wells. Both the policies have clearly defined the responsibility but both the departments take advantage of gaps in the policy to keep them safe.

These shallow tube wells in the slums and private areas are not monitored either by CWASA or DoE claiming that in their tests they did not find presence of arsenic in these waters. In fact, none of the authorities test the shallow tube well water. The water supply governance has failed to address the issue in a sense that there is no coordination among organisations. Instead of coordinating and co-operating with each other, the relevant authorities avoid their responsibilities. CWASA, for instance, claims that they are mandated to supply safe water from their water sources and is not concerned with the private use of shallow tube wells. On the other hand, DPHE avoids the responsibility arguing that CWASA area is out of their operation area. Quality monitoring authority, DoE, denies presence of arsenic and so there is nothing to be concerned about. As a result arsenic contamination is taking a toll on the underprivileged citizens (Uddin and Islam 2013) and the affected areas seem to be a land of no authority.

6.4.2 Air quality and governance

The main threat of air pollution in CCC is that of Suspended Particulate Matters (SPM), which has already exceeded $50\mu\text{g}/\text{m}^3$ as per BECR'97. SPM is constantly increasing along with the increase in housing and infrastructure construction, running of faulty and unfit vehicles on the streets, black smoke from brick kilns and contribution from various industries. The scenario worsens during dry seasons. According to Bangladesh Road Transport Authority (BRTA), about 14 thousand buses and trucks, approximately 100 thousand minibuses, about 10 thousand mini trucks and pickups, more than 25 thousand three wheelers, as well as 57 thousand motorbikes ply the city streets every day (Daily Independent 2014). On the other hand, at least 10 highly polluting industries, 45 moderately polluting industries, 48 less polluting industries (DoE 2014) and more than ten brick kilns are constantly contributing to air pollution (Begum *et al.* 2012).

The overall air quality is not safe in CCC. Though the state of nitrogen dioxide, sulphur dioxide in the air is found satisfactory in all seasons, but the fine particles, especially particles between 2.2 and $2.5\mu\text{g}/\text{m}^3$, are heavily concentrated. This concentration becomes hazardous between November to April with a range between 280 and $470\mu\text{g}/\text{m}^3$ (DoE 2014). Noticeably, air pollution in some places is so severe that it leads to unliveable conditions, such as the GEC *Mor* ($600\mu\text{g}/\text{m}^3$), and in other places SPM is recorded between 500 and $600\mu\text{g}/\text{m}^3$ such as, Bayezid Bostami Road, City Gate, Pahartali, Sholoshahar (Gate - 2 *Mor*), and Bahaddarhat *Mor*. However, during rainy seasons the concentration lies between 180 and $420\mu\text{g}/\text{m}^3$ (ibid).

In addition, under Clean Air and Sustainable Environment Project (CASE), DoE monitors five criteria of pollutants in a continuous basis: such as ground-level ozone, particle pollution, carbon monoxide, sulphur dioxide, and nitrogen dioxide (CASE 2014). According to Air Quality Index (AQI), Chittagong is not safe and does not fare well *vis-à-vis* other cities in Bangladesh (Table 6.1). However, the scenario is even more hazardous than the AQI reflects. Among the five pollutants, SPM (0.25 and 0.10) are found

between 153 and 241 $\mu\text{g}/\text{m}^3$, which falls within unhealthy category. About 20 percent of citizens reported being affected by air quality. Among them, slum dwellers are found to be more concerned than that of non-slum dwellers. The impact of air pollution is recorded in terms of cold, asthma, fever and eye sore in both slum and non-slums areas. In the BIGD Survey (2014), respondents pointed out that stinging eyes in slums areas and asthma in non-slum areas are the major air pollution related health problems.

Table 6.1: Air quality index for selected Bangladeshi cities

Location	AQ	Category	Reference AQI Values	Levels of Health Concern
Dhaka	172	Unhealthy	0-50	Good
Chittagong	125	Moderate	51-100	Moderate
Gazipur	178	Unhealthy	10-150	Unhealthy for Sensitive Groups
Narayanganj	174	Unhealthy	151 to 200	Unhealthy
Sylhet	129	Moderate	201 to 300	Very Unhealthy
Khulna	DNA	DNA	301 to 500	Hazardous
Rajshahi	118	Moderate		
Barisal	118	Moderate		

*DNA-data not available

Source: DoE 2014

There are a number of acts/rules and institutions to deal with air pollution, including Clean Air Act, BECR 1997, Housing and Building Construction Rules, and so on. Among these acts, BECR 1997 is found to be implemented to some extent. Authorities that are working for air quality management include DoE, BRTA, CCC and CDA; and every authority has its own mandate. For example, DoE pays attention to industrial and brick field pollution. BRTC deals with the faulty and outdated motor vehicles. Since there is a poor, and in some aspects lack of, coordination between these authorities, the governance of air quality monitoring in the city is still a challenge.⁶

Air quality management is further handicapped by the enforcement and monitoring of protocols. Since 2002, there have been 289 cases filed in Environmental court, of which 94 involved brick fields, 75 for hill cutting, and 16 related to polythene bags. Among the cases, 189 were writ petitions and only a handful of cases were settled. It is revealed from our field investigation that sometimes there is an agreed settlement among politicians, polluters, and enforcement authority. As it appears in the re-clearance procedure, each year every industry has to get clearance from DoE. During 2012-13, 74 red category industries applied for renewal of their licenses and all were given clearance (DoE 2014). This implies that there is hardly any problem with the industries in terms of pollution. But the Chaktai Khal, which absorbs most of the industrial pollution, was found to be at the stage of becoming abandoned. DoE, which is the regulatory body formed to address this problem, focuses on revenue generation by fining pollutants. Experts believe that other legal means are also necessary to make the pollutants accountable.

6. CDA construction work generates enormous volumes of dust which is left to be removed by CCC. However, CCC does not take the responsibility. In case of Bahaddarhat flyover project, CDA constructed the bridge and left behind residual to be removed by the CCC, whereas CCC did not show any interest to clean up these residuals causing air pollution.

6.4.3 Noise pollution and governance

Continuous noise in excess of 30 dB (decibels) disturbs sleep of human beings. Anyone in long-term daily exposure to noise levels above 65 dB or with acute exposure to noise levels above 80 to 85 dB could face cardiovascular disturbances, disturbance in nervous system, and abnormal hormonal responses, leading to temporary increases in blood pressure. Noise pollution above 80 dB can cause disturbance in mental health (Muhit and Chowdhury 2013). According to the Noise Pollution Control Rules 2006, suitable sound condition for Bangladesh are 45 dB and 35 dB, for day and night time respectively. For residential areas, 50 and 40 dB at day and night time respectively are permitted. For the mixed areas (residential, commercial and industrial localities), noise level is set between 60 and 70 dB, and for industrial areas 70-75 dB are set as standard limits (DoE 2014). Noise pollution in Chittagong is mainly dominated by high traffic density. Along with that, high population density, continuous population growth leading to infrastructure development, heavy industries, and development work is causing noise pollution (Goines and Hagler 2007).

DoE conducts routine monitoring by carrying out random noise quality tests in various points of pollution sources within the city in a sectoral basis. For example, a survey in January 2014 focused on the healthcare establishments at Nasirabad Industrial area. However, based on the survey data of DoE from May 2011 to March 2014, it was found that noise quality in industrial areas range between 70 and 79 dB. At traffic nodal points noise quality was recorded between 71 and 84 dB, including highest pollution in the Badamtali, Kadamtali, Market *Mor* and GEC *Mor*. Around school and college areas noise status is between 63 and 77dB, highest reading observed at Nurul Hoque High School, and at Colonel Hat. In the office area the range is found between 64 and 80 dB, the highest at PDB and Agrabad. In the filling stations the average noise pollution was recorded as high as 79-83dB, especially in the Khulshi CNG station. However, inside an industrial area, noise pollution was recorded as high as 102 in CDA Avenue at Bahaddarhat industrial area (DoE 2014).

A study was conducted by Muhit and Chowdhury (2013) to review the level of traffic noise in Chittagong that covered almost all the important traffic routes. Out of the entire road network of the city, 11 large segments were chosen based on the magnitude and traffic pressure on these roads over the past 10 years. Data was collected and analysed by using the calculation of roads with traffic density from 12 stations and statistical noise index were estimated for 18 hours. The highest pollution was observed at 90.12 dB through CDA Avenue (Gate 2 to GEC Circle) followed by Bahaddarhat Circle to Gate 2. The respondents were very dissatisfied with the existing noise quality. Recent fieldwork shows that only 14 percent respondents were satisfied with the level of noise; whereas, the majority mentioned that the present noise level is just tolerable. However, more than 18 percent respondents were worried about the level of pollution and they found it intolerable (BIGD Survey 2014).

DoE along with CCC and BRTA are the major regulatory authorities in noise quality management. DoE is the main player to monitor noise quality. It is stated that any event occurring in residential areas on occasion of religious, national or other day celebrations, producing noise that exceeds 65 dB, has to get a permit from the police commissioner in the case of metropolitan area. Other than these special cases, noise level should be limited to 65 db in these areas. The City Corporation should identify the risk areas and notify the permitted level of noise limits through public signposts. However, CCC does not even have any signposts identifying 'residential' or 'industrial' areas. The issue of noise pollution do not seem to be important or may not even be in the work list of CCC. Henceforth, detailed signpost with marked sound limit is very much required for vehicles to follow.

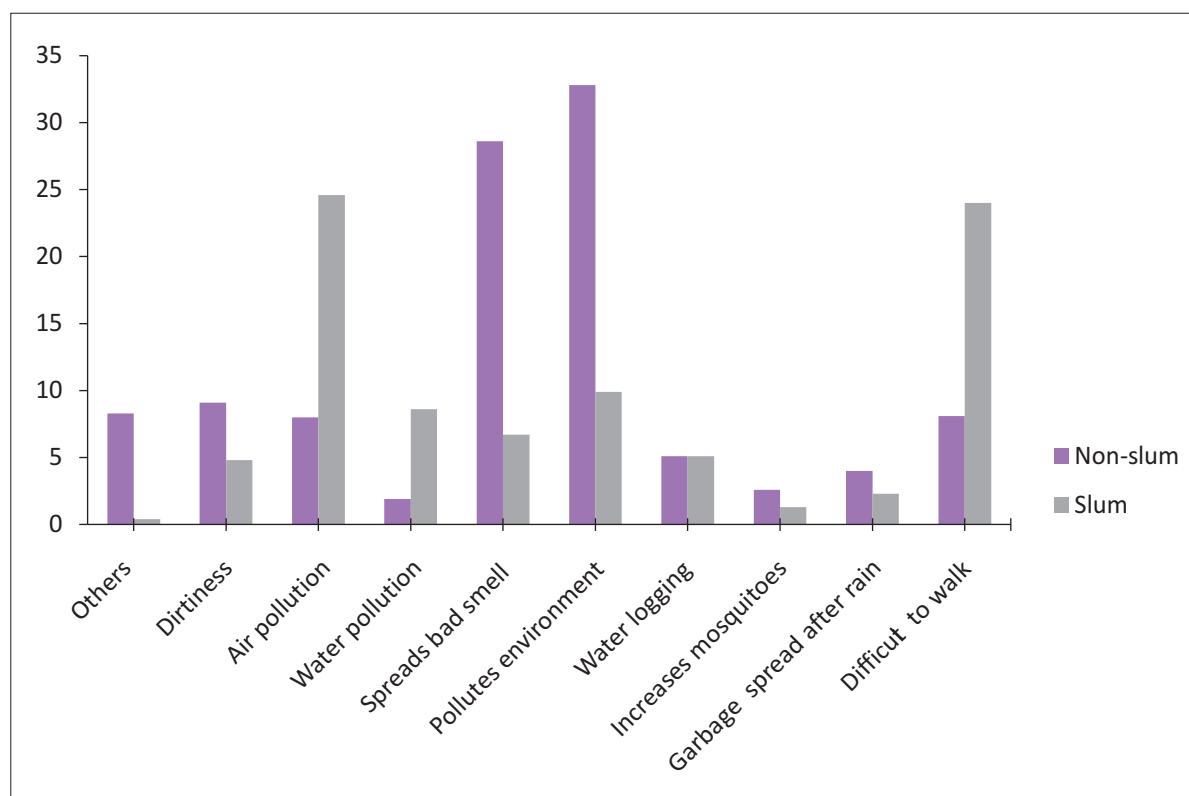
The existing noise pollution has been continuing for a long time. Hardly any visible intervention or enforcement is pursued to regulate noise level of the vehicles by BRTC or other regulatory bodies. DoE often monitors noise level from industrial origin. However, respondents felt that hardly any of the industries are taxed for noise pollution. Having poor coordination or lack of proper coordination between DoE, CCC and BRTA, noise governance is literally absent.

6.4.4 Solid waste disposal and governance

In Chittagong, everyday, about one third of the solid waste remains uncollected (Chowdhury *et al.* 2013b). These uncollected wastes in many areas of the city cause bad odours, aesthetic impairment, breeding of flies and mosquitoes, generation of harmful gases, clogging of drains, and deterioration of soil quality and contamination of surface water. Most importantly, improper management of solid waste is to be blamed for the water logging in the city. Existing practice of throwing or placing of waste outside the dustbins/containers and spillage of waste during collection and transportation are also common in the city. In addition, final management of solid waste is unsanitary and causes air and water pollution. Disposal of wastes in this manner causes emission of greenhouse gases (CO₂, CH₄), ground water contamination due to leachate percolation, land degradation and the overall deterioration of the surrounding environment (ibid).

In CCC area, before collecting waste from door to door, about 30 percent of the waste remain uncollected and often thrown around the drain, river or elsewhere. The door to door collectors store the waste in the 1150 dustbins and 240 metal containers provided by CCC. Given the shortage of vehicles to collect waste, CCC cleaners use old, outdated and hired trucks to transport waste from storage to two disposal points: Roufabad (landfill) and Anandabazar (open dumping). From the collected waste about 72 percent are disposed to landfill in Roufabad, which is 5 km away from city centre, 27 percent is dumped in Anandabazar (6km) open dumping, only 2 percent goes to composting and garbage treatment plant (CGTG) near the Anandabazar dumping site.

As per the City Corporation Ordinance and *Pourashava* Ordinance 1977, CCC is responsible for proper disposal of solid waste. The most important task of the authority is to manage the waste properly to keep the city clean and healthy. CCC operates the SWM under the conservancy wings executed by Chief Conservancy Officer (CCO) under the direct supervision of the Mayor of the City Corporations. However, CCC fails to carry out the responsibility properly. The CCC does not collect waste from door to door. Even though, some community based organisations (CBOs) and non-governmental organisations (NGOs) do the primary collection from the households, CCC cannot carry out the regular garbage disposal work. The institution does not have a unified waste management system for the city. Instead the conservancy department adjusts their incapacity of service delivery by prioritising service providing areas. The 41 wards of the CCC are grouped into two categories: (i) conservancy wards (24), and (ii) non-conservancy wards (17). In the conservancy ward, (the privileged areas) trucks collect and remove garbage from the dustbins at least three times a day and the roads and drains are cleaned twice a day. Whereas the in the non-conservancy wards, (the underprivileged areas) trucks collect garbage once or twice a day and drains and roads are occasionally cleaned resulting in unhygienic and filthy living conditions in these neighbourhoods. There are shortage of both vehicles and cleaners. The BIGD Survey (2014) found that waste pollution is responsible for polluting ambient environment, causing air pollution and generating bad smell (Figure 6.2):

Figure 6.2: Adverse effects of improper disposal of solid waste

Source: BIGD Survey 2014

There is discrimination in terms of priority of waste collection. At present, conservancy wards, which receive regular services, are generally rich. Pricing for waste collection and disposal also has variations, conservancy ward pay 7 percent of tax (from house tax) and non-conservancy wards pay 4 percent. In solid waste governance, the CCC, DoE and CBOs as well as various NGOs are involved. In CCC, two wings mainly carry out the entire management. Conservation department is responsible for the maintenance of sanitation systems headed by Conservation officer and transport department is in charge of vehicles. Having two wings that work separately causes management problems, leaving the existing inadequate management more complex and difficult. In addition, waste disposal system does not comply with the existing environmental law. Under the Environmental Conservation Rule 1997, all municipal dumping sites and 'incinerators' are considered environmentally harmful and these are labelled as "red category". If disposal sites fall in the red category, it is mandatory for the CCC to get the environmental impact assessment (EIA) clearance. However, Anandabazar open dumping site has been functioning for 54 years and Roufabad for 13 years without the DoE clearance certificate. According to the 3R (reduce, reuse, and recycle) strategy 2010, waste needs to be treated as resource, adoption of appropriate and affordable technology are required, private sector investment and polluter pay principle. Evidently, such strategy is not duly implemented by CCC.

6.4.5 Drainage system and governance

Being located in the tropical zone, the city has high temperature and receives heavy rainfall with high humidity. Annual rainfall in the city varies from 2100 mm to 3800mm, of which 2400 mm occurs only during the monsoon (Islam 2009b). Although the city has become water logged because of good natural gravitational drainage systems, unplanned urbanisation, illegally refilling natural channels, encroachment of drains. Most of the drainages are obstructed by building structure, *kutch*a houses (made up of wood, mud, straw and dry leaves), retaining walls and building walls, boundary walls, *pucca* (typically made of concrete, stone, clay tiles) toilets, steel piles, wall of multi-storied buildings, public toilets, several trees, R.C.C frame of buildings, electric poles and columns, bridges, culverts, land filling (CDA 2011). Problems in the drainage have been continuing for decades. The most recent water logging occurred in June 2014, when most of the city area was inundated, especially the low-lying areas of the port city. Particularly Bakalia, Chawkbazar, Agrabad, Haliashahar, Kapasgola, Chandgaon, Shulakbahar, Bahaddarhat and Probartak intersection went under water due to the heavy rains, causing immense sufferings to the people living in these areas (Daily Star 2013c).

This water logging issue was not taken seriously for decades as the natural drainage system was working well draining out the storm water quick enough. In 1961 the first master plan was conducted focusing mainly on zoning maps for housing and industries with very little or no reference to drainage planning. Since then, major drainage planning was developed without any integration with the land use planning process. As a result, engineers built drains, rehabilitated *khals* (canals) on the basis of actual situation in the catchments or on an *ad hoc* basis. The future use of flood plain was not considered in the provisions for flood storage works. They have allowed building in flood plains without providing for the appropriate drainage that is 20 feet or 60 feet. However, the drain width mysteriously remained constant at 2 to 3 feet (Ashraf and Chowdhury 2009).

The existing drainage network in the city follows four hierarchies: primary, secondary, tertiary and plot drains. Open channels such as Chaktai, Rajakhali are the primary *khals*. They are naturally developed and linked with the river. Primary *khals* consist of two main systems of canals: first one consists of Mirza, Chaktai, Dhomkhali and Noakhali *Khals* and the other one consists of Nasir and Moheshkhali *khals*. Secondary drainages are those which loads the primary drains (canals), made of concrete, bricks. These secondary *khals* are generally parallel to roads (CDA 2008d). Tertiary *khals* are local drains, narrow and primary pathway to drain off water to secondary *khals*. In addition to these three drainage systems, plot drains are earthen/ *kutch*a drains which are seen in the undeveloped plots. The width of the plot drain are determined by the plot developer (ibid). At present, only three primary/natural *khals* and 22 secondary *khals* exist in the city.

Several authorities carry out the drainage management in the city: CWASA, CCC, Bangladesh Water Development Board (BWDB), Chittagong Port Authority, Chittagong Development Authority. The core responsibility for storm water drainage and sewerage belongs to CWASA. However, CWASA has neither developed any sewerage system nor storm water drainage infrastructure till date. CCC is mainly working on the local and tertiary drainage development and construction and is also responsible to keep the drains clean. CDA's role in the drainage system is in incorporating drains in land use and structural plans and allotting space in city designs. BWDB also plans for the flood

management of CCC in which they are involved in linking embankment with the drainage system. However, the existing problem in the overall drainage system is due to budget constraints — without which CWASA and CCC can not undertake development work or take initiatives to implement the drainage plan (CDA 2011). The Chittagong Storm Water Drainage and Flood Control Master Plan 1995, proposed for developing the drainage system in five phases within the plan period of 1995-2015. Regrettably, eight years have elapsed since gazette publication of Drainage Master Plan in 1999 with no visible progress in its implementation and in restoring Chaktai canal, the backbone of drainage system of the port city.

In drainage system management, one of the biggest challenges for CCC is to deal with the illegal occupancy of the *khals*. Many of the primary *khals* have disappeared and several secondary canals are either completely or partially occupied. The occupiers are so powerful that no government authority wants to recover any *khals*. It was only during the period of caretaker government in 2007-8, the CCC recovered the Chaktai *Khal*. The CDA and CCC are planning to excavate new *khals* rather than reclaim the old ones.

The governance of drainage system is not limited to institutional and political constraints. The distribution of management of the drainage system follows the drainage hierarchy, namely the primary, the secondary and the tertiary drainage. CCC, for example mainly deals with the drainages besides the houses, road and small scale unstructured rain water runoff. Whereas, CDA deals with the primary and larger canals and CWASA is responsible for sanitation and storm water management. Consequently, drainage system management is either over-mandated or under-mandated to these institutions. Experts familiar with the issue observe that they have coordination meetings only when water logging issue surfaces during rainy season. Recently a coordination meeting was held to restore the Chaktai *Khal*, where CCC and CDA were entrusted with the responsibility for doing this. However, past experiences show that, the decisions made in such meetings were hardly implemented. After developing the CMMP '95 guideline, the drainage system was to be implemented within one and a half year time but it could not be done in the last 13 years. Due to lack of coordination, construction could not be carried out for a very important *khal* (Mirza-Chaktai), that could have protected a huge area under Panchlaish and Chandgaon Police Stations from water logging (Daily Star 2008).

6.4.6 Environmental governance: Institutional constraints and implications for common pool of resources

The discussion of the preceding sections suggests that overall environmental quality is less than satisfactory in Chittagong, compared to the national standard. Among the environmental problems, waste pollution is seen as the major concern for the city dwellers. Poor water quality, particularly having arsenic contamination, affects the low-income groups in slum areas. Beside waste and water, air quality in some places recorded at hazardous level, though the AQI index shows the state of air is at cautious level. In addition, noise pollution is the most unaddressed and ignored environment problem which is far beyond the safety limit. The natural drainage system of city has disappeared and there is no structural drainage system in existence causing water problem (Table 6.2).

Table 6.2: The state of the environmental quality and governance in CCC

Underlying reasons	Water	Air	Noise	Solid waste	Water logging	land use
State of quality	-40 percent area unsupplied, 6 wards having arsenic	-Cautious - dry season is hazardous	High, some places hazardous level	30 percent Uncollected, Unhygienic disposal	No drainage system, Water logging	Unplanned use and no segregation No control in land type transform
People's perception	Only 40 percent citizen are satisfied with quality	20 percent Reported intolerable	About 17 percent reported intolerable	Intolerable	Unliveable	Loosing green land
Main concern authorities	CWASA, DoE DPHE	DoE, BRTA	DoE, CCC, BRTA	CCC, DoE	CDA, CCC, DoE	CDA, CCC, DC office, Railway-
Combating externalities	-ETP is either absent or inactive - Govt industries also pollutes - river polluters are occasionally fined	-Industries are occasionally visited and fined -Vehicles are not monitored	Not priced at all	Very under priced	Not priced	Hill cutting is present - land type change is usual
Governance issues	- No coordination - Institutions follow rule of business	DoE-industry focus Traffic congestion BRTA is inactive in road monitoring	No activity No coordination	Institutions failure to address the problem	- No coordination between CCC,CDA and CWASA	Private sector dominated

Source: BIGD Survey 2014 and KII

The environment quality in the city is degrading in absence of enforcement of regulations and inadequate pricing of pollution. DoE is the main authority to ensure and enforce environmental laws. Except for water logging, the other components are directly in the DoE's enforcement agenda. In fact, DoE to some extent enforces rules against industrial pollution, but hardly fines for air pollution and almost never fines for sound pollution. As the quality of environment is unhealthy, DoE's gap, limitations and incapacity to combat polluters are clearly evident. There are allegations that many cases are settled informally, often intermediated by political power holders. On the other hand, Environmental Court is overwhelmed with cases and its effectiveness largely depends on the investigation report of DoE. In the past 11 years, it passed judgment of 100 cases whereas about 3000 cases were submitted. Interestingly, only two cases ended up with the verdict of minor imprisonment and the rest were either fined or freed of charges.

The institutional constraints to govern the city's environment, particularly in the area of water, waste and water-logging has wider implications for the city's common pool of natural resources such as Karnaphuli River, which is the lifeline of Chittagong for its economic and environmental importance (See Box 6.2).

Box 6.2: Governing the commons: The case of Karnaphuli River

Karnaphuli River is used for transporting 12.5 million tonnes of cargo per year through more than 1500 merchant ships along with about 3000 fishing vessels. The river water is extensively used for water supply for the city. However, the river faces severe environmental problems generated by multiple sources (See Map 6.1 in appendix). The illegal/accidental discharges from ships, pollutants from more than 1,000 industries, among which 200 industries are recoded as highly pollutant. Open dumping of solid and liquid waste and river bank grabbing have pushed the river at dangerous stage (Daily Azadi 2014d). In addition, undeterred hill cutting and deforestation in upstream are reducing the water loading capacity of the river. Moreover, extensive amount of pesticides and insecticides from agriculture use drain off to this river and contaminate the fresh water.

The consequence of polluting this river is that it became a major threat to biodiversity. The level of oxygen has decreased to an alarming stage for water-based animals and plants. In the last 40 years, almost 18 local varieties of fish have already disappeared and another six are becoming scarce (Miah et al. 2010). Pollution has impact on river navigation system due to irregular water flow, leading canals drying and Char lands (low lying flood and erosion prone areas in or adjacent to major rivers) developing. Moreover, river pollution is also a challenge for the livelihood of the fishermen. If this process continues, it will tend to make the river dead. Economically, reduction in navigation ability can impact on the major route of transport by industries and people of the city and will have direct impact over the industries and thus over economy.

For governing the commons, the most important dictum is Bangladesh Environmental Conservancy Rule 1997, where it is clearly stated that rivers should be kept unpolluted (clause 4.6.d) and it has also defined guidelines for CCC not to dump waste in the river (clause 4.9.d). Despite having specific guidelines and pricing policy, pollution is hardly combated and controlled. In fact the major polluters are the government authorities themselves. CCC, for example, leaves 30 percent waste uncollected and those wastes are mostly dumped into various rivers eventually leading into the Karnaphuli. Chittagong WASA has no effective sewerage system in Chittagong and thus all liquid waste directly goes to river. Many government industries situated in the river banks are recorded as highly pollutant. On the other hand, DoE with its limited resources and monitoring capacity enforces the pollutants ineffectively and insufficiently. Sometimes pollutants have agreed settlements with the law enforcers so that they are not priced (taxed) at all. Civil society organisations (CSOs) are very vocal against the pollution in Karnaphuli.

Under the port authority there are four sub-committees for Cleaning, Dredging, Fixing boundary line, eviction and finding reasons of pollution. There is a committee consisting of 14 members for keeping usual navigation level and water flow and for making recommendations to reduce pollutions. Several CSOs play important role in making people aware and stopping pollution. They include Poribesh Bachao Andolon, Chittagong Regional Cultural Academy, Karnaphuli River Sampan Boatmen Manjhi Welfare Society are taking several awareness programmes to make people aware about pollution issues (Daily Independent 2014).

There are various laws and awareness programmes to prevent pollution of Karnaphuli. However, these laws and rules are rampantly breached. Unless the city solves waste, drainage and sewerage problems, until and the industries are subjected to penalties, pollution in Karnaphuli is likely to continue. Citizens' and CSOs' roles are no less important. Thus a coordinated initiative involving the polluters, regulators, law enforcers and citizen groups is needed to save Karnaphuli.

6.5 Conclusion

Discussions focusing on water, air, noise, solid waste and drainage system management suggest that Chittagong faces marked environmental challenges. Among the various environmental problems, solid waste management has been identified as the city's major environmental problem. Only two percent of the waste is currently recycled. Having no 'reduce or reuse' mechanism, the city gets overloaded with the waste causing water logging and air pollution.

When it comes to water quality, the CWASA's existing dilapidated supply pipeline network contaminates water. It also needs to extend its coverage so that the low income people can have access to safe water. People in the urban slum areas depend mostly on shallow tube wells, they are at risk of arsenic contamination and other health hazards. This signifies the role of authorities in managing water quality. Neither CWASA nor DPHE takes the responsibility of arsenic affected areas.

The air quality of the city poses serious health risks. Among polluters, industry and vehicles were found to be the main contributors whereas, respondents blamed waste as the main reason for air pollution. Various diseases including cold, asthma, fever etc. were blamed for the poor air quality. The lack of monitoring and coordination among regulators (DoE, BRTC, CDA, and CCC) and weak enforcement of existing law are blamed for unabated air pollution in the city.

Noise pollution is very high both in industrial areas and road networks. One fifth city dwellers reported that the sound pollution is tolerable but not safe for health (BIGD Survey 2014). There is no effective enforcement visible to control the pollutants. DoE, to some extent monitors the industries, but the vehicles are very rarely investigated. Land use zoning in the city is a must in order to segregate residents from industry and commercial areas so that vehicles can follow the signposts with sound limit indications. At present, CDA does not implement the land use zoning and CCC does not install any signposts, thus, vehicles have no guidelines to follow.

Without any structural drainage system developed, the city depends on the natural drainages that are heavily polluted by industries, solid waste, sediments eroded from hill cutting and land grabbing causing water logging. The drainage system governance needs a clearly defined responsibility among stakeholders, i.e., CDA, CWASA, and CCC.

There is also a serious problem in governing common natural resources such as the Karnaphuli River. This is a result of failure to implement the city master plan on drainage, CCC's inability to collect most waste and CWASA's inability to establish a sound sewerage system. Moreover, regulatory institutions are largely ineffective to control industrial pollution, further exacerbating the problem. There is a need for multi-level efforts involving CCC, CDA, CWASA, DoE, and citizen groups to save the common resources like the Karnaphuli River.

To address the existing environmental problems as well as to make Chittagong liveable, the study recommends the following:

1. For water quality management, CWASA needs to modernise its delivery infrastructure replacing its age-old pipelines. Moreover, water quality monitoring requires coordination among key regulators namely, DoE, CWASA, and DPHE. A common monitoring cell needs to be developed through which data can be shared, used and archived and also to avoid overlapping and to cover under-monitored areas. CWASA and DoE should make a joint effort to develop the cell.

2. In air pollution management, DoE, BRTA and CCC have to work together. A coordination committee is essential for collective effort.
3. In noise pollution control, segregation of land use for residential, commercial, and industrial purposes is must to follow BECR '97 Rules. An effective coordination committee comprising DoE, CCC, BRTC, and Police authority is also needed.
4. In solid waste management, the CCC has to extend its waste collection coverage and recycle them by extending infrastructure facilities. It should follow the 3R strategy.
5. Recovery of illegally occupied rivers and implementation of Drainage Master Plan are critical to resolve the water logging problem.
6. In governing the Karnaphuli River, the lifeline of the city, all stakeholders need to be engaged.
7. DoE seems to be interested in revenue generation, whereas they should focus on stopping pollution. As DoE lacks monitoring resources, they should adopt new surveillance strategy.

Chapter 7

Conclusions and Way Forward

The pace of urbanisation of Chittagong has come about primarily due to its geographic location. As discussed in the introductory chapter, the port based economy connects its large hinterland with forelands, channelling commercial, political and cultural exchanges, making Chittagong a leading urban centre of Bangladesh. It was in the latter half of the British period that the city experienced steady urbanisation, which continued during the Pakistan era and accelerated in post independent Bangladesh.

While urban governance in Chittagong has been greatly influenced by traders and rulers, *inter alia*, for over a millennium, the city is yet to develop an effective governance system ensuring accountability to the city dwellers. In its long history, although the city has experienced occasional decentralised governance, in post-independent Bangladesh it was only in the 1980s and 1990s that the city was introduced to a devolved governance system, following the reform of city governance leading to the formation of Chittagong City Corporation (CCC). The democratic representation through elected Mayor and councillors since 1994 provided the opportunity to develop a bottom-up governance system. However, as discussed in this report, this did not happen due to the limited devolution of administrative and financial power, lack of single authority to ensure horizontal accountability and the city's increased dependency on the centre for funds and policies.

The existing governance system has had wider implications for the city's service delivery, infrastructure provisions and environmental issues, among others, as analysed in the report. There is a detailed analysis of subject specific micro issues in the individual chapters that evidently shows that the city's service delivery, transport provisions, and housing needs, among others have not been addressed in line with its speedy urbanisation. The city's service delivery is characterised by inadequacy of various services such as water, sanitation, gas and electricity. About 30 percent waste in the city remains uncollected, only two percent of waste is recycled, power cuts are routine, there is a rationing of gas for households and industries, housing supply is constrained by utility shortages such as unavailability of new gas lines and CWASA being able to supply only about 40 percent of water compared to the city's need. The city dwellers are at severe health risk, as reflected in various indicators of water, air, noise and

other industrial pollution. The water-logging problem keeps the city under water during the rainy season. Shortage of housing supply pushes the low income people to take shelter in risky slopes of hills, distorting the land use and generating hill cutting and other environmental problems. As a result, Chittagong is at the risk of becoming an unliveable city.

The report shows that the governance response to address the city's urban transition is either poor or inadequate. Given the circumstances, a number of cross-cutting governance issues are discussed here that have far reaching consequences with regard to the city's agglomeration and liveability.

1. Importance of coordination among service delivery and regulatory agencies

The study shows that coordination among the two key agencies i.e., CDA and CCC is critical to govern the city effectively. The lack of coordination between them seems to have handicapped the city's development. The housing and other construction projects of both CDA and CCC either got delayed or withheld based on compliance and other issues. Little evidence could be found that they worked in tandem. Nevertheless, the lack of coordination is not limited to these two institutions. The chapter on Environmental Governance shows that owing to coordination failure among other factors, the city's existing regulatory system has largely failed to tax externalities. Water quality monitoring for instance, requires coordination among key regulators, namely DoE, CWASA, and DPHE. In air pollution management, DoE, BRTA and CCC have to work together. In noise pollution control, segregation of land used for residential, commercial and industrial purposes is imperative to follow BECR 1997. An effective coordination committee comprising DoE, CCC, BRTC and Police authority is also needed. Failure in acting together by all these agencies means the pollutants are maximising their personal gain at the cost of the society.

The chapter on Urban Service Delivery indicates that to provide better sanitation services, the coordination between CWASA and CCC are critical as the maintenance of sewerage services are supposed to be undertaken by the former and the drains (removing solid waste and dredging the canals) by the latter. The chapter on Transportation Governance shows that given the lack of coordination between BRTA, CCC and CMP, the informal transport is under regulated as a large number of unlicensed rickshaws ply in the city restricting its mobility.

Coordination among key agencies, primarily the CCC and CDA is also needed to implement the city's Master Plan, which is critical to providing better services and fostering urban agglomeration. In fact, given the past experiences of constraints in project implementation, the Structure plan of CDA recommended that an Urban Development Co-ordination Council should be established. A co-ordination tool to govern the cities could be the idea of city government conceived by the former Mayors of Dhaka and Chittagong.

2. Streamlining of dualism in service delivery and social inclusion of low income groups

The existence of a dual service delivery model for slum and non-slum residents as well as the presence of multiple authorities is the fundamental flaw of the city's service delivery system. The chapter on Governance of Land Use and Housing showed that given the failure of CDA, CCC, NHA, *inter alia*, to provide housing to the low income people, a large number of poor people had to take shelters in slums and other informal settlements. As the formal agencies do not generally extend services to those settlements, slum landlords arrange for service provision of shared gas, controlled electricity, water,

shared toilet facilities, etc. However, these informal arrangements cannot function as substitutes of formal service delivery. As the chapter on Urban Service Delivery shows that for all the services bar gas, slum dwellers are worse-off than that of non-slum residents. Similarly, as the city's transport management has not been addressed in line with master plans. The growing demand-supply gap is filled up by informal channels by supplying a large number of unlicensed and unregulated transports such as paddled and battery powered rickshaws limiting the mobility of the city. It was also reported in the Transportation Governance chapter that the informal agencies liaise with the formal institutes to keep unlicensed rickshaws and other informal modes of transport to ply on the streets through monetary exchanges.

There are other limitations of informal service delivery model even if it provides a low-cost solution. While people in slum areas get water service from landlords, their dependency on shallow tube-wells for example, expose them to the risk of arsenic contamination and other health hazards. But there is no authority to address the issue. More worryingly, slum owners not only enjoy monopoly control over service provisions, but also act as a *de facto* authority. Given the limited interaction with formal agencies, including the City Corporation, slum residents are nearly excluded from the city's governance system. As formal service delivery agencies have legal constraints to provide services to informal settlements, in the short-run NGOs can be involved to some extent for providing basic services such as water to the slum dwellers. Moreover, there should be some priority projects on low income housing to minimise the city's informal settlement, in turn limiting the sprawl of the city. This will also help formal service delivery agencies to extend services for the low income group.

3. Imperatives of need-based development and implementation of urban plans

Chittagong's development priorities are best outlined in its master plans. Thus, the implementation of those plans is critical to provide better service delivery, an efficient transport system and above all, to make Chittagong a liveable city. As discussed in the Environmental Governance Chapter, the pollution of Karnaphuli River is a classic example that shows how a common pool of resources had to bear the cost of city's mal-governance, perpetuated by the absence of a need-based development model. Non-implementation of waste management, drainage and sewerage projects and coordination failure in addressing externalities forced the Karnaphuli River to eventually absorb a host of pollution, by-products of density.

The chapter on Transportation Governance showed that the city's development is not needs-based. Largely ignoring the priority projects identified by CDA master plans, some even prioritised as early as during the 1960s and the civil society voice (such as Forum for Planned Chittagong), the authorities are implementing some of the least prioritised projects, such as flyovers to manage Chittagong City's traffic congestion. As discussed with substantive evidence, with less financial resources, the city can develop Bus Rapid Transit and other mass transits. The city could have saved millions, by utilising the existing roads to their full capacity and not channelling scarce resources in flyover construction that have proven to be less effective in controlling the city's traffic congestion. The development model that has been followed by CDA is proven not to be needs-based. However, CDA's (or other agencies) *ad hocism* in project prioritisation could be avoided by ensuring its accountability to the elected body of the city, which is directly accountable to the citizens. Any major projects undertaken by CDA and other entities also should be subject to public hearings if they are not in the master plan or other important plans.

4. Importance of greater role of citizens and civil society organisations

The role of citizens and civil society groups are no less important for better functioning of cities. The importance of civic responsibility is evident in the chapter on Urban Service Delivery. Citizens' skewed preference for cheap services and unwillingness to follow the cost-recovery pricing model, based on the principle of 'pay-per-use', have constrained the service delivery agencies to extend the coverage to a host of services such as water and gas. The service providers incur huge losses every year, particularly for water and gas. The cost-recovery pricing is also important to improve the quality of services. The city dwellers' civic responsibility is also important to keep the city clean, as a large section of households, particularly those who live in slums do not follow the waste management guidelines. Civil society organisations could play a greater role in managing the garbage problem and controlling pollution in canals and the Karnaphuli River. Moreover, the involvement of NGOs is imperative to provide basic services in slums given the legal bindings of formal authorities to extend services to informal settlements. NGOs can also play a greater role in addressing issues involving health risks that are not addressed by service delivery agencies such as arsenic problem in slums and unattended medical waste in the city.

5. Importance of practicing horizontally accountable devolved governance model

The report shows that given the lack of accountability, the inhabitants of Chittagong are deprived of quality services. One worrying sign of the city's service delivery as far as redressal mechanism is concerned, is that given the lack of accountability and inadequate capacity of concerned authorities, city dwellers are often deprived of prompt services that discourage them from lodging complaints when faced with problems. This was found to be particularly true in case of waste management and electricity services. As explained by the chapter on Political Economy of Urban Governance, since most agencies fulfil the vertical accountability practicing top-down governance model, they are not ultimately accountable to either the elected local governance body CCC or city dwellers.

This constraint also affects the implementation of the city's Master Plan and other priority projects. As most agencies barring the CCC are not directly accountable to the city dwellers, they are beyond the accountability mechanism for non-implementation of the plan or implementing the less prioritised projects. They often fulfil the mandates of their line ministries, headquartered in the capital city.

It was found that the city's service delivery is greatly constrained by infrastructure bottlenecks such as age-old water supply line, inadequate and very dated gas pipelines, vulnerable electricity transmission system and inadequate resources for waste management. The local agencies are not empowered to take major decisions involving investment in infrastructure. However, despite sending numerous proposals to develop the city's service delivery infrastructure, the concerned authorities in Dhaka have either responded inadequately or ignored those proposals.

Given the lack of a fully devolved governance system, the city is also unable to channel its own resources (by introducing new tax or adjusting utility prices in line with cost-recovery pricing model) to finance its utility projects or priority projects identified by the Master Plan. In addition, it does not get the required funds from the centre and the availability of funds is subject to higher volatility. There is no defined policy exercised by the centre on allocation of funds to the major planning and governance agencies of the city. The available funds are often not being spent for the city's pressing needs such as

sewerage system or drainage Master Plan, owing to patronage politics. The centre's lack of defined policies to finance cities as well as CCC's capacity constraints to mobilise funds from its existing sources has made the city fiscally weak, resulting in chronic underinvestment in the city.

Chittagong lags behind Indian and other regional cities, as well as Dhaka in terms of per capita capital expenditure. Needless to say, development of Chittagong beyond the purview of its commercial capital status is vital if decentralisation (from Dhaka and hence of Bangladesh) is to be taken seriously. In this sense, considerable investment and planning need to go into how infrastructure, institutions, and opportunities are availed in the city. The report has demonstrated that Chittagong's physical infrastructure and service provisions are ill-equipped to foster agglomeration, ultimately affecting its liveability adversely. This is partly, if not largely, an outcome of the urban primacy of Dhaka that is difficult to break, if the experiences of other developing countries are any guide, as discussed in the Introductory chapter and Political Economy of Urban Governance chapter of this report.

To solve the problem of limited devolution of power to cities, which is linked with accountability problem and coordination failure of key agencies, *inter alia*, the city needs a unified urban governance model with greater devolution. The chapter, Political Economy of Urban Governance provided a set of recommendations pertaining to the city's administrative and financial devolution by making the CCC a single point authority ensuring ultimate accountability to the city dwellers.

Lastly, the literature on urbanisation in relation to developing countries and experience of other cities show that cities have to be innovative and learn from success stories of developing and developed countries by initiating financial and other reforms to become financially independent. This could help cities to reduce their dependency from the centre. The empowered local authorities could help rationalisation of utility prices and mobilisation of revenue to meet the city's short-term and long-term needs.

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Annex

Table A4.1: Completed projects of CWASA

Sl.	Project name	Project description	Other information
1	First Water Supply Project	13 Deep tube well 45 Mld capacity Iron Removal plant at Kalurghat.	Source of Fund: The World Bank. Completion Year: 1977
2	Second Water Supply Project	Mohara Water Treatment Plant (90 Mld Capacity) - Surface Water Treatment Plant. Capacity of Kalurghat IRP became 67 Mld.	Source of Fund: The World Bank. Completion Year: 1987
3	Generator & Express Power Line Project	Express power line has been established in 57 Deep tube well pump stations Diesel generator has been procured in 20 deep tube well pump stations	Project Cost: BDT 167.581 Million Source of Fund: GOB & CWASA Completion Year: 2011
4	Mohara & Kalurghat Water Treatment Plant Rehabilitation Project	All the Mechanical and Electrical equipment of Mohara and Kalurghat WTP has been updated DCS control system has been introduced in Mohara WTP and Kalurghat WTP An underground service reservoir and pump house has been constructed in Kalurghat Iron Removal Plant.	Project Cost: US\$ 12 Million Source of Fund: Japan Debt Cancellation Fund Completion Year: 2011
5	Project for Non-Revenue Water Reduction Initiative (PANI)	Reduction of non-revenue water in some pilot project areas. Establishment of GIS mapping system in the 5 pilot areas.	Source of Fund: JICA Grant, GOB and CWASA
6	Third Interim Project	6 km water distribution and circulation pipe line has been established. 18 deep tube wells have been established.	
7	Emergency Water Supply Project	30 deep tube wells have been established. 19 km water distribution and circulation pipe line has been established.	

Source: CWASA Website < <http://ctg-wasa.org.bd/>>

Table A4.2: Ongoing projects of CWASA

Sl.	Project name	Project description	Other information
1	Karnaphuli Water Supply Project (1st Phase)	<ul style="list-style-type: none"> • Treatment Plant- 143 Mld Capacity and Pumping Head of 81 m • Transmission from WTP to Nasirabad reservoir of 24.0 km of 1200mm DIP • Transmission pipeline Nasirabad to Batali hill =6.0 km (1200mm to 1000mm) • Distribution pipeline= 44.0 km (200mm dia to 600 mm dia) • Nasirabad Reservoir (26000m³) , Batali Hill Reservoir (8500 m³), Improvement of Khulshi Booster pump station. 	<ul style="list-style-type: none"> • Project Cost: US\$ 202 million • Source of Fund: JICA ODA Loan • 60 percent work completed up to October,2013. Fully completed on August,2014.
2	Chittagong Water Supply Improvement and Sanitation Project(CWSISP)	<ul style="list-style-type: none"> • 90 Mld Water Treatment Plant at Modunaghat • Modunaghat WTP to Nasirabad Reservoir (45 MLD 900 dia, 12 Km.) • Modunaghat WTP to Kalurghat Booster Station (45 MLD 900 dia, 9 Km.) • Kalurghat Booster Station to Patenga Booster Station (25 MLD, 750 dia, 13 Km.) • Construction & Replacement works of Patenga in-line Booster Station • Drainage Master plan • Pilot Septic sludge system • Institutional & operational development and project management support 	<ul style="list-style-type: none"> • Project Cost: US\$ 170.0 million • Source of Fund: World Bank. • Will be completed on December,2015.
3	Karnaphuli Water Supply Project (2nd Phase)	<ul style="list-style-type: none"> • Rangunia WTP (14 crore litre) • 505 km Pipeline 	<ul style="list-style-type: none"> • Will be completed on January, 2022.

Source: CWASA Website < <http://ctg-wasa.org.bd/>>**Table A4.3: Distribution summary of electricity**

Particulars	South zone (Chittagong)
Total no. of sub-stations	19
33/11 KV sub-station capacity (MVA)	1206/1436
Distribution lines (K.m)	8028
Total no. of consumers	670012
Distribution system loss (percent)	9.2

Source: Internal document, BPDB 2014

Table A4.4: Peak and off-peak daily average load demand

	Load demand during off-peak	Load demand during peak
Industrial load	191 MW	607 MW
Domestic load	491 MW	174 MW
Total load	682 MW	781 MW

Source: Internal document, BPDB 2014

Table A4.5: Sector-wise gas pricing with existing tariff structure

Consumer category	Existing price (BDT/MCF ¹)	Rescheduled price (BDT/MCF)
Power	73.91	79.82
Fertiliser	63.41	72.92
Captive power, SPP	105.59	118.26
Industry	148.13	165.91
Tea garden	148.13	165.91
Commercial	233.12	268.09
Domestic with meter	130	148.25
Domestic with one burner (per month)	350	400
Domestic with two burner (per month)	400	450
LPG Cylinder (per 12.5 Kg)	850	700

Source: Bangladesh Energy Regulatory Commission (BERC)

website <http://www.berc.org.bd/images/stories/pdf/natural_gas_tariff_w.e.f_01_August_2009.pdf>

Table A4.6: Condition of existing dumping yards in Chittagong City

Site Name	Specific Location	Buffer zone separator	Soil Cover	Protection against rain	Leachate treatment plant	Gas monitoring system	Accessibility	Physical Condition	Environmental Acceptability
Arefin Nagar	Asian Women University is located within 100m	No	No	No	No	No	Not Good	Poor, leachate is flowing and has chance of mixing with surface water	Odour, pollution and noise are found, no incineration. No social acceptance
Halishahar	RCC protect wall along the sea shore within 10 metre	No	No	No	No	No	Good	Mixing of medical waste, cattle grazing is common, vehicle moves across the landfill	Odour, pollution and noise are found. Waste is incinerated. Not socially accepted

Source: BMDf 2012

1. MCF means million cubic feet for gas supply.

Table A4.7: Characteristics of potential landfill sites for waste management

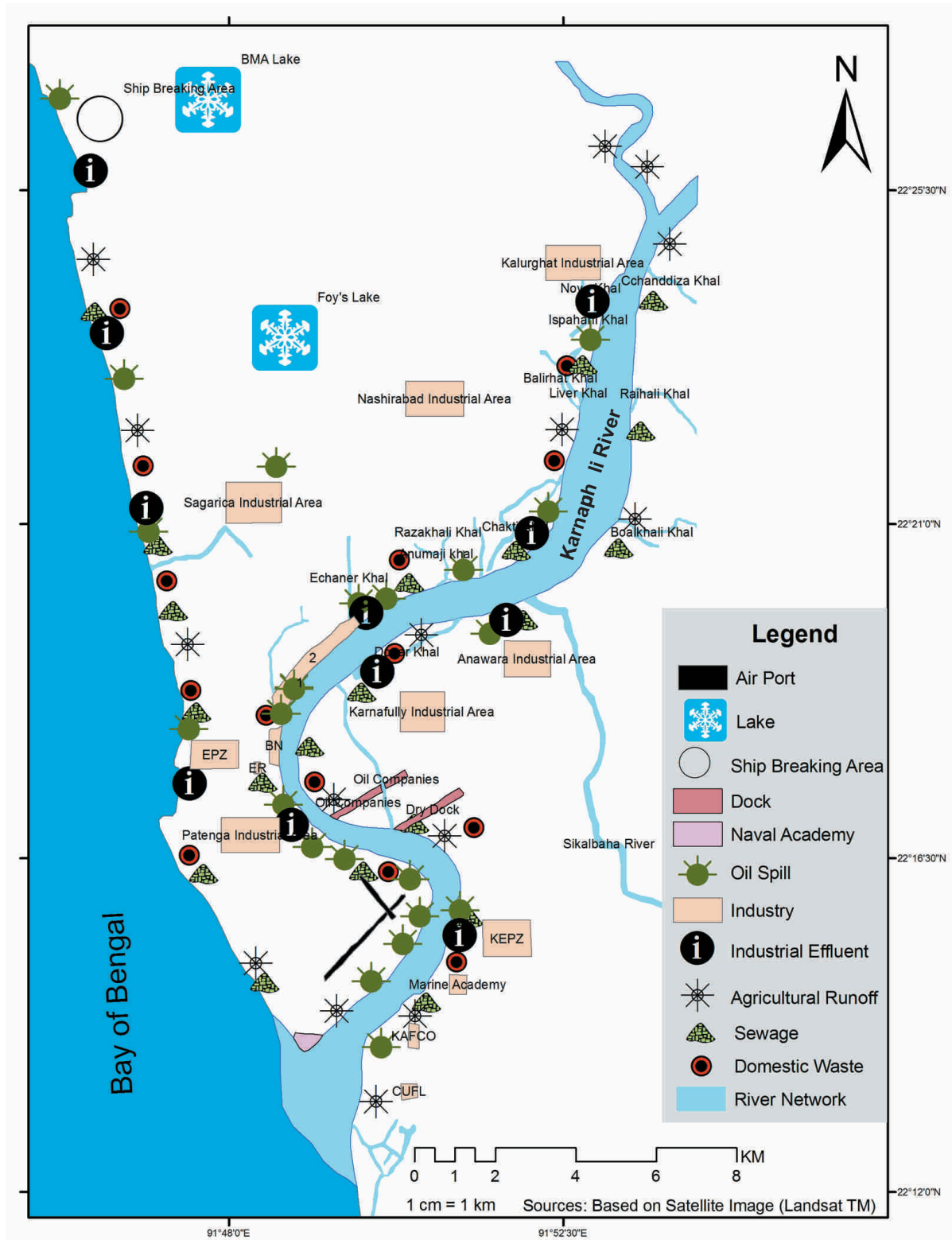
Location	Specific Location	Elevation	Soil suitability based on bore log analysis	Land price (per katha)	Land size	Accessibility	Remarks
South of the city at South Haliashahar, Ward 39	Near CEPZ - Approx 11 km from BRAC Primary School	Low land 2.5m above mean sea level	Moderate	8 lakh	About 80 acres	Good	Satisfies most of the controlling criteria. Near char land (Shoal)
West of the city at North Middle Haliashahar, Ward 37 + North Haliashahar, Ward 26 + South Kattali, Ward 11 + North Kattali, Ward 10	Approx 1 km from Chittagong Polytechnic for Girls	Low land 2.5m above mean sea level	Moderate	5 lakh	About 160 acres	Good	Satisfies most of the controlling criteria. Several types of water bodies are found
East of the city at Mohra, Ward 5	Approx 1.5 km from the east of Hamidpur Primary School	Low land 2.5m above mean sea level	Very High	8 lakh	About 50 acres	Good	Satisfies most of the controlling criteria. Safe distance away from the river
North of the city at North Pahartali, Ward 9	Approx 500m from west of Darul Quran Madrasa	Moderately high land 7m above mean sea level	Moderate	15 lakh	About 110 acres	Good	Satisfies all controlling criteria. Situated in hilly region. Slums exist

Source: Ashraf *et al.* forthcoming**Table A4.8: The state of service delivery, compared to 2 years back**

	Better than before	Same as before	Worse than before
Water	Non-slum	33	5510
	Slum	25	6212
Sanitation	Non-slum	35	593
	Slum	12	7214
Electricity	Non-slum	19	4434
	Slum	14	4737
Gas	Non-slum	36	5012
	Slum	32	5511
Garbage	Non-slum	16	4735
	Slum	9	4840

Source: BIGD Survey 2014

Map 6.1: Shore-based pollution sources of the Karnaphuli River and the Bay of Bengal



Source: SUB forthcoming

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The research on the city of Chittagong for the series the State of Cities conducted by the BRAC Institute of Governance and Development (BIGD) was an honest endeavour to investigate into different dimensions of crucial problems jeopardising urban development of the principal port city and the second largest metropolis of Bangladesh. The research dealt with urban service delivery, housing and transport provisions, environmental pollution and the political economy of urban governance. The findings were quite revealing. The researchers boldly unearthed the real malaise afflicting the city, and some of those issues are quite sensitive. The political relationship of city mayors with the central government, the increasing trend of centralisation of decision-making, unbelievably poor financial grants from the ministry in most years, almost total neglect of the city's master plan, lack of co-ordination among agencies related to urban governance and development, unplanned wastage of resources on drainage, lack of a storm-sewerage system, encroachment of canals, pollution of the Karnaphuli River, unplanned development of flyovers and foot-over bridges, tension between the Chittagong City Corporation and the Chittagong Development Authority—all these issues were highlighted in the report. The write-up is quite objective, bold and frank. There is a chapter of recommendations on 'the way forward'. If the stakeholders read the report attentively and try sincerely to follow up with prompt implementation of the suggested solutions, they will be able to use it for future guidelines in their efforts to expedite the economic and social development of Chittagong City.

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