IMPACT OF PRIVATE LAND DEVELOPMENT ON THE ENVIRONMENT OF THE EASTERN FRINGE AREA OF DHAKA

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Abstract

This study is an investigation into the effects of conversion of wetlands and seasonal agricultural lands to urban residential uses and its effects on the environmental condition of the local area and also the city. This study particularly focuses on the Eastern Fringe Areas (EFAs) where drastic land use changes are taking place due to urban land development activities and which is assumed to have undesirable effects on the physical, social, economic conditions and natural environmental resources.

Being located in a delta, most parts of Bangladesh, including Dhaka, experience regular inundation. The triple characteristics of Dhaka, as the capital city, mega-city and prime-city, attract people from around the country, and thus increase the demand for housing and other related services. Due to scarcity of flood-free high lands, the wetlands and low-lying areas are continuously being filled above flood level and used for all sorts of urban activities. Lethargy and/or reluctance on the part of public sector to manage the demands, and needs of the citizens triggered opportunities for the Private Land Development Companies (PLDCs) to grab the prospect of reaping unlimited profit from land development activities.

A close scrutiny of the development process of the city reveals that most of the peripheral areas of Dhaka have developed in an unplanned manner. Despite having the Dhaka (Dacca) City Master Plan, 1959 and Dhaka Metropolitan Development Plan 1995-2015 and other short-term plans, very few parts of Dhaka have been developed in a planned manner. It is alleged that both the public and private agencies have misused and manipulated plans and regulations to levels producing an unplanned and highly polluted city by filling up wetlands and low-lying areas. Under this research, the study area and its surroundings have been covered which are important in respect of urban expansion, drainage and environment. Primarily, these low-lying areas serve the purpose of important drainage and flood control and water retention areas. An urbanization planning is, therefore, needed in order to avoid any serious drainage problems and subsequent environmental hazard. During the dry season, storm waters and illegally discharged domestic and industrial wastewater drain through these lands into the Balu River by gravity. It is also seen that the effectiveness of drainage networks is gradually being reduced, which is ultimately creating water logging in the city.

Meanwhile, some canals have already been filled up and occupied by the private real estate companies. Moreover, the Local Government continues to construct roads under 'Food for Work Programme' creating a lot of blocks on water flow to the canals and channels. The creation of blocks is made in the EFAs by landfill activities and the run-off storm water flow is often obstructed.

The construction of the western embankment triggered development frenzy around its surrounding areas and most of western part of Dhaka have been gradually developed. The adoption of plans for poldering the eastern part and a bypass road for Dhaka has set yet another development rush, and large and powerful developers have converted huge chunks of land to build residential areas and townships in the eastern fringe. It is apprehended that such development in the long run is not only contradictory to the recommendations made in the Flood Action Plan 1992 eastern fringe for Dhaka; the massive land-filling is going to aggravate the flood situation of the locality and the city. This study intends to explore how seasonal agricultural land and wetlands are being converted into urban residential uses, the reasons for such conversions and the impacts of this alteration on the local environment and that of the city.

The changing land use of the eastern fringe areas has been continuing from open low-lying area to urban use due to development activities, particularly housing estates. The areas are getting more populated by residential and other settlements. It is clearly indicated that the agriculture lands are being reduced and settlement areas are increasing.

However, the major problems identified in the study areas are: (i) rapidly changing land uses in the EFAs (ii) water flow obstruction (iii) damage of natural resources like wetlands, water reservoirs and different species (flora and fauna) (iv) overlaps and conflicts in terms of legal aspects in development process among different agencies (v) loopholes of existing acts/laws; and (vi) weaknesses of different institutions in handling the development of the fringe areas.

Comprehensive Planning Guidelines are essential for comprising appropriate physical planning (land use), drainage and flood control measures, and environment. It is assumed that the EFAs will develop as new urban area. The proposed Embankment

along the Balu River of the eastern periphery of Dhaka city will be constructed with adequate pumping capacity, major canals and road infrastructure as proposed in FAP 8A 1992, JICA.

To implement such plan, the public and private sectors may use the partnership technique to fulfill the objective. The public sector will play the role of facilitator in land acquisition, plan preparation and implementation guidelines, etc and will also hold the power to land distribution and regulatory control. On the other hand, the private sector may engage in developing the areas with their fund or collect fund from elsewhere. The private sector will get some parcel of the lands to implement their housing project according to the guidelines of plan.

Analyzing the relevant acts/laws/policies, this research has identified the loopholes and has put recommendations for revision of the existing acts/laws and new edicts to address these loopholes. The revision is essential particularly for the Town Improvement Act 1953 (amended 1987), the Building Construction Act 1952 (amended 1987), and the Dhaka City Corporation Ordinance, 1983 (modified 1992) 1987 and Pourashava Ordinance 1977.

To meet environmental objectives, the mitigation plan is essential along with the proposal of new urban development. Such measures are needed for protecting natural canals, preserving wetlands and open water bodies etc.

This research also looks into urban management issue of the public agencies and identified the problems (like overlaps and conflicts in activities) and the appropriate proposals are addressed through strengthening capacity building of the agencies/organizations; and also make suggestions for integration among the agencies.

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Acronyms and Abbreviations

ADB	-	Asian Development Bank
AMEU	-	The Appraisal Monitoring and Evaluation Unit
BBS	-	Bangladesh Bureau of Statistics
BCAS	-	Bangladesh Center for Advance Studies
BNHA	-	Bangladesh National Housing Authority
BOD	-	Biological Oxygen Demand
BUET	-	Bangladesh University of Engineering and Technology
BWDB	-	Bangladesh Water Development Board
CBD	-	Central Business District
CBO	-	Community Based Organization
CDA	-	Chittagong Development Authority
CMA	-	Calcutta Metropolitan Area
CNG	-	Compressed Natural Gas
CO	-	Carbon Oxide
CO_2	-	Carbon Dioxide
COD	-	Chemical Oxygen Demand
CS	-	Cadastral Survey
CUS	-	Centre for Urban Studies
DAP	-	Detailed Area Plan
DC	-	Deputy Commissioner
DCC	-	Dhaka City Corporation
DGE	-	Department of Geology and Environment
DIT	-	Dhaka Improvement Trust
DITS	-	Dhaka Integrated Transport Study
DMA	-	Dhaka Metropolitan Area
DMAIUDP	-	Dhaka Metropolitan Area Integrated Urban Development Project
DMDP	-	Dhaka Metropolitan Development Plan
DND	-	Dhaka Narayangonj Demra
DOE	-	Department of Environment
DO	-	Dissolved Oxygen
DWASA	-	Dhaka Water and Sewerage Authority
EFAs	-	Eastern Fringe Areas

EHC	-	Eastern Housing Company
EWPDCL	-	East-West Property Development Company Limited
FAP	-	Flood Action Plan
GDTPCB	-	Greater Dhaka Transport Planning & Coordination Board
GIS	-	Geographic Information System
GLD	-	Guided Land Development
GOB	-	Government of Bangladesh
GTS	-	Geodetic Transverse Survey
HBFC	-	House Building Finance Corporation
HPLC	-	Hirajheel Property Limited Company
HSD	-	Housing and Settlement Directorate
HYV	-	High Yield Varieties
IEE	-	Initial Environmental Examination
IIFC	-	Infrastructure Investment Facilitation Centre
IWFM	-	Institute of Water and Flood Management
IWM	-	Institute of Water Modelling
JICA	-	Japan International Co-operation Agency
KMDA	-	Kolkata Metropolitan Development Authority
KUDP	-	Kolkata Urban Development Project
LG	-	Local Government
LGD	-	Local Government Division
LGED	-	Local Government Engineering Department
MDP	-	Municipal Development Programme
MHPW	-	Ministry of Housing and Public Works
MIS	-	Management Information System
MLGRD&C	-	Ministry of Local Govt. Rural Development & Cooperatives
MMA	-	Madras Metropolotan Area
MMC	-	Metro Manila Commission
MMDA	-	Madras Metropolitan Development Authority
MoL	-	Ministry of Land
MP	-	Malaysian Plan
MWSS	-	Metropolitan Water and Sewerage System
NDP	-	National Development Plan
NGO	-	Non-Government Organization.

NOx	-	Nitrogen Oxide
PLDCs	-	Private Land Development Companies
PLDHR	-	Private Land Development Housing Rules
PWD	-	Public Works Division
RAJUK	-	Rajdhani Unnayan Kartripakkha
REHAB	-	Real Estate Housing Association of Bangladesh
RHD	-	Road and Highway Department
ROW	-	Right-of-Way
RTPI	-	Royal Town Planning Institute
SMA	-	Statistical Metropolitan Area
SOx	-	Sulphur Oxide
SPZs	-	Spatial Planning Zones
SWMC	-	Surface Water Modelling Centre
TI Act	-	Town Improvement Act 1953 (Amended 1987)
TPDD	-	Total Planning and Development Doctrine
UAP	-	Urban Area Plan
UDD	-	Urban Development Directorate
UK	-	United Kingdom
UNCHS	-	United Nations Conference for Human Settlement
UNDP	-	United Nations Development Programme
WASA	-	Water and Sewerage Authority
WB	-	The World Bank

CHAPTER 1: INTRODUCTION

1.1 Introduction:

This study is an investigation of the effects of conversion of wetlands and agricultural lands to urban (residential) uses. and its effects on the environmental conditions of the Eastern Fringe Areas (EFAs) of Dhaka city where drastic land use changes are taking place due to urban land development activities (1). It is assumed to have undesirable effects on the local environment in terms of air and water quality, water flow, drainage and flood condition, flora and fauna, and their habitats.

Land is a basic requirement for development and which is needed to accommodate all kinds of human activities, and it is becoming scarce as population is booming at a rapid rate. Urbanization in Bangladesh, particularly in Dhaka city has been characterized by high rate of population growth. Dhaka's population was 1.06 million within the 572 sqkm jurisdiction of Dacca City Master Plan, 1959: whereas this population stands at about 12 million, in 2004 accommodated in the area of the DMDP 1528 sqkm. The growth rate between 1961 and 1974 was 6 percent per annum (DMAIUDP 1980). The government agencies have been able to provide only a few planned residential areas with major part of the city developing in an unplanned way.

The government agencies provide only 7 percent of the total housing facilities for city dwellers, whereas private sector entertains the bulk of 93 percent. Very recently, private real estate developers have been constructing multi-storied residences to meet a part of housing needs. Such multi-storied residential construction is quite profitable both for landowners and property developers. Some developers have acquired lands in the eastern fringe of Dhaka and are developing residential estate small townships. Most of these townships have provisions for residential plots. schools and various community facilities. The wetlands and seasonal agricultural lands are being rapidly converted for urban residential uses. It is apprehended that such conversion is having adverse impacts on the enviroumental condition on the EFAs as well as Dhaka city.

Notes: 'Notes and References' shown in the text, indicating the numeric number e.g. (1). (2). (3 are referred at the end of each chapter.

1.2 Background of the Study:

When one attempts to visualise the physical transformation of Dhaka from a sleepy, trading town to a burgeoning capital city– one cannot help but get awed by the tremendous growth of the city. In 1875, Dhaka, a very small town located on the bank of the Buriganga River and at present it has developed into a primate city of 1528 sqkm. In the development process, the once lush green city with an intricate network of rivers, canals and lakes have been filled up by the unauthorized encroachment; and destroying in its wake the thriving green and abundant open spaces within a matter of three decades. The question is does development have to be associated with such destruction? Then one might argue about the limited supply of flood free land because one-third of the physical space of Bangladesh is comprised of water, and huge areas of the country's land are submerged during the monsoon. Bangladesh also possesses the world's largest delta system and the greatest flow of water to the sea of any country on earth. The delta makes it one of the most fertile lands on earth. Water is the main source of fish protein, major provider of silt for crop production and transport, and undoubtedly, the greatest source of wealth of Bangladesh.

The country's means of support is also one of its major problems. The Himalayas are considered as the storehouse of 25 percent of global sweet water; Bangladesh being the major gateway to the Bay of Bengal and Indian Ocean carries this water through different rivers. Perhaps, nowhere else so much water and silt flow into such a small land area in such a short time as in Bangladesh during the monsoon season. The river networks comprising the Ganges, Brahmaputra and Meghna and their tributaries and distributaries, carry about 2.5 billion tons of silt and 1.3 trillions cu metres of water per year. While much of the water and snowfall that fall on the Himalayas finds it way into Bangladesh, the region makes up only eight percent of the total 15, 59,400 sqkm of the Ganges-Brahmaputra basin within its territory. Fed by the Himalayan snowmelt and copious rainfall (ranging from 200mm to 2500 mm), the great rivers of Bangladesh race southward and consequently inundate at least one-fifth land area of the country during each monsoon (Hafiz, 1998).

The people of this region have managed to live with the floods for ages. Floods posed major threats to the people as an extensive and intricate networks of rivers, crisscross

the whole country. These networks of rivers carry away excess water that occurs as a result of heavy monsoon rainfall and/or overflow of rivers. The government constructed small-scale flood protection structures, compatible with the environment, where they were required. Rivers and their channels were scrupulously maintained and kept navigable. This kept flood damages to a minimum and also made year round water transportation possible. River transportations provided the cheapest and efficient means of communication to all parts of the country. This communication network was, however, dismantled during the British colonial rule and was never reconstructed. Rivers, ponds, canals, etc. provided drinking water till the early 1900s, when Dhaka did not have a citywide water supply network. Rivers, ponds, canals were supplementary sources of water until recently. Mass scale destruction of such water sources as well as pollution of other natural resources of the city began during the 1980s.

Bangladesh has been experiencing a population boom since the 1970s. At the time of independence in 1971 the population was 71.50 million, whereas it is more than 130 million in 2004. Dhaka is also experiencing huge population growth; the city's population was 1.06 million in 1959, which has increased to about 12 million in 2004. Since 1991 the population has been forecast at Table 1.1.

Table 1.1: Population Forecast, 1991-2016 of DMDP Areas

(Population in Thousand)

Forecast Component	SPZ's	1991	1996	2001	2006	2011	2016
Total by Natural Increase of 1981 Population	1-7	3044	3272	3438	3675	3822	3917
	8-14	1584	1742	1899	2022	2124	2197
	15-18	890	993	1088	1188	1275	1365
	19	450	493	535	580	632	685
Net Migration in Previous Period.	1-7	800	552	499	456	449	410
	8-14	460	501	488	433	433	456
	15-18	115	89	89	85	76	67
	19	3	2	3	3	4	4
Cumulative Migration Totals Plus Natural. Increase.	1-7	-	860	1764	2176	2737	3172
	8-14	-	501	1077	1659	2208	2747
	15-18	-	124	231	336	438	534
	19	-	3	5	8	11	16
Total Population	1-7	3844	4684	5747	6308	7008	7498
	8-14	2044	2744	3464	4114	4764	5400
	15-18	1005	1206	1408	1609	1789	1966
	19	453	498	543	588	647	705
Total Population	1-19	7334	9132	11162	12619	14208	15569

Source: Dhaka Metropolitan Development Plan (DMDP) 1995-2015.

A sharp increase in population coupled with river siltation led Bangladesh to suffer some of the worst floods on record in 1987, 1988 and then again in 1998 and most recently in 2004. Vast areas of the country, including Dhaka, were inundated to an unprecedented level with floodwaters rising to 1.5 meter higher than normal for periods up to four weeks. In Dhaka alone, more than 70 percent of the city area was submerged. These floods directly affected over 2.5 million people and water depths ranged between 0.3 meter and over 4.5 metres during the deluges. Life in Dhaka was totally disrupted during the floods and damage due to flood exceeded Tk. 700 million in 1988. Recently, almost the areas of Dhaka city were submerged twice (in August and September 2004). Reviewing the serious inundating situation and people's misery due to severe flooding, the government was forced to declare it a public holiday on September 14, 2004.

Most parts of Bangladesh, including Dhaka, experience annual flooding as the country is located in a delta. Initially, Dhaka's development took place on available flood-free lands. Before the 1970s, Dhaka was the provincial capital and it had a little impetus for growth. However, after the emergence of Bangladesh in 1971 as a sovereign state and the ascendance of Dhaka to that of a capital city—a rapid increase in population was evident and the city limit extended fast. The triple characteristics of Dhaka as capital city, mega-city and prime-city, attract people from all over the country and, as a result, amplified the demand for housing and other related services. The flood-prone areas were filled up and used for development activities due to scarcity of serviced land.

However, the rapid population growth of Dhaka has led to rapid expansion of the city both horizontally and vertically. In this process private sector played the dominant role while public sector limited itself to infrastructure development and service provision. Lethargy and/or reluctance on part of public sector to cope with the demands and needs of the populace have provided opportunities for the private real estate developers or Private Land Development Companies (PLDCs) to grab the opportunity for reaping unlimited profit (2).

A close scrutiny of the city development reveals that most parts of Dhaka have developed in an unplanned manner. Despite Dhaka City Master Plan, 1959 and Dhaka Metropolitan Development Plan 1995-2015 (DMDP), and recommendations of mid-term studies very few parts of Dhaka have been developed in a planned manner. The question is why is it so? It is assumed that a mismatch between plans and implementation measures and various other related problems, including that stated in

this thesis have caused urban sprawl and other undesirable outcomes. It is assumed that both the public and private agencies have misused and manipulated plans and regulations to levels producing a much unplanned and highly polluted city by filling up wetlands indiscriminately and without taking into account the consequences of such actions on the environmental condition of the city.

In such a rash process, most of the wetlands existing within the city have disappeared affecting city environment in terms of frequent occurrence of disastrous floods, high level of pollution and uncomfortable thermal level and experiences of microclimates within the city. Floods of 1987, 1988 and 1998 magnitudes required an extensive flood protection embankment to be set up around the western periphery of the city (FAP 8B, 1991)[1] (3). Now plans are on the cards to construct another flood protection embankment around the eastern edge of the city. Construction of the western embankment accelerated development frenzy and most of western parts of Dhaka have been gradually developed. The adoption of plans for poldering the eastern part and a by-pass road for the capital city has set yet another development frenzy and PLDCs have bought chunks of land in the eastern fringe for developing residential areas and acquired high profit from such development. As government agencies, such as Rajdhani Unnayan Kartripakkha (RAJUK) has to keep pace with the growth of Dhaka, they geared their efforts to the development of the city in a planned manner. Thus, most of the urban areas, specifically residential areas within the city, have grown according to private initiatives without any coordination or much legitimate control. Land development schemes for residential purposes, undertaken by the RAJUK, were mainly targeted towards high income group of the society and this income group later converted their low-rise, low-density residential areas to high density, high-rise residential, commercial or residential-cum-commercial utilization for more profit. Due to lack of foresightedness and lack of appropriate perspective plans urban centres in Bangladesh have grown without any legitimate control. Plans were made in isolation to deal with specific and immediate problems without any coordination of the agencies involved in development.

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[1] Dhaka Integrated Flood Protection Project which has the objective of identifying drainage, flood protection and complementary environmental improvement projects and preparing feasibility studies for the immediate investment needs in the Greater Dhaka Area of 260 sqkm. This area mainly covers the western part of Dhaka.

Dhaka attracts the people due to the location of all-important institutional, administrative, educational, industrial and commercial and health services. The city expanded to a north-south direction in a vertical manner because of the physical constraints in east and west. There has been overall shortage of flood-free, developable land and land prices have increased at rates substantially above general inflation levels. Due to locational advantage and close proximity to the Central Business District (CBD) the expansion is going in the southeast direction at present. Private real estate developers have mainly spearheaded the latter expansion. Private developers have used agricultural and wetlands, by moderate to large scale land filling, for residential neighborhood or township development. The residential areas have well designed streets, space for locating community facilities etc. The planning and design of these residential areas have an impression of western suburbia and modernity; and cater to the affluent section of the society.

Although majority of Dhaka's residents belong to low-income category, efforts of housing development by private (formal) or public sectors are most often not directed towards them. Most of the planned residential areas are targeted towards the affluent group for a quick return of investments made for these residential developments. The urban poor majority has always been left out from the privileges of modest housing facility. For development of residential area in the eastern fringe area, local landowners and small farmers were forced to sell their land to private real estate developers. Landowners, unwilling to sell their land, were tactfully routed out of their land. These landowners or small farmers are not the beneficiaries of such residential development. Despite cautionary notes in the Flood Action Plan (FAP) for Dhaka, the real estate developers or PLDCs were filling low-lying lands in the eastern city periphery. In this regard, government agencies were helpless onlookers and their actions were mostly futile in restraining the PLDCs in taking up development programs that had adverse impacts on the local environment.

1.3 Statement of the Problems:

The proposed study area in the eastern fringe of Dhaka is defined as the zone in between eastern side of Progati Sarani and the Balu River. Presently most of the lands in the eastern fringe are low-lying and land liable to annual flooding.

The dominant land use of the eastern fringe is mainly agricultural and much of the land in the area covers waters bodies. Besides, canal network and squatter settlements with

low density exist in the area. According to the FAP 8A (JICA 1992), about 78 percent land is being used for agriculture purpose, particularly in the lean season, 12.5 percent for settlements and 10 percent for water bodies/wetlands (4). At present a large parcel of land is covered for residential use. The eastern fringe of the zone (SPZ-12)[2] is a developing area, which can potentially be steered in a planned manner. All developments in the area should be safeguarded through proper planning. The example has been prevailing for a long time, as a result unplanned and unsustainable growth takes place in the areas.

This study intends to investigate how agricultural lands and wetlands are being converted into urban residential uses, the reasons for such conversion and the impact of this conversion on local environment and that of the city. Construction of an embankment around the western perimeter of the city made the western part of Dhaka literally flood-free. Land prices soared as it was pondered and most lands in the western part hitherto considered unfit for development were developed and put to different urban uses, though mainly residential.

As plans are being taken to construct an embankment around the eastern perimeter and also to develop a bypass road for Dhaka, developers are eying on the eastern fringe. Flood proneness of the eastern fringe, which required moderate to extensive land filling– hitherto discouraged individual households to go for constructing settlements. Land use in the eastern fringe is mainly agricultural and wetlands with sparse settlements of local farmers and landowners. Profit-seeking real estate developers or the PLDCs have set a trend of developing small townships in the periphery of the city, the eastern fringe.

Wetlands that were primarily used for agriculture in the dry winter months are now being converted to urban uses. Big and powerful developers, such as the Eastern Housing Limited (EHL), East West Property Development (Pvt.) Limited (EWPDPL), Jamuna Builders (Pvt.) Limited (JBL), etc. have converted large chunks of land to build residential areas and townships in the eastern fringe. It is apprehended that such development in the long run is not only contradictory to the recommendations made in

[2] SPZ (Spatial Planning Zone), DMDP areas are subdivided into 26 zones and sub-zones. Eastern fringe is under SPZ-12 (DMDP, Vol-II, Urban Area Plan 1995-2005).

the FAP for Dhaka. the massive land filling is going to aggravate flood situation of the locality and also of the city. Decrease in physical space for water bodies and channels, obstruction of water flow. indiscriminate dumping of waste in these channels and surrounding rivers has already affected the water quality of these channels. The floods of 1987, 1988 and 1998 and 2004 have inundated Dhaka city as well as the project area. However, the return period of these floods are shown in Table 8.2. The magnitude and rate of occurrence of these floods show the grim result of massive destruction of wetlands in and around Dhaka (FAP 8A, JICA). The conversion of generally agricultural land into urban uses has also caused loss of prime agricultural land with attendant effect of decrease in agricultural production, loss of farm related jobs, loss of fish stocks and their habitat, destruction of water bodies. and not to forget, destruction of local natural landscape. Local residents are too poor and also powerless to resist the drastic change in their lives; moreover, they are not skilled enough to take up jobs in the urban sector.

The real estate developers or PLDCs have been developing land in the eastern fringe to build housing projects since the 1980s. The eastern fringe became highly potential for development because of relatively low land price and its close proximity to the city centre. PLDCs mean business and their sole aim is to make profit. The individual landowners were tricked into selling their land to the developers or were forced to sell their lands. Local farmers and landowners were mostly unable to accommodate with the intense competition posed by the new urban developments, they had no other way but to succumb to the PLDCs' power and grudgingly gave up their land to the developers. Some developers cunningly grabbed government-owned (*Khas*) land within the vicinity of their projects. In other cases, they bought the land surrounding that of a landowner, who was unwilling to sell his land, and thus cutting off access to his land, and forcing him to sell land at a price quoted by the developers. Allegation is high that the developers also used muscle power to compel local landowners to sell their land. This research assumes that well-equipped with money and manpower, PLDCs or real estate developers have emerged as the new power-group of this era. The question arises, from the observation of the activities of these developers - how these organisations acquire so much power so as to force landowners and local farmers out of their land and also encroach government-owned land right under the very nose of the government? Acting within the framework of planning and law, how do the developers acquire this power?

1.4 Research Questions:

Questions raised in the previous sections are reframed as research questions in the following manner:

i. How do the PLDCs acting within the framework of urban planning development programmes contribute to development, which results in adverse environmental impacts?

ii. How do the PLDCs acquire power so as to outwit and force local farmers and landowners out of their land and advance in their interests only?

iii. If the interest of the state is to look after the citizens' welfare, then how does the state become a party to the PLDCs exploitations?

iv. What is the nature of urban planning that helps the PLDCs to exploit the urban poor, in this case local farmers and landowners?

v. What are loopholes laws/acts in the existing urban planning system that allows the PLDCs to escape? Then, what is the nature of urban planning in Dhaka?

1.5 Objectives of the Study:

Keeping in mind the above research questions, the general and specific objectives of this study are:

i. To investigate the nature of the impacts of the PLDCs activities (whether adverse or beneficial):

- To investigate the present physical condition of the study area and compare it with its previous condition so that an idea is formed regarding conversion rate
- To obtain information regarding natural features that exist in the study area and make an account of the damages done
- To investigate the past land use of the study area with the present land use as will be evident from the survey
- To investigate the rate of land conversion from agricultural to urban residential uses

ii. To investigate the pattern of emergence of the PLDCs in the housing sector and analyse their role as providers of housing

- To obtain information on the historical background of emergence of the PLDCs
- To examine whether the emergence of the PLDCs was the result of inability of the public agencies to fulfill the demand and supply of housing and/or land for housing
- To investigate how the PLDCs fulfill the role of housing facility provider
- To enquire the success level of the PLDCs as housing provider

iii. To investigate the activities of the PLDCs in relation to housing development and process of their power acquisition:

- To investigate how the PLDCs acquire, buy and sell land for housing purposes
- To investigate the level of manpower, equipment, finance, logistic supports, etc. required to for this housing business
- To explore and enquire the level of power or influence they exert on individuals, groups, public officials, etc. to carry on their activities.

iv. To investigate the efficiency of public agencies regarding urban development and housing provision:

- To investigate the role of public agencies, specifically the RAJUK regarding urban development and housing provision
- To investigate the planning and execution process of the RAJUK regarding urban development and housing provision
- To investigate the success rate of the RAJUK regarding urban development and housing provision
- To investigate the manpower and logistics support that the RAJUK possess to carry out its entrusted responsibilities successfully
- To investigate the monitoring process and policing power of the RAJUK, and also to investigate whether it has the power to cancel or ban planning approval when they appear contradictory in the approved plan and that built on the ground

- To investigate the level of transparency and accountability of public agencies, specifically that of the RAJUK.

v. To study meticulously and critically to analyze the various plans taken up for the development and improvement of Dhaka and also the legal measures that enforces them:

- To investigate what planning and programmes were adopted to develop and improve Dhaka, and specifically for the EFAs of Dhaka
- To investigate the nature of these plans and their implementation and/or execution process
- To investigate the reviewing process of plans by the RAJUK and the regularity and success rate of the reviewing process
- To investigate the legal procedures to execute plans
- To investigate the validity of some plans and why they still exist
- To investigate what are the safeguarding devises or methods exist to seal gaps between plans and existing realities on the ground.

vi To analyse the power of the PLDCs and the impacts their activities have on the environmental condition of the EFAs and Dhaka:

- To investigate how local people and smaller PLDCs are dislocated by the bigger PLDCs
- To investigate the level of manpower involved in each specific project and the power they can exert on the locality
- To investigate the power-plays in the locality regarding land acquisition, buying and possession and development of specific sites

vii. To investigate the nature and level of environmental degradation that has set in as a result of the PLDCs' activities in the EFAs of Dhaka, in terms of:

- Rate of dislocation of people
- Change in demography and occupation of local people
- Ability of the local people to adapt to changes brought on by urban development process in the EFAs
- Jobs available in urban sector and the ability of local people to adapt to new jobs
- Vegetation
- Air and water quality
- Land conversion rate
- Loss of agricultural land and loss of production

- Physical space of water bodies and wetlands
- Loss in fish production
- Loss of agricultural related jobs
- Loss of flora and fauna and their habitat, etc.

1.6 Rationale of the Study:

The population of Dhaka has increased from 1.2 million in 1971 to about 12 million in 2004. The tremendous increase in population has consequently created a demand for housing and other related services. The efforts of the public agencies regarding housing fall far short of the demands and needs of the people. Private companies, such as the PLDCs among others, came forward to provide housing and/or serviced land for housing and make handsome profits in the bargain. The public agencies are alleged to be short of manpower and expertise, inept, corrupt, indifferent, and lethargic to increase housing stock through plan implementation. The consequences of these are manifested in the unplanned growth of the city and deterioration of the environmental conditions of the city. Dhaka is transforming into a city of low environmental quality, however, it varies between old and new city areas. The activities of the PLDCs accelerate deterioration of the city environment.

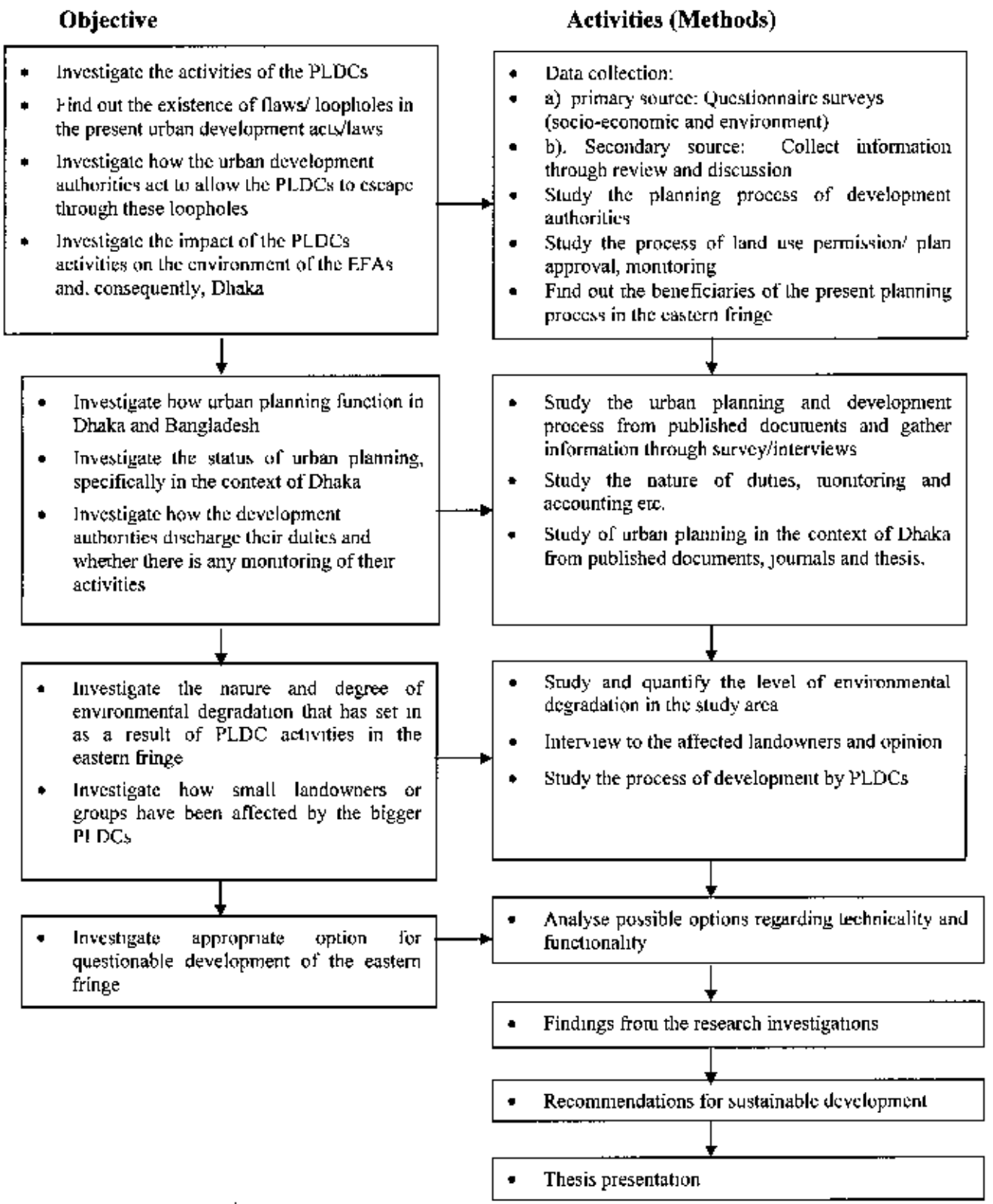
Urbanization and urban development do not necessarily mean that it should have negative impacts. A well-thought out plan to guide and direct growth can have immense beneficial effects on the residents. The aim of this study is to show whether PLDCs' activities did in reality contribute to adverse impacts on the environmental condition of the EFAs and the city. The aim of this study is also to show that urban development, housing development and /or land conversion can take place in a planned way by embodying efficiency and environmental sustainability. Efficiency in this case is related to the functional aspects of the EFAs, to be achieved through comprehensive and action planning of the area and through rigorous implementation of the plan and law. Environmental sustainability may be achieved through realistic planning and coordinated efforts on the part of public agencies implementing these plans.

1.7 Research Methodology:

This section presents the methods and techniques applied in the process of this research. It includes an explanation of data collection and techniques used during the entire course of this research. Methodology for this research has been shown in the Flow Chart

1.1. The left side of the chart shows the objectives of this research and right side shows the methods applied in collecting data/ information for the research.

Flow Chart 1.1: Outlines of Research Methodology



1.7.1 Type of research:

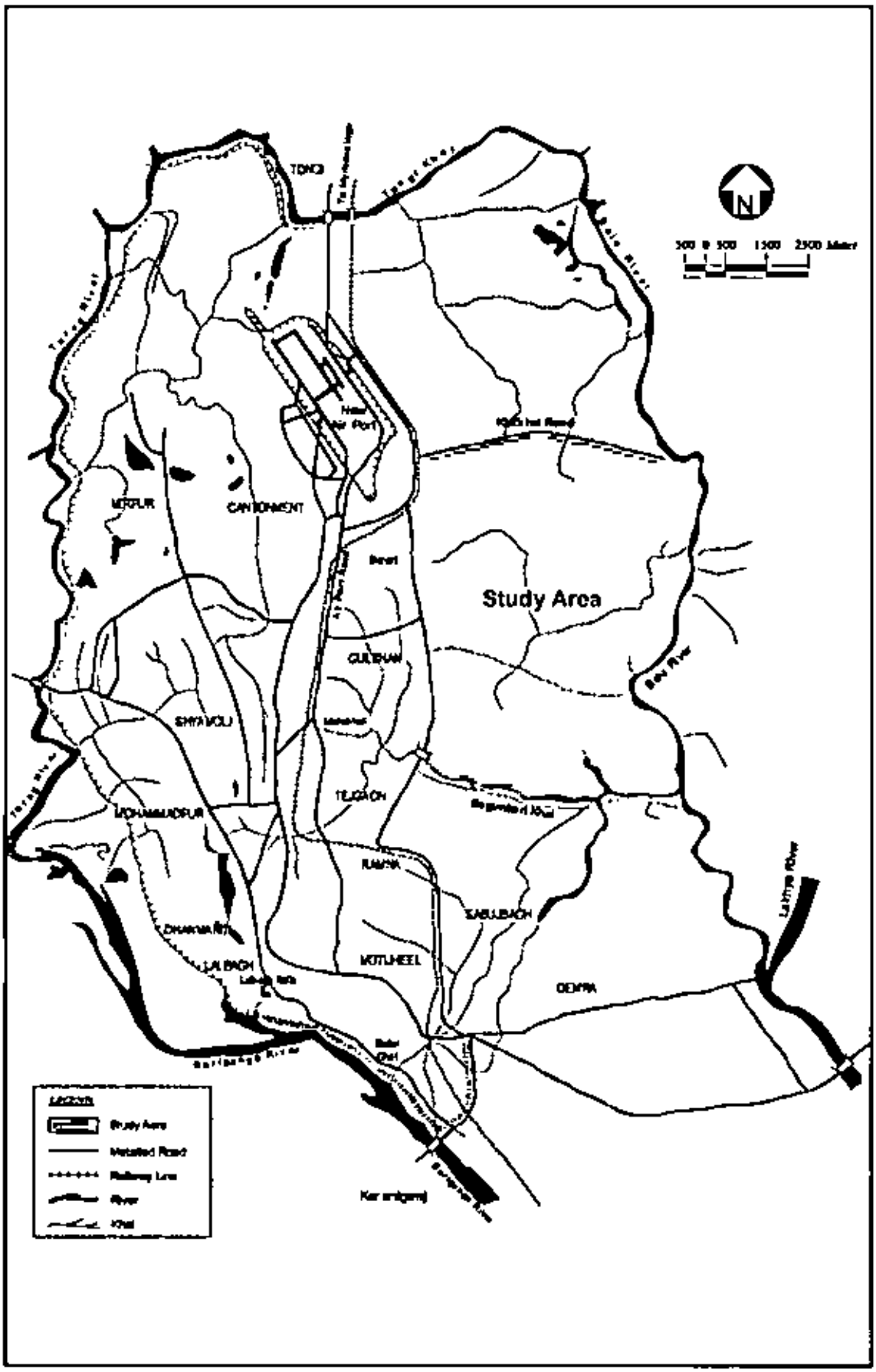
This research is an evaluative and exploratory one; it is evaluative in the sense, that the planning and land conversion process in the EFAs, its trend of development and the conversion process were studied. A research was conducted as to the planning process applied for the improvement or to contain the land use change. The role of the planning authority, the RAJUK, its past and present planning efforts to develop the EFAs and the city of Dhaka were analysed. The roles of other development agencies like Dhaka City Corporation (DCC), Dhaka Water and Sewerage Authority (DWASA), Bangladesh Water Development Board (BWDB), Department of Environment (DoE) and Ministry of Land (MoL) are also analysed.

This research is also explanatory in nature, as there has been no previous attempt to analyse and document the development trend of the EFAs. So the present research intends to explore the causes and factors responsible for the development of the EFAs and the conversion of the primarily agricultural and wetlands to urban residential use. The research also intends to assess the nature of impact on the environmental condition of the EFAs and also on the city.

1.7.2 The study area:

The proposed study area surrounds Progati Sarani on the west, Balu River on the east, Dakkhinkhan (Khilkhet Road) on the north and Begunbari Khal on the south, covering about 46.61 sqkm, Map 1.1. The area is about six to seven kilometres northeast of the Central Business District (CBD).

The EFAs in Dhaka has been selected for study as significant changes in land use has taken place due to intervention from the PLDCs and other actors (co-operative housing societies, housing association, landowners group and individual). After the construction of an embankment around the western perimeter of Dhaka, inside land which was previously considered unfit for development, became rapidly urbanized. Individuals, households, housing societies and cooperatives developed small parcels of land for housing purposes.



Map 1.1 Location Map of the Study Area (Eastern Fringe), Dhaka.
Source: FAP 8A, JICA-1992.

The adoption of plan for a bypass road along the Balu River and embankment for flood-proofing the eastern part of Dhaka set loose developers on a development spree and various developers started housing projects (sometimes outbidding one another). The EFAs due to its close proximity to the city and low land price became the prime target for development by the PLDCs. The release of the acquired area in the western part of EFAs (Badda, Bhattara) by the government of Bangladesh had also set land free for development. It is alleged that the PLDC's intervention have also significantly changed the land use pattern in the EFAs and adverse impacts have been wrought on the environment.

All these make the EFAs an interesting case for study. Therefore, an in-depth study will allow to discern the land conversion process in the EFAs; the effect of lethargic attitudes of the public agencies, affecting growth and development of the EFAs, and the PLDCs intervention having significant impacts on the EFAs.

1.7.3 Category and level of research:

1.7.3.1 Secondary data:

This included a literature survey to obtain information regarding fringe area development and development and management process of large cities, specifically metropolitan cities. A research was also conducted to specify the role of the PLDCs in land development and housing provision. Maps and reports were collected from the RAJUK, DCC, Land Records Office, BWDB, Office of the District Commissioner (DC), Dhaka and other public agencies, private offices and research centres.

1.7.3.2 Primary data:

As evident from the objectives stated in Section 1.5 this study is based on data drawn mostly from primary level of investigation. Under this research two types of survey were conducted in the study area: socio-economic and environmental surveys. The socio-economic survey was conducted at household level of each mouza; on the other hand, environmental survey was carried out at union level. The environmental survey included the topography, wetlands, natural flora and fauna, flood sensitivity natural

drainage of the area and other related information. The physical space and quality of water bodies, etc. and changes arising out of PLDCs' activities were noted. A socio-economic survey brought forth information regarding the demographic pattern, occupation and economic status of the local people, whether the PLDCs' activities affected the social and economic status of local residents, community facilities in the study area, etc. Initially a reconnaissance survey and personal observation allowed obtaining first hand information regarding the impacts of the PLDCs' activities and the on-going land conversion process.

Questionnaire Surveys:

Based on primary information of the study area and surroundings, two types (socio-economic and environment) of questionnaires were designed and tested in field, accordingly these were final questionnaires. Expert investigators filled –up the questionnaires through interviewing the local people.

a. Socio-economic survey: Within the study area, 400 socio-economic questionnaires were filled up through interview at household level of each mouza. The households were selected at random basis. They answered on their family size, education, land ownership, income and expenditure.

b. Environment survey: Within the study area, 69 environment questionnaires were filled up through interviews and discussion with local people and experts. The respondents were selected from each mouza. Relevant experts helped to form ideas and obtain information regarding land use, land value, land development, sanitation and environmental issues.

The flow Chart 1.1 helped to organize works for collecting data and preparing this thesis.

1.8 Organization of the Thesis:

The thesis has been organized so as to give the reader an idea about the problem under study and the way this research has been conducted. Thus, Chapter 1 features a statement of the problems and how it came about, the research questions to be tested, the objectives of the study, and a discussion of the research methods. This Chapter also outlines the arrangement of the various Chapters in this thesis and the information they illustrate. Chapter 2 features a literature review and discussion of theories to this thesis.

The theoretical concepts of town planning, land use planning, mega-city, land use conversion, government and financial institutions, etc. have been discussed so as to analyze and explain the situation prevailing at the eastern fringe of Dhaka. Chapter 3 gives an account of the development of Dhaka along with a discussion of the planning process that has been applied to guide the development of the city. This Chapter also analyses the development pattern of the city and the efforts of the city development authorities to accommodate the growing population of the city. The role of the development authorities and their sincerity in discharging their duties and responsibilities are also discussed in this regard. Chapter 4 focuses on the historical emergence of the PLDCs in the urban housing sector of Dhaka. It, in this context, traces the history of the emergence of the PLDCs, its initiative to adopt the role of developed land and housing provider and ultimately their emergence as power group in the urban scene of Dhaka. Chapter 5 contains the results of the physical and socio-economic surveys of the EFAs in Dhaka. The physical survey includes information regarding topography, existing and previous land use, wetlands and natural drainage, flood sensitivity and hydrology, climatic condition, etc. of the study area.

The socio-economic part surrounds information regarding the demographic pattern of the study area and also local residents' economic status and their occupation, their land ownership pattern, etc. Changes in the price of land were noted to draw a comparison between previous and present land price resulting from the PLDCs presence in that area. Chapter 6 basically focuses on information regarding different housing projects in the EFAs and Chapter 7 highlights the impact of land development activities and/or housing projects on the environmental condition of the local area as well as the city. Initial Environmental Examination (IEE) technique has been applied to assess the environmental impacts on the EFAs. This method allowed gauging the rate of land conversion and damage brought about by PLDCs' activities to the local area. Chapter 8 discusses management issues and the constraints. In this chapter the ongoing/future projects also discusses and identified its management problems. Chapter 9 discusses the previous studies recommendation and their merits and demerits. The final recommendations are stated in this chapter. The planning approach and management process that needs to be adopted with the intention of mitigating and improving the environmental condition of the local area as well as that of the city as a whole.

Notes and References

1. The Eastern Fringe Areas (EFAs) have been earmarked in between Progoti Sarani Road and the Balu River. The area covers SPZs 12 and part of 7 DMDP. These zones are low-lying and developing through land filling. The area is partly covered by the private housing projects. The geophysical condition of the area near Rampura (southern site) is not favourable for vertical expansion. Rampura Fault on Begunbari Jirani Khal makes the area vulnerable in case of earthquake. At the same time, the area is important for drainage and environmental purposes; for further reading RAJUK, MHPW UNCHS and UNCHS (1995). Urban Area Plan 1995-2005 vol. 11, DMDP, Dhaka, chapter 4 pp 56-58 & 68-70.

2. PLDCs (Private Land Development Companies) are registered under Cooperative Act, 1985. They purchase undeveloped-land at a low cost and developed such land and making plots through sub-division and sell out with a big profit. PLDCs are very much active in Dhaka with the private housing project. They offer serviced plots at attractive price with easy instalment. They give a colourful advertisement to the mass-media (Television Channels, Radio, and News Papers etc.) to attract prospective buyers; see GOB and ADP (1993) "Formulation of Land Development Controls and Procedures for Dhaka", Culpin Planning Consultant Ltd, ADB, chapter 4 pp 83-86.

3. Integrated Flood Protection Project FAP 8B, (1991) "Updating studies on storm water drainage system improvement project in Dhaka".

4. Japan International Cooperation Agency (JICA)' Flood Action Plan -8A, 1992, Dhaka.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK FOR THE RESEARCH

2.1 Introduction:

Why is there any need for theories? What should they seek to explain? Theories are interpretative and aim at giving in-depth explanation of contemporary events in an abstract level. Traditional studies in Bangladesh are based on heavy empiricism and add little to knowledge beyond what these statistics make apparent. There are very few theoretical studies in urban planning and urban development discipline. The intention of the theories is to fill a part of this void and demonstrate how theories can deconstruct and explain the complexities of Bangladeshi societies and its major problem regarding land development for housing, environmental degradation and subsequent dislocation of local people. This Chapter intends to provide ideal positions and compare them with realities on the ground, point out the flaws in existing system(s) and prepare grounds for necessary amendments to rectify them.

2.2 The Concept of Town Planning:

The very first theory this study deals with is the concept of town planning. This gives an opportunity to the reader to compare the theoretical or ideal context of town planning and what exists in reality in other countries and Bangladesh, (especially in Dhaka). The core concept of town planning is that it should be sustainable, integrative and inclusive with the single aim to improve the quality of people's life.

There are probably as many concepts of planning as there are planners, possibly more. Most would accept, however, that planning is concerned with taking an objective and rational view of future conditions, assessing what society desires its destiny to be forecasting the amount of change, estimating the degree of control required, and formulating a policy to take account of this destiny, change and control. Where any conscious attempt to undertake this task exists, two extreme forms can be distinguished; these are sometimes described as blue print planning and process planning.

This adopts a comprehensive approach towards planning, and is ideally portrayed in the system employed since 1947 in the United Kingdom. It has developed from the technical professions like architecture, surveying, and engineering, and has consequently produced solutions to urban problems that are predominantly physical in character, such as, land use maps, zoning density through the medium of a master plan. hence the description blueprint, and operates upon a rigorous established administrative structure. The overall desires of the community, otherwise known as the goals and objectives, are given, having been previously decided by the political representatives, and do not therefore form part of the procedure of planning. Although it attempts to influence or direct all the activities connected with the physical environment, and is founded upon the notion of public benefit and amenity, it is singularly ill-equipped to deal with the majority of social issues and at times incompatible with economic expediency. Whilst exercising great control over the environment, it is subject to considerable delays between the political decision and the preparation of the plan, its implementation, and any subsequent review and amendment (John Ratcliffe, 1977).

The planning is a continuous process; distinct from a static policy prepared at one particular point in time. Great premium is placed upon the incorporation of social and economic planning within the physical framework. Constant review is maintained regarding the performance of the plan and adjustments made whenever necessary, thus reducing delays to a minimum and preserving the relevance of the policy in the light of prevailing circumstances. Although, in theory, this approach is the tendency in the United States, being of a more ad-hoc nature, better geared towards a market economy, and with a more flexible relationship towards fluctuating public interest, the lack of coercive legislating and the degree of local autonomy has precluded the effectiveness there of almost any planning system. The complex problems of urban structure and organization require an approach more akin to process planning has led to fundamental changes in both the theory and practice of town planning (John Ratcliffe, 1977) (1)

2.2.1 The Royal Town Planning Institute, UK:

According to the Royal Town Planning Institute (RTPI), UK, "Town Planning embraces all forms of development and land use activities. It operates in all social strata and on several inter-related spatial levels– local, rural, urban metropolitan, regional, national and international. It is concerned with the promotion, guidance, enhancement and control of development in the constantly changing physical environment in the interest of the common good but respecting the rights of the individual".

It makes provision for future; helps reconcile conflicts of interest, projects physical and social changes, facilitates the harmonious evolution of communities and initiates action for the optimum use of resources. It is both a management and creative activity. It is a catalyst in conserving and developing the present and future structure and form of urban and rural areas. It contributes to the creation of the present and future character of physical, social, economic, organizational and environmental quality.

Town Planning is not deterministic. It seeks to establish balance and harmony. It draws attention to the possible options; safeguards freedom of choice for the present and future. It is so conceived as to be able to adapt to the evolution of circumstances.

"Town Planning is rarely an independent process; it must take account of external decisions. It works through and negotiates with the decision-making mechanisms of society's political institutions and public and private sectors. Public participation is an indispensable element in the process. By virtue of its direct involvement with people and their day to day activities, Town Planning inevitably has strong political overtones."

This may be summarized as Planning contributes to the management of change in the built environment. Effective planning may take many forms, but requires knowledge about urban and regional change, the physical and natural environment, and social and economic environment, combined understanding and skill in applying this knowledge to policy formulation, implementation and project development in complex political/ institutional contexts.

The role of planning therefore is to improve people's quality of life; be it in the context of rural, metropolitan, regional, national or international levels. In developing countries, in the race to catch up with developed nations, change in the built environment is a permanent feature of any management. Planning education, therefore, has to identify the

'what, how and why' of change in the following:

- Geographical levels of development-rural, urban, regional etc.
- Physical and natural environment
- Socio-economic development
- Skills in the application of knowledge in these fields to policy formulation and implementation
- Techniques of project development and management
- Obtaining political approval, support and resources in the political and institutional contexts

A New Vision for Planning:

In June 2001 the RTPI published a paper entitled "A New Vision for Planning: Delivering Sustainable Communities, Settlements and Places- The Need for Action" that sets the "context for a dialogue with members and others about the way planning should evolve". "The new vision" is built around the core ideas of planning, that is:

- Spatial– the management of the competing uses for space and making of places that are valued and have identity.
- Sustainable– addresses how planning can mediate between the short-term economic and financial benefits and the medium and long-term social and environmental implications.
- Integrative– take account of a wider set of issues, full range of public, corporate and community strategies and initiatives, bringing together wider range of professional skills and disciplines to influence spatial planning and delivery mechanisms.
- Inclusive– recognizing the wide range of people involved in planning by respecting differences of opinion, recognizing social and spatial inequalities,

withstand independent scrutiny and negotiate through a process of arbitration resulting in shared commitment.

In all the above matters planning is:

- Value driven– identifies, understands and mediates conflicting sets of values
- Action oriented– driven by the twin activities of mediating space and making of place

Based on this New Vision for Planning, the RTPI Education Commission published a lengthy report in January 2003 that sets out clearly and with well-reasoned confidence the field of planning that gives us the right to claim professional status. The key elements of their observations are:

- Critical thinking aimed at achieving outcomes not just procedures
- Space emphasizing locational relationships and the impacts and interrelationships of the sectoral on the spatial and vice versa
- Place– a focus on outcomes, quality, form and identity as experienced by occupants
- Action or intervention– a deliberative process focusing on what could and should be done based on ethics, values and facts require management skills appropriate to securing outcomes

It does not suggest planning as a governmental activity whose legitimacy depends on statute or regulation, nor in-built economic, social or environmental privilege; but sees planning as necessary and inevitable within any society with aspirations beyond subsistence. Due to its richness and complexity, it calls for a cadre of people with knowledge, skills and competence to facilitate it.

The competency required of the planner refers to:

- **Planning related skills to:**
  - Produce strategies, policies and plans for sustaining and shaping physical environment and the activities it supports

- Manage change in the spatial and physical environment and its component activities and facilitate the implementation of development
- Communicate spatial and planning related information

- **Planning related transferable skills in:**
  - Problem definition
  - Data collection, investigation and research
  - Quantitative and qualitative analysis and appraisal
  - Aesthetic and design awareness and critique
  - Postulating and evaluation of alternative futures
  - Collaborative and multidisciplinary working
  - Weighing evidence, problem solving and decision making
  - Negotiation, mediation and advocacy

- **Generic transferable skills in:**
  - Project and resource management
  - People and organization management and leadership
  - Creativity
  - Flexibility and adaptability
  - Written, oral, graphic and multimedia communication
  - Using information technology

Awareness of value dimensions of planning work and ethical responsibility, appreciation and respect or:

- Issues of equal opportunity (with respect to race, gender and disability), social justice, economic welfare and efficiency in the use of resources
- Issues of sustainability and sustainable development in protecting and exploiting natural and human resources; the role of government and public participation in a democratic society and the balancing of the individual, collective rights and interests

- The diversity of cultures, views and ideologies, including respect for the diversity of different values and perspectives, and acknowledgement of their importance in decision making; significance of social and cultural heritages
- The ethics of professional practice and behaviour, including the relationship to clients (including politicians), other professionals and the public
- Use of the Code of Professional Conduct
- The interconnected social, economic and political dimensions

Specialized studies refer to:

Specialized studies enable joint routes to planning and other professional qualifications e.g. architecture and planning, planning and landscape architecture, planning and environmental management.

2.2.2 Recent planning and development principles in Malaysia:

Malaysia is undergoing a tremendous pace of physical and socio-economic development as it is moving towards an industrially developed country by 2020. The most sensible pathway for a small nation like ours to take, is to emulate those of the developed countries, hopefully, with little or no mistake along the way. Malaysia has felt the importance of private sector in the process of planning and implementation. Private sector investment has been given the task of meeting 55 percent of the total investment required by the country during the same period, implying an annual growth rate of seven percent in real terms. The government seems to be aware of the potential short investment. It has implemented its much-publicized privatization with the public sector monopoly on certain key areas.

The foreign investment has been prompted by the realization that foreigners share in Malaysian companies 30 percent target. Foreigners can, therefore, be encouraged to set up wholly or majority of any Malaysian holdings without offending long standing political systems. Indeed, the process has already started. Foreign companies are no longer restricted to a 30 percent maximum holding, their Malaysian associates, provided these associates export at least 20 percent of their production. In certain circumstances, foreigners can now own majority stakes of up to 80 percent of Malaysian companies (2).

The Malaysian government has formulated three principal policies, which have become the main thrust for national development planning and implementation.

- Vision 2020: Vision 2020 was specifically designed to guide Malaysia towards the status of an industrially developed country by the year 2020. The progress intended is not limited to economic advancement only, but covers all aspects of life including social justice, quality of life and potential stability with emphasis given to positive social and spiritual values (stressing the physical, cultural and psychological development of the people).

- National Development Plan (NDP): The objective of the NDP is to create more than a just and united society. It is aimed at providing an environment conducive for growth with equitable distribution of resources, emphasis on poverty alleviation and restructuring the society to rectify social and economic imbalances among the races.

- The Five-Year Malaysian Plan (MP): The Five-Year Malaysian Plan maintains and continues to emphasize the balance development concept as contained in the NDP. The MPs continue to give serious attention to strategies that will generate rapid and continuous economic growth while ensuring equitable distribution of resources in balance with conservation of the environment and natural resources. Apart from economy, the MPs stress social development while improving the quality of life. These three planning policies together help to formulate the total planning and development approach.

2.2.2.1 The role of physical planning in Malaysia:

The role of physical planning in line with the Vision 2020, NDP and MPs, is to translate the socio-economic, cultural and environmental needs into spatial and physical forms. Its aim is to implement development planning programs, policies and sttategies and translate them into spatial form and coordinate them with the physical planning with emphasis in environmental quality, provision and management of urban facilities and the management of scientific and technological development.

2.2.2.2 Existing planning practice in Malaysia:

The planning practices in several towns of developing world give inadequate emphasis on the environmental aspects for maintaining quality and sustainable living environment. Present planning concepts do not explicitly demonstrate noble values, which are necessary for developing human values and mitigating social ills. Malaysian planners have realized that planning and development, which are not based on noble spiritual values, have in the past contributed to social ills and wrought damages and degradation to the environment. Natural disasters, such as flash floods, building collapse, land slides and threat of haze has been underscored due to lack of human sensitivity to the environment, disrespect to fellow human beings, and ultimately to the creator. A planning guideline based on total planning and development doctrine has evolved from sensitivity towards human development in national development. Therefore, the current planning practices have been enhanced so as to serve as comprehensive guidance for the country's planning and development efforts based in the belief that meticulous and methodological planning is the key factor for ensuring success of any planning effort, and more so in the context of current sophisticated and complex living conditions. A planning doctrine able to handle social woes, which respects the people and environment, is much needed in the present planning practices.

2.2.2.3 Total planning and development doctrine (TPDD):

The main philosophy behind the TPDD is:

- Comprehensive: The TPDD or concept of planning should cover all values, moral and spiritual, besides physical and material aspects. These elements cannot be separate because the main objective of the TPDD is sustained well being of the citizens.
- Man as the Focus of Development: Man's needs, attitude and aspirations are some of the most important factors that should be taken into account in the formulation of policies and development approach. However, all considerations should stress on the achievement of a balance between the needs of man and capacity of the environment to fulfil and support these needs.
- Multi-Dimensional Activities: Planned development must be multi-dimensional in nature. With the above principles in view, the city of Putrajaya has been

developed to ease out the increasing burden of urbanization on Kuala Lumpur. Putrajaya is indeed a fine example of urban planners' dedication to build a city that is environmentally sustainable and viable and a source of pride for the nation bent on achieving the status of a developed country. Putrajaya shows how a city can be build by being compatible, sensible and respectful to the nature and environment and by enhancing the natural resources within that particular region. The city is all that a human soul yearns for in a city.

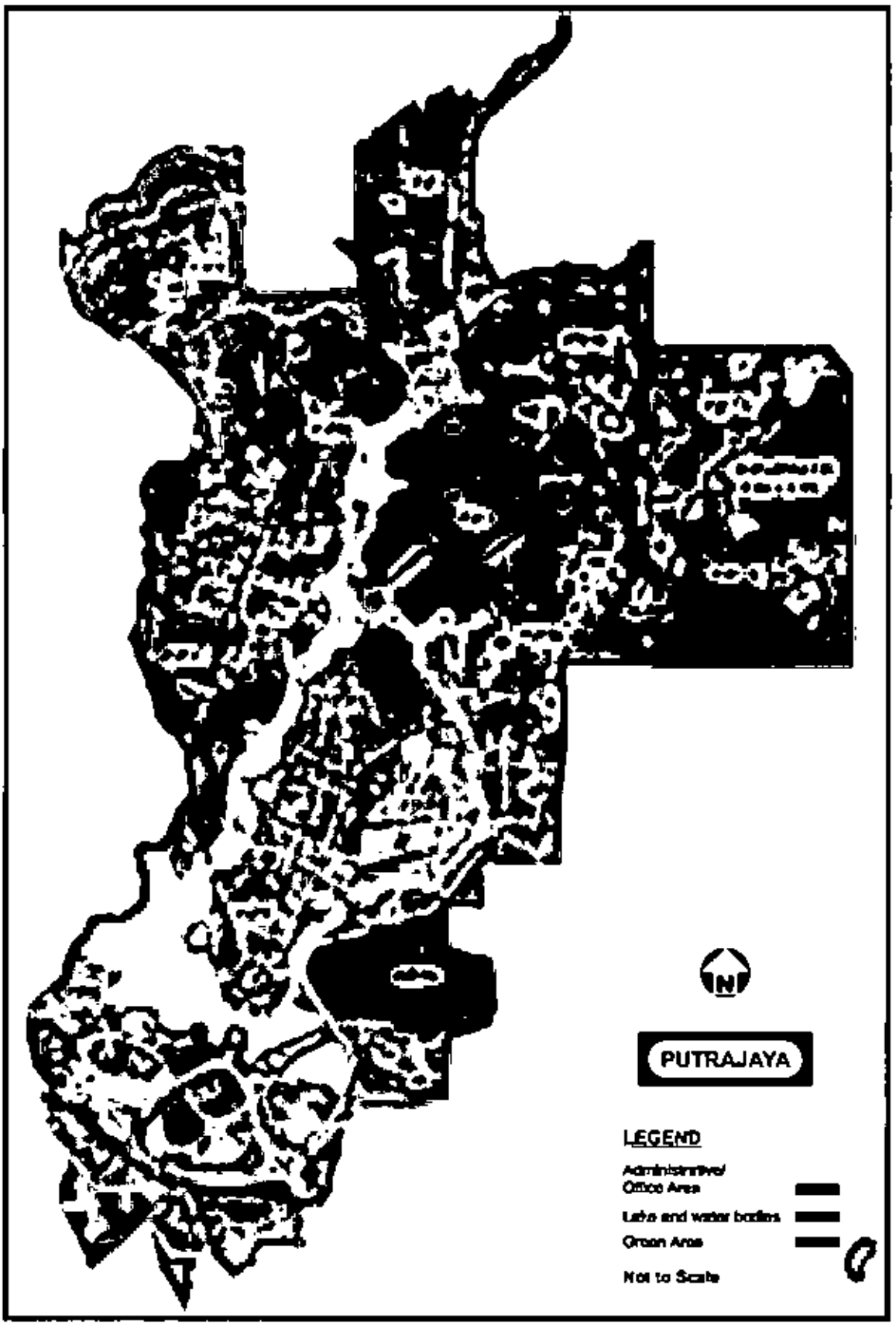
2.2.2.4 Implementation of the plan:

It is much easier to make a plan than to implement that plan in detail. The TPDD always follows city and national level development strategies and theses are continuously updated accordingly to demand to face new challenges in the new millennium. The proposals indicated in the plan are mostly implemented by the private sector. The TPDD applied in the case of Putrajaya have been meticulously worked out in detail so that no inconsistencies arise during implementation of the plan (Map-2.1)[1] Construction, development and enhancing natural resources are complementary to each other so as to achieve a sustainable living environment.

2.3 Urban Planning Management, Weaknesses Conflicts in other Asian Cities:

According to Taylor and Williams (1982), the earliest paradigm of planning in Asian cities was a colonial system of sectoral agencies in each city, which independently pursued their objectives under the tenuous direction of a long-range master plan. This system is still widely used in the region, although, as already observed, there may be little relation between the rhetoric of the plan and actual planning activity, as expressed in decisions made by the state. Since the 1960s, a new project oriented approach has

[1] Putrajaya is planned to embrace two major themes i.e. 'Garden City' and 'Intelligent City'. Reflecting the 'Garden City' concept, Putrajaya is sought to reflect the very best in city planning and landscape architectural ideas to realize a new vibrant city of tomorrow. The following features are: a formal axis punctuated with nodal features; structuring of Core Area into identifiable precincts; a variety of informal and formal activity areas, reforestation and enhancement of the natural landscape; a network of open spaces, optimisation of scenic views and an interesting cityscape.



Map 2.1 Master Plan of Putrajaya, Malaysia
Source: Director of National Mapping Malaysia

emerged, which emphasizes short-term activities. uses budgets ensure financial feasibility, and de-emphasises physical (land use) planning and includes a wider range of socio-economic policies.

Taylor and Williams believe that these weaknesses in present practice can be overcome by a technocratic response, which would improve efficiency by systematizing the process of planning programming and implementation to select the most appropriate strategy for development.

Planning and Resolving the Problems and Conflicts: Asian Versions:

Rigid master plans have long been abandoned in most developed countries; developing countries still cling to the idea that the statutory authority should prepare such plans. In addition, all related regulatory legislation is linked to the existence of the official master plan. Economic considerations and political and finical constrains, however, require greater emphasis on strategic planning. However, can these be reconciled? How these developments can be controlled in such circumstances? Major important cities in Asia have been analysed in view to planning management and conflicts etc.

Metro Manila, Philippines:

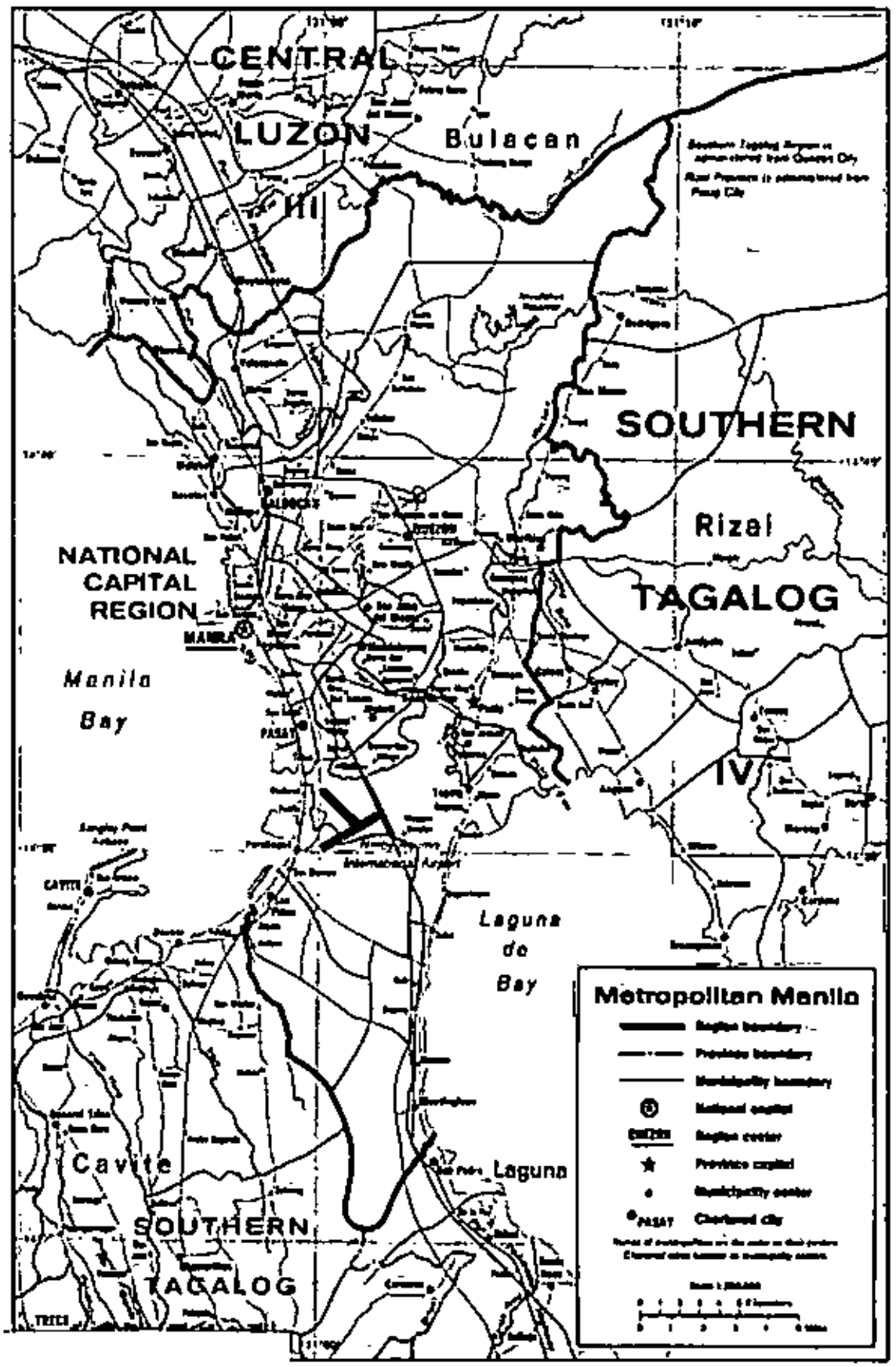
Metro Manila in the Philippines covers an area of 870 sqkm with more than 10 million populations in 2004 (Map 2.2). It is radical concentric in plan with a flat side along the bay. Growth has occurred mainly through landfill and increased declines within existing urban areas. Metro Manila is plagued, not surprisingly, with many of the same problems that afflict other capital cities in developing countries. Population growth has been high for many years and continues unabated. Despite road improvements and traffic management, congestion mount as the number of private and commercial vehicles increases. Flooding continues in many areas because of the flat. low lying terrain and poor drainage systems even though control measures and facilities have been introduced. Large areas of Metro Manila also experience inadequate water distribution and low pressure in the water mains, though this is now being rectified through a massive water supply program. Sanitation is a problem because there are few areas with sewers, the streams and rivers are heavily polluted, and solid wastes collection system is inadequate. Air pollution has reached serious levels primarily because of emissions

from vehicles, power stations, and factories. Finally, more than half of the population lives in wholly inadequate housing, which does not have basic services, enough space. or a pleasant environment.

Seventeen separately elected municipal mayors and their councils, which are, in theory, coordinated by a governor and an appointed body, which is called the Metro Manila Commission (MMC), administer Metro Manila. Although the MMC is vested with the power to assume all strategic responsibilities in the metropolis, it has assumed control only over the local government budget and the management of solid waste disposal. Local governments continue to implement small-scale capital works programs, provide most urban social services, and maintain all local facilities. National government agencies have broad responsibilities in Metro Manila, including control over strategic planning, health, education, social services, housing roads, drainage, and other services, Since these functions have not yet been transferred to the MMC as was proposed originally, the only truly metropolitan agency is the 'Metropolitan Water and Sewerage System (MWSS)', which plans and implements water supply and sewerage projects and levies rates throughout the metropolitan region.

Responsibility for strategic planning for Metro Manila has unofficially been transferred from the National Economic Development Authority to the MMC, which, in turn, has been able to formulate land use and zoning plans but has not been able to effectively control the urbanization process or co-ordinate the local or national agencies. Thus Metro Manila does not have an effective metropolitan form of government to direct planning and development, and the MMC has little strategic responsibility or authority. This situation leaves the administrative system without co-ordination and at times, in chaos. The conflicts among the development projects are:

- Long term programmes versus short term projects
- Managed capital investment versus uncoordinated programme
- Demand for, versus supply of land
- Formal versus informal sector
- Public versus private sector
- Visual aesthetics versus public and private affordability.



Map 2.2 Map of Metro Manila
Source: http://www.angaxp.net/sunsetboulevard/showdocument.htm.

The planning and development by the public and private sectors have failed to deliver enough urban services at affordable prices to the grassroots. The low-income shelter programs of the National Housing Authority are strongly supported by the opposition faction in the current national assembly. Furthermore, future urban planning and development programs must strive to distribute benefits equitably. The Philippine efforts to increase the rate of shelter production are commendable despite the fact that prices are often initially unaffordable for low-income group. The reliance on the private sector appears to be an important factor in their relative success in the public and private sectors is needed and cannot be overemphasized as a valuable way to multiply the supply of low-income urban shelter.

Urban land resources and the control of land remain essential components in implementing any significant urban policies in the Philippines. The lessons of Korea, Taiwan, and Japan in urban land management could be actively promoted in the Philippines (Howard B. Henward. Jr. 1985). These countries have introduced some techniques to handle urban lands in terms of economic use and also ensure planned growth in city, such techniques are land pooling, land readjustment and guided land development (Archer, 1984). But at this stage, the techniques are not yet familiar and there is no institutional establishment are taken place in Manila, Philippines (3).

Jakarta, Indonesia:

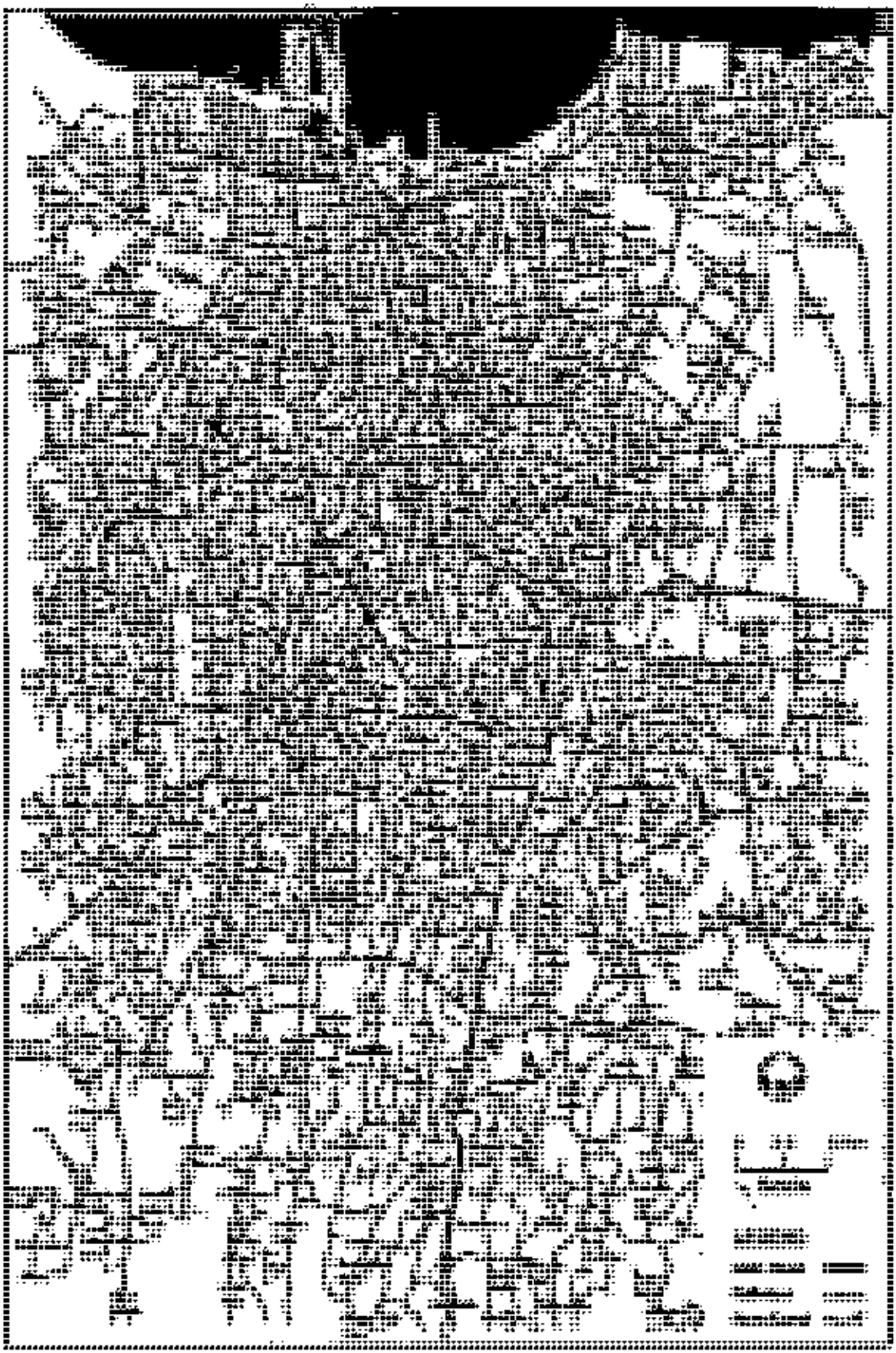
Jakarta is the national capital of Indonesia. It is central to the region and has special status as one of the 27 provinces in the country. The 1965-85 Master Plan for Jakarta emphasized on physical form and recommended a concentric pattern of spatial growth of the city after its inception. The governor of Jakarta has now formally approved the Jakarta Structure Plan. and in addition a modified regional development plan for Jabotabek will shortly be approved by the central government (Map 2.3). Thus the framework for the future direction of urban growth is now formally agreed upon and can be used as a framework for strategic planning by local governments (T.R. Clarke, WB Symposium 1985).

Major weakness of the planning systems, a simple and robust form of structure planning was developed, which indicated policies for board zones and land use. Such a system would be an effective point of reference for the investment programmes of development agencies (government). This is important because infrastructure investment is likely to be only real way to control the form and direction of urban growth. Later on. the system could be developed to coordinate local "action area" plans and to increase control over plans for land use and building.

In Jakarta, co-ordination between sectors is steadily improving, and the agreed east-west strategy for growth is being implemented by several new developments: the introduction of a pilot project for Guided Land Development (GLD) in East Jakarta, the development of high priority projects for arterial road planning and railway upgrading in the east and west expansion zones, the implementation of the first stage of the Urban Betterment Project in North Jakarta, and the design of large regional service centres in the east and west expansion zones to encourage commercial decentralization.

In conjunction with the central government, appropriate methods are being devised to decentralize plan making and development control to the lower-tiers of government within nearing studies are being made to define urban development projects to encourage the rapid growth of several key growth centres around Jakarta.

Several key experiences in Jakarta may be applied in other cities. The most important lesson is the need for a strategic planning approach that integrates the physical, economic, financial, and institutional aspects. This forms an identifiable stage in the development planning process and moves away from the static master plan. It also enables future urban growth to be guided and monitored more effectively. Strategic planning, in turn. helps to improve coordination in investment across sectors and to compensate for the lack of vertical and horizontal integration between agencies. At the national level, the lack of urban investment planning and systematic allocation in situations with limited resources, together with pressure for urban services, causes urban investment to be highly concentrated in the capital city. This results in a great dependence on funds from central government and ineffective local support for cost recovery mechanisms. The over concentration of resources in the capital city creates



Map 2.3 Map of Jakarta City
Source: http://www.encartamsn.com/Jakarta city map.htm

problems in secondary cities, which have an even greater need for infrastructure investment.

Lack of enough serviced land to accommodate rapid urban growth compounds the conflict between the formal and informal city and causes steep increases in land prices and reduces the supply of affordable low-income shelters. Thus, mechanisms are needed to improve access to land for the low-income informal groups through direct and indirect means. There also lies the problem of the dual city, in which the predominant informal low-income housing and infrastructure sector is constructed outside the official system for providing shelter. This creates problems in designing balanced economic and physical solutions. The latter is influenced mainly by government planners with established attitudes and conventional views about the needs for the poor. The official attitudes are often dominated by the visual and aesthetic conditioning of the beautiful city concept for capital city. This is often in opposition to the basic needs of the majority of low-income city dwellers in most Asian cities (T.R. Clarke 1985).

Kolkata (Calcutta), India:

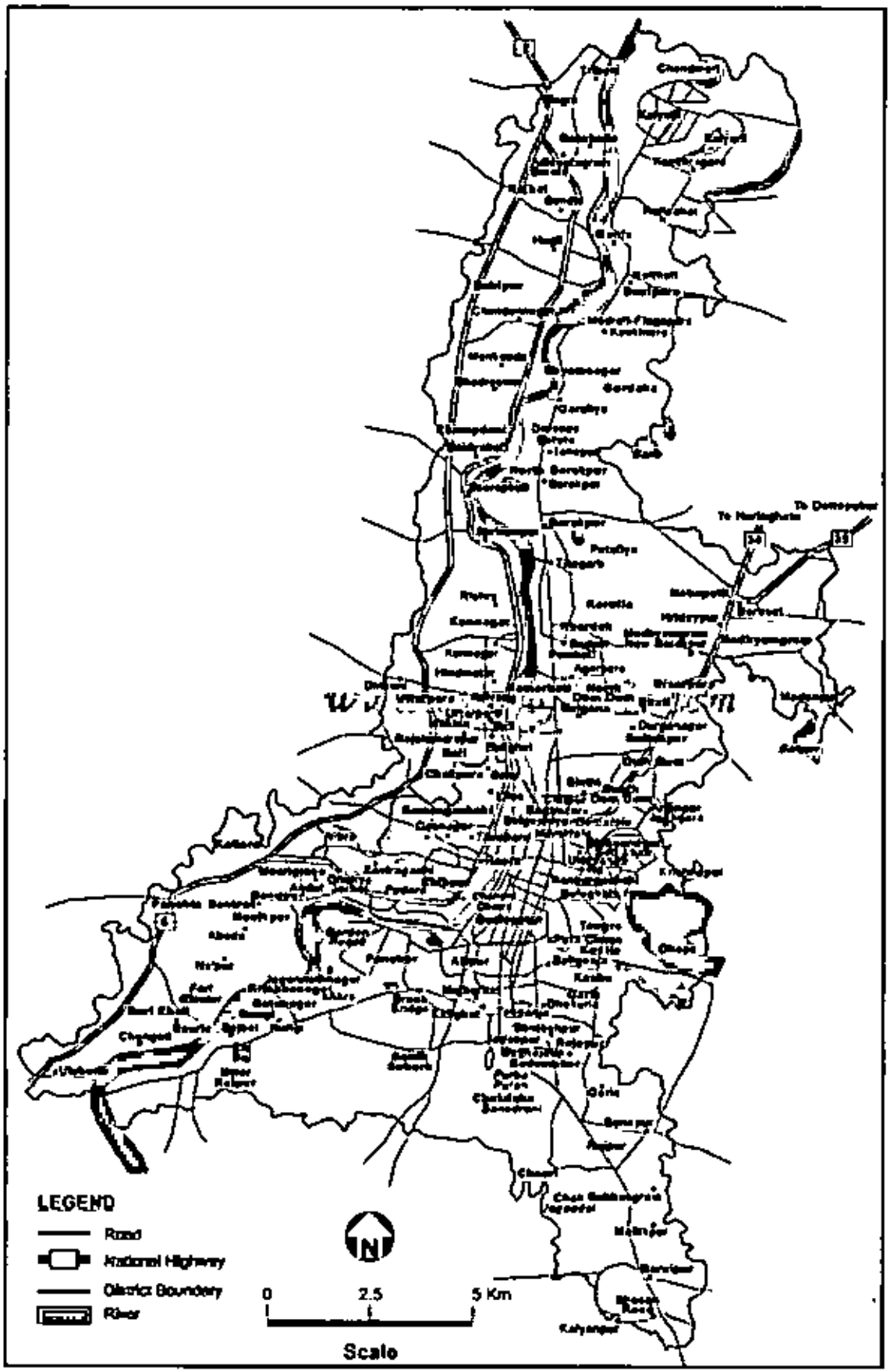
Kolkata (Calcutta) was established in 1690 by East India Company. In 1727, a municipal corporation for Calcutta headed by a mayor was established. Between 1774 and 1911, it was officially the capital of the British Empire in India. In 1921 Kolkata city with its 1.05 million population, accounted for 47 percent of the urban agglomeration's popnlation of 2.25 million (Calcutta Urban Agglomeration, which is a string of towns extending from the city and both sides of the Hoogly River). Calcutta was renamed Kolkata in December 2000. The Kolkata Metropolitan Area, previously known as 'Calcutta Metropolitan Area', covers an area of 1, 414 sqkm with about 13 million populations of West Bengal State and in the economic capital of the eastern region of India (Map 2.4). The Kolkata Metropolitan Planning Organization, founded in 1960, made extensive studies and recommendation embodied in the Basic Development Plan 1966 (Menezes, WB Symposium 1985).

Kolkata has a long tradition of structure planning and investment programming and also has an older and larger infrastructure network. The West Bengal government is implementing policy initiatives taken during the preparation and formulation of the third Calcutta Development Project (CDP) in 1970. Introduction of self-appraisal techniques by an independent cell within the Kolkata Metropolitan Development Authority

(CMDA, 1980) are carried out. The Appraisal Monitoring and Evaluation Unit (AMEU) is now an accepted and integral part of investment selection. The unit has already amended or deleted several sub-projects from the CMDA's original shopping list just because they could not be justified on economic or financial grounds. This important change from previous practice in the city can lead to the more effective use of scarce resource.

The new appraisal process is also used to assess the relation of investment in different sectors. a practice that was not always done before. For example, the planning of large centrally planned investments is integrated with the investments selected by the local authorities under the Municipal Development Programme (MDP) and vice-versa. The implementation of the state government's policy of permitting local authorities to help select their own investments under the MDP is proving to be the cornerstone of the success of this programme. The local authorities have also been making responsible for constructing the investment they select. The chairmen of these local authorities have, therefore, become directly answerable to their constituents. This process gives greater assurance than those previously. Genuine efforts are being made to improve the quality and quantity of services. The local authorities are now more aware of the relation between the creation of an asset and the necessity of providing funds to operate and maintain it, as well as repaying the capital cost. For the first time, current financial information on the revenue collection to institutionalise the monitoring and evaluation of such data has been undertaken.

By now, two years of the CMD's five-year program have elapsed. Although progress has not matched all the original projections. a solid foundation has been laid for CMDs new role as the designated development authority for the whole metropolitan area. The principal innovation by the state government and the CMDA in the planning and implementation process under the third CUDP, compared with previous projects, has been able to give the local authorities a substantial say in selecting the investments for their own jurisdiction. In doing so many of the traditional problems of centralized planning and construction have been substantially reduced. In addition, investments were previously made without assessing either the ability of the local authorities to raise the necessary revenues to fund, maintain, and service the operations or their technical expertise to operate them (Menezes 1985) (4).



Map 2.4 Map of Kolkata City (Calcutta)
Source: Copyright © Compare Ingobase Pvt. Ltd. 2001-02

Experience suggests that when the local authorities are given the opportunity to select and construct an investment, and what manpower and funds are necessary to operate and maintain it, they will act more responsibly. Public pressure to ensure that the investment is used productively far outweighs interagency or intergovernmental influences. Other reasons for the success to date in MDP have been the state government's commitment to follow through its policy and the initiatives; it has taken to do so. These initiatives include:

- Strengthening local authorities by holding local elections and by providing them with needed specialist expertise, such as executives, engineers or finance and health officers
- Holding seminars on development, management, and finance for the newly elected chairmen and senior management of the local authorities
- Defining clear roles and responsibilities for various local agencies
- Substantially increasing the allocation of capital funds
- Substantially increasing access to additional sources of technical assistance and training for local authorizes to help them prepare plans and estimates and analyse municipal budgets
- Monitoring and evaluating the physical and financial performance of local authorities

Chennai (Madras), India:

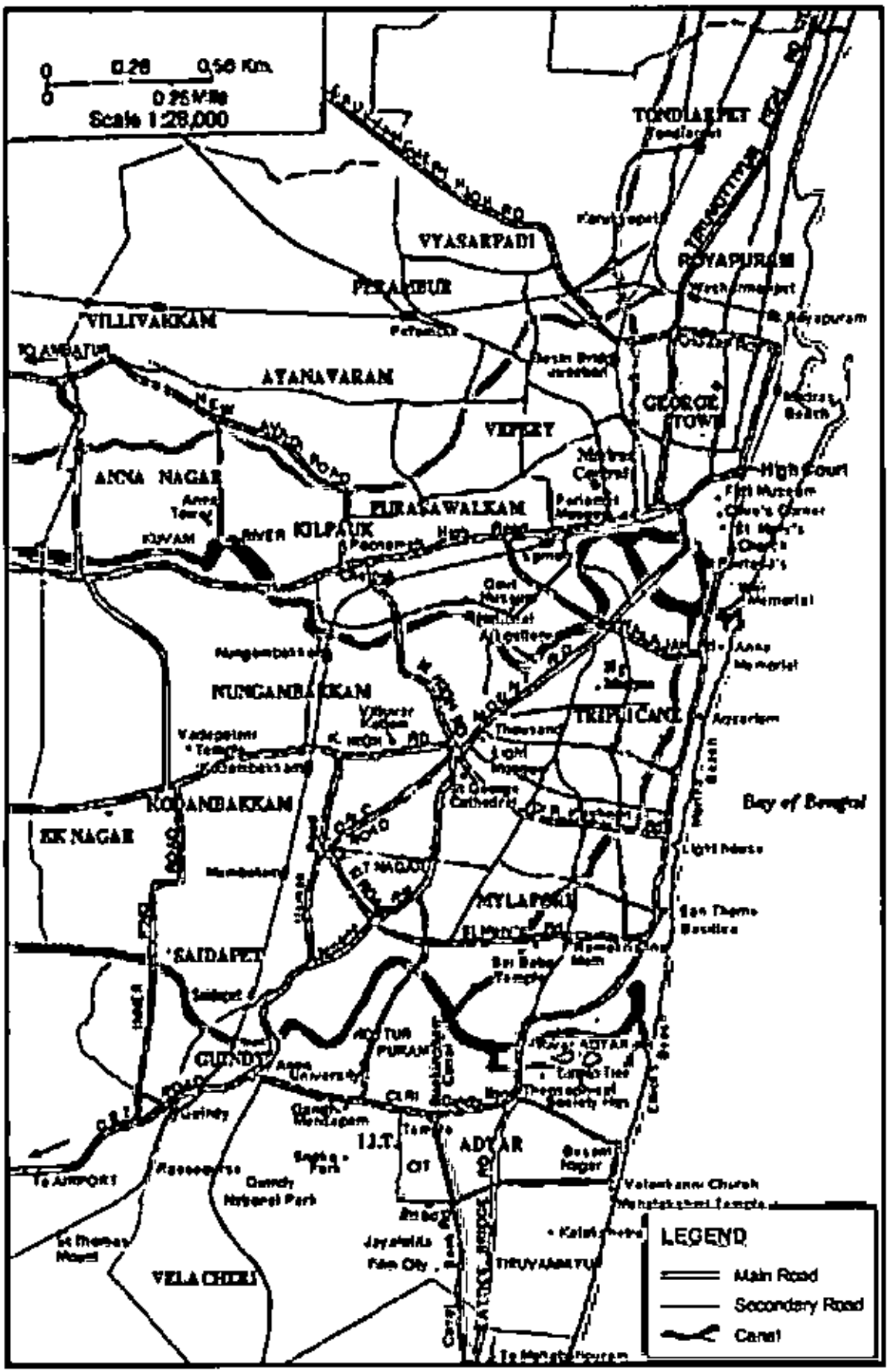
Chennai (Madras), the capital of the south Indian state of Tamil Nadu, is the fourth largest city in India. Since August 1975, urban physical growth within the Madras Metropolitan Area has been managed through a master plan, which is prepared and enforced by Madras (Chennai) Metropolitan Development Authority (MMDA) (Map 2.5). The plan consists two parts: one is land use plan and another is a development control rule. This master plan indicates only broad land uses and is supported by documents called Detailed Development Plans.

As a multi-sectoral project. the second Chennai (Madras) Urban Development Project addressed several sectional needs both in transport and the provision of low-income shelter. City public transport services have improved considerably. Both the first and second urban projects have contributed to create an efficient bus company. Some have

encountered further problems however. For example, in the transport sector, the need to increase fares to strengthen the financial viability of the companies concerned has been limited by political constraints. It has proved politically more difficult than expected to increase the fares. By contrast. the low-income housing programme has been quite successful and continues to develop largely as planned. Because the sites are far from the city centre and workplaces, the bus companies have had to be involved to assure reasonable access. Also, few people in Chennai own cars, so a strengthened bus company was an important part of improving mobility.

In the housing project, the sites and services under the first urban project is now rapidly approaching final consolidation. Some problems associated with providing low-income shelter have been highlighted. For example, delays in land acquisition have slowed down progress in the sites and services component in the second project. Due to heavy demand for housing, many of the plots went to the better income group people other than low-income group and were bought for speculative purposes. Enforcement and control of the distribution of the plots to minimize the misallocation places a heavy demand on limited government resources. The administrative overhead is required to assure that the low-income groups benefit may well prove to be a burden in larger scale programme because of the heavy demand for serviced land by all income groups. This problem should ease as more serviced land and core housing appears on the market. Perhaps the most important question that emerges in Chennai is the effective packaging of multicultural projects in complex political and institutional environments. Such projects are difficult to achieve due to the unique needs of various sectors. The housing sector, for example, clearly has a special set of institutional and policy objectives, which are quite different from those of the transport sector. In transportation, it is difficult to break up the needs of low-income sector. Usually transport policy must deal with all income groups and therefore must impose potentially inequitable fare structures to recover all costs.

The debate continues, however. on whether to use multicultural or single sector approaches. Conclusive evidence is not yet available, which leads to the conclusion at this stage, is each project must be designed to respond to its particular political and institutional constraints. Those who adhere inflexibly to single sector approaches may in some situations be promoting what is referred to as sect oral chauvinism. The failure to examine rigorously the need for a multicultural approach may reduce the full effectiveness of a particular sectoral activity (Lakshmanan, 1985).



Map 2.5 Map of Chennai (Madras) City

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2.4 Previous Plans and Studies on Dhaka:

Planners of the developing countries, such as Bangladesh, face a daunting task. Population of the country is growing at a phenomenal rate. The number of population in the country has doubled within only three decades. The population of Dhaka makes close to 12 million at present whereas it was 7.3 million in the 1991. Such population growth overwhelms all efforts to improve the living and environmental conditions of the mass people.

Rapid population growth has obvious implications for infrastructure and service needs of cities and regions. The failure to match safe water supply, sanitation systems, adequate housing and efficient transportation with increasing population has become a prime cause of misery in the developing world and also in Bangladesh. It is argued that even with a limited level of economic development, resources can be better managed to provide an improved living environment for all if the right plans are implemented at the appropriate moment. Such efforts are lacking in Bangladesh, specifically in Dhaka.

The planning legacy, we inherited, is a colonial inheritance. Colonialism played a dominant role in shaping cities and regions of many developing countries. Because of the extent of her colonial possessions, Britain had a major influence in shaping the pattern of urban development in parts of Africa and Asia in the immediate pre-independence and post-independence periods. Many of the ideas and principles, which have been applied in city development in the developing countries during this period, were derived from the practice of town and country planning in Britain. Indeed, many of the practices were transferred from Britain with little or no adaptation to local conditions.

The Dacca (Dhaka) City Master Plan, 1959:

A Master Plan for Dacca, 1959 (presently Dhaka) was prepared on behalf of the Dacca Improvement Trust (DIT). The Plan was basically a development control document (Map 2.6). The Town Improvement Act, 1953 provides regulatory powers for the DIT over a designated area. In practice development control, based on the control of building on individual plots, can only be effective in the specific development areas, which are

planned and leased by the DIT and other development agencies. Development in other parts of the city remains largely uncontrolled, and the lack of updating the plan leaves the statutory service agencies in the city without coordinated action.

The Master plan was founded on two assumptions, both of which have since proved to be incorrect. Firstly, population growth was projected at $1^{3}/_{4}$ percent per annum, a figure less than even the rate of natural increases of the existing population. Actual growth between 1961 and 1974 has been approximately 6 percent per annum. Secondly, it assumed that the city would continue to grow ontwards at existing urban densities. In practice, it is apparent that the major trend since 1959 has been the extreme intensification of densities in some areas with a recent rapid growth on the eastern and southern fringes at comparatively low densities.

The results in 1980 show that not all the development areas proposed in the Master Plan, 1959 have been developed yet. Two examples are Uttara Model Town and the proposed development areas north of Tongi. On the other hand, there has been substantial unplanned growth around the edges of the city. Many of these unplanned areas are liable to seasonal flooding.

Previous assumptions about the standards and feasibility of providing services, the level of building occupancy, and the usage of transport system have therefore all been superseded.

Thus, traditional planning practices often referred to had many weaknesses –

- The concern with the preparation of a plan document rather than with achieving any effect on the ground
- The attempt to be too comprehensive, covering all aspects, like a mini-national development plan, rather than focusing on key issues
- The dominance of spatial and land use issues compared to social, economic or environmental issues
- The negative view of urban growth, leading to an objective of limiting urban growth regardless of whether that is appropriate or achievable
- As a result, unrealistic projections were made on urban population
- Projections of public investments requirements also tended to be unrealistic, given the sort of resources which were likely to be available

- The separation of plan making process from decision-making process about budgets, infrastructure development and service provision
- The absence of any effective mechanism for controlling land development (legislative weakness, bureaucratic failure, corruption, and the absence of adequate mechanism to control development).

The above weaknesses are evident production of a detailed, rigid, zoning plan, which is unrelated to the forces shaping cities and regions, and which is too inflexible to be adjusted to the light of the realities of the situation (migration and population explosion after Bangladesh's independence). In the realm of urban planning itself, dissatisfaction with traditional, rigid and inappropriate Master Plan led to rather different responses: Structure Planning and Action Planning for guiding development. The Structure Plan is intended to provide a broader, strategic framework for subsequent local plans, and is to look into the regional context.

DMAIUDP, 1981

The Bangladesh government undertook the Dhaka Metropolitan Area Integrated Urban Development Project (DMAIUDP) in 1981. The recommendations were made that the northern expansion and peripheral development should be directed towards the flood-free land in areas. Moreover, the short and mid term strategies should be undertaken urban development like public land increase, transport links within city areas and improve employment situation and so on; therefore the available resources should be applied to:

- the immediate initiation of a public sector land bank in order to reserve in advance at acceptable costs
- the provision of industrial incentives and the promotion of employment generating activities in the Tongi area
- the improvement and extension of transportation links
- the comprehensively planned and integrated extension of physical and social infrastructure

As a complementary component of the strategy, the peri-urban, largely agricultural economy was to be strengthened and diversified. The aim would be to create a belt of

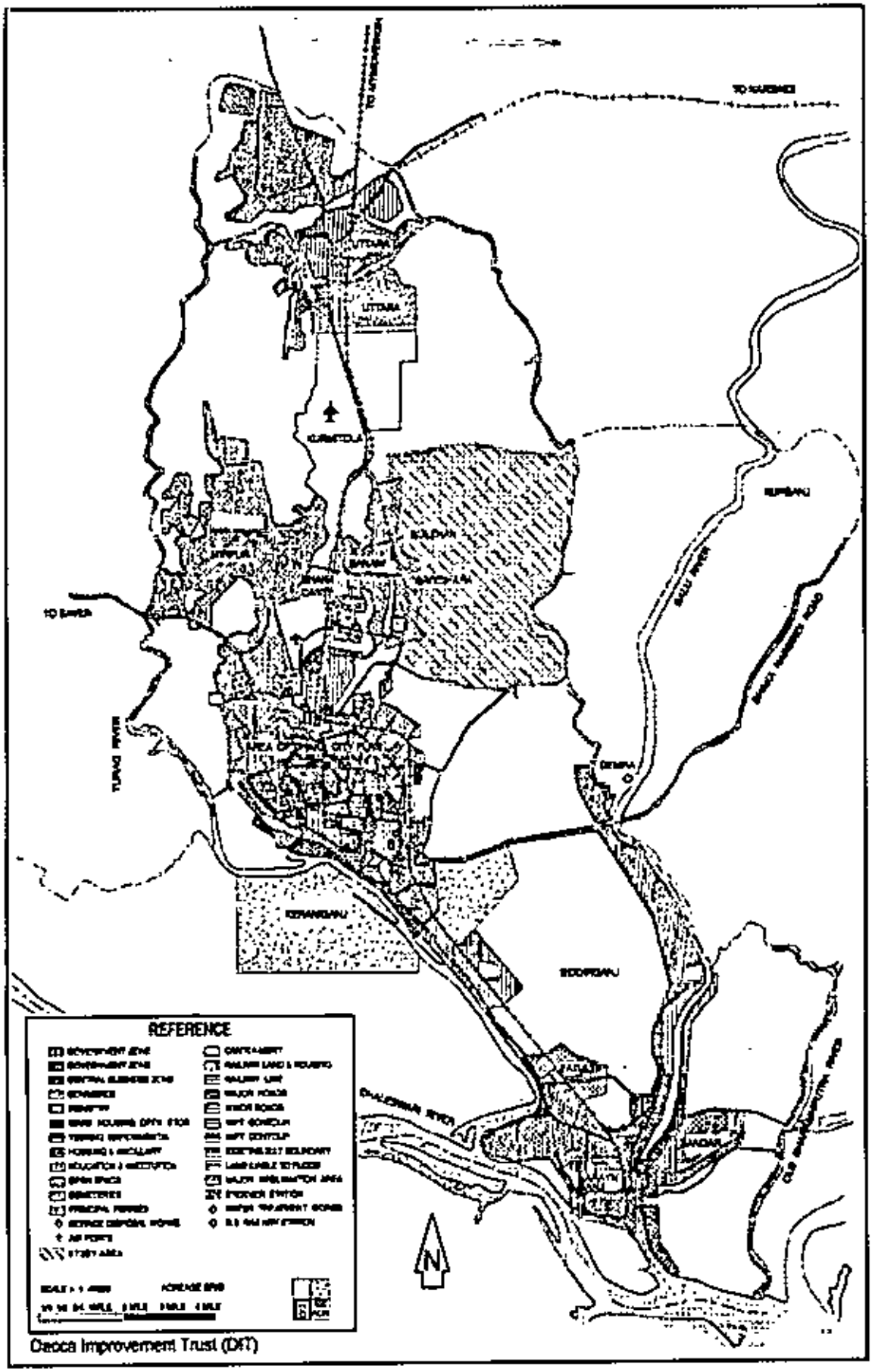
intensive market-gardening areas geared directly to satisfying the demands of the rapidly increasing urban population, and to compensate for the loss of agricultural land and the changing patterns of small-scale backyard farming within the existing urban areas.

In the background the characteristics of the city were analysed and prepared Urban Characteristics Map[2] and shown in the Map 2.7. However, it provides a useful summary of the nature of strategic planning and structure plan.

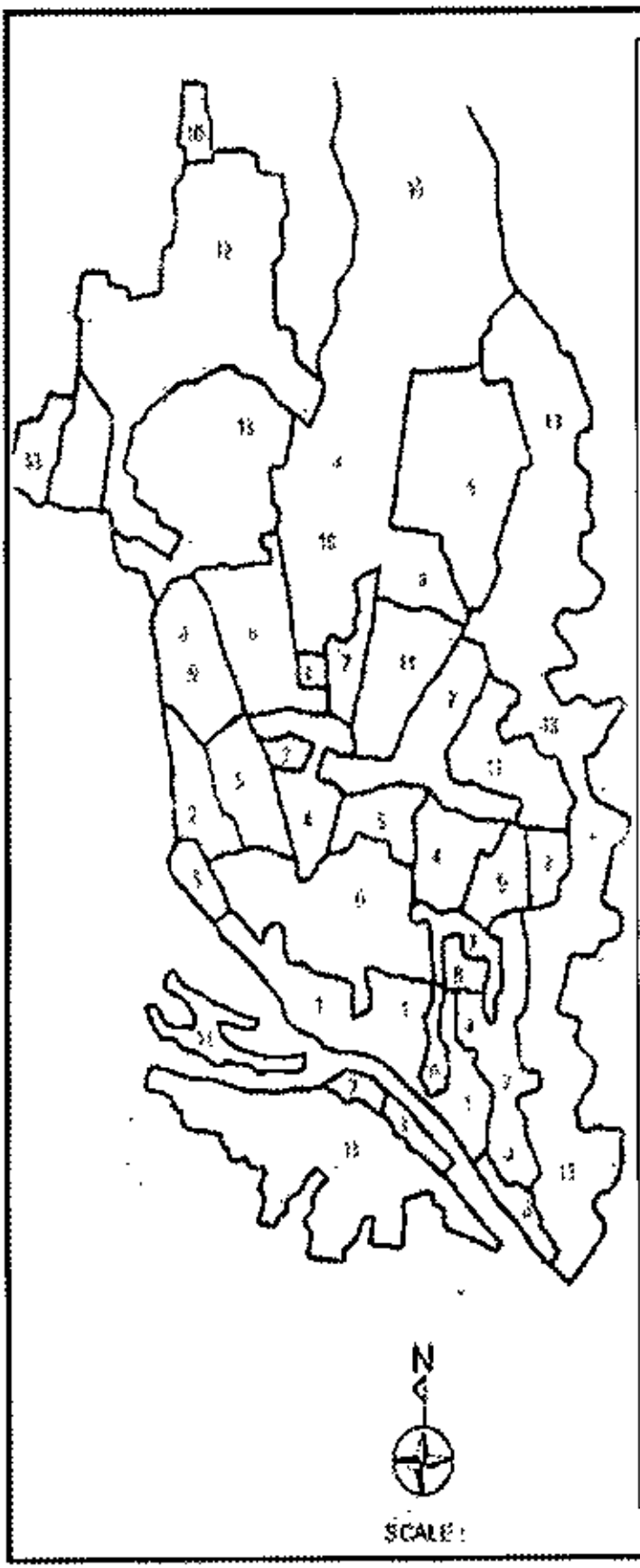
The rapid urbanization process of Dhaka began since 1970s. The physical expansion has been continued to the direction of east and west parts of the city (Maps 8-10) (5).

A structure plan can be distinguished from the more formal planning processes, such as development plan and master plan, in that it accepts and recognizes the uncertainty of future events by concentrating on fundamentals and leaving more detailed problems for resolution nearer the time they occur. In this way, it is to a certain extent open-ended. providing a broad policy framework for action plans and development programmes which because of their shorter time scale can be formulated in greater detail. An urban development strategy should be subject to regular review, but, because of its concentration on central issues rather than details, should not become as rapidly outdated as the more traditional master plan. This form of planning is particularly appropriate for metropolitan Dhaka where the growth of population and economic development cannot be determined with any degree of precision.

[2] Urban Characteristics Map, which divides an urban area into zones, which is characteristically distinct. The parameters used include socio-economic, physical and locational characteristics as well as the dynamics of change in a zone

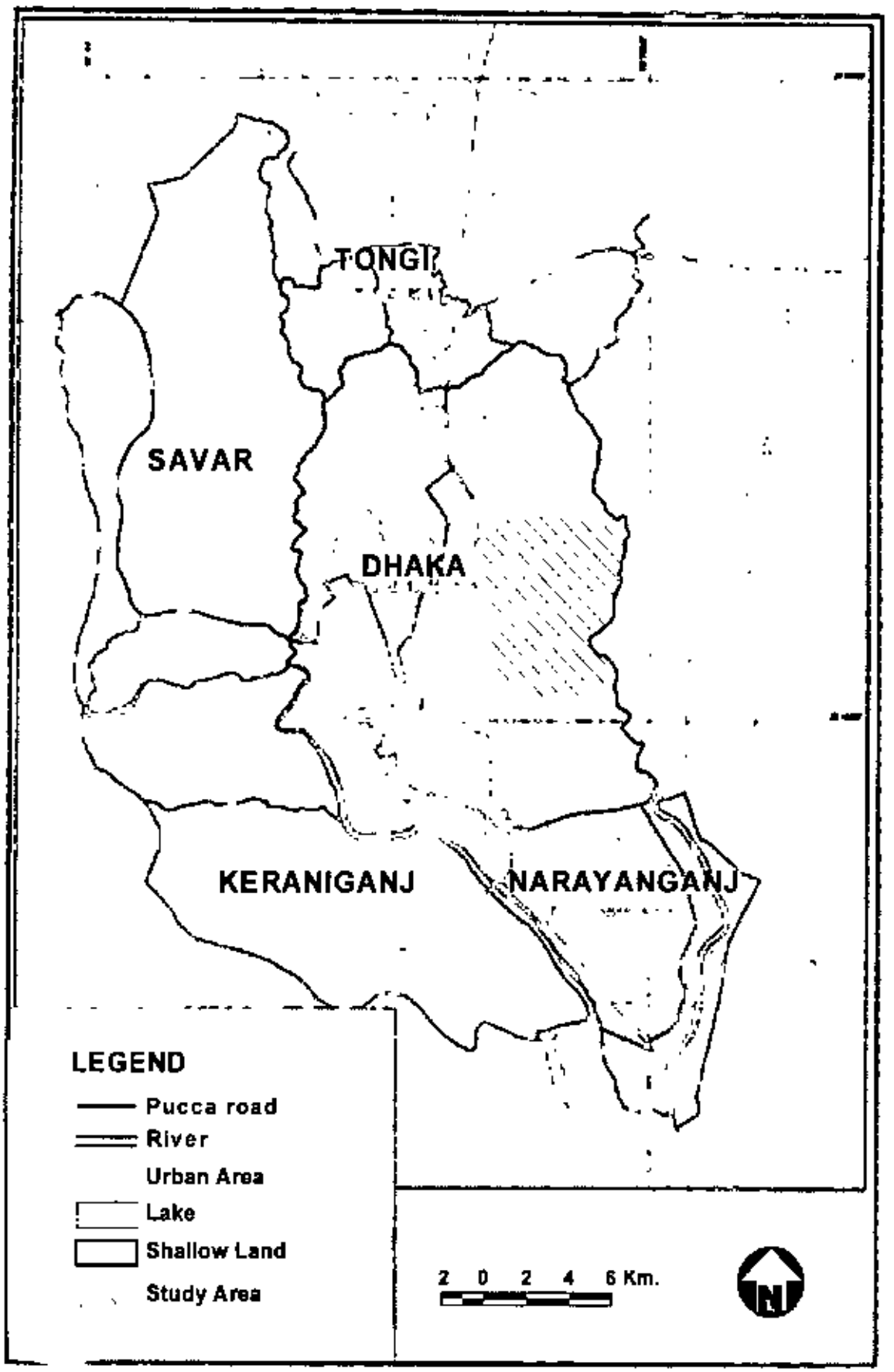


Map 2.6 The Dacca (Dhaka) City Master Plan, 1959
Source: DIT (RAJUK)

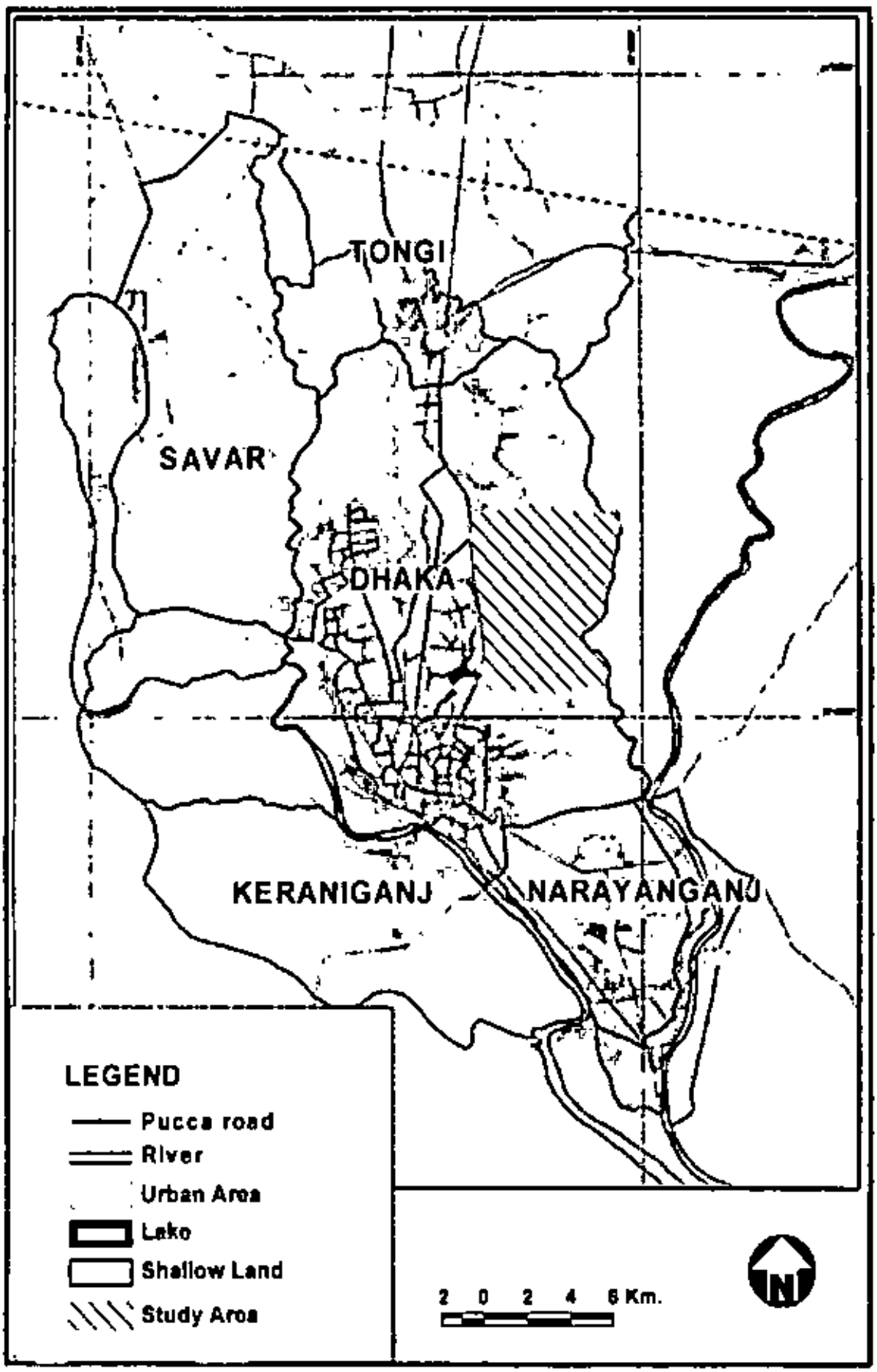


1. Old Urban core, mixed high density, deteriorating
2. Mainly low income medium density, unplanned residential
a. Previously old high-income residential area now deteriorating
3. Old industrial area largely unplanned
4. Low/middle income planned in part medium density. Mainly residential with pockets of commercial use
5. Middle/ high-income low density planned residential
6. Old central business district public administration
7. Planned modern central business district
8. Government institutional education, recreation, administration defence, jail, some public sector housing
9. Pockets of squatters, refugee camps
10. Government institutional: airports, defence, and health
11. Mixed income groups medium / low density planned but uncontrolled mainly residential
12. Medium density mainly low income, planned public sector residential scheme, recent middle sector formal industry. and small pockets of uncontrolled residential
13. Low lying, low density mainly residential/ agricultural
14. Planned modern industrial area, pockets of squatters.

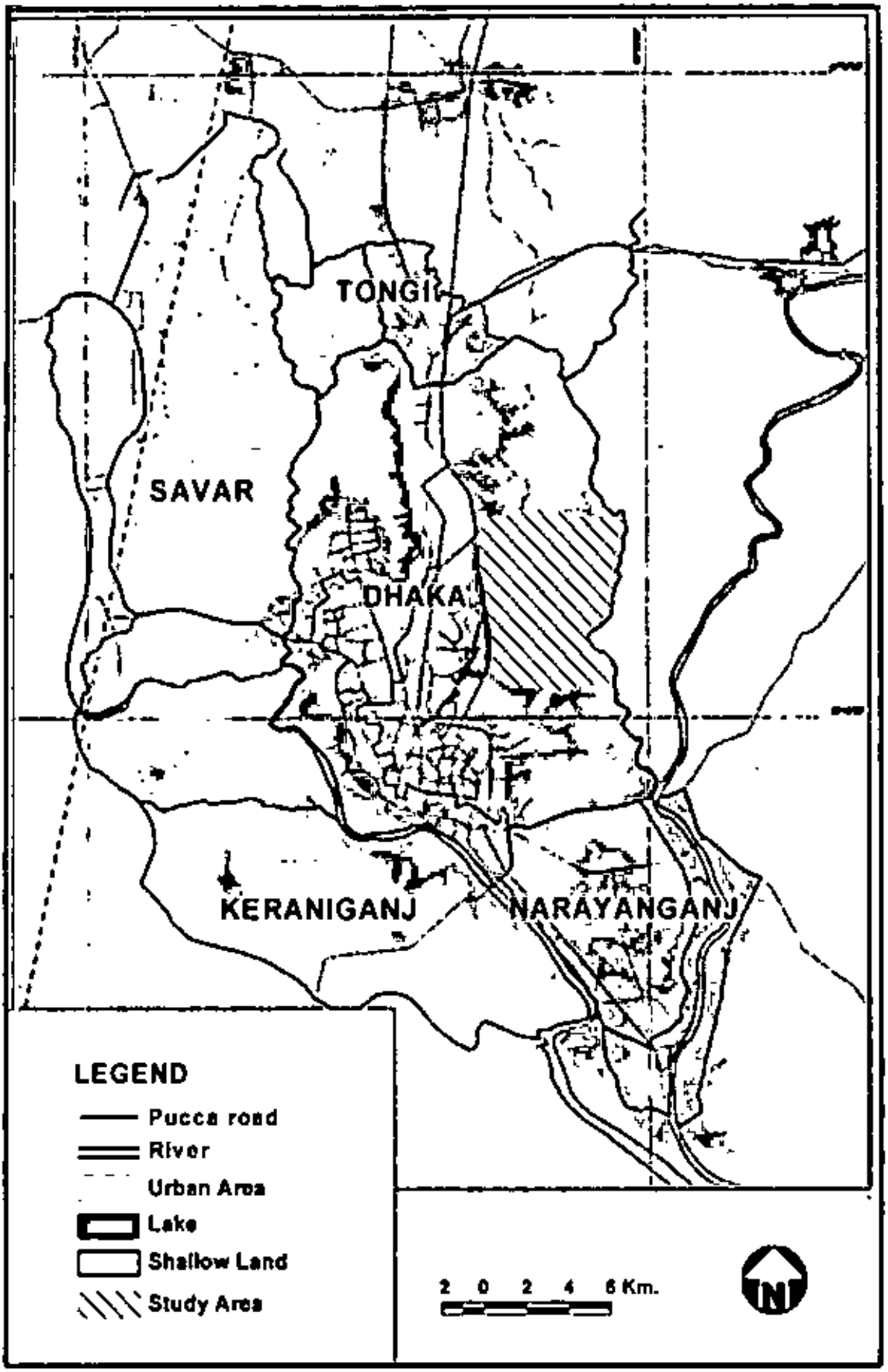
Map 2.7 Characteristic Zones of Dhaka City, 1981
Source: DMPUDP-1981



Map 2.8 Urbanization, 1990, Dhaka
Source: FAP, 8A, 1992, JICA



Map 2.9 Urbanization, 1996, Dhaka
Source: FAP, 8A, 1992 (Projected), JICA



Map 2.10 Urbanization, 2000, Dhaka
Source: FAP, 8A, 1992 (Projected), JICA

A strategy, as opposed to a plan, recognizes that the future is not certain, and that it is not possible to predict with confidence the future circumstances of the city. Equally it is not possible to foresee the appropriate physical form of urban development areas beyond medium term. The detailed design of development should not therefore be attempted until the development of an area is likely within succeeding five or ten year period. This approach means that certain decisions affecting the development of the city in medium and long term cannot be built into the strategy immediately. One purpose of the strategy should be to identify those which cannot be taken immediately, to suggest approximate date at which decisions will be necessary, and to recommend the trends which must be kept under review to allow decision points to be identified more accurately at a later time.

The purpose of a strategy is to lessen collective uncertainty about short- term action, and to provide a coordinated basis for development agencies to proceed knowing that they are all working together for a common goal. For a strategy to be implemented it has to be expressed as programmes, projects and physical plans.

An appropriate way of detailing the physical form of an urban development strategy at the city level is by a structure plan. This term is derived from the British planning practice, but the concept is widely used internationally. Its principal components are:

- The built-up area of the city, divided into broad zones of different land uses. character and density
- Main lines of communication
- Principal institutional uses which serve the whole city
- The main functional areas of the city

A structural plan differs from the older-style master plan by concentrating only on the broad structure of the city. It is not concerned, as are master plans, with either the detail of the physical layout of the city. or with the detail of individual development areas, which cannot be implemented until the later stages of the plan period. The preparation of a master plan for the whole metropolitan area would be totally inappropriate and at variance with the strategy and structure plan approach. It would not be possible to determine the detailed form of land use and development implied by a master plan over such a long time scale, bearing in mind the uncertainties associated with economic and population growth. Its preparation would, in addition, be time-consuming and would be in the current situation be an irresponsible use of skilled manpower to little purpose.

What is required is the production of more limited area specific plans where action can be contemplated within a relatively short time when needed.

With structure plan technique, individual parts of the city development area are not planned in physical detail until their development is within the short-term programme period. These areas may be parts of the existing city proposed for redevelopment or improvement, or they may, more often, be proposed urban expansion areas.

2.5 Dhaka Metropolitan Development Plan (1995-2015):

With the above issues in mind the preparation of the Dhaka Metropolitan Area Development Plan (DMDP) was started in 1991 (after the single the City Master Plan of Dhaka, 1959). This plan has been prepared comprising 1528 sqkm area administered by the RAJUK (Map.2.11). Within this jurisdiction, Dhaka City Corporation (DCC) and five municipalities namely Narayanganj, Kadamrasul, Savar, Gazipur and Tongi and Keraniganj (not yet functioning) their surrounding areas are included. Each type of the following plan is designed to meet particular needs.

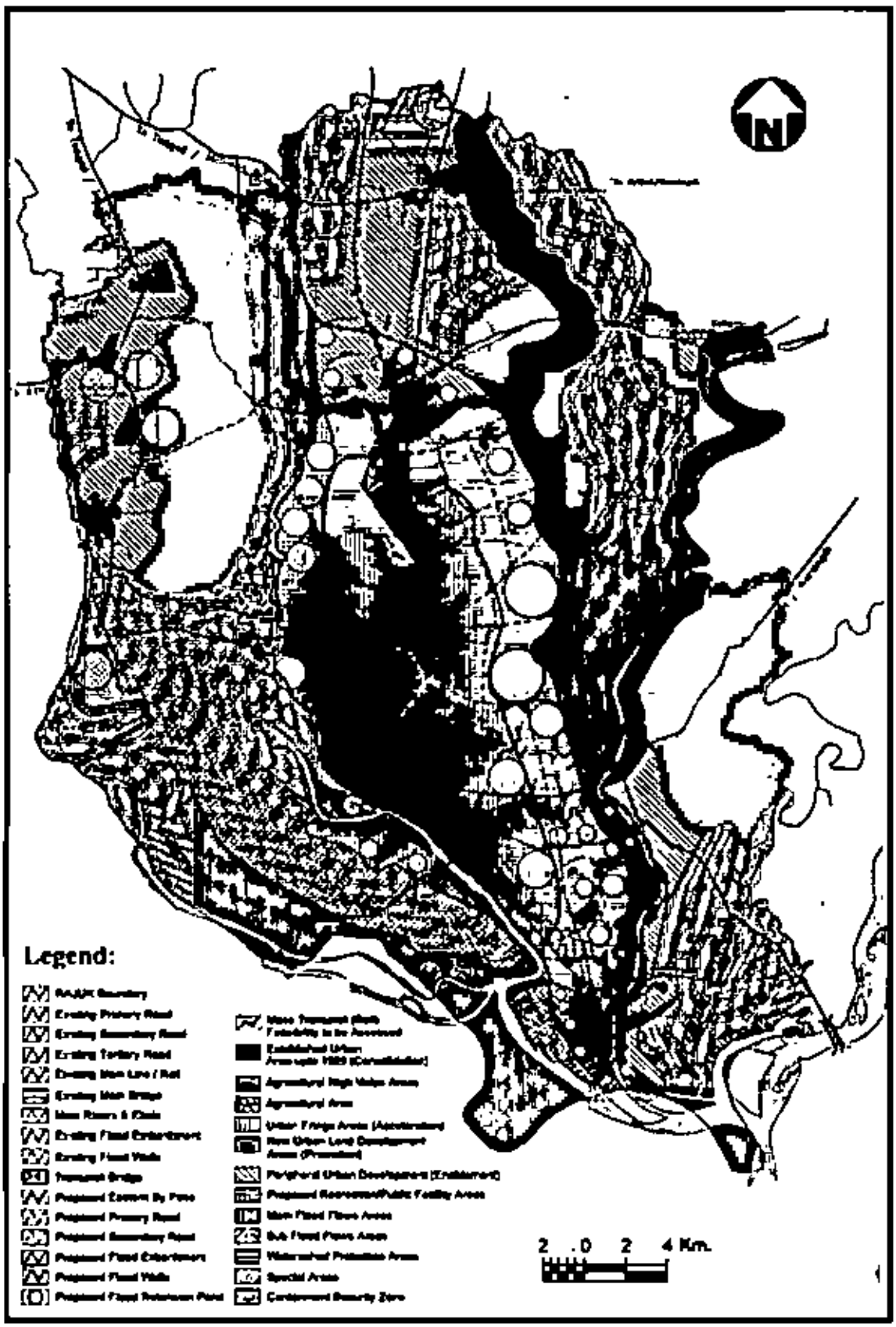
A. Dhaka Structure Plan[3]
B. Urban Area Plan[4]
C. Detailed Area Plan[5]

Each type of the above mentioned plan is designed to meet particular needs (6).

A. Dhaka Structure Plan (SP):

- The plan embodied in Dhaka SP proposals is presented semi-diagrammatically at 1:50,000 scales. As such they are broad brush and indicative and are developed and elaborated in the DMDP Urban Area Plan and Detailed Area Plan;
- Dhaka SP provides a long term strategy and coincides with the launching of the longer tern national planning covering the periods 1995 to 2015

[3] DMDP Structure Plan provides a long-term strategy for 20 years to 2015 for the development of greater Dhaka sub-region.
[4] Urban Area Plan provides an interim mid-term strategy for 10 years to 2005 and covers for the development of urban areas within Metro Dhaka Management Area.
[5] Detailed Area Plans provide more detailed planning proposals for specific sub-areas of Dhaka.



Map: 2.11 Dhaka Metropolitan Development Plan 1995-2015

Source: DMDP, RAJUK.

- It should be reviewed and updated every five years with the reviews taking place at least one year before the end of each five year periods
- It identifies the magnitude and direction of growth
- Recommends spatial and sector-wise policies over the long term for the DMDP area of control of about 1528 sqkm.

Functions of Dhaka SP:

Dhaka SP covers the whole of RAJUK's development control area (1528 sqkm). The function of the plan will be to:

- Interpret national policies
- Establish aims and policies and general proposals to guide metropolitan Dhaka's long-term growth and development
- Provide a framework and the mechanisms necessary to ensure that all the public and private agencies coordinate and prioritise their respective development planning and investment programmes and decisions within the metropolitan area, in particular, phasing of development.

The Dhaka SP, both in its preparatory and implementation stages, aims to provide coordinated and consistent framework for the development of the plan and programmes of all the public and private sector agencies within the metropolitan areas and to:

- Bring the main planning issues of the metropolitan areas to the attention of the government, other public and private sector agencies, vested interest groups and the public at large. The broad and strategic intent of the Dhaka SP will need wide dissemination;
- Provide a framework for local plans. Dhaka SP will set the context for the preparation of Detailed Area Plans and Local Plans, as appropriate, including identification of development themes and specific areas in need of immediate/short-term action
- Provide guidance for development management. Structure Plan will provide the basis for development management at the broad metropolitan level, via management policies for items of strategic and structural importance. The Dhaka SP (DMDP) will not include detailed development management policies or standards.

Form and Content of Dhaka SP: (1995-2015)

The Dhaka SP (DMDP) is presented both in written and graphic form. The written documentation is as important as the physical plans – they should be read in conjunction with each other. The series of plans provide the geographical context for the recommended policies presented.

Topics covered by the Dhaka SP (DMDP) include the following policies and provide guidelines:

- Population
- Land use provision
- Economic development
- Industrial
- Shelter and housing
- Physical infrastructure (road, waterway and railway etc), social infrastructure (open/recreational spaces, educational institution and other civic facilities)
- Flood control and drainage
- Utility services etc

B. Urban Area Plan (UAP) 1995-2005:

The vicinity designated in the Dhaka SP (DMDP) is, for strategic planning purposes, subdivided into following broad categories.

The content of the UAP (DMDP):

- The UAP provides for a mid-term strategy programme for 10 years (1995-2005) and cover for the development of urban areas within the metro Dhaka management area;
- The geographic boundaries comprising the UAP area are the areas within the proposed FAP 8A and 8B (JICA) as well as the Tongi-Gazipur and Savar-Dhamsona areas
- The UAP (DMDP) has several components consisting of an Explanatory Report, Resources Maps, Interim Management Report, Interim Planning Rules, Urban Area Plan Map, and a Multi-sectoral Investment Program (explained as below).

i. Explanatory Report: This report explains the basis for the UAP and describes the salient features for each of the 26 Spatial Planning Zones (SPZs).

ii. Resources Map: This is a record of existing infrastructure locations, along with the public and private sector development commitments.

iii. Interim Management Report: This report describes the basis and approach taken toward urban land use management.

iv. Interim Planning Rules: It states in a legal format the rules for urban land use management within the UAP.

v. UAP: It designates various land use management zones.

vi. Multi-Sectoral Investment Program: This integrates and prioritises urban development investments over the next 3-5 years.

C. Detailed Area Plan (DAP):

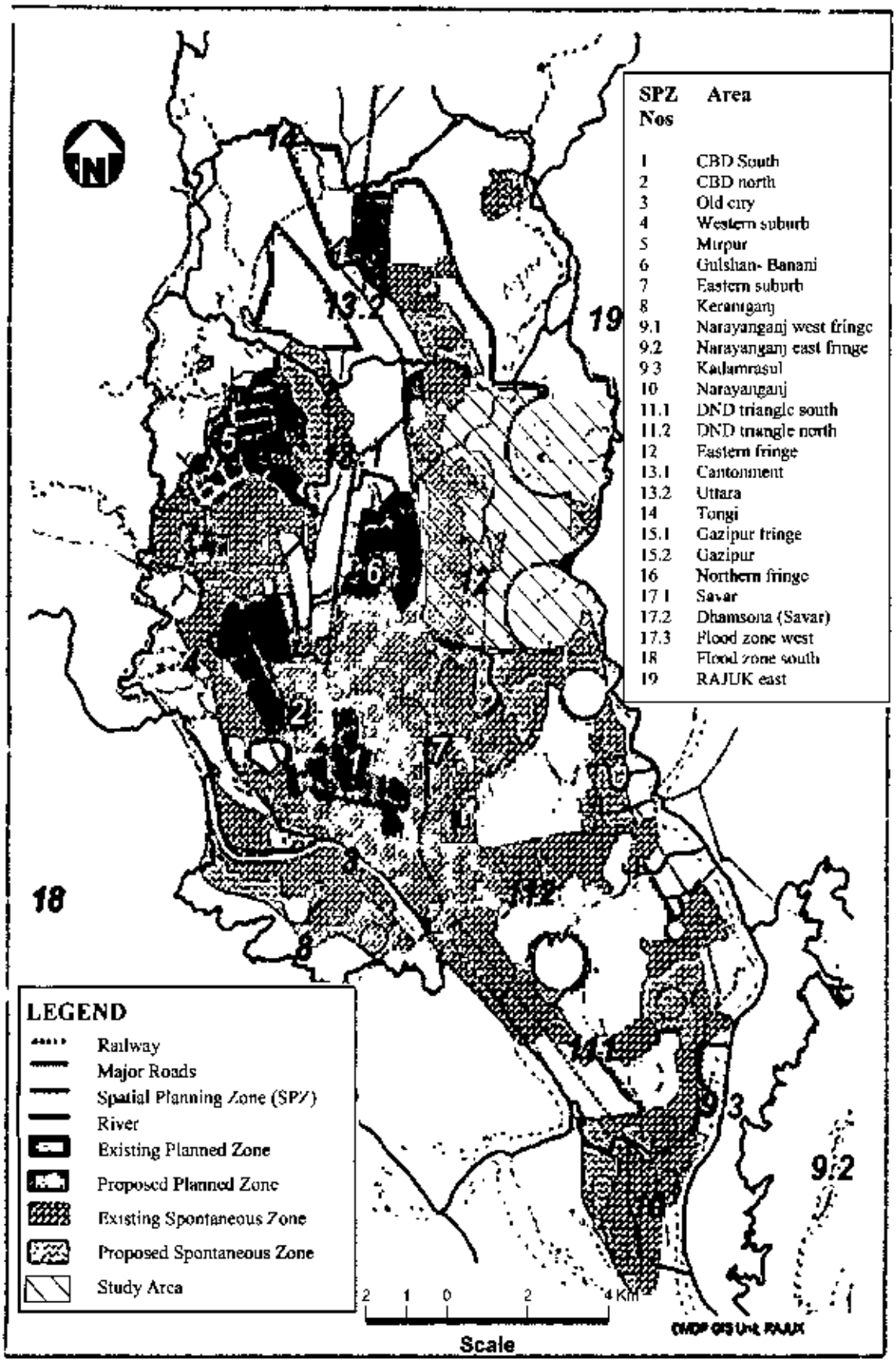
- The DAP (DMDP) provides more detailed planning proposals for specific sub-areas of Dhaka
- The DAP consists of reports and maps at 1:3960 scale (or larger as appropriate) with supporting documents
- Until a DAP is prepared for a sub-area land use management functions will be exercised through the policies, guidelines and rules found in the Structure Plan and the Urban Area Plan.

2.6 Land Use Characteristics and Dynamics of the SPZs[6] (DMDP)

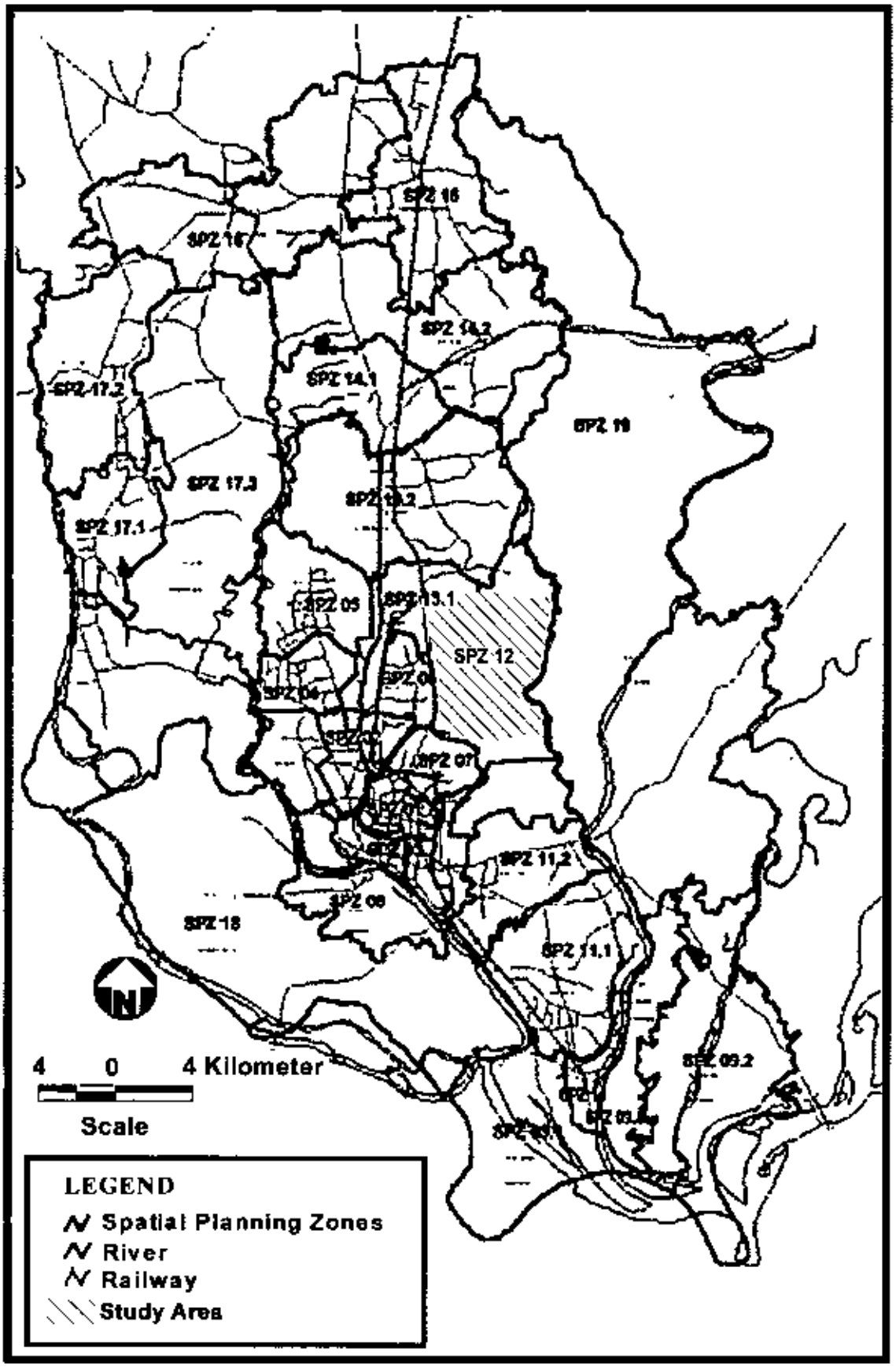
- The land use provision of DMDP is shown in Map 2.12.

The DMDP areas have been divided into 26 Spatial Planning Zones and sub-zones (SPZs)[7]. Map 2.13 describes the characteristics of land use and dynamics of different spatial zones of the city, which are summarized and presented in Table 2.1.

[6] SPZ (Spatial Planning Zones)-Geographic unit of the DMA, which is laid down in the DMDP.
[7] SPZ (Spatial Planning Zones) –Geographic unit of Metropolitan Area



Map 2.12 Laud use Categories, 1995
Source: Adapted from DMDP 1995-2015, (Adjusted)



Map 2.13 Spatial Planning Zones (SPZs) in Dhaka Metropolitan Area
Source: DMDP 1995-2015, 1997, (Adjusted)

Table 2.1: Characteristics of Land use SPZs of DMDP Areas

SPZs (Spatial Planning Zones)	Locations	Characteristics of Land use	Dynamics
SPZ-1 Central Business District (CBD) South	Ramna, Segunbagicha and Surrounding Areas	- Predominantly Institution Use (south-west) - Residential (North-east) - Park Open Space	Densifying[8]
SPZ-2 Central Business Business District (CBD) North	Dhanmondi, Kalabagan, DIR Area Tajgoan, Nakhal para and Surrounding Areas	Mixed Use (Residential, Institutional and Industrial)	Densifying
SPZ-3 Old City	Old City Area Sadarghat, Chakbazaar, Islampur, Tatibazaar, Wari and Surrounding Areas	-Commercial Heart of City (Commercial Wholesale, Residential, Historical Areas)	Static
SPZ-4 Western Suburbs	Lalmatia, Mohammadpur, Rayerbazaar, Hazaribagh, Shewrapara, Kamrangir Char Areas	- Planned Residential -Spontaneous Development and Concentration of Slums	Intensifying[9]
SPZ-5 Mirpur	Mirpur and Surrounding Areas	- Predominantly Planned Residential Use -Institutional and -Recreational Use	Densifying and intensifying
SPZ-6 Gulshan, Banani, Baridhara, Badda	Gulshan, Banani, Baridhara, Badda, Mohakhali and Surrounding Areas	-Planned Residential Areas with Commercial-cum-Residential	Densifying and intensifying
SPZ-7 Eastern Suburbs	Khilgaon, Jatrabari, Golapbagh, Manik Nagar, Mugdapara, Manda, Shahjahanpur, Nandipara, Rampura, Malibagh	Mixed Use (Spontaneous Development)	Intensifying
SPZ-8 Jinjira/Kerani-ganj	The Opposite Bank of Buriganga (Jinjira and Keraniganj)	Mixed Use (Unplanned) -Residential (Low Income Group)	Intensifying (Spontaneous)
SPZ-9.1 Narayanganj Fringe-West	Narayanganj District	-Rural Character (Residential, Industrial and Others)	Intensifying (slow development)
SPZ-9.2 Narayanganj Fringe East	North-east of Dhaka-Chittagong Highway	- Predominantly Rural Character - Sonargoan (Historical Area)	Static
SPZ-9.3 Kadam Rasul Pourashava	The Eastern Bank of River Sitalakkhya	-Mixed Use with Rural Character	Intensifying
SPZ-10 Narayanganj	The Western Bank of Sitalakkhya	Mixed Use (trade centre Industrial and Residential)	Deteriorating

Continued next page

[8] Densifying: More people coming in
[9] Intensifying: More function and activities coming in

SPZ-11.1 DND Triangle south	Area with in Dhaka Narayanganj-Demra Road	- Mixed Use with Rural Character (Protected by Embankments)	Densifying)
SPz-11.2 DND Triangle north	Northern Part of DND Triangle	- Mixed Use with Rural Character (Protected by Embankments)	Densifying (slow dev.due to restriction
SPZ-12 Eastern Fringe	Area in between Pragati Sarani and River Balu	- Eastern fringe areas (Low-lying Area). -Planned Residential Area (Dev. by Private Companies)	Densifying
SPZ-13.1 Cantonment	Dhaka Cantonment	-Restricted Area, (Controlled by Cantt. Board)	Densifying
SPZ-13.2 Uttara	Uttara (Northern Part of City)	- Planned Residential Area - Spontaneous Dev. at Uttar khan. Dakhin Khan	Densifying
SPZ-14.1 Tongi	Tongi	-Planned Industrial Area -Spontaneous Development	Intensifying
SP-14.2 Tongi/ Gazipur Fringe	Area in between Tongi and Gazipur	-Predominantly Rural Character.	Intensifying
SPZ-15 Gazipur	North-eastern Edge of RAJUK Area	- Planned Institutional Area - Spontaneous Development	Intensifying
SPZ-16 Northern Fringe	North-western Edge of RAJUK Area	- Rural-based - Forest	Static (slow dev.
SPZ-17.1 Savar	Savar	Mixed Use (Institutional, Industrial and Commercial)	Intensifying
SPZ-17.2 Dhamsona	Dhamsona (Savar)	Mixed Use (Institutional, DEPZ, National Mausoleum, Industrial	Intensifying
SPZ-17.3 Flood Zone West	In between Savar and Dhamsona	Flood Plain Character (Rural/Pisculture	Mostly Static
SPZ-18 Dhaleshwari/ Flood zone-south	Area is under Keranigonj Thana	- Predominantly Rural Character.	Static
SPZ-19 RAJUK East	Eastern Boundary of RAJUK	Predominantly Rural Character -Industrial - Purbachal New Town	Static

Source: DMDP 1995-2015

Development and Population Distribution:

Dhaka's spatial development pattern was not in conformity with the Dhaka City Master Plan, 1959. A large part of the city was already in existence at the time the plan was in its preparation level. It is surprising that growth occurring beyond the urban envelope of the master plan is of such modest proportions. Even more surprising is that some of the land designated for development in the Dhaka City Master Plan, 1959 has not yet been urbanized.

The outgrowth and undergrowth patterns of the Dhaka City Master Plan, 1959 are approximately of equal proportions. Although mismatched spatially, today's gross urbanized area is little different from that proposed in the 1959 plan. Two statements emerge from this; first that with four times the population designed for in the master plan, the vast majority of additional growth has been absorbed via densification and not via continuing outward expansion. Second, in spatial terms, whilst most of the outgrowth is relatively central, the designated areas, which failed to attract significant growth at the northern side of Uttara and Tongi; and the southern extremes at Narayanganj *(Strategic Growth Option Dhaka – 2016, DMDP).*

It is evident that relatively little urbanization has occurred in the northern expansion areas proposed in the DMAIUDP 1981 strategy. This is unsurprising as the strategy was never officially adopted, and by the estimates of the plan itself, would have only now begun to have an impact had the plans for implementation been laid.

The 1981 Population Census allows comparison of actual distribution of population relative to that planned in the Dacca City Master Plan 1959, just two years after the end of its plan period.

Using the Statistical Metropolitan Areas (SMA) 1981 as an approximation for the 1959 Master Plan area (it was in fact slightly smaller), the first column of Table 2.2 indicates that in gross terms its population at 3.7 million in 1981 was two and a half times larger than planned.

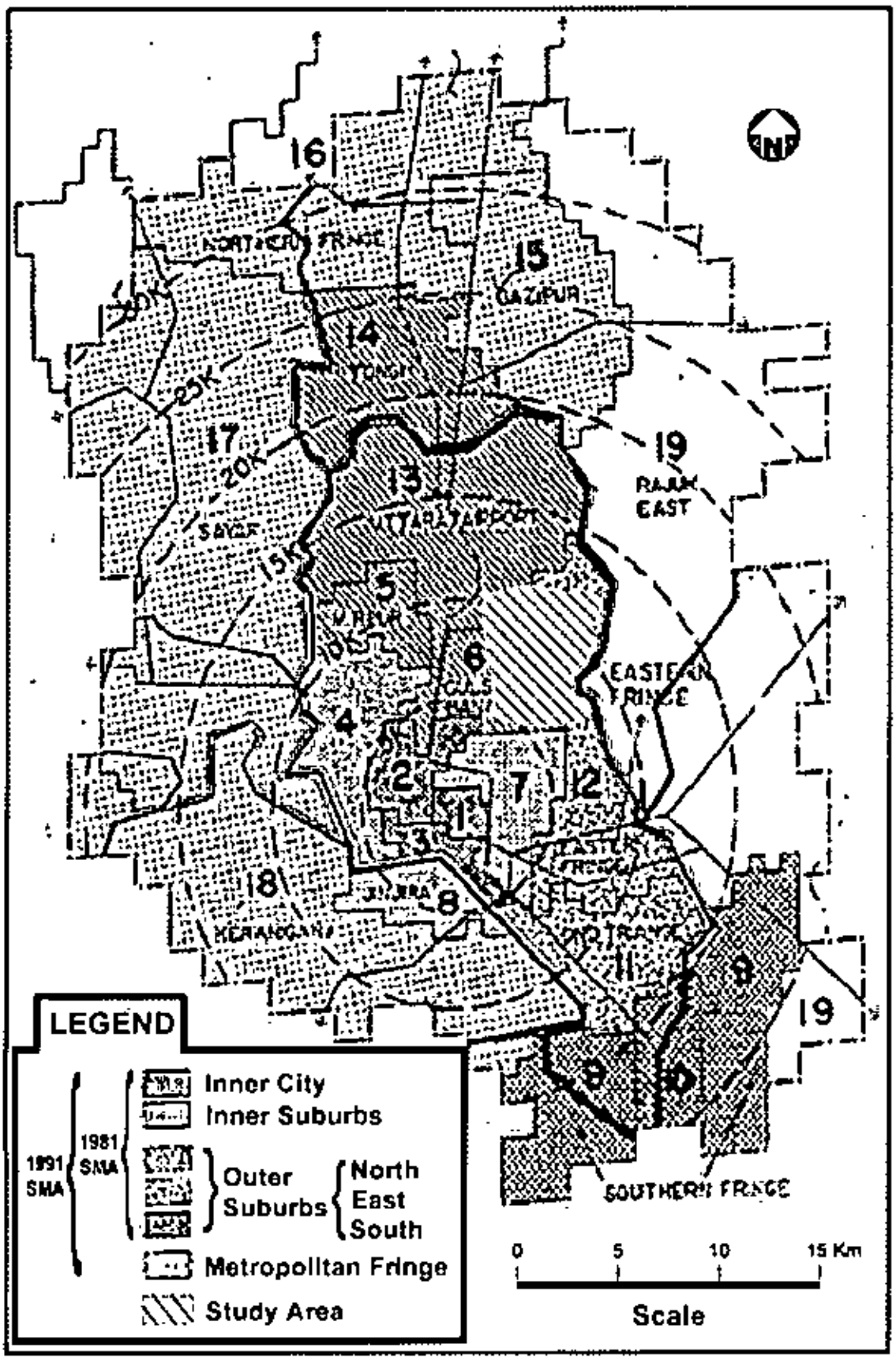
Table 2.2: Share of Population 1981, 1991 & 2000 and Share Growth by Area (SMA)

SPZs	1981 Population		1991 Population		1981-91 Pop Increase		Population, 2000
	Total (000's)	Share in %	Total (000's)	Share in %	Total Increase	Share in %	Total (000's)
1.2 & 3	1,189	32	1,402	26	213	12	1653
4,7 & 8	1,109	30	1,890	35	781	45	3221
Sub-Total (1)	2,298	62	3,292	61	994	57	4874
5.6.13 & 14	605	16	1,002	18	397	23	1659
9 & 10	463	12	546	10	83	4	643
11 & 12	340	10	619	11	279	16	1126
Sub-Total (2)	1,408	38	2,167	39	759	43	3428
Total:	3,706	100	5,459	100	1,753	100	8302

Source: BBS 1981 and 1991 Census of Population (unadjusted) and 2000 (projected).

We know from the City Master Plan, 1959 that most of the population growth forecast (almost half a million) was to be distributed into the expansion areas of Mirpur, Gulshan/Banani and Uttara, Tongi. These areas are encompassed by ***SPZs*** 5, 6, 13 and 14, encompasses these areas. This is a clear indication that up to 1981 the majority of population increase was being absorbed via densification rather than dispersal. Table 2.2 also indicates that this pattern changed very little to 1991. The main conclusions from a comparison of 1981 and 1991 (Map 2.14) population distribution are:

- The inner urban areas (SPZs 1-4, 7 and 8) continued to receive most of the growth (57%) within the area of the 1981 SMA and maintained their share of total population 62 percent in 1981 and 61 percent in 1991).
- Whilst the core area (SPZs 1-3) showed a relative decline in its rate of growth, the inner suburbs (SPZs 4, 7 and 8) absorbed fully 45 percent of all growth, increasing its share of total population from 30 percent to 35 percent.
- In the outer urban areas, modest increases in the share of total population occurred in the north (SPZs 5, 6, 13 and 14) and east (SPZs 11 and 12) but in Narayanganj and the southern fringes shares declined as a result of below average growth rates.



Map 2.14 SPZ Groupings by 1981-1991 in Dhaka Metropolitan Area
Source: Strategic Growth Options – 1993 (DMDP)

2.7 Land Conversion and Population Distribution

The DMDP studies have revealed that the 1980s were a period of major land conversion within the 1981 (SPZs 1-14). It was calculated that about 5670 hectares were converted from rural to urban use between 1983 and 1991. It was assumed that about 2116 hectares new urban land was developed by the period 1991 and population densities reached a quarter of the 1983 level. The density of the established built-up areas was increased by 29 percent in Inner Zone 1-8. Almost two-thirds of this total occurred in the fringe area particularly, SPZs 11-14. The position was reversed in the central urban zone (SPZs 1-8) where 70 percent of the population growth occurred but with only 38 percent of the increase in newly converted land.

It was shown that only 30 percent of population increase between 1983 and 1991, but 63 percent of the increase in new urban land. The area of urban land in the outer zone almost doubled during this period. The land increase outstripped population increase by 2 to 1, the opposite of what happened in the Inner Zones. Overall population density actually dropped in the outer zones particularly Outer Zone 9-14.

Further studies revealed that although overall urban land has increased by 50 percent the new land absorbed only 32 percent of the population increase with fully 68 percent being absorbed via identification within built-up areas.

Population distribution between Inner and Outer Zones stayed constant but land increase was overwhelmingly in the Outer Zones. However, despite the constancy of population ratio, actual growth was much greater in the Inner Zones, as they contained the bulk of the population. About 70 percent of total increase was in the Inner Zones. As the increase of new land in the Inner Zones was limited, most of the population would have been accommodated at higher densities (7). The percentage of total increase in land and population, 1983-91 is tabulated below:

Table 2.3: Percentage of Total Increase in Land and Population 1983-91

	Inner Zones		Outer Zones	
	% Population	% Land	% Population	% Land
1983	73	66	27	34
1991	72	56	28	44

Source: Strategic Growth Option Dhaka – 2016, DMDP, 1993.

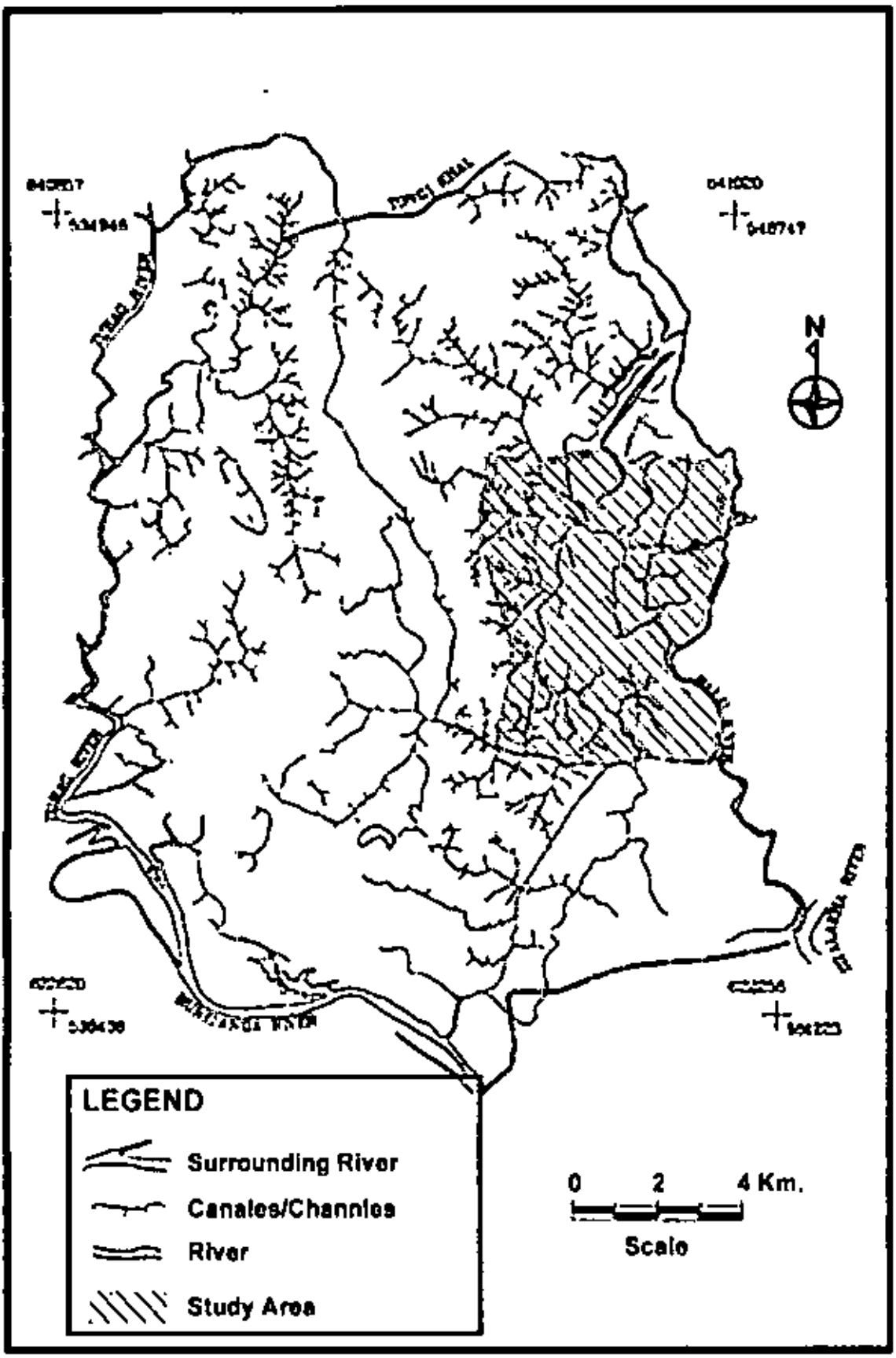
Why the fringe areas of Dhaka are highly pressurized for urban development? The reasons are categorically explain in chapter one and two. However, it is clear that population of city has been increased and also the established urban areas have experienced heavy increase in population gradually. Moreover, the unused and under utilized lands are bring under urban use. The pocket lands in the city areas are also being occupied intensively. In process, the land value enhances in urbanized areas. Therefore, middle income and lower groups have very limited access to urban land. In this situation, urban fringe and surroundings are tremendously pressurized for urban development.

Due to construction of the embankment in western part of Dhaka with the technical and financial supports of ADB under FAP 8B project, a huge land has become free from annual flooding and these lands have been quickly developed due to initiatives from both public and private sectors. The eastern fringe areas have been left out and waiting for development as the area is not protected by flood control embankment. Meanwhile, actors like the PLDCs, (formal and informal companies), Cooperative Housing Societies, Individuals are implementing their housing projects. It is also found that the individual developments are taking place through incremental land filling. All of these actors are highly encouraged due to a certain opportunities which are: demand for housing plots, close proximity of fringe areas to city and cheap land value etc.

2.8 Fringe Area Development under the DMDP:

Eastern fringe, particularly, the study area covers about 46.61 sqkm which includes central and southern compartments of FAP 8A 1992, JICA study. Most of the land in eastern fringe is low lying and a large portion of lands is liable to annual flooding.

In 1950, the growth in the eastern fringe was slowly continued by the initiative of individual landowners. Growth opportunities were not available in the areas due to poor connectivity in terms of road, rail and others. Only canal networks were used for water transport and drainage purposes. During this period (1950s) there was an excellent channel/canal network within the city and the eastern and western peripheral areas (Map 2.15).



Map 2.15 Rivers and Channels in Dhaka City Per-Urban Conditions
Source: 1955 Aerial Photograph Interpretation (Map Coordinate BTM Projection)

In 1960s the growth in fringe areas was continued by landowners to build houses through incremental land filling while the formal and informal private sectors played a minor role. In 1970, growth in the northern part of eastern fringe was accelerated by the completions of Rampura Road. Mostly growth has taken place along the road on higher lands but not on lands those were deep inside.

During 1980s, development took place in a spontaneous, but haphazard way, leaving little way either for an appropriate road network or for basic infrastructure facilities and services. During this period, most PLDCs (formal and informal companies) have come up in the peripheral areas with housing projects through massive land filling. The PLDCs realized the opportunities to develop housing project in the peripheral areas. The opportunities were:

- Tremendous demand for housing plots
- Available flood protected land (particularly in the west and southern parts) of the city
- Land to close to the city and
- Low price of etc.

In the absence of an overall guidance plan for the area, it is very difficult to achieve rational development. A comparison of 1983-1991 shows that 37 percent increase in urban population. 51 percent in areas in then urban land and 11 percent decrease in grows population density. Population, urban areas and density 1983-91 is shown in the following table:

Table 2.4: Population, Urban Areas and Density 1983-91

Zone	Urban Population (000s)		Urban Build-up Areas in hectare		Densities per hectare	
	1983	1991	1983	1991	1983	1991
Eastern Fringe	152	245	434	1122	350	218
SMA Areas (1981)	4,253	5,830	11143	16931	382	344

Source: Strategic Growth Options -Dhaka 2016, DMDP

Urban Fringe Development Policy (DMDP):

"The Authorities will initiate and co-ordinate a range of measures aimed at stimulating reorganization and re-subdivision of the urban fringe area."
This is the area of land, which was converted to urban use in the 1980's. It is widely scattered around most of Dhaka's established urban area including urban fringe.

2.9 Land Use Planning:

Land use planning is an extremely complex matter, combining physical, social and economic aspects of land use with an assessment of potential future needs. The land use planning system should be efficient, effective and simple in conception and operation, to facilitate and bring about the desired level of development. Land use planning should not be regarded simply as a tool for preventing change. Properly used it can help to secure economy, efficiency and amenity in the area of development and use of the land. The land use planning function was increasingly employed as an enabling function to encourage private enterprise to undertake development programs in circumstances that would otherwise have been difficult or unattractive. The purpose of land use planning is to select land to maintain land use practices that will meet the needs of the people best while safeguarding resources for the future. The driving force in planning is the need for change, the need for improved management or the need for a quite different pattern of land use dictated by changing economic, political or social circumstances.

2.10 Theoretical Explanation:

This research is guided by the established theories and concepts on fringe area development. In this case signal theory or concept does not cover or explain all the components and sub- components in the process of the fringe area development. The major components are: the physical growth and land use change, drainage and embankment, natural, chemical and biological environment. All these components and their sub-components have been addressed in the light of the theories. The relevant theories are: urban land use theories (the concentric, sector and multiple nuclei), good city form and micro-economic urban land use theories and the concept of sustainable development.

a. Urban Land Use Theories:

Urban land use theories focus on the conversion of individual parcels of land from rural to urban uses and on the role of the actors of public and private sectors in that conversion. These three theories were developed over the twenty-five year period from 1920 to 1945 and each added to the knowledge of cities. Three major urban land use theories are: the concentric ring theory, sector theory and multiple nuclei theory, which are, explained the overall structure of cities. These theories are illustrated below:

a. The concentric ring theory is based on the pioneering work of Ernest Burgess. Who identified five zones of land use: (i) a Central Business District (CBD) representing the centre of activity, generally close to the site of the original settlement; (ii) a zone of transition, mixing commercial and industrial uses; (iii) a low-income housing zone in the metropolitan area, containing older housing units; static while the transition zone enlarges into the central zone.

b. The sector theory was proposed in 1939. It suggests that city grows not in strict concentric zones, but rather in sectors of similar types of development. That is, residential areas might expand outward along existing transportation links, topographic features, and natural amenities.

c. The multiple nuclei theory was developed in 1945 by Chauncy Harris and Edward Ullman, It varies from previous views in that the downtown area is not considered to be the only focal point for growth. Land use patterns are seen to develop as a series of nuclei, each with a different function. Each centre develops from the spatial interdependence of certain functions.

Contemporary urban land use theory typically concentrates either on use value characteristics or on exchange value characteristics but there is little or no conception as to how the two may be related to each other. Geographers and sociologists have evolved a variety of land use theories, which focus on patterns of use. The concentric zone, sectoral and multiple nuclei theories are nothing more than generalized descriptions of patterns of use in the urban space economy. The tradition of research in factorial ecology attempts the same thing with much greater sophistication, while the work of

other sociologists such as Gas (1970) and Suttees (1968) brings a certain amount of realism to the somewhat arid statistical summaries of factorial ecology. Other various devices exist for generalizing statistically about the macro patterns of urban land use.

It is tempting to view this corpus of urban land use theory as providing an adequate framework for analysing the market forces shaping urban land use. Unfortunately these theories abstract from questions of use value and do as little to bring use and exchange value together as do the formulations of geographers and sociologists, who start with use value as their basic consideration. The fact that utility maximizing models contain a crude assumption concerning the relationship between use value and exchange value should not deceive us into thinking that real problems have been resolved. This is not to condemn the models derived out of microeconomics as useless. They focus on the exchange value aspect of urban land use theory in much the same way that geographers and sociologists have shed light on the use value aspects. But an adequate urban land use theory requires a synthesis of both these two aspects in such a way that grasp the social process of commodity exchange in the sense that Marx conceived of it. This theory will not be easy to construct, particularly in view of the peculiar qualities of land and improvements and the diverse uses to which these may be put.

b. Theory of Good City Form:

Lynch Kevin's (1981) theory of "Good City Form" reserves how urban settlement patterns have responded to social values and how they influence the heath and welfare of all city residents. The histories of specific elements of urban form have been treated separately.

In this theory, the ideal situation has explained. The Good Urban Form takes place based on several factors, which are mainly physical character of the city and surroundings (topography. land level, soil condition etc.), land use policy of public sector, master plan of city, socio-economic condition and urban heritage and socio-cultural behaviour. This theory may help to understand the settlement pattern and policy oriented land use. However, the theory of good city form may also help to understand the city development.

2.11 The Concept of Sustainable Development:

The literature on sustainable development is already vast and continues to grow. This new revolution provides the foundations of the concept of sustainable development. The term has become a popular catch phrase and as Pearce, Markandya and Barbier (1989) point out it is difficult to be against "sustainable urban development". The concept is usually associated with the Brundtland Commission Report in 1987, but the true origins can be traced back to the World Conservation Strategy: Living Resource Conservation for Sustainable Development (IUCN 1980). The second "World Conservation Strategy" recognises a more central role for economics. The concept of economic sustainability is introduced in the form of the requirement to pass on to future generations a non-declining stock of capital assets, including environmental assets, to ensure intergenerational equity.

In 1987, the concept of "sustainable urban development" on the international agenda and highlighted its applicability to the environmental problems. The natural resources and that environment as an input into are complements, it is not economic growth per se that is to be rejected but there is a need to search for alternative development strategies and technologies based on sustaining and expanding the environmental resource base. In the words of the Brundt land Commission (1987): "There has been a growing realisation in national government and multilateral institutions that it is impossible to separate economic development issues from environmental issues, many forms of development erode the environmental resources upon which they must be based, and environmental degradation can undermine economic development."

In many ways this is true for, as White and Whitney (1992) point out, most modern cities have spread far beyond their 'carrying capacity' and draw resources from very wide areas: in return, the more immediately surrounding areas often received much of the waste and pollution from rapid urban growth, in form of contaminated water, land and air.

The objectives of environmentally sustainable development are economic, social and ecological. The economic objectives include growth, equity and efficiency; the social objectives include employment, participation social mobility and cohesion, cultural

identity and institutional development; ecological objectives include: ecosystem integrity, carrying capacity, biodiversity and global issues.

The components of sustainable urban development are economic (urban fiscal base, access to adequate income); political (role of state, institution and participatory planning); social (basic needs and human rights); demographic (fertility, migration and ethnical); and environmental (sustainable use of renewable resources, minimal use of non- renewable resources and appropriate physical planning). Some major issues related to fringe areas development are discussed below:

Agriculture productivity: Sustainable development covers agricultural development (Markandy). The predominantly agricultural economies of developing countries depend on the availability and quality of natural resources for the sustained use of the bio productive systems of agriculture, ranching, forestry and fishery. Degradation and depletion of land /soil and water are thus the outstanding enviroumental problems. It is suggested that a set of working rules or targets covering equity, resilience and efficiency as a first step in making the concept operational in the agricultural sector.

Wetlands in fringe area: What is a wetland? It is wetland that is to say, land covered with water for appreciable periods of time. These areas bear such designations as swamps, marshes, bogs, fens and wet meadows. But in recent years, deep low lying areas also become wetlands with natural resources in its own right, duly validated by stature and provided the ultimate distinction of governmentally designated programme and agencies in many developed countries.

Problems in defining wetlands abound. The initial question involves how wet, how often, and for how long. What constitutes a recognizable wetland is another issue. Still a third question, and one currently rife with controversy in the United States, is how one goes about delineating a wetland. The fact is that the definition of a wetland will vary being agency and even by advocate.

Why do wetlands matter? Simply because they perform useful functions and provide important values. The first might be termed physical and hydrological. Wetlands, for example, impede wave action and disperse flood flows over area and time. By doing so, they trap and deposit sediments, and reduce erosion. Much has already been discovered

about the important natural relationships that exist between wetlands, surface water, and ground water in particular locations. In artificial settings, it is no accident that developers often seek to divert urban runoff into existing wetlands.

A second functional category is primarily biological and biochemical. Wetlands are invaluable as habitat for fish and wildlife, furnishing nutrients, food, and cover and even functioning as nursery ground for living resources. From the human standpoint, the biological capacity of wetlands to break down and assimilate wastes is becoming increasingly important for point and no point source pollution control. Economic benefits represent one of several categories of values. Directly harvestable wetland resources include such items as berries, rice, hay, peat, bottomland forests, fish and fur. Significant indirect returns can occur when wetlands increase water yields, enhance water quality, or prevent fold damage.

This theoretical expression gives wetlands importance to make the sustainable development for city or any part of the city. In case of eastern fringe area development of Dhaka it will be easy to understand and take the measures accordingly.

Environmental accounting or monitoring: The area that of environmental accounting or monitoring is also fundamental to the pursuit of policy of sustainable development. Markandya and others stress the need to develop a set of sustainability indicators that can be used to evaluate performance. But much of the information required doing this. such as data on the stocks and service flows related to environmental assets, is not routinely collected or analysed. Emphasis on these economic variables has led to a dangerous asymmetry and inconsistency in the way we think about the value of natural resources, which has been institutionalised, in the national accounting system. The fundamental definition of sustainable income requires that information be gathered on natural resource stocks and service flows. In wasting assets: natural resources in the national income accounts explore these issues showing how the difference in the treatment of natural resources provides false signals to policy makers and reinforces the false dichotomy between the economic and the environment that leads policy makers to ignore or destroy the latter in the name of economic development.

2.12 Micro-Economic Urban Land use Theory:

A critical appraisal of the micro economic approach will help us to identify what the problem is Kirwan and Martin (1971) has reviewed the contribution of this approach to our understanding of residential land uses. The assumptions typically built into the micro-economic approach are obviously unrealistic, and are generally admitted to be so. But then this is true of all micro-economic models of this sort. The question is how and to what degree the general conceptualization is unrealistic. This study can start to answer this by comparing the general nature of the results with the reality this study is seeking to understand. The remarkable fact is although the theories derived analytically, they have been subjected to rigorous empirical testing; these theories of urban land use (although normative) yield result, which are not too much at variance with the realities of city structure. Put another way, the case for regarding them as empirically relevant devices may not have been proved, but it has not been disproved either. These theories may thus be regarded as perhaps not unreasonable general characterisations of the forces shaping urban use.

2.13 Mega Cities:

The world is in the midst of a massive urban transition unlike that of any other time in history. Within the next decade, more than half of the world's population, an estimated 3.3 billon will be living in urban areas (UN, 1995). One commonly used metric for measuring urban growth is the 'mega city' defined as a city with a population exceeding 8 million. In 199-50, just two such mega cities existed: New York, with a population of 12.3 million, and London, with 8.7 million. By 1990, there were 21 mega cities, 16 of them in the developing world. In 2015. there will be 33 mega cities, 27 in the developing world (World Health Statistics Quarterly, vol. 44, 1991). Bangladesh is no exception with its capital, primate-mega city Dhaka is serving as the national and regional engines of growth. centres of economic growth, centres of technological creativity, centre of administrative, cultural and socio-economic functions, the veritable source of environmental pollution and sought after by millions of home and job-seekers. It is generally agreed that spatial restructuring is a pre-requisite for successful adjustment to the size of mega city. The negative externalities of large cities, such as, traffic congestion, environmental pollution, dearth of quantity and quality housing and

basic civic amenities can be overcome by decentralization and sub-urbanization. However, policymakers in most cases have avoided the efficient promotion of polycentric development. Such failures were particularly accounted to under-capitalization and the chronic failure to control change in land uses. Often resources were wasted by investing in infrastructure in the wrong place or in advance of prospective demand.

Mega cities deserve special attention considering their unique sizes, the enormous problems they present regarding their proper management and the impact they have on the residents. There are no precedents to mega-cities and they cannot be managed by simply scaling up solutions that are applied to smaller cities and towns. The mega cities require new, thoughtful and imaginative solutions in order to provide houses and create job opportunities, medical care, education, transportation, etc. to at least 10 million residents in specific cities and solutions applicable at such large scales which are economically viable and environmentally sustainable.

There are no primate-mega cities in the developed world, they are found only in the developing countries. In developed countries, the physical limit of the city is bounded by green belt or physical boundary or barrier. On the other hand, the cities in developing countries are rapidly growing due to mainly economic reason. Due to economic activities and employment in city areas population are concentrated rapidly. Some mega-cities in Asia adopted spatial strategies designed to promote a polycentric structure as a means of slowing down the growth experienced by mega cities. In the city of Mumbai, planners promoted the development of a second metropolitan city across the Thane Creek; while in New Delhi a decentralization programme was taken by promoting 18 growth centres including six ring towns. Jakarta attempted to alter the axis of growth by changing its previous north-south directional growth to an east-west one. More recently Kuala Lumpur has developed a second city in Putrajaya in a bid to decentralize the growth of Kuala Lumpur. Seoul promoted a directional strategy by developing new towns, satellite cities and industrial estates and associated transportation and communication facilities, housing, health care and educational facilities and related land use controls, taxes, etc. Dhaka adopted a northern direction development strategy in 1980s, but its growth pattern has widely deviated away from that proposed in the Master Plan. Of all the above examples of decentralization and/or

attempting to build an alternate or series of towns and cities to cope with increasing urbanization, the Malaysian planners have been very successful in redirecting growth of Kuala Lumpur to Putrajaya – which the planners has indeed every reasons to be found.

Urban Land Use Policy in Mega Cities:

Under land policies in the developing countries are mostly inappropriate where structural plan, urban area plan and detailed area plan are not exist. Most of the cities of developing countries are still follow the traditional master plan where the land use provision is mostly rigid. In the present context, this master plan has been abundant in most of developed countries, because there are a lot of conflicts raised during the enforcement. Moreover, urban land issues have not been coordinated to regional context, as result, mismanagement and poor-management are common phenomenon. Excessive and/ or ineffective regulations, inappropriate pricing and taxation systems. land speculations, etc. all add up to and help to perpetuate land use problems. The developed countries and some developing countries adopted land readjustment, guided land development technique through institution and resolve urban land management problems.

There is a critical relation between the urban form of a city and its land use. One of the hurdles to used successful land use planning is the poor institutional capacity to manage urban land. Most of the cities of the developing countries have inadequate information to frame required land use strategies. Present policy guidelines of the different sectors determine land use and these are managed according. It also helps to make harmony among the sectors of physical, economic, social and envrionmental condition.

2.14 Land Use Conversion:

There is no single theory of urban planning that can adequately explain the complex and dynamic realities of land use planning practice working under the conditions of competition, change and reciprocity. The city is constantly changing, thus a conceptual approach based on management of land use change comes closest to matching the reality of planning practice. Under this approach, the goals of all land use planning activities, including intelligence collection, advance planning. development management and problem solving are to monitor and guide continuing change to benefit

the community. To do so, land use planners must balance three competing sets of land values: social, market and ecological.

- **Social values** express the weight that people give to various arrangements of land use as settings for living their lives. This view sees land use as a facilitator of desirable activity pattern and social aspirations. Concepts of social use value include those derived from theories of urbau form, activities systems, and the social neighbourhood. They all consider connections betweeu physical environment and the quality of life and concerned them with planning, design and residents' behaviour.

- **Market values** express the weight that people give to land as a commodity. This view sees land as a real estate project medium. Commodity values of land drive the business side of urbanization, provides incentives to developers and financiers as well as measures of locational advantage for firms and organizations. In this view, land should be put to its "highest and best use" as determined by the operations of the market. As usual, land use planning practice operates in a terrain that is broad and responsive to changing urban conditions.

- **Ecological Values** express the weights that people give to the natural systems on the land. This view sees land use as a potential environmental threat to be mitigated.

The above three values sometimes work separately and sometimes compete with each other; sometimes they intermingle and support each other. Urbau land use planners have incorporated environmental integrity values into their plans through the use of concepts that link characteristics of land areas with environmeutal processes and human uses. The limits of ecological values are environmental (air, water and their quality; the stability of the ecosystem, soil erosion, etc.); physical (infrastructure capacity), or psychological (e.g. perspectives of crowding or aesthetics). Environmental assets are to be efficiently managed for human benefit through plans, management programs, regulatious and project evaluation.

To use a simple structural analogy, land use management can be visualized as a three legged tool whose seat is the main integrating framework, i.e. the land use management and three legs are the social values, market values and the ecological values. Further

holding the three legs together in place is the band of sustainable development. For the tool to stand and be usable, every part must be in place, equally proportional and properly joined (Chapin, 1994).

2.15 Real Estate Developers:

Developers and the housing construction industry are involved in the process of creating new use values for others in order to realize exchange values for themselves. The purchase of the land, the preparation of it (particularly the provision of public utilities), and the construction of the housing, requires considerable capital outlay in advance of exchange. Firms involved in this process are subject to competitive pressure, and must realize a profit. They therefore have a strong vested interest in bringing into being the use values necessary to sustain their exchange value benefits. There are numerous ways (both legal and illegal) for accomplishing this and certainly this group in the housing market has a strong vested interest in the process of sub-urbanization and to a lesser degree, in processes of rehabilitation and redevelopment. Both these groups are interested in use values for others, only in so far as they yield exchange values to themselves. They purchase certain percentage of lands and most of them are *biana* or basic/initial land agreement. In addition companies also occupy absentee lands and government-owned (*Khas*)[10] land. Under this process, land price is lower, but cost enhance for land filling. As a result, they can lease out plot at affordable and attractive price. Due to implementation of the project a large number of families are gradually being pushed out without rehabilitation.

2.16 The Private Land Development Companies (PLDCs):

There are two types of PLDCs, formal and informal. The formal companies are registered according to the company acts. They are known as housing company, housing cooperatives, land development companies etc. Although they differ constitutionally but the purpose and objectives of these companies are almost similar. The activities of the companies include purchase raw/undeveloped land at a low cost, develop it by providing different services and then subdivide land for sale with profit. The PLDCs are

[10] *Khas* land – (Khasmahal): Government property: estates helds in the management of government, sometime lands are unused.

very active in the Dhaka Metropolitan Areas. Although they differ constitutionally but the purpose and objectives are almost similar. Their main characteristics are:

- Purchase of land in the peripheral fringe areas where large tracts of undeveloped raw land are available at low cost
- Their activities are concentrated in land purchase, development and subdivision of plots
- Clients are mostly middle income groups some of whom do not have land in Dhaka and some who want to invest in land
- A few prominent land companies in Dhaka purchase land long before development and gradually develop and sell, in effect operating a private land bank
- Attractive advertisements and payments by instalments are offered to prospective buyers. Companies with large-scale investment capacity make good profits in the long run
- On the other hand, there are many housing companies which do not have large capital investments and confine their land development to a small scale in terms of land area and number of clients
- General characteristics of this group in land development and housing are that the process in very slow and often little progress in development are made over the years. Problems of land transfer, low land development infrastructure services provision, slow progress of sales etc the drawbacks faced by the companies.

Individual landowners are the group in possession of the largest share of land in Dhaka and individual seller/buyer transactions dominate the land market. Continuous sub-division, purchase and selling of land characterize the market. The landowners are mainly two types: those obtaining land through inheritance and those obtaining land by purchase.

Normally, landowners take all responsibilities for land development and housing by arranging funds through savings or loans from HBFC, commercial banks or other mechanisms. They construct their housing in the form of additions or extensions to an existing house or new building construction.

The PLDCs have a significant contribution in urban housing sector through providing service-plots in the eastern fringe and other areas. The PLDCs are filling large areas on the eastern fringe. It has proven that the development in the eastern fringe is emerging. They are highly stimulated and look at the peripheral lands due to cheap land value, close proximity to the central areas and high potentiality for development and profit.

PLDCs are playing such role and accumulate lands from small landowners. It is widely felt that there has been a general scramble into land speculation by individuals and housing companies. In addition, it has been further fuelled by purchase of land by non-resident Bangladeshi seeking outlets for their remittances from abroad, because it is more safe investment and high rate of return.

Dhaka is being developed through landfilling in the eastern fringe area. The PLDCs are ignoring all sorts of consideration in this regard. They provide road infrastructure and preserve service land for utilities, resulting that exchange value from low-lying areas to plot becomes higher. It is noted the PLDCs resort to illegal means during land procurements.

2.17 Public Institutions:

The government institutions usually called into existence by political processes stemming from the lack of use values available to the consumers of housing frequently interfere in the housing market. Production of use values through public action (the provision of public housing for example) is a direct form of intervention; but intervention is frequently indirect The latter might take the form of helping the financial institutions, the developers and construction industry to gain exchange values by government action to provide tax shelter, to guarantee profits, or to eliminate risk. It is argued that supporting the market is one way of ensuring the production of use values unfortunately it does not always work out that way. The government also imposes and administers a variety of institutional constraints on the operation of the housing market (zoning and land use planning controls being the most conspicuous). In so far as the government allocates many of the services. facilities and access routes, it also contributes indirectly to the use value of housing by shaping the surrounding environment.

The role of government institutions on urban fringe are analysed within the framework. There are a good number of institutions/ agencies in city and national level for city development for the different aspects Figure 2.1.

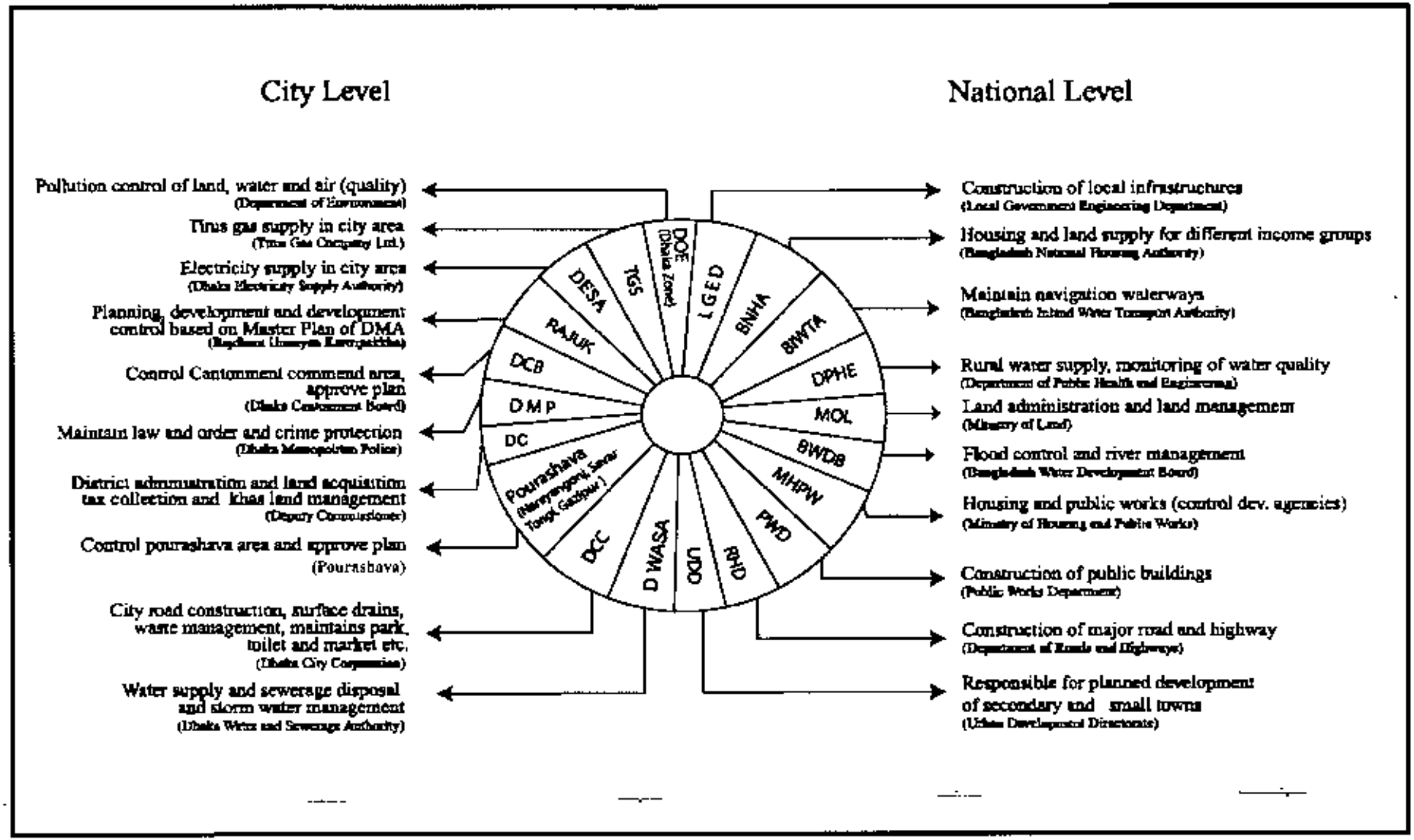


Figure 2.1: City and National Level Agencies Involved in Dhaka City Development

Government policies, at this stage, discourse piecemeal development and haphazard growth in the EFA, which gives negative impacts on the environment. One the other hand, the government wants to develop the area as a planned manner without disrupting the area's environment. Under such consideration, the government wants to construct eastern embankment along the Balu River and institutional arrangement is being undertaken. When the areas are brought under protection from annual flooding, the land value will certainly increase. This institution intervention will help to change the production of use value of land. At this stage, the RAJUK, DC office and MoL administer these areas. The broad land use indicated in the DMDP under the RAJUK at the same time DC and MoL maintain the government-owned *khas* lands. Present restriction in planning permission provides negative impacts housing and land market. This permission is mandatory before launching the projects or development programmes, but usually the companies try to obtain permission from the authorities concerned after completion of landfilling activities.

Another intervention is to protect natural water bodies in the urban fringe areas through the Natural Water Bodies Protection Law 2000 but enforcement of this law is weak. The law indicates that natural water bodies and low lying areas must be identified on the mouza map specifically and published in the official gazette with plot schedules, but this works are not being done. Due to this shortcoming in execution (as per law), the PI.DCs and landowners file case against institutional control in civil court.

2.18 Financial Institutions:

Financial institutions play an important role in the housing market owing to the particular characteristics of housing. The financing of owner occupancy, landlord operations, development and new construction, draws heavily upon the resources of banks, insurance companies, building societies and other financial institutions. Some of these institutions are locked into financing in the housing market. But others service all sectors and they tend to allocate their funds to housing insofar as housing yields opportunities for profitable and secure investment relative to other investment opportunities. Fundamentally, the financial institutions are interested in gaining exchange values through financing opportunities for the creating or procurement of use values. But financial institutions as a whole are involved in all aspects of real estate development and they therefore help to allocate land to uses through their control over financing. Such decisions are plainly geared to profitability and risk avoidance.

Within the framework of the above theory, the role of financial institution for the PLDCs has been explained with criticism. The question raises how they obtain financial support and how land uses are control by the financial institutions imposing the conditions of financing. The PLDCs sometimes invest their own fund for fringe development initially. In the process of development, they collect fund from clients through colourful and alluring advertisements in television, radio and daily newspapers to sell plots. In this case, the decision of companies determines land uses without any influence. After development the exchange value of project lands (plots) become higher. It is found that some big companies have their own banks and they borrow loan from their or other financial institutions during land purchase and development period. The financial opportunities gear up land price high. From our experience, we can say that they prefer to build the housing estate with some commercial plots and reserve lands for urban services. The reserved lands for services are being gradually converted into plots. Meanwhile, most of the developed plots are sell-out. The motives of these companies to make maximum profit from the project where environment issues and principles of project both are ignored. In this case, the exchange value of lands/plots becomes higher on the one hand and the influence of financial institutions on land uses on the other hand. Medium and small projects in the eastern fringe usually asked financial from institutions, in this case institutions do oversee the project to make profitable and risk avoidance. All the projects of different group usually face some constraints like clearance from different agencies: sometime they obtain it and sometime become restricted by the existing rules and regulations. Under this situation, some companies adopt illegal means through making false certificate and documents.

2.19 Urban Environment:

Indiscriminate earth-filling activities in the eastern fringe area trigger enviroumental problems in such areas and the city as well. The main emerging problems are:

- The eastern fringe areas have been using for agriculture (seasonal), aquaculture and retention purposes. Thus landfills activities damage agriculture productions, fisheries and other natural resources
- The eastern fringe areas are expanded in the rainy season and create a vast open water body submerging its surroundings due to squeezing wetlands and low-lying areas

- The landscapes and character of the fringe areas particularly in the eastern side have been changing by the landfill activities
- The existing natural canal networks in the eastern fringe areas have been used up for drainage, navigation and retention purposes but these canal networks are gradually disappearing owing to land filling activities by the PLDCs. Resulting that, the water flow have been obstructed in such canals *(khals)* and create water logging particularly in lean season in city areas
- The land use character in the eastern fringe is being changed by unregulated and unplanned landfills activities and settlements; as a result, the area faces environmental problems

2.20 Elites, Politics and Urban Development:

Urban politics and urban development in Bangladesh should be analysed and investigated from the point of view of the structure of the society and the politics that revolve around it. No decisions are taken in a political vacuum, specifically those concerned with urban developments or more precisely, with development projects. This means that urban development and urban politics are very much interconnected. Since politics in Bangladesh revolve around personalities, individuals, groups and/or agencies. thereby effect urban development to a great extent.

When the colonial city was established. it grew to serve the needs of the colonial rulers not the local people. Culturally the towns were relatively isolated from the surrounding regions and economically it was a vehicle for extracting surplus from the surrounding hinterland for consumption in the dominant country. The colonial city acted as a vehicle for transporting native produce out of the country rather than encouraging new commercial markets /urban centres within it. Colonialism often required only one town or a few towns to serve its ends. Therefore, there was no effort to develop other towns or urban centres. Eventually these towns grew out to be the prime city of that region. In terms of economic, cultural and political activities such towns had very little competition.

The concentration of urban development has been very difficult to dilute in the post-colonial era. There were rather very little efforts for decentralization. Adoption of planning policies and measures taken into service from the metropolis without their

adaptation to local needs and conditions resulted in disproportionate growth of the cities. Proliferation of urban development institutions, their overlapping responsibilities, problems of coordination make them unable to provide any efficient solutions to urban problems riddling these cities. Plurality of institutions leads to uncontrolled development and unconnected growth. Institutions lack adequate and specific power, clear-cut responsibilities, transparency and accountability making them unable to act on behalf of the people; while, contrarily they wield supreme power and get with corruption. This result in adoption of projects taken up in the interest of the general people; in fact, which do not benefit them at all.

Ruling elites and their allies are interested in development projects as it gives them chances for enhancing their supreme position as the dominant class and opportunities for increasing their individual wealth; while allowing them to be oblivious to the fact that large-scale development projects entail dislocation of people, destruction of their habitats and employment opportunities, destruction of local natural resources, etc. – leading to their proper state and without bringing any apparent benefit to them.

At local and city level, the political and social elites are involved in urban politics. In the development process of the fringe areas, these elite groups are always very much active as they can achieve benefits from such situations. They are mainly either past or present local representatives, or influential persons. They are powerful in terms of political and financial prowess. In the development process, the role of such elites is always very tricky; sometimes they support landowners against developers and raise questions like why landowners are forced out of their land without proper compensation saying these activities of the developers absolutely unfair. On the other hand, they are getting benefit in kind or cash from the developers through secret dealings. Every landowner feels that local elites are working in their favour but actually they are only looking for their own benefits. On the other hand, these elites always impose themselves as neutral and unbiased persons who are working for the community welfare.

There are no studies to assert that development projects taken up till now have taken in regards of the morphological development of this deltaic region and its rivers, which are still in their formative stages. If there were proper and adequate studies then perhaps there would have been no large-scale projects requiring massive land filling, obstruction and/or filling of wetlands and blind destruction of natural resources (Hafiz, 1998).

Notes and References

1. There are probably many concepts of planning. The planning is concerned with taking an objective and rational view of future conditions, assessing what society desires its destiny to be forecasting the amount of change, estimating the degree of control required and formulating a policy to take account of this destiny, change and control; for further reading see Ratcliffe John (1970): *An Introduction to Town and Country Planning*, Hutchinson & Co (Publishers) Ltd, London, UK.
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3. Archer R W, "The use of land pooling/readjustment to improve urban development and land supply in Asian countries". Asian Institute of Technology (AIT), Bangkok, Thailand. 1984.
4. Bartone C. Bernstein., *el at.* (1994), "Towards environmental strategies for cities: policy consideration for urban environmental management in developing countries". Urban Management Programme no.18, UNDP/UNCHS/ WB, Washington D C. USA.
5. The growth in terms of population and physical expansion in Dhaka city was remarkable in between 1961 and 1974. During this period, the annual growth of population was taking place 6 percent (approx). The city continues to grow outwards of the city boundary, but it is apparent that the major trend of growth on the eastern and southern fringe where low density is found. Moreover, the northern expansion of the city has been recommended in the study of "Dhaka Metropolitan Area Integrated Urban Development Project (DMAIUDP), 1980/81", Chapter 3, pp. 12 and 13.
6. DMDP Structure Plan (SP) provides strategies and policies for 20 years to 2015 for the development of greater Dhaka, Urban Area Plan (UAP) providing an interim mid-term strategic policies for 10 years to 2005, and cover for the development of urban areas within Metro Dhaka Management Area, see RAJUK, MHPW. UNDP and UNCHS (1995), Dhaka Metropolitan Development Plan (1995-2015).
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CHAPTER 3: URBAN DEVELOPMENT OF DHAKA: SCOPE OF PLANNING

3.1 Introduction:

The question of land is important for urban development. Urban development simply means the progressive changes in any society brought about by adequate planning measures. Man modifies land uses and its development affects him in a significant way.

Castells (1978) provides a complicated explanation of land as an ideological product evolving from the hierarchical system of power relations within the society and the development of various modes of production. Polyani's explanation in this regard is quite simple. According to his definition-- land, labour and capital are commodities in Economics. Therefore, they are synonymous to commodities produced for sale. However, labour (a synonym for human activity) ends with life and is produced for entirely different purposes other than sale; similarly, land (synonymous to nature) cannot be produced either, but it is very much affected by man's activities. Capital cannot be produced but comes into being through the mechanism of state finance.

Polyani (1944) states though land, labour and capital appears to be fictitious; these are; in reality, bought and sold in the market. Their demand and sale are of real magnitude and policies and measures can slow down and retard the formation of such markets in rural areas. The towns and cities, in fact, both enveloped and prevented them from developing. Markets were nothing more than mere accessories for economic life. Where markets were highly developed, they prospered under the control of a totally centralized administration, which fostered autarchy both in the life of individuals and in some respect in national life. The planning, design and development of towns and services to be provided and means of providing them, the people that were to populate these towns were all decided by the powerful and affluent section of the society. Emergence of the self-regulatory market was a complete reversal of the trend of development that occurred in this system or the previous era (Hafiz, 1994).

The discussion in this chapter will reveal that though this subcontinent was subjected to centralized rules for thousands of years, towns and cities were largely dominated by residential areas of the ruling class and habitation of generally poor masses.

The following section will reveal that since Dhaka's modest beginning as a small town in the early Indian civilization its growth towards a capital city of the sovereign state of Bangladesh has never been done in a planned manner. Development was fragmented and carried out in an uncoordinated manner without involving other sectors.

3.2 Historical Growth of Dhaka and Development Programmes:

Historical growth and development of Dhaka are tried to be analysis through different urban theories. The 'Good City Form' (Lynch, 1981), expresses the physical condition like topography, land level, soil condition are the main dominating factors for city form. Meanwhile, micro-economic urban land use theory expresses the socio-economic condition, urban heritage and cultural interaction, etc., as the important factors for city form. At the same time, economic variables are mainly responsible for city growth and expansion and its development. Within the frameworks of these theories, the growth and development of Dhaka is explained.

Early urban development in the Indian subcontinent was evident in the Indus Valley Civilization, such as Mohenjedaro and Harappa. These two cities owed their design and planning to the existence of a highly centralized authority. Exercise of absolute authority is evident in the design of the living quarters and areas allotted to the general public and the more affluent section of the population.

Houses of the wealthy people of these societies were higher than one-storey, built around well-landscaped courtyards with fountains. On the other hand, living quarters of the common people were regimental barracks, simple and plain, serving the requirement of the inhabitants devoid of either aesthetics or imagination. The existence of the great public baths, the state granaries and a very advanced citywide sewerage network (not found in contemporary civilizations) speaks of a highly developed state system and exploitation of the general masses.

The imperial rulers of the Mauryas, the Guptas and the great Mughals propelled marked urban development and were evident in the rapid growth of cities. The Mauryas, the Guptas and the Mughals, however, left the social organizations of the villages intact. This allowed the local headmen to exercise some power while discouraging the development

of social relations and the forces of production in an indirect way. This exemplifies Polyani's statement that the growth of the markets were enveloped and contained in towns. The towns were the exclusive residences of the rulers and elites. Their expansion was prevented so that such towns remained the exclusive domain of the powerful class. Villages continued with age-old methods in agriculture, industry and commerce. There was very limited development in the field of technology. Hence, the huge labour force engaged in agriculture was never free to be largely employed in industry, trade or commerce.

Strong centralized rule allowed extensive increase in income from trade and commerce, which coupled with land revenue, enabled these imperial regimes to erect splendid palaces and sumptuous courts. The social organization of the villages and fate of common masses remained unchanged for centuries despite urban growth and unique architectural marvels. There was no incentive to improve the local technology or to educate the general masses. The mechanism of connecting various levels of urban hierarchy was provided by the contracts drawn and alliances among the urban and different local groups, organizations and various chiefs (headmen, local *mahajans* or moneylenders). The distinct features, specifically, the Mughal urban system, were the importance of the cities and close interweaving of the political and commercial urban system.

Throughout the greater part of Indian history the urban system was fragmented and did not develop into a well-structured hierarchical organization. The traditional town served as the headquarters for the governor and as the centre for local or regional trade. The fortresses, bazaars and temples or mosques formed the basic components of the Indian town. These headquarters-towns linked the villages through the regional level of the government with the central ruler in a predominantly agricultural society were the nexus of cash flow within that society. Infrastructure development, specifically hydraulic works, was a major preoccupation of the rulers, specially the Mughals. They maintained the age-old network of rivers and canals (including irrigation canals) and embankments. Therefore, there are no historical accounts of massive famine, floods or droughts.

Inequality was pronounced in the polities of that era. The society was composed of the monarchs and their families, landlords (*diwans, subedars, nazims, mansabdars* and so on), bureaucrats at the top level and vast masses of poor peasantry below. There was no

improvement in agriculture; and the peasantry toiled to produce the surplus for the richer class while the opulence, splendour and sophistication of the courts dazzled observers. It is interesting to note that the regions, which contributed most taxes, were exploited the most. Thus the region of Bangladesh always remained the most depressed area compared to Kolkata (Calcutta), Delhi or Agra (Hafiz, 1998).

Colonial Era: British capitalist intervention was supposed to liberate the previous societies from oppressive exploitation. The main policy of British capitalism in India, however, was to convert the latter into a major supplier of raw materials and food grains for Europe and its many colonies overseas. Dhaka, in this regard, became a jute processing and baling centre, after the colonial rulers had completely destroyed its cotton and silk industries deliberately.

The land tenure system indicates the social pattern in rural area. At the top of the social rung was the *zaminders* or independent *talukdars* who were direct offshoots of widespread sub-*infeudation* (1). This chain of middlemen shifted from one to the other, the responsibility of collecting rents and looking after the interests of the *(Raiyats)* (2).

The system of land revenue administration thus led *zamindars, taluqdars, ijaradars* or revenue farmers, the tenure-holders and even the ordinary peasants to look to the city, the seat of the Collector, as the place with which their complaints were to be lodged, justice sought against the complaints were to be lodged, justice sough against the highhandedness of landholders or collusion of ryots against the *zamindars*, claims stated under the Tenancy Acts, and lands were bought and sold. Disputes arising out of rival claims among co-sharers of estates and questions of inheritance also came to be settle here, with reference to the deeds in custody of the Register of Deeds. The presence in Dhaka of the office of the Commissioner of Revenue, the supreme revenue officer of the division, added further weight and importance to Dhaka in the eyes of all those with interests in the land.

It was the common practice of *zamindars,* landholders and deputed agents to oversee their interests during Mughal period. On the other hand, certain landholders took up residence in Dhaka, leaving the administration of their estates to *naibs* or deputies. Under the British, this practice was less needed, nevertheless many *zamindars* and *taluqdars*

continued to maintain a *naib* in Dhaka to keep their relations with the Collector in good working order. The good will of these officials, it was realized, could be the source of profitable governmental patronage. being particularly indispensable for those hungry for *Rai Bahadurship* or some similar honour involving a seat on a local board or municipality. In return, such obliged men to the government would become a bulwark of authority both in town and countryside.

A classic case was that of the *Bhawal zamindar*, whose rural seat was at Jaydebpur, but who nonetheless kept a full complement of *naibs* and staff in Dhaka. The later *zamindars* moved into the city themselves, investing heavily in land and property, thereby acquiring considerable powers to social and political patronage.

The railway was expected to connect different areas, which proved arduous and lengthy by water routes and road transportations. Railroads played a significant role in enhancing colonial exploitation. For connecting areas, colonial rulers chose raw material producing regions to points of their shipment abroad while most areas remained unconnected. No railway equipment or railway building industry grew in India; it had to depend entirely on Britain for improving and expanding the railway network. On the other hand, the age-old water communication network was destroyed through neglect and ill maintenance. The connection between various markets was disrupted and pauperisation of the common people increased. Waterways also became stagnated and silted from ill maintenance, increasing the incidences of waterborne diseases.

The Mauryas, Gaptas, and Mughal rulers, etc. had at least left the Indian society in a stable state for centuries, which allowed incremental development of the forces of production. But the colonial government did not take any initiative to promote the growth of capitalism in any sector of the society and introduction of railroads did not play any catalytic role in this regard. Even when there was a unified administrative superstructure, improved and modern government compared to previous regimes, each death and famine occurred with greater intensity than before. Between 1860 and 1943, there were 34 mayors in colonial India and the region of Bangladesh was the worst affected one during the period.

The early European trading and mission settlements were mainly established within the historic core throughout the 18th and 19th centuries. By 1850, the greater part of the land defined as Old Dhaka, between the formal railway alignment and the Buriganga River had been developed through settlements and most roads were constructed within these areas. The major land uses were office blocks, institutions, health and recreational centres, housing units, commercial and industrial areas, and other establishments. All structures were built up along the major city roads. At this period, there was no planning control over land use. The Bengal Municipal Act 1932 was prepared and it provided powers to the municipal authority to regulate conservancy, drainage, sewage disposal, sanitary and public health activities. The control generally meant the imposition of conditions on both constructions of the private and public buildings. Under the act, the local body exercised power to control development activities (Hafiz, 1998). The same practice continued before and after the partition of Bengal. These changes were in contrast to the theory of 'Good City Form'. On the other hand, the Buriganga River in south and low-lying areas in east and west sides of the city were the natural barriers for the city, therefore, development was concentrated within the built-up areas. However, the municipal services were provided in the core areas. The municipal authority did not extend serviced area for planned growth or 'Good City Form' of the city and land uses.

Modern infrastructure, which was expected to revolutionize India, in reality, had the opposite effect at least in the case of Bangladesh (previously known as East Bengal); British colonial policy left the once affluent region in a poverty-stricken state and dependent on foreign capital for its existence. The colonial administration did not develop India in the fashion evident in their homeland. Their policy was to reap maximum surpluses by any measure. There was no concern for affects of such a policy; British colonial policy was beyond simple humanitarianism and devoid of the simple Christian faith (Hafiz, 1998).

Post-Colonial Era: This situation was expected to change with the end of British colonial rule in India in the subsequent Pakistan period due to the creation of a country where majority of the population were Muslims. However, the issue of inequality and West Pakistani dominance and oppression led to the liberation of Bangladesh. Bangladesh is also a society of acute inequalities. On the one hand, there is abject poverty pervading the

society and there is inequality in the distribution of income and wealth both in the urban and rural areas.

Pre-colonial society was relatively static, social mobility was extremely low. Family and its traditional occupation determined the respective position of a person in the society. The society was uncompetitive and a client-patron relationship existed between the people and rulers. In the pre-colonial society, the process of urbanization was slow and measured. Rural traditions strongly dominated the socio-cnltural sphere. Hence, the life-style and housing pattern of the rural and urban people were almost similar. Though well-developed urban centres existed for centuries in India, they were mainly the habitation and administrative centres of the small core of ruling class and the overall economy was maintained primarily by agriculture. The physical size and form of the population of the city was governed by a technology based on animate rather than inanimate energy. The size of the urban population was actually dependent on serving the ruling class.

Indian society as a whole underwent a major structural change during the colonial rule and its effects were more evident in the urban centres than in the rural areas. Primary reason was that the centralized policy of colonial rule required all institutions to be positioned in city land where colonial rules acted as a catalyst to change property rights and monazite the local economy and inevitably the growth of the urban population (3).

The home and work place, which was synonymous in the pre-colonial era. underwent drastic change, and cities were eventually compartmentalized into different land uses (residential, commercial, recreational and industrial etc.) Single nse areas replaced the hive forth-traditional mixed land uses.

In 1917 the formal plan for Dhaka was prepared by British Town Planner Patrick Geddes and proponent of what has become known as the Garden City concept –concept most evident in the romantic street patterns and until 1947, Dhaka city functioned primarily as a district headquarters, trade centre and university town.

After the partition in 1947, Dhaka gained the status of provincial capital and the city began to expand as city areas. It was a simple fact that population of the city increased enormously because the rate of migration from rural areas accelerated. Moreover, the

mass of refugees spilled over this time in city areas due to migration. The economic activities were also expanding at the same time (Hafiz, 1998). The physical expansion of city areas continued in an unplanned way, and corresponding increase in the utility services were followed by such developments.

Ahmad Hasan Dani expressed the scenario of the city growth in 1950s in his book '*Dacca: A Record of its Changing Fortunes*'. He expressed: "The elevated spot of the city enlivened with the traditional greenery of Bengal contrasts markedly with the low-lying plain stretching for miles and miles around. Its old companion the Buriganga River not only bears the city on its northern bank but also afford facilities for trade and commercial city and reflects in its water the historic past: the domes and minarets, the *katras* and mosques, towers and fortification all casting their deep shadows on the tranquil current of the river. The old town, with its medieval appearance, winding streets and age-old markets, still guards the secret of its origin, but a later day channelling through its quarters is evident from the existence of the old town. But the most revolutionary change that is now going on is the building of New Dhaka, which not only tastes of modernity but also forecasts a complete change in the life of the city. Dhaka is in the grip of rebirth from the old into a new world."

In fact, both the public and private sectors development initiatives were taking without planning because at that time there was no formal Master Plan for the city. The urban centre had become further aggravated with multi dimensional problems like shortage and sub-standard housing, deteriorating public services, overcrowding, congestion, pollution, unemployment, crime etc. It was therefore badly felt that the city needs a comprehensive master plan for the city areas.

The growth of the city dates from its expansion outwards from the Old Dhaka areas. Until the end of the 19th century the city remained restricted within the old town area, defined at its northern edge by the former railway alignment. After India-Pakistan partition, the city got the status of provisional capital of East Pakistan and construction of government offices and housing increased markedly with the city spreading out to a new band of development area comprising Azimpur, New Market, New Eskaton, Purana Paltan, Kamlapur and Dhanmondi date from 1953 and the 1960s.

Meanwhile, the government framed 'The East Bengal Construction Act 1952'. The sprite of the act was to prevent haphazard construction of buildings and structures in city master plan areas, but the city had no master plan. Now the question raised was to what extend the city areas would be covered by this act. By this time, a separate act became a necessity for improvement of cities, therefore the government framed "The Town Improvement Act, 1953" and it was the first statutory power to establish development authorities and prepare master plan for the city. Accordingly, the Dhaka Improvement Trust (DIT) was founded in 1957 and Dhaka City Master Plan was prepared in 1959 by the DIT (presently RAJUK). The main purpose of the master plan was to ensure planned growth of Dhaka, Narayanganj and certain areas in their vicinity to opening up congested areas, laying out or altering streets, providing open spaces for ventilation or recreation purposes, demolishing or constructing buildings. The Master Plan was prepared on two assumptions both of which have since proved to be incorrect. Firstly, population growth was projected at one percent per annum, a figure less than even the rate of natural increase of the existing population. Actual growth between 1961 and 1974 has been approximately six percent per annum. Secondly, it was assumed that the city would continue to grow outwards at existing urban densities. In practice it is apparent that the major trend since 1959 has been the extreme intensification of densities in some areas with a recent rapid growth on the eastern and western fringes at comparatively low densities. In the master plan, the peripheral low-lying areas were earmarked as flood zone. The plan also indicated that if these land need to be developed, the zonal plan or detailed area plan of such lands must be prepared. But a few numbers zonal plans were prepared. 'Senpara Parbata Zonal Plan' is one of them. Rest of the areas were developed spontaneously, now it is very difficult to bring under the planning norms.

This Master Plan was basically a development control document. The Town Improvement Act, 1953 provided regulatory powers to the DIT over a designated area. In practice, development control, based on the control of buildings on individual plots, can only be effective in specific development areas, which are planned and leased by the DIT. Development in the other parts of the city remains largely uncontrolled, and the lack of updating the plan leaves the statutory service agencies in the city without a basis for coordinated action. This plan was not followed by the traditional theories (like concentric, sector and multiple nuclei). But the urban activities and economic forces played a vital role to over-ride all theoretical concepts. Now about 12 million people are living in Dhaka

and they are involved in different formal and informal economic activities. National level policies, strategies and political programmes support such economic activities. Micro economic activities are the main dominating factors that changes land use, which are mostly contrasted with the concept of sustainable development (ref. Chapter 2, section 2.11). It has been proven internationally that contrast is prevailed everywhere in between economic activities and environment.

In the late 1970s, Dhaka's form approached that of a conurbation in the sense that its outward growth had started to link up with outlying towns, particularly Narayanganj and Tongi. The corridor between Dhaka and Narayanganj is now being built up, mainly for industrial uses. With the development of Kurmitola area, the undeveloped area between Narayanganj and Tongi is the site of the Uttara Model Town.

After independence of Bangladesh in 1971, no formal plan was prepared for greater Dhaka but some planning, drainage and transport studies such as the DMA/UDP Study (1981), DITS (1994). FAP 8A, 8B (1992) Land Study (1993) and Eastern Bypass Study (1997-98) etc. were done and a lot of recommendations were put forward but these were not implemented due to several reasons such as weaknesses of institutions, lack of finance and legal support etc.

Even the recommendations of the above studies have been rarely considered during the period of development programmes. It continued to use the Dacca Master Plan, 1959 resulting in various problems such as indiscriminate land filling in peripheral areas for settlements, densifying the existing urban areas, overloading existing physical and social services and causing rapid change in land uses.

Most profitable businesses in Dhaka are land speculation, land hoarding, land development and housing projects in the EFAs which may give quick return from such investments. Although, the previous master plan recommended making the zonal plan of the flood zone indicated in the plan if developments are required. But this recommendation never came into light. Rather it helped the haphazard development in the fringe and surrounding areas (4).

The DMDP 1995-2015 has been prepared comprising 1528 sqkm areas with the technical and financial support of UNDP, UNCHS and local consultants. development proposals were made in the plan, particularly that related to road infrastructure, commuter train network and waterways, canal network, multi-modal transport terminals, wetland development and keeping 12 percent retention areas free as water reservoir for the eastern part of Dhaka. It was also recommended that no more indiscriminate land filling activities should be allowed; moreover, the existing private housing companies should be reviewed in the light of the comprehensive plan. The proposals in the DMDP are theoretical for sustainable development, and conceptually acceptable with relation to the concept of sustainable urban development. PLDCs continue their landfill activities in such areas to implement the projects ignoring physical constraints, drainage, flood control that are basic elements of sustainable development concept (ref 2.11).

However, agencies like the RAJUK, DWASA and DoE try to protect the areas by enforcing the Natural Water Body, Open Space, Park/Playground Protection Law, 2000 for elaborate discussion in Chapter 4, section 4.7.

3.3 Urban Development Programmes for Dhaka:

The development programmes of Dhaka were put forward in the DMDP (1995-2015) for short, medium and long term developments. The main programmes focus on infrastructure development like the Eastern Bypass, road construction, commuter rail network and waterways and construction of transport terminal. At the same time, enhancing the housing sector in the city is also deemed important. The plan also emphasizes the responsibility of agencies that will implement such projects. The major projects/programmes are summarized below (5).

3.3.1 Development programmes (infrastructure):

Within the city development programmes (DMDP) in connection to infrastructures are summarised in the following tables (ref. Map 3.1: Integrated Transport Network).

Road Development Programmes:

Table 3.1: DMDP Proposals for Major Road Programmes of the Study Area

North-South Connections

Integrated Transport Network Map Ref.	Name of Roads	Length (Km)	Width (metre)	Implementing Agencies
M4	Second Primary Road- from Chittagong Road to Nasirabad via Bomail and Naraibagh	7.6	30.48	RAJUK
M4A	Second Primary Road- form Nasirabad to Panchakhola	4.0	30.48	RAJUK
M6A	First Primary Road- from Chittagong Road to Trimohini via Matuail and Nandipara	7.0	30.48	RAJUK
M6B	First Primary Road- from Trimohini to Namapara via Satarkul	7.8	30.48	RAJUK
M6C	First Primary Road- form Namapara to Muinnar Tek via Dobadia	5.0	30.48	RAJUK

East-West Connection

M3	From Pragati Sharani near Rampura Bridge to Eastern Bypass near Baburjayga	5.8	30.48	RAJUK
M5	From Madani Avenue intersection and Progati Sarani to Baraberaid Merul	5.7	30.48	RHD
M7	From Airport Road near Khilket to First Balu Bridge near Tek Noadda	6.5	30 48	RAJUK
M11	From Western Embankment near Ashutia to Eastern Bypass near Nayakhol via Abdullahpur and Muinnar Tek	11.5	30.48	RAJUK
R7	Uttara to Purbachal (Commuter Railway)			RAJUK

Source: DMDP 1995-2015.

3.3.1.1 The Embankment-cum-Road: The government has given priority to the construct embankment-cum -road along the Balu River in the eastern periphery of Dhaka with adequate pumping capacity. It also will be considered as road and connect to national major highway. After construction, both the inter-district and intra-district traffic can easily pass through the capital city without entering the city. The detail discussion has provided in Chapter 8, Section 8.2.3.

3.3.1.2 Water Transport Development: For an easy, cheap and comfortable transport navigability; a circular waterway for Dhaka city has been proposed in the DMDP. Recently, water transportations have started from Ashsulia to Saderghat via Gabtali. Meanwhile, the BIWTA has established waterway terminals at Ashulia, Gabtali, Basila and Sadarghat. With the successful operation of the waterway, traffic jam in Old City will gradually be reduced. This will also reduce the pollution level in the city areas.

3.3.1.3 Multi-Modal Transport Terminal: To meet the future need of transport in Dhaka, Multi Modal Transport Terminals are proposed in different places like at Rampura Bridge (along Progati Sarani), Sadarghat, Gabtali and Tongi. The earmarked terminals in the Integrated Transport Plan 1995-2015 will link different parts of the city through different modes of transports commuter trains, subways, waterways and road transports.

3.3.1.4 Commuter Railway Network: The commuter train has been proposed from Uttara to Purbachal New Town through northern side of eastern part (see Map 3.1). This proposed network is to be expanded towards Savar in the west and Kaliganj in the northeast. It will serve as the fast-moving mode of transport for the people of the peripheral areas, thus reducing the pressure on housing and other services in the city areas. Once the commuter railway is established, it will also reduce people's attraction to live within the city areas. The dispersal policy of the DMDP plan can be implemented through the proposed transport facilities mentioned above.

3.3.1.5 Future development Projects:

To establish the efficient transport network in city and it's surrounding the following road, flyover, tunnels and bridge projects are proposed by the different development agencies. These projects will be implemented phase-wise. The summary of the project is shows in Table 3.2.

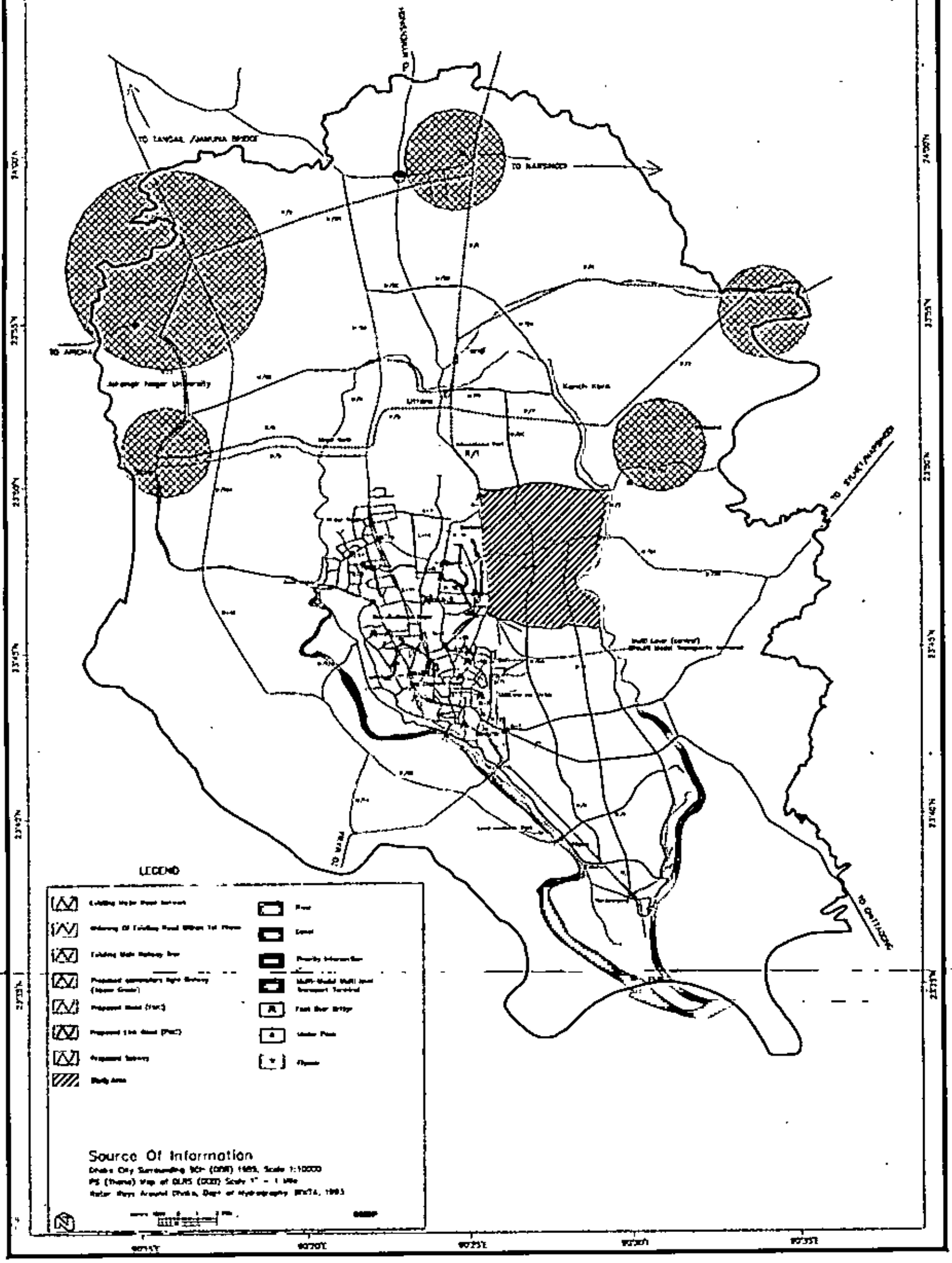
Table3.2: Proposed Roads, Flyover, Tunnels and Bridge in Dhaka.

Sl. No.	Description	Length (km)	Type & Specification	Implementing Agencies
1.	Bangla College to Kafrul Intersecting Rokeya Sharani	3.66	2-lane dual	RAJUK
2.	Zia colony to Mirpur Cantonment - Pallabi	6.30	2-lane dual	DCC/CB
3.	Bijoy Sarano to Tongi Diversion Road (from Rangs Y Jn.)	0.80	2-land dual	RAJUK
4	Sonargaon (Panthapath) to Rampura Bridge(Hatirjheel)	3.60	2-lane dual	DCC
5.	Tunnel Connecting Shahid Jahangir Gate (Cantonment) & Rokeya Saroni	0.90	3-lane dual	
6.	Bashaboo Jame Mosque to Trimohini Ghdaraghat via Shekker Jaiga Bridge	6.30	2-lane dual	RAJUK
7.	Malibagh Chowrasta Gulbagh – Janapath (Bishaw road)	0.67	2-lane dual	RAJUK
8.	Construction of Buriganga 3rd bridge near Basila	0.70	3-lane dual	RHD
9.	Bashabo Kadamtola Road up to Manikdi	3.65	2-lane dual	RAJUK
10.	Construction of Jatrabari-Gulistan Flyover	7.00	2-lane dual	DCC

Source: RAJUK, DCC, RHD Offices

DHAKA TRANSPORT DEVELOPMENT PLANNING (DMDP) AREA

INTEGRATED TRANSPORT NETWORK 1995-2015



Map 3.1 Integrated Transport Network 1995-2015, Dhaka

3.3.2 Housing programmes:

3.3.2.1 Public Sector:

The government, through its various agencies, (BNHA, PWD, RAJUK) and other development authorities are involved in development of land and/or production of dwelling units directly through: Government employee housing; low and lower-middle income housing project programmes, including slum upgrading and sites-and serviced: and housing projects for the middle upper income groups, mostly by development authorities. Despite the multiplicity of agencies and programme, in real terms, public sector contribution in the provision around 6000 plots and dwelling units annually, representing only a little over one percent of the total requirement, excluding slum upgrading. Governmental housing programmes have generally come to be recognized as unsustainable due to their prescriptive layouts and standards, high costs, limited outreach and excessive delays (6).

3.3.2.1.1 Bangladesh National Housing Authority (BNHA):

Under the Ministry of Housing and Public Works (MHPW), Bangladesh National Housing Authority (BNHA) provides housing in Dhaka and other part of the country. The BNHA has allotted serviced plots, core houses, semi-pucca houses and flats. The main target groups for providing housing are: squatters and footloose, refugees, resettlement people and also general masses from low to middle income groups. The serviced plots to city dwellers which although subsidized can be afforded only by these income groups. The main estates of this authority are located at Mohammadpur and Mirpur areas in Dhaka.

3.3.2.1.2 Housing Programmes of RAJUK:

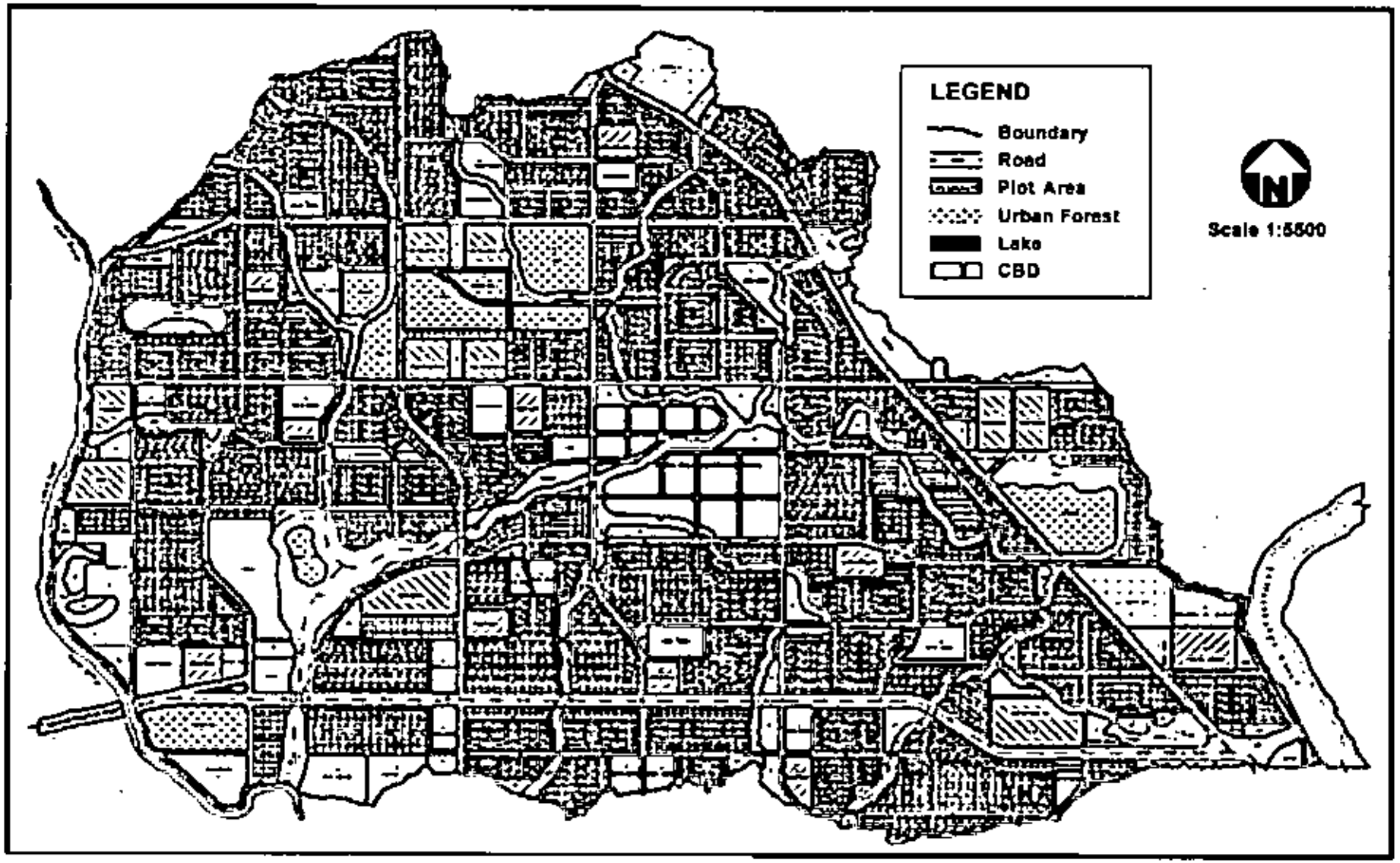
To fulfil the national objectives in the development process, the RAJUK has under taken some model towns and housing estates to supply serviced plots, apartment blocks for all income groups. In these estates, all sorts of infrastructure and services facilities are provided. Under this programme, housing units will be enhanced which may partially fulfil the housing problems. On the other hand, the peripheral areas of city will be developed as planned way. In this process, proper rehabilitation is the most critical issue. RAJUK always try to rehabilitate original affected people providing serviced plot with reduced price. Moreover, the affected people get the opportunities to pay instalments at low interest.

a) Purbachal (Yousufganj Residential Model Town) Project, 1993: The project is located on the eastern side of the Balu River under Narayanganj and Rupganj districts about five kilometres from the CBD. It will provide about 28 thousand serviced-plots, apartment blocks of different sizes for different income groups. The project comprises an area of 2,470 hectare that accommodates 3 million populations. Moreover, the provision for commercial, industrial, administrative and recreational blocks have been kept in the layout plan. The projects will be implemented by next ten years. The main objectives of the project are to decentralized population and activities from city areas, On the other hand, the housing needs will partially fulfil which has a positive impact in city.

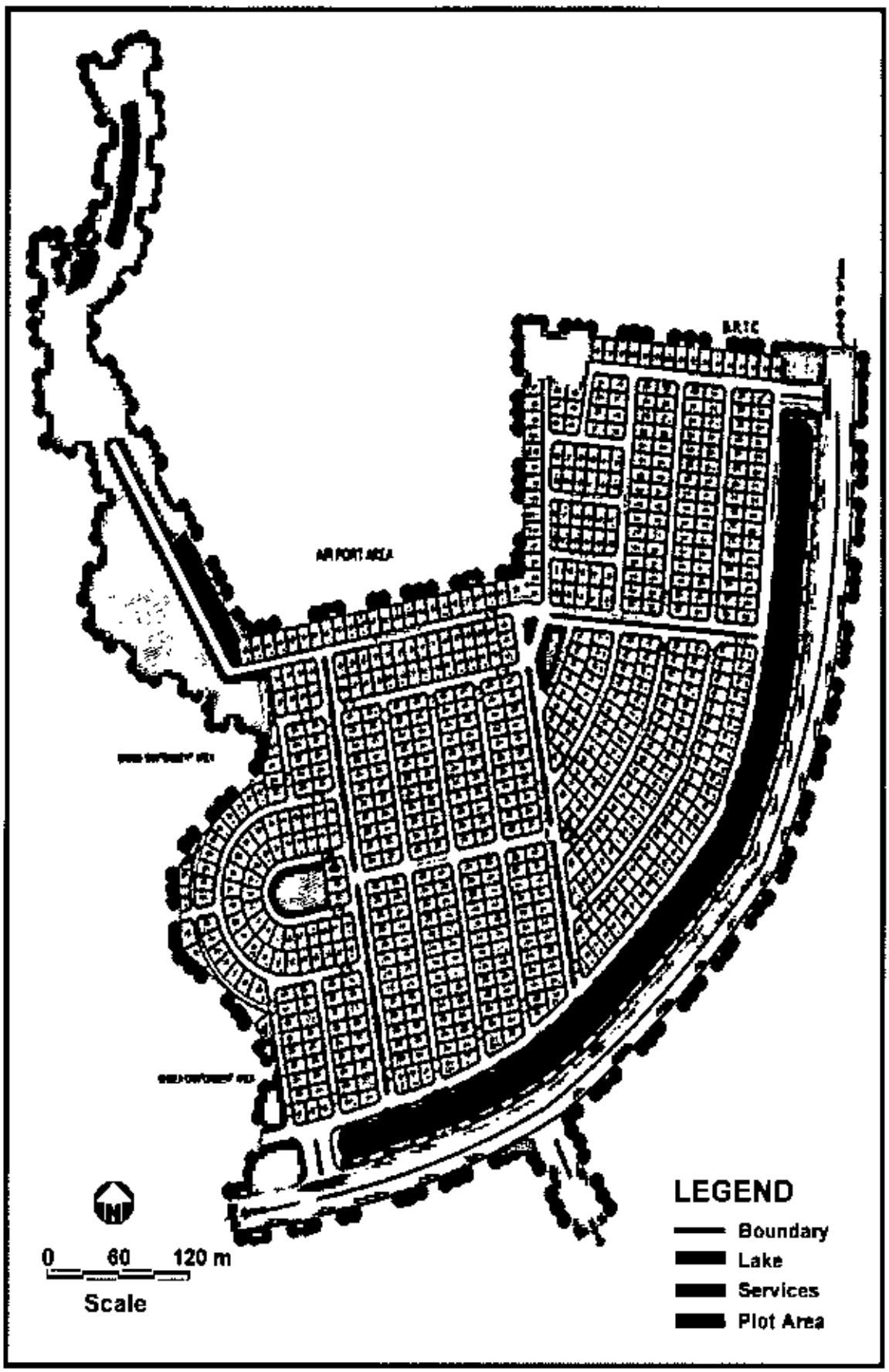
b) Nikunja (Residential Housing Estate, 1993): This project will provide about 500 serviced plots of different sizes comprising an area of 27.52-hectare land. The location of project is at Joarshahara near Kurmitola Airport and height is limited by the embargo of Bangladesh Civil Aviation Authority. This project is designed as neighbourhood concept where more or less than 5,000 populations can be accommodated. The main objective of the project is to decentralized population and activities in peripheral area. It has a positive impact in city housing needs. By next 5 years the project will be completed.

c) Jhilmil Residential Project, 1999: It will provide 500 serviced plots of different sizes comprising 154.38-hectare land. In layout plan there are provisions for apartment blocks where middle and lower-middle income group can get access. This project is designed as neighbourhood concept where more or less than 10,000 people can be accommodated. The location of the project is in the southern part of the city under Keraniganj Police Station. The main objective is to increase housing stock in the city and accommodate people. The project will be completed by next 5 years.

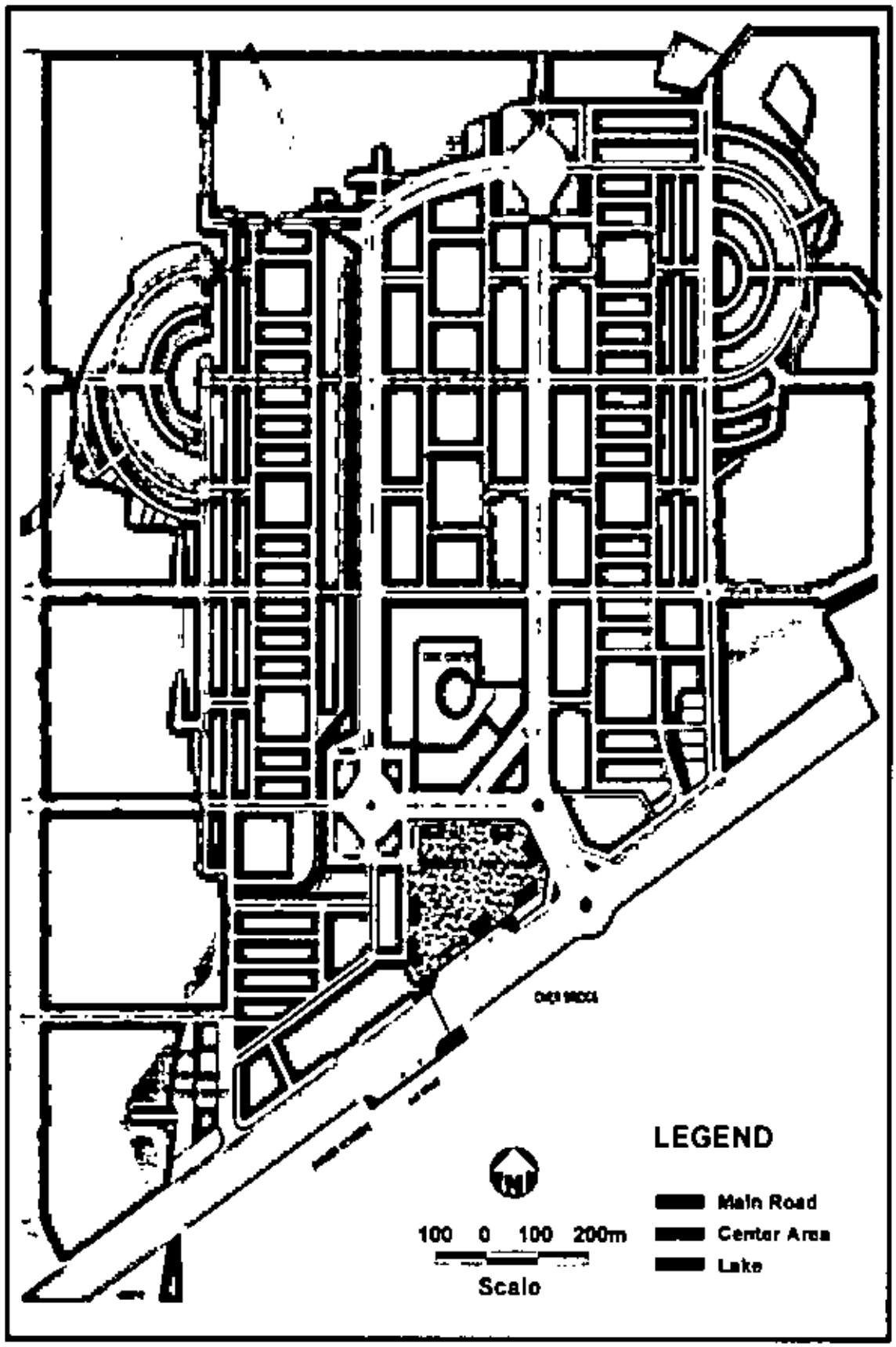
d) Uttata Third Phase, 2000: This project is the extension of Uttara Model Town towards west. It is inside of the western embankment. Under this project, about 7,500 serviced plots and housing blocks have been proposed. The project comprises an area of 850.5 hectare land that accommodates 1,50,000 population. The provision for commercial, administrative and recreational areas is kept in the layout plan. The projects will be implemented by next five to six years. The objective of the project is to develop peripheral areas and enhanced more serviced plot. It has certainly a positive impact in housing sector. Now the development works are being continued and hopefully by next 5 the project will be completed.



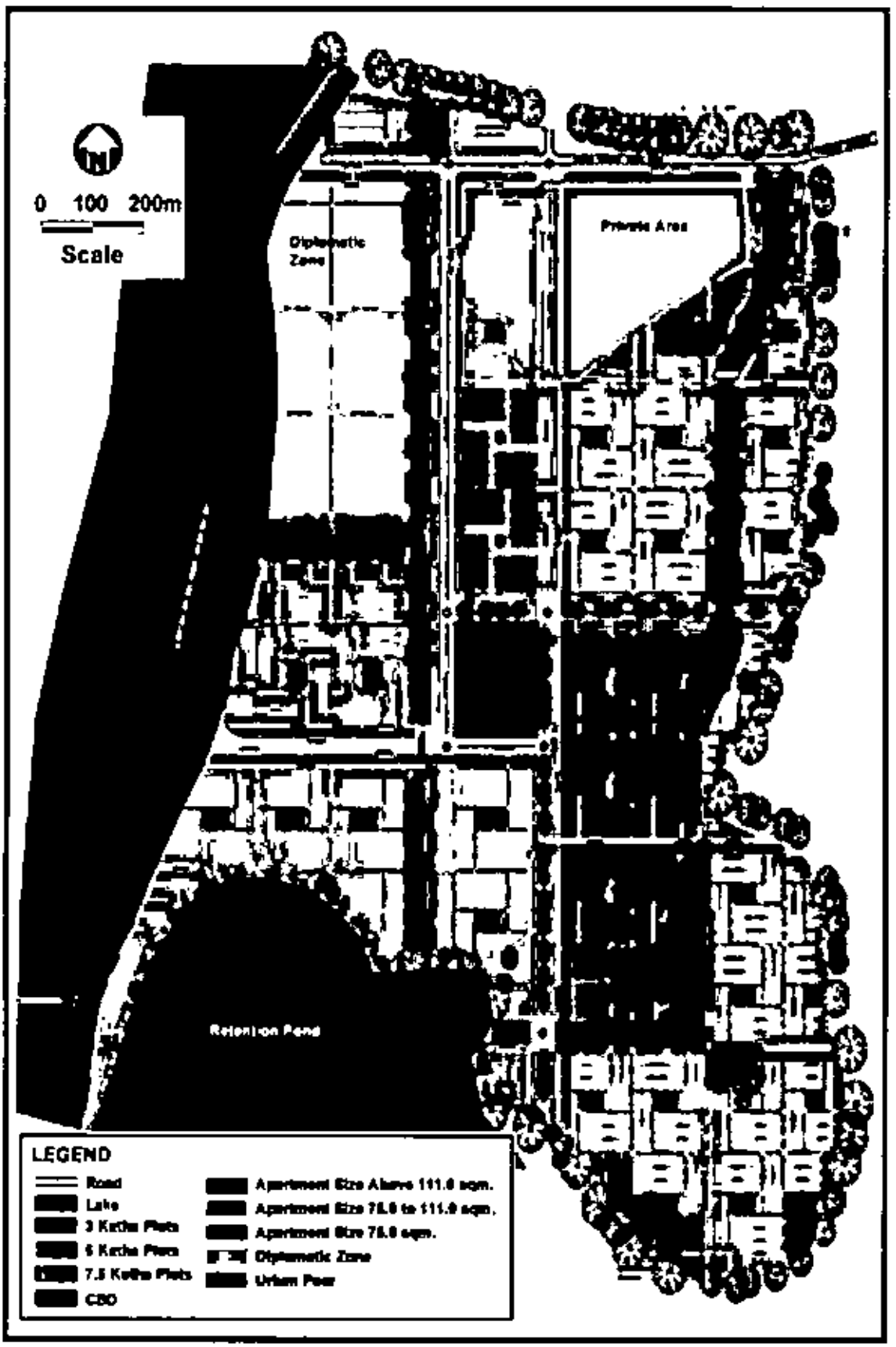
Map: 3.2 Land use Plan of Purbachal Model Town
Source: RAJUK, 2004



Map: 3.3 Layout Plan of Nikunjo Residential Housing Estate
Source: RAJUK



Map: 3.4 Layout Plan of Jhilmil Residential Housing Estate
Source: RAJUK



Map: 3.5 Layout Plan of Uttara (Third Phase) Model Town
Source: RAJUK

3.3.2.1.3 Government Housing (for employees):

The government has attempted to provide housing for selected civil servants. In recent years, construction programmes have been reduced and the percentage of employees who receives accommodation has reduced. To date, approximately 30 thousand dwellings have been provided for a total public service staff of nearly one million (7). The MHPW supplies approximately 50 percent of this housing and the size of the units is 9.30, 46.50, 54.42, 116.25 and 139.50 sqm.

3.4 Private Initiative to Provide Housing to the City Dwellers:

The rate of urbanization is high and further aggravated by high population growth rate and fast migration to urban areas. The present trend of urban growth of the country is about five to six percent per annum. This will change and increase Bangladesh's demand for habitats. At present 28 percent of Bangladesh's population live in urban areas, which will be 34 percent in 2025.

The present estimated population of Dhaka is 11.50 million and estimated growth rate is 4.7 percent per annum. All these population need shelter. To suit the housing need of this explosive population, Dhaka has attempted to expand vertically. The real estate companies have taken this opportunity to provide housing plots and units to the clients. They are playing a very important role in providing housing regardless of high, middle and low-income people since the past two decade. Since 1980s, the PLDCs have successfully undertaken both high rise buildings and land development projects and their business flourished in the 1990s. Meanwhile the real estate companies together formed an association called, Real Estate Housing Company of Bangladesh (REHAB). It is a business forum of PLDCs and real estate developers. The association advocates their activities to the government and public. Meanwhile, it has proven that they contributing a significant role in housing sector.

3.5 An Overview of Housing in Dhaka:

At present, the housing condition of urban area in Bangladesh, in general, is quite unimpressive. In all metropolitan cities, there is an acute shortage of housing supply and the backlog is continuously on the increase of inadequate supply of dwelling units for middle and low income group people and high rental value are among the most severe

challenges afflicting urban living in Dhaka. At present in our country annually required shelter varies from 300 to 55 thousand units. Housing shortage in the country in 1991 was estimated to be 3.1 million units (FFYP 1997-2002). Bangladesh will need to construct approximately four million new houses annually to meet the future demand of the next 20 years. At present, Dhaka needs 60 thousand new houses annually to accommodate its growing population. However, the existing annual supply is only 20 thousand units. So there is a huge backlog and it is increasing every year.

House rent is a very explicit indicator in the demand and supply of housing market mechanism, as rent is supposed to increase with the shortfall in supply. Present housing market is not perfectly responsive to the demand. The table no. 3.4 indicates perceive the housing situation. The shortage in supply of housing is, as observed extremely acute for the low-income group indicated by average rent being more than that for the middle-income group. The types of houses are *kutcha*[1], semi-*pucca*[2] and *pucca*; and size and rent of houses of different income groups in Dhaka are presented below.

Table-3.4: Size and Rent of Houses of Different Income Group in Dhaka.

Category		Low Income Group			Middle Income Group		High Income Group
		Kutcha (sq.m)	Semi pucca (sqm)	Pucca (sq.m)	Semi pucca (sq.m)	Pucca (sq.m)	Pucca (sq.m)
Size of Dwelling (sq.metre)	Max	20.91	37.18	18.59	60.41	111.52	353.16
	Min.	3.35	5.95	7.44	41.82	20.45	134.76
	Avg.	9.33	19.36	16.09	51.34	61.45	222.02
Rent Tk. per sq.metre	Max	165	224	201	74	192	222
	Min.	23	48	62	37	27	72
	Avg.	64	109	110	57	77	132

Source: Survey Report 2003, Sheltech.

3.6 The Need for Good Housing:

The need for housing units has increased with population growth in city areas. It is recognized that Dhaka is one of the growing city in terms of population and its physical expansion. The population of Dhaka stands about million 12 and it is anticipated that

[1] *Kutcha*- Any construction of a temporary and impermanent nature using natural and locally available materials

[2] Semi-*pucca*- Any construction of a semi-permanent and/or impermanent nature using local traditional building materials

the population will be doubled in 25 years (DMDP projection). According to a joint survey of the World Bank and BCAS (Bangladesh Centre for Advance Studies) 1995, the annual average housing demand stands at 0.5 million units while more than 6.2 million backlog housing units exists. The gap between supply and demand of housing units was found and it is getting bigger gradually. The supply of housing units from government agencies and private sector is still lagging behind from demand. This is why the PLDCs are very much encouraged in the housing sector.

3.7 The National Housing Policy 1993 (Amended 1999):

The key strategies of the policy are:

i. The role of government in housing will primarily be to increase access to land, infrastructure, services and credit facilities for all especially to the low and middle income group;

ii. The private sector would be encouraged through policies and supply of more housing units in the market for all income groups and the public sector would take facilitator's role;

iii. Improvement of the existing housing stock, both in public and private sectors;

iv. Emphasis will be laid on affordability, personal savings, self-help and cost effectiveness etc.

Recently, the BNHA has taken the initiative to revise the existing housing policy and has prepared a draft policy. The proposed policy recommends apartment housing rather than creation of plots. It could be more effective for saving lands in both urban and rural areas. However, the approach has derived from shortage of land and environmental point of view.

3.8 The Emergence of PLDCs:

The eastern fringe is fast becoming a zone of intense land use conversion where various actors are playing their respective roles. Land conversion is concentrated in peripheral sub-urban areas. The city, the recognized urban areas, has been already developed and the scope for further development has become limited. The growth spurts in the fringe areas

may be the basis for housing demand. The PLDCs, housing cooperatives, land speculators and individuals are themselves involved in purchasing land, preparing layout plans, showing plots, providing road infrastructure and selling finished plots. The PLDCs have moved in housing sector with business motive since the 1980s. The land market in the fringe area is operating well with little signs of speculative changes and rapid turnover parcels. The PLDCs have launched projects in the peripheral low-lying areas and have developed plots of different sizes. The following factors may likely be responsible for emerging real estate business.

Demand for housing units has enhanced with population boom. It is recognized that Dhaka is one of the world's fastest growing cities in terms of its population and physical expansion. According to housing records, a large backlog of housing units was found. Responses from the public sector are quite inadequate in terms of housing demand; as a result, the private sector has come up who are playing a significant role in this sector.

Apparently, urban development pressure shifted to more distant locations where land purchase and access are easier. Nearly 70 percent of all land conversion occurring between 1980 and 2000 took place beyond the city centre. Land price declines with distance from city central areas. On the fringe of metropolitan areas, the lower ratio reflects the fact that market makes little distinction between serviced and without serviced plots, an indication of speculative nature of the sub-urban land market. The availability of infrastructure adds considerably to the value of typical housing plots.

The eastern fringe is defined as the zone between eastern side of Progati Sarani and the Balu River. The area is situated at the northeast side of central areas, which is about six kilometres from the city centre. Progati Sarani surrounds the area on the west, the Balu River on the east, Dhaka-Chittagong Highway on the south, and Khilkhate on the north. The area is well connected by roads, rivers and canals. The area is enormously potential for the PLDCs from commercial point of view. The area is highly influenced by its surroundings. Banshee project. for example, is a close proximity to central area leads to increase of density and land value.

Indicating canals and ponds and depressed areas on the cadastral map[3] are considered as government *khan's* land. In the eastern fringe a huge chunk of land is government *khals*

[3] Cadastral Survey (C.S) Map was prepared in 1906. Cadastral Survey carried some improvement from the Khasra Survey, which generally preceded revenue survey. The scale of this map is 16"= 1 mile (1 3960).

and Court of Wards lands, which are not properly looked after by the authorities concerned. Even they did not maintain the up-to-date records of land in the area. For this, the PLDCs have chanced to illegally encroach such lands in the area. The government has launched an effort to recover illegally encroached or occupied lands. In connection to this MoL is supported by parliamentary.

Meanwhile, encroachers and individuals have already occupied canals, ponds, wetlands and fallow lands in different areas. In some areas MoL and Deputy Commissioner's office, Dhaka has leased out government *khas* lands for short, medium long term periods for certain purposes.

Notes and References

1. The system of land revenue administration thus led *zamindars, taluqdar, ijaradars* or revenue farmers; the tenure holders and even the ordinary peasants to took to the city, the seat of the collector, as the place with which their fortunes were bound up; for further reading Ahmed Sharif Uddin (1986): *Dhaka- A Study in Urban History and Development* 1840-1921, pp. 28-55, Academic Press and Publishers Ltd, Dhaka.

2. *Raiyats* mean tenants and they are for 10 years tenure. The revenue system was proved that the beneficial to the *rayats* and just to the state, see Husscin, T. (1995): *Land Rights in Bangladesh. Problems of Management,* University Press Limited, Dhaka.

3. A.K.Nazmul Karim (1996): *Changing Society in India, Pakistan and Bangladesh,* Published Nawroze Kitabistan. Banglabazar, Dhaka.

4. Dacca Improvement Trust (DIT) (1959), "Dacca City Master Plan", prepared under the Technical Co-operation Scheme of the Colombo Plan, (engaged Minoprio and Spencely and P. W. Macfarlane, under Architects and Town Planning Consultants), Dacca.

5. RAJUK, MHPW. UNDP and UNCHS (1995), "Dhaka Structure Plan (1995-2015)". Dhaka, chapter 5, pp. 71-97.
6. The World Bank, "Toward an Urban Strategy for Bangladesh, Infrastructure Sector Unit, South Asia Region," May 15, 1999, pp 32-38.

7. UDD, UNDP, and UNCHS (1993). Urban and Shelter Sector Review Report of Bangladesh. Dhaka

CHAPTER 4: EMERGENCE OF PRIVATE LAND DEVELOPMENT COMPANIES (PLDCs) IN DHAKA

4.1 Introduction:

Housing cooperatives and societies began to emerge, as the public sector was increasingly incapable of providing sufficient housing or land for housing for the growing population of Dhaka. Although there were quite a number of small housing societies land development companies and cooperatives previously, but at present some are become large such as the Eastern Housing Limited, which emerged in the 1960s with the idea of multi-storied housing. Initially such a novel idea was not acceptable to the people who were more inclined towards individual/detached houses with some space around it. People were much interested in buying flats or apartment units only until the 1990s. People yearned to have houses with their own front garden and backyard. As the scarcity of flood-free constructional land became apparent people has more recently opted for apartment living inside the city. Apartment development has also provided a hassle-free and relatively easy way to quality house-ownership.

There were also efforts to develop land for housing in the fringe areas of the city. The construction of the embankment around the western perimeter of Dhaka enhanced land development in the western part of Dhaka. Due to scarcity of land and construction of the Eastern Bypass-cum-Embankment in the pipeline the PLDCs have thronged to the EFAs to make profit. Experts apprehension of the public agencies' lethargy or reluctance to adopt strict measure to regulate development in the western part of Dhaka within the immediate periods of construction of the western embankment led to the disappearances of the much needed open spaces and water bodies in that area. A similar fate is predicted for the EFAs where substantial land development has been taking place, causing much damage to the local natural environment.

This Chapter discusses about emergence of the PLDCs in Dhaka's housing sector, why people look towards the PLDCs for housing or land for housing and why the public agencies are increasingly unable to control their activities.

4.2 The Emergence of the PLDCs in the EFAs:

Increasing demand for housing has lead to the growth spurts in EFAs by the PLDCs, housing cooperatives, land speculators and individuals. All these actors are involved in purchasing land, filling up land where required, installing services either to build houses or subdivide and sell plots. There were few land development schemes in the EFAs during the 1950s or the 1960s (1). Individual landowners used to develop their own land for their homestead and other purposes. Since the 1980s, the PLDCs have moved on with the intention of developing land for housing in the EFAs.

Public agencies are failing to meet the total demand for housing units. They also supply serviced-plots in planned areas to a limited extent. The government can meet only three percent of the total demand for housing. Thus, it has been encouraging the private sector to take initiatives to provide housing to the public. The private sector, basically, meets the housing demand through initiatives undertaken by individuals, households, groups, companies etc. The private sector (formal) has been building apartments in the city where land is extremely scarce, and previously they devoted themselves to small-scale site development for residential development. Apartments are quite popular among prospective buyers because of building designs, organization of interior spaces, aesthetics, service provisions, etc.

Recently the PLDCs are active in the EFAs with their business. Increasing demand for housing or land for housing has encouraged the PLDCs to develop land in the EFAs. The EFAs are close to the city; land prices are also relatively cheaper than elsewhere in the city and large chunks of land are available for buying. Therefore, the PLDCs have bought land, and are providing services, subdividing them and selling them with profit. Most people are interested to buy land from the PLDCs because they are located in planned sites. There are also no alternative sources for investing money. Land price is always on the rise, so people can readily sell off their land if there is an urgent need for cash. PLDCs are very interested in launching their projects in the fringe areas. The following factors are mostly governing their interests, which are analyzed below:

4.2.1 Increasing housing demand:

The demand for housing increased with the growing city population. Meanwhile, the public housing supply is very inconsistent with the demand. Housing requirements in Dhaka is large. It is estimated in 1996 (UPRP-ADB) that the annual requirements in Dhaka is 218,000 units including the dissolution of backlog until 2000 and replacement, wherein the requirements of urban poor is 1. 40,000 units, which share almost two-thirds of the total requirements.

Public sectors contribution to improve the housing situation in Dhaka is minimal and not targeted to the group which badly needs government support. Despite the huge requirement, formal land and housing markets have not been well established that the private sector can hardly exercise their capabilities adequately. Consequently, the largest supplier of land and housing is the informal private sector comprising of small-scale builders and developers, owner-builders.

4.2.2 Operation of the land market:

The land market in the fringe areas is quite complex. Different actors like the PLDCs. cooperative. housing societies; land speculators, land brokers and individuals are participating in the operating land market. Land prices in the fringe areas soared as the PLDCs started their operations and land conversion started taking placing.

Land prices in eastern fringe are low in comparison with the established urban areas. Urban development is taking place in the EFAs, where land purchase and access to land are easier. The price varies depending on land type, soil quality and distance from central areas etc. However, the land price is also highly influenced by surrounding land use. In the land market prices of serviced-plot reach four to five times higher than lowland and land without services. The infrastructure and services adds the value of typical housing plots. The average land price of the EFAs was Tk 9,73,000 per hectare in the 1980s. In the 1990s land price increased from Tk 27,20,000 ~ 28,43,000 per hectare: even this value was comparatively low in comparison with surrounding urban areas (ref. Table 5.10). Therefore. the PLDCs are highly encouraged to speculate land and implement housing project in the areas. Land speculative business is the most common practices of the PLDC's and individuals so that land prices escalate. Besides,

the investments of expatriate Bangladeshi remittance lead to increase of land value. They invest their remittance in fringe area as it has turned out to be the foolproof source of income for investment.

4.2.3 Availability of land in close proximity to city centre:

The study area in eastern fringe is located in the zone between Progati Sarani and the Balu River. The area is towards the northeast side of CBD and about six kilometres off from Motijheel area. The areas are close proximity to Rampura, Badda, Gulshan and Baridhara and Bashundhara. Progati Sarani, considered as a corridor, connects the area. The internal road network is still poor and localized. On the other hand, the area is also linked to local *khals*, which make easy for carrying filling materials (sand) to fill land. Therefore, private developers are highly interested to undertake housing projects in this fringe area. They are mainly interested in making money rather than sustainable development of the areas (ref. the concept of sustainable development, Chapter 2). However, the Natural Water Body, Open Space, Park/Playground Protection Act, 2000 applies to control illegal land filling activities. To some extent, such law is helpful to protect the fringe lands.

4.2.4 Government-owned lands:

The natural rivers, canals, channels and ponds/tanks are shown on the Cadastral Survey (CS) map. These are government-owned *khas* lands. Furthermore, government mostly owned a large quantum of lands within deep low-lying areas. Moreover, some lands belong to the Court of Wards[1] although it is not demarcated in ground, but a few official records are available in office of the Deputy Commissioner (DC). In case of *khas* land the proper records are properly maintained in the DC office, and there are physical demarcations. This weakness makes are opportunity for unscrupulous PLDCs to encroach such land without any lease agreement. Some companies make agreement with the MoL or Deputy Commissioner to exchange their land with government *khas* land (Banasree Project and Begunbari Khal). It is alleged that some active canals are being government *khas* land and some are filled up or encroached by the PLDCs.

[1]The Court of Wards is the government authority and holds the responsibilities of *Bhawal* and *Nawab* estates.

4.3 Alliances between PLDCs and State Development Agencies:

The MHPW is responsible for providing housing, both in the urban and rural areas of Bangladesh. For Dhaka, the RAJUK and BNHA provide serviced-plots and flats. It is mention earlier that present housing stock is inadequate in terms of demand, as a result, the gap between demand and supply is continuously increasing. The housing demand was discussed in the Chapter 3. The PLDCs have come forward to develop housing projects in EFAs. More than 40 companies are involved in housing projects in the city peripheral low-lying areas (Appendix F). Government policies also encourage private sector (PLDCs) to participate in housing to enhance housing stocks. It should be mentioned that the Fourth Five-Year Plan (1991-95) indicated that the "mobilization of resources for development would be shifted from the government to the private sector". In the same vein, the Bangladesh National Housing Policy 1993 (revised in 1999) indicated that the strategy of the government is to act as promoter and facilitator for the private sector. The private sector takes the government facilities on the one hand; on the other hand, some are followed the existing government rules and regulations.

4.3.1 PLDCs in eastern fringe:

With rapid growth of Dhaka, acquisition of lands for housing in the central and sub-centre zone is nearly impossible for majority of people. The residential expansion into the fringe areas has become inevitable. Indeed, the metropolitan fringe has become an area of intense conversion to urban lands.

The PLDCs to implement housing projects in low lying areas with their own style ignoring the existing laws, restrictions and even they are not sincere and co-operative with government agencies. They are always looking for loopholes and default of laws/acts as well as the weaknesses of authorities. The PLDCs flout laws and fill-up low-lying areas by carrying sand/earth from other areas using country boats and engine boats. The regulatory bodies in this context are not always eager to enforce law effectively. The PLDCs have filled up hectare of low-lying land on the city's eastern fringe flouting government directives and laws. For example, several hundred hectare of low lands have been filled up for housing projects, such as Banasree and Aftabnagar of Eastern Housing Limited (EHL); Bashundhara of East West Property Development Private Limited (EWPDPL), Basumati of Hecrajheel Property Limited (HPL). The

massive land filling activities in the peripheral areas including study area have now become a deep concern to experts, professionals and environmentalist.

4.3.2 Housing projects in the EFAs:

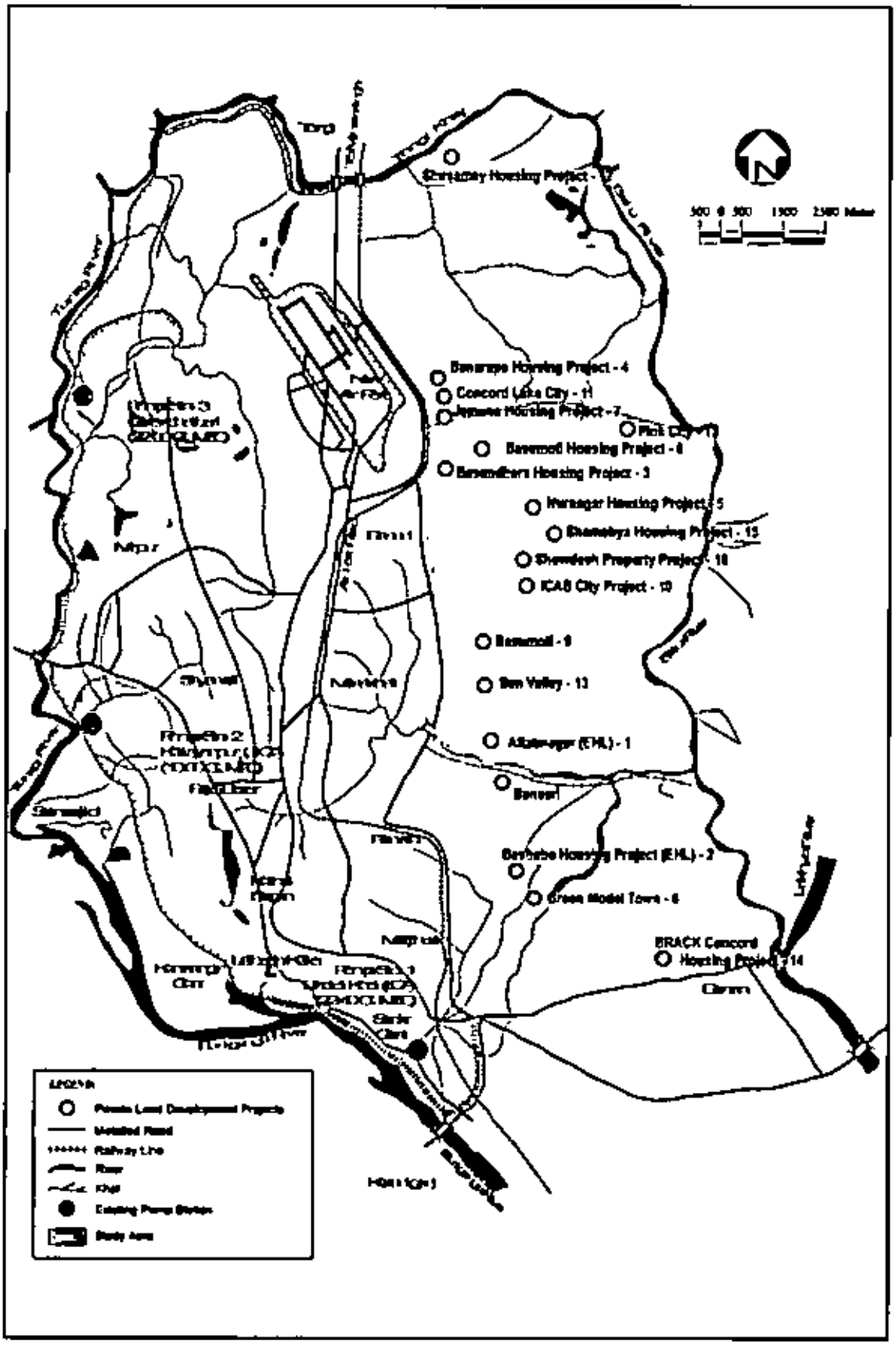
There are also commitments for large-scale planned private development. Elsewhere, unapproved, illegal development is going on. A continuation of such peripheral growth may be expected even without protection provided by embankments. However, as public perceptions regarding flood protection become established, acceleration in land development in the EFAs is expected. Such development, and its associated landfill. may affect the drainage pattern and jeopardize present flood protection measures for the city.

The internal channels with in the areas are connected to the main khals and these are extensively used as out-lets to discharge liquid waste from the industries located along the rivers, canals and other channels. The collecting points of polluted water are the Tejgaon Industrial Area, Mohakhali Tuberculosis Hospital and surrounding areas of Moghbazar, Paribagh and adjoining areas. Moreover, the existing channels are gradually being filled up by incremental disposal of solid wastes. As a result, the effectiveness of Begunbari Khal has Gerani Khal greatly reduced. Gerani Khal connects from Trimohoni to Dholai Khal via Madertak, Jatrabari areas. The khal within the urbanized part flows through the box-culvert built for that purpose, as a result, the whole city has been deprived of the opportunities of natural cooling and aesthetics enhanced by the presence of water bodies. The channel has been contained in the box-culvert and mainly used for drainage purpose. It is noted that Dholai Khal comprises 640-hectare catchments areas (Environmental Improvement Project, DCC 1988) and it is also connected to the Buriganga River. In the part of Madertek, this khal is gradually filled-up by the solid wastes. At present, it has been reduced to storm water out-let. The water transport and drainage network is under threat by indiscriminate land filling by PLDCs and other land development actors. However, the following listed projects (Table 4.1) take place in the eastern fringe areas and location of the projects has been shown in the Map 4.1.

Table 4.1: Private Housing Projects in Eastern Fringe, Dhaka

Sl No.	Companies	Project name	Mouzas	Area (hectare)	Status of Approval	Ref. nos
1	Eastern Housing Ltd. (EHL)	Banasri and Aftabnagar Project	Ullon, Meradia, Goran and Nandipara	517.18	Approved 1987	1
2	Eastern Housing Ltd. (EHL)	Bashabo Housing Project	Shahar Khilgoan, Goran, Razarbagh and Sabujbagh	1.50	Approved 1989	2
3	East West Property Development (Pvt.) Ltd. (EWPDL)	Basundhara Housing Project	Joarshahara and Bhatara	123.43	Approved 1987	3
4	Banani Property Development (Pvt.) Ltd.	Banarupa Housing Project	Joarshahara, Barua and Dhakhin Khan	95.61	Approved 1999	4
5	Nurnagar Housing Co. Ltd.	Nurnagar Housing Project	Satarkul	72.3	Not approved	5
6	Hirajheel property Dev. Limited	Basumoti Housing Project	Kathaldia	67.99	Not approved	6
7	Jamuna Builders Ltd.	Jamuna Housing Project	Dumni and Barua	21.23	Not approved	7
8	Amin Mohammad Land Development Company Ltd.	Green Model Town	Manda and Matuail.	-	Not Approved	9
9	Hirajheel Property Dev. Ltd.	Basumoti	Satarkul and Bhatara	202.34	Not Approved	8
10	ICAB City Company (Pvt.) Ltd.	ICAB City Project	Saterkul	-	Not Approved	10
11	Concord Construction Company Ltd.	Concord Lake City	Joarshahara	-	Approved Building Plans	11
12	Shusamay Bahumukhi Shamobaya Samity	Shusamay Housing Project	Uttar khan, Gobindapur, Nirni	-	Not Approved	12
13	Showdesh Property Ltd	Sun Valley	Saterkul, Sutibhala and Nasimbad	-	Not Approved	13
14	Concord Construction Company Ltd.	BRACK Concord Housing Project	Matual	3.52	Approved	14
15	Shamoby Housing Ltd.	Shamobya Housing Project	Dumni, Mastual and Kathaldia	-	Not Approved	15
16	Showdesh Property Ltd.	Showdesh Property Project	Dumni, Mastial and Dhakhin khan	-	Not Approved	16
17	Xeno Valley	The Pink City	Dumni and Barua	-	Not Approved	17

Source: Office Records of RAJUK, 2003



Map 4.1 Locations of the Private Land Development Housing Projects in Eastern Fringe, Dhaka

Source: Field Survey, 2003 and RAJUK Office Records.

4.3.3 Policies for fringe area and river protection:

The following policies have been formulated in DMDP to protect the fringe areas and surroundings rivers of Dhaka. The concerned agencies like BWDB, RAJUK, DWASA and DoE are responsible to protect such areas to the policies (2). The policies are illustrated below:

a. River and Canal Pollution Control: "Environmental protection measures will be taken to prevent pollution of the Lakhya River and its tributary. the Balu River, in order to ensure that it remains a viable, long-term source of potable water for Dhaka city."

Policy Explanation: With the magnitude of anticipated urban growth, metropolitan Dhaka will increasingly look to its rivers to augment the supply of potable water from artesian sources. These rivers have the greatest potential for such purpose and strong measures should be taken to provide this water source the necessary environmental protection. However, activities of the PLDCs help to make pollution in the eastern fringe area as well as linking the Balu and Lakhya Rivers.

The internal canals have a network with Jirani, Narali, Begunbari and Badda, Satarkul and Manda; and their connecting points are Trimohoni. Beraid and Satarkul. Engine-driven country boats and other high-powered vessels operate on Begunbari *khals* (from Rampura to Trimohoni). About two kilometres from Rampura Bridge, private developers have destroyed and squeezed the original course and width of the *khals*. The internal channels with the areas are connected with the main *khals* and these are expensively used as out-let to discharge liquid waste.

The Lakhya River flows in the northeast part of Dhaka and covers Narayanganj areas. The catchments areas of the rivers have been expanded and a good number of jute and textile industries have encroached the place. Several *khals* within the areas, connected to river, are carrying contaminated water.

The policy also extends to control all sorts of industrial and commercial development, existing and future. within one kilometre of the rivers Lakhya and Balu to be subject to minimum standards of effluent control, and surface water run-off into rivers to be constantly monitored and pollution from any source to be identified and stopped forthwith.

b. Policy for Flood Retention Ponds: "Control will be maintained over the areas designated in Dhaka Metropolitan Areas for flood retention ponds to ensure that they

remain capable of fulfilling their primary function of water storage at times of flooding."

Policy Explanation: Flood retention ponds are a key and critically important component. The proposed retention ponds will be designed to reduce intensity of local flooding within the protected areas. and reduce pumping requirements at times of maximum surface water run-off. Their location should be the subject of detailed geological survey to ensure that the city's natural drainage system uncompromising and the effects of water logging are minimized.

e. Urban Fringe Development Acceleration: "The authority will initiate and coordination a range of measures aimed at stimulating reorganization and re-sub-division of the urban fringe areas. To optimize the utilization of land converted to urban use in the 1980s and the development of appropriate and affordable levels of infrastructure and road provision".

Policy Explanation:

This is the area of land, which was converted, to urban use in the 1980s. It is widely scattered around most of Dhaka's established urban area and with its 1214 hectare (DMDP), it comprises one tenth of the 1991 urban area and supports almost .54 million people. However the development has taken in a spontaneous, but haphazard way, leaving little way neither for an appropriate road network nor for basic infrastructure facilities and services

4.3.4. State development agencies:

In the development process of fringe areas in Dhaka, the state development agencies are responsible to prepare plan, execution, monitoring. control, etc. In light of that the responsibilities and contribution of such agencies like RAJUK, BWDB. DWASA and DoE are stated below:

RAJUK:

The former Dhaka Improvement Trust (DIT), presently Rajdhani Unnayan Kartripakkha (RAJUK) was established in 1956 under the provision of the Town Improvement Act 1953. The act provides power to DIT for preparing master plan of Dhaka city. Formal DIT had prepared the 'Dhaka City Master Plan 1959' comprising 830 sqkm under this

act, section 73 and approved the plan under section 74 (3). After a long time, the Dhaka Metropolitan Development Plan (1995-20015) has prepared for greater Dhaka and approved published in gazettes on August 4, 1997. This plan covers 1528 sqkm of area with Naryangonj Tongi, Saver, Gazipur and Keraniganj and their surrounding. The planning areas are divided into 26 zones and each zone has separate planning recommendations (4).

Land use Provision: The Concept of Structure Plan break through the traditional master plan. In the structure plan land use provision are adjusted with the dynamic change on the other hand Dhaka City Master Plan, 1959 provision was most rigid. Rigid master plan has been continued in most developing countries. But out dated legislation in developing countries still demand that the statutory authority prepare such plan. In addition, all related regulatory legislations are linked to the existence of an official master plan. Economic consideration, political and financial constraints, however, requires greater emphasis on strategic planning (Conflict or Consistency, Calcutta, Merezes 1985). However land use categories of Dacca City Master Plan 1959 and DMDP (1995-2015) are tabulated below:

Table 4.2: The Land Use Categories of Dhaka City Master Plan 1959 and DMDP 1995-2015

Land use categories of Dacca City Master Plan 1959	Land use Categories in DMDP 1995-2015
Housing and Ancillary Uses	Mixed Use Spontaneous Zone
Industry	Main Flood Flow Zone
Central Business Zone	Sub Flood Flow Zone
Commerce and Warehousing	Open Space
Government and public Buildings	Restricted Airport Overlay
Hospitals	Restricted Military/Public Safety
Main Roads and Railway Land	Restricted Flood Protection Reserves
Steamer Station and Bus Stations	Restricted Road/Utility Reserves
Education Open Space & Cemeteries	Restricted Special
Cantonments (part only)	Water Supply Protection Zone
Sewerage Treatment & Wireless Stations	Industrial (Moderate Hazard)
Major Reclamation (part only)	Mixed Use Planned Zone
Water Areas (Land Liable to Flood)	Industrial (Low hazard)

Source: Dacca City Master Plan, 1959 and DMDP 1995-2015

Planning Permission (Land Use Clearance):

The planning permissions are given under the Article 6 of the Urban Area Plan (DMDP)[2]. This permission is mandatory for individual construction and housing estates and it is given based on the following considerations:

- Proposed land use must be in conformity with Structure Plan and Urban Area Plan (DMDP-1995-2015)
- Review and site inspection are mandatory
- Clearance from other agencies (if required)

Types of permission: According to DMDP the permission are given in the following ways:

a. Full planning permission
b. Conditional permission
c. Permission after plan review and site inspection

The chairman, RAJUK can give construction permission exercising the power under sub-section of section 75 (1) of the Town Improvement Act 1953 (amended 1987) where desired land use is contrast with indicated land use in DMDP. The provision of 75 (1) is quoted below:

"If any person desires to use land for any purpose other than that laid down in the [Master] Plan approved, he may apply in writing to the Chairman for permission so to do.

i. If the chairman refuses permission to any person, such person may, within sixty days of the chairman's refusal, appeal to the [Kartripakkha] against such refusal.
ii. The decision of the [Kartripakkha] on any appeal under sub-section (2) shall be final".

[2] Article 6 of the Urban Area Plan: The purpose of the Planning Permission is to ensure that proposed development is in conformance with the Metro Dhaka Structure Plan and any other plan currently enforced.

In this process a large number of planning permissions are being given based on site inspection by the planning team. Although this is an interim arrangement; the DAPs (Detailed Area Plans) of the private areas are not yet prepared. It has both positive and negative implications because the development activities of the public and private sectors are not disrupted if planning permission continues under Town Improvement Act 1953 (amended 1987). On the other hand, this piecemeal development will take place that may obstruct future DAP proposals and that situation definitely lose the harmony in planned growth.

The Private Land Development Housing Project Rules, 2004:

Recently the Private Land Development Housing Project Rules (PLDHPR), 2004 was framed with guidelines and instructions of private housing project (5). This rule clearly states that how the project will prepare, and how the project gets approval and how the project will monitor. However, the salient features of PLDHPR are summarized below:

Stage-1: **Registration:** The interested PLDCs/ professionals (planners, architects and engineers) may register with the RAJUK and obtain registration number for real estate business in Dhaka Metropolitan Areas. The basic requirements for registration are: trade license, VAT (Value Added Tax) certificate, and memorandum of articles of the company and performance of the company.

Stage-2: **Advice:** After registration, companies may take advice from the RAJUK for their land development project to get approval. RAJUK personnel will give advice to the companies for the applied project in light of the PLDHPR, 2004. The advice would be on land use provision in the DMDP, government policies and programme, executive order from the government, and provide guidelines from the PLDHPR, 2004.

Stage-3: **Application:** The companies will duly fill-up the prescribed Application Form and submit along with land ownership document, clearances from concerned agencies and DoE for specific project for approval. If the project implementation is hampered for land procurement, the government will acquire only 15 percent land for the interest of the project.

Stage-4: **Layout Plan:** Prescribed application encompasses a standard layout plan. Along with the application, the company must submit layout plan indicating road, infrastructure and service network. In the layout plan, more than 30 percent land should be preserved for schools, colleges, playgrounds. open space, lakes and other civic uses etc.

Stage-5: **Land use Provision:** The Project land must be in conformity with the DMDP land use provision. The natural water bodies, flood flow and sub-flow zones cannot be converted for housing projects. The government will identify such areas and notify those in the government gazette.

Stage-6: **Checking and Verification:** The project documents shall be checked by the authority and make the report on field verification.

Stage-7: **Approval Procedures:** The RAJUK board will endorse it and forward to the Approval Committee. The committee comprises 10 members headed by the MHPW.

Stage-8: **Implementation:** During the implementation stage, the authority will supervise and monitor the project according to the terms of condition of approval. Simultaneously, the company will inform to the authority concerned time-to-time and obtain completion certificate within the stipulated period.

REHAB's comments on the PLDHPR:

Real Estate and Housing Association of Bangladesh (REHAB) made some comments on the PLDHPR and requested the government to bring certain changes in it. They are summarized below:

- The Natural Water Body, Open Space, Park/Playground Protection Law, 2000 is unrealistic and non-transparent. Meanwhile the government has stopped most of

the ongoing housing projects, but government agencies are continuing housing projects in low-lying areas, which is contradictory to the existing law (6).

- DMDP (1995-2015) indicates that surrounding low-lying areas of the city should be developed for habitation in due course of time. On the contrary, the Natural Water Body, Open Space, Park/Playground Protection Law, 2000 defines the restrictions and discourages to take land development project in low-lying areas.
- Proper explanation and identification of the natural water bodies surrounding Dhaka city must be included in the proposed DAPs.
- Equal facilities in the private land development projects should be ensured like public (government agencies) sector programme.
- The role of private development in housing sector are to be evaluated as in urbanization and expansion process of Dhaka city,
- Permission should be given to a company on maximum13.38 hectares land, but in case of partner project. the same quantum of land may allow under the same project.
- The Concept Plan of the project and its future expansion should be allowed in advance.
- If the PLDCs fail to purchase any quantum of land within the project area and prove it essential for the interest of project. in that case, the government should acquire such land (15 percent of a project area) on behalf of the developer.
- Government-owned *khas* land inside the approved project area can be given to the developer on lease or permanent basis for the interest of the project.
- Consultation should take place between the government and PLDCs regarding the PLDHPR, 2004 to make it easy and accessible to private developers.

Approach to sustainable development concept:

All the efforts are to make framework for the sustainable environmental concept (ref. Chapter 2, theoretical explanation). The concept includes physical, social, economic and environmental components and sub-components in area basis and also in city content. But with the PLDC activities, discharge of wastewater from surrounding areas into the

EFAs is going on; as a result, environmental damages are taking place in the areas. Moreover, the pollution sources of the EFAs surroundings are leading to dent in water and environment resources.

The weak enforcement of existing acts/laws by the development agencies concerned encourages continuation of the illegal activities by the PLDCs. Now the question is raised why it is happening frequently. From the analysis of this research, it is revealed that lack coordination among the agencies, overlapping the functions, ligancies of duties and weak building capacities (professional, manpower, logistic support, management etc) are the reasons.

However, within the commitment of sustainable development in the EFAs, the following issues would be ensured: (i) to ensure not to discharge liquid and solid wastes in canals and low-lying areas (ii) to reduce chemical and physical hazards in the EFAs surroundings, and (iii) to maintain inhabitants and ecosystems through preservation of canals and wetlands.

4.3.5. Identification of low-lying land and activities of PLDCs:

The low-lying areas within the jurisdiction of Dhaka Metropolitan Areas have been broadly identified in the DMDP. However, the identification of low-lying areas on mouza map (1:3960) is not yet completed. In the DAPs the natural water bodies, pond, canals, flood flow and sub-flood zones and low-lying areas will be demarcated. Meanwhile, preparation of the DAPs has already started.

However, identification of low-lying areas in the city and restricted land use are most critical and debatable because some areas within the city go under water during the rainy season and water remains stagnant there for four to dive months. In the lean season, these lands become dried up and can be brought under traditional land uses. The identification of *khal*, low-lying areas, lakes, natural water bodies, flood flow and sub-flood flow areas have to be identified and published in official gazette for restricted land use. The clauses of the Natural Water Bodies, Open Space, Park/Playgronnd Protection Law, 2000 conflict with land classification (*vitta, nalaa, challaa*) prepared by the MoL.

Mentioning the above loophole in the law, landowners always try to keep aside their lands from being identified as low-lying lands.

In this connection, it is observed that sometimes the PLDCs invest money on low-lying areas without obtaining planning permission. It is not an illegal activity but they continue their projects in low-lying areas. Initially the developers purchase lands from the landowners and start to landfill on the proposed areas. At this stage, PLDCs seek permission of the project. In some cases the government needs project lands for public interest and starts acquisition process. Under these circumstances, developers are seriously affected and lose their potential clients. To overcome this situation, low lands have to be identified first, and earmarked in the city and mouza (1:3960) maps and also publicized for land use provision and possible future use.

BWDB:

Bangladesh Water Development Board (BWDB) is responsible for protecting the urban and rural areas from annual flooding through constructing embankment. At this stage, most of the fringe areas including eastern fringe of Dhaka are affected by annual flooding in the rainy season. This organization possesses contour map, topo map and other hydraulic map. These documents are extremely useful for the development programme of both public and private sectors. Before taking any project, the technical feasibility analysis and environmental screening are essential. Meanwhile, the BWDB has already taken initiative to construct an embankment along the Balu River. The project is discussed in detailed in Chapter 8 (see, Section 8.2.3).

DWASA:

Dhaka Water and Sewerage Authority (DWASA) have created in 1963. In 1989, the drainage circle of Bangladesh Public Health Engineering Department was handed to DWASA with staff and resources. This authority is main concerned about to supply water, drainage and sewerage within city areas. This authorities are also responsible for maintain internal canals to discharge storm water. Water logging in city is one of the main problems due to landfill activities in the low-lying areas including canals/channels.

The internal *khals* are Begunbari khal, Segunbagicha khal, Kallaynpur khal, Abdullahpur khal, Degun khal, Doali khal and Doali khal. Once there was an excellent canal network in the eastern part of the city but this network has damaged by the encroachers (PLDCs and individual land owners). Besides, Local Government (LG) constructs local roads under Food for Works Programme without any plan, which sometimes obstructs flow of water to the canals. As a result, water logging in the areas is a common phenomenon. For example, monsoon rains in July 2005, which continues for two days, disrupted normal life in the city. The city experienced heavy downpour submerging most of areas of the metropolis, and paralyzed city life totally. Met Office said that the capital experienced 160mm of rain in last 36 hours which caused water logging in most parts of the city, and this problem was due to the dilapidated drainage network of the city. The earth filling of canals by a section of land grabbers also caused water logging even in slight showers. These canals were used as natural outflow of rain and floodwaters in Dhaka in the past. Besides, at least 70 percent areas of the capital city have no sewerage lines, which is also contributes to water logging in the metropolis during flood. As a result, the flooded areas of the city included Segun Bagicha, Topkhana, Motijheel Commercial Area, Dilkusha Commercial Area. Mirpur, Shewrapara, Kazi Para, Muhammad, Muchak, Kakrail, Basabo, Goran, Bijoynagar, Naya Paltan. Rajarbag, Arambagh, inside of the DND, Azimpur, Dayaganj, Jatrabari, Shajhanpur, Demra, Asadgate, Malibagh, Fakirapool, Baridhara, and some part of Gulshan and Banani, and the places near by Notre Dame College. The DCC is working on to recover canals and drainage outlets from the land grabbers. The agencies concerned (DCC. DWASA, RAJUK) had earlier recovered some canals/channels and recently they initiated to recover remaining canals from the encroachers.

At the same time, the DWASA and other agencies should take programme on priority basis to resort the original canals/channels. In this connection, the high power committee under Ministry of Home was formed to take pragmatic measure to recover encroached canals/channels. The implementation works have already started.

DoE:

The Department of Environment (DoE) concerns to protect land, water and air pollution. This department has supports to maintain field level information records regarding pollution level in water, land and air, and pollution sources. In the eastern

fringe, the developments are taken place and the existing *khals* are continuously contaminated by the surrounding polluting activities. In this regard, DoE measures are inadequate to protect polluting activities. Moreover, the monitoring of water pollution is very poor.

Begunbari Khal and Gerani Khal both are using as outlet of eastern parts of Dhaka and the khals are being contaminated. The pollution level of water in the *khals* should monitor regularly. The continuous water pollution damages surrounding water and the areas are gradually disappearing and also lead human heath.

The DoE is presently weak by technicalities like shortage technical manpower and equipments (like testing laboratory, computer lap and others facilities). The building capacity of DoE and financial strengthening are not unto mark.

4.4 Urban Politics and Urban Power Groups:

The PLDCs, cooperative housing societies, individuals and land speculators are the main actors to handle the lands in the EFAs. They play power game with the fringe lands. Land buying and selling, speculation, illegal occupying land is the main practice. Land brokers (*dalals*)[3] are associated with the PLDCs and engage for land buying and selling. Land brokers usually have good connections in society, so that they know prospective buyers and sellers. Normally the brokers are well acquainted with the land market conditions. They keep close contact with Sub-Register offices, and they are up-to-date with information regarding transfers/transactions etc.

Land brokers or *dalals* negotiate between the buyers and sellers and take charges from both the parties. In some cases, brokers resort to dishonest means, for example, by selling land with disputed ownership, selling land in absence of owners, using false deeds and sometimes selling the same parcel of land to more than one purchaser.

[3] Land Broker (*dalals*) acts as self-employed agents. They operate mostly at individual level and develop their own disentitle who are mostly private buyers and brokers usually having good connection in the society and therefore they know prospective buyers and sellers.

There is a very active game of politics and power in this area. The larger PLDCs have proven to be quite powerful as they have officials to draw and handle specific projects and the power to maintain *Mastans* or musclemen[4] to look after and protect their project lands. The PLDCs also employ these musclemen to occupy low land to extend the projects. There are allegations that the PLDCs can capture land from landowners unwilling to sell their land by foul tactics or simply by applying force. The aim of the PLDCs is to make large profits from housing projects without thinking landfill activities are legal or illegal. In fact, the PLDCs have become the 'God-Fathers' in the EFAs and they can deal and handle with any piece of land and control the lands. Ruling elites and other powerful people of the society often support PLDCs activities.

4.4.1 Politics: State versus PLDCs:

The state agencies seem to be seriously concerned at protecting peripheral fringe areas through adoption of various policies and laws. In reality, it is found that existing policies and laws could not protect most of the project activities and create conflicting situations between the state agencies and PLDCs. Some acts/laws, policies plans are described in this section. The existing policies and regulations may protect water-prone areas/fringe area and these are illustrated in Figure 4.1.

a. Politics among the PLDCs:

A good member of land development companies is involved in land filling activities in the EFAs for housing estates. Among them, some companies are big and powerful in terms of financial and political prowess. Each company maintains its tentative boundary adjacent to the project. These companies try to purchase land applying the different technique, which are: attractive false offers to the landowners, make false case against landowners or companies, occupy public owned land *(khas)* with help of local *masalman* (musclemen); they are also bound to sell individual owned lands at low price through arresting by surrounded lands. The EWPDPL (Basundhara) has started to graph HPLC's project lands in the EFAs with the help of musclemen

[4] *Mastaans* (musclemen) - group of physically strong people engaged by the PLDCs to illegally occupy land from companies and individuals. They also force local landowners to sell their lands to the companies at the PLDC quoted prices They also protect such lands.

Furthermore, the EWPDPL has a case against HPLC in the court. The project sites of these two companies are located side by side. The EWPDPL is trying to occupy adjacent HPLC lands. At the initial stage, the EWPDPL offered the HPLC to sell its land for expanding the Basumati project, but HPLC strongly refused the proposal. Under this circumstance, Basumati project is encircled by the EWPDPL lands and it closed all entries to the HPLC project restricting its expansion in the surrounding areas. This way the EWPDPL applied force on the HPLC to sell their lands to them. Meanwhile, some areas of the HPLC have already been occupied by the EWPDPL with the help of their musclemen.

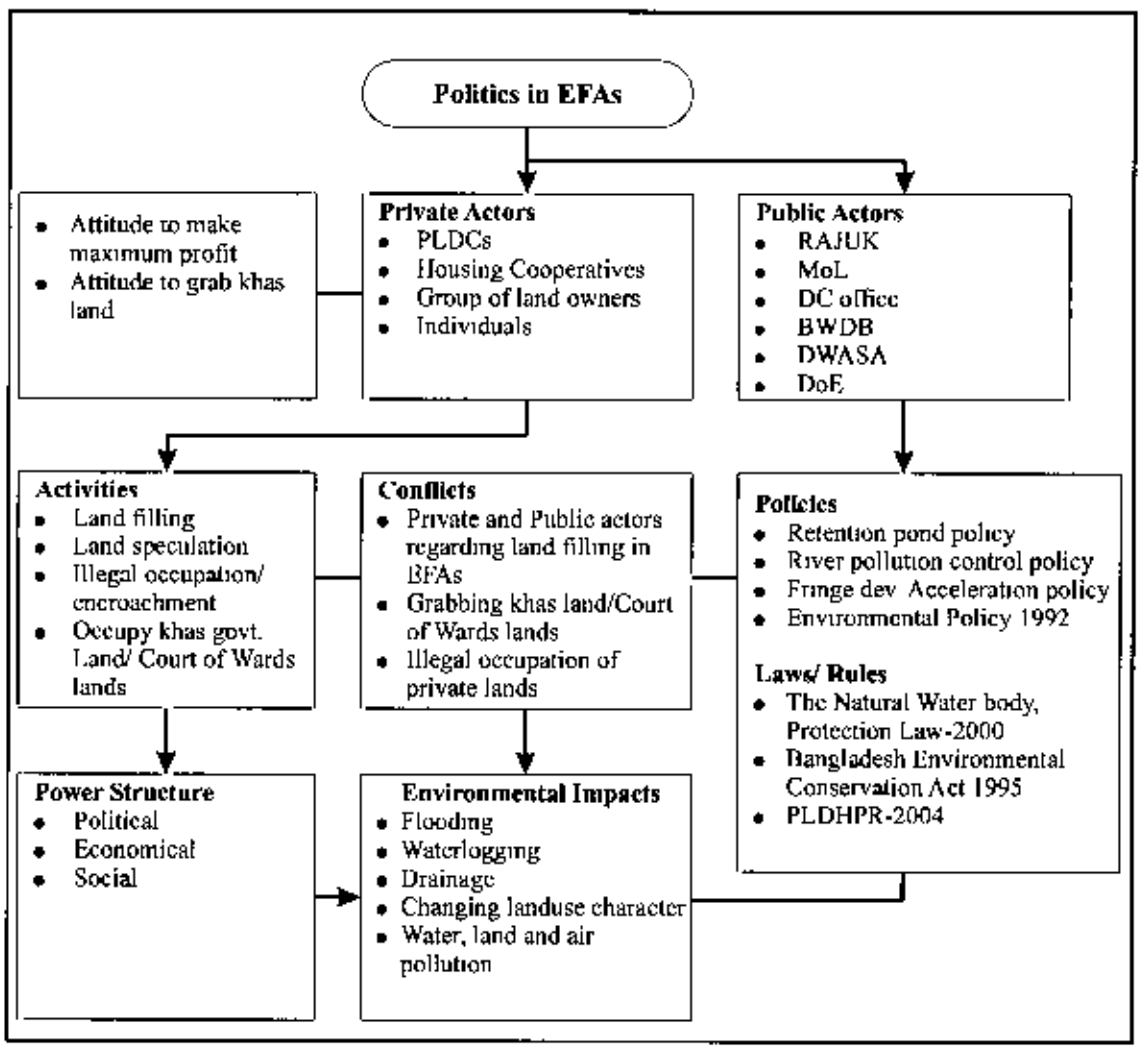


Figure 4.1: Politics in Eastern Fringe Areas

4.5 Implementation of Government Order:

Illegal occupation of *khas* lands of the government in the fringe areas, grabbing of canals, lakes, water bodies and earth-filling and unplanned constructions over the last few decades are responsible for such disaster. The weak implementation of laws encouraged unplanned development in the fringe areas. This process has been carried out by some greedy PLDCs in collaboration with some dishonest officials of different public agencies including RAJUK and politicians who work for the illegal activities.

Recently, leaders of 20 environmental and social organizations called on the government to take effective steps to protect the city from floods and water logging and to evict illegal encroachers occupying water bodies. They also demanded immediate execution of the government's decision regarding the DMDP 1995-2015 and the Natural Water Body Protection Law, 2000

Different associations and NGOs protested against land filling in low-lying areas of the city. Bangladesh Paribesh Andolon (BAPA) formed a human chain in front of RAJUK office in 2004 where hundreds of people gathered. Speaking at the gathering, the leaders said most city roads go under knee-deep water even after slight or moderate rain as over 90 percent lands in and around the capital has been filled up by land grabbers. They demanded recovery of such canals, wetlands and lakes from illegal encroachers in eastern fringe areas for the greater interest of the city. Among others, Angora Udder, Coalition for Urban poor (CUP), Proshika, SID, Hunger Project, Drama Bikes and Parries Surabaya Sanity, Sitar and Seba Samity, Bishwa Shanti Sangha, Work for Better Bangladesh, Bastibasi Adhikar Surakkha Committee, Pallima Sangsad, Citizen's Forum and Centre for Human Communities Development participated in there.

4.6 Relevant Acts/Laws to Control Development:

- **The Building Construction Act 1952 (amended 1987):**

The Building Construction Act 1952 (Amended 1987) is mainly concerned to protect unauthorised construction within the designated master plan areas. As per provision of the act, each and every building needs approval for construction by the Building Construction Committee (BCC) (6). This committee is constituted by MHPW comparing planners, architects and engineers of RAJUK, PWD, D0A (Department of Architecture) and BNHA. The act provides building definition: "The Building includes a house, hut, wall and any other structure where of masonry bricks, corrugated iron sheet, metal tires

wood, bamboo, mud, leaves, grass, thatch or any other materials whatsoever." This act does not cover landfill activities, which is the key weakness of the act.

- **The Natural Water Body, Open Space, Park/Playground Protection Law, 2000**

The government has framed the Natural Water bodies, Open space, Playground, Park Protection Law, 2000 to protect natural water bodies. canals, rivers. depressed low-lying areas and open space within metropolitan areas. It provides power to the concerned authorities to protect water bodies to face environmental hazards. It also indicates that the land use in the DMDP will be the documents for Dhaka Metropolitan Areas. The broad land use has been shown in the Dhaka Structure Plan (1:50000) and Urban Plan (1:25,000). But in the detailed level such land use (like natural water bodies, canals, rivers, depressed low lying areas) are not yet been demarcated on mouza map (1:3960). Presently, the DAPs are under preparation with help of local consultants.

The weaknesses/loopholes in laws and acts are discussed in following section. The developers try to establish their arguments to take the opportunities to implement their projects in low-lying areas. On the other hand, the government tries to protect the areas, which are restricted in DMDP. Under this situation, application of this acts /laws becomes ambiguous and difficult to enforce.

4.7 Loopholes of Acts/Laws and Plans:

There are several acts/laws at the city and national levels to protect environmental damages. The agencies can enforce their laws according to the requirement. In this process overlapping of functions among the agencies are found. Moreover, some conflicts occur due to overlapping of jurisdictions of different agencies. Some acts/laws are not sufficient and they have some dependable variables, for example, the Natural Water Body, Open Space, Park/Playground Protection Law, 2000, requires identifying river, *khal, beel,* lake, natural water bodies and flood flow and sub-flood zones in mouza map (scale 1:3960). It also has to publicize locations of such retention areas in official gazettes but the mouza map is not yet prepared. As a result, the enforcement of this law is often challenged in civil court. However, under this research, the relevant acts/laws and plans have been critically reviewed, and their weaknesses and loopholes were found (see the table 4.3).

Table 4.3: Loopholes of Acts/Laws and Plans

Sl. No.	Provision of Acts/Laws/Plans	Weakness/Loopholes
1.	The Town Improvement Act 1953 (amended 1987) provides that no compensation shall payable to any person owing to the restricted use to which his land may be put under sections 73 and 74.	RAJUK is empowered to prepare master plan of Dhaka under section73 and 74 of the Town Improvement Acts 1953 (amended 1987) indicating land uses. The provision of the act is that no compensation shall be payable to any person owing to the restricted use to which his land may be put under above sections. The enforcement for ensuring prescribed land use as per the master plan has become weak because of such lands is privately owned.
2.	The Building Construction Act 1952 (amended 1987) provides power for the prevention of haphazard construction of the buildings/structures and excavation of tanks and cutting of hills, which are likely to interfere with the planning of certain areas.	This act does not cover the landfill activities; therefore, RAJUK cannot exercise the power of the act to stop haphazard landfill activities in the low-lying areas.
3	The Dhaka City Corporation Ordinance 1983 (modified 1992) Section 108, Master Plan- The Corporation may, and if so required by the government shall, draw up a Master Plan for the city which shall, among other matters provided for-Sub-section (c) restriction, regulation and prohibitions to be imposed with regard to the development of sites, and the erection and re-erection of buildings within the city.	Dhaka City Corporation (DCC) is empowered to prepare master plan under this act. This is overlapping with the Town Improvement Acts 1953 (amended 1987) under section 73 and 74. The eastern fringe areas of Dhaka are beyond the boundary of DCC Presently, the area is controlled by district administration. Therefore, the provisions of restrictions, regulations and prohibitions indicated the Dhaka City Corporation Ordinance 1983 (modified 1992) couldn't be imposed over the areas.
4	Paurashava Ordinance 1977 (Ordinance XXX1 of 1977) Section Master Plan- A Paurashavas may, and if so required by the prescribed Authority shall, draw up a Master Plan for municipality. Erection and re-erection of buildings; No person shall erect or re-rect a building or commence to erect or re-rect a building unless the site has been approved, and building has been sanction by the Paurashavas Bangladesh Gazette 1 April 2003 declared that Tongi, Narayangonj, Savar and Gazipur Paurashava areas excluded from RAJUK jurisdiction. Paurashavas authorities are empowered to carryout the development programmes and allowed to approve the building plan.	At the sametime, RAJUK is empowered to prepare master plan of Dhaka under section73 and 74 of the Town Improvement Acts 1953 (amended 1987) indicating land uses. Therefore, there is a conflict between the Paurashava Ordinance 1977 and the Town Improvement Act 1953. At the sametime RAJUK is empowered to approve building plan within the Paurashava areas under The Building construction Act 1952 (Amended 1987). There are some conflicts berween the Building Construction Act 1952 and the Paurashava Ordinance 1977.

Continued next page

5.	Cantonments Act 1924. The Cantonment Board gives approval of building within the jurisdiction of Cantonment Board. The area is demarcated through the gazette notification.	Under the Cantonment Act 1924 provides power to approval /disapproval building plan under section 186 (section 284) There is a overlapping of the functions between the Cantonment Act 1924 and the Building Construction Act 1952
6.	The Natural Water body, Open space, Park /Play Ground Protection Law 2000 The identified river, khal, bill, lake, natural water body flood flow and sub-flood zones law-lying in the master plan must be protected. These areas must be published through gazette notification. The character of the areas cannot be changed to project environment.	Declaration of the natural water bodies, the low-lying and retention area, *khal*, natural water body within DMDP are not earmarked on mouza map (scale 1:3960) In case of the eastern fringe, DMDP has proposed as 'new urban land development area. Presently the overview of the areas is low-lying and seasonally use for agricultural purpose. But there is no detailing.
7.	The National Housing Policy 1993 (revised 1999) The strategy of the government will be act as promoter and facilitator of housing by the private sector, while retaining the government's role as a provider to a limited extent. Encourage the involvement of the private sector in land development, infrastructure development and construction.	According to the policy guidelines the private sectors are not adequately provided land, finance and services etc. Private land development policy not yet approved as guidelines Under the loopholes, the private companies, and developers implement their projects in low- lying areas.
8	Dhaka Metropolitan Development Plan 1995-2015, The polices are. Urban Fringe Development Acceleration: Authorities will initiate and co-ordinate a range of measures aimed at stimulating reorganisation and re-subdivision of the urban fringe area. Fringe Area Growth Acceleration: To initiate and coordinate a range of measures aimed at stimulating and accelerating the rate of development in the designated areas of the urban fringe. Eastern Bypass: The government has attached high priority to the development of the Eastern Bypass to become a key link in the emerging national network of arterial roads and to relieve the existing urban network. Flood Retention Pond Areas: Control will be maintained over the areas designated in the plan for flood retention areas in order to ensure that they remain capable of fulfilling their primary function of water storage at times of flooding. Planning Permission (Land Use Clearance) The Article 6 of Urban Area Plan (DMDP) is followed for developed control of Dhaka.	DMDP does not provide detailed guidelines to the private sector or other developers. The general guidelines have loopholes for the irrational and unscrupulous land development activities, Planning Permission (Land Use Clearance) is followed by DMDP. The requirements for obtaining planning and building permission is applicable to all persons seeking permission to carry out development activities within the area under the jurisdiction of RAJUK for the purpose of development and construction and as defined by DMDP (Dhaka Structure Plan and Urban Area Plan). According to the plan three types of permission are given, these are: basic planning permission, full planning permission and conditional use permission. The purpose of the basic planning permission procedure is to ensure that proposed development is in conformance with DMDP. But it is a difficult task to check individual C.S. Plots (in mouza map, scale: 1:3960) with the Structure Plan (scale 1.50000) and Urban Area Plan (scale: 1:3000).

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	The plan is basically a development control document and each and every individual building for housing, commercial, industrial estates need planning permission from RAJUK	
9.	The Private Land Development Housing Project Rules (PLDHPR), 2004: PLDCs must submit project documents layout plan indicating road, infrastructure and service network. In the layout plan, certain land should be preserved (as indicated in the PLDHPR) for schools, colleges, playgrounds, open space, lakes and other uses etc. The project documents shall be checked by the authority and make field verification report according to PLDHPR. During the implementation the authority will supervise and monitor the projects as per of approval. Simultaneously, the company obtain completion certificate within the specific period.	The enforcement, management parts is not properly indicated, in PLDHPR and therefore whole process of the implementation delayed and cumbersome. There is no panel section in this rule, which can apply to protect the growing unauthorised housing estate Although PLDHPR is supported by clearance other agencies, which are supported by acts and laws.

Notes and References

1. The role of private housing companies in 1950s and 1960s were not significant for converting inner fringe and extent to outer fringe. During this period, the actual development for residential purpose in fringe area was not remarkable, see Islam. Nazrul (1990), Dhaka Metropolitan Fringe, Land and Housing Development, Dhaka, pp. 18.
2. RAJUK, MHPW, UNCHS and UNDP (1995), "Dhaka Metropolitan Development Plan (1995-2015)," Dhaka.
3. Dacca Improvement Trust (DIT) (1959), "Dacca City Master Plan", prepared under the Technical Co-operation Scheme of the Colombo Plan, (engaged Minoprio and Spencely and P. W. Macfarlane, under Architects and Town Planning Consultants), Dhaka.
4. *Op. cit. 2, vol. 11. Chapter 4. p. 43.*
3. GOB (2004), The Private Land Development Housing Project Rules (PLDHPR) 2004, published in Official Gazette, Dhaka.
4. The Building Construction Committee (BCC) is formed by the Ministry of Housing and Public Works under the Building Construction Act 1952 (Amended 1987). The committee consists 6 to 7 professional members like Planner, Architect and Engineer headed by Members (Planning / Development), RAJUK
5. GOB (2000), The Natural Water bodies, Open Space, Playground. Park Protection Law, 2000. Published in Bangladesh Gazette, Dhaka.

CHAPTER 5: ANALYSING THE EFAs: PLDCs RECENT CHOICE FOR DEVELOPMENT

5.1 Introduction:

Chapter 4 focused discussion on the emergence of the PLDCs and their activities in the EFAs of Dhaka. At the same time, the role of public sector and the loopholes of existing laws/acts are critically analyzed. Besides, the urban politics among the actors in EFAs are highlighted. This chapter analyzes the physical conditions of the EFAs to study its condition prior to intervention of the PLDCs and the changes land development activities brought to the area. It also discusses the socio-economic conditions of the local people to examine how land development activities have affected their vicinity.

In theoretical explanation of "Good City Form" (Lynch 1981) the urban form takes place based on the physical (topography, land level and soil etc.) condition, land use policy, and recommendations in master plan of the city or particular areas. Moreover, the socio-economic condition and socio-cultural behaviour are also influential factors for making area form of the city area. In this chapter, all relevant components and sub-components of the physical aspects are analysed within the format of the good city form theory (please see Chapter 2, section .2.11). The physical condition, morphology the area and surroundings, drainage, flood sensitivity, earthquake and other influential factors of EFAs are analysed. Moreover, the land use policy of government and socio-economic condition are also important factors for determining to make the area. But in reality, such contributions are less; on the other hand, the profit drive is the most important issue, which prevail whereas it is not considered in the light of sustainable development. However, the following discussions are made under the above theory and concept and highlight the differences.

As the eastern fringe is situated within Dhaka's boundary, a discussion on the geographic characteristics is also deemed necessary. The city's environmental condition will be affected if marked changes are brought about in the geo-morphological and environmental conditions of the EFAs.

Dhaka is located in a great delta, making it prone to flooding. Geographically, Bangladesh is located in a great alluvial floodplain and its formation has been caused by thousands of years of silt accretion. The topographic setting of the region is such that it carries the outflow of the Ganges-Brahmaputra River and the Himalayan snowmelt out to the Indian Ocean. About 60 percent of water of this river system flows through

Bangladesh; however; only about 70% of this whole river system is located inside Bangladesh's border. The rivers have an intricate network spread all over the country that carry off the huge load of water (1.3 trillion cusecs) flowing through the Bangladesh's land.

In the past, flood did not pose a threat to human settlements as the rivers were scrupulously maintained to keep them navigable and to contain run-off. However, with population increase and consequent increased urbanization, wetlands were filled up to make room for development. Decrease in water bodies and increase in built up areas made flood a perennial problem for Bangladesh. The EFAs are basically a floodplain, which is used for agricultural purposes in the dry winter season. The EFAs are also the only open space left in the eastern part of Dhaka having the flood retention ponds recommended by the FAP 1992.

5.2 Physical Analysis of Eastern Fringe:

5.2.1 Topography and relics:

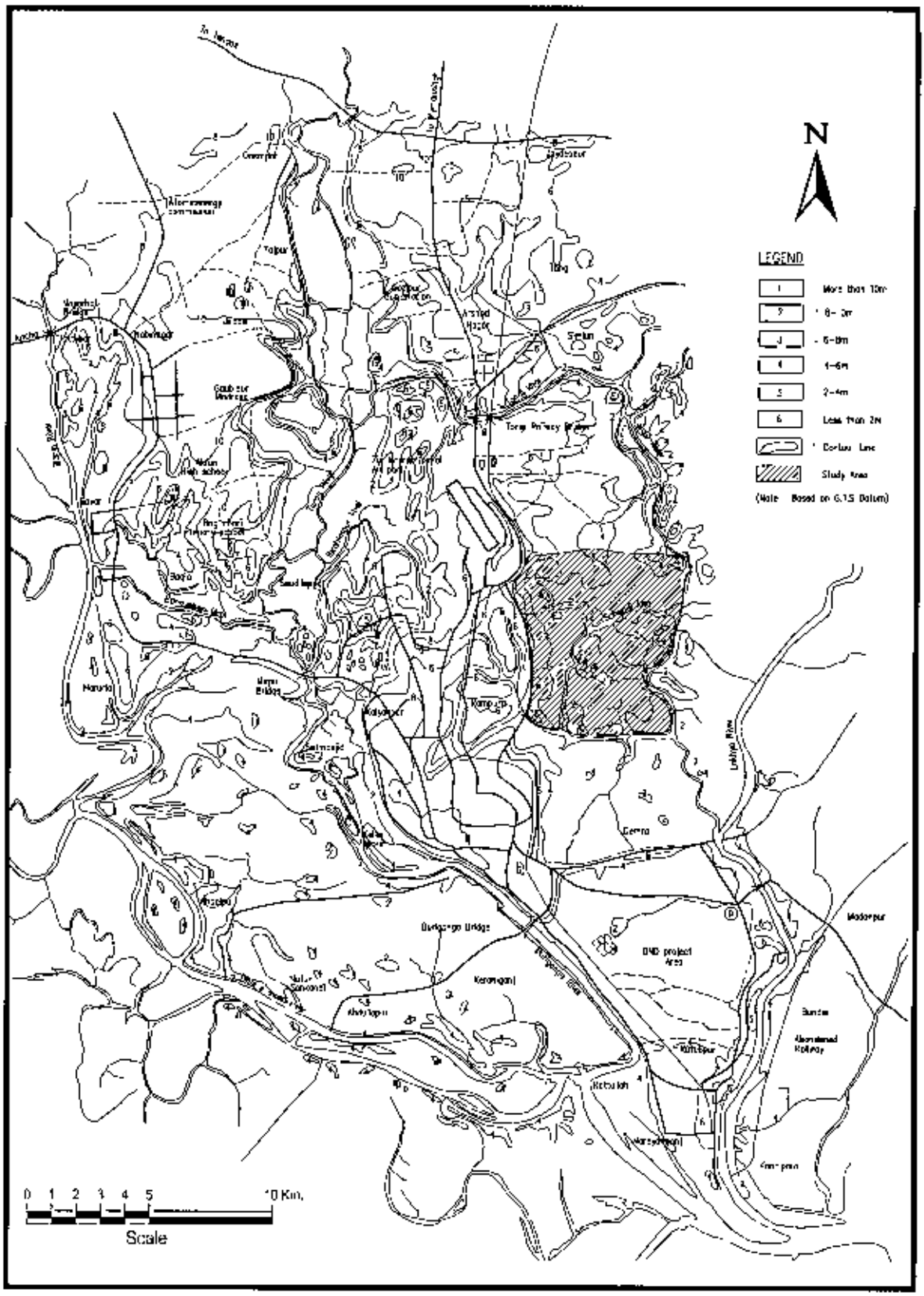
The eastern fringe of Dhaka is a low-lying area with patches of higher lands. The contour height of the eastern part of Dhaka is shown Map 5.1. The required flood-free level and vary from one and half meters to six meters while in the centre city, it is seven to eight meters (1). The normal flood-free level of Dhaka is six meters. Thus, in order to make the land in the area fit for development earth filling is essential. The land elevation in the EFAs are shown in Figure 5.1

Table 5.1: Land Elevation above Mean Sea Level

Land form Area	Land Elevation Above Mean Sea Level (GTS)[1]	Comments
1	Higher than 10.0 metre	1 and 2 landform areas are considered as safe from annual flooding, 3 is marginally free from normal flooding and remaining 4 to 6 are under threat of flooding.
2	8.0 - 10.0 metre	
3	6.0 - 8.0 metre	
	Average flood level 6.0 metre	
4	4.0 - 6.0 metre	
	2.0 - 4.0 metre	
5	Lower than 2.0 metre	
6		

Source: FAP 8A, JICA Study, 1992

[1] Note: Based on G.T.S. (Geodetic Transverse Survey) Datum plan used by survey of stage equal to the datum plane of Mean sea level.



Map 5.1 Land Form Elevations and Contour Map of Dhaka
Source. FAP 8A. JICA, 1992

5.2.2 Morphology of eastern fringe:

Dhaka is geo-morphologically located at downstream of one of the largest river basin systems in the world, named Ganges-Brahmaputra river basin. The branches of the river system surround the city. Dhalswari and Lakhya rivers are the main tributaries of New and Old Brahmoputra river system. Buriganga and Turag Rivers are within the same system. Balu River, in particular, is the main drainage channel for northeastern Madhupur Tract.

Geologically the project area is situation the Pleistocene terrace of the Bengal basin. It covers nearly 1600 sqkm are of Dhaka city. The top unit of the soil formation is locally known as Modhupur clay, which is composed primarily of mottled red, brown. Grey and orange sickly clay-containing ferruginous and calcareous nodules as well as laterite are also available in the area. The thinness of Modhupur clay varies from a few centimetres to maximum of 30 centimetres depending on location. The Modhupur clay is underlain by Dupilila sandstone or clay stone formulation of the late Miocene Age.[2] General soil conditions between the eastern fringe of Dhaka and the Balu River are poor with alluvial deposits and it is becoming thicker and the channel is moving towards the east.

The formation of the basin and ridges, and modification of the landform due to human interventions all together attributed the study area within a complex geomorphic and sedimentary pattern. According to the geological origin, soil type, land height and normal flooding depth the geomorphic units of the eastern fringe are categorized (see Figure 5.2).

High Terrace: This unit belongs to the southeastern edge of the main Madhupur Tract and has the highest elevation in the area ranging from seven to eight metres GTS. At present, the geomorphic characteristics of this unit have been totally erased due to extensive urbanization. Most of the information on the unit was attained from past surveys that were carried in the 60's.

[2] Mid Term Report on "Techno-Economic and Environmental Assessment of Low and Adjacent to Sonargaon Hotel and Hatijheel Areas 2004".

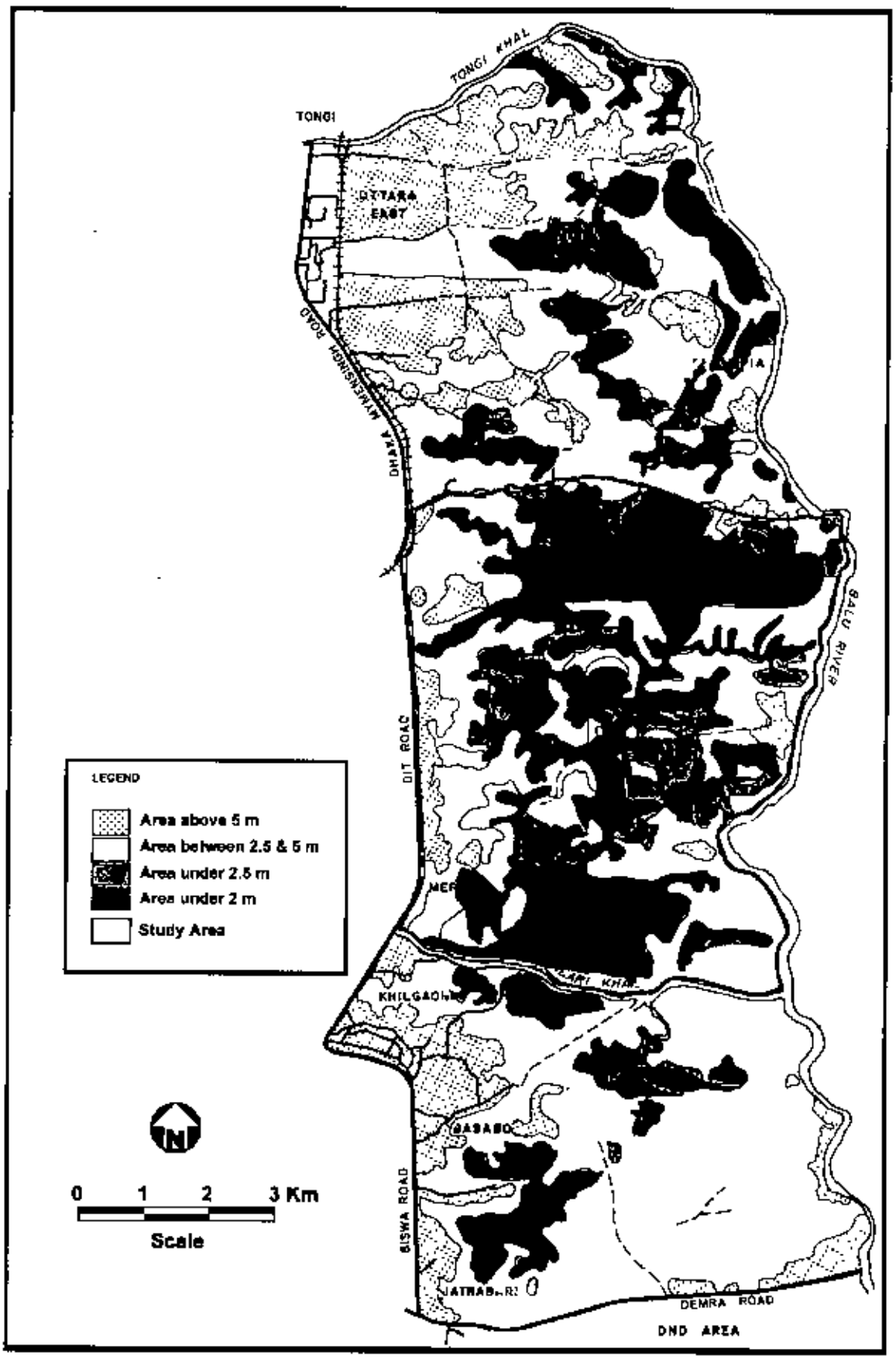


Figure: 5.1 Existing Land Heights in the Eastern Fringe Area, Dhaka
Source. FAP 8A, JICA, 1992

Medium Terrace: This extension of Madhupur Tract is least dissected. The terrace has an elevation similar to that of dissected terrace.

Dissected Terrace: This is also a southward extension of the main Madhupur Tract and is located along the western and northern boundary of the EFAs. The very west edge of the terrace is experiencing urban growth; the rest of the unit retains the natural landscape.

Terrace Outliners: These parts are the remnants of the main terrace. The edges of the unit s get shallow flooding during the monsoon period.

Balu Natural Levee: The levee continues along the river from south to north to some extent and disappears. The levee again reappears in the northeast and north.

Balu Point Bar: This point bar formed at the location where the Balu River branches off from the Lakhya River in a meandering form. This unit is mainly used for agriculture.

Low Floodplain: This part of the extension of Old Brahmaputra floodplain. Deposits of the existing fluvial systems later covered the basin.

Depression: These are considered as the natural water retention area. Most of depressions are saucer shaped and contain water year round or more than 6 months.

Waterbodies (Tributaries/Lake/Ponds): Tributaries are the drainage channels branching out from the surrounding rivers and local *khals*. It is noticed that regarding the approximate annual flooding depth and duration on these units it was seen that all the Madhupur Terrace group units stay above normal flood level. The rest of the units get flooded to some extent.

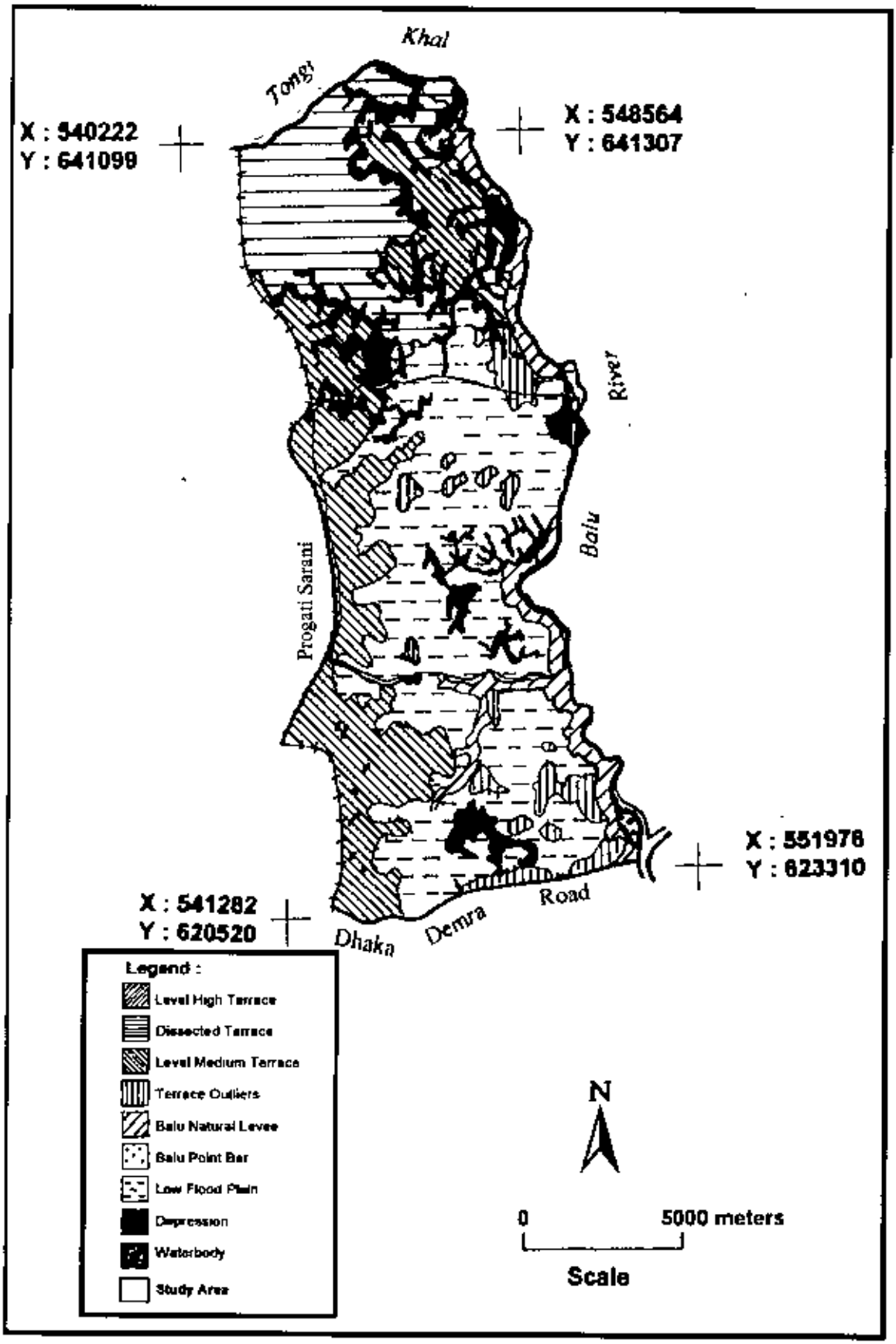


Figure: 5.2 Geomorphic Units in the Eastern Fringe, Dhaka, 1996
Source: Oriental Geographer vol-45, no-2, July 2001

5.2.3 Geomorphology and land uses:

Geomorphology and land use relationship manifests that agriculture is the typical land use of low floodplain, depressions and valleys, whereas most of the settlements have taken place on the higher lands. The higher the land, the more dense has been the urbanization process. But not all the higher grounds visible today in the landscape, are tectonically uplifted terraces or deposited ridges; rather they are the results of landfilling owing to urban expansion. Such landfilling is mainly occurring on three types of landforms-- on flood plains or agricultural lands, on depressions and on low terraces. However, an intrinsic adjustment between geomorphology and land use has been seen in the EFAs. (3) The geomorphology of Greater Dhaka has been shown in Figure 5.3.

Table 5.2: Percentage of Area Occupied by Different Land use on Geomorphic Units

Geom. Units / Land use Units	Highly Urban (%)	Urban (%)	Semi Urban (%)	Rural (%)	Agricu-lture (%)	Marshy Land (%)	Open Space (%)	Water Body (%)
High Terrace	11.56	-	-	-	-	-	-	-
Dissected Terrace	-	1.57	4 38	1.95	-	-	-	-
Medium Terrace	-	11.16	-	1 44	-	-	0.15	-
Terrace Outliners	0.18	3.43	6.35	1.99	-	-	-	-
Balu Natural Levee	0.14	-	0.28	3.04	-	-	-	-
Balu Point Bar	-	-	-	-	0.05	-	-	-
Low Flood Plain	-	-	-	-	36.71	-	0.8	-
Depression	-	-	-	-	-	9.40	-	0.16
Water body	-	-	-	-	-	-	-	0.36
Rivers	-	-	-	-	-	-	-	4.90
Total	11.88	16.16	11.01	8 42	36.76	9.40	0.95	5.42

Source: Oriental Geographer vol. 45 no.2 July 2001

The trend of urban growth in Dhaka at present reveals that the expansion is taking place along the east of the fringe areas. In the northern part of eastern fringe: there are natural higher urban growth prevailing: in the middle-western part, consequently newer urban settlements are encroaching towards the filled-in floodplains and depressions. The overall process of change within the natural environment due to urban expansion is summarized in following Figure 5.4.

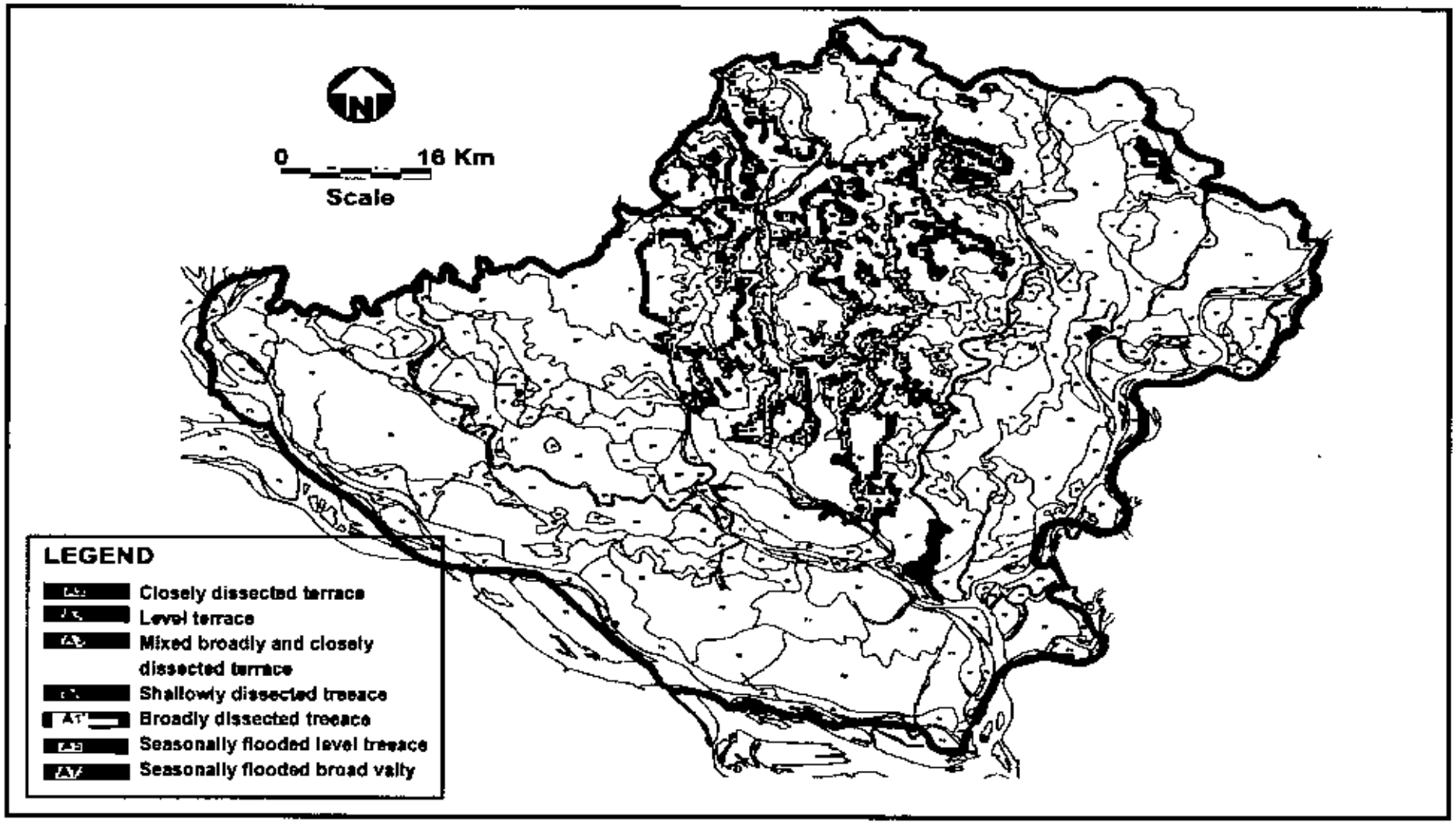
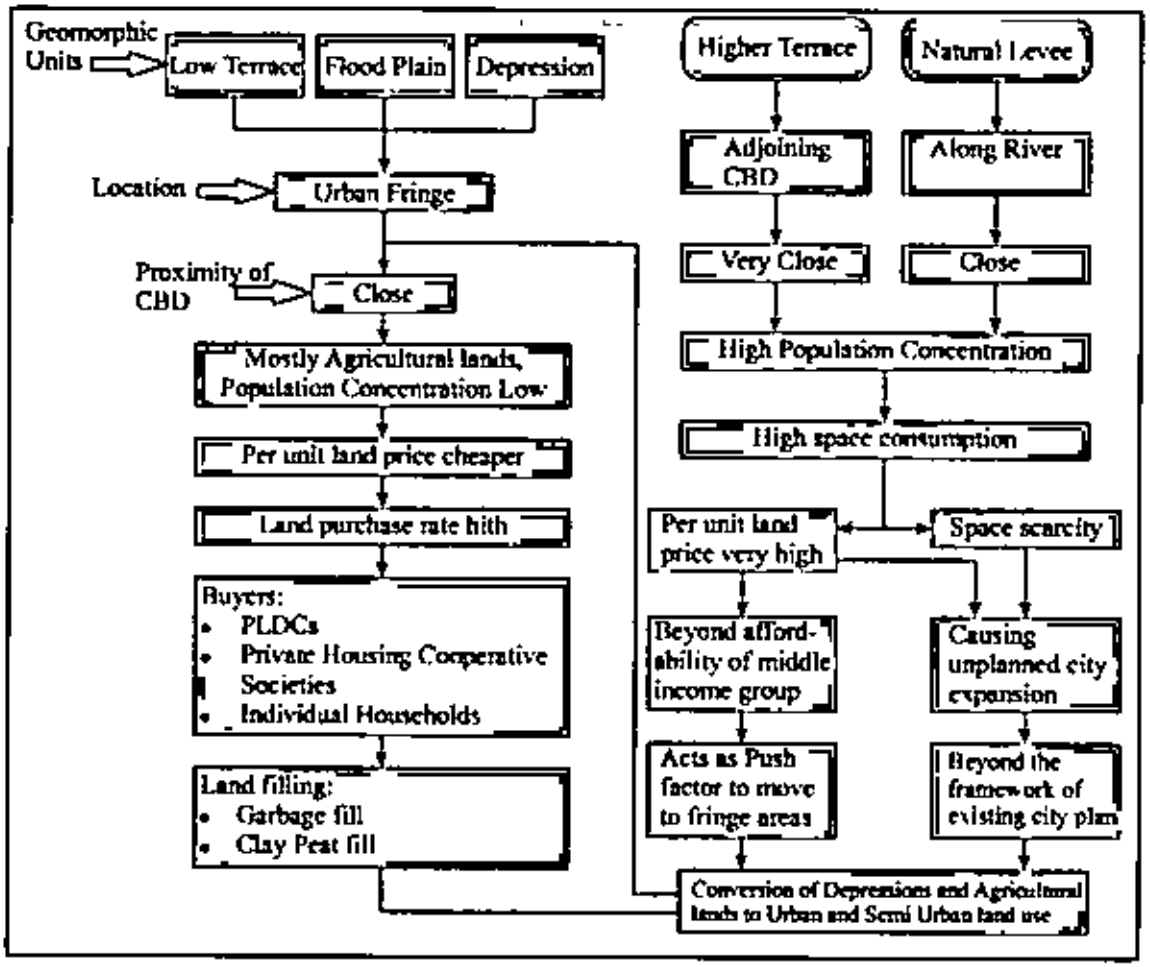


Figure 5.3 Geomorphology of Greater Dhaka
Source: BWDB, Bangladesh Soil Survey Depm. Dhaka and Taufique, K.Z.H. (1997)



Source: Oriental Geographer Vol. 45 No. 2 July 2001.

Figure 5.4 Changing Geomorphic Environment through Land use Geomorphic Units (Adjusted)

Most of the landfilling sites in the area are located on High Terrace and Medium Terrace. In the land use category, these two units have been identified as highly urban and urban classes respectively. The soil report of 1965 mapped these units experiencing seasonal flooding, but the present information characterizes the unit as a flood-free zone, this is due to extensive earth-filling activities on the part of rapid urbanization that occurred in the units, thus elevating their previous height. Information attained from local people revealed that the landfilling occurred both at individual and PLDCs levels. But these land-fillings are not high enough to save the sites from abnormal flooding. The situation is particularly true for the middle level terrace that includes residential areas like Mugdapara, Manda, Beraid, Groan, Madartek, Meradia, Rampura, Merul-Badda and adjacent areas etc. Indications of future landfill on the low lands along the fringes of the urban and semi-urban land use were apparent from the higher rate of selling agricultural land. Such transactions have been continuing between the farmers and urban dwellers.

5.2.4 Climate:

Maximum temperature in the area ranges from 12° to 33° Celsius while minimum temperature is about 6° Celsius characterizing the north-east during monsoon, associated with generally dry and cool period from November to February. During this period rainfall is about three percent annually. Connective rainfall yields some 20 to 25 percent of annual rainfalls in the sub-seasonal period from March to May, with temperatures rising to a maximum of over 40° Celsius with a significant increase in humidity. The weather is unstable and wind velocities are high, occasionally cyclonic. The subsequent southwest monsoon lasts from about June to October and brings heavy, persistent rainfall. Humidity remains high (80 to 90 percent) but temperatures fall during this season, having a diurnal range between 25° Celsius and 31° Celsius.

The evaporation regime over the area is fairly consistent, with the maximum expending over March, April and May when the temperature is high, dropping slightly during the wet season and decreasing during the dry winter season. Generally, rainfall occurs in excess of potential vapour-transpiration for the months of May to October, but there is a net deficit of rainfall compared to transpiration from November to April.

The temperature of the country has the relationship with the period of rainfall. In general cool seasons coincide with the period of lowest rainfall. Table 5.3 shows the monthly average mean, maximum and minimum temperature of Dhaka

Table 5.3: Temperature (mean, max and min) and Humidity of Dhaka

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
Mean Tem (°C)	18	21	26	29	29	28	28	29	29	27	24	19	25.6
Max Temp (°C)	26	28	32	33	33	32	31	31	32	31	29	26	30.3
Min Temp (°C)	13	15	20	23	24	26	26	26	26	24	20	14	21.4
Humidity (%)	69	63	56	70	80	85	85	85	84	79	70	74	75
Wind Speed (m/s)	0.3	0.3	0.5	0.6	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.33
Sunshine (Hours)	8.8	8.6	8.8	7.9	6.9	4.7	4.5	4.5	5.1	7.2	8.4	8.6	7
Solar Radiation (MJ/m2/d)	17	18	21	21	20	17	17	16	16	17	16	16	17.7
Evaporation (mm/d)	2.3	2.9	4	4.6	4.4	3.8	3.7	3.6	3.5	3 3	2.7	2.1	3 39

Altitude: 8 meter(s) above MSL, Source: BMD 2003.

5.2.5 Rainfall:

The general pattern of precipitation (which consists entirely of rain) follows the monsoon pattern with the cooler, drier months of November to March, increasing rains in April and May and highest rainfall in the summer months of June to September when the prevailing wind direction from the southwest brings moisture laden air from Bay of Bengal. Average monthly rainfall values for Dhaka are given in Table 5.4. The highest average rainfall occurs in July, which is 337mm and 373 in Banani and Nawabganj station respectively.

The cool season in Bangladesh coincides with the period of lowest precipitation where highest precipitation occurs in the wet season. As a result of the greater cloud cover during the wet season, average hours of sunshine are least between June to September at about 5 hours a day. This higher incidence of cloud cover has great significance for the stability of the atmosphere and hence dispersion of atmospheric pollutants.

Table 5.4: Characteristics Rainfall in Dhaka (1990-2003)

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Station ID: CL42 Banani														
Average rainfall (mm)		11	23	64	126	335	290	377	325	293	167	31	12	2063
Average rainy day per month		2	2	5	9	14	18	23	21	17	9	3	0	
Station ID: CL 9 Dhaka PBO Nawabganj														
Average rainfall (mm)		9	24	68	112	353	264	373	295	274	148	31	14	2039
Average rainy day per month		1	3	5	7	14	17	21	22	16	9	3	1	

Source: BWDB 2003

5.2.6 River system and hydrology:

The Buriganga River bound Dhaka city to the south, Turag to the west, Balu to the east and Tongi khal to the north. The storm run-off from the study area is drained to the Balu River through Begunbari Khal. Balu River runs mainly through the extensive swamps of Beel Belai and those in the eastern part of Dhaka, joining the Shitalakhya near Demra. It has a narrow connection through the Suti Nadi near Kapasia with the Shitalakshya, and also by way of the Tongi Khal with the Turag, there is also a link with the Shitalakshya near Kaliganj. Although it carries floodwater from the Shitalakshya and the Turag during the flood season, the Balu is of importance mainly for local drainage and access by small boats.

The present hydrological condition includes rainfall, water level, flood sensitivity and water discharge of the study area. Hydrological analysis was carried out based on data sets from the BWDB and SWMC. Frequent rainfall data analysis of a number of stations of Dhaka city and its surrounding areas, annual highest water level for a number of gauging stations plus annual maximum discharge of one gauging station on the river system which influence the flooding and drainage situation of the greater Dhaka city have been evaluated.

5.2.7 Drainage:

It is found that at the Tongi Khal, floods always flow north to south, however, at the Turag River, floods sometimes flow from north to south, sometimes south to north. A balance of discharge upstream of the Turag River seems to be the cause of this flow pattern. Floods occurred mostly when heavy rain coincided with high river stages of the Ganges and Brahmaputra rivers. However, the Balu River and connecting Begunbari, Jirani and Amir *Khals* are being used as drainage network in the eastern part of the city. The drainage basin system of Greater Dhaka is shown in Figure 5.5.

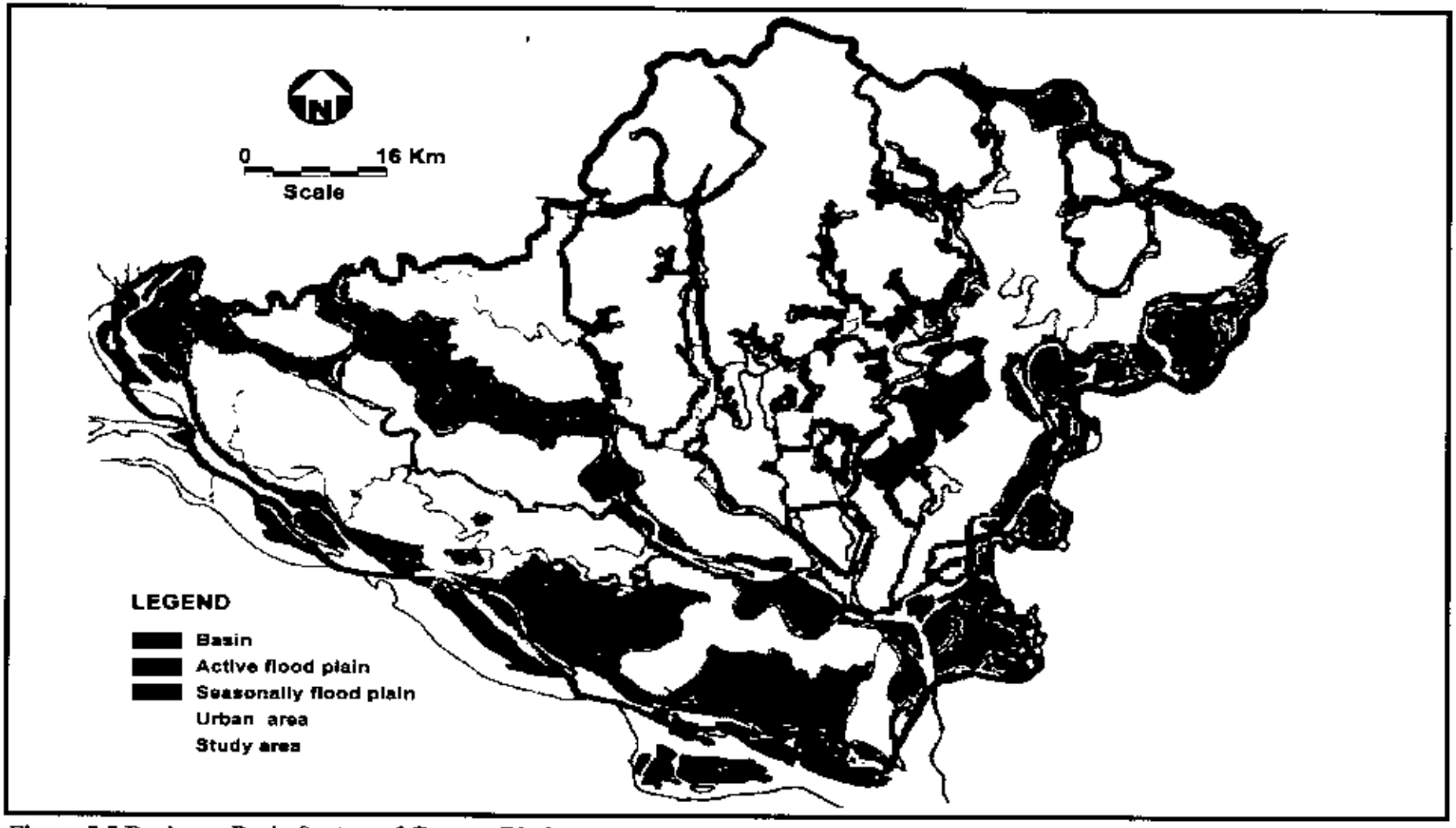


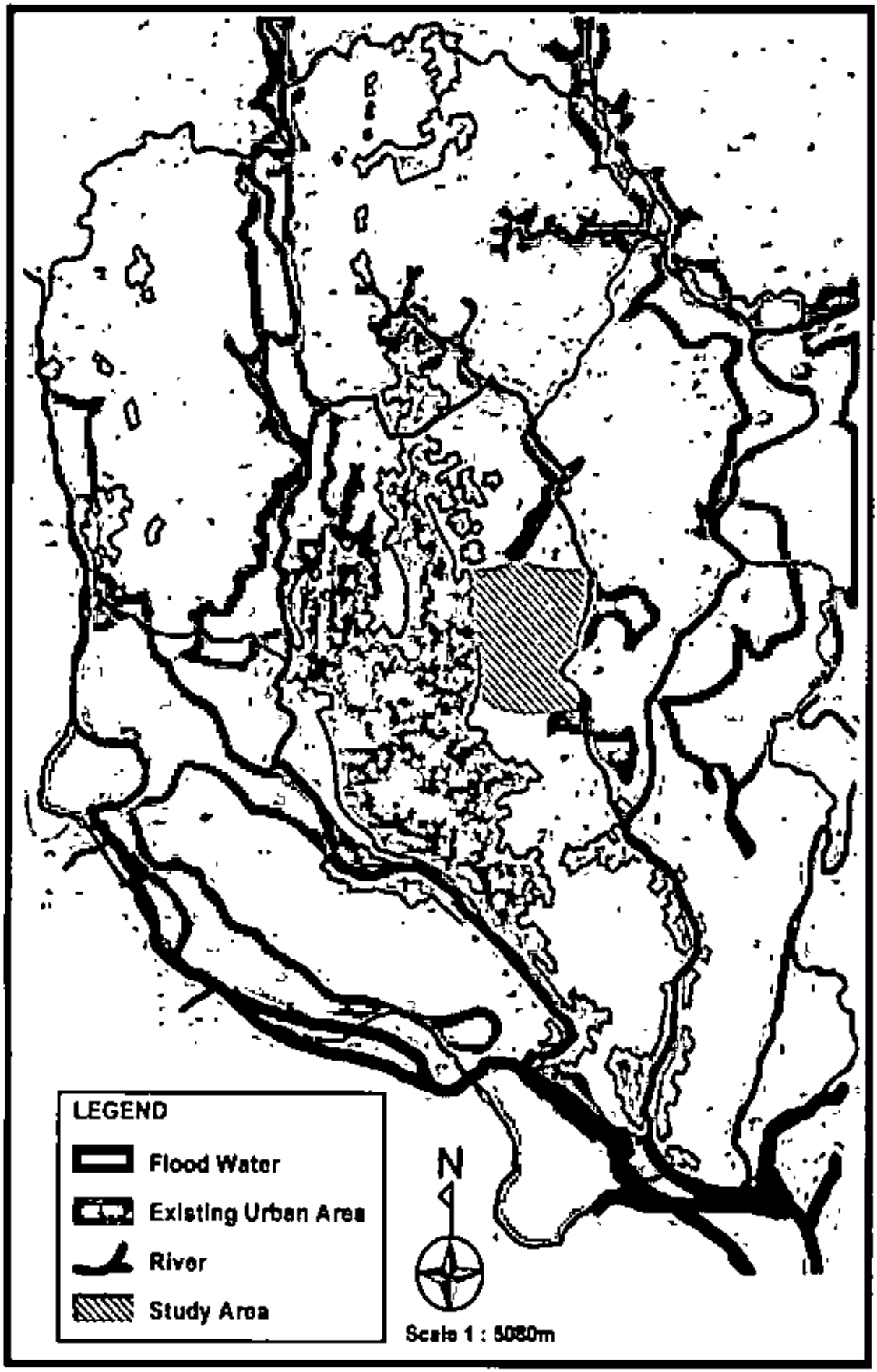
Figure 5.5 Drainage Basin System of Greater Dhaka
Source: BWDB, Bangladesh Soil Survey Deptt. Dhaka and Taufique, K.Z.H. (1997)

5.2.8 Flood sensitivity:

Annual flooding in the monsoon period, characteristically, submerges the eastern fringe and the weather becomes dried up in the early lean season. In the late dry season (February - March), the small ditches in the area are dried or nearly so, depending on their bed elevation relative to ground water. Water levels in the adjacent of the Balu River control such elevation. Under this condition, there is very little exchange of water between upstream/downstream of the Balu River or depressed areas and its surroundings as rainfall, evaporation, spill or seepage. During filling from April to August, water enters into the EFAs as rainfall, and by seepage of the Balu River through the ground or over river flooding.

According to the FAP-8A (JICA, 1992), the external and internal floods affect the eastern part of the city annually. Overflow of surrounding river causes external floods while storm water flooding due to insufficient drainage facilities causes internal flood. JICA team had conducted a survey under the FAP-8A project in 1991 covering 118 sqkm in the eastern part and a part of Greater Dhaka of west (47.74 sqkm) with built-up areas and drains off eastwards to the Balu River. It reveals that 47 percent area is usually affected by annual flooding. Most of the lands are submerged during this season. Rural villages and settlements are likely isolated but still flood-free because their houses are built a little higher than the annual flood stage. The flooding areas are shown in Map 5.2.

The eastern part has been flooding from long time during the wet season, and turns into vast water body; as a result, *kutcha* roads and farmlands go under water. However, in lean season such lands are used for agriculture purposes. The flood situation records of Dhaka have been shown in Table 5.5.



Map: 5.2 Flood Affected Areas
Source: LBWBD and Dept. of Soil Survey Bangladesh

Table 5.5: Analysis with the Inundation/Flood Depth Maps

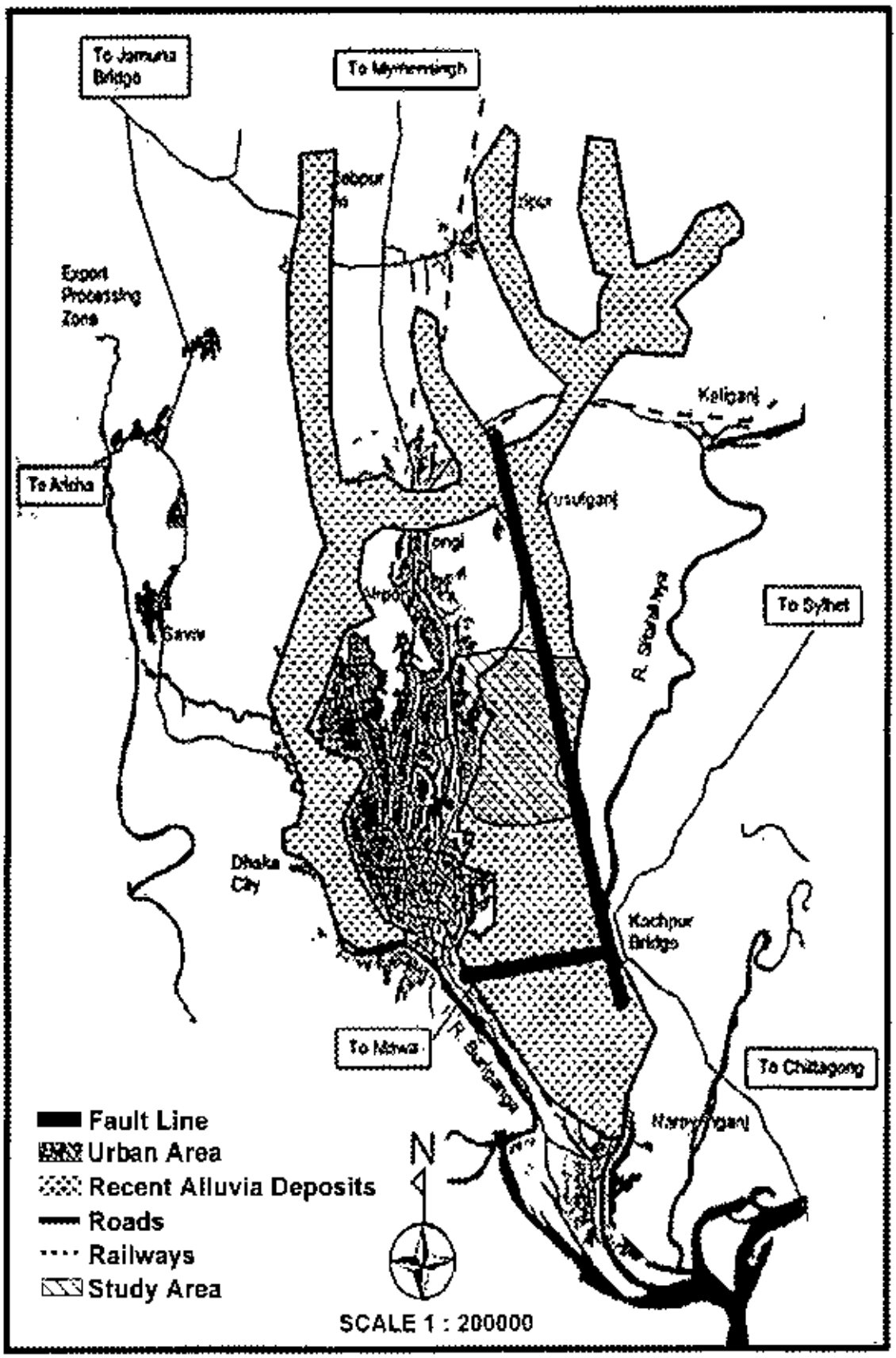
Years (flood affected)	Embankment (with/without)	Peak flood or HWL / average WL	Area inundated sqkm	Range of depth Inundation (m)
1988 flood	Without	Peak Flood	242	0 – 7.50
1988 flood	Without	Average	183	0 – 6.11
1989 non-flood	Without	HWL	156	0 –5.30
1988 non-flood	Without	Average	148	0 – 5.22
1997 non-flood	With	HWL	118	0 – 5.60
1997 non-flood	With	Average	109	0 - 5.15
1998 flood	With	Peak Flood	160	0 – 7.14
1998	With	Average	133	0 – 6.40

Source: Source: BWDB and SWMC, 2000

5.2.9 Natural fault and earthquakes:

Bangladesh is one of the most disaster-prone countries in the world. It is vulnerable to wide variety of natural hazards, viz flood, storm surge, drought, riverbank erosion and earthquake. Bolt (1987) analyzed the different seismic sources in and around Bangladesh and arrived at conclusions related to maximum likely earthquake magnitude (Bolt, 1987). He identified four major seismic sources like (i) Assam Fault Zone, (ii) Tripura Fault Zone, (iii) Sub-Dauki Fault Zone, and (iv) Bogra Fault Zone. The magnitudes of earthquake suggested by Bolt are the maximum magnitude generated in these tectonic blocks as recorded in the historical seismic catalogue. The historical seismic catalogue of the region covers approximately 250 years of recent seismicity of the region as such a meager database does not provide true picture of seismicity of the tectonic provinces. For example, the Assam and the Tripura fault zones contain significant faults capable of producing maguitude 8.6 and 8.0 earthquakes respectively in future. Similarly maximum magnitude of 7.5 on the Richter scale in Sub-Dauki fault zone and in Bogra fault zones is not unlikely events.

Dhaka appears to have one of the highest values of earthquake disaster risk (Cardona et al, 1999) mainly due to its vulnerability and poor emergency response and recovery capability (4). The EFAs in Dhaka natural faults exist which are vulnerable for massive urbanization according to the records of Geological Department of Bangladesh Map 5.3. One of the faults exists at Rampura on Begunbari khal and it goes towards northeast that makes it vulnerable to unpredict settlements increase earthquake risks.



Map: 5.3 The Geological Constraints (Natural Fault) in the Eastern Fringe, Dhaka

Source. Dhaka Eastern Bypass Study, 1997/98, Halcrow Fox Consultant

Geo-physical conditions are not favourable for vertical expansion and heavy construction. Under the circumstances, at the fault zone and surrounding should critically examine before allowing vertical expansion of structures.

5.2.10 Land use pattern and change:

Before 1970, the eastern part of Dhaka particularly in the study area and its surroundings were mostly low-lying areas and a few settlements existed there. In the lean season, this area is affected by annual flooding. Recently, the land use information has been collected through a field survey and the survey is categorized into four broad categories of the study area, which are cultivable lands (agriculture), homesteads (settlements), water bodies and non-cultivable land. The information is presented in the following Table 5.6.

Table 5.6: Land use in the Study Area (EFAs)

Unions		Land use area in percentage			
Sl. No.	Unions and area (hectare)	Cultivable land	Homesteads	Water bodies	Non-cultivable land
1	Beraid (1662.93)	54.63	14.20	27.52	3.65
2	Satarkul (1316.25)	52 70	19.75	23.22	4.33
3	Demra (768.29)	51.17	20.29	23 42	5.12
4	Dakhinkhan (37.26)	49.54	28.01	16 37	6.08
5	Cantt. Ward No. 75 (319.95)	6.18	35.42	2.17	26.23
6	Meradia Ward No. 56 (72.09)	34 28	17.54	15 04	33.14
7	Badda Ward No. 74 (471.83)	24.30	39.82	11.05	24.83
Total	4646.60	38.97	25.01	21.26	14.76

Source. Field Survey, 2003.

Cultivable land: Beraid, Satarkul and part of Dakkhinkhan unions are identified as prime agriculture zone with a few scattered settlements. It was mentioned before that most lands in the EFAs are brought under cultivation in lean season because the annual flooding in monsoon submerge the areas, and the part usually turns into a vast water body after the monsoon ends. Therefore, there is no scope to cultivate farmland in the areas during the rainy season.

Homesteads (settlements): The existing homesteads are highly scattered. Most of the settlements are found at Satarkul, western part of Dakkhinkhan and Cantonment Ward no. 75. Satarkul, Beraid and Demra unions are rural based and their houses are built by mud, tin, thatch, bamboo etc.

Water bodies: Water bodies of the areas include open *khals*, natural water bodies, ponds, wetlands and depressed land where water is stagnant throughout the year. The maximum low-lying areas are found at Satarkul, Dakkhinkhan and Cantonment ward no. 75 unions (photo 5.1 and 5.2). To develop the housing projects and build homestead, land digging is going on at Dakkhinkhan and Cantonment Ward no. 75 unions.

Non-cultivable land: Most of the non-cultivable lands are along the main and secondary roads and these lands are not brought under cultivation. In the process of urbanization, the areas are going to be developed through earth filling.

Photo 5.1 Low lying area at Saterkul [15-03-2003]

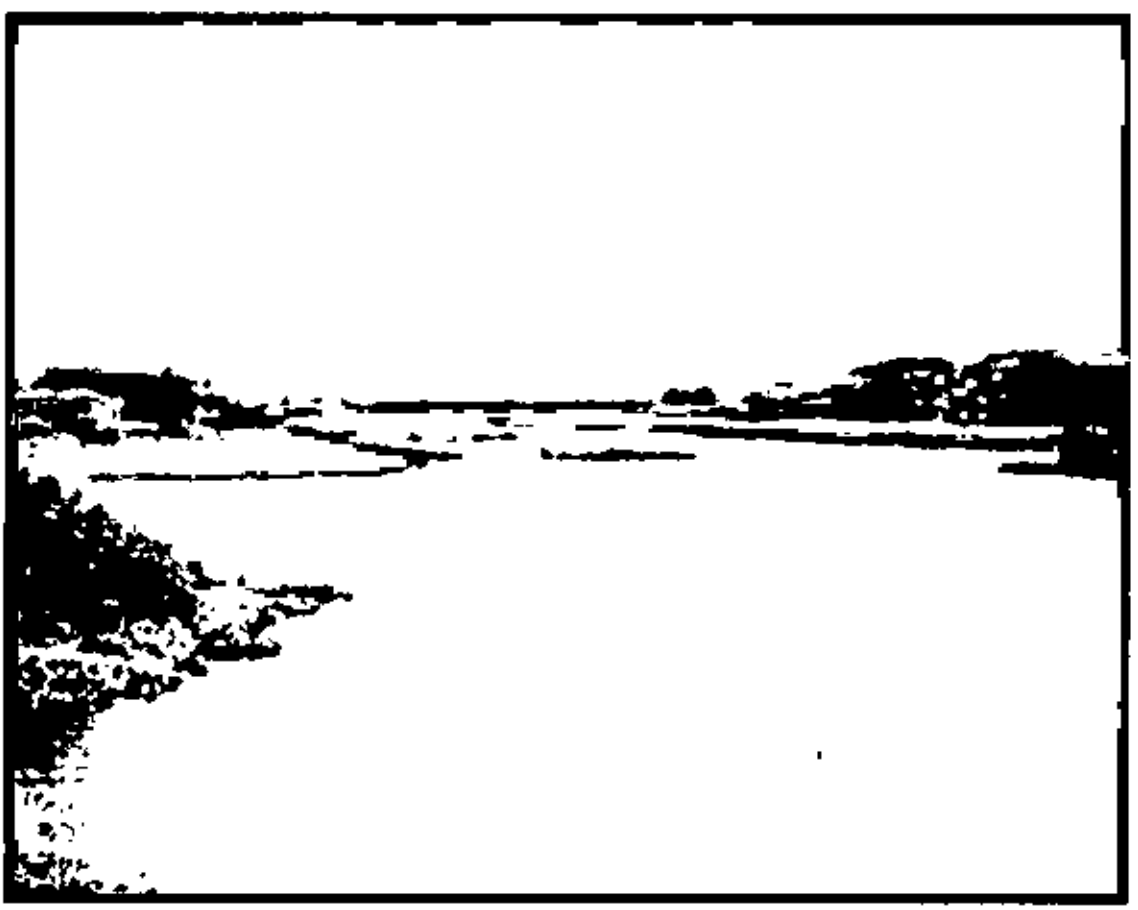


Photo 5.2 Existing canal at Saterkul (15-03-2003)

5.2.11 Changes of land use:

Analysing the image of 1980, 1990, 1996 and 2000 of Dhaka, it is found that the EFAs are being urbanized gradually. Before the 1980s the eastern part of Dhaka was mostly open water body where the areas were seasonally used for agricultural purposes. The land use change started in the EFAs after PLDCs' interventions started. Moreover, construction of Rampura-Biswa Road also provides a platform for peripheral development of the EFAs. Analying the image of 1996-2000, the broad land uses like agricultural land settlements and closed water bodies and its changes in study area from 1996 to 2000 are presented in the image. The analysis of the image is presented in the following Table 5.7 (see Figures 5.5 and 5.6).

Table 5.7: Land use Changes in the Study Area from 1996 to 2000

Image	Agricultural land (hectare)	Settlements (hectare)	Closed Water Bodies (hectare)
IRS- IC Pan Image 1996	2558 94 (55.04 %)	982.79 (21%)	1106.87 (24%)
IRS- IC Pan Image 2000	6,080.62 (53 %)	1023.00 (22%)	1162.95 (25 %)

Source: IRS- IC Pan Image 1996 and 2000

It is revealed that all land is gradually being converted into human settlements. The seasonal agriculture lands are reduced on the one hand, and the closed water bodies have been increased on the other hand. Water bodies like *khals*, ponds, and depressed low-lying areas have been squeezing due to unplanned establishment of settlements by human interventions.

Changing Landuse Scenario of The Study Area 1996 to 2000

Figure (Image) 5.6 Landuse of Eastern Fringe in 1996
Source: CEGIS (Centre for Environmental Geographic Information Services)

Figure (Image) 5.6 Landuse of Eastern Fringe in 2000
Source: CEGIS (Centre for Environmental Geographic Information Services)

5.3 Socio- Economic Conditions of Households:

The socio-economic survey of the study area represents the understanding of demographic characteristics of habitants, occupation pattern, and income status of households, land value, sources of water supply, drainage, and sanitation facilities. Under this study, 400 households were surveyed in the study area at mouza level in 2003. The following analysis has undertaken on the basis of survey findings.

5.3.1 Demographic characteristics:

The demographic characteristics of 400 sample households are analysed comprising population, male and female, household size and density. The total population of 400 households is ***2152***. The size of household is ***5.38*** persons, which is smaller than the national average.

Table 5.8: Population of Surveyed Households in the Study Area

Thana	Union	Mouza	Population		
			Male	Female	Total
Gulshan	Beraid	Bara Beraid	208	194	402
"	"	Chhota Beraid	24	20	44
"	"	Bara Kathaldia	44	34	78
"	"	Nigur Aplaid	40	26	66
"	"	Patira	80	90	170
"	"	Paschim Haradia	14	18	32
"	"	Purba Haradia	14	6	20
"	"	Dumni (Part)	38	26	64
Demra	Demra (Part)	Gazaria	96	86	182
"	"	Nasirabad (Part)	40	24	64
"	"	Nandipara (Part)	22	14	36
Gulshan	Satarkul	Bhatara (Part)	138	148	286
"	"	Satarkul	102	54	156
"	"	Sutibhola	8	18	26
Gulshan	Dakkhi Khan (Part)	Barua (Part)	16	10	26
Sabujbagh	Ward No. 56 (Part)	Meradia (Part)	18	6	24
Cantonment	Ward No. 75 (Part)	Joarshahara (Part)	136	130	266
Gulshan	Ward No 74 (Part)	Badda (Part)	96	84	180
Gulshan	Ward No. 74(Part)	Ullon 15	16	14	30
Total			1150	1002	2152

Source: Field Survey, 2002

A large majority of the population in the area was below the age of 30 and their number is almost 70 percent. Literacy level is 30 percent where male residents are more literate than the female population.

The survey findings reveal that mouza Ullon, Badda and Cantonment Ward are becoming dense rapidly. Improvement of road infrastructure, installation of gas and electricity lead to increase the density in such areas. It is found that migrated population comes from different areas, particularly southern part of the country. River erosion and other natural calamities have pushed them out of their native villages.

5.3.2 Occupational patterns:

The primary occupations of the people in the EFAs are agriculture, fishing, boating and house works. The occupation pattern has been changed recently and most of the household members are engaged in more than one job. The types of occupation and changing pattern of surveyed households in 1995 and 2002 are presented in the following table:

Table 5.9: Primary Occupation Types of Household Members in 1995 and 2002

Primary Occupations	1995 Percentage of household members engaged	2002 Percentage of household member engaged	Remarks
Agriculture/ Cultivation	52.00	43.00	Members of household are encouraged in seasonal employment.
Business	6.00	13.10	
Service	4.00	10.50	
Fishing	6.00	3.40	
Boating	2.40	1.50	More than 50% household members are engaged in secondary occupation
Household works	13.00	10.50	
Unemployment	7.50	6.25	
Wage Laboures	9.10	11.75	

Source: Field Survey, 2002

The survey findings state that the people, who were traditionally farmers, fisher, boatmen and house-workers, are now shifting to business and trade. It was also found that in the rainy season, agricultural labourers are usually engaged in landfilling activities. Educated family members are working elsewhere in the city. The movement of people has increased due to improvement of road infrastructure resulting in a good

number of people getting access to work in city areas. A large number of people are engaged in both farming and landfill activities during lean seasons.

The fish production in open water bodies in the EFAs has been reducing gradually due to water pollution and interventions from land development activities by the PLDCs (Photo 5.3 and 5.4.). In addition, landfilling activities on canals and water channels create obstruction for navigation in the eastern fringe. Engine-driven local boats are still active in the region for navigation during the monsoon. These are used for moving goods and carrying sand for landfilling.

The survey shows that 43 percent of the local population is agriculturalists and 9.75 percent household heads are wage labourers and most of them are poor. The marginally poor households are forced to take up a second job.

5.3.3 Landholding and household income:

According to the survey in the study area about 47 percent households are poor. On an average, they own .08 hectare of land. About 40 percent households, who owned arable lands, on an average have .094 hectare of such land. The second largest group is the marginal poor, which is almost 35 percent or 60 households, with an average landholding of .39 hectare. About 13 percent households belonged to the middle class and owned on an average .88-hectare land. About 11 percent households belonged to the upper class. These households on an average owned 20 percent of all land in the village. Their average per household ownership is more than 2.03 hectare.

In the study area, the typically middle-income group has 45 percent of the local population having monthly income in between Tk. 3,000 and 5,000, and 24 percent has income between Tk. 5,000 and Tk. 10,000. The higher middle income is seven percent of the population having monthly income above Tk. 10,000. The lower income group is about 18 percent, while the low-income group is only about six percent.

Most remarkable thing is the similar income between the poor and marginal peasants of the study area. The poor are taking the opportunity in off-farm employment as rickshaw-pullers and labourers but the marginal peasants have very limited scope for employment. The poor are completely depending on cash income while the marginal households engage more of their time for cultivation, but they are not receiving equitable returns.

Photo: 5.3 Local people using fishing net to catch fish at Joarshahara [02-04-2003]

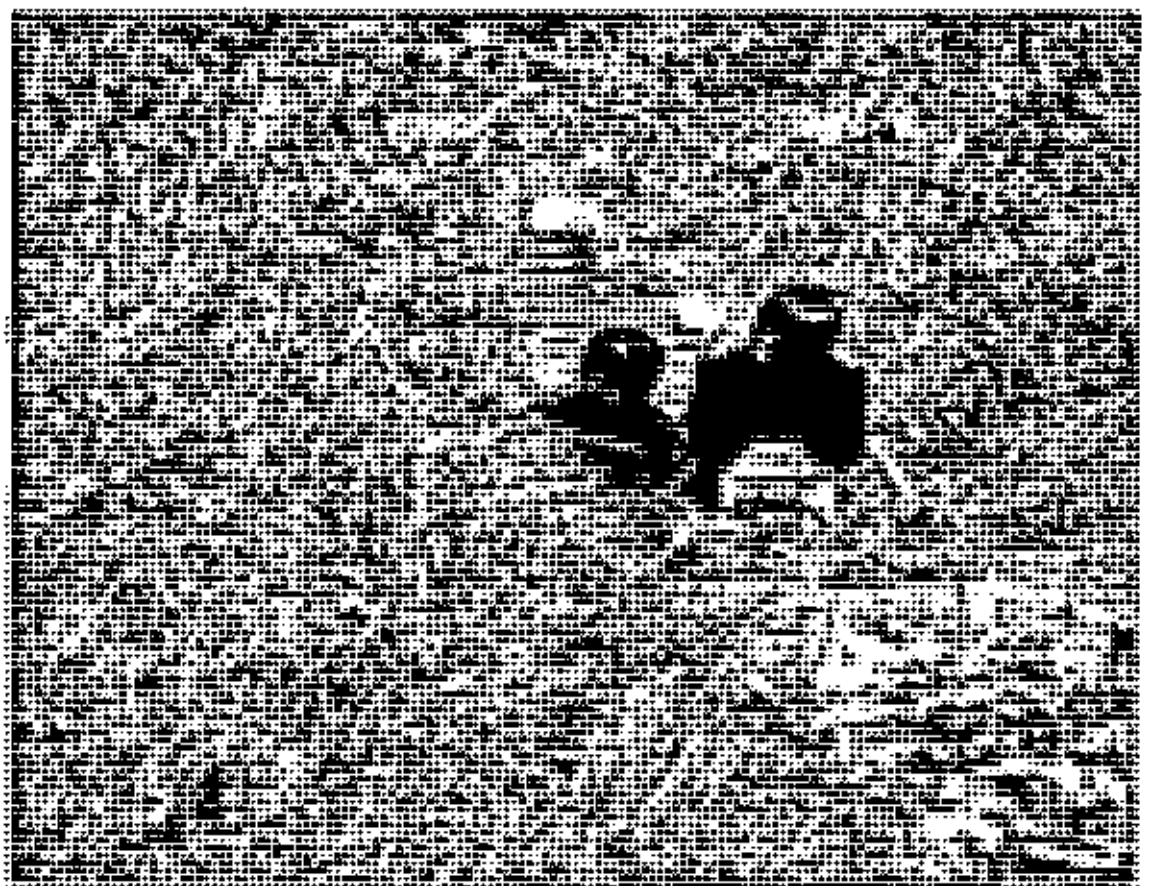


Photo: 5.4 Children catching fish at Joarshahara [02-04-2003]

5.3.4 Land value:

The land value in eastern fringe of Dhaka has been increasing for a long period. Before 1970, land value of the city and its peripheries increased slowly. After the 1970s, land value of the areas had increased due to demand for urban land. The values varied depending on locations and sites and classifications of land.

In the 1980s, mainly different actors like the PLDCs, housing cooperatives, individual households and land brokers operated in the land market. The government's involvement in the land market was almost absent, but in an indirect way, it participated in market supplying residential, commercial and industrial plots.

The PLDCs are doing monopoly business in the EFAs. The companies are dominating the market since 1980. These companies engaged local *dalals* to purchase land for their projects through negotiation with private landowners. The land value of the study area has shown in the following table.

Table 5.10: Land Value in Eastern Fringe from 1970-2002

(Taka in Thousand)

Year	Range of Land value Taka / per hectare	Average Taka per/ hectare	Increment Increase
1970	374 - 523	449	Based
1975	673 -748	711	11.67
1980	898-1047	973	19.01
1985	1871-2245	2058	41.31
1990	2619-2843	2731	47.85
1995	2993-3143	3068	50.32
2000	3293-3442	3368	52.28
2002	3592-3667	3630	54.84

Source: i. Field Survey of the Study Area 2002

During the period from 1980 to 1990, land value sharply increased. Active involvement of the PLDCs for housing projects is likely the main reason. The approval system for projects in fringe was easier, and during this period the RAJUK approved a good number of private housing projects.

In 1990, the land value sharply declined due to strict government intervention. Individual landowners and different sections of the society doubted land whether the lands were privately owned project lands or government *khas* land. These issues made litigation to approve the private housing projects. In these regards, the RAJUK served notices to the companies as well as in newspapers to stop housing activities in the area. The land value slightly decreased due to RAJUK notifications; on the other hand, the unauthorized housing projects took place in different areas.

5.3.5 Infrastructure and social facilities

Most of the households are not facilities by direct access to a motorway road. In fact, only 25 percent houses are connected to fairly wide roads. The others have access only to narrower and un-surfaced roads or muddy roads. Some households have no road access. These are to be reached by boat in rainy season and on foot across fields in dry season. The area is not yet connected to any city bus system. However, rickshaw, cycle, auto tempos (taking 10-12 passengers) and CNG taxi are transports for most locals.

The study area is not yet facilitated by drainage network. A few parts of unions like Bnaid, Satarkul, and the Wards of Gulshan and Cantonment are providing *pucca* drainage. But more than 80 percent households use either *kutcha* drains or *pucca* drains. All household level drains are connected to local canals or ditch areas and create water pollution sources.

Water Supply: The survey findings reveal that only 10 percent households are facilities by piped water of DWASA while 63 percent households have their own private tube wells and 27 percent use ponds, canals and rivers. Most affluent families in the area maintain ponds within their home premises keeping rainwater for drinking purposes. These ponds have been protected from all sorts of water contamination. Family members and neighbours use water of those ponds for drinking, bathing and cooking purposes. But open water of the fringe areas is usually thickly contaminated particularly in lean season and it is a causing factor for waterborne diseases like diarrhoea and dysentery. High contamination level of water is come down during the monsoon.

Sanitation and Sewerage Disposal: There is no formal underground sanitation and sewerage network in the EFAs. About 15 percent households have installed septic tanks while 25 percent use pit latrines for human waste disposal. Others use hanging latrine, open ground, canal and roadsides. All the sewerage and waste dispose into the water bodies that lead to water pollution.

Electricity and Fuel: About 40 percent households have electricity at home. Only 15 percent households have gas utility until now. Firewood is still the predominant fuel type while a sizeable number of households use kerosene for fuel.

Food Markets: A good number of small and medium types of retail food markets exist in the study area. This facility for local people is essential no doubt, but the generated wastes in market areas are dumped in the nearest water bodies and ditches. About 80 percent area is beyond the DCC jurisdiction, therefore, these garbage mostly remain uncollected. This is the main source of water pollution.

Social Cohesion: The EFAs are traditionally rural in its character. Recently, rural community does not show a strong bond due to urbanization and migration process. On the other hand, some degrees of conflicts between original residents and new settlers exist. The connectedness, networks and relationships among groups are an essential and these are considered as social capital. There may be many different types of connection between groups (work relationship, exchange of information, mutual help, common celebrations, prayer, marriages, and funerals). But the bondage among the communities/groups is gradually slackening due to new settlements.

Notes and References

1. Japan International Cooperation Agency (1991), "Flood Action Plan 8A, Supporting Report", Nov, 1991, Dhaka

2. The geomorphic and land use units for the area were identified using the Indian Remote Sensing (IRS) –1C Pan image of February 1996, which were confirmed and updated by field verifications, see Chowdhury, N. Y., (2001), "Impact of land use change and urbanization on geomorphologic environment: A case study of eastern part of Dhaka," *Oriental Geographer*, vol. 45, no. 2, pp. 29-32.

3. *Op.cit.*2. pp 32-38.

4. Chowdhury, Jamilur Reza (2000), "Seismic Hazard in Bangladesh and Emergency Preparedness," presented at the workshop organised by the Ministry of Disaster Management & Relief and Disaster management Bureau, GOB, Dhaka 18 May 2000.

5. Connectedness manifests itself in the different types of groups at the local level from guilds and mutual aid societies to sports clubs and credit groups. to forest, fishery or pest credit groups, to forest, fishery or pest management groups, and to literary societies and mother and toddler groups. It also implies connections to other groups in society, from both micro to macro levels (Uphoff, 1993; Grootaert, 1998; Woolcock, 1998; Rowley, 1999), for further reading, Pretty Jules and W. Hugh, "Social Capital and the Environment", World Development, vol 29, pp 209-227.

CHAPTER 6: HOUSING PROJECTS IN THE EFAs: THREE CASE STUDIES

6.1 Introduction:

This chapter, with some case studies, intends to show how the PLDCs develop land for housing projects and what changes have been brought to local environment. The PLDCs started housing projects at the city periphery since 1980s specifically in the low-lying areas where land price is relatively cheap (1). These companies usually acquire lands in the different ways and prepare plan-showing sub-division of plots. After getting approval from the RAJUK, PLDCs may promote sales activities of their plots. But many companies are selling plots without approval through flashy advertisements in various media. This chapter takes up three land development housing projects as case studies, which are located at different areas of the EFAs. The existing projects in EFAs are shown in Table 4.1, Chapter 4. Recently, some new projects came in the study area (Photo 6.9 and 9.10). However the three projects are Bashundhara, Abtab-nagar and Basumati. Most of these projects started in the late 1980s and they are being developed in phases. The projects comprised privately owned seasonal agricultural lands, canals /*khals*, ponds, government *khas* lands and lands of the Court of Wards.

The projects are located on low-lying areas and the contour height of the areas ranges from two metres to four meters while the surrounding urbanized area is about seven to eight metres elevated. The general contour height of the filled areas is between four and eight metres while normal flood-free level for Dhaka is six meters. Some areas are vulnerable and environmentally sensitive in terms of natural fault. Within the project areas, Local Government has constructed some katcha and semi-pucca road under the 'Food for Works Programme'. On the other hand, within the project areas the internal primary and secondary roads are being constructed as per layout plan of the project.

Previously an excellent network of canals existed in the area which were used as natural out-lets and also for navigation in the monsoon. The canals, shown in Cadastral Map (Mouza map), are about to lose their courses due to land filling. In some areas, the canal network is still used for transporting passengers and goods. The Balu River covers the eastern part of the Dhaka and the canals are linked to this river. The internal *khals* linked with each other make a network. The major *khals* are mainly Begunbari, Jirani, Narail, Fakir, and Dumri and so on. Begunbari Khal covers Badda, Begunbari, Mohakhali and Rampura, Khilgaon and surrounding areas for out-letting storm water. The catchments

areas of Jirani Khal are Madertak, Kadamtala, Goarn, Nandipara and Trimohoni areas. At the same way, Fakir Khal works as the out-let of Joarshahara, Bhatra and Kathaldia. Engine-driven country boats and other vessels are still flying in these canals for transportation purpose, which was discussed in Chapter 5 and Chapter 7.

The silt and clay are prominent in the upper layer of the soil having an approximate thickness of 5 to 20 metres in Dhaka city and its surroundings. Sands occupy the major portion of the lower deposits. The soils of the project area fall into three main classes namely the red clay of Modhupor Tract, the ordinary beel clay and the marsh clay and peat are the combination of alluvial and paludal deposits. The red clay when dry is extremely hard, and it becomes slippery rather than soft when exposed to rain. The beel clay is stiff clay deposited on the bottoms and edges of beels. It is most common in the natural khals and along the rivers and in many places mixed with the decayed remains of aquatic plants. This clay is soft in nature. Marsh clay and peat are common in beel and it structurally controls depressions. The soil of Dhaka city is clay layer at the top followed by fine sand and silt layer at a depth of about 50 metres.

According to FAP 8A conducted by JICA in 1992 the condition of soil along the Begunbari Khal and surroundings conditions are: (i) surface layers with thickness of around eight meters are silt or silt without clay, (ii) The non-cohesive soil appearing about 8 metres below the surface mainly consists fine to medium sand with silt. Table 6.1 shows the sub-soil consists layer (2).

Table 6.1: Sub-soil Consists Layers

Layer	Depth (metre)	Thickness (meter)	Material	N- Value	Solidity
Upper layer	0-20	5-20	Grey silt w/sand or claycy silt w/sand	0-3	Very soft
Middle layer	5-25	5-7	Grey or brown silt w/sand or fine sand w/silt	5-20	stiff
Lower layer	below 25	-	Grey or brown sand silt or find sand	Over 20	Very stiff

Source: FAP 8A, Supporting Report 11, JICA, 1992

The lower layer, having N- values of over 20, is presumed to be a suitable soil layer to support the major structures.

The land usages in the project and surrounding areas have been ascertained that about 70 percent land is presently under low-lying areas and annual flooding submerge these areas during the wet season. In the lean season, most lands become dry and fit for cultivation. Some slum and squatter settlements are taken place in the EFAs without infrastructure falsities (3). The DMDP indicates the whole areas that are urban fringe. The presence of natural fault prohibits high-rise construction in the EFAs and house/plot buyers are not made aware of this situation. (Map 5.3).

6.2 The Projects:

6.2.1 Bashundhara land development housing project (BLDHP):

Bashundhara Land Development Housing Project (BLDHP) is the largest project in the EFAs. The project location is situated in the eastern side of Progati Sarani and the northeast of RAJUK's Baridhara Model Town. The project comprises parts of mouza of Joarshahara, Bhatara, and Kathaldia under Gulshan Thana. A link road of about 24.39-metre wide connects Bashundhara project to Progati Sarani.

Initially, the RAJUK approved a layout plan of Basundhara project in 1987 comprising 123.53-hectare lands with blocks A to F (see Figure 6.1) with certain terms and conditions. During the approval, RAJUK did not consider in pros and corns the present and future conditions and their implications. The company is giving pressure and even using brutal force on landowners to sell their land at the company's quoted price. RAJUK tried to monitor the project, but some time failed to do so.

Frequent inspection of the Basundhara project area is not possible due to company's restriction. Now the company is seeking approval for its extended areas. At the same time, the EWPDPL obtained approval of a Concept Plan, where future extension is indicated. Now they use it as tools to acquire lands from landowners. The individual landowners are often pressured by the company to sell their lands at the company's quoted price.

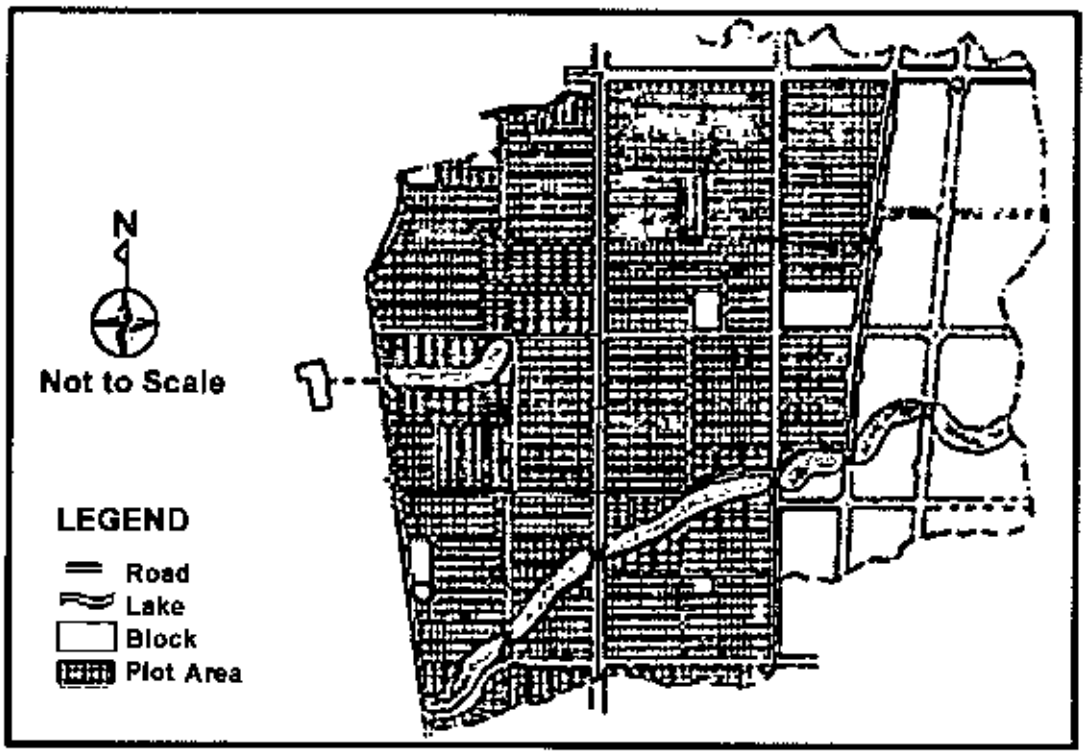


Figure: 6.1 Layout Plan of Bashundhara Land Dev. Housing Project

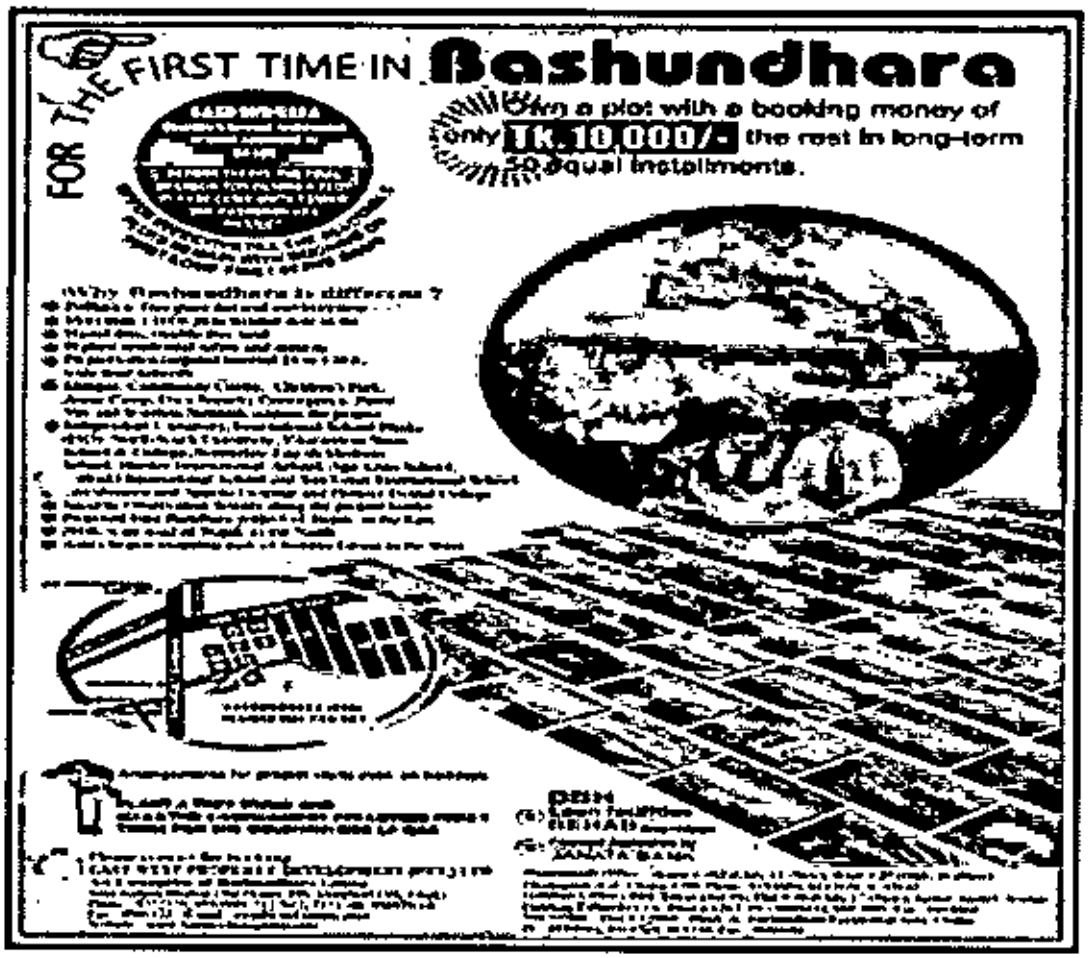


Figure: 6.2. A Colourful Advertisement of Bashundhara Housing Project
Source: Office of East West Property Development Pvt. Limited.

At present, the company seeks approval for the second phase of the project. In the previous layout plan, a lot of deviations were made in first phase plan. The deviations were:

In the plan (approval form RAJUK), the street network was laid down in a gridiron pattern and there were adequate provision of all infra-structural facilities. During implementation stage, the provision of road infrastructure and facilities have been changed;
Plots were created on the reserved land for services and community spaces;
The company was also filled up a sonorous low-lying area including and retention areas and son on.

In the project design, road network was indicated as gridiron pattern and provision for common services and facilities were shown adequately, but in the implementation stage it was deviated from the plan. However, the project (previous one and its extension) are summarised in Table 6.2.

Table 6.2: Project Phases, Blocks and Areas

Phase	Blocks	Mouzas	Area (hectares)	Plots size (sq.metre)	Comments
Phase-I	A, B, C, D, E, F (part)	Joarshahara (p) Bhatara (p) Badda (p)	123.53	200-700	Most of the plots were sold out
Phase-I (Revised and extension)	F (part), G, H, I, J, K, L	Kathaldia (p) Joarshahara (p) Badda (p)	381.50	200-700	Incremental land filling activities are continued.
Phase-II Future Extension	M, N, O, P	Kathaldia (p) Satarkul (p)	800	200-700	Maximum land is in low-lying areas and use for agricultural purpose seasonally.

Source: RAJUK Office Records, 2003
(Note: P means part of the mouza)

The land filling activities are continuing in the project areas and the company develops plots for selling (Photo 6.1, 6.2, 6.3, 6.4). During the project preparation, the identified retention areas and canals were not properly shown. The company has filled-up the existing channels/*khals* for the interest of the project Before taking the project, topography of the areas, flood control drainage networks and erosion measures were not considered.

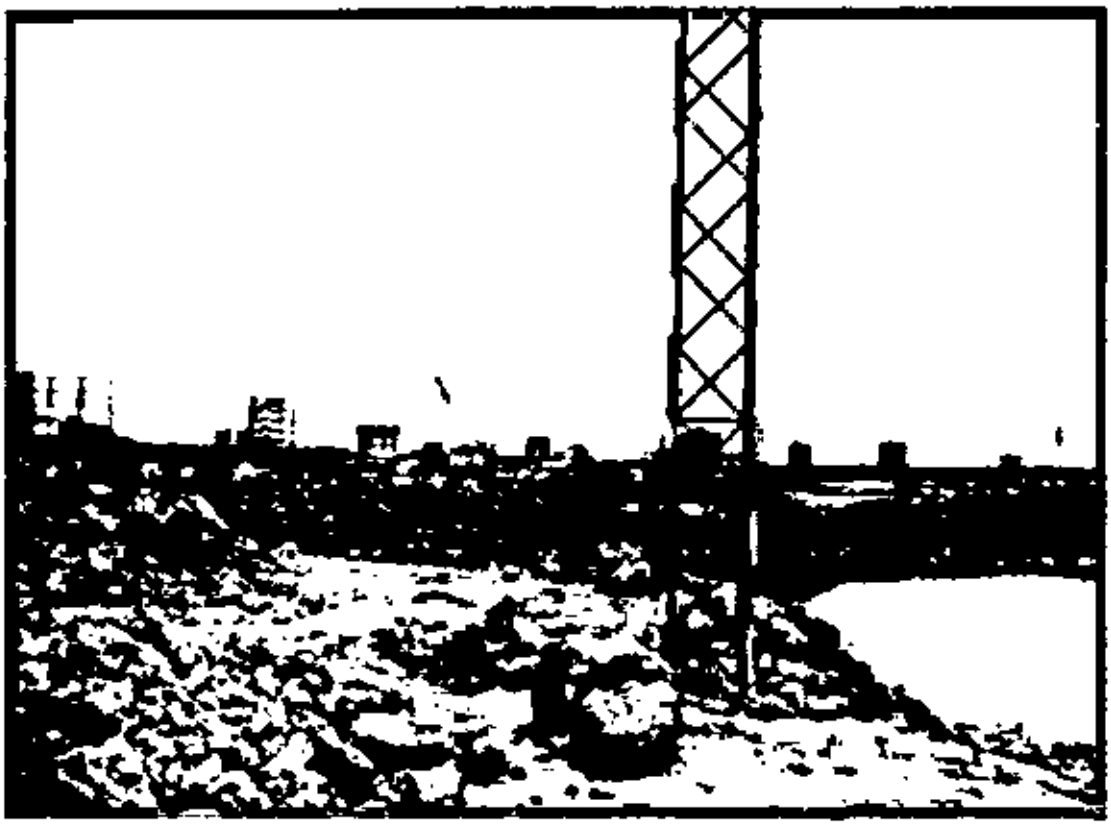


Photo: 6.1 Land filling activities at Bhatara mouza under Bashundhara Housing Project (10-02-2003)

Photo: 6.2 Land filling activities at Bhatara mouza under Bashundhara Housing Project (10-02-2003)

Land Ownership: The company has been procuring lands from individual landowners, government *khas* lands and land of the Court of Wards and others. Meanwhile, the company obtained clearance from the MoL instead of the Court of Wards. The Court of Wards still claims that about 39.46 hectares land (C.S. plot no. 3285, at mouza Joarshahara) is under the project area. Moreover, about one hectare land is government *khas* land excluding the existing *khals* (government land), which are under the project area. The present status of land in terms of ownership is shown in the Table 6.3.

Advertisements: The company gives colourful advertisements in daily newspapers, radio and TV channels to attract potential clients for buying plots/flats from their project (see Figure 6.2A.). This advertisement highlights project location, physical, social and community facilities, environmental soundness and easy payment schedule etc. But the company usually flashes exaggerate statement about the project for the interest of their business. Through this advertisement, the company attract buyers.

Phase 1: Bashundhara Project (Revised and Extension):

Recently, EWPDPL has submitted revised Bashundhara project along with layout plan and relevant documents. In this plan the road network has been indicated 30, 25, and 15, 9 and 7 metre wide. In this plan 59.17 percent (296.22 hectares) for housing plots and apartment/condominium block; 5.27 percent (26.38 hectares) for commercial;

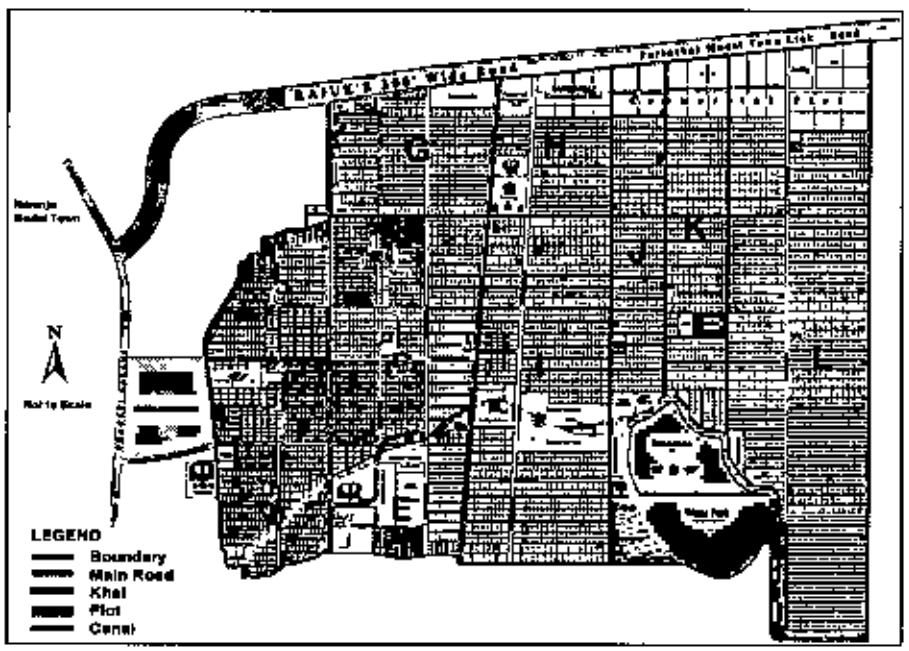


Figure: 6.3 Revised and Proposed Layout Plan of Bashundhara Land Development Housing Project

Source: Bashundhara Project Office

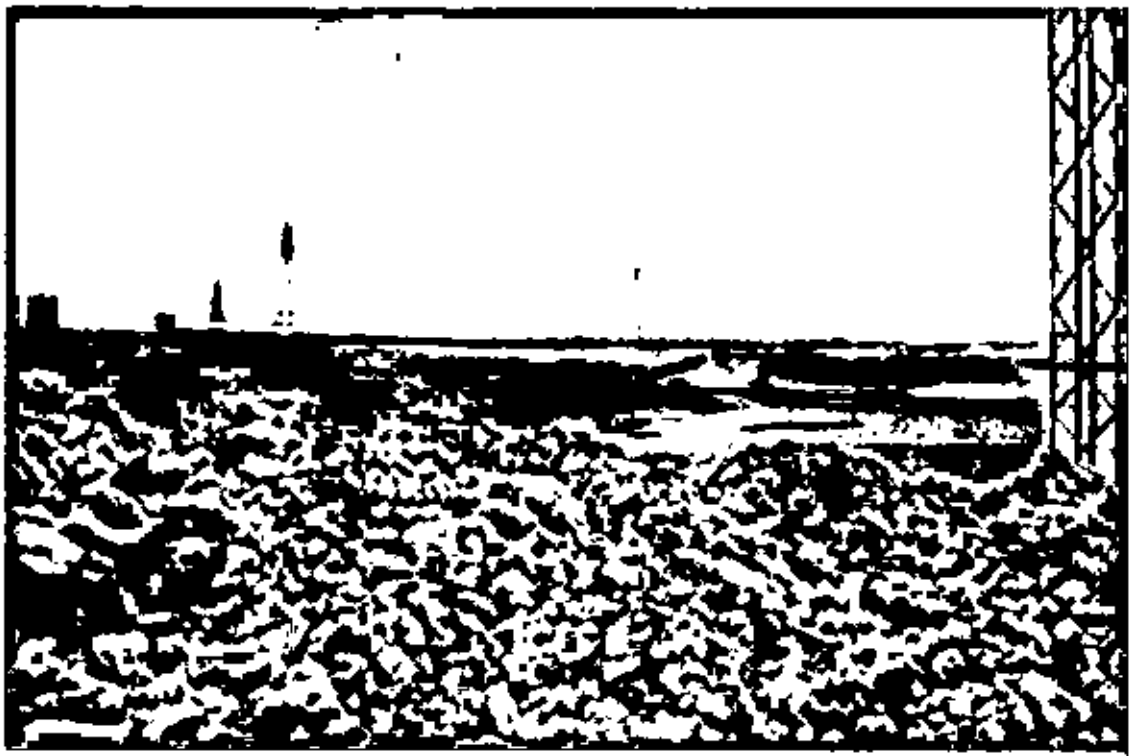


Photo: 6.3 Land filling activities continue at Khathaldia mouza under Bashundhara Housing Project [10-02-2003]

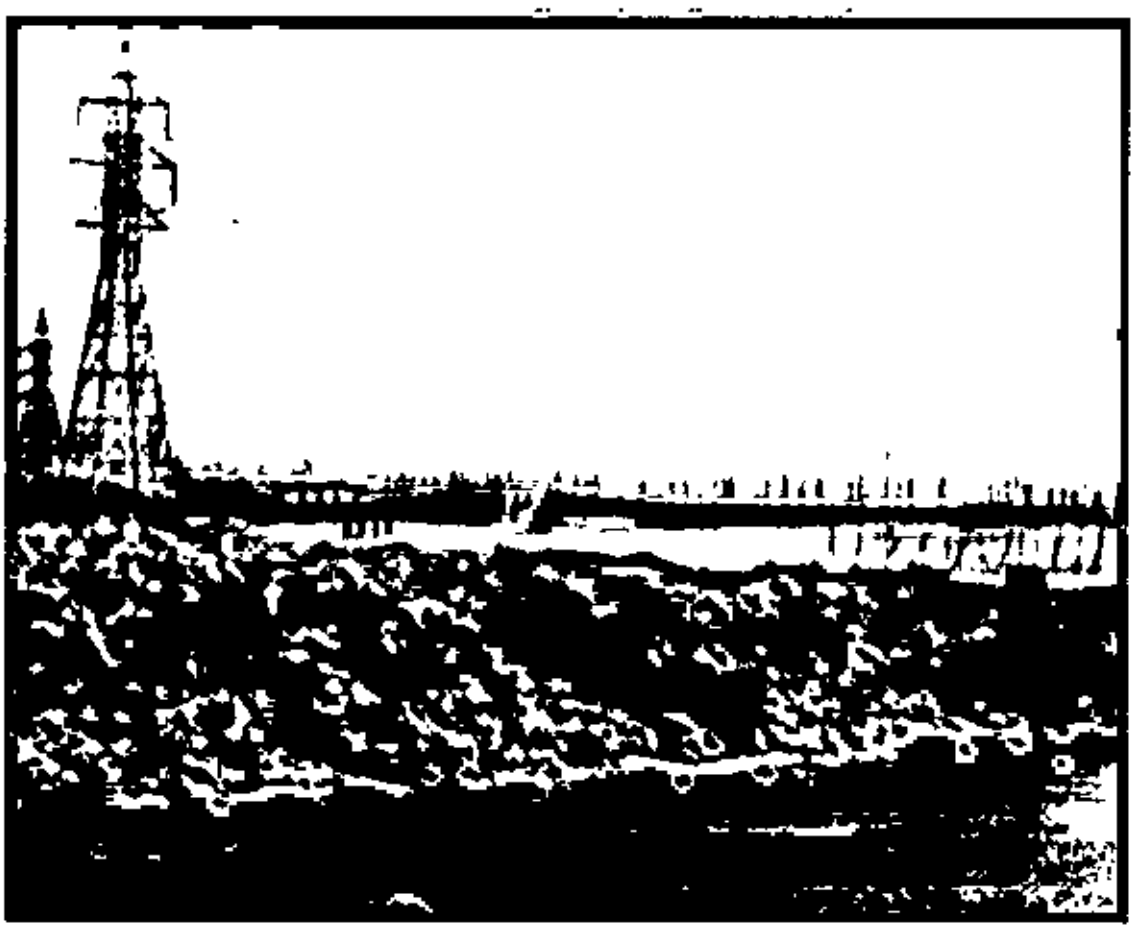


Photo: 6.4 Land filling activities continue at Khathaldia mouza under Bashundhara Housing Project [10-02-2003]

4.02 percent (20.12 hectares) school, college and university; .48 percent (2.40 hectares) health; 4.04 percent (20.23 hectares) for religion purpose; 2.48 percent (12.42 hectares) for park, open space and lake; and .21 percent (1.05 hectares) for utilities. In addition, 24.33 percent (121.80 hectares) lands are preserved for urban facilities.

They obtained ownership certificate from DC office, clearance from DoE and Dhaka Urban Transport Coordination Board (DUTCB) and other agencies. Most of the clearances are given with certain terms and conditions. It appears that the clearance from different agencies needs to be properly re-examined. The landownership of the project is given below:

Table 6.3: Statement of Land Ownership (Revised and Extension Area)

Area in hectare

Mouza	Project Area	Purchased	Power of Attorney	*Baina*	Under Process (for purchase)
Joarshahara	302.04	267.03	12.57	4.89	17 55
Kathaldia	116.81	76.23	23.22	3.46	13.9
Bhatara	74.53	38.45	10.71	5.29	20 08
Barua	7.24	3.93	1.22	.19	1.90
	500.62	385.64	47.72	13.83	53.43

Source: BLDHP office, 2002

6.2.2 Aftab nagar land development housing project:

Aftab-nagar is another big housing project of the Eastern Housing Limited (EHL) in the EFAs. The project is located at the northeast side of Rampura Bridge and adjacent to Begunbari Khal. The earth-filling activities in the project area have been continued for the past ten years (Photo 6.5 and 6.6). The project boundary has been gradually expanded to the northeast direction.


Begunbari Khal at Ullon mouza Photo [20-02-03]

Begunbari Khal is in between Banasree and Aftab-nagar project. About two kilometres of the Rampura Bridge, the original course and width of Begunbari Khal has been changed to a significant extent due to the EHL's development activities. The total canal length of Begunbari Khal is about 3,857 meters and it covers about 14.42 hectares drainage zone (JICA Report, 1992). The internal channels with the areas are connected to the main *khal* and these are extensively used as out-lets to discharge storm water and liquid waste. The collection points of polluted water are Tejgaon Industrial Areas, Mohakhali Tuberculosis Hospital and surrounding areas and Moghbazar, Paribagh and adjoining areas. The EHL has rerouted Begunbari Khal, and is filling up its linked channels for the interest of their project.

The EHL also owns Banasree Housing project in the same area. The project comprises 160.28-hectares land and lands for the project were low-lying and it was liable to flooding. The company has implemented this project through landfills. RAJUK approved this project in 1985 with certain terms and conditions. The terms and conditions are mainly (i) approved layout plan cannot be changed, modified or revised without further approval, (ii) land must be raised above flood level, (iii) the existing drainage network (canals/channels) cannot fill up, and (iv) this approval does not mean land ownership against the project.

The same thing happened in the case of Banseree Housing Project. From the beginning, the company started to deviate from the approved layout plan because it intends to gain more profit. About 70 percent land filling activities at Aftab-nagar project has been completed within 517.18-hectare lands; new low-lying lands are being included for future expansion. Moreover, for the project, Begunbari Khal has been rerouted from its original course and reduced in size for the aforesaid project's interest. In this case, *khas* land exchange agreement was between the MoL and EHL. This natural *khal* is used to discharge Dhaka's storm water. The effectiveness of Begunbari Khal has been disrupted due to the change of the course of the project. Under the project, a huge low-lying area has been reclaimed and changed from their original character.

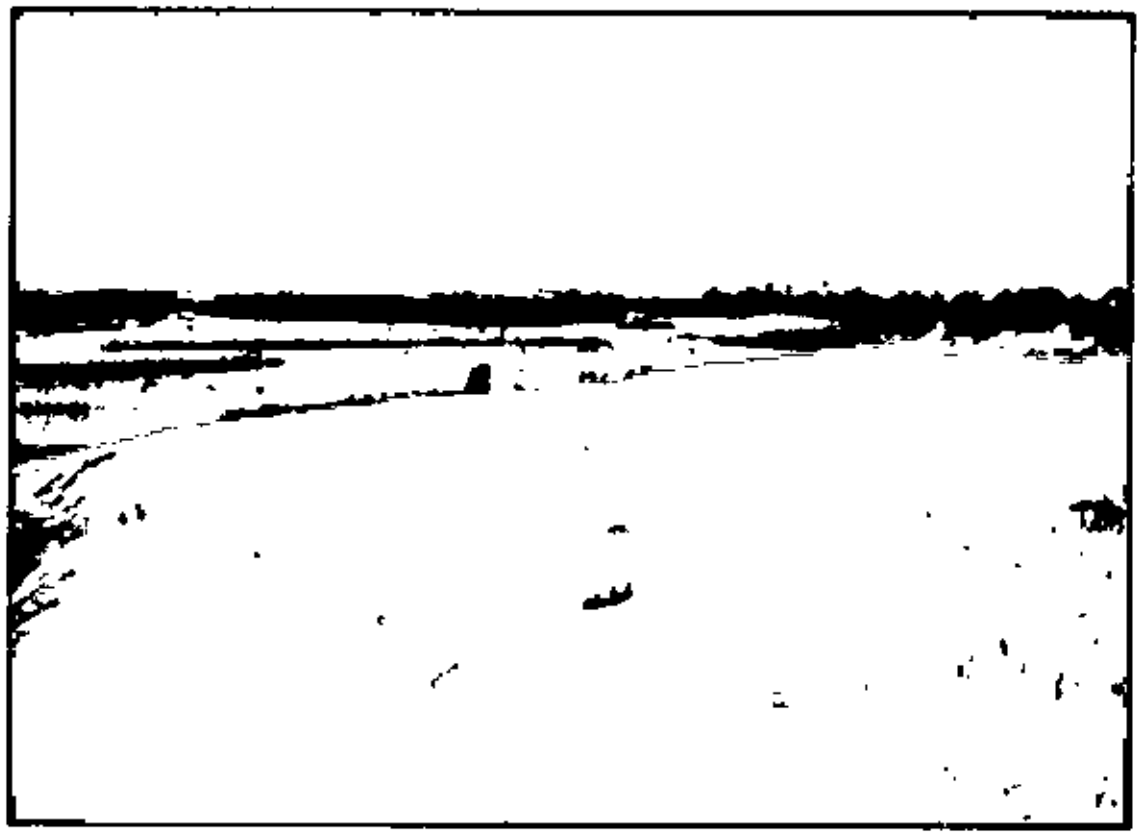


Photo: 6.5 Land filling activities at Badda mouza under Aftab-nagar Housing Project [10-02-2003]

Photo: 6.6 Land filling activities along the canal at Badda mouza within Aftabnagar Housing Project [10-02-2003]

Land ownership: The company has been procuring lands through purchasing from individual landowners and leasing from the MoL. It was found that some private lands are being included under the project without paying compensation to the landowners.

However, the company has registered more than 70 percent land under this project. The remaining private lands are under *baina*. Within the project area, some lands are *khas* belonging to the government and some are owned by absentee landlords.

6.2.3 Basumati land development housing project:

Hirajheel Property Limited Company (HPLC) owns Basumati land development housing project in the EFAs. The project is at the eastern side of Bashundhara project site. The project area comprises about 58 hectares land at mouza of Khilkhaldia and Joarshahara under Gulshan Thana. The project lands are low-lying and liable to flooding. A large portion of project lands have been using seasonally for agricultural purpose. Jamir Khal and some channels flow within this project area.

The project owned lands are not contiguous. The landfilling activities have been stated since 1990s at indiscriminate way (Photo 6.7 and 6.8). This type of earth filling leads to damage wetlands and disrupts drainage network, threatening local environment. More than 60 percent of the project land is still privately owned. The project has been submitted to RAJUK for approval without land ownership documents, clearance from relevant agenesis and DoE.

The HPLC is under pressure to sell the Basumati project to EWPDPL company (Bashundhara). The EWPDPL and Jamuna Group Limited (JGL) have also purchased surrounding lands of Basumati project to grab this project. EWPDPL has already started to occupy HPL company's lands. The present activities of HPLC are similar to other companies as it is also filling low-lying areas, occupying and encroaching privately owned land, and grabbing *khas* lands.

The EWPDPL has tried to push out HPLC from this area. In order to do so, it started to purchase lands surrounding the Basumati project with ulterior motives. At the present position, most of the surrounding lands of Basumati project area are owned by Bashundhara project (EWPDPL) therefore Bashundhara project area is gradually being expanded.

On the other hand, the JGL entered in this area and are also into similar practices of land filling activities, occupying and encroaching privately owned land and *khas* land. This company also intends to occupy the Basumati project lands in the northern side. Both companies, EWPDPL and JGL are financially and politically very powerful. The conflict of land possession is prevailing among the EWPDPL, HPLC and JGL. However. Basumati is at a disadvantaous position for the following reasons:

- the project is almost isolated from road access
- the project is surrounded by Bashundhara and Jamuna group
- HPLC is comparatively weak in terms of financial and political prowess
- RAJUK has not yet approved the project
- Litigation of land ownerships etc.

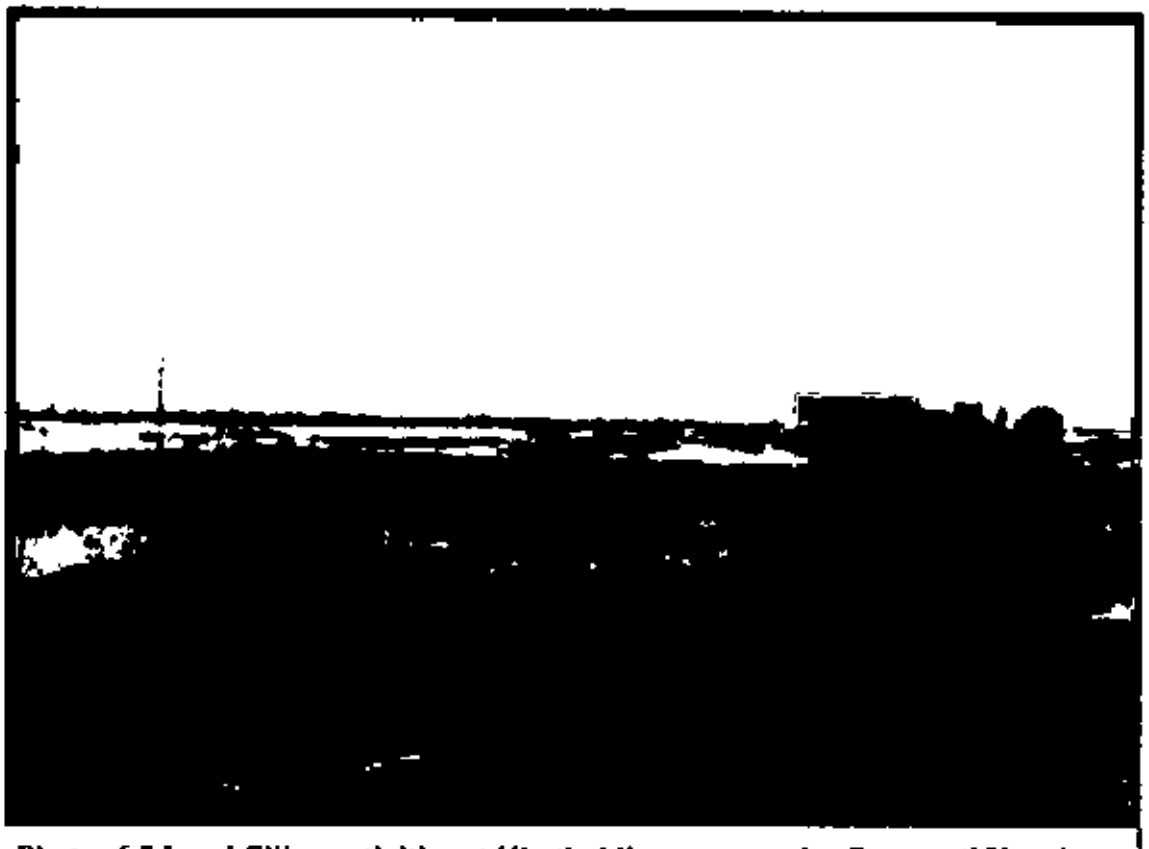


Photo: 6.7 Land filling activities at Khathaldia mouza under Basumati Housing Project [10-02-2003]

Photo: 6.8 Land filling activities at Khathaldia mouza under Basumati Housing Project [10-02-2003]

Photo: 6.9 Earmarked new project site by developer at Khathaldia mouza [07-03-2003]

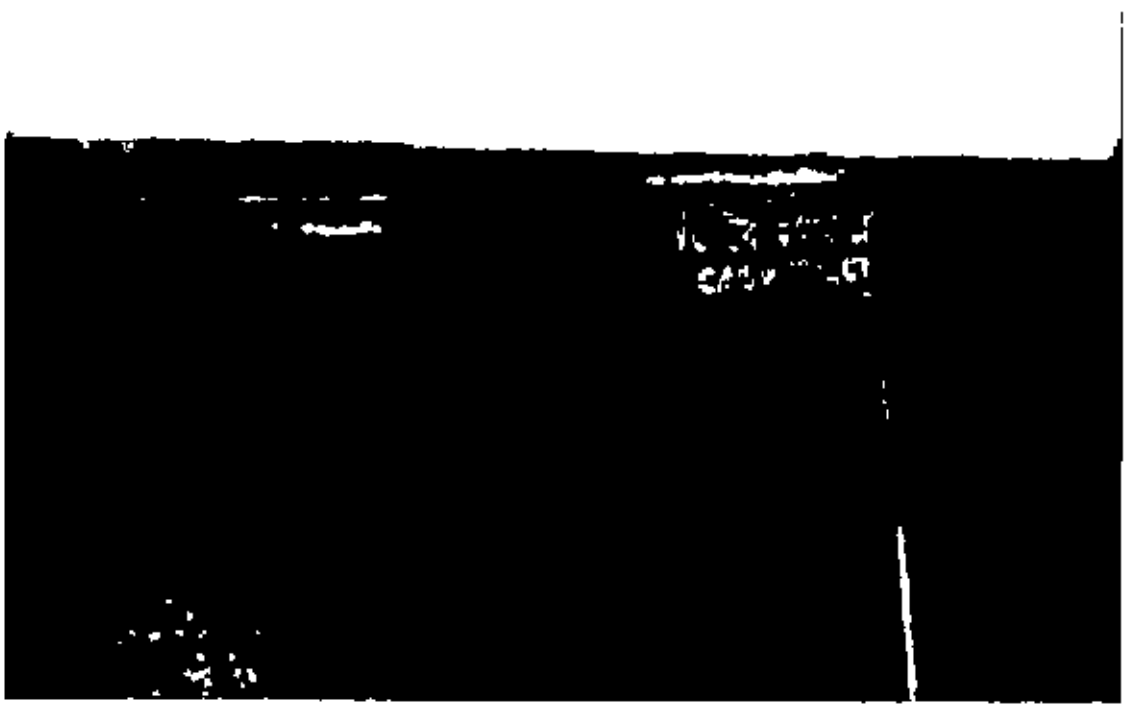


Photo: 6.10 Earmarked new project site at Khathaldia in the study Area [07-03-2003]

6.3 Common Practices for Development of Housing Projects:

6.3.1 Land collection:

6.3.1.1 Purchase of private land:

The companies purchase lands at low-lying areas at cheap price and sell serviced-plot at higher price. They collect lands for their projects applying a various techniques. The companies engage local middlemen, land brokers (*dalal*) to purchase lands within the project area. Usually the brokers are well acquainted with market conditions, keeping contact with Registration Office and they have experiences on land transfer system. Broker is in advantageous position because they usually have good connections among communities/societies so that they know prospective buyers and sellers.

Land brokers negotiate between the buying companies and sellers, and take fees from both parties. In most cases, brokers resort to dishonest means, for example, by selling land with disputed ownership, selling land in the absence of owners by using false documents and sometimes selling the some parcel of land to more than one purchaser. The brokers apply tactics to encourage landowners to sell lands to the companies and they have an important role in the negotiation (4).

Individual landowners sometimes are forced by the company to sell their lands at company's quoted price. This situation started due to company's strong intervention and resort to physical force to compel local people to sell their lands to companies. In is way the landowners are pushed out from their land *(vitta)* and they become landless.

During the survey, we interviewed a lot of families affected by the PLDCs. They expressed their grievances against these companies and said they were deprived of their land price from the actual market price. Initially the companies offered them market price for their land and made temporary agreement or *baina*, but later the companies raised a lot of questions regarding land ownership such as land is litigated, land belonging to other shareholders, land position deviated from the documents and complaints against the landowners etc. Taking advantage of these fake complaints, the companies force landowners to sell their lands at the company's quoted price. Sometimes landowners do not receive rest of the payment for the lands other than the *baina* amount. These private companies often sell plots within *khas khatians* (government lands) keeping the clients in

dark about the land status, and put their clients in problem as such lands cannot be registered. The PLDCs also do not have any provision for rehabilitating the affected families in their project areas.

6.3.1.2 Primary land agreement:

The companies make primary agreement (*biana*) with landowners. The companies usually make a small down payment and then prolong payment of subsequent payment for years together and create an artificial litigation on land title and other land issues to hold individual lands. As a result, the suffering of landowners becomes acute and painful. Under this circumstance, the landowners are usually deprived of full payment of land against their land as per the agreement. Ultimately, they are bound to give registration to the companies at companies quoted price.

6.3.1.3 Private lands:

In some cases, the companies bring individually owned lands within their project boundary by purchasing surrounding lands and individual landowners are restricted from access to their lands. Thus, the landowners lose physical possession to their land. Under this situation, the individual landownership becomes demoralized and usually landowners are bound to sell their lands to the company at its quoted price. It is a major set back to implement private project. In this situation the company can request to government as per PLDHPR-2004 to acquire lands and handed over to the companies for interest of the project and the company bear acquisition cost. It is discussed details in Chapter 4.

6.3.1.4 Absentee landowners:

Within the vast low-lying areas of the EFAs, the number of absentee landlords is significant. In this connection, the land title document is not properly maintaining the concern office. The companies are taking the opportunity and acquiring such lands. In this case, companies make false documents and appear persons as landowners and complete the registration. In this process representatives of the companies local *dalals*. Sub-Registration office employees are directly or indirectly involved.

6.3.1.5 Government land:

The companies intend to grab government *khas* lands, which are available within the vicinity of their project. The government land includes canals, tanks/ponds indicated on mouza maps (scale: 1:3960). The *khas* lands are not always demarked in map. In many areas the government *khas* land are leased-out to the companies that need to review, because sometime the companies extended their area in government owned land. Moreover, the following problems are faced in public land:

- litigation on land ownership about government *khas* lands
- damage canal networks (indicated in mouza map), which lead to water logging and flooding
- destruction of the natural landscapes and change in the character of the areas
- loss of agricultural lands and reduces agricultural productivity etc.

6.4 Development Constraints and Opportunities:

The development constraints and opportunities in the EFAs are indicated in the DMDP and these are verified during the survey and field visit and these are summarised below.

Development Constraints:

- A system of canals fairly covers the area providing water transport and other access facilities are very limited. The water transport and drainage network are under threat due to indiscriminate land-filling activities of private developers
- As estimated by FAP-8A study JICA 1992 that about 12.5 percent areas should be reserved as retention ponds. In order to realize such proposals, areas for retention ponds and east-west polders should be reserved
- Geo-physical conditions are not favourable for vertical expansion. Rumpura Fault on Begunbari-Jirani Khal makes the area vulnerable to unpredictable settlements in case of earthquakes
- The private developers are not taking into account the FAP-8A requirements or the geo-physical constraints. Further analysis of the Rampura Fault line and geological condition should be made to ensure proper development

- PLCDs developers have been destroying the effectiveness of Begunbari Khal. which drains out one-third of Dhaka's storm and wastewaters
- Absence of local administration makes the delivery of essential services difficult

Development Opportunities:

- After construction of the embankment along the Balu River a vast area will be free from annual flooding and thereby augment the supply of flood free land for urban development will enhance
- The proposed east-west roads and north-south roads will provide access facilities in the area
- A very large part of the zone will be freed for development purposes as such development of this area can be steered in a planned manner

Private developers are developing a substantial portion of the area and those are coordinated and managed

6.5 Environmental Issues:

Environmental issues in the EFAs are topography and land slopes, existing vegetation and land use pattern, sanitation and habitat-environment, water supply, disposal of solid and liquid wastes. The present development trends in the eastern fringe have posed environmental threat to the areas. The areas have been considered as a reservoir for a long time where storm water of the eastern part of the city run off through internal *khals* (5). The development activities damage natural landscaping and changing the character of the areas. At the same time, loss of agricultural lands and reducing agricultural productivity are occurring. The urban areas upstream cannot discharge storm water adequately in the natural reservoir.

About 12.5 percent area in the EFAs is retained for retention purposes to protect the city from flood and preserve environmental quality of the eastern part. The upstream water is obstructed to discharge adequately earth activities, which is the main cause of flooding. Indiscriminate land filling at Basuniti project damaged the drainage network and reduced wetland areas. It has negative impact on the local environment. The retention amas are tentatively indicated in deepest low-lying areas where internal khals and channels are

linked. Presently, the canals are not functioning adequately for drainage and navigation purposes (6).

The SP (DMDP) acknowledges that even without these changes, new land conversion will continue to occur, particularly in locations adjacent to presently developed and developing areas and in spite of high flood risk and a capacity of infrastructure services and other social and community services provision. This form of development is taking place in the absence of any planning and development control and without any due regard to Dhaka's fragile eco-system and natural and vulnerable drainage system. There is clear evidence of this at the sites at Kuril and Meradia. Private sector interests have been acquiring large tracts of fringe urban land, filling the land with loose and excavated soil of inherent unstable qualities and ignoring geological evidence and data regarding environmental consequences, the potential and increased risk of subsidence and water logging of land-filling these areas. The SP (DMDP) advocates that private sector intervention in the land market should adhere to the basic planning principles as laid down in the SP and the UAP. The PLDCs are looking for the opportunities to convert such lands into residential or commercial plots. Allegations run high that the PLDCs are motivated primarily in making high profits and are often involved in fraudulent land transactions. In this process of development, they almost ignored the Master Plan provision. existing policies and provisions of TI Act 1952 and BC Act 1953. The PLDCs' tendency is to start land collection and filling those first, and then they create pressure to the authorities concerned (RAJUK) from influential corners to obtained approval for the project.

6.5.1 Implications of development activities on environment:

The quality of urban environment in Dhaka is gradually eroding. This could be accounted to several reasons, which include: rapid urbanization. high population growth and concentration of polluting in urban areas. The urban environmental problems are associated with damage of land and water contamination, air pollution, inadequate solid waste disposal, river pollution, loss of agricultural land, green spaces and deforestation etc. These activities have a great negative impact on the health of the city dwellers, and the urban poor suffer most.

The extraction and depletion of natural resources are important concern for any city. Cities require vast quantities of resources for its inhabitants and economic activities. The process

of natural resource extraction also gives severe impacts environment. It alters natural habitants. increases land consumption, contaminates water, and exploits farming lands.

Presently a good number of housing projects in different size are been develop in the EFAs and serves undying. The hazardous activities of these projects are:

i. Incremental land activities, reduction of wetland, retention ponds and canals;

ii. Local geological structure, geo-physical conditions and hydraulic effect in the EFA, are not taken into consideration by the projects:

iii. Rapid change in the original land use character have adverse impact on occupation pattern and aesthetic views;

iv. Squeezing seasonal agricultural lands and reduce on productivity;

v. Demarked *Khals* (canals) in mouza map are being gradually squeezed up by illegal occupation;

vi. Increase in landlessness and need to be resettled.

6.5.2. Loss of agricultural land:

The conversion of prime agricultural land to urban use may have negative impacts. Seasonally, the project lands are used for agricultural purpose; on the other hand, these are also used for fish culture. Fish and fisheries have been playing a very significant role in the nutrition culture and the city economy. Not only additional farmland have to be found elsewhere, but also has to be carried to greater distance or imported and stored for longer periods at higher energy costs. Moreover, this will tend to increase food cost for consumers as well as cause environmental damages (air pollution and water contamination etc.). Conversion of agricultural lands into urban uses also may increase the total amount of runoff generated from rainstorm, and threaten to replace the visual amenities of rural and pastoral landscapes (Mekvichai et al. 1990). Notwithstanding the potential negative impacts, the loss of agricultural land is not a serious problem for most rapidly growing cities. The conversion of agricultural land into urban residential or industrial use reflects its lower value relative to urban land value.

6.5.3 Loss of wetlands:

Understanding the importance of existence of wetlands it is highly necessary to protect them and make them suitable for judicious use of machined. Wetlands are important biotic

habita, and so their protection and preservation is a must destruction activities by PLDCs and others should immediately to stop for the greater interest of the city as whole.

Huge chunks of lowland have already been filled up with many trawlers and engine boats carrying earth to the areas of Banasree-Aftabnagar and Bashundhara projects. The companies have reclaimed these areas to expand their projects without obtaining proper approval from concern agency. Meanwhile, specialists have expressed concern over such indiscriminate filling of low lands and cautioned that this would result in ecological disaster and massive flooding. According to the DMDP plan (SPZ.12, Dhaka Urban Plan 1995-2005) northwest part of Rampura Bridge areas are marked as an earthquake fault line (Chapter 5, Map.5.3).

6.6 Justification of Public Sector Housing Projects:

People are always attracted to buy RAJUK plots as the land price is reasonable, services are ensured, transfer of land is permissible, land can be transferred back to the RAJUK, deposits can be withdrawn etc. In contrast, private companies do not provide such facilities.

But people are questioning why the RAJUK is implementing their housing projects in low-lying areas like the PLDCs. Allegations brought against the RAJUK are: (i) whether the RAJUK project lands are in conformity with the provisions of the DMDP (1995-2015); (ii) whether the projects are disastrous for local drainage and environment: and (iii) whether affected people are rehabilitated or not.

In reply to these allegations, the RAJUK resolves that the project areas are in conformity with the provisions of the DMDP (1995-2015); all natural features like *khals*, ponds, lakes and wetlands are mostly incorporated in the projects if those features fall within the project areas; all sorts of mitigation measures are also taken up: road network, utilities services and common facilities etc. are provided according to the planning principles of the DMDP 1995-2015; all affected families are rehabilitated within the project area in priority basis.

Notes and References

1. Haque, S.M.B. (1984). "Process of Land and Residential Development in the Urban Fringe, A case Study in Dhaka, "Bangladesh, Master's Thesis, AIT, Bangkok. 1984

2. Japan International Cooperation Agency (1992), "Flood Action Plan (FAP) No. 8A, Supporting Report 11", Dhaka.

3. Slum and squatting settlements are emerged in low-lying areas; these are mostly liable to flood almost in every year. Infrastructure facilities including access roads are either absent or highly inadequate. Houses are semi-permanent or temporary nature and occupants are obviously the poor, for further reading, Dhaka Metropolitan Fringe, Land and Housing Development. Islam. Nazrul, 1990, pp. 23 & 23

4. GOB and ADP (1993), "Formulation of Land Development Controls and Procedures for Dhaka", Culpin Planning Consultant Ltd, ADB, chapter 4 pp 83-86.

5. Islam M. Anwarul and Huq, Saleemul (1995), "Dhaka City Development Plan, An Environmental by Review," Dhaka.

6. Due to rapid urbanization, unplanned and unregulated urban growth, Dhaka suffers from problems of drainage and stagnation of rainwater, the situation is bad both in old and new areas, some of which experience storm and rain water stagnation. Unwise closure of natural and old artificial drainage and navigational canals in east and west peripheral areas of Dhaka has aggravated the situation. Dhaka also suffer from annual and abnormal floods like the ones 1987 and 1988, see Islam M. Anwarul and Huq, Saleemul (1995), "Dhaka City Development Plan, An Environmental by Review," Dhaka, p 16.

CHAPTER 7: ANALYSING THE ENVIRONMENTAL IMPACTS OF LAND DEVELOPMENT ACTIVITIES ON THE ENVIRONMENT OF THE EFAs AND DHAKA

7.1 Introduction:

In the last chapter three housing projects (as case study) were studied in detail focusing on land collection, landfilling activities, development constrains, opportunities and their implication. These were analyzed and supporting evidences were presented in the form of case studies. The present chapter analyses the impacts of land development activities on the environmental condition of the EFAs and how it ultimately affects the environmental condition of Dhaka city. From this chapter, it will be evident that the present land development activities undertaken by the PLDCs in the EFAs are a deviation from the stated objectives and norms of urban planning and urban development stated in Chapter 2.

The objectives of this chapter are to assess the impacts of land development activities on the environmental conditions of the EFAs. The basic objective is to ensure that nobody is made worse off the environment in the study area. In order to achieve this objective, all negative impacts have to be identified and quantify and suggest mitigation measures of the land development projects. If possible quantify and suggest mitigation measures of the land development projects. The overall aim is to ensure that the projects are environmentally sound and sustainable, following the international requirements laid out in Agenda 21 of the Rio Convention in 1992, in which Bangladesh is a signatory.

The overall environmental objectives are:

- to study the ecological system and environmental problems in the project area
- to assist planners, PLDCs, and decision-makers involved in the project in preparing sustainable development plans and implementation

Land developments through filling of wetlands and low-lying areas in the EFAs prompted urban expansion, establishment of infrastructures including road infrastructure, electricity gas and water supply etc. Urbanization enhances service facilities through establishment of residential and commercial industrial educational and administration areas, in addition to that motorized road network contributing to

economic development and enhancing the quality of life. The demand for land within Dhaka has increased tremendously as the mobility of urban, sub-urban and regional commuters has increased. This has initiated the ongoing development of housing through land filling in the fringe areas of Dhaka.

Environmental considerations include topography, soil condition, land use and land use pattern, existing situational/plantation, building materials traffic densities and consequential air pollution, vibrations earthquake, sanitation and habitat-environment, disposal of solid and liquid waste, privation wetland and fringe areas etc.

Earth-filling and infrastructure development, however, have caused widespread environmental degradation. Poorly planned development, malpractices in construction activities and ill maintenance had far-reaching and negative effects on the environment. The resulting damages in many cases are permanent. The negative effects continue for a long time and have lasting consequences. The extent and coverage of such damage is very extensive to the natural non-living as well as natural living and human environment. As discussed in the previous chapters, land development projects by earth filling have caused, in most cases, minor to serious damages to land, water and air. They have disfigured topography and landscape, damaged soils, disrupted drainage systems, contaminated water bodies and deteriorated air quality. Land development by earth-filling is a major cause of damage to the natural living environment including ecological destabilization, habitat destruction, and damage to flora and fauna.

The scope of environmental assessment in this study covers the natural and human environment, their interaction and any induced change brought about by the land development projects in EFAs. It also provides information on the trend of urban expansion. The methodology covers review of environmental policies, acts, laws, environmental procedures and guidelines. The environmental study covers preparation of an Initial Environmental Examination (IEE) report as this is the only assessment of likely project impacts.

This IEE study is the result of a major review of literature studies and reports including significant field data collection exercise, analysis and interpretation of their results.

Data on topography, climate, hydrology, ground water, agriculture, fishery, ecology, land uses and public opinion were incorporated in IEE study.

In addition the informations were collected through questionnaire surveys at unions, mouza and wards level and consultation with local people, elites and local leaders. Moreover, the experiences of other studies and projects were gathered in the process.

7.2 The Environmental Conditions of the EFAs:

7.2.1 Natural resources:

The topography occupies low-lying areas between the Balu River floodplain and the eastern fringe boundary of the Dhaka. The project area turns into a vast water body and become wetlands during monsoon period. In the lean season, the area is dry and used for cultivation purpose. By the seasonal flooding, land resource, vegetable, plantation conservation of water, soil, biodiversity preservation recreation services are damaged. According to the survey (2002), more general economic damage in agriculture and fish (in open water) productivity has been reduced. The reduction of the availability of plantation, vegetation and grazing land other forest products has effects on biological diversity of the area. The process of urbanization is being continued and pollution level becomes higher. The major sources of pollution are surrounding industries and filling activities. The effects of an increasing urban population have led to damage housing, and sanitation and water resources.

On the other hand, in agriculture, pesticide use in not effectively controlled, and farms are highly affected by toxic pesticides. Application of fertilizer is generally unbalanced leads to reduced soil fertility. Moreover, overplayed fertilizer causes unnecessary contamination of water and land.

7.2.2 Ecological resources:

The whole region is a semi-aquatic environment, regularly inundated by the Balu River and Begunbari, Fakir, Jamair, Dumri and Jirani khals. The areas are characterized by planted vegetation of various species having ecological and economic significance. The

range of habitats includes open fields, artificial and natural wetlands, scattered rural villages and homesteads and uncultivated lands. These habitats represent diverse terrestrial and aquatic species.

The floodplains are croplands used for cereal and vegetable cultivation. General fertility level of the land is not the same in all places. The perennial water body is the habitat of different local fishes. The common and usual plants and local birds are seen in the area. No rare and endangered species were observed in the study area.

7.2.2.1 Wetlands:

The whole fringe areas in the eastern part of Dhaka turns into a vast water body in the rainy season and most of the low-lying areas are cultivated in lean (dry) season. Ponds and ditches are common features within the wetlands areas. The PLDCs and individual landowners are active to fill areas in a continuous process within the project area, resulting in the deterioration of wetland features, canals, channels and adjacent lands. Environmental survey findings reflect that the rate of destruction of wetlands is high at along the built up areas. The wetlands reducing areas are mostly Joarsahara. Dakkhin Khan, Meradia and Badda unions are losing (Photo 7.1 and 7.7). The wetland fauna and flora are disappearing gradually. These are very important for the environment of the area. Wetland fauna means the wildlife and fishes that are closely related to the wetlands. It is valued in various degrees by different societies. In the same way, wetland flora is very much important because it plays a vital role for biodiversity conservation. The detailed discussion is presented in section 7.2.3. The following table shows the damage of wetlands caused by land filling in different unions/areas.

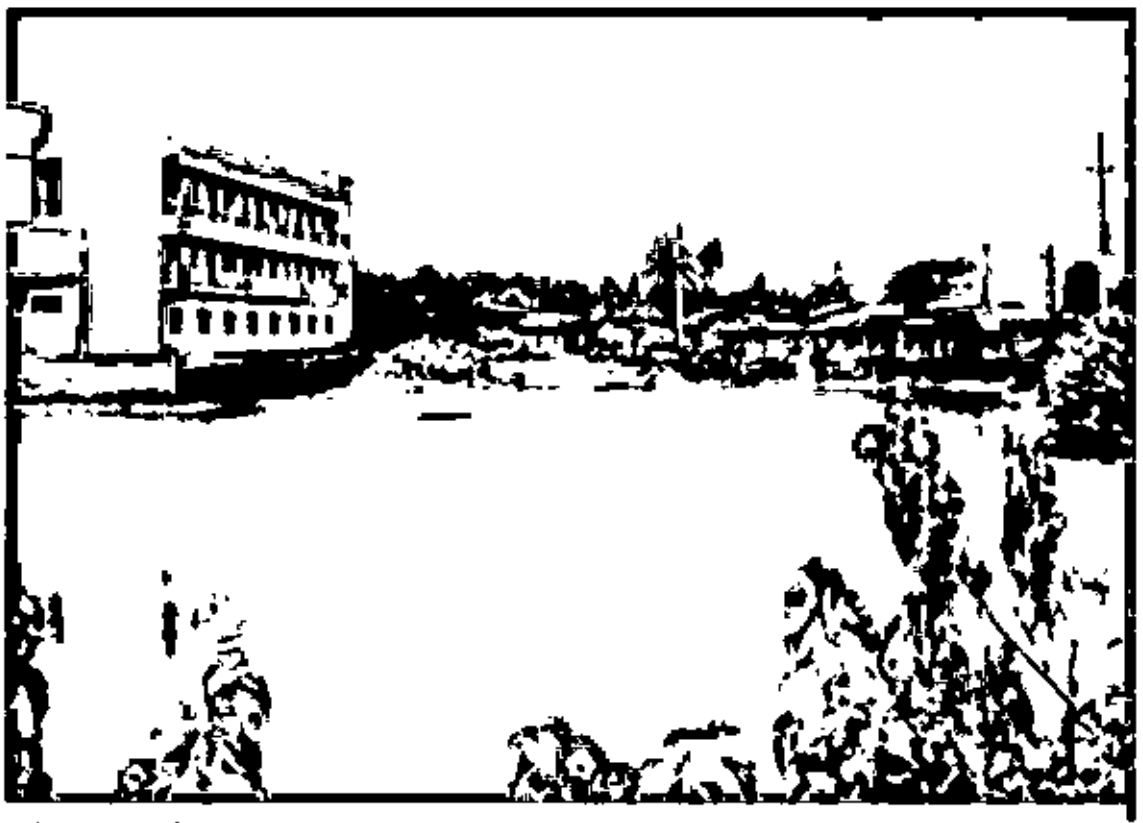


Photo: 7.1 Encroachment wetlands by the pucca structures at Bhatara mouza (07-03-2003)

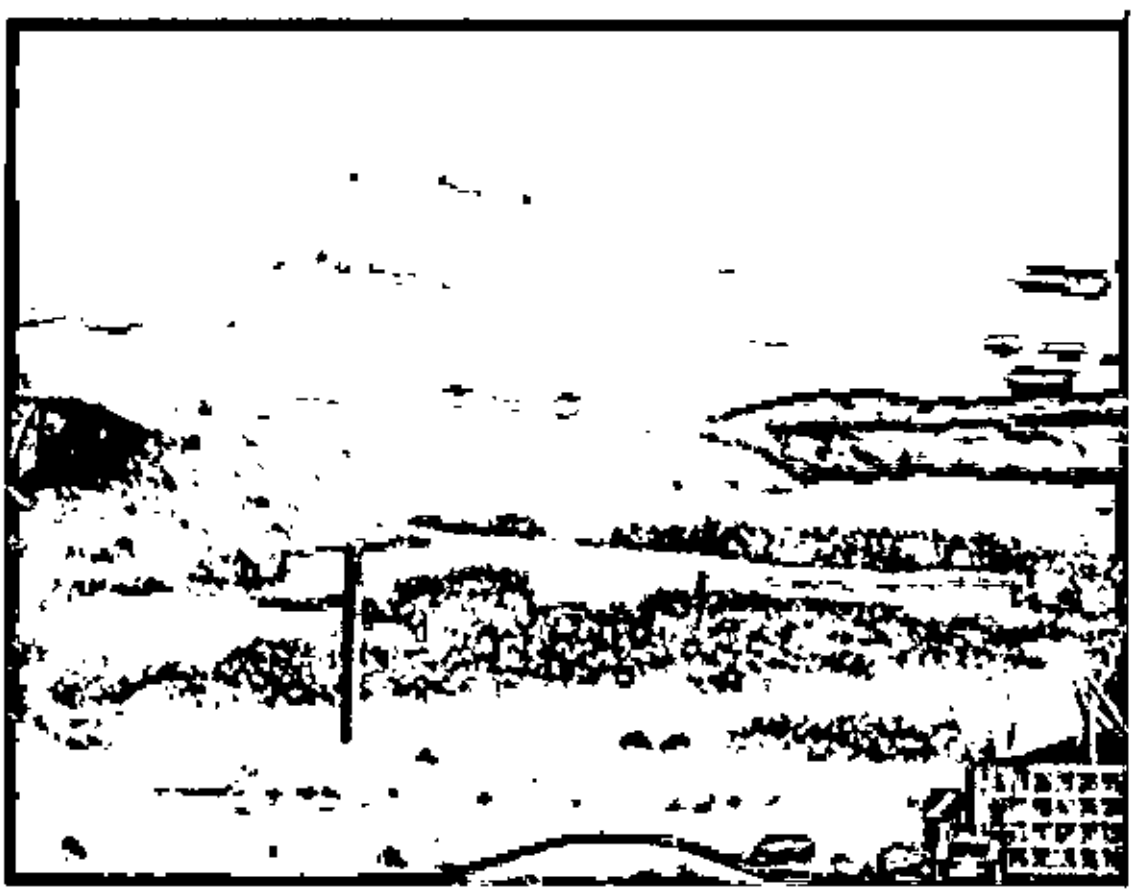


Photo: 7.2 Land filling activities continued by developers at Sutibbola mouza (07-03-2003)

Table 7.1 Wetlands in the Study Area

SL. No	Name of Unions	Loss of Wetlands Percentage (hectare)	Reasons/Remarks
1.	Beraid	55 (22.28)	The areas are beyond the urban influenced zone. Encroachment into wetlands is comparatively low because the road infrastructures are inadequate and awaiting for urban facilities. It is apprehend that the areas will be highly potential if proposed embankment will take place along the Balu River.
2.	Satarkul	56 (22.68)	
3.	Demra (P)	35 (14.18)	
4.	Joarshahara Ward no. 75	75 (30.38)	The areas are highly influenced by urban development activities. Moreover, Progati Sarani is the main arterial road. The landfilling activities are being continued by PLDCs to implement the housing estates. Besides, the individual landowners are encouraged to fill their lands and build the house for commercial interest. The colourful advertisement also attacks the potential buyers/clients.
5.	Dakhin Khan	76 (30.78)	
6.	Meradia Ward no.56 (P)	70 (28.35)	
7.	Badda, Ullon Ward no. 74 (P)	72 (29.16)	

Source: Field Survey 2002 and Interview with Local People.

The destruction of wetlands occurred due to earth-filling activities by the PLDCs and individual intervention for urban activities. It has negative impacts on the natural environment in the project adjoining areas. The medium impacts occur in Beraid, Satarkul, Demra and adjacent remote areas. The destruction of wetlands at Beraid and Satarkul unions, which are far distant from major existing roads.

The wetlands in the western part of Dhaka have been converted into urban use, as a result of the construction of embankment. The faulty design and planning of the embankment will further damage the natural hydrology, opening drainage and ecology. There will be stagnant water pools existing wetlands and canals.

7.2.2.2. Drainage and water logging:

The human interference associated with landfilling and unplanned development activities over the natural drainage system have aggravated the present water logging in the project area. The natural channels have been disappearing in some places. Water flow as well as hydrologic links between the major and minor channels has been disrupted because of landfilling. The canals have been choked up by encroachment through earth filling, garbage disposal, low discharge capacity and elevated culvert and road construction in the wetland areas. Such negative impacts on land and environment resulted in a severe flooding in 1998 (1)

Soil Erosion:

The soil erosion occurs on the banks of the Balu River and its connecting canals in the rainy season. The run of storm water and annual flooding are the causes for erosion. The surrounding areas towards upper part (to Tongi) the and down stream Demra of the Balu River are affected by erosion. In the lean season, water flow slow and the rate of erosion in the areas gradually reduce to a greater extent. However, the erosion in the eastern part of Dhaka is not at all significant.

Natural Hazards:

Natural hazard viz. flood, storm surge fault rupture and drought in the EFAs have been analyzed in Chapter 5. The private housing projects are continuously built up without considering natural hazards. To avoid the environmental risks, no mitigation measures were in the case of previously approved plan. The companies as well as the habitat are in the potential danger of earthquakes. The vulnerable areas and seismic zone were not accurately identified. However, the natural fault in the EFAs is indicated in Map. 5.3. The poor planning, inappropriate building design, faulty construction, on hazard prose loads all contribute to both the environmental degradation and increased vulnerability to catastrophic events.

By close examination of the seismic city map, it can be seen that the northwestern region and eastern cities including Dhaka, is comparatively less vulnerable than the aforesaid cities.

Road Infrastructure:

Three major roads viz. Progati Sarani to Beraid via Satarkul; Airport Road to Yusufganj Bazar via Khilhet Bazar and Rampura Bridge to Trimohani have been constructed in the EFAs. Recently, the Roads and Highways Department (RHD) have undertaken 100 feet wide road project from Badda to Demra. Some local dirt (*kutcha*) roads exist in the areas, which have been constructed by the Union Parishad with the support from local people. Most of the local roads go under water during rainy season, because the roads are not elevated above flood level. It is found that the road construction and settlements are being taken place along the major roads sides. The existing roads and settlements obstruct the flow of water, which lead environmental degradation.

7.2.2.3. Land use pattern:

The land uses of the EFAs are mainly agriculture, settlements and closed water bodies. Analysing the satellite images of 1996 and 2000 indicates that agriculture lands are being reduced and the same time, the area of closed stagnant water bodies is being increased. The water bodies particularly *khals*, ponds, ditches and low-lying are being reduced by encroachment of PLDCs and individuals. The images of 1996 (Figure 7.1) and 2000 (Figure 7.2) are overlapped and land use conversion is shown in Figure 7.3.

This figure indicates that agricultural lands are gradually being converted into housing projects. The number of closed water bodies has increased due to cutting of lands within the fringe areas. The land uses with the study area have been changing through the activities of cutting and landfilling. In this way the land use of project area has been changing gradually.

It is also observed that the built-up area has increased from one-fifth in 1990 to about one-third in 2000 (approximately) while agricultural lands and water bodies decreased from four-fifths to nearly half in the natural part of eastern Dhaka. This change started around the 1980s and it accelerated due to intervention from the individuals, cooperative housing and PLDCs.

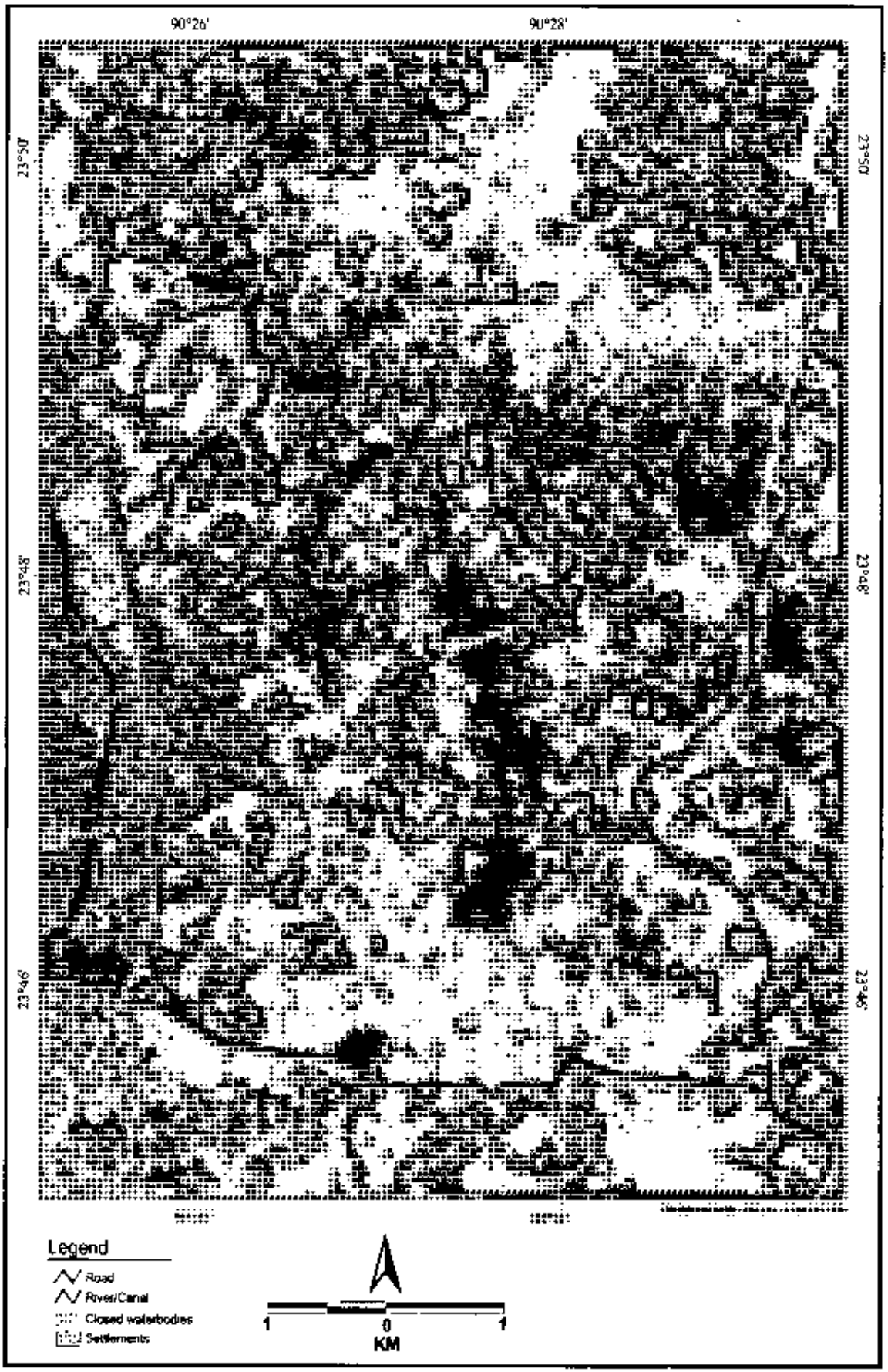


Figure (Image) 7.1 Land use Pattern of the Eastern Fringe Area, 1996
Source: CEGIS (Centre for Environmental Geographic Information Services)

Figure (Image) 7.2 Land use Pattern of the Eastern Fringe Area, 2000
Source: CEGIS (Centre for Environmental Geographic Information Services)

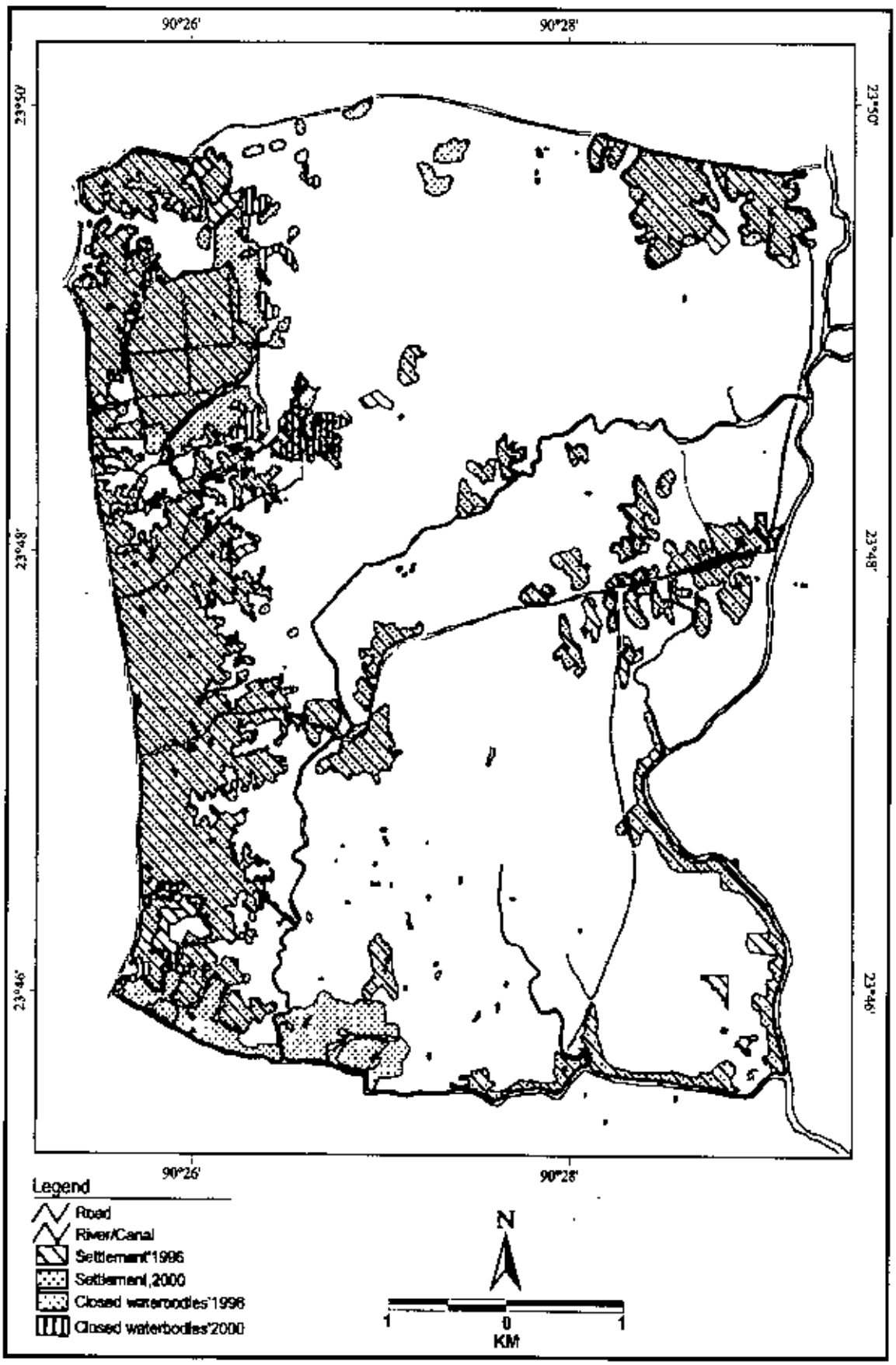


Figure: 7.3 Conversion of Land use from 1996 to 2000
Source: Adopted from IRS ID Plan Image February 1996, IRS ID Plan Image February 2000

The present land use activities such as land filling for housing and road construction etc in the study area might create drainage congestion of water-logging. The urbanized western part of Dhaka city is suffering badly from such problems.

7.2.3 Biological resources:

The natural ecosystem at present in the EFAs is at a critical stage. Water resources are one of the most important and valuable components of eco-system and its quality is an important factor for aquatic environment. The open water bodies, the Balu River, Begunbari and Jirani Khals are being contaminated by various sources. The dynamic balance in the aquatic ecosystem is upset by human activities. Aquatic fauna is affected severely by upsetting the ecological balance. The region can be broadly described as a semi-aquatic environment related to the Balu and Lakhya Rivers. The ecology of the area involves interaction between a large number of faunal and floral species and a range of different types of habitat. The habitat includes seasonal wetlands and seasonal grassland etc. The available trees near the water bodies provide supports for shelters and foods (Photo) (2). The present condition in EFAs of species particularly flora, fauna and fisheries are stated below.

7.2.3.1. Flora:

A total of 51 terrestrial floral species were recorded in the eastern part of Dhaka (FAP-8A, JICA 1992). Flora was classified under three categories for example: Terrestrial Natural Flora, Terrestrial Planted Flora, and Medicinal Flora. A few of these, like *Elacocurpus roustas,* are rare. The most important problem is water *Hyacinthm, Echicornica crappies* in the flood season. It covers the water surface with a thick mat of vegetation, blocking the light. With the potential to deoxygenate water bodies. it also threatens the viability of other aquatic flora and fauna, particularly fish.

7.2.3.2. Fauna:

Terrestrial fauna was recorded of the study area 40 specials from FAP 8A, JICA, 1992 and also verify from the project area through observation and discussions with local people. The respondents reported that even if recorded species of terrestrial fauna exists,

the number of species has been reduced. Among them, six species are of amphibian, nine of reptiles, seven of mammals and eighteen of birds. Some of these are very common and very few like *sona bang* (*Rana Tigruna*) and *beji (Herpests)*. The wildlife that fully depended on the terrestrial land throughout their whole life for existence, shelter, and food, nesting, breeding and also producing offspring is called terrestrial fauna (3)

The importance of flora and fauna is the establish facts for ecological balance of a particular area and its surroundings. For newly developed area, like eastern fringe the species (flora and fauna) are essential element for human habitation. This area is still low-lying comprising wetlands, settlements with excellent canal network. It is a good place for flora and fauna habitation. The present trend of development damages the species and the area is becoming ecologically unbalanced. The ecological balance becomes the prime consideration of the concept of sustainable development (Chapter 2, section 2.11).

7.2.3.3 Fisheries:

Most of the low-lying areas including the floodplain are used for single cropped agricultural purpose and it is also potential for open water capture fisheries. The Balu River and surrounding floodplain areas are predominant spawning grounds of open water capture fisheries. The survey was conducted under FAP 8A, JICA project in 1992 and audit that about 74 fish species, 10 fresh water prawn species and two oval species were identified. The existence of another five species was found in the areas. Most of the fishes are potentially important in terms of nutrition and commercial value.

The habitations of fishes in floodplain and reserve areas are affected by water pollution and human activities. Rapid disappearing of fisheries in open bodies is responsible for such pollution. At the same time, fish production has been increasing through farming in ponds with technical support and credit facilities from NGOs and Department of Fishery (DoF). The fish production within the project area of 1995 and 2000 and its is shown in Table 7.2.

Photo 7.3 A tree that support shelter and food for certain species of wildlife at Joarshahara mouza [07-02-2003]

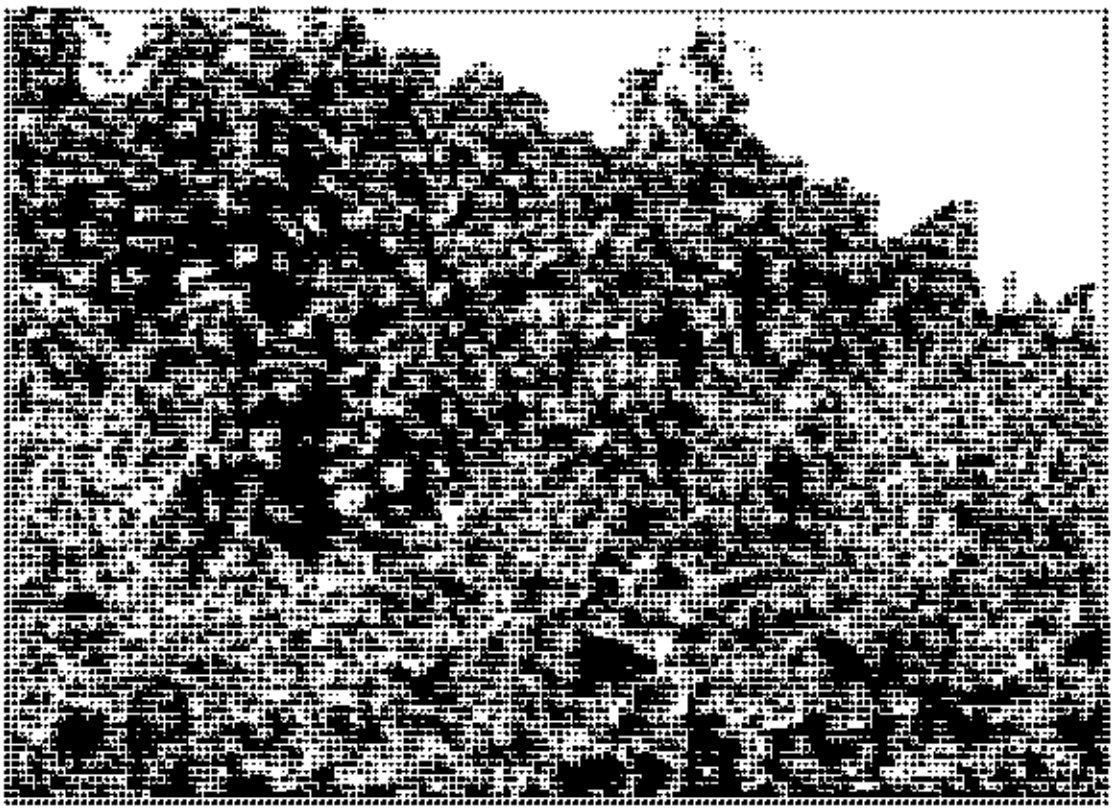


Photo: 7.4 A tree that supports shelter and food for certain species of wildlife at Joarshahara mouza [07-02-2003]

Table 7.2: Fish Production in the Study Area

Area in hectare and production in Ton

		Fish Production (in Ton)			
Sl. no.	Unions	1995		2000	
		Area (hectare)	Production (ton)	Area (hectare)	Production (ton)
1	Beraid	1.62	1.98	1.62	3.97
2	Satarkul	0.94	1.54	0.94	4.41
3	Demra	1.39	1 50	1.39	3.86
4	Joarshahara Ward no. 75	1.82	10 36	1.82	16.54
5	Dakhin Khan	0.13	11 02	0.13	0.66
6	Meradia Ward no.56	0.27	15 43	0.27	1.54
7	Badda / Ullon Ward no. 74	-	-	-	-

Source: Field Survey, 2002

7.2.3.4. Water quality:

The water quality in the EFAs is critical. In the dry season, the water quality deteriorates compared to wet season. The major composition of run-off is wastewater discharge and it is the causing factor for water contamination. The waste is dumped in or near point of low-lying areas during dry season, which was out in monsoon rainfall and run-off.

The catchment area of the EFAs is Tejgaon Industrial Areas, Moghbazar, Paribagh, and Kathalbagan and their surroundings areas. The industrial effluent is usually discharged into the Begunbari Khal. This khal is also connected by the internal *khals* and these are using as discharge out-let. The waste water mainly discharges from Tejgoan Industrial Areas, Mohakhali Tuberculosis Hospital areas, Moghbazar, Paribagh areas. The settlement areas in the southeast of the study area are Khilgaon, Nandipara and surrounding areas of Trimohani. These areas are highly densified by the settlements with mixed use (residential, commercial, industrial etc) and generate both solid and liquid wastes. Jirani Khal is one of the discharge channels of these areas. Moreover, the internal channels of these areas are also using for discharging waste into the EFAs. Moreover, Jirani khal is an important outlet for contaminated water. The discharged water is highly contaminated and spread over the EFAs. On the other hand, open and hung latrine is also source of domestic sewer that contaminates land and water. Most

critical areas are Begunbari and Trimohoni and their surroundings. The open water fish and other species are being severely affected by such contamination (eg untreated raw sewages). The industrial effluents and domestic sewage are gradually polluting water flow towards the Balu River and Lakhya. The water quality in the Rampura points is presented in Table 7.3.

Table 7.3: Characteristics of Drainage Water Samples Collected from Rampura Points

Sl. no.	Parameters	Unit	
			WW-1
1	pH	--	7.82
2	Colour	Pt.-Co	215.0
3	Lead (Pb)	mg/l	0.0217
4	Cadmium (Cd)	mg/l	0.0039
5	Chromium (Cr)	mg/l	0.21
6	Phosphate (PO_4^{3-})	mg/l	1.70
7	Nitrate(NO_3-N)	mg/l	11.5
8	Ammonia (NH_3-N)	mg/l	52.0
9	BOD_5	mg/l	163.0
10	COD ($K_2Cr_2O_7$ value)	mg/l	573.0
11	Total Solids (TDS)	mg/l	357 0
12	Total Dissolved Solids (TDS)	mg/l	216.0
13	Suspended Solids(SS)	mg/l	7.82

Source: BUET Laboratory Test, 2004

Location: East of Rampura Regulator
GPS: 23 46'57" N 90 25'25" E
Sampling date: June 15, 2004

The water quality in EFAs varies dilution rainwater of effluent discharged from the neighbouring settlements. The general quality of water worse become during the dry season (4)

7.3 Human Activities and Economic Development and Impacts:

The socio-economic survey has been conducted in the study area at the household level to ascertain the socio-economic status of the people on the one hand and also access the impacts for human activities and economic development. The survey provides

information, productivity, vegetation and grazing fishing, wildlife, livestock, infrastructure and utilities services etc. The findings of the study area:

i. highest percentage of households of the study area is dependent on agriculture;

ii. some members of the households in the study areas are engaged in agriculture as their primary occupation and others are engaged in secondary occupation

Thus, creation of new employment opportunity will have positive effect on the socio-economic status of most of the people within the project boundary as well as, to some extent, on the adjacent areas.

For the information on health obtained through discussion with local people, the main conclusions are:

- Diarrhea and dysentery are the most common health problems for both children and adults
- Nutritional level in the area is moderate
- A good number of households use sanitary latrine, yet most latrines of the area are *katcha* and unhygienic

Almost all the households use tube well water for drinking purpose. Quality of tube well water is good in the area.

7.3.1 Agricultural productivity:

Generally *Boro* has been the dominant crop in the study area. Some divergences in cropping patterns in the different parts are found within this area. Low-lying areas have been cultivated for *Boro* rice. The survey findings indicate that *Boro* (HYV) production has decreased from 1990 to 2000 at most the unions. The following table shows the details.

Table 7.4: Boro (HYV) Production in the Study Area

Area in hectare and production in Ton

Study Area		Boro (HYV) Production in 1990 and 2000			
Sl. no.	Unions/Wards	1990		2000	
		Area	Production	Area	Production
1	Beraid	27.18	124.13	19.55	108.46
2	Satarkul	12.72	70.36	7.63	48.10
3	Demra	9.77	54.31	10.31	61 10
4	Joarshahara Ward no 75	2.00	10.28	0.67	4.11
5	Dakshin khan	2.00	7.61	0.80	4.28
6	Meradia Ward no.56	3.75	17 69	2.14	11 93
7	Badda/Ulon Ward no. 74	3.35	18 92	1.34	6.99

Source: Field Survey, 2002

The survey findings indicate the cultivable lands in most unions/wards have been squatted in the last five years, and still this process is continuing. Apparently, the landfilling activities on productive lands increase infrastructures both *katcha* and *pucca causing* the declining of the trend of production.

About 60 percent labour force of the study area is directly or indirectly engaged in farming activities. The landless household members sell their labour in farming or businesses or both as daily or weekly basis. Agricultural based income is small of the households in terms of total percentage of income.

7.3.2 Loss of vegetation:

The local farmers grow seasonal vegetables in most of the unions and wards within the study area. These are grown within and around the premises of the homestead where lands are flood-free and not used for cereals or legumes. It has been observed that the cultivatable land for vegetation has decreased due to sub-division of plots and construction of more houses, vegetable production has dropped as a result. Local women usually plant beans and other vegetables that climbs/fruit claim over the roof of

their huts and/or trees. The following table represents environmental impact on union levels.

Table7.5: Loss of Vegetation in the Study Area

Loss of Vegetation		Environmental Impacts				
		Unknown	Significance %			
Sl. No.	Union		None	Low	Medium	High
1	Beraid	0	0	48.28	31.03	20.69
2	Satarkul	0	25.00	41.67	0	33.33
3	Demra	0	0	100	0	0
4	Joarshahara Ward No. 75	0	0	0	100	0
5	Dakkhin Khan	0	0	100	0	0
6	Meradia Ward no. 56	0	0	0	100	0
7	Baddha / Ullon Ward 74	0	0	0	100	0

Source: Field Survey, 2002

7.3.3. Plantation:

Traditionally the households have plantation practices. The available lands within homestead and surrounding are used for seasonal plantation in the rainy season. Horticulture crops are planted during the winter when lands dry out. The study area abounds in

Photo Azadirachta Indica (Nim) at Joarshahara mouza [20.6.2003]

mango, litchi, guava, coconut and berries. There are also Mahogany trees. Medicinal plants are also seen in the areas. Akanda, Banyan trees, Paken and Bot (large shade providing trees) has been reduced. Their numbers are reducing due to urbanization

process. The loss of plantation has a negative impact on environment the areas as sometimes loss of plantation makes shortage of food, nutrition and medicine etc.

7.3.4 Grazing land:

The grazing lands of unions/wards namely Joarsahara, Dakkhin Khan, Meradia and Badda have been reduced through converging of grazing into housing projects. Because opportunities for the grazing lands has been squeezed up. Consequences for the reduction of grazing land the opportunities of expanding live-stock have become limited. As a result, it gives negative impact on household income. The following table shows the environmental impact at union level.

Table 7.6: Loss of Grazing Land in Study Area

Grazing Land		Environmental Impact				
		Unknown	Significance %			
Sl. No.	Union		None	Low	Medium	High
1	Beraid	0	31.03	44.83	24.14	0
2	Satarkul	0	0	41.67	58.33	0
3	Demra	0	14.29	85.71	0	0
4	Joarshahara Ward No. 75	0	0	100	0	0
5	Dakkhin Khan	0	100	0	0	0
6	Meradia Ward No. 56	0	0	100	0	0
7	Badda/Ullon Ward No. 74	0	0	100	0	0

Source: Field Survey, 2002

7.3.5 Mobility:

During the monsoon engine-driven country boat is the main for carrying transport people and goods (Photo 7.5 and 7.6). Landfilling activities have reduced and obstructed navigable waterways, thus reducing income of people whose income depends on plying boats. The existing road infrastructure in the study area is *kutcha* and semi-*pucca*. The motorized and non-motorized vehicles ply on these roads. The local *kutcha*

small using roads are by pedestrians. Most of the local roads are used in winter season but in any season the roads are inundated by flooding.

Table 7.7: Mobility People in Study Area.

Movement of People Restricted		Environmental Impacts				
		Unknown	Significance %			
Sl. no.	Union		None	Low	Medium	High
1	Beraid	0	69	31	0	0
2	Satarkul	0	75	25	0	0
3	Demra	0	100	0	0	0
4	Joarshahara Ward No. 75	0	100	0	0	0
5	Dakkhin Khan	0	100	0	0	0
6	Meradia Ward No. 56	0	0	100	0	0
7	Badda/Ulon Ward No. 74	0	0	100	0	0

Source: Socio-economic Survey, 2002

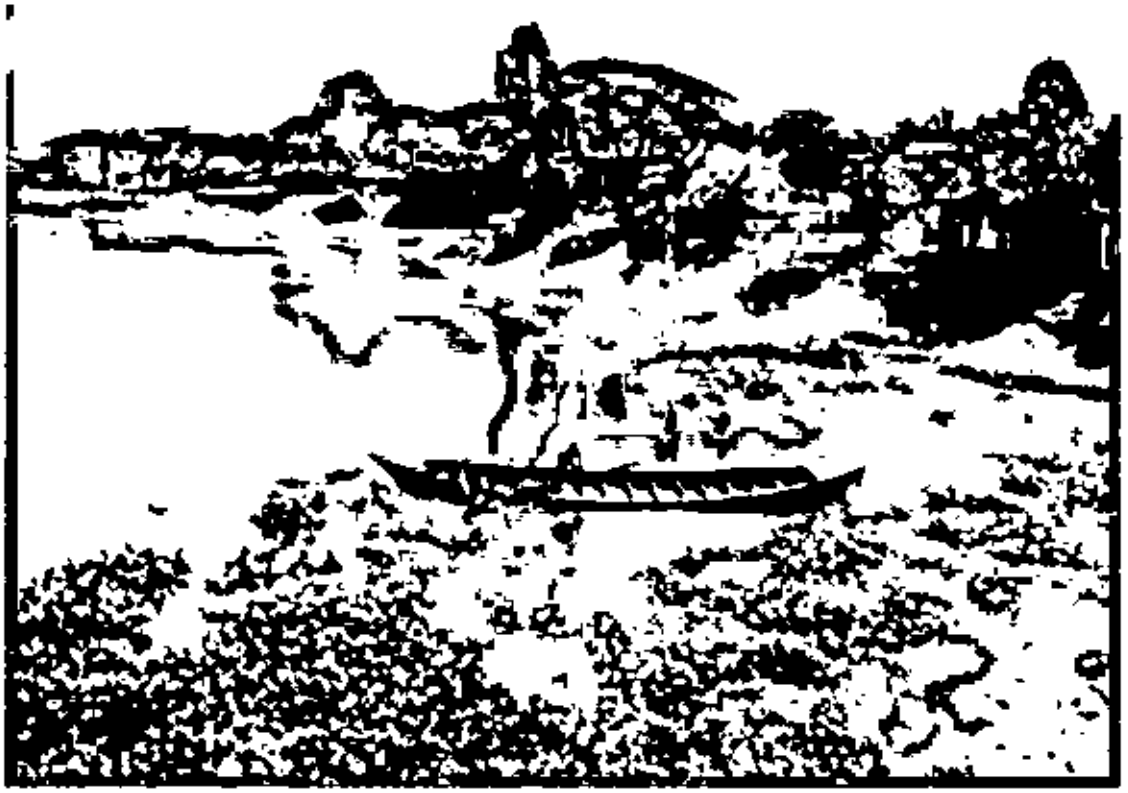


Photo: 7.5 Local boats plying at Satarkul mouza [15-04-2003]

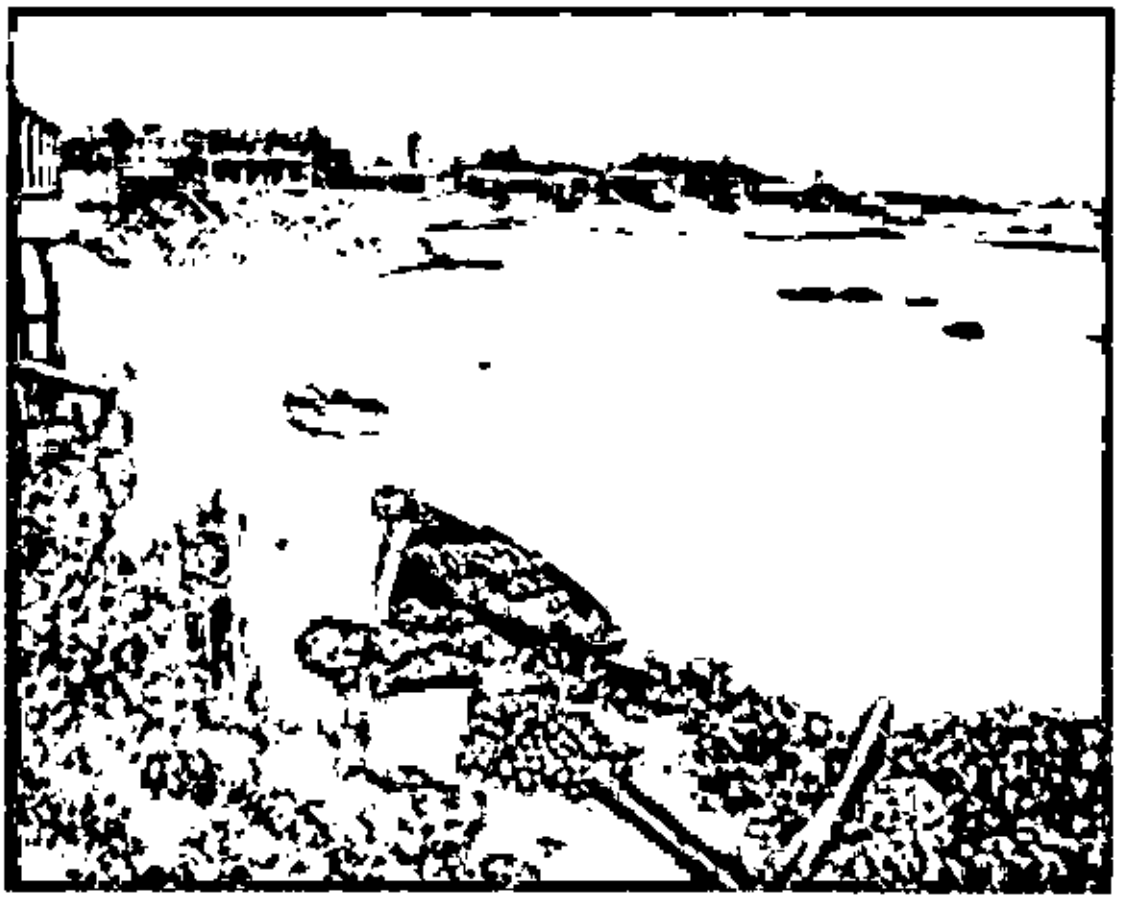


Photo 7.6 Local boat carrying goods at Satarkul mouza [15-04-2003]

7.4 Anticipated Environmental Impacts:

7.4.1 Soils:

A large amount of earth-filling materials are being used. The PLDC's contractors determine the source of these materials under their own arrangements and thus lead to:

- loss of agricultural land
- damage of land and landscape as a result of storage and dumping manilas
- Landscape may become disfigured due to the dumping effect
- rain erosion will develop rills and gullies, which will ultimately affect structural strength of the soil.

7.4.2 Seismology:

Seismic activity could have significant effect on structures on this filled-up land in the future. As such attention should be given to seismic effects in the final design of the total area and associated structures in future.

7.4.3 Surface water:

Landfilling activities obstructs the natural surface water of eastern fringe flow towards the Balu River in some areas. Unless adequate drainage is allowed impounding water accentuates and extends flooding. So there is a need to develop primary, secondary and tertiary drains with appropriate gradient. Existing planning practice have no scope of monitoring such activities and PLDCs.

7.4.4 Analysis of possible impacts:

The existing physical, biological and social conditions of the project areas are analyzed and also possible impacts are found out. All selected environmental components, conditions and possible impacts are summarized in Table 7.8.

Table 7.8: Summary of Present Conditions and Analysis of Possible Impacts

Sl. No.	Selected IECs	Present Condition	Possible Impacts
A	**Physical Environment**		
1.	Regional hydrological regime, flood pattern etc.	High flow regimes in and around the study area through the internal *khals*.	Adverse impact due to detrimental slow drainage of floodwater from study area. For natural fish-culture surface water will be reduced So adverse impact is likely.
2.	Natural flushing	There is existing provision	Negative impact due to landfilling is likely and reduction in drainage and water flow to reduce So it is negative impacts.
3.	Ground water table	Normal	Absence of water storage in the wetlands and *khals*, lower GWT is expected. So adverse impact is likely.
4.	Water quality	Normal– slightly turbid during monsoon season.	Water quality is likely to determinate in water bodies ponds, wetlands, *khals*. Water quality is expected to be better in monsoon season.
5.	Water logging and drainage	Moderate drainage during *Aman* and less water in the *khals* during *Boro* is detrimental.	Drainage will be further reduced and have further negative impact
6	Erosion and salinity	No erosion and salinity	May occur where land is not compacted properly and where canals have been damaged for landfilling. So small negative impact is likely.
7.	Soil characteristics/fertility	Normal	Absence of flooding will reduce fertility of land, and decrease agricultural production. On the other hand, the areas are being occupied for housing project. So, little impact is likely.
B	**Biological Environment**		
8.	Wetlands and aquatic habitat	More than 30% permanent aquatic habitat and some seasonal too.	All of the permanent wetlands will be converted into housing estates. So there will be negative impacts.
9.	Terrestrial habitat	Normal, cultivated lands, homesteads and vegetations.	Plantation will decrease. So likely negative impacts will start to come up.

Continued next page

10.	Natural fishery	Seasonal natural fishes are available in small in the study area.	Fish resources likely to decrease, so a negative change will start.
11.	Culture fish	Culture fish prevails to some extent.	Possibility of increased fish. So positive impact can be expected.
12.	Wildlife and biological diversity	General plants are available. Usual wildlife species exist.	General plants and tress are likely to decrease as increasing land are brought under housing projects. This is going to affect the animal species that are dependent on these trees.
13	Aquatic weed and hyacinth	Normal	Likely to be reduced for use as animal fodder, fertilizer, fuel etc.
C	**Social Environment**		
14	Land acquisition/land loss	Land is available for acquisition.	Land acquisition will be required for the project. So, significant impact is likely.
15.	Agricultural development	Present crop production is about 219 ton (only *Boro*)	Crop production will decrease to 75%.
16.	Waterways transport	People generally use waterway transport facility.	Reduction and obstruction of waterways to have adverse impacts socially and economically.
17	Employment scope	Locally employment scope is insufficient.	Scope of employment will increase. However, there will be little employment for local people, as they require substantial skills.
18	Health and nutrition	Health and nutrition level is moderate.	Health and nutrition level will be improved.
19.	Community impact	Farmer, day labor trader/businessmen etc.	More farmers will be out of job, opportunities for petty trader and businessmen likely to increase.
20.	Culture and heritage	Nothing of importance is there.	No change.
21.	Natural Environment and Aesthetic	Serene environment	Destruction due to land corrosion
22.	Temperature and Precipitation	Cool temperature and propitiation	Temperature is likely to rise as a result of increase in built-up area. Consequently there will be less precipitation. Microclimate way is experienced.

Sources: Adopted from various studies and field survey. 2002
Note: IECs: Important Environmental Components.

At the same time the evaluation s of the project impacts are also shown in Figure 7.9.

Table 7.9: Impacts Evaluation for the IEE

Sl. no.	Selected IECs	Relative impact					
		Unknown	Beneficial	No change	Adverse		
					Low	Medium	High
A	**Physical Environment**						
1	Regional hydrological regime, flood pattern, etc.					√	
2	Natural flushing						√
3	Ground water table				√		
4	Water quality						√
5	Water logging and drainage					√	
6	Erosion and siltation				√		
7	Soil characteristics and fertility				√		
B	**Biological Environment**						
1	Wetland and aquatic habitat					√	
2	Terrestrial habitat					√	
3	Natural fish						√
4	Culture fish		√				
5	Wildlife and biological diversity					√	
6	Unwanted aquatic weed and hyacinth				√		
C	**Social Environment**						
1	Land acquisition/land loss					√	
2	Agricultural development					√	
3	Waterways transport						√
4	Employment scope		√				
5	Health, nutrition, and disease					√	
6	Community impact				√		
7	Culture and heritage					√	

Notes and Reference

1. The main causes of water logging in the eastern fringe areas of Dhaka is due to blockage and squeezing of canals, channels in the east-west part of Dhaka and disruption of hydrologic link occurs in between the cannel and river. Choking up of *khals* due to accelerated situation are caused by the construction activities and disposal of domestic garbage, as a result, reduction of flow capacity of the *khal* etc. see Khan, N. I.. "Assessment of Water logging Conditions using Integrated GIS and Remote Sensing Technique (2001), A Study of Dhaka Mega City," *Oriental Geographer*, vol. 45, no. 2, pp 41-54, 2001.

2. Japan International Cooperation Agency JICA 1992, "Main Report Flood Action Plan 8A", chapter 7 pp 7-1, and 7-2.

3. BRTC and BUET (2004), Baseline study on "Techno-economic and environmental assessment of the proposed commercial development of low lands adjacent to Sonargoan Hotel and low-lying areas of Hatirjheel", Dhaka (Draft).

4. BRTC and BUET (2004), Feasibility Study on "Techno-economic and environmental assessment of the proposed commercial development of low lands adjacent to Sonargoan Hotel and preparation of preliminary development plan for the low lying areas between Tongi division road and Progati Sarani (Rampura bridge)", Dhaka (Draft).

CHAPTER 8: EXISTING MANAGEMENT OF THE EFAs

8.1 Introduction:

The present management practice of development agencies in the eastern fringe is not at all systemic. The existing acts/laws of different agencies remain, as management tools, which are not exercised properly in the areas. Overlapping of functions among the agencies creates conflicts in management and controls. This chapter analyses this issue and the management drawbacks of public sector. Coordination among the public agencies and their management system are ineffective because most agencies implement their programmes in their own way. The effective control in the EFAs is not possible due to the lack of coordination among the city development agencies. This situation encourage the PLDCs to implement their projects as they desire, as a result coordinated development is not taking place in this area.

There are several development policies and programmes (DMDP 1995-2015), acts/laws at city level for sustainable development. But law enforcement activities from the public sector and their performances are weak and ineffective It is observed that each agency/organization carries their programmes within their institutional framework. In the process, implementation of some functions is overlapped among the agencies (like RAJUK, DCC and Pourashava).

Under this scenario urban governance issue in the city areas emerged for better coordination among the development agencies. Resource mobilization, co-relation among the agencies and strength of public institutions are inadequate in this regard. The key responsibilities of the public sectors are to provide infrastructure services, to improve predicting and to lift the standard of living for urban residents, to regulate private activities, and to allow private sector to function efficiently in the urban areas. Effectiveness of urban government depends on a range of continual factors such as political commitment, social cohesion, economic heronry and skills and motivation of its policymakers and officials who serve them.

In management perspective of the EFAs, particularly private land development housing projects, physical land use, drainage, canal network and proposed embankment are analysed.

8.2 Development Activities and Management:

The private sector is widely engaged in land development of housing project through irregular earth filling. Other developments like road construction, utility services like electricity, gas, and water supplies are also taking place in the area. On the other hand, development agencies like the RAJUK, RHD, DWASA, LG, DoE and DCC are responsible for regulating development activities. The existing canals and channels are gradually being filled up as well as obstructed by road constructions; as a result the canal and channel networks are drying up. At the same time, the PLDCs are forcing drastic reduction in low-lying areas and wetlands by such unregulated land filling and encroachment activities without paying attention to their drainage network. Therefore, the scope becomes limited gradually to retain storm and flood water.

Every public agency involved in city development has development programmes for short, medium and long term and they are implementing those programmes in phases ignoring the programmes of other agencies. In the development process, coordination is very weak in the area of infrastructure development (road constructions and utilities installations etc). Overlapping and conflicting activities among the agencies are the most common phenomenon. To address these problems, a Coordination Committee was formed in the late 1990s headed by the then DCC Mayor and representatives from different agencies. This is an official mechanism for coordination in Dhaka City Corporation Ordinance.

Following a notification from the government in 1997, the DCC has a new and expanded body, Dhaka City Corporation Coordination Committee, for coordination among different city development agencies. The minister of the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) heads the Coordination Committee while the city mayor is its co-chairman and executive heads of 13 agencies are other members. The agencies are the RAJUK (Rajdhani Unnayan Kartripakkha), BWDB (Bangladesh Water Development Board), BRTA (Bangladesh Road Transport Authority), BTTB (Telegraph & Telephone Board), DESA (Dhaka Electric Supply Authority), PWD (Public Works Department) and PHD (Public Health Department), DMP (Dhaka Metropolitan Police), DWSA (Dhaka Water & Sewerage Authority), DSW (Department of Social Welfare), TGL (Titas Gas Limited) and Civil Surgeon, Dhaka District.

The Chief Executive Officer (CEO) of the corporation is the member secretary of the coordination committee. The previous committee mostly delivered technical advices while top office-bearers of technical agencies (delivery services) were the members of the new committee.

A drawback of this committee is that the DCC jurisdiction area does not cover the whole of the metropolitan area. Moreover, the jurisdiction of the RAJUK, DWASA and DoE are larger than the DCC area. As a result, the committee failed to perform its charter of duties and lasted for a short period. Later the government formed another committee headed by the LGRDC Minister, top executives of the different agencies or departments were also committee members. The committee again lasted for a brief period and its performance is not noteworthy.

Another monitoring committee on 'Good Governance' is currently working under the supervision of the principal secretary to the prime minister. The heads of different development organisations/agencies encompass this committee. This committee oversees the development programmes of the different organisations/agencies. The committee mainly looks into the construction of major roads, link roads, footpath, flyovers, underpasses, overpasses, parking and lake development, drainage, flood control and city beautification etc.

8.2.1. Private housing projects and management:

The housing activities of the PLDCs were discussed detail in Chapters 6. A number of private land development housing projects have been developed in the fringe areas. The locations of these projects are scattered. The management issues of the PLDCs are cumbersome and critical. PLDCs, Individuals, Cooperatives Housing Societies collect land adopting different technique like *baina* agreement, transfer by landowners, and encroachment on government lands. After paying a small amount of the total land price, the PLDCs start land development activities without completing the land registration process. On the other hand, the companies collect maximum amount of money against each plot as down payment in the first instalment. Subsequently these companies attempt to collect rest of the amount within a short period. The companies redouble their fund in this way and utilize the sum to develop the project areas by landfilling,

infrastructure development etc. The companies do not hand over plots and registration papers to their clients until full payments are made. The companies also occupy surrounding government *khas* land and the Court of Ward's land. They also draft forge land documents of absentee landlords with connivance of some land registration office staff. Under this circumstance, most landowners within the project area are deprived of the actual price of their lands. In this way, each company makes high profit, which is likely to be two to three times higher than the actual cost of the project.

To regulate these activities, there are a lot of ambiguities in traditional land records. On the contrary, the RAJUK has so far failed to manage the project area with the existing acts and laws. The existing laws are the Natural Water Body, Open Space, and Parks, Playground Protection law. 2000 and the Building Construction Act, 1952 (amended in 1987) which do not directly address to discernment earth-filling in low-lying areas (see Table 4.3). Moreover, recently introduced Private Land Development Housing Rules 2004 do not provide penal clause against unapproved housing companies.

In the EFAs, the RAJUK in 1987 has approved two projects, which are Abtabnagar and Bashundhara, but the projects are gradually being extended towards the eastern direction without any revised approval. Both companies have partially changed road network; location of service plots etc of the approved plans. In some areas, it is also found that the earmarked land for common facilities and services has been converted into residential plots/blocks for apartment/commercial/institutional plots. These converted plots are sold out at a high price. Meanwhile, a number of private universities, hospitals and schools have bought residential plots or blocks in these project areas.

In the process of approval there are several weaknesses, such as lack of absolute land ownership in favour of the respective development company, and inadequate infrastructure services. Political leaders and powerful elites influenced the RAJUK in obtaining approval for these land development projects. The Plot Owners Association is mainly interested about the welfare of project dwellers. They also observe how developers are implementing the project. If they find any deviation from the approved layout plan, the dwellers lodge complaints with the RAJUK against such activities. In management and control of the land use, RAJUK serves notices to the companies against deviation from the approved layout plan. In this case, the RAJUK has the right

to cancel such disputed approvals, but there is no specific law to check such malpractices. The RAJUK also refuses to approve building plans within the project area. It is noticed that without the proper land documents the litigation occurs during land registration and building plan approval.

The land uses of the eastern fringe areas are gradually changing by the continuous activities of PLDCs and their clients. The changes are usually of the following manner:

Table 8.1: Land use Changes in the Eastern Fringe Areas

Land use Categories	Land Area in 2000 (%)	Possible Conversion in 2015 (%)
Urban	31	85
Depression	36	10
Agriculture	33	5

Source: "Study on Impact of Land Use Change upon Storm Water Drainage and Wetlands in the eastern Part of Dhaka City" by Jahir Uddin Chowdury November, 2002

8.2.2 Management of canal and drainage network:

The canal network and drainage systems, discussed in previous chapters, are very important components in the EFAs. It includes road network, natural drainage system and retention ponds. From management perspective, the DWASA should deal with such activities.

Amid serious water logging that the capital city continues to experience due to heavy rains, a study is underway to prepare a master plan for the drainage system development of the metropolis. The DWASA, which is responsible for the maintenance of around 240 kilometers of drainage network in the city, has initiated the master plan with financial help from the World Bank.

Experts blamed lack of proper maintenance of drains for water-logging in the city. They say drainage system is in bad shape for various reasons like earth filling in the canals and uses of other natural wetlands as outlets of drainage of flood and rainwaters.

The DWASA maintains the main drains of the city and the DCC is responsible for maintaining surface drains in lanes and by-lanes covering at least 1,500 kilometers. The DCC has allocated Tk. 160 crore for maintenance of roads pavements and drains for

2005-2006 fiscal years. Informed circles also believe that absence of timely cleaning of drains by the DCC staff was responsible for creating water stagnation or floodwater in lanes and by-lanes of the city.

According to a survey, the city had 43 canals, most of which are under illegal occupation by a section of grabbers. But in a recent drive, the DWASA recovered 15 main canals from illegal occupants.

The work done by the DWASA to ensure smooth drainage network in the city includes construction of 36-metre box culverts at different road crossings, cleaning of 8.50 km of box culverts, installation of new pipelines covering 11 km and procurement of 60 new pumps to drain water from submerged areas. Officials said as part of the measures to ensure smooth flow of water drainage, 160 km have been cleaned up. Meanwhile, at least 70 percent areas of the city including Gulshan, Baridhara and Banani have no sewerage lines. Lack of funds had slowed down the implementation of the DWASA projects to expand and improve sewerage systems in the entire city.

In the eastern part of city, Beupar and Dumai khals in the north and Fakir and Gazaria canals in the south are the main discharge channels as well as Narali and Begunbari canals are also functioning as outlets for city waters. Earth-filling activities by the PLDCs have greatly reduced these canals and their branches. In fact, the whole EFAs are now under the threat of indiscriminate landfilling.

At present flooding regime in eastern Dhaka is completely dominated by the Balu River. There will be complete change in hydraulic condition when protection against flooding of this river and pumped drainage system for the internal storm runoff would be provided. Computer simulation results indicate that the storm runoff of the study area in fully urbanized situation in 2015 is likely to be more than double of the simulated value of 2000.

Analysis of the proposed drainage system indicates that there is scope for revising the channel dimension proposed by the JICA (1992). This, along with the preceding observation, calls for revision of final design of storm drainage in the eastern part of Dhaka City.

Allocation of five percent of every drainage sub-catchments as on-site detention reservoirs (reducing the area of detention reservoir at the site of pump station is to compensate for the total area allocated for local wetlands) in the computer simulation

results in substantial reduction of local peak flows 45 to 65 percent. Required area for drainage channels and detention reservoirs may not be available in eastern Dhaka if present uncontrolled land use activities continue. Inadequate channel section and elimination of local wetlands would cause severe drainage congestion as the simulation results demonstrate (Chowdhury 2002).

Local ponds and wetlands can be considered as reservoirs for storm water. The drainage process even at far upstream is influenced by backwater effect in the channel because of small bed slope. Every drainage sub-catchments for on-site detention reservoirs result in substantial reduction of local peak flows. In this simulation, the area of detention reservoir at the site of pump station has been reduced to compensate the total area allocated for local wetlands. Preservation of local wetlands is also helpful in reducing the dangerous consequences of reduced channel width or raised channel bed.

Presently, the study area is unprotected from flooding. To protect the area from further floods, the government is planning to construct an embankment in the area very soon. Once the embankment is built along the Balu River, it would trigger urban expansion process and the urban structures, and infrastructures would gradually encroach the floodplains due to reduced flood risk and safety of properties from severe flooding risk. But in Bangladesh, construction of dykes and embankments does not always guarantee flood-free area. On the other hand, embankments also generate problems like water logging. The western part of the city with its flood protection embankment is already exposed to such problems. Protection dykes were meaningless under the spell of a series of heavy rainfalls a few months ago.

If the present sprite of uncontrolled land development activities continues, it can be inferred from field observation that required area may not be available in the EFAs for drainage channels and detention reservoirs. Inadequate channel section and elimination of local wetlands would cause severe drainage congestion as the simulation results of the joint study by IWFM (Institute of Water and Flood Management), BUET, GGE (Department of Geology and Environment), University of Dhaka and IWMC (Institute of Water Modelling Centre) demonstrated. Such situation is experienced in the urbanized western part of Dhaka city.

It states that simulated peak runoff rates in the drainage channel are considerably smaller than the design values for the pumped drainage system proposed in the Drainage Master Plan, 1992 (JICA) (1). The conclusion of this study is also supported by a runoff measurement project carried out in the urbanised western part of Dhaka city during the 1996 and 1997 monsoons. Analysis of the proposed drainage system indicates that there is scope for revising the channel dimensions. These observations urgently called for a revision of the Design of Storm Drainage Plan for the EFAs (Chowdhury, 2002) (2).

The drainage plan, as proposed in FAP-8A 1992, covers flood mitigation proposals like restoration ponds, network of natural drainage (canals/channels) to ease water flow. Moreover, about 12.5 percent areas should be preserved for retention ponds for water storage. The lands, which are now floodplains, will no longer be inundated and most of those will be developed for urban uses. The cost of land development will reach to an enormous amount.

From the management perspective, the DWASA associated with the BWDB, LG, office of the DC, Dhaka, RAJUK and DoE are directly or indirectly responsible for making the area sustainable where canal and drainage must be active. Under this circumstance, some agencies feel their importance, but they do not take any action in this regard. At this stage, RAJUK alone is unable to protect the canals from landfilling activities. Moreover, the preservation of wetlands is not considered due to accurate demarcation of retention area on mouza map.

Now the question comes on the lands belonging to private owners. The existing canal flow is disrupted by local roads (funded by Food for Works Programme), which are blocking flow of such canals. The canals (indicated in mouza map) belong to government-owned *khas* lands, which are not identified in the field by the Office of Deputy Commissioner.

The DoE is also a counterpart agency in maintaining water quality and protection of land and air from pollution. The sources of pollution should be identified and proper measures should be taken. The whole lapse crops up due to several reasons. RAJUK, DWASA, DC office and DoE are taking isolated measures against the illegal activities. On the contrary, most of these agencies have resource constraints, shortage of technicalities and lack of cooperation and coordination among themselves.

8.2.3 Construction of embankment along the eastern periphery:

The FAP-8A, 1992 (JICA) study recommended for constructing embankment along the eastern periphery. The proposed alignment of embankment from Tongi to Kachpur Bridge along the westside of the Balu River with four pump stations and retention ponds (Figure 8.1) the basic purpose of the proposed embankment is to protect the eastern part of the city from annual flooding. In late 1980s, the government attempted to construct the eastern embankment- along the Balu Rive. but it was not materialize. Due to the 1987 flood. the government accelerated it work again to construct this embankment. This project will protect floodwater because most of the EFAs go under water in the wet season. The overflow of Balu and Sitalykkha Rivers and their surroundings and increased storm water are the main reason for flooding in the EFAs. Topographically, the eastern part of the city is low and settlement areas are isolated and on higher than the annual flood level (Table 5.1, Chapter 5). In the wet season, this area has been flooding for a long time and the areas turn into vast water bodies. In the lean season, the area is used for agricultural purposes.

It is noted that on 27 August. 1998 the Buriganga at Dhaka has hit the peak at 6.70 m/PWD. By the peak level, the flood of 1998 is the fourth in a record since 1910. The other floods and corresponding return period are shown in Table: 8. 2

Table 8.2: Flood in Dhaka from 1954–1998

Year	Station	Peak/Level (metre)	Return Period (Years)
1988	Dhaka	7.78	94.0
1955	Dhaka	7 09	31.5
1954	Dhaka	7.05	29.5
1998	Dhaka	6.70	13.5
1987	Dhaka	6 64	11.7

Source: M.A.Matin, article published in The Daily Star, 2002

The recorded rainfall, water level and flow velocity indicate that local rainfall runoff has no noticeable influence on the flood level. After the construction of the proposed embankment, there will be a complete change in hydraulic condition in the EFAs when

protection against the Balu River and pumped drainage of internal storm runoff would be essential. The storm water will runoff in fully urbanized situation. The proposed land level in the area appears inappropriate for check against flooding if gravity drainage is provided instead of pumped drainage system.

Due to flooding August-September, 2004, the goverument further accelerated the project to implement embankment along eastern periphery along the Balu River to project flood damage of settlements, infrastructures and resources. Loss of livestock and economic losses were enormous and uncountable in the previous floods. In this regard, the government is politically committed to construct although a huge fund will be required for this purpose.

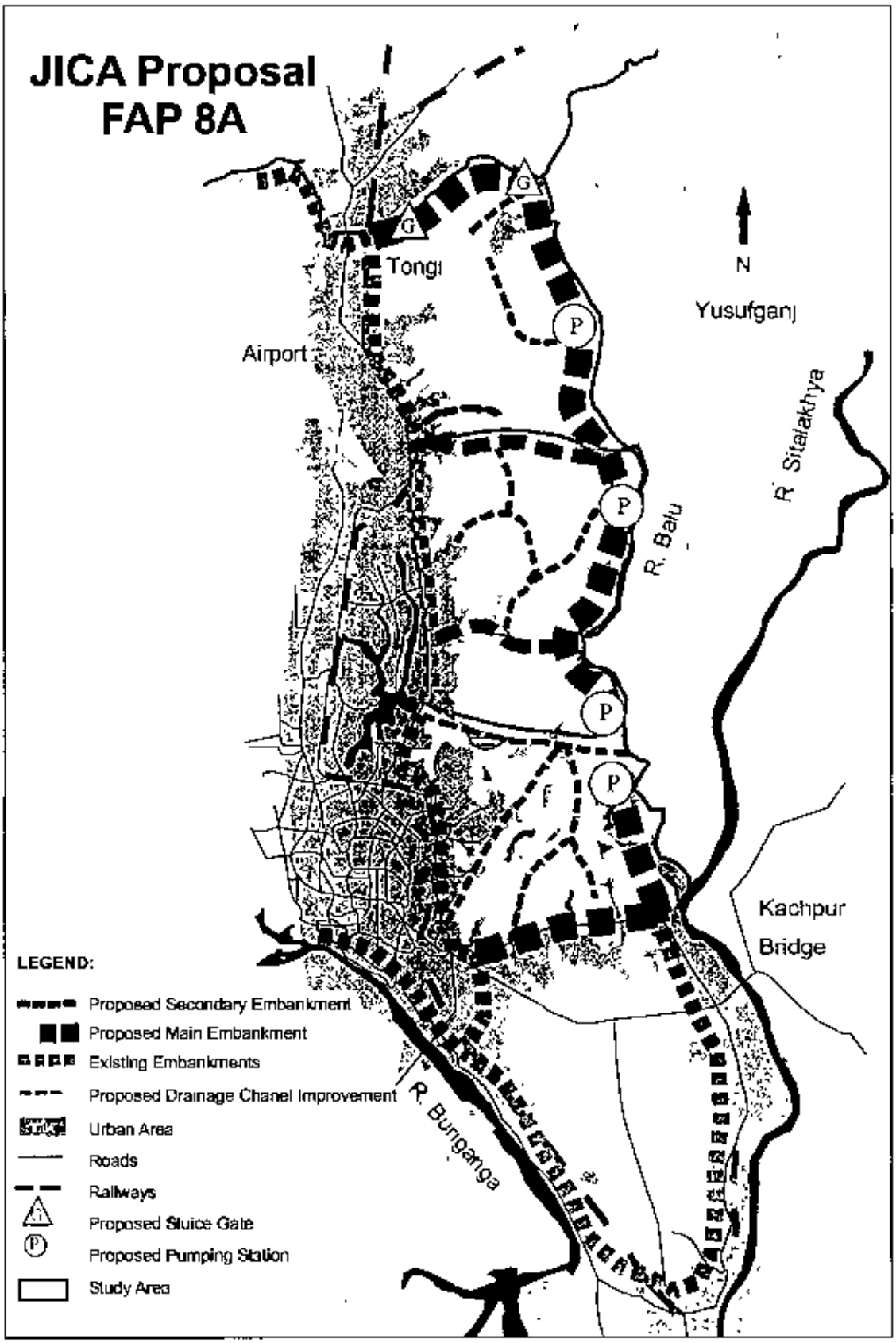


Figure: 8.1 Proposed Embankment in the Eastern Periphery
Source: FAP 8A, JICA, 1992

The World Bank (WB), Asian Development Bank (ADB), Japan International Cooperation Agency (JICA) and other donor agencies may likely provide funding. Line agencies will be involved in cost recovery, evaluation, and monitoring of the project with the guidelines by an agreement between the government and international development partners. In this regard they suggest forming a separate authority with local professionals and experts.

Implication of the Embankment:

The implications of the proposed Embankment will likely be: (i) urbanisation will accelerate within the protected areas therefore preparation of a pioneer plan with enforcement is essential before construction of the embankment. Otherwise, PLDCs, Cooperative Housing Companies and individuals will rapidly develop the area in an unplanned manner, (ii) after the construction of the embankment, if internal canals, wetlands and ecosystem are not properly maintained the whole drainage network will collapse and eco-system will be damaged, and (iii) large number of households will need rehabilitation or resettlement once the construction work begins (3). Consequently, the settlements will take place along the embankment and land use will change drastically. The prevailing resource potentialities will be damaged.

Management issues: The proposed eastern embankment project will cover several major components such as: (i) construction of embankment (ii) acquisition and resettlement (iii) internal drainage system, (iv) internal urbanisation, and (v) environment etc. According to the DMDP recommendation, DWASA, BWDP, RHD and RAJUK (DMDP 1995-2015) will work as the implementing agencies for the early completion of feasibility study, design, and full integration of necessary hydraulic work of the long-term flood protection and drainage strategy for the project. From the management perspective, the government may constitute an authority to take the responsibilities for the design and implementation of the project.

Alignment of Dhaka Eastern Bypass:

The development partners of the government are worried about fixation of the suitable alignment of the Dhaka Eastern Bypass. The World Bank engaged Hal crow Fox,

consulting firm, to fix alignment of the Eastern By-Pass and its implication. The consulting firm covered drainage, environment and resettlement issue of the eastern part of city. It has also justified the bypass because about 36,000 private cars, buses and trucks use Dhaka roads every day, and of these about 1,300 are trucks. The remainder starts or finishes their journeys inside Dhaka. Hal crow Fox has given four alignment options for the Dhaka Eastern Bypass (Figure 8 2 & 8.3):

Option 1: Starting from Naojuri on the Tangail Road and ending near Dogail on Dhaka-Chittagong Highway

Option 2: Starting from Naojuri on the Tangail Road and ending near Kachpur on the west side of the Balu River

Option 3: Starting from Naojuri on the Tangail Road ending near Kachpur on the east side of the Balu River; and.

Option 4: Starting from Naojuri on the Tangail Road crossing the Balu and Sitalakhaya Rivers and meeting Kachpur on Dhaka-Chittagong Highway

Option 5: Chosen Alignment is Option 1: Starting from Naojuri on the Tangail Road and ending near Dogail on Dhaka-Chittagong Highway. This option provides Two links, one at Kilkhet and another at Rampura to the existing network of Dhaka city road. It also meets National highway network near Joydevpur in north and near Kachpur.

The government is not yet finalized the alignment of Dhaka Eastern Bypass. On one side. it may play a positive role while it also has some negative impacts.

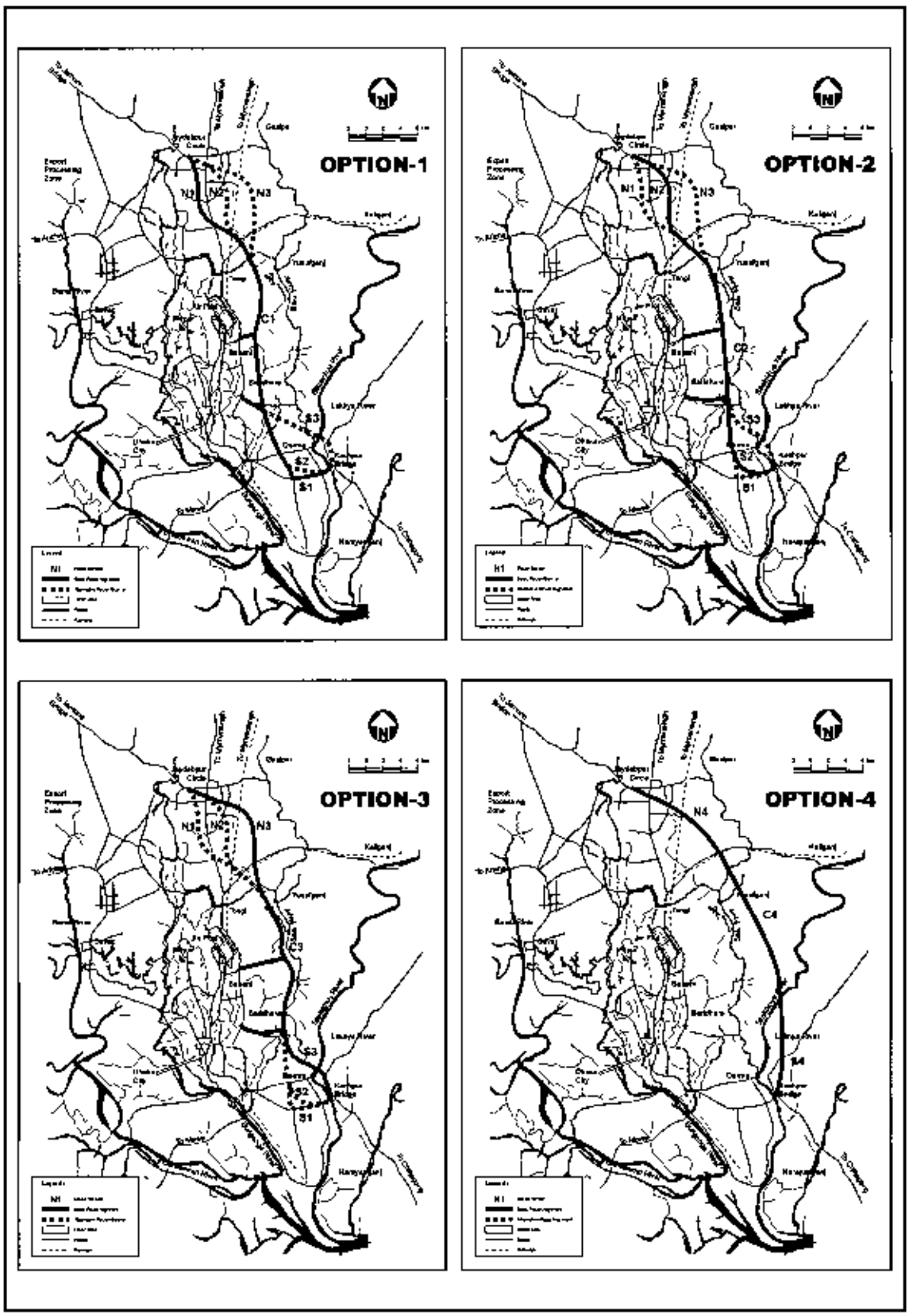


Figure: 8.2 Alignments of the Proposed Eastern Bypass:
Source: Dhaka Eastern Bypass Study, 1997/98, Halcrow Fox Consultant

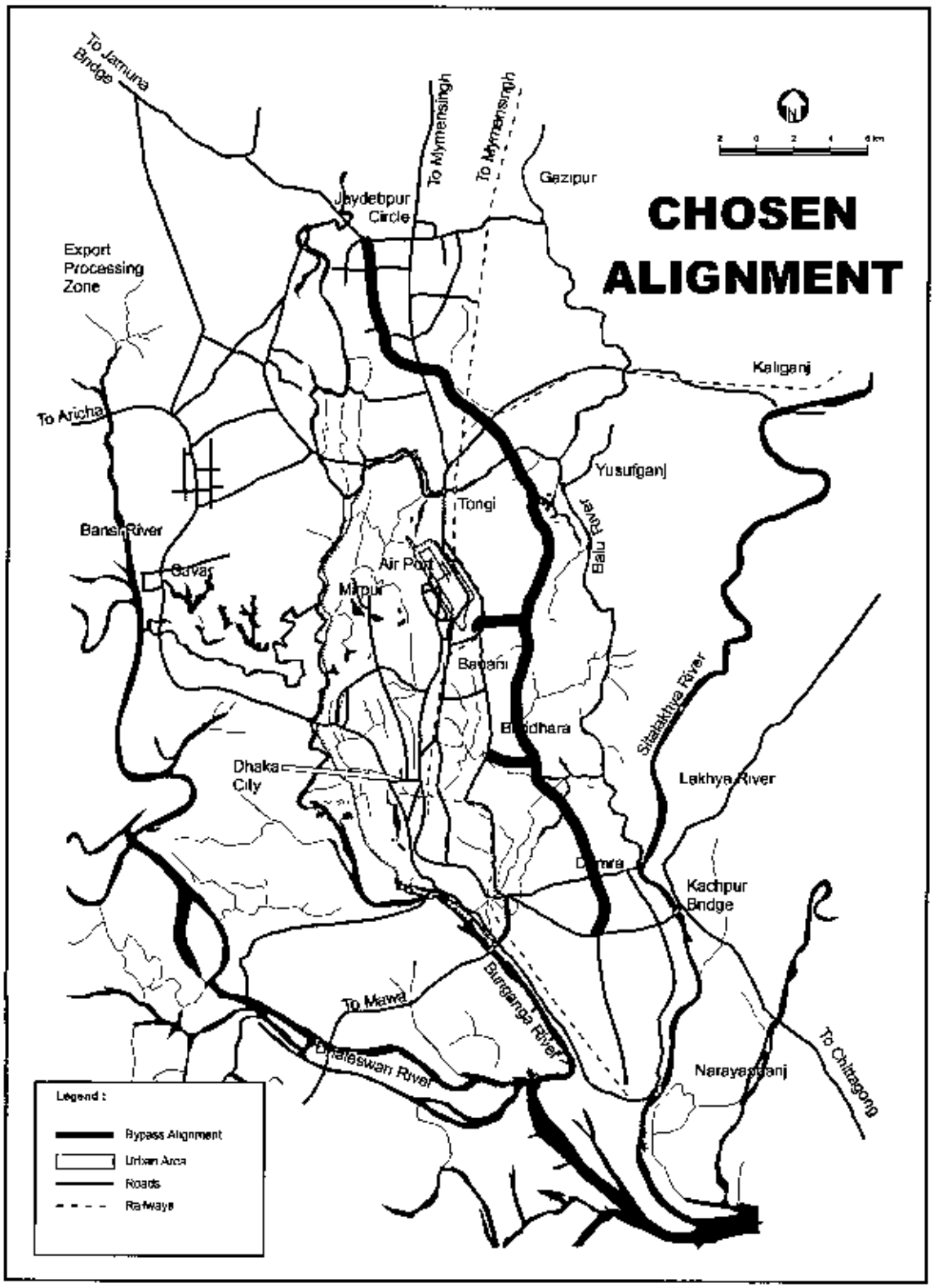


Figure: 8.3 Chosen Alignment of the Proposed Eastern Bypass:
Source: Dhaka Eastern Bypass Study, 1997/98, Halcrow Fox Consultant

8.3 Overlaps and Conflicts among Agencies:

The agencies concerned are in charge of making the development plan. They are also responsible for guiding the private development companies for project implementation control and monitoring. The RAJUK is responsible for planning, development and development control of the city areas. At the same time, the DCC can design plan within its jurisdiction areas. There is a major overlapping in functions. The DWASA holds the mandate to provide water supply, drainage and sewerage and the BWDB is liable to the management of rivers to control construction of embankments etc. The MoL and Office of the DC, Dhaka maintains land ownership documents including *khas* lands and the DoE is also responsible in maintaining pollution free water, air and land.

However, the present programmes and responsibilities of these agencies are not coordinated, and isolated, and therefore widely criticized. The overlapping and uncoordinated programmes among agencies occur frequently. In terms of responsibilities, local government construct local roads responding to the demands of local people under the supervision of local chairman/ward commissioner. The functions of the RAJUK, RHD and LG sometimes have overlap and conflict in road construction programmes. The DWASA and BWDB are responsible to ensure effective drainage system and flood control and hydraulic management, but they are paying less attention in saving the existing canal.

The MoL and DC office are aware of maintaining the records of land ownership, *khas* lands, acquisitioned and re-requisitioned lands of different agencies. These offices also hold the authority to lease-out *khas* lands and exchange deed with public companies or individuals. They are not encouraged in updating land records and due to shortage of manpower and absence of modern management system.

The DCC is not yet a part of the whole EFAs. Most of the areas are beyond their jurisdiction, excluding the sides along Progati Sarani. The municipal services have been limited in the areas. On the other hand, different agencies are unable to provide basic civic amenities in the EFAs.

The DoE looks into overall environment, land water and air. But the up-to-date information on water quality, ecosystem, and natural resources are not available to this organization. In both developing and developed countries, local governments are under severe stress from rapid urban changes either population growth or decline fiscal pressure. Due to growing demand for services, and increasing pollution, they often have neither the mandate nor the money or resource to cope up with their mounting problems. This is especially true in the developing countries where urban growth is most rapid and the governments tend to be under-funded and institutionally weak.

Community mobilization is by no means limited to cities in developing countries. It concludes by examining the vital role that cities must play in achieving the goals of sustainable development.

In contrast, many cities in developing countries are facing new pollution threats with weak institutional structures, inadequate budgets, backlogs in providing basic infrastructure, and the economies are less able to generate the needed capital.

However, as the number of these institutions grew, confusion over levels of authority, overlapping responsibilities, and vested political interests grew parallel. Metropolitan authorities construct large, expensive infrastructures and then transfer the management responsibility of those to separate institutes or organizations. The public and private sectors and their supporting acts/laws conflicting each other are presented in Figure 8.2.

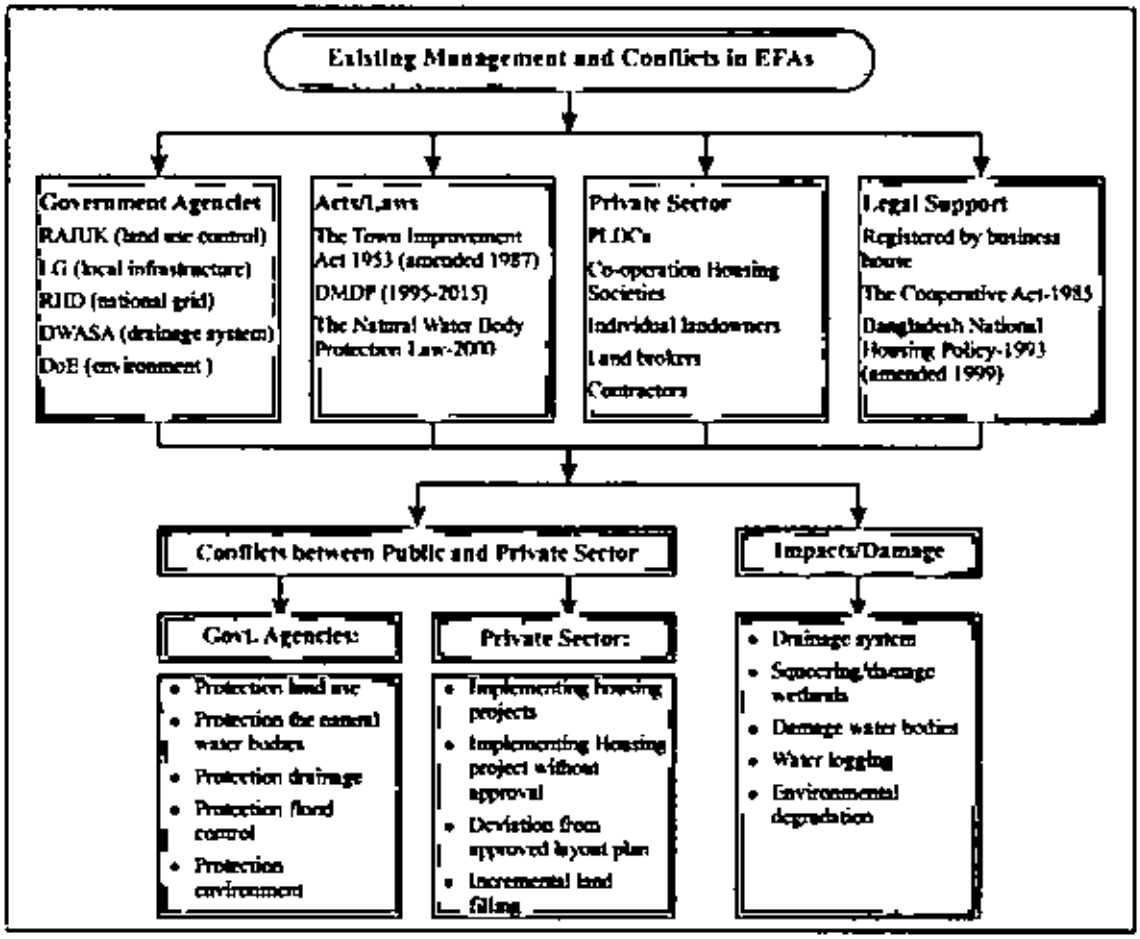


Figure 8.4: Existing Management and Conflicts in the EFAs

Weak institutional capacity undermines most governmental efforts to manage urban land effectively. This encompasses lack of expertise in environmental planning, management and inadequate financial resources. In many countries, there are many land management institutions that formulate plans and policies and make investments in urban lands.

The RAJUK, RHD, DWASA, BWDBD and DoE are responsible for protecting the EFAs from flooding and providing effective drainage network, and checking pollution for sustainable urban development.

The functions of different agencies, weaknesses in management, overlapping among agencies and conflicting in EFAs are summarised in Table 8.3. To execute these responsibilities, the agencies concerned should be strengthened to build their internal capacities like management structure, professional capacities, technical and logistics etc. In this matter, only 750 personnel have been working at the RAJUK since the last two

decades. Now this updated organogram is essential. We discussed only about the organisational structure of the RAJUK and its strengths and weaknesses.

It is primarily responsible for preparing the master plan. detailed area plan for Dhaka city including the eastern fringe, simultaneously it is empowered to control land use and all sorts of development activities.

Table 8.3: Functions of Different Agencies, Weaknesses in Management, Overlapping among Agencies and Conflicting in EFAs

Agencies/ Organizations	Specific Functions	Weaknesses in Management	Overlapping/ Conflicting Areas
RAJUK	Planning, development and development control of EFAs: -preparation of Detailed Area Plan (DAP) -land use control -planning permission -regulate private housing estates.	-Wetlands, retention ponds, deep low-lying areas are not yet earmarked on mouza map (scale: 1:3960); -During preparation of DAP identification and earmark of wetlands, retention ponds, deep low-lying areas will be completed	Due to absence of identification of cannels/ channels/ ponds and government *khas* land, RAJUK faces difficulties to prepare DAPs and issuing planning permission
Ministry of Land (MoL)	-MoL owns government land and maintains the records of *khas* and acquired lands of different agencies	Government *khas* land, e.g. *khals*/channels/ponds and agencies lands are not earmarked in the EFAs. This weakness encourages encroachment on government lands	Confusion surface while RAJUK and other agencies issue clearance and development permission to acquire land for development projects. Moreover the difficulties also rise for the housing permission to the PI.DCs.
DWASA	-Development, operation and maintenance of storm water drainage are to remove water logging; -Development, operation and maintenance of sewerage system and treatment etc.	-Maintain cannels/channels in EFAs; -Construction of treatment plan near EFAs -Concept of box-culvert is unsuitable in eastern part of the city and introduction of open canals/cannels should be encouraged	Permission of the DWASA creates conflicts with land use provision and infrastructure proposals of the DMDP.

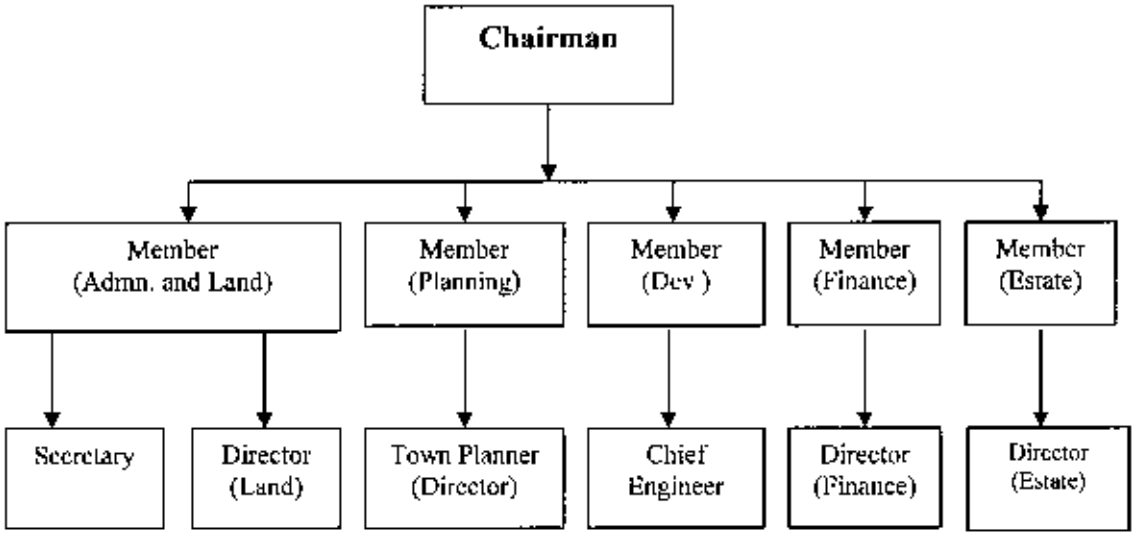
Continued next page

DCC	-Provision to draw up Master Plan of an area of city area within its jurisdiction, -Development, expansion and improvement (such as site development protection, expansion and restriction on low-lying areas.)	The DCC is mainly concerned at building up areas—part of Badda, Bhatara and Joarsahara mouzas	-DDC, *Pourashavas* construct road infrastructures where RAJUK programmes are not considered in most of cases
BWDB	-Construction of the proposed embankment along the Balu River. -Control of hydrology of the Balu River and surroundings. -Planning, implementation and management of water related projects, -Direction and flow of the rivers. -Embankment and flood control, - Coordination and implementation of National Water Management Plan with the WARPO.	The alignment of proposed embankment was fixed-up in 1987 and acquisition process started, but it was not materialized Meanwhile some studies have already been done and FAP, DMDP, Hal crow Fox and STP have some new proposals. The change in alignment is raised with respect to the physical, economical, social and environmental considerations. Now the question is raised which alignment should be final.	-Present situation creates a dilemma between the fixing of embankment alignment and how much lands are required for acquisition, -The question is raised about absence of coordination and harmony of land use, drainage and environment
DoE	Preparation of environmental plan, implementation, monitories, review and feedback	-The DoE is not carrying out its activities due to shortage of technical manpower and logistic support. -The PLDCs are often confused about environmental mitigation measures	The contribution of the public agencies such as canals excavation/re-excavation and construction of the proposed embankment. Development activities of private sector are not guided by environmental planning.

8.4 Management Structure and Functions of the RAJUK:

Before 1987, the organizational structure of former Dhaka Improvement Trust (now RAJUK) comprised a full-time chairman and 12 part-time trustees of the board. In 1987, it has replaced the structure by its present five full-time members (called Kartripakkha). All members are government officials. In this process, public representation in policymaking, planning and policy execution have been crossed out (4). These board members are chartered to execute responsibilities of the organization known as

Kartripakkha. The function of the members and directors are tangled, as their responsibilities are not yet clearly chartered.



It still follows 1984 Organogram, where 784 staff and employees were sanctioned. This was staff-based rather than technical manpower-based. The varieties of factors have contributed to long delay in implementing this proposal, initiating steps to bring the plan up-to-date and the failure to continue to exercise strategic planning functions. Shortage of planning staff with the necessary skills and experiences has been a factor. But over the years, the RAJUK management has preferred to prioritize its land development functions. The justification of the function is to fulfil profitability requirements of the organization's survival. Therefore, heavily preoccupied development strategies get priority rather than planning.

Professional capacities: While there is a role for generalist in the management of a parasitical, the composition of the board as a whole lacks professional orientation to its main mission of town planning and land development. Furthermore, the role of generalist full-time member does not fit well with that of the professional director of a department.

Representation: The board, being bureaucratic in composition, lacks representative character in terms of the community it is serving, which diminishes its accountability and hence its credibility and public support (4). The board does not bring in comprehensive measures from other agencies involved. About the previous representative board, allegations run high that it had poor attendance and lack of commitment to perform the duties.

Administrative weaknesses: The existing organizational setup in the RAJUK is weak in terms of plan preparation. development and development control. This organization is having poor technical manpower and logistic support. During recruitment procedures, the interview board was sometimes highly influenced by political personalities and influential elites of the society. In past, temporary appointment was made on master role work-charge basis as a result quality personnel got limited access to the city development organization.

RAJUK office in Dhaka centrally controls plan preparation and plan implementation. All manpower of the organization is working at the head office and it appears that they cannot carry out their functions effectively because of the need to travel long distances frequently.

This procedure is less effective for area-based plan preparation through surveying, feedback for plan correction and monitoring for plan implementation etc. The responsibilities of different sections within the organization are overlapped.

Technical support: The RAJUK has limited number of experienced technical professionals. Some technical professionals are diverse in different disciplines of the organization. At the same time, existing manpower is involved in day-to-day respective assignments. The existing RAJUK manpower is quite inadequate to oversee the in-field development of the city. To carry put these tasks properly more professionals, planners.

architects and engineers are needed. For better management and control of land use, the RAJUK should set up regional offices in different areas.

This organization lacks modern survey equipments, computers, GIS labs, MIS, soil and other material testing laboratories and research labs etc. Therefore, the present system fails to prepare plans and plan implementations significantly.

8.5 Development Components:

The existing land development housing projects need resource mobilisation, appropriate technology, cultural understanding of the community and public participation. But the ongoing housing projects are not supported by these components. Even they are not obtaining suggestion from others. The projects start with their own fund and adopt different traditional techniques to implement the projects.

8.5.1 Resources:

The RAJUK is a self-financed organization and its resource strength is very limited. The main revenue source of this organization comes from selling of residential, commercial and industrial plots. In addition, some other income generating options for the organization are collection of fees from building plan, selling of application form for clean building plan, etc.

The RAJUK is alone incapable of implementing projects in the EFAs, particularly eastern bypass, due to lack of experts and funds. In this case, mobilisation of funds from internal and external sources is essential. On the other hand, experts should be hired for this project.

8.5.2 Cultural understanding:

The location of projects is evidence of a cultural misunderstanding. A case in point where peripheral sites are identified conflicts with inner city employment opportunity and cultural distance. Where employment ability should have been improved by minimizing the housing and commuting expenses, the plan borrowed the idea from one culture and is adjusting them for another may not be appropriate at all. Building houses borrowed from one culture and adjusting them for another culture may not be

appropriate too. Building houses for the poor in the United Kingdom to solve housing problems does not assure it will work in poorer developing countries.

In terms of the fact that the EFAs are a predominantly rural character, traditional households are bonded with their own culture and attitude. Before the 1980s, the local communities had close attachment with social interactions. Due to urbanization process in the area, the cultural bondage became slackened. The established facts are intervention of the PLDCs housing in the eastern fringe, increase land value, areas identifying by migration particularly urban poor and so on. During the field survey, the information was elicited through discussion with household members, tenants, communities and general people.

The survey findings reveal that agricultural holding including homesteads are being sold to the PLDCs at high price. The funds are used to purchase homestead and agricultural land outside the areas where lands are available and cheep. If any money is leftover they spend the amount for children's education and marriage as other mischance purposes. If further money is left over, then they buy replacement agricultural land in low accessible parts of adjacent areas where land values are much lower.

Meanwhile, some housing projects have already started in the EFAs, Bashundhara, Banasri and Aftabnagar. The people living in the areas have mostly come from outside. The culture, behaviour and attitude are quite different from local people. In this case a cultural gap is remarkable.

The occupational pattern is changing quickly due to urbanisation. The available labour force in the area prefers them to be engaged in off-farm employment in the city areas as such opportunities garner high income. Most of them are engaged in business, trade, factories and offices and daily labour. Previously, their occupation was mainly farming and fishing. Generally, majority of the farmers have to supplement their incomes with off-farm work from selling vegetable as day labourers. In this process, the whole cultural behaviour and attitude is changing gradually.

8.5.3 Appropriate technology:

The planning framework is dependent upon the technical surveys required prior to construction and the capability of those charged with building it. The detailed provision

for the necessary surveys, which is an essential ingredient of the planning process, is prerequisite for undertaking such a venture.

The RAJUK deserves full technical supports like GIS and MIS labs; unfortunately which is unavailable at present. Now the RAJUK is trying to set up these modern equipments for proper planning and like GIS and MIS labs.

Complexities arise in incorporating technology into development projects. The first problem is to identify what constitutes technology, and in the EFAs technology slipped through different routes. Expatriate consultants, local planners, and engineers trained abroad sought solutions with a high technical content rather than an indigenous one. One could compromise accepting 'intermediate technology', which is probably the second best.

Given the experience of Bangladesh in successfully incorporating a number of flood control projects, there is no reason to believe that the same could not be used to protect the EFAs from flooding. The planning framework was established to ensure successful completion of such a structure.

8.5.4 Public participation:

Public participation is a widely acceptable phenomenon in the process of plan preparation, implementation, monitoring and management. This participation may be created either though direct or indirect chosen representatives. In the project based no consultation was ignored before both the public and private sectors. In case of eastern fringe area, the PLDCs have undertaken lots of projects without consultation with the community, local leaders, elites and locals. Even most projects are expanding without prior approval from the RAJUK. On the other hand, the RAJUK does not consult with other agencies as well as community people and local leaders during approvals of any land development project. However, the major concerns in the area are private housing projects, canal networks and drainages, road networks and flood protection embankment along the Balu River. The public sector has been executing management work of these levels. To regulate these activities, public sector is directly or indirectly responsible to look into the activities. This chapter also deals with the private housing projects,

drainage and embankment and responsibilities and management performance by the government agencies (like RAJUK, DWASA, BWDB, DCC, DoE and others).

To obtain necessary information. public meeting is probably the best method where all point of views can be shared. But the danger is when community leaders, who are self-appointed, express their views that are untypical of those of the rest of the community.

The project would have a different fate if full and open consultation with the residents were done throughout the planning process. The following responses to whether the design priorities of the planners could have been altered: whether the residents reacted positively to the financial implications of the project or what proposals might they have to make to reduce the cost to the levels they could afford.

Fund constraints, inappropriate project plan execution and lack of monitoring are responsible for the failure of the projects. The government agencies particularly the RAJUK, LG, RHD, DWASA, BWDB, DoE, should perform their respective role in controlling and managing the EFAs.

Notes and Reference

1. Japan International Cooperation Agency (1992), "Drainage Master Plan has been prepared on drainage zone of Dhaka. It includes eastern part of city. DND and Narayangonj and surrounding areas. The Master Plan comprises storm water drain, canal network, retention ponds, flood control and pumping stations etc, Dhaka.

2 Chowdhury, J. Uddin., *et al.*, (2002), " Impacts of Land Use Change upon Storm Water Drainage and Wetlands in Eastern Part of Dhaka City" in 2002 Seminar on Integration of Wetlands in Storm Drainage Management: An Opportunities for Eastern Dhaka City.

3. Halcrow Fox Consultants (1997), "Dhaka Eastern Bypass Study", the World Bank project, Dhaka.

4. Pasteur, David (1994), A Report on Institutional Management of Dhaka Metropolitan Area under DMDP project, Dhaka.

5. Choguill, Charles L. (1987):, *New Communities for Urban Squatters*, Plenum Press, and London.

CHAPTER 9: COMPREHENSIVE PLAN: GUIDELINES FOR SUSTAINABLE DEVELOPMENT AND MANAGEMENT

9.1 Introduction

To accommodate the growing population of Dhaka, the need for serviced residential lands is increasing everyday. In view of liveable environment, the physical infrastructure, utility services and civic amenities related to the area have been ignored. All aspects were discussed in the previous chapters in this research. However, this chapter attempts to provide a comprehensive planning guideline based on information analysis where physical, flood management and drainage, environmental and management components are incorporated. In the process of research the problems found in the study area are synthesised below:

Problem 1: The PLDCs purchase lands from individual landowners and occupy government *khas* lands and lands of different agencies for housing projects and land speculation. In the process of collection, individual landowners are compelled to sell their lands to these companies at their quoted price. The PLDcs are grabbing unprotected *khas* lands surrounding their projects area. In this process, the companies become landlords and use the lands for housing projects.

Problem 2: The EFAs are now considered as a moneymaking market place for these actors. The actors are mainly PLDCs, cooperatives housing societies, landowners, land brokers, land speculators and expatriate Bangladeshis. The attitude of the actor is to obtain money from their project areas. In the EFAs the actors have adopted the techniques of operating their businesses; as a result land value in these areas is increasing. The landowners are being encouraged to sell their lands at a higher price, and in this way they are becoming landless both from their homesteads and agricultural lands.

Problems 3: The EFAs are physically low with one or more excellent canal networks; moreover, some low-lying areas including wetlands, ponds and ditches are available for water storage. The random land filling activities by the PLDCs is damaging wetlands

and water reserves; therefore it provides severe impacts on the productivity of agriculture and fisheries.

Problems 4: The effectiveness of drainage networks is gradually being reduced, which creates water logging. Meanwhile private companies have already filled up and occupied some canals. Due to such activities and construction of local roads, the runoff of storm water is obstructed. The local government under Food for Work Programme constructs the local roads. The local road construction activities also accelerate the obstruction on smooth water flow.

Problems 5: The EFAs are continuously turning into urban uses and this process is accelerated due to the proposed embankment (Bypass) along the Balu River. At this stage most of the actors are active in holding barren lands for future housing projects and land speculation purposes. The land value in the area is rising sharply for such activities.

Problems 6: The EFAs are surrounded by industrial, residential and mixed land uses. A huge quantity of solid waste is generated from the areas and more than 30 percent of the garbage is thrown at the nearest water bodies, *khals* and ditches. Moreover, the generated liquid waste of domestic and industrial effluents of Tejgoan Industrial Area is discharged into Begunbari Khal that later flow into the EFAs. As a result, the flora and fauna and natural species are gradually disappearing and the areas are becoming ecologically imbalanced.

Problems 7: The changing land uses of the EFAs continue due to urbanization and urban land development activities. The areas are densifying through new settlements (residential and others). It gives negative impacts on the physical and socio-economic resources. Analysing the image of 1990, 1996 and 2000, it is clearly indicated that the agriculture lands are reducing and the scenario is changing.

Problems 8: The development agencies concerned are responsible for controlling the fringe areas by enforcing existing acts/laws. Present legislatives have some loopholes, which lead to overlaps and conflicts in the development process. Moreover, these are inadequate to take steps against illegal earth-filling activities in the low-lying areas. To

address the problems, a new law regarding illegal land filling should be framed and it is also essential to revise the existing acts/laws with panel section.

- **Implications of the problems:**

The implications of the above mentioned problems are frequent water logging in the city and its surroundings, flood risk, depletion of natural and biological resources. The water storage areas for storm water and flood are reducing gradually by earth filling, as a result flood risk and temperature of the area is gradually rising. We can also say that the ongoing activities lead to changing land use. As a result, the people of the area have to pay off its impacts.

On the other hand, in the area's irregular and unplanned growth are the constraints for sustainable development process. The network drainage and preservation of wetlands are most important for better environment. Moreover, the changing land uses of the study areas increase land, water and air pollutions, therefore, the environmental risks are associated with land use and land management. To address the problems, a comprehensive plan is essential comprising the physical, drainage and environmental aspects.

Responding to the growing demand of housing blocks in the city, the PLDCs are establishing housing projects in the peripheral low areas. The EFAs are now a potential location for present and future housing and urban development programmes. The PLDCs and cooperative housing companies and other actors legally or illegally occupy lands and try to establish their rights in the areas. To understand this scenario, some studies and planning programmes were carried out in these areas. These are as follows:

FAP (JICA), 1992 Study: This study addressed the problem of inundation of the capital city by recurring floods and recommended an embankment around the capital city. The eastern part is planned to be built under the FAP 8A along the Balu River, which is around five to seven kilometres east off the city (1).

Halcrow Fox Study: In 1997-98 a study was undertaken to examine the practically of constructing the road and potentiality of funding it through private sector. The study

also looked into the drainage, land use, resettlement and environment situation of the proposed Eastern Bypass. The study, however, considered four alignments (see chapter 8) and recommended alignment 1, which is a 39 km road along the eastern edge of Dhaka city from Kanchpur to Tongi since it can generate intra-city traffic as well as be used as a bypass road (2).

After the 1998 flood, the government felt the need for an embankment and extended scope of the Halcrow Fox study to incorporate provision of a flood embankment. The government preferred alignment 3 of the study, which is a flood embankment-cum-road along the Balu River around five to seven kilometres east of Dhaka city, with the bypass road on the top of it (Dhaka Integrated Flood Embankment-cum-Bypass Road). The donor agencies soon concluded that the government might finance this project as it does not yield any significant financial returns. But the project could not attract development partners or donors.

DMDP 1995-2015: The DMDP shows the EFAs as an urban fringe; but the areas can be built up as new urban area if the proposed embankment is constructed. The plan also recommended making a Detailed Area Plan keeping the infrastructure drainage networks and retention areas as planned. The plan also recommended that the indicated geological fault conditions need further analysis. Moreover, the existing housing projects (like Bashundhara and Abtabnagar) need urgent review to adhere those to water management (3).

Dhaka East City Development Conceptual and Contractual Framework (2002): Infrastructure Investment Facilitation Centre (IIFC) has proposed Dhaka East City development recognizing if potentially high land enhancement and property development concept can be combined with other projects. High land enhancement and property development concept can be combined with other projects. It can dramatically improve their viability and financial abilities. At the same time, it can create a modern and planned city starting from the east edge of Dhaka city to the Balu River. This city can ease traffic congestion, air pollution and unplanned growth of the present city. The development options of the IIFC were: (i) full city development, which allows capturing the land enhancement value and planned land use of the entire area; (ii) limited city

development to the extent of the land with value enhancement sufficient to realize the bypass and flood embankment (4).

The key advantages are avoiding huge financial requirement for land acquisition, land value enhancements, more acceptability from social and legal point of view. According to the recommendations, landowners and the government equitable shares in the land value enhancement. On the other hand, if most of the landowners opt not to participate in government-funded requirements, acquisition can be increased to an indefinite amount.

Study on Impacts of Land Use Change upon Storm Water Drainage and Wetlands in Eastern Part of Dhaka City (2002):

The IWFM (BUET), DGE (Department of Geography and Environment, DU) and IWM jointly carried out a study was in the north part of the eastern edge of Dhaka. The study also mapped the southern part of the area up to Begunbari Khal and recommended to preserve local wetlands and natural *khals* for drainage channels. institutional arrangement for regular measurement of storm runoff from the drainage. This study also suggested that management of land use activities should be integrated with storm water drainage management plan. In addition, the land use plan and alignment of main internal roads should be such that maximum utilization of existing topographic advantage can be taken in the drainage master plan. Integrated approach to urban development was also recommended in the study report. This study, however, did not incorporate all components of urbanization (5).

Reviewing these proposals and research findings, the following recommendations/ proposals was put forward for planned development in the EFAs. In this case, a comprehensive development approach would be essential to make the area sustainable.

9.2 Comprehensive Plan Guidelines:

A comprehensive plan for the EFAs is essential comprising the physical plan, drainage and flood control measures, environment plan and management proposal in respect of the research objective. Figure 9.1.

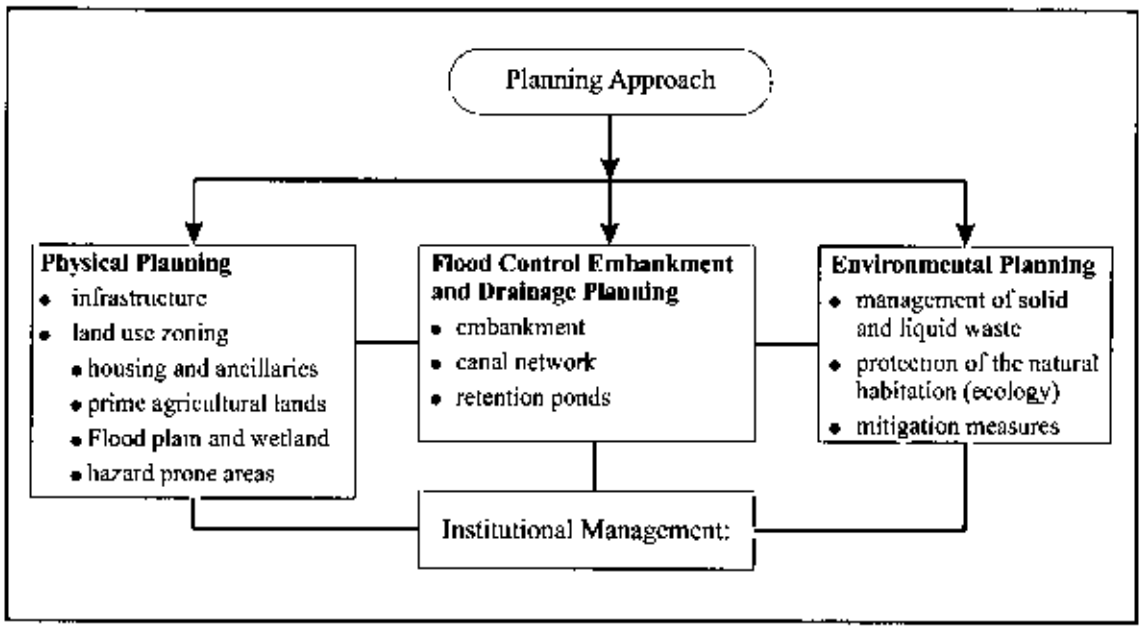


Figure 9.1 Comprehensive Plan Guidelines

Flood Control and Drainage Planning: The eastern embankment will be built along the west bank of the Balu River to protect eastern part of the city from floodwaters. A total pumping capacity of 180.5 m3/s with required volume retention pond area of 157.91 sqkm has been estimated for the protection of entire eastern Dhaka. In the study area, the pumping capacity of 107.70 m3/s with required volume retention areas. (FAP, JICA, 1992).

The drainage system is a very important component in the EFAs. Within the available canals and channels in the surrounding areas of the study areas are using as outlets. The depressed lands (wetlands) are mainly used as water storage areas. In the early discussion, the land filling/land development activities by the PLDCs and road construction and their effects on drainage system were reviewed. This section proposes the problems of drainage system in the area.

Environmental Planning in the EFAs: The study area, in particular, is sensitive from the environmental point of view because part of this low-lying area serves as a very important drainage channel. Storm run-off as well as wastewater generated within a wide area around the project site flows through the project area. In this study, the IEE was carried-out and the impacts on ecological, physio-chemical, economic and human related parameters were assessed. Then assessment primarily focuses on hydrology and flood, natural flushing water, wetlands and aquatic habitat, terrestrial habitat, fishery, employment and health etc. This planning also includes management of generated liquid and solid wastes within and surrounding the project areas.

9.2.1 Physical planning:

The physical planning of the study area should be guided by the topography, land level, cannel network and proposed embankment. The physical plan comprises infrastructure (roads and services) land use provision (zoning), housing and ancillaries and density control. The proposed new urban areas should be ensured during the DAP. The existing built up housing will be adjusted on the basis of the Private Land Development Housing Rules 2004.

Land Use Zoning (Guidelines):

The physical planning of the EFAs comprises setting of appropriate land uses and land distribution based on physical development. The physical plan (land uses) of the area is the part of comprehensive urban plan The plan would be broadly guided by planning principles for future growth using the instrument to regulate land uses. The growth is determined based on the existing topography, settlements, and critical environmental factors. These are wetlands, geology and soil hazard prone areas. (natural fault) canals network and retention ponds etc. The board land use zoning of this study area is recommended based on the analysis of the various aspects (6).

- **Housing and ancillaries zoning:**

Housing zone in the EFAs should be determined based on geomorphology, land level and soil condition. Moreover, the major environmental factors should be considered to make the area sustainable. It is discussed that the EFAs are being gradually converted into private housing without any consideration for physical constraint. However, housing zone would be restricted where land is unsuitable for the environment. Moreover, drainage channels, existing settlements, natural canals and physical infrastructures should be considered in housing zone. The existing and ongoing land development projects within the study area should essentially re-examine the prevailing situation and incorporate in the housing zones.

- **Agriculture zoning:**

An analysis of the EFAs shows that about 70 percent land of the area is used for agricultural purposes seasonally. The survey report reveals that agricultural lands are mainly found in Berail, Satarkul and Demra union. In the urbanization process it is the most difficult part to keep land free for agricultural purpose within the proposed area.

However, the measures of discouraging urban sprawl in prime agricultural lands or promoting the orderly conversion of agricultural land to urban use were made (DMDP). Exclusive zoning is necessary in the eastern fringe to preserve certain agricultural land for production for urban areas. The comparatively low-lying areas may be brought under multi-use forms like agriculture in lean season and retention pond in wet season. This approach provides food supply in the city areas at a lower price at the same time the areas could be used as open space (7).

- **Flood plain and wetlands zoning:**

Flood plain zone should cover the hydrological areas subject to seasonal flooding. The EFAs (before construction of the embankment) should be controlled in order to avoid obstruction to flood flow, which might otherwise result in adverse hydraulic effects. After the construction of flood embankment, the internal management of flood would be controlled and preserved wetlands, installation of pumping station etc.

The wetland zoning is the most common instrument for regulating land use The proposed retention areas would be considered and preserved as wetlands, which have been tentatively earmarked in FAP 8A (1992). About 12.5 percent land should be kept free for retention. Adequate measures should be taken to prevent such areas from urbanization. Understanding the importance of existing wetlands, it is necessary to protect all sorts of development activities. The buffer zones will be helpful to insulate wetlands as well as water quality from any adverse impacts from surrounding areas. The buffer zone of wetlands should be used for land use. The Natural Water Body, Open Space, Playground and Park Protection Law, 2000 and other relevant acts should be applied to protect the low-lying areas.

- **Hazard-Prone areas zoning:**

According to geophysical records, Rampura Fault on Begunbari-Jurain Khal makes the area vulnerable for massive urbanisation, particularly construction of high-rise buildings. Therefore, compatible land use on such hazard prone areas may be allowed. This could be used as park or open space, and such necessary management controls can be undertaken (8).

- **Road infrastructure:**

This road infrastructure should follow the Integrated Transport Network 1995-2015 (see Map 3 1). It should be considered as a broad network and the internal network will be determined during the DAPs (DMDP). In this plan, land use and road network should match, and need to ensure traffic circulation with pedestrians and parking facilities. The utility agencies concerned will provide the required services to develop the areas in a planned manner.

9.2.2 Flood management and drainage:

9.2.2.1 The embankment:

The construction of the embankment along the Balu River (Tongi Bridge to Kachpur Bridge) has been proposed in the FAP 8A Project (JICA 1992) and DMDP (1995-2015). The main embankment should be constructed in between Tongi and Demra to manage floodwaters in the Balu and Lakhya Rivers. It will expend to Tangail Road in the northern part and in the southern part it will connect Chittagong Highway at Kachpur Bridge. Flood management in the EFAs is another important factor in overall planning.

According to the Master Plan for Greater Dhaka Flood Protection Project (JICA 1992), eastern embankment along the Balu River is to be constructed for protection of eastern Dhaka from external flood from pumping station with a total capacity of 180.5 m3/s is to be constructed along the embankment to keep eastern part of city free from internal flooding. With the accordance to a major flood in 2004, the need for constructing the eastern embankment as part of eastern bypass project has gained considerable attention and priority. The proposed alignment of embankment follows along the Balu River and the height of the embankment and floodwall stands at 8.80 metres.

9.2.2.2 Drainage network:

The Master Plan of drainage in the eastern part will protect an area of 118.62 sqkm of which 46.61 sqkm is in the study area (FAP 1992, JICA). The drainage network in the EFAs is connected to upward and downward areas and their surroundings. It is a natural drainage linkage connecting *khals,* internal channels and rivers. However, the detailed proposals have been made in the following.

- **Compartmentalized development:**

All formal developments should contribute to the off-site retention ponds or include a reservoir of for retention purposes. The imminent development of the eastern embankment may push forward the need for compartmentalization in the EFAs. The retention areas consisting ponds and interconnected khals have to be timely preserved and should result in review of approved developments such as the eastern housing project. The drainage area of 166.36 sqkm covers the entire drainage by natural channels/*khals* in Greater Dhaka East (9).

The Greater Dhaka East Dhaka was proposed to be divided into four drainage compartments as summarized below and shown in Map no.9.1

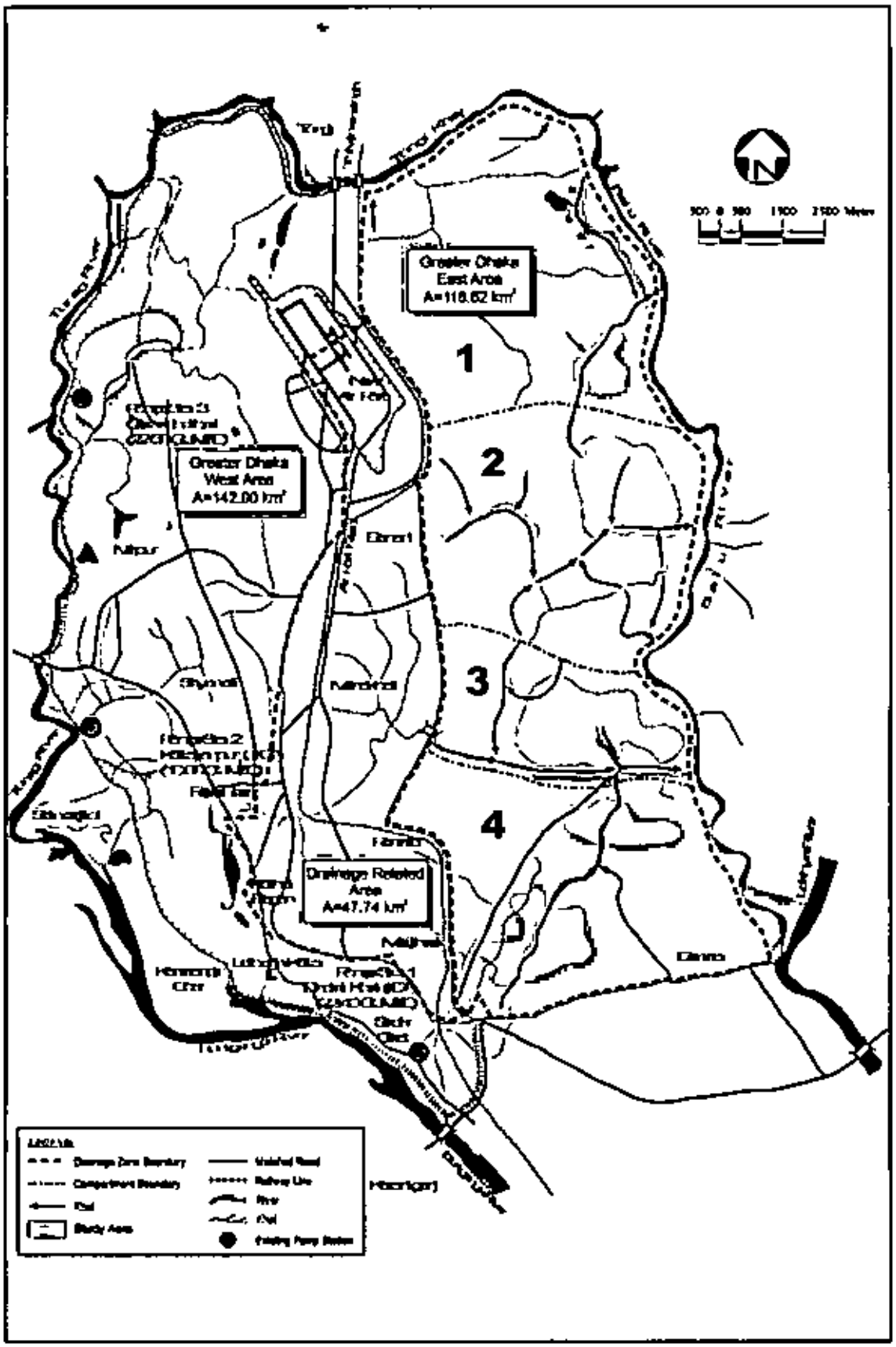
Table 9.1: Compartmentalized Development:

Name of Compartment	Greater Dhaka East (sqkm)	Study Area (sqkm)	Khals	Drainage Area (sqkm)
1 Northern Compartment	40.69		Boalia and Nali khals	30.56
2 Central Compartment	32.04	32.04	Jamair Khal	47.88
3. Southern Compartment	14 57	14.57	Begunbari Khal, Gulshan and Banani Khals	46 58
4. Southern Compartment	31.32		Sequnbagicha Khal, Geram Khal	41 34
Total	118 62	46.61		166 36

Source: FAP-8A-1992

a. Canal maintenance:

The importance of a canal network in the EFAs is enormous for drainage purpose. The EFAs are low-lying areas and subject to periodic flooding from local rainfall and backflow from the Balu River. The proposed canal network will be effective to discharge water into the retention ponds and Balu River. The existing canals should be maintained properly and kept free from all sorts of development otherwise internal flooding within the protected areas would ensue (after construction of the proposed embankment). All canals should be used as collector of water into retention ponds or river, Map no 9.1.



Map 9.1 The Proposed Drainage Compartments and Canal Network in Eastern Fringe Area, Dhaka
Source: FAP-8A, JICA, 1992

b. Retention Ponds:

Flood retention ponds are an important part of the flood protection project. The ponds will reduce the intensity of local floods within the protected area and reduce pumping requirements.

The present land use within the flood retention ponds has been affected due to land-filling activities. The majority of land for this purpose is privately owned and are in agricultural use. Various options are available to maintain and control the land for flood retention ponds, and to maintain as water reservoirs. The proposed retention ponds have been shown in Map 9.2 covering about 12.5 percent (582 hectare of the study area) land in the study area. Moreover, the canals and their likes also serve for retention purposes. The options may be implemented in the whole area for its development without compulsory acquisition programme (10)

Option A: Compulsory acquisition by the authority of the complete retention pond areas. This was presumed to be the intent in the original design of the Flood Action Programme, however, it is understood that actual implementation of land acquisition is a difficult task as large areas are needed (incorporating many parcels of land) and huge investment is involved.

Option B: Enacting land use or zoning restrictions to prevent land-filling and land development would adversely affect the function of the land to act as a retention pond. This would result in restricting landowners for using their lands. A significant number of the land parcels are under private ownership and consequently landowners could rightly claim some compensation for loss of land use, presently agricultural uses. However, as with the Option A, even the costs of partial compensation would require a large amount of money that is also too high for the government to bear alone.

Option C: Land swap option could be considered whereby equivalent (government) value land in other city areas could be offered to the land owners as an incentive to resettle, leaving the retention pond area for governmental use, which could then be converted into some appropriate use (recreational or productive uses).

Option D: An engineering solution could reduce the required area and/or its costs. For example, since the retention pond is based on having a certain storage volume available, the net area of retention pond could be reduced if the same volume is maintained by

excavating within the pond area between set elevations. However, estimates show that this option is not very effective due to the relatively flat nature of the land involved.

Another method could be applied to increase pumping capacities; retention ponds act on the principle of greater retention (by retention ponds) of the storm water flow to reduce pumping requirements. However, preliminary estimates suggest that there is a very little to gain from this option and that the pond size and pump capacity have already been fairly optimised.

Option E: The land-filling activities could be protected through implementing the Natural Water Body, Open Space, Playground and Park Protection Law, 2000. A scheme of land use conversion to other uses, such as fish cultivation, are agreed and supported by the owners collectively.

Fishponds could be constructed with a limitation on the top water level corresponding to the retention pond low-level of the storage. Moreover, additional issues arise such as whether fish cultivation is indeed feasible and practical from the point of view of water quality. It is an economically attractive option since there is a ready market for fish and fish products in Dhaka. If water quality is an important criterion, then a number of further options exist, such as:

- imposing a requirement for treatment of wastewater flows within the embankment compartment
- if full sewerage (i.e. separate form storm water drainage system) is impractical then schemes based on interceptor drains can be considered whereby the sanitation waste flows can be combined with the storm water into a combined drainage system, but the wastewaters can be diverted by systems of overflows and be treated separately.

Option F: A do-nothing approach would effectively mean that individual landowners would be at the mercy of local flooding and drainage problems. During the wet season, the lands in retention pond area would be almost permanently under water to varying depths and for certain periods of time. This would rule out stable agricultural use for half of the year. This could be proved socially unacceptable, even though the present lands within the retention pond areas are subject to flooding for some parts of the year.

9.2.3 Environmental Management Plan:

The prime objectives of Environmental Management Plan are to protect natural water bodies, ecological habitation, drainage, canal network, wetland and environmental resources. The impacts of physical, biological and social environment parameters are assessed through Initial Environmental Examination (IEE) (see Chapter 7). The subjective assessment has been made in this research. However, in the Environmental Plan, the general recommendations and mitigation measures are put forward to improve the environmental conditions, these are:

i. Immediate actions are needed from the DWASA for disconnection of domestic sewer lines to the existing storm sewers and facilitating construction of properly designed septic tank at residential and surrounding areas,

ii. The storm sewers discharging into the low-lying areas of waterwheel also carry domestic sewage from the surrounding residential areas. The industrial effluents from Tejgaon Industrial Area are also discharged into the study area through Begunbari Khal. Management of the water quality would be a major challenge in the overall development planning of the EbAs. Adequate measures should be taken to stop discharge of domestic and industrial wastewater into the area. Such measures may include establishment of combined sewage treatment plant for both domestic and industrial wastewater and gradually connecting domestic wastewater line from the storm sewer line Detailed design of the Combined Sewer Overflow (CSO) and the twin sewer diversion line should be undertaken by the DWASA (11)

iii. The liquid and solid waste generated in the proposed urbanized areas at present and future need management plan and implementation of the plan must be ensured.

iv. A monitoring system for identification of possible pollution sources and to assess water quality of the canals and wetlands. According to the requirement treatment to be taken up;

The significant environmental impacts have been shown in the Tables of Chapter 7. The corresponding mitigation measures to minimize adverse impacts and enhance positive (beneficial) impacts are presented in Table 9.2.

Table 9.2: Mitigation Measures

Significant Impact Issue	Type of Impact		Mitigation Measures
	Beneficial	Adverse	
Regional hydrological regime, flood pattern, etc.		√	Regular/annual re-excavation/maintenance of canals *(khals)*
Natural flushing		√	Excavate primary, secondary and tertiary canals *(khals)* periodically
Ground water table		√	Preserve open water bodies, retention ponds
Water logging and drainage		√	Regular re-excavations of canals *(khals)* place CC Blocks for erosion control
Erosion and siltation		√	Regular/annual re-excavation/ maintenance of canals *(khals)*
Wetland and aquatic habitat		√	Preserve dry season water bodies
Terrestrial habitat		√	Encourage plantation
Natural fishery		√	Enhance culture fishery
Culture fishery	√		Ensure funding support to expand culture fishery
Employment scope	√		Engage local people for infrastructure development
Health, nutrition, and disease	√		Expansion of urban health service through institutional coordination
Community impacts	√		Enhance employment generation

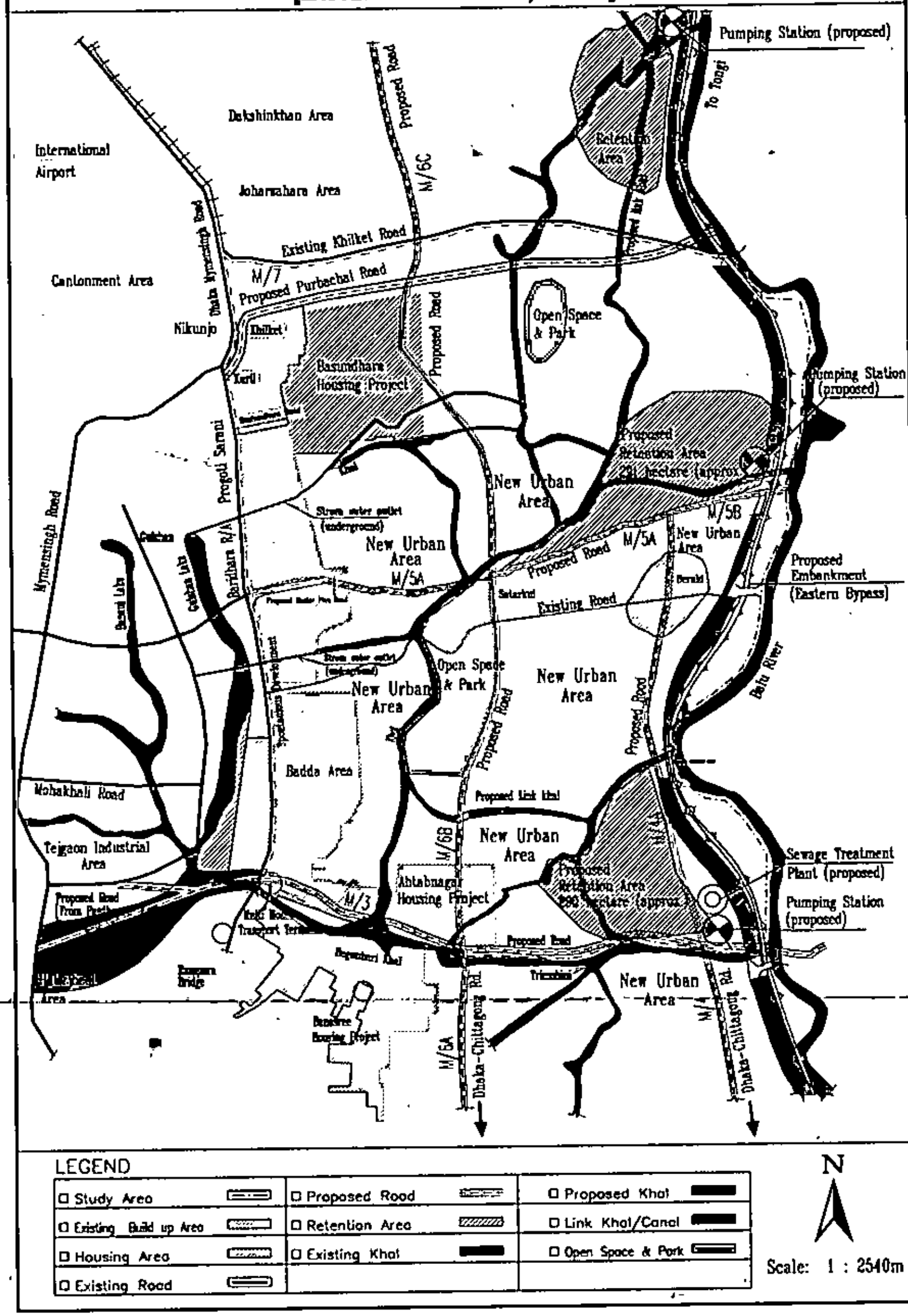
Source. Survey findings and concern with relevant documents

9.2.4 Environmental monitoring:

The research apparently reveals that the study area would have no remarkable negative effect on environment of the area if mitigation and monitoring programmes were carried out with coordinated institutional support. The canals and wetlands should also be regularly monitored to protect them from encroachment, congestion or water logging. Adequate operation and maintenance of the CSO structure built for diversion of domestic wastewater must be ensured. The water quality of canals and wetlands, retention ponds should be regularly monitored. Traffic movement in and around the future urbanized areas (EFAs) should be monitored so that appropriate traffic control measures could be undertaken to ease traffic tailbacks on major roads. At the same time, air quality and noise level should be regularly monitored in and around of study area.

CONCEPTUAL PLAN

COMPREHENSIVE PLAN OF THE STUDY AREA [EASTERN FRINGE AREA, DHAKA]



Map 9.2 Comprehensive Plan of the Study Area (Eastern Fringe, Dhaka)

9.3 Plan Implementation:

The recommended Comprehensive Plan could be implemented through the public sector by compulsory land acquisition. On the other hand, implementation programme may be undertaken through partnership programme among the public and private sectors. The implementation process is presented in Figure 9.2. Both the options have a lot of merits and demerits. These issues have been discussed in the following sections.

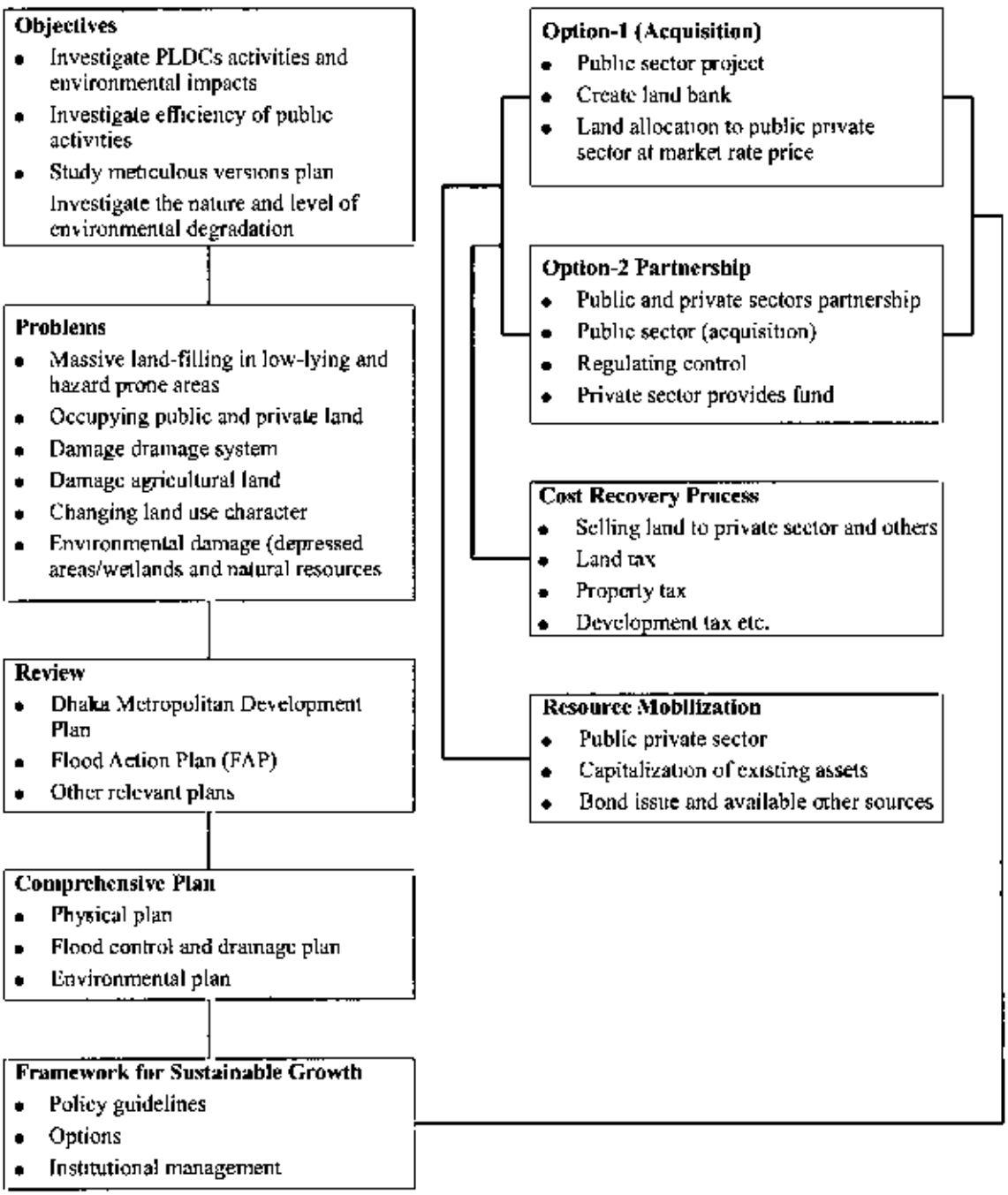


Figure 9.2: Plan Implementation Process for Sustainable Development

9.3.1 Option–1: Compulsory acquisition:

The compulsory land acquisition programme may be executed for future urban development in the EFAs. This programme is useful for developing serviced lands for housing and other urban uses. At this stage, many opportunities prevail in the EFAs. They are: (i) the area is low-lying and almost all part of the area is free from settlements (ii) land price is comparatively low, therefore acquisition cost will be less (iii) maximum litigation regarding land issue may be possible to avoid and (iv) a huge quantum of government *khas* and land of the Court of Wards and also lands of absentee landlords are available.

9.3.1.1. Land bank:

A land bank can be created to undertake land acquisition activities to fulfil advanced land requirements for both public ad private sectors. The purpose of acquisition is to develop the areas in a planned and sustainable way. In this case, the government earns revenue through buying land at a lower value and selling it at higher price. On the other hand, the land management could be easier and desired land use can be achieved.

Land banking usually requires a single agency with considerable powers to raise capital, acquire land quickly, coordinate with other government agencies, regulate a larger land portfolio and dispose of land at the most favourable time. In this case, the authority concerned can play this role, but within the existing framework it is very difficult to handle the task properly. In this case, the RAJUK may be strengthened in terms of organizational restructuring, increased efficient manpower and revised organizational functions etc. (12).

9.3.1.2. Land distribution:

It will be possible for the authorities concerned to distribute lands to the public and private sectors for housing or other urban uses. In this regard, the land distribution policy would be framed supported by existing laws and policies of the government. In this case, the land use must be conformity to the Comprehensive Master Plan. The

allotted lands (parcel/block) must be developed with adequate infrastructure. In the process, the land acquisition and development cost will be compensated.

9.3.2. Option 2: Public and private partnership:

Government policy encourages the private sector, particularly in housing sector and enhancing housing stocks. The partnerships could take several forms. In this case, the government acquires land (e.g compulsory purchase) and then makes blocks under the Comprehensive Plan. The private sector will be responsible for constructing infrastructure and services. The government will retain the power to allocate blocks to private sectors. An important advantage of this approach is that the private resources can be mobilized for up-front infrastructure provision. The main disadvantage is the government has limited resources to purchase land. The need for clear legislation is essential for both parties in the management process.

b. Public sector may be responsible for:

- Public sector may pool land through compulsory land acquisition
- Properly maintain land records and land schedule
- A comprehensive plan has to be prepared by the public sector comprising physical, drainage and environmental components
- Planning standard and norms to be follow during the plan preparation
- Responsibilities for land allocation and land management through Management Information System (MIS).

9.3.3. Critical issues:

i. The compulsory land acquisition has a lot of critical issues. It is an effective tool but requires a rigorous approach to the definition of what land is to be the subject of an order, fair market price, valuation and trust between the government and landowners concerning compensation procedures. In the acquisition process, the land price is determined based on present selling

government price. It is generally declared in Sub-Register's Office (SRO) and it reveals that the government assessment is usually lower than the actual market price. Therefore, landowners are partially deprived in this acquisition process. On the other hand, the issue of resettlement of the affected arises which is a very gigantic task.

ii. Public land acquisition by voluntary sale of private land to public agencies is in theory, the most efficient and equitable method of acquisition, but it creates a number of constraints. On the sellers' side, the appeal of selling to the public sector are often limited, with suspicions that the process will be slow and bureaucratic, that arguments will arise over prices and that there is higher risk of liability to taxes. On the buyer's side, it is normal for the public body to make proposals public in order to minimize corruption. Such disclosure requirements have a tendency to inflate prices and/or encourage owners to hold on to their land speculating higher prices. In the case of the buoyant land market of Dhaka, the landowner certainly is much more likely to sell lands to a private sector buyer.

iii. The land holding by the urban fringe landowners is worsened by the widespread land speculation activity that amplifies land prices and storage of land. The present land speculation activity can be conferred through compulsory land acquisition Under this process, all sorts of lands that is physically and economically ripe for urban development.

iv. A huge portion of the EFAs is government-owned *khas* land occupied by ponds, *khals* and river indicated in the mouza map. PLDCs and individuals also encroach some portion of the *khas* land. During the acquisition process, it will be difficult to procure and bring under control such lands.

v. Meanwhile, some housing projects have already been established in the area, which are again very difficult to bring under acquisition. In this case, arbitration may grow between the government and private development companies. In some cases, the government has leased out *khas* lands and also made *biana* agreement with some companies.

vi. From Bangladesh's experience, it has been proven that more acquisition creates more landless population. If the whole areas were acquired for planned development, the question will be raised to rehabilitate the affected households It is a gigantic task to resettle the affected households and determine the volume of lands needed for the rehabilitation programme. All these issues create litigation and may likely draw legal battles in the courts and eventually delay the project work.

9.4. Revised Act/Laws:

The loopholes/weaknesses of the existing acts/laws are pinpointed in Chapter 4, Table 4.3. To address such loopholes the revision/modification change has been proposed in Table 9.3.

Private sector to be responsible for:

- Private sector will provide fund for land acquisition under certain terms and conditions.
- Private sector fund will be utilized in constructing all infrastructure indicated in the plan (road, embankment and bridge/culvert).

Privileges for private sector:

- Public sector will allocate adequate lands (blocks) to private sector for specific project adjusted with their involved fund;
- Private sector will be allowed to sell plots to their clients at market price
- Private sector may get privileges of tax holidays for certain period
- Private sector may get easy access to commercial bank, leasing companies and financial institutions for loan facilities with support from the public sector.

Table: 9.3 Revisions and Modification of Acts and Laws

Sl. No.	Provision of Acts/Laws	Weakness/Loopholes	Proposed Revisions
1	The Town Improvement Act 1953 (amended 1987) provides that no compensation shall payable to any person owing to the restricted use to which his land may be put under sections 73 and 74.	RAJUK is empowered to prepare master plan of Dhaka under section73 and 74 of the Town Improvement Acts 1953 (amended 1987) indicating land uses. The provision of the act is that no compensation shall payable to any person owing to the restricted use to which his land may be put under above sections. The enforcement for ensuring prescribed land use as per the master plan has become weak because of such lands is privately owned.	Under this section, revision can be made in the following in public interest: "The restricted areas in the master plan can be requisition or acquisition by the city development authority with compensation (under government provision). In this case, phase-wise acquisition may allow to continue at fixed rate is determined at the period of requisition and it will complete with certain period." Alternatively the provision can be made in the following way: "The private land that owners may allow to use the land within certain restriction but it will not be in contrast with land use in development plan (master plan)
2.	The Building Construction Act 1952 (amended 1987) provides power for the prevention of haphazard construction of buildings/structures and excavation of tanks and cutting of hills, which are likely to interfere with the planning of certain areas.	This act does not cover the landfill activities; therefore RAJUK can not exercise the power of the act to stop haphazard landfill activities in the low-lying areas	The Building Construction Act 1952 (amended 1987) should be amended in definition and inserting "land filling" should be enacted in its defimition. The landfilling means natural water bodies; pond, lake and low-lying areas identified master plan, which are restricted for development. The definition should be "whereas it is expatiated to provide for the prevention of hazard construction of building, excavation of tanks, land filling and cutting of hills which are likely to infer the planning of certain areas in Bangladesh
3.	The Dhaka City Corporation Ordinance 1983 (modified 1992) Section 108. Master Plan-The Corporation may, and if so required by the government shall, draw up a Master Plan for the city which shall among other matters provided for- Sub-section (c) restriction, regulation and prohibitions to be imposed with regard to the development of sites, and the erection and re-erection of buildings within the city.	Dhaka City Corporation (DCC) is empowered to prepare master plan under this act This is overlapping with The Town Improvement Acts 1953 (amended 1987) under section 73 and 74. The eastern fringe areas of Dhaka are beyond the boundary of DCC. Presently, the area is controlled by district administration. Therefore, the provisions of restrictions, regulation and prohibitions indicated the Dhaka City Corporation Ordinance 1983 (modified 1992) couldn't be imposed over the areas.	To avoid overlapping activities among RAJUK and City Corporation Ordinance and Pourashava Ordinance should be amended in the way. i. Master Plan preparation under section 108 of The Dhaka City Corporation Ordinance 1983 (modified 1992) should be deleted from section 108. ii. The DCC Ordinance 1983 (modified 1992) should be amend deleting approval and control of unauthorized construction of building The approval of building plan and its control should under The Building Construction Act. The exercise of the BC Act should include Cantonment and Pourahsava areas. Accordingly Ordinance of Pourashavas and Cantonment Board should be revised

Continued next page

4	The Natural Water body, Open space, Park/ Playground Protection Law 2000 The identified river, khal, bill, lake, natural water body and flood flow and sub-flood zones in the master plan must be protected. These areas must be published through gazette notification. The character of the areas cannot be changed to project environment.	Declaration of the natural water bodies, the low-lying and retention area, *khal*, natural water body within DMDP are not earmarked on mouza map (scale 1:3960) In case of eastern fringe, DMDP proposed as 'new urban land development area' presently the overview of the areas is low-lying and seasonally use for agricultural purpose. But there is no detailing.	The natural water bodies, low-lying and retention area, *khal*, natural water body within DMDP should be earmarked on mouza map (scale 1:3960) indicating plot schedule that must be reflected in zonal plan and DAP. These maps should indicate restriction areas showing to the natural water body, open space, park/playfield etc
5.	The National Housing Policy 1993 (revised 1999) The strategy of the government will be act as promoter and facilitator of housing by the private sector, while retaining the government's role as a provider to a limited extent. Encourage the involvement of the private sector in land development, infrastructure development and construction	According to the policy guidelines the private sectors are not adequately provided land, finance and services etc. Private land development policy not yet approved as guidelines Under the loopholes, the private companies, developers implement their projects, and particularly in low- lying areas.	In private investment in housing sector should be principally guided by DMDP/ Detailed Area Plan The government may allocate land to private sector for housing estates Government may build apartment housing for all groups higher to poor). In the case cross subsidy may be applied. In this perspective the NHP should revised.
6	Dhaka Metropolitan Development Plan 1995-2015, The polices are: Urban Fringe Development Acceleration: Authorities will initiate and co-ordinate a range of measures aimed at stimulating reorganisation and re-subdivision of the urban fringe area. Fringe Area Growth Acceleration: To initiate and coordinate a range of measures aimed at stimulating and accelerating the rate of development in the designated areas of the urban fringe. Eastern Bypass: The government has attached high priority to the development of the Eastern Bypass to become a key link in the emerging national network of arterial roads and to relieve the existing urban network	DMDP does not provide detailed guidelines to the private sector or other developers. The general guidelines have loopholes for the irrational and unscrupulous land development activities. Planning Permission (Land Use Clearance) is followed by DMDP. The requirements for obtaining planning and building permission is applicable to all persons seeking permission to carry out development activities within the area under the jurisdiction of RAJUK for the purpose of development and construction and as defined by DMDP (Dhaka Structure Plan and Urban Area Plan). According to the plan three types of permission are given, these are, basic planning permission, full planning permission and conditional use permission.	DAPs are most essential for development and land use control. In this plan the low-lying areas / wetland must be identified and appropriate rules should frame with legal support. The power provided to the chairman, RAJUK under IT Act, section 75(1) to change land use provision indicated in the DMDP should be omitted. If any change is essential for public interest that must be reviewed by planning experts/consultants. In DAPs the different level of maps/ plans will be necessary in relation to 1.50000 and 1:3000 etc. Planning standard should be set up based on the character of the areas DAPs will recommend such standard.

Continued next page

	Flood Retention Pond Areas Control will be maintained over the areas designated in the plan for flood retention areas in order to ensure that they remain capable of fulfilling their primary function of water storage at times of flooding. Planning Permission (Land Use Clearance) The Article 6 of Urban Area Plan (DMDP) is followed for developed control of Dhaka. The plan is basically a development control document and each and every individual building for housing, commercial, industrial estates need planning permission from RAJUK.	The purpose of the basic planning permission procedure is to ensure that proposed development is in conformance with DMDP. But it is a difficult task to check individual C.S plots (in mouza map, scale: 1:3960) with the Structure Plan (scale 1:50000) and Urban Area Plan (scale: 1:3000).	
7	The Private Land Development Housing Project Rules (PLDHPR), 2004. PLDCs must submit project documents layout plan indicating road, infrastructure and service network. In the layout plan, certain land should be preserved (as indicated in the (PLDHPR) for schools, colleges playgrounds, open space, lakes and other uses etc. The project documents shall be checked by the authority and make field verification report according to PLDHPR. During the implementation the authority will supervise and monitor the projects as per of approval. Simultaneously, the company obtain completion certificate within the specific period.	The enforcement, management parts is not properly indicated, in PLDHPR and therefore whole process of the implementation delayed and cumbersome. There is no panel section in this rule, which can apply to protect the growing unauthorised housing estate. Although PLDHPR is supported by clearance other agencies, which are supported by acts and laws	Panel section should be enacted into The Private Land Development Housing Project Rules (PLDHPR), 2004. If necessary another supporting law may be framed to control unauthorised housing estates unplanned city expansion.

9.5 Institutional Management:

Managing urban land to meet environmental and equity objectives requires a mixture of policies and instruments to guide and motivate the behaviour of actors causing the land related problems and those responsible for managing urban land so as to avoid those

problems. To implement the land management strategies discussed above, some of these instruments will influence market behaviour while others will affect the land management process through improved regulation, provision of critical information. Regulatory instruments, economic instruments, land acquisition alternatives, property rights, government provision of infrastructure are for land management.

No single instrument will be effective in achieving all land management objectives. Urban land managers will be needed to select the most appropriate instrument or mixture of instruments to meet the particular needs, priorities, and special characteristics of each problem and locality. In the existing land use and other applicable controls that may or may not be appropriate or effectively enforced.

To operate the whole activities of land acquisition, land development, comprehensive plan preparation with drainage and environmental sustainability, contraction of embankment (eastern bypass along the Balu River) and resettlement programme etc; a separate wing is needed to be established under the RAJUK (Ministry of Housing and Public Works). Internal and external experts/consultants may be hired for this set-up, the professionals of different agencies concerned like the BWDB, DWASA, RHD, DoE, RAJUK, LG, and DCC also need to work together for a better performance (13)

Aspects covered by this research have been the structure, function, conflicts and overlaps of urban government, its internal organization and management process, its staffing, financing and its relation with the private sector and community organization.

Management of Area Development: Effective management needs the public and private sectors partnership. In addition concern agencies should involve in the process of implementation and monitoring (Choguill 1987). It needs some degree of integration in relation to near settlement, redevelopment of deprived areas and the response to overall challenges, such as decline of traditional activity and environmental determination. The Metropolitan Authority (proposed in the DMDP) may provide effective leadership in planning the overall development of the study area and the surroundings responding to economic, social, habitation and environmental problems (14)

To develop the area considering all components: geology, flood protection and drainage, land use, settlement and resettlement, and environment. The protection within the study area and its surroundings need assessment of the cost, recovery and labour productivity. Regulatory interment of the project needs to be closely associated in times with visible improvement in services and environmental conditions to encourage public support. In this context, political role is very important.

Relation between city and local areas must be co-related and tied under an umbrella in terms of planning, taking development projects and implementation and management. In this case, the DMDP may be guided to take the projects by both the city development authorities and local authorities to create management collaboration.

Cooperation established between different agencies: lack of cooperation among the city development agencies concerned are found in development works. Overlapping and conflicts in the process of planning and implementation are now most common phenomenon (see Chapter-8).

Embankment construction: In the case of eastern fringe area management, the local and international experts (if necessary) may engage to carry out. This authority, like the Jamuna Multipurpose Bridge Authority that operated successfully, will hold the power of planning, development, and investment, funding the statutory framework and operation control over local agencies.

Organizational Effectiveness Individual agency should be strengthened to contribute an effective role in managing the EFAs But it depends, above all on a culture of public service performance and efficiency. This derives essentially from a combination of circumstance challenging tasks, adequate powers and boundaries, buoyant resources all entrancing the agency's ability to deliver service and command public respect (Kenneth J. Davey. Urban Management, the UNDP/UNCHS/WB Nov. 1993). In our context, the involved agencies like the RAJUK, UDB, DWASA, RHD, DoE, DCC and LG should be strengthened in terms of building capacity (organizational structure, technical manpower, equipments and logistic support etc). Interaction should be established among the locals, local elites, elected commissions like MP, NGO, and PLDCs and

others for planning, implementation and management issues. The justified proposal would be incorporated in the plan and development will take place accordingly.

Public participation: Public participation is highly publicized. Ward commissioners/ Union Chairmen are very active in formulating demand and monitoring local capital work by the support of ruling parties. The private sector has its own spheres of operation but that is not welcomed at the public sector.

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11. BRTC and BUET (2005), "Techno-economic and environmental assessment of the proposed commercial development of low lands adjacent to Sonargoan Hotel and preparation of preliminary development plan for the low lying areas between Tongi division road and Progati Sarani (Rampura bridge)". feasibility study, Dhaka.

12 *Op.cit.* 10, p 105.

13. Pasteur. David. (1994) "Report on Institutional Management of Dhaka Metropolitan Area" under DMDP project, Dhaka

14. A successful plan is one, which ties up these organizational loose ends and specifies the role of each body involved in implementation. It identifies financial responsibilities and insures that each contributor has agreed to its role before implementation begins. If coordination committees are to be required, the plan includes provision for them. In addition, rather than merely specifying that a monitoring of progress should be carried out, the plan identifies the monitoring authority and also sets forth the chain of command, which ill insures that a response is make to such monitoring, see Choguill, Charles L (1987): *New Communities for Urban Squatters*. Plenum Press, and London.

CHAPTER 10: CONCLUSION

Dhaka is the eighth largest city in the world in terms of its population which is about 12 million. By 2015, assuming current population growth trends, the Dhaka Metropolitan Areas will have a population of about 15 million and may become the fourth most populated city in the world. The urbanization process often means accelerated economic performance for a country. The accompanying increases in urban land prices as well as the conversion of land whether that lies within or outside the existing urbanized area may have negative implications on the environment.

The eastern part of Dhaka has a great importance for new urban development. In this circumstance, this area needs development, which must be sustainable in terms of physical, economic, social and environmental perspectives. Through this research, it is found that the PLDCs purchase lands from individual landowners and they also occupy government *khas* land and fallow lands for housing projects. The canal network and wetlands are randomly being filled up by the PLDCs, creating water logging in the EFAs and its surroundings. To protect such activities, the existing acts/laws are not effective, because those have a lot of loopholes that create overlaps and conflicts in the development process. To some extent, some laws/acts have become paralysed due to enforcement process.

This study intends to investigate how low-lying areas including agricultural lands and wetlands are being converted into urban uses. The PLDCs have set a trend of developing small townships in the periphery of the city area. How the development actors implement their housing projects in the EFAs, and what are the impacts on environment in the area and surroundings?

From the background study, we found that the PLDCs have been developing housing projects since the 1980s in the EFAs because the areas were highly potential for housing. The PLDCs main target is to make profit from selling housing plots and apartments. They have proved themselves as key actors in the areas as land developers. On the other hand, they have become 'landlords' in the area. The individual landowners were either tricked or forced to sell their lands to the developers. Original landowners were mostly unable to accommodate with the intense competition posed by the new urban developments. The landowners had no other way but to succumb to the PLDCs' power, and they are grudgingly giving up their lands to the developers. Most of the big

developers deviously grabbed government-owned land within the vicinity of their housing projects. They buy the surrounding lands of landowners who are unwilling to sell their lands, and thus cut off access to their land to force them to sell their lands at the powerful PLDCs' quoted price.

Random earth filling and infrastructure development, however, have caused widespread environmental degradation. In appropriate development, malpractices in construction activities and weak maintenance had far-reaching and negative effects on the environment. The extent and coverage of such damage is very extensive to the natural non-living as well as natural living, and human environment. Land development by land filling is a major cause of damage to the natural living environment including ecological destabilization, habitat destruction and damage to flora and fauna. This study covers the natural and human environment, their interaction, and changes brought about by land development project activities in the EIAs.

The Balu and Lakhya Rivers surrounds Dhaka in the east, the Turag in northwest, the Buriganga in the south, and the Dhaleswari and Meghna in southeast. And lots of canals and channels are connected to these rivers forming a lifeline for the city. In the last 20 years, a convergence of unregulated industrial expansion, rural to urban migration, encroachment of the rivers, canals/channels overloaded infrastructure. Conflicts and overlapping of functions of different agencies are degrading the management and quality of Dhaka's surface waters due to ineffective enforcement of environment regulations.

On the other hand, most important component of environment is wetland in the city and peripheral areas, which should be kept free from any sort of encroachment. Meanwhile most of such lands in the city have already been filled up, affecting city environment in terms of frequent floods, high level of pollution and uncomfortable thermal level and microclimates within the city. The city has experienced heavy downpour that submerged most areas of the metropolis paralysing the city and surroundings.

Adequate drainage facility is a very important component in the eastern part of the city. The available canals/channels are being used as outlets to discharge storm and wastewater. The depressed lands (wetlands) are mainly used as water storage areas. Storm runoff as well as wastewater generated within the wide areas flows into the

wetlands. But these lands are squeezing through massive land filling by the PLDCs and individuals.

If environmental degradation in the EFAs continues at the current rate, Dhaka will be threatened as a city for living. We have bad experiences in the western part of Dhaka and DND protected areas where water logging and environmental disasters are critical issues now. Recent experiences have showed that heavy showers submerged most parts of the city, and areas within the western embankments and DND areas became waterlogged due to inadequate drainage facilities. It is also observable that the water discharge outlets of the DWASA and BWDB are not maintained and functioning property.

In this study, the IEE (Initial Environmental Examination) has been applied and assessed the impacts on physical, social, economical and biological environment. Assessment primarily focused on hydrology and flood, natural flushing water, wetlands and aquatic habitat, terrestrial habitat, fishery, employment and health etc. Based on these findings the strategies and policies as well as the programmes are framed.

In the DMDP 1995-2015 some strategies, policies and development programmes were made. The proposed development projects are: road construction (major and link roads) and construction of the Eastern Bypass, introduction of commuter rail network and waterways transport (ref. Chapter 3, section 3.3).

The existing acts/laws of the agencies concerned remain as management tools, which are not enforced properly in the areas. Overlapping of functions and jurisdiction of the agencies often lead to inaction. It creates conflicts among the agencies in the management process. Thus coordination among the agencies and their management systems are ineffective because most of the agencies implement their projects as per their own programmes. In fact, lack of initiatives from agencies concerned is the main reason for growing number of housing projects in the EFAs. The institutional framework and their management technique are improper to protect such activities.

Weak institutional capacity undermines most government efforts to manage urban land and cultural resources effectively. The expertise in physical planning, drainage, and environment and management are not adequate in different agencies. At the same time, the private sector institutionally lacks expertises. Land administration and development

agencies (like RAJUK, DCC and Pourashavas, DWASA, DESA and DoE) have roles for determining the land use. In this situation, there are traditional authorities as well as private organizations that are significant actors in urban land and housing markets. In most developing countries, however, there is no coordination among these actors.

Considering all issues, the EFAs require a comprehensive plan for sustainable development. The concept of comprehensive plan is encompassed by the components of physical planning, flood control and drainage, and environmental planning. The revision of existing acts/laws is needed for strengthening the development agencies. New acts/laws are also required to enforce them effectively. At the same time dishonest practices of the PLDCs with connivance of a section of officials should be stopped immediately for sustainable development in the EFAs.

The physical planning of the study area should be guided by the topography, land level, cannel network and drainage. The proposed embankment must be taken into care. It comprises the existing features land uses and infrastructure provision. Some degree of control should be excluded over land use and development of the EFAs. Without effective policies and regulations, it is difficult to control indiscriminate land filling by private actors. The government policies and regulations are inadequate in preventing the private sector activities. The development restrictions should be empowered by the acts/laws. However, the city is undergoing rapid expansion. One of the most important challenges is to achieve a proper balance between urban development and environment.

Some private developers have been developing a substantial portion of land in the EFAs for housing projects. In this case some adjustment may take effect if circumstances prevail. On the other hand, the new built up urban areas may be accommodated in the Detailed Area Plan. The existing housing infrastructures built up by the public and private sectors may be considered within the planning principles and norms.

The canal network in the EFAs is essential for drainage purposes of Dhaka. The EFAs are low-lying and subject to periodic flooding from local rainfall and backflow from the Balu River. In response to the problems, the existing canals should be properly maintained and kept free from all sorts of development activities. Flood retention ponds are also important for flood protection. The present land use within the flood retention ponds has been affected due to land filling activities. Most of the lands in the fringe

areas are privately owned and are used for agricultural purpose. The various options are proposed in recommendations to maintain and control the flood retention ponds.

The environmental management plan is to protect natural water bodies, ecological habitation, drainage, canal network, wetlands and environmental resources. In this study, the impacts of physical, biological and social environment parameters are assessed. However, the general recommendations and mitigation measures are proposed to improve the environmental conditions in the environmental plan.

To implement this comprehensive plan, government agencies could not afford required funding. Therefore, public and private (PLDCs) sector partnership is recommended. The partnerships could take several forms. In this case, the government may acquire lands and the private sector may be responsible for constructing infrastructure and services The government will retain the power to allocate housing blocks, and the private sector will get land for their investment. An important advantage of this approach is that the private resources can be mobilized for up-front infrastructure provision. The main weaknesses are the resources limitation and management issues of government agencies.
Due to institutional weaknesses the proposed development concept (partnership) may not be effective. In this case, a separate authority may be formed to make overall development responding to economic, social, habitation and environmental factors.

It is expected that this research document may guide, and be used for the development of the EFAs. Within the study area development programmes of either public or private sector may be guided by this document. The document is enriched by essential components for fringe area development.

Formulating and implementing land management strategies require a wide range of actions and capabilities from various public and private actors in urban land markets. Unfortunately, local agencies in many third world cities lack the skills to adequately assess alternative strategies. Moreover, these cities lack the necessary information for effective land management strategies and tools. In developing any kind of strategic approach to land management therefore, each city will need to build up its capabilities in formulating as well as assessing alternative management approaches. It will establish clear institutional arrangements encouraging public participation in the planning and decision making processes, and building broad based support.

Appendix-A

Table 1: Union-wise Population Distribution of the Study Area by Sex.

Thana	Union	Mouza	Area in hectare	Population			Population density per hectare	Sex Ratio (M:F)
				Male	Female	Total		
Gulshan	Beraid	Bara Beraid	387.18	4785	4758	9543	25	101
"	"	Chhota Beraid	37.26	259	243	502	13	106
"	"	Bara Kathaldia	514.76	585	560	1145	2	104
"	"	Nigur Aplaid	27.13	444	345	789	29	129
"	"	Patira	165.65	1570	1548	3118	19	101
"	"	Paschim Haradia	54.27	165	168	333	6	98
"	"	Purba Haradia	68.85	46	48	94	1	96
"	"	Dumni (Part)	407.83	368	364	732	2	101
Demra	Demra (P)	Gazaria	445.91	2368	1978	4346	10	119
"	"	Nasirabad (Part)	90.75	381	356	737	8	107
"	"	Nandipara (Part)	231.66	150	148	298	1	101
Gulshan	Satarkul	Bhattara (Part)	547.56	11249	9066	20315	37	124
"	"	Satarkul	649.62	3285	2910	6195	10	113
"	"	Sutibhola	119.07	780	668	1448	12	116
Gulshan	Dakshin Khan (Part)	Barua (Part)	37.26	174	170	344	9	102
Sabujbag	Ward No. 56 (Part)	Meradia (Part)	72.09	468	452	920	13	103
Canton ment	Ward No 75 (Part)	Joarshahara (Part)	319.95	15658	12864	28522	89	121
Gulshan	Ward No 74 (Part)	Badda (Part)	462.51	28661	24772	53433	115	116
"	"	Ullon (Part)	9.31	71	67	138	15	105
Total			4648.6	71469	61785	150552	32	116

Source: BBS, 1991

Appendix-B

Table 1: Union-wise Household Distribution of the Study Area

Name of Thana	Name of Union	Name of Mouza	No. of Households
Gulshan	Beraid	Bara Beraid	3,545
"	"	Chhota Beraid	102
"	"	Bara Kathaldia	203
"	"	Nigur Aplaid	99
"	"	Patira	546
"	"	Paschim Haradia	53
"	"	Purba Haradia	13
"	"	Dumni (Part)	130
Demra	Demra (Part)	Gazaria	706
"	"	Nasirabad (Part)	107
"	"	Nandipara (Part)	20
Gulshan	Satarkul	Bhattara (Part)	3,536
"	"	Satarkul	1,002
"	"	Sutibhola	207
Gulshan	Dakshin Khan (Part)	Barua (Part)	68
Sabujbagh	Ward No 56 (Part)	Meradia (Part)	63
Cantonment	Ward No. 75 (Part)	Joarshahara (Part)	5,704
Gulshan	Ward No 74 (Part)	Badda (Part)	10,286
"	"	Ullon (Part)	23
Total			26,413

Source: BBS, 1991

Appendix-B-a

Table 1: Mouza –wise Questionnaire survey in the Study Area

Name of Thana	Name of Union	Name of Mouza	No. of Questionnaire
Gulshan	Beraid	Bara Beraid	64
"	"	Chhota Beraid	8
"	"	Bara Kathaldia	18
"	"	Nigur Aplaid	10
"	"	Patira	32
"	"	Paschim Haradia	6
"	"	Purba Haradia	4
"	"	Dumni (Part)	12
Demra	Demra (Part)	Gazaria	28
"	"	Nasirabad (Part)	12
"	"	Nandipara (Part)	6
Gulshan	Satarkul	Bhattara (Part)	60
"	"	Satarkul	30
"	"	Sutibhola	6
Gulshan	Dakshin Khan (Part)	Barua (Part)	6
Sabujbagh	Ward No. 56 (Part)	Meradia (Part)	
Cantonment	Ward No. 75 (Part)	Joarshahara (Part)	58
Gulshan	Ward No 74 (Part)	Badda (Part)	40
"	"	Ullon (Part)	-
Total			400

Source: Field Survey- 2003

Appendix C

Questionnaire: Socio-Economic Survey

Research Title: IMPACT OF PRIVATE LAND DEVELOPMENT ON THE ENVIRONMENT OF THE EASTERN FRINGE AREA OF DHAKA.

Student : MD. JAHURUL HOQUE

Programme : Ph. D

Name of the Department: URP, BUET, Dhaka

1. Identification :

i)	Sl.	.	09
ii)	Date of Interview	:	21/4/02
iii)	Name of Interviewer	:	Hasina Akhter
iv)	Name of Respondent	:	Md Anwar Khandaker
v)	Mouza	:	Bara Beraid
vi)	Mohalla/Street/Union/Ward	.	7 (Union)
vii)	Holding no./House no.		1373

2. Socio-Economic Conditions :

i)	Head of Family	.	Md. Saiful Khandaker
ii)	Religion	.	Islam

3. Number of Persons in the Household:

Sl no	Age	Gender (Male/ Female)	Relation with family head	Marital Status	Education	Occupation		Monthly Income in Taka
						Main	Secondary	
i.	60	1	Self	2	1	1	-	5,000/-
ii.	42	2	Wife	2	1	7		2000/-
iii.	23	1	Son	1	5	5		6000/-
iv.	21	1	"	1	4	-		
v.	17	1	"	1	3	-		
vi.	13	2	Daughter	1	3	-		
vii.	10	1	"	1	2	-		
viii	x	-x		-	-	-		

Code:

Gender:

Marital Status:

1 = Single
2 = Married
3 = Widow
4 = Foreigners

1 = Male
2 = Female

Education:

1 = Illiterate
2 = Primary
3 = Secondary
4 = Higher Secondary
5 = Bachelor Degree/Graduate
6 = Masters Degree & others (specify)

Profession:

1 = Agriculture
2 = Labour
3 = Govt. Service
4 = Private Service
5 = Business
6 = Unemployment
7 = Housewife
8 = Others (specify)

4. House Ownership:

1 = Owned from parents
2 = Owned (purchase)
3 = Rented
4 = Govt. quarter
5 = Free occupied
6 = Others

[1]

5. House Types and Use: Type [3] Use [1]

Type Code
1 = Pucca
2 = Semi-Pucca
3 = Katcha

Use Code:
1 = Residential
2 = Commercial
3 = Mixed
4 = Cultivated/Agriculture
5 = Unused

6. Family Owned Land Price: (Tk.)

	Land				Taka		
	Decimal	Katha	Bigha		Decimal	Katha	Bigha
Homestead	1.50	-	-		1,50,000	-	-
Low- lying			1 50				1,20,000
Not low-lying (average)							
High land							
Total:	1.50	-	1.50	Total Tk:	1,50,000		1,20,000

Note 1 hectare = 246 91 decimal
= 149 44 katha
= 7 47 Bigha

7 Are you sure that the land value has enhanced in this area?

i) Yes [√] No. [ ]

ii) How much the value is enhanced in last five years?

Tk.15, 000-20,000 has increased per Bigha more or less

iii) Why land value is increased?

a. Increased population [√]

b. Better transportation facility [ ]

c. Social and economic reasons [√]

iv) What is your opinion regarding the land value?

The eastern fringe area will be flood free after the construction of embankment along the Balu River. Therefore, the whole are come will under urban uses. So, the land value is increasing sharply.

8. Service Conditions:

Utility Service:			Service Standard:		
1=	Electricity		1=	Good	Service
2=	Water (WASA)	1	2=	Moderate	3
3=	Gas		3=	Bad	
4=	Sewerage				

9. Monthly Expenditure of Your Household (Taka):

i.	Rent	:	-
ii	Food	:	8,000/-
iii.	Transport	:	500/-
iv.	Education	:	2,000/-
v	Gas/Oil/Electricity/Water/	:	600/-
vi	Health	:	500/-
vii.	Recreation	:	100/-
viii.	Others	:	-
	Total Expenditure		Tk.11700/

10. Monthly Savings/Debit Amount (Taka):

		Savings	Debit
1)	Cash:	1,500/-	
ii)	Bank/Personal Account:		
iii)	Others:		
	Total:	1,500/-	

11 How many years you are living with household/family?

1 = 1 to 5 years

2 = 6 to 10 years

3 = 11 to 20 years [2]

4 = 21 and above

5 = Inhabitant

12. Why your family came to Dhaka?

1	=	Service/transfer	
2	=	Higher education	
3	=	Business	
4	=	No resident and agricultural land	
5	=	Due to security	
6	=	Long term treatment	
7	=	Urban facilities	
8	=	By birth	8
9	=	Others (specify): ----------	

13. What types of facilities you aspect to live outside of Dhaka?

- Not interested to go outside of Dhaka.

14. Adjacent Road to the House:

1	=	Pucca	1
2	=	Semi-pucca	
3	=	Kutcha	
4	=	No road	

15. Road facility to your home:

Length (Metre) 8.2 Width (Metre) 3

16 Sanitation facilities:

1 = Pucca 2 = Kutcha, 3 = Absent 1

17. Drainage facilities (near your house):

1	=	Pucca	1
2	=	Kutcha	
3	=	No drainage facilities	

18. Latrine at the House:

1	=	Sanitary	
2	=	Non-sanitary	1
3	=	Absent/none	

19 Do you have any problems in your movement? Yes √ No

i)	Narrow Road	
ii)	Water logging	√
iii)	Transport	√
v)	No problem	
vi)	Others	

20. Do you face any problems during the flood?

1	Drinking water	1,2,3,4
2	Transport	
3	Sanitation	
4	Problems in cooking food	
5	Others (specify)	

21. What are the possible of advantages/disadvantages if the embankment/flood protection wall will construct along the Balu River?

1.	Expansion of the city area	1, 3
2.	Population increase	
3.	Environmental degradation	

22. What types of services/facilities are available in your area?

Opportunities	Yes	Distance (Km)	Standard Services		
			Good	Moderate	Worst
Hospital/Clinic	1	1	√		
Community Center	1	1		√	
Shopping Center	2	.5		√	
Dumping ground	1	1		√	
Telephone/Card Phone	1	.5		√	
Police Box	1	1		√	
Play ground	2	.5			
Bank	1	1		√	
Post office	1	1		√	
Fire service	1	1.5		√	
School: Primary/ Secondary	1	1 1	√ √		
Katcha Bazaar	1	1		√	
Bus stand	2			√	
Library/Book Store	1	1.5		√	
Graveyard	1	1		√	
Mosque	2	.75	√		

23. What types of trees are available in your home/premises?

		Type	Nos
Timber		√	2
1	Fruits	√	6
4.	Medicine Tree	√	8
4	Others (Specify):		

24. What types of species/ birds are available in your area?

		Present	Previous
1	Amphibia	Less	More
2	Reptiles	Less	More
3	Mammalia	Less	More
4	Birds	Less	More

25. What are the sources and causes of water pollution in your area?

i) Domestic and industrial effluent [√]

ii) Absence of sanitation system [√]

26 Is there any facility to collect your domestic waste?

Yes [ ] No [√]

i) If yes, please specify.

ii) If no, where it is dumped? Beside the house and also dump in the low lying areas

27. What are sources of pollution in your area?

1	Industry	√
2	Open latrine	√
3	Garbage	√
4	Others	

28. What are the fish conditions in Rivers/Khals/Ponds/Beels?

1 -	Increasing local fish	
2 -	Decreasing local fish	√
3 -	Same as previous	
4 -	Increasing culture fish	√

29. Causes for decrease of fishes?

1	Pollution in river/canal	√
2	Discharge liquid waste in the river/canal	√
3	Others (specify):	

The various types of local fish are being disappeared due to squeezing of water bodies and water pollution.

30. What type of disease affects your family members?

1	-	Cold fever	1, 2, 3
2	-	DPT.	
3	-	Cough	
4	-	Diarrhea	
5	-	Others (specify)	

31. What are the causes of these diseases?

1. Changed weather — 2

2. Water pollution

32. What types of the problem do you face in your locality?

1	-	Gas	1, 2, 3, 4
2.	-	Electricity	
3	-	Telephone,	
4.		WASA water	
5	-	Others (specify)	

33. Is there any development plan prepared for your area? What suggestions you have for such plans?

We have heard that the RAJUK is preparing a Detailed Area Plan (DAP) for this area. We suggest for making a comprehensive plan comprising drainage, land use plan and environment. Moreover, we would like to participate in the plan preparation and implementation process. At present, we need *pucca* road and widening of the existing roads, utilities/services like electric, gas, water, sewerage and telephone etc.

(Hasina Akhter)
Name of Interviewer

Appendix-D

Questionnaire: Environmental Aspects in the Study Area (Eastern Fringe), Dhaka

(Note: The physical and related informations in questionnaire were collected from secondary sources. These informations were checked and verified in the study area through random sampling).

(Sample Respondent)

1. Date: 7/4/02 Time: 11:00AM
2. Name of Person Respondent: Md. Nuru Miah
3. Age: Occupation: Service
4. Male/Female: Male
5. Village: Bara Baraid
6. Mouza: Bara Beraid Union: Beraid
7. Thana: Badda
8. Name of investigator: Md. Zakirul Islam

A. Physical Aspects:

A.1 What are the land types and their areas?

Table: Land Elevation Above Mean Sea Level

Land form Area	Land Elevation Above Mean Level (GTS)[1]	Approx. Area (hectares)
1	Higher than 10.0 metre	30
2	8.0 - 10.0 metre	75
3	6.0 - 8.0 metre	95
	Average flood level 6.0 metre	
4	4.0 - 6.0 metre	150
5	2.0 - 4.0 metre	100
6	Lower than 2.0 metre	65

Source: FAP 8A, JICA Study, 1992

A2. How much lands are used for different purpose in your area?

	Type of Land uses	Area (hectares)
1	Cultivable land	187
2	Net cultivated land	70
3	Cultivable waste land	5
4	Total cultivable land	75
5	Non cultivable land	-
6	Homesteads	15
7	Pond/ditches	3
8	Permanent fallow	-
9	Open water bodies (*beel/khal etc.*)	7
10	Total non cultivable land	25

2b. What are the land values in your area since 1970 years?

Year	Range of land value Taka/Per bigha	Average Value in Taka
1970	Tk. 50,000-60,000	Tk. 55,000
1975	-	-
1980	Tk 1,20,000-1,30.000	Tk. 1.25,000
1985	Tk. 2,70,000- 2,75,000	Tk. 2,72,500
1990	-	-
1985	-	-
2000	-	-
2002	Tk. 4.50,000-5,00,000	Tk. 4,75,000

(Average of homestead, high and low-lying land)

[1] Note. Based on G.T.S. (Geodetic Transverse Survey) Datum plan used by survey of stage equal to the datum plane of Mean sea level.

3. How much crops were harvested in your areas from last 7 years?

Production in Maund/ Bigha

Crops	1995		1996		1997		1998		1999		2000		2002	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
Aus (L)														
Aus (HYV)														
Aman (L)														
Aman (HYV)														
Boro (L)														
Boro (HYV)	2	25	2	27	2	30	2	30	2.5	30	2.5	25	2.5	25
Pulses														
Oil seeds														
Vegetables													1	20
Others														

4. How much fishes were harvested in your area for last 7 years?

Year	Locations	Area (Bigha)	Type of fishes/ Species harvested	Harvested (Maund)	Remarks
1995					
1996					
1997					
1998					
1999			No Response		
2000	Bara Beraid	12	Pony fish / Swamp Barl / Magur / Stinging Catfish etc	96.46	
2001	"	15	"	120.00	Increase of culture-fish
2002	"	16	"	150.00	"

Note Maund and Bigha are local units

1 hectare = 246 91 decimal
= 149.44 katha
= 7 47 Bigha

1 maund = 37 32 kg

5. How many people are engaged in fish harvesting?

Union/Mouza	Nos. of person involved in fish culture			Remarks
	Part time	Full time	Casual	
Bara Beraid Mouza	100	30	5	Most of the harvesting fish sold out in market. About 10-15 kg fish are consumed in family

6. How many of live stocks/poultries were available in your area?

Union/ Mouza	Livestock	Years							
		1995	1996	1997	1998	1999	2000	2001	2002
B.Beraid	Bullocks	20	25	32	15	20	19	28	29
	Milch cow	25	30	35	18	23	42	30	35
	Goat	50	57	63	37	50	11	62	65
	Sheep	-	-	-	-	-	-	-	-
	Poultry	7	10	17	9	13	15	20	27

7 How many people are involved in the different activities in your area?

Union/ Mouza	Year	Fishing (Full Time)	Agriculture	Boatman	Daily laborer	Rickshaw	Other
B. Beraid	1995	25	75	20	15	2	5
	1997	27	75	20	22	5	7
	1999	27	65	18	25	7	12
	2000	28	60	15	30	10	17
	2001	30	55	15	35	20	18
	2002	30	55	12	40	30	20

8. What are the environmental impacts due to the different activities in study areas?

Environmental Factors	Environmental Impact				
	Significance %				
	Unknown	None	Low	Medium	High
Encroachment on wetlands			√		
Encroachment on cultural value			√		
Movement of people restricted			√		
Movement of livestock restricted			√		
Movement of wildlife restricted			√		
Reduction of drinking water sources					√
Pollution in drinking water sources			√		
Pollution in irrigation water			√		
Reduction in irrigation water				√	
Reduction in water supply for downstream users			√		
Flooding risks increased			√		
Stagnant water			√		
Increase of conflicts between water source users			√		
Upstream erosion		√	√		
Downstream erosion		√			
Drainage water becomes polluted with silt & wastewater					√
Drainage water becomes polluted with chemicals			√		
Increased land disputes			√		
Increased use of pesticide			√		
Embankments not maintained	√				
Groundwater depletion				√	
Waterborne diseases				√	
Crop pest vector			√		
Loss in supply of fodder			√		
Loss of grazing fields			√		
Tree (timber, medicinal)/loss of vegetation				√	
Other loss of product/amenity			√		
Habitation loss for fish (place)					√
Reduction of fish / species habitats					√
Floodplain reduction			√		

9. Water and Sanitation Facilities:

a. What are the main sources of drinking water?

Union/Mouza	Tap water	Tube well	Surface Water	
			Pond	.Canal/River
Bara Beraid		√	√	

b. What are sanitation facilities?

Union/Mouza	Sanitary	Katcha	Open Field	Remarks
Bara Beraid		√	√	

10. What is your opinion regarding the environmental condition of your area?

The environment resources are gradually being reduced by the massive land filling activities. The existing canal/channel networks are polluted by waste water.

(Md. Zakirul Islam)
Name of investigator

Appendix-E

Definition of the Environmental Terms

Amphibians: Amphibians are amphibious organisms i.e. able to live both on land in water, such as frogs, toads or newts.

Aquatic: Growing or living in or near water.

Beel: A "back swamp" or depression, which can be either perennial seasonal.

BOD (Biological Oxygen Demand): The amount of dissolved oxygen, consumed in a biological process, which degrades the organic matter in water.

COD (Chemical Oxygen Demand): The amount of dissolved oxygen consumed in the chemical process in water affected by contaminants.

Emission: The total amount of solid, liquid or gaseous pollutant emitted into the atmosphere from a given source within a given time, as indicated, for e g. in grams per cubic meter of gas or by a relative measure, upon discharge from the source.

Endangered species: Species in danger of extinction and whose survival is unlikely if the existing conditions continue to operate. Included among those are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to suffer from immediate danger of extinction.

Environmental quality: The state of the environment as perceived objectively, in terms of measurement of its components, or in terms of its attributes such as beauty and worth.

Erosion: Process in which wind and water removes materials from their original place, for instance, soil washed away from an agricultural field.

Eutrophication: Aquatic situation with too many nutrients as a result of which algae start to grow abundantly. This causes a sharply decreasing oxygen concentration in the water. Many organisms, fish especially, will suffocate. Possibly result of pollution.

Evaporation: The combined effect of moisture that evaporates from soils, plants, and other surface areas with moisture released through plant stomata.

Extinction: A human-induced or natural process, whereby a species/sub-species or distinct biological population irreversibly ceases to be extinct for all time.

Fauna: A collective term denoting the animals occurring in a particular region or period.

Flood plain: Areas of relatively low-lying land seasonally inundated by over spill from adjacent rivers, lakes and natural depressions.

Flora: All of the plants found in a given area.

Important Environmental Component (IEC): These are environmental components of biophysical or socio-economic importance to one or more interested parties. The use of important environmental components helps to focus the environmental assessment.

Land use: Types of land use like agriculture, horticulture, settlement, pisciculture, and industries.

Lowland: Land flooded by seasonal flooding.

Tributary: A river or stream flowing into large river or lake.

Polder: An embankment used to isolate and protect agricultural lands from saline water.

Pollution: An undesirable change in the physical, chemical or biological characteristics of land, water and land that can harmfully affect human life and other species.

Reptiles: Reptiles are air- breathing vertebrates comprising alligators, crocodiles, lizards, snakes, turtles etc. Reptiles crawl or move on their belly (such as snakes) or on small short legs (such as lizards).

Water logging: Condition of soil saturation due to the rise of the ground water table.

Ward: Small administrative units under Pourashava.

Watershed: A defined geographic area from which water drains into the same catchment. Areas of higher elevation generally bound a watershed on three sides and the area into which the watershed drains is on the fourth side.

Wetlands: Land that retains an excess of water for a frequency and duration sufficient to support organisms adapted to life in inundated or saturated soil conditions. Types of Wetlands found in EFAs are river, lake, pond, flood plain, khal (narrow canal), swamp, marsh, pond dighee (big pond), pukur (small pond) etc.

Wildlife habitat. An area maintained as an undisturbed breeding ground for wild fauna. The habitat is protected for the continued well-being of the resident and migratory fauna.

Wildlife: Organism that can survive without any artificial help.

Source: (i) BRTC, BUET (2005) and (ii) Environmental Profile, ADB (1997)

Appendix -F

Private Land Development Housing Projects

01 Pallobi Abashik Prokalpo, Mirpur.

02 Arambag Co-operative Housing Society.

03. Shikdar Real Estate, Dhanmondi.

04. Kallanpur Land Project.

05. Adarsha Shayaneer Greha-Nirman Shamobaya Samity, Mohammadpur.

06. Abdur Rafique Housing, Mohammadpur.

07. Bitul Aman Co-operative Housing.

08. Caphasan Housing Complex, Tejgaon (Niketon Project).

09. Mohammadpur Pesi-culture Housing, Mohammadpur.

10. Firoza Properties & Development. Abashik Prokalpo.

11. Dhaka Real Estate, Mohammadpur.

12. Sunibir Greha Nirman Shamobaya Shamiti.

13. Metropolitan Christian Co-operative Housing, Tejgaon.

14. Janata Housing Prokalpo.Kafrul, Mirpur.

15. Bonoshree and Aftabnagar Abasik Prokalpo.

16. Banashree Mogbazar, Khilgaon Abashik Prokalpo, (Bara Mahanagar Prokalpo).

17. Postagola Abashik Prokalpo, Postogola.

18. Rayer Bazar Prokhalpo, Dhanmondi.

19. Goran, Chatbari Prokalpo, Mirpur (Pallabi 2nd Phase Abashik Prokalpo).

20. Shismahal Land Project, Bagbari, Mirpur.

21. K.M.Das Lane Abashik Prokalpo.

22. Caphasan Housing Paikpara, Mirpur.

23. Bashabo Abashik Prokalpo.

24. Postagola River view Land Project, Sutrapur.

25. Mollika Abashik Prokalpo, Mirpur.

26. Ms. Blustar Estate (Apartment Housing).

27 Probal Housing, Mohammadpur.

28 Janata Co-operative Housing Mohammadpur.

29 Basundhara Residential Model Town, Bhatara, Joarshahara

30 Mukti Real Estate, Mirpur

31. Shamoli Housing, Uttara.

32. Rabat Housing Prokalpo.

33. Sukhineer Abashik Prokalpo, Tejgaon.

34. Shusamay Bahumukhi Shamobaya Samity

35. Jahangirnagar University Co-operative (Arunapalli).

36. Banarupa Abashik Prokalpo.

37. ICAB Housing Project, Joarshahara

38. Concord Real Estate Project.

39. Rupayan Housing Estate.

40. BRAC Concord Land Project.

41. Shadesh Housing Estate. Joarshahara

42. Pink City Housing Estate, Joarshahara

43. Sun Valley Housing Project, Joarshahara

Appendix-G

Environmental Factors and its Impacts

Table: 1: Wetlands

Wetlands		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Unions		None	Low	Medium	High	
1	Beraid	0	10.34 (3)	65.52 (19)	24.14 (7)	0	29
2	Satarkul	0	0	66 67 (8)	35.33 (4)	0	12
3	Demra	0	35.72 (5)	50 (7)	14.28 (2)	0	14
4	Ward No. 75	0	0	0	100 (3)	0	3
5	Dakshin Khan	0	0	0	100 (3)	0	3
6	Ward No.56	0	0	0	100 (3)	0	3
7	Ward No 74	0	0	0	100 (5)	0	5
Total							69

Sources: Field survey, 2002

Table 2: Cultural Value

Cultural Value		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Unions		None	Low	Medium	High	
1	Beraid	0	0	100 (29)	0	0	29
2	Satarkul	0	0	66.67 (8)	35.33 (4)	0	12
3	Demra	0	0	100 (14)		0	14
4	Ward No. 75	0	0	100 (3)	0	0	3
5	Dakshin Khan	0	0	100 (3)		0	3
6	Ward No.56	0	0	100 (3)	0	0	3
7	Ward No. 74	0	0	100 (5)	0	0	5
Total							69

Sources: Field survey, 2002

Table 3: Restriction on People's Movement

Movement of people restricted		Environmental Impact					Respondents
		Unknown	Significance %				
Union No	Unions		None	Low	Medium	High	
1	Beraid	0	68.97 (20)	31.03 (9)	0	0	29
2	Satarkul	0	75 (9)	25 (3)	0	0	12
3	Demra	0	100 (14)	0	0	0	14
4	Ward No. 75	0	100 (3)	0	0	0	3
5	Dakshin Khan	0	100 (3)	0	0	0	3
6	Ward No.56	0	0	100 (3)	0	0	3
7	Ward No. 74	0	0	100 (5)	0	0	5
Total							69

Sources: Field survey, 2002

Table 4: Movement of Wildlife Restricted

Movement of wildlife restricted		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Unions		None	Low	Medium	High	
1	Beraid	0	0	10.34 (3)	55.18 (16)	34.48 (10)	29
2	Satarkul	0	0	0	0	100 (12)	12
3	Demra	0	0	35.72 (5)	14.28 (2)	50 (7)	14
4	Ward No. 75	0	0	0	0	100 (3)	3
5	Dakshin Khan	0	0	0	0	100 (3)	3
6	Ward No 56	0	0	0	0	100 (3)	3
7	Ward No. 74	0	0	0	0	100 (5)	5
Total							69

Sources: Field survey, 2002

Table 5: Pollution of Irrigation Water

Pollution of Irrigation Water		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Unions		None	Low	Medium	High	
1	Beraid	0	0	27.59 (8)	62.07 (18)	10.34 (3)	29
2	Satarkul	0	0	33.33 (4)	66 67 (8)	0	12
3	Demra	0	0	0	64 29 (9)	35 72 (5)	14
4	Word No. 75	0	0	0	100 (3)	0	3
5	Dakshin Khan	0	0	100 (3)	0	0	3
6	Ward No.56	0	0	0	100 (3)	0	3
7	Ward No 74	0	0	0	100 (5)	0	5
Total							69

Sources: Field survey, 2002

Table 6: Waterborne Diseases

Water borne disease		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Union Name		None	Low	Medium	High	
1	Beraid	0%	0%	37.93 (11)	62.07 (18)	0%	29
2	Satarkul	0	0	41.66 (5)	38.34 (7)	0	12
3	Demra	0	0	0	100 (14)	0	14
4	Ward No 75	0	0	0	100 (3)	0	3
5	Dakshin Khan	0	0	0	100 (3)	0	3
6	Ward No 56	0	0	100 (3)	0	0	3
7	Ward No. 74	0	0	100 (5)	0	0	5
Total							69

Sources: Field survey, 2002

Table 7: Loss of Grazing Land

Loss of grazing land		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Union Name		None	Low	Medium	High	
1	Beraid	0	31.03 (9)	44.83 (13)	24 14 (7)	0	29
2	Satarkul	0	0	41 67 (5)	58.33 (7)	0	12
3	Demra	0	14.29 (2)	85.71 (12)	0	0	14
4	Ward No. 75	0	0	100% (3)	0	0	3
5	Dakshin Khan	0	100% (3)	0	0	0	3
6	Ward No.56	0	0	100% (3)	0	0	3
7	Ward No. 74	0	0	100% (5)	0	0	5
Total							69

Sources: Field survey, 2002

Table 8: Loss of Trees/Vegetations

Tree loss of vegetation		Environmental Impact					Respondents
		Unknown	Significance %				
Union No	Union Name		None	Low	Medium	High	
1	Beraid	0	0	48.28 (14)	31.03 (9)	20.69 (6)	29
2	Satarkul	0	25.00 (3)	41.67 (5)	0	33.33 (4)	12
3	Demra	0	0	100 (14)	0	0	14
4	Ward No. 75	0	0	0	100 (3)	0	3
5	Dakshin Khan	0	0	100 (3)	0	0	3
6	Ward No 56	0	0	0	100 (3)	0	3
7	Ward No. 74	0	0	0	100 (5)	0	5
Total							69

Sources: Field survey, 2002

Table 9: Habitat Loss for Fish

Habitat loss for fish		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Union Name		None	Low	Medium	High	
1	Beraid	0	0	0	51 72 (15)	48.28 (14)	29
2	Satarkul	0	0	0	100 (3)	0	12
3	Demra	0	0	0	64 29 (9)	35.71 (5)	14
4	Ward No. 75	0	0	0	100 (3)	0	3
5	Dakshin Khan	0	0	0	0	100% (3)	3
6	Ward No.56	0	0	0	100 (3)	0	3
7	Ward No. 74	0	0	0	0	100 (5)	5
Total							69

Sources: Field survey, 2002

10: Reduction in Fish Habitat

Reduction if fish habitat		Environmental Impact					Respondents
		Unknown	Significance %				
Union No.	Union Name		None	Low	Medium	High	
1	Beraid	0	0	0	55.17 (16)	44.83	29
2	Satarkul	0	0	0	100 (12)	0	12
3	Demra	0	0	0	64.29 (9)	35.71	14
4	Ward No. 75	0	0	0	100 (3)	0	3
5	Dakshin Khan	0	0	0	0	100 (3)	3
6	Ward No.56	0	0	0	100 (3)	0	3
7	Ward No. 74	0	0	0	100 (5)	0	5
	Total						69

Sources. Field survey, 2002

Table 11: Percentage of Land uses in the Study Area

Union		Percentage of Land uses				Respondents
Union No	Union Name	Cultivable land	Home-stead	Water bodies	Non cultivable land	
1	Beraid	78.10	11.90	9.50	0.5	29
2	Satarkul	70.00	16.70	13.30	-	12
3	Demra	74.29	14.29	11.42	-	14
4	Ward No. 75	10.00	15.00	45.00	30.00	3
5	Dashinkhan	68.00	15.00	15.00	2 00	3
6	Ward No. 56	55.00	8.00	7.00	30.00	3
7	Ward No. 74	60.00	10.00	10 00	20.00	5
Total						69

Sources: Field survey, 2002

Table 12: Boro (HYV) Production (Maund/Bigha)

Union		Boro (HYV) Production (Maund/ Bigha)				Respondents
Union	Union Name	1990		2000		
		Area	Production	Area	Production	
1	Beraid	203	3017	146	2636	29
2	Satarkul	95	1710	57	1169	12
3	Demra	73	1320	77	1485	14
4	Ward No 75	15	250	5	100	3
5	Dakshin Khan	15	185	6	104	3
6	Ward No. 56	28	430	16	290	3
7	Ward No. 74	25	460	10	170	5

Sources: Field survey, 2002

Table 13: Fish Production (Maund/Bigha)

Union		Fish Production (Maund/Bigha)				Respondents
Union	Union Name	1995		2000		
		Area	Production	Area	Production	
1	Beraid	12	48.23	12	96.46	29
2	Satarkul	7	37 51	7	107.18	12
3	Demra	10.25	36.44	10.25	93.78	14
4	Ward No. 75	13.5	251.87	13.5	401.93	3
5	Dakshin Khan	1	267.95 Cultured	1	16.08	3
6	Ward No. 56	2	375.13 Cultured	4	37.51	3
7	Ward No. 74	-	-	-	-	5

Sources: Field survey, 2002, (Note: 1 Maund=37.32 kg)

Table 14: Livestock

Union		1990			2000			Respondents
No	Name	Bullocks	Milch Cow	Goat	Bullocks	Milch cow	Goat	
1	Beraid	16	40	10	19	42	11	29
2	Satarkul	10	12	8	5	13	5	12
3	Demra	12	16	5	7	18	6	14
4	Ward No. 75	5	6	3	2	3	5	3
5	Dakshin Khan	5	5	7	3	3	6	3
6	Ward No. 56	5	6	0	4	2	0	3
7	Ward No. 74	6	7	0	2	3	0	5
	Total	59	92	33	42	84	33	69

Sources: Field survey, 2002

Table 15: Occupational Pattern

Unions		1995				2002			
No	Name	Fishing %	Agri/ Business %	Boatman %	Other %	Fishing %	Agri/ Business %	Boatman %	Other %
1	Beraid	12.41	75.68	2.41	9.50	5.51	71.89	1.1	21.5
2	Saytarkul	13.33	72.91	0.41	13.35	4.33	64.58	2.9	29.0
3	Demra	8.92	77.16	5.0	8.92	5.71	70.37	5	18.92
4	Ward No. 75	5.0	70.0	0	25	2 0	60.0	0	38
5	Dakshin Khan	10.0	75.0	0	15	5.0	70.0	0	25
6	Ward No. 56	5.0	80.0	1.0	14.0	2.0	75.0	2.0	21.0
7	Ward No. 74	2.0	70.0	3 0	25.0	1.0	50.0	0	49

Sources: Field survey, 2002

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