A SEMINAR PAPER
ON
DYNAMICS OF LAND USE LAND COVER CHANGES IN DHAKA
MEGACITY

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A SEMINAR PAPER

ON

DYNAMICS OF LAND USE LAND COVER CHANGES IN DHAKA MEGACITY

Abstract

Urbanization is one of the fundamental characteristics of the any civilization. They are the key feature to keep running the wheel of economy. Megacities are one of the results of urbanization and a city can be called megacity if over 10 million people living there. Currently there are 27 megacities around the world. Tokyo, New-York, Mexico city, Mumbai, Delhi, Dhaka, Sao Paulo, Calcutta are some of the world's largest megacity. Earlier most of the megacities situated in the developed countries but at present condition most of the megacities situated in the developing country. Higher population growth and migration for better life is the reason for it. A growing number of megacities have emerged in the South Asia. According to the world bank Dhaka is expanding quickly at the rate of expansion is 4.24% per year and it is expected to be the third largest megacity of the world by the year of 2020. Due to the rapid urbanization in Dhaka city the land use land cover is changing in a concerning rate. After the liberation war the direction of urban expansion was only at northward and later with time the patterns of LULC change revealed that Dhaka started to expand in all directions. The expansion is taking place on agricultural land and on wetlands by filling them. Different studies show that the urban areas increased by 6131 ha during 1975–1992 and 4422 ha from 1992 to 2003. These unplanned urbanization results in haphazard development, creation of slums and increase the risk of natural disaster. To maintain a city in a proper way current and accurate information on land use land cover is a prerequisite. Remote sensing and GIS data can be useful for Dhaka Metropolitan, as there is a lack of consistent spatial information. Timely and reliable land cover information is not only necessary to represent the past and present condition of the land but also important to facilitate the development of integrated resource management policies, to achieve sustainable urban development.

Keywords: Urbanization, Remote Sensing, GIS, Pattern change.

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Chapter I

INTRODUCTION

Urbanization is the key feature of growth and development of a country. They serve as the primary function to keep running the wheel of economy. Only 3% of the earth surface is covered by urban areas but it has a great impact on both society and environment (Dewan and Yamaguchi, 2009). Large cities have great contribution in the share of countries gross domestic product (GDP) like Lima-44%, Bangkok-38%, London-21% (Daniels, 2004).

Urbanization is the representation of the basic transformation of information, technology, culture, and moreover people into developed area from rural area and thus it can create a chaos if it is not under proper management system (Mamun *et al*., 2013). Megacities are those which have over 10 million people living there(Taubenböck *et al*., 2011).By the meaning of higher threshold of population of 10 million, there were 23 mega-cities worldwide in 2000 and among them 18 were in the developing countries(Daniels, 2004). At present there are 27 megacities around the world among them Bangkok, Hyderabad, Chicago, Caracas, Mumbai, Dhaka are some few (Taubenböck *et al*., 2011).Developing countries have the most megacities as they have the higher rate of urban migration, a larger and rapidly growing population.

Dhaka is the capital of Bangladesh and of the fastest growing mega city of the world (Bird *et al*., 2018). Greater Dhaka is now the 11th-largest city in the world (UN, 2015).Dhaka declared as the capital of Bengal for the first time in 1610 A.D. during Mughal area (Nilufar, 2010).The city has a great history of about 400 years and developed gradually over the time.

Dhaka is situated in the central part of the country and urban growth rate is very fast among the Developing countries (Sultana *et al*., 2009). The growth of the city during 50's was tardy. During the period of 1949-1989 the development rate was not very speedy but at a general rate and the constructed area limited to the Mughal development area (Nilufar, 2010) but after the liberation war in 1971 the city started to develop vary fast (Chowdhury and Faruqui, 1989).After this period the city started to develop very fast, the low laying areas started to fill up and newly constructed areas were developing there.

The population of Bangladesh is increasing rapidly and as Dhaka is the capital of it, people migrate continuously to Dhaka to earn money, to mitigate poverty in a word for a better life. The population of Dhaka city increases from 3 million to 18 million in the period of 1980 to 2018. As the area of the city is limited the population is increasing promptly the density of population is creating a major concern. Dhaka occupied 1% of the countries territory but 10% of the country's population live in here. At today the density of population in Dhaka city is 41,000 per square kilometer (Bird *et al*., 2018).

The population growth rate of Dhaka is increasing at a rate of 3-4% a year, which is highest among the Asian cities (BBS, 2001; UN, 2012).These huge people living in Dhaka city requires land for their accommodation. For economic activity requires factories, offices and shop and for developing this infrastructures land requirement is must. Land is the heart of the development of a city. Land availability and land use patterns are therefore crucial in determining how effectively, or ineffectively, cities function (Duranton and Puga, 2015). As the land area is confined, city developers are filling the wetlands inside or around the Dhaka city to develop new infrastructure for housing or industry. The population is increasing rapidly in the city so this development process is also taking place at an alarming rate so the city developing in an unplanned way (Byomkesh *et al.,* 2012).

The filling of wetlands and developing infrastructures on them hampering the natural drainage system of the city and increase the risk during natural calamities like earthquake and flooding. It is very important to keep the land use land cover(LULC) information of the city because it is a major concern of global climate change because it is related with the ecosystem, biogeochemical cycle, biodiversity, human activity as well as the environment (Mamun *et al*., 2013). If the proper LULC data can be maintained the city will be developed in a planned way and the city developer should have proper map of the city so that it can be easily identified where the most developmental process taking place and the direction of it.

Geographical Information Systems (GIS) and Remote Sensing (RS) can be a very useful and important tool for monitoring the LULC changing pattern (Dewan and Yamaguchi, 2009) and assess the amount of changes in the land uses due to urbanization by using satellite images and different machine learning algorithm like Random forest, Linear Regression, Logistic Regression, SVM etc. Remote sensing can provide multi-temporal image for monitoring land use pattern and process and GIS process helps in mapping of the analysis and the pattern of changes (Long *et al.*, 2007).

Keeping these above considerations in view, the present study has aimed with the following objectives:

1. To review the literature related to Land Use Land Cover change monitoring of greater Dhaka city
2. To review the dynamics of spatial and temporal pattern of urban expansion of this city

Chapter II

Materials and Methods

This seminar paper is exclusively a review paper. All the information here has been collected from the secondary sources. During the preparation of this review paper the various sources including relevant books, journals, proceedings, reports, and internet so on are followed. Moreover, most of the information was collected from internet browsing and with the help of the library facilities of Bangabandhu Sheikh Mujibur Rahman Agricultural University. Fortunately, my major professor as well as course instructors also provided much valuable suggestions to prepare this seminar paper. After collecting all the available information, collected information were compiled finally to prepare this seminar paper. The existing data related to this study were collected from different books, journals and websites.

Chapter III

Review of Major Findings and Discussion

Urbanization in the global perspective

Earlier cities were arisen to simplify business and religious or political issues. These cities brought people from different culture altogether. For example Istanbul is one of the world's ancient city since 1500 years and is the largest permanent market between India and Western Europe (Keyder, 1999).

The population in the urban area is increasing continuously after the industrial evolution from 3% in 1800 to 47% in 2000. Initially the rate of urbanization was high in the developed countries but now urbanization is more rapid in the developing countries. From 1800 to1910 the population of London increased seven times while this growth rate achieved by some African country within a generation and many Asian country increased four times. By the year of 2030 the global urban population will be twice as the rural population and cities will be grown 160% by this period (Daniels, 2004).

Figure.1 indicates that developing countries has faster population growth ratethan the developed ones. The developed countries has slower advanced economics rate (0.3% per annum) compared to some Asian countries where growth of some cities is more than 1% per annum (Daniels, 2004).
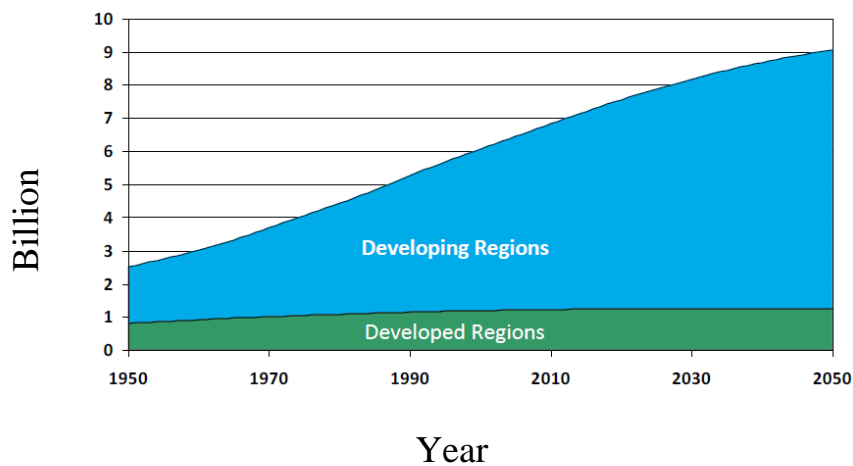

Fig. 1.Urban Population by Region.

(Source: UN-HABITAT, *2013)*

Table 1.World's Largest Cities from 1980 and 2010

1980	Rank	2010	Rank change from 1980-2010
Tokyo	1	Tokyo	No change
New York	2	Bombay	+14
Mexico City	3	Logos	Outside top 20 in 1980
Sau Paulo	4	Sau Paulo	No change
Shanghai	5	Mexico City	-2
Osaka	6	Dhaka	Outside top 20 in 1980
Los Angeles	7	New York	-5
Buenos Aires	8	Karachi	Outside top 20 in 1980
Calcutta	9	Calcutta	No change
Beijing	10	Jakarta	Outside top 20 in 1980
Paris	11	Delhi	Outside top 20 in 1980
Rio de Janeiro	12	Los Angeles	-4
Seoul	13	Metro Manila	Outside top 20 in 1980
Moscow	14	Buenos Aires	-7
Chicago	15	Shanghai	-10
Bombay	16	Cairo	+2
London	17	Istanbul	Outside top 20 in 1980
Tianjin	18	Beijing	-8
Cairo	19	Rio de Janeiro	-7
Essen	20	Osaka	-14

(Source: Daniels, 2004)

From Table 1.we can see world's largest cities in 1980 and 2000 and how their position has changed. Among the developed countries, only Tokyo held its place for 30 years as the largest megacity of the world. These larger cities are already huge, for example Mexico City has over 20 million people. Although ranks may have changed, all the large cities will have experienced population growth (Daniels, 2004) but different region of the world have different rate of population growth.

Urbanization in South Asia and South East Asia

The South Asian countries are urbanizing rapidly and their spatial transformation over the last two decades has been extraordinary. A growing number of megacities have emerged in this area. Many of them are strategically located, serving as drivers of economic growth and lifting millions of people out of poverty but yet urbanization has been messy in South Asia. The amount of urban land available has grown in a mostly organic way, with diseconomies happening naturally as firms and households concentrate in whatever areas are available. Countries in South Asia are thus missing out on some of the gains from agglomeration because of excessive congestion and low livability (Ellis and Roberts, 2015).

The rate of urbanization is steadily increasing in south East Asia. In the year of 1950 there only 15.5% people lived in urban areas but it increased to 41.8% in the year of 2010 and expected to be 50% in the year of 2050 (Sheng, 2011). Table 2.represents different south East Asian countries with their urbanization as % of total population that means how many % of the population living in the urban area.

Table 2.Urbanization Levels of Countries in South-East Asia in 2010

Country	Urban as % of total population	Country	Urban as % of total population
Singapore	100.0	Myanmar	33.6
Brunei	75.7	Lao PDR	33.2
Malaysia	72.2	Viet Nam	30.4
Philippines	48.9	Timor-Leste	28.1
Indonesia	44.3	Cambodia	20.1
Thailand	34.0	South-East Asia	41.8

(Source: Sheng, 2011*)*

World's famous megacities

Mega city usually refers to the largest category of cities in the urban development. The megacities quantitatively as conurbation having more than 10 million inhabitants (UN, 2007) According to the official numbers there are 27 mega cities around the world and it is expected to increase (UN, 2009). Tokyo, New-York, Mexico city, Mumbai, Delhi, Dhaka, Sao Paulo,

Calcutta are some of the world's largest megacity. Other city like Caracas, Bangkok, Chicago, Hyderabad just to name a few are already close to becoming a mega city.

India is a south Asian country and it has a dynamic megacity development. It already has three megacities (Mumbai, Delhi, Calcutta) and expected to increase to six (including Bangalore, Chennai and Hyderabad) by the year of 2020 (Chakrabati, 2001).

Table 3.Top 10 Largest Urban Agglomerations 2025 Estimate

Number	City Name	Population (million)	Status (Developed or Developing)
1	Tokyo, Japan	36.4	Developed
2	Mumbai, India	26.4	Developing
3	Delhi, India	22.5	Developing
4	Dhaka, Bangladesh	22	Developing
5	Sau Paulo, Brazil	21.4	Developing
6	Mexico City, Mexico	21	Developing
7	New York, USA	20.6	Developed
8	Calcutta, India	20.6	Developing
9	Shanghai, China	19.4	Developing
10	Karachi, Pakistan	19.1	Developing

(Source: UN, 2007)

Table 3.shows world's top 10 largest cities with their population and their rank as developing or developed and it is clear that by the year of 2025 most of the world's largest city will be in the developing countries. In many countries, particularly in Africa and South Asia, resources are very limited and often problems are same like low agricultural prices, debt, economic recession, flood or drought or any other natural disasters that drive people off the rural area to the cities. Many of the in-migrants end up in the largest cities where already resources are limited for investment in basic service and the city placed under even more pressure (Richardson, 1993).
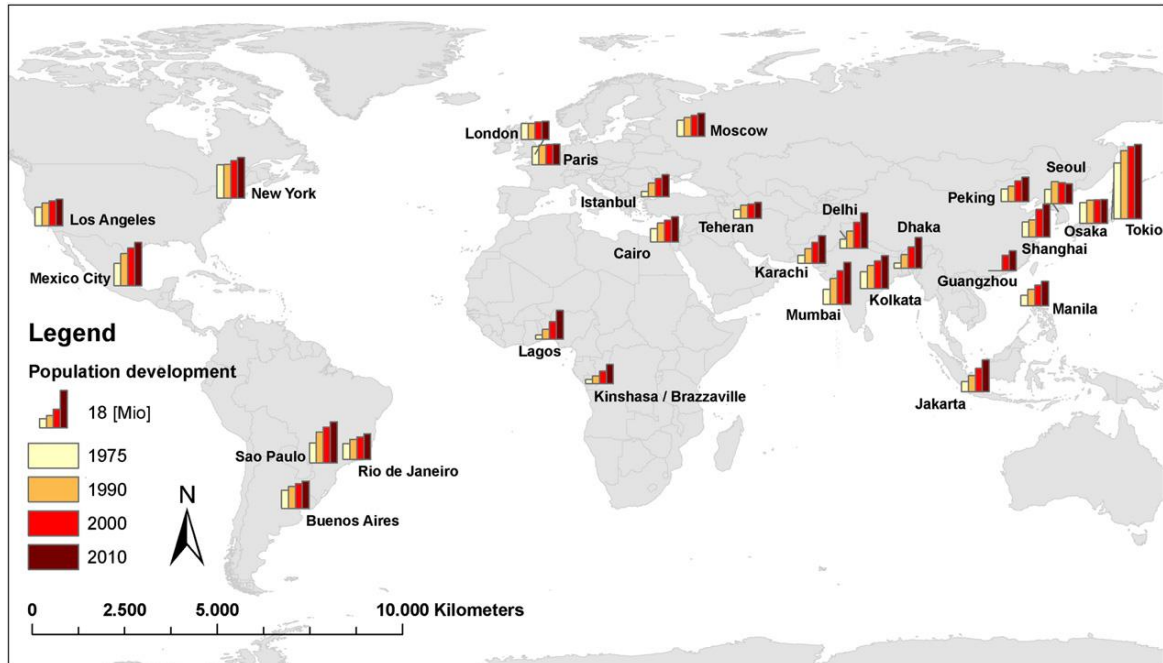
Fig. 2.Distribution of the Current Mega Cities and Their Population Development since 1975.

(Source: UN, 2007)

From figure.2 we can clearly understand that since 1975 the population growth and the rate of urbanization in mega cities outside the high developed countries were ample. The development of mega cities in less developed countries results from both the population growth and the process of migration. Migration actually occurs due to the gap between urban and rural productivities and incomes and to sociological reasons: the attraction of the urban way of life. In contrary, most mega cities in developed countries have long been large cities; and the growth has been much slower and regular (Bourdeau-Lepage and Huriot, 2007).

The spatial and temporal growth of mega cities

To identify the changes and pattern of changes of world's largest megacities the satellite images are classified in four time steps - in1975, around 1990, 2000 and 2010. The post classification change detection allows identification, localization and quantification the pattern and dimension of urban expansion over time. The figure.3below shows the pattern and quantity of urban changes in developed country (London, England) and figure.4 shows the pattern and quantity of urban changes in developing country (Mumbai, India) with long term change analysis.
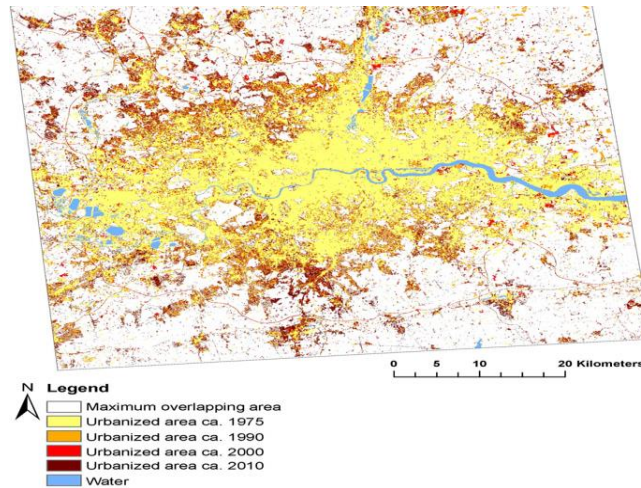
Fig. 3.Change Detection for Megacity London, England.
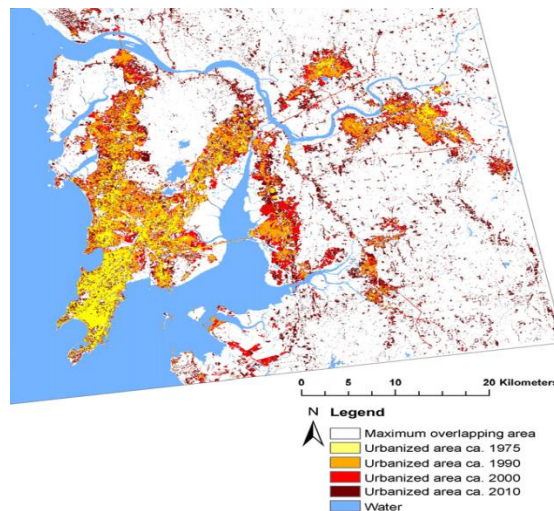
(Source: Taubenböck *et al*., 2012)

Fig. 4.Change Detection for Megacity Mumbai, India.

(Source: Taubenböck *et al.,* 2012)

From the figures (3and 4) the trends of urbanization are immediately clear. In figure.5 the terms of spatial extent, the spatial dynamics of urbanization over the time period are observed and it is highest in developing countries. However, the spatial extents in developed countries are noticeably larger with respect to population.
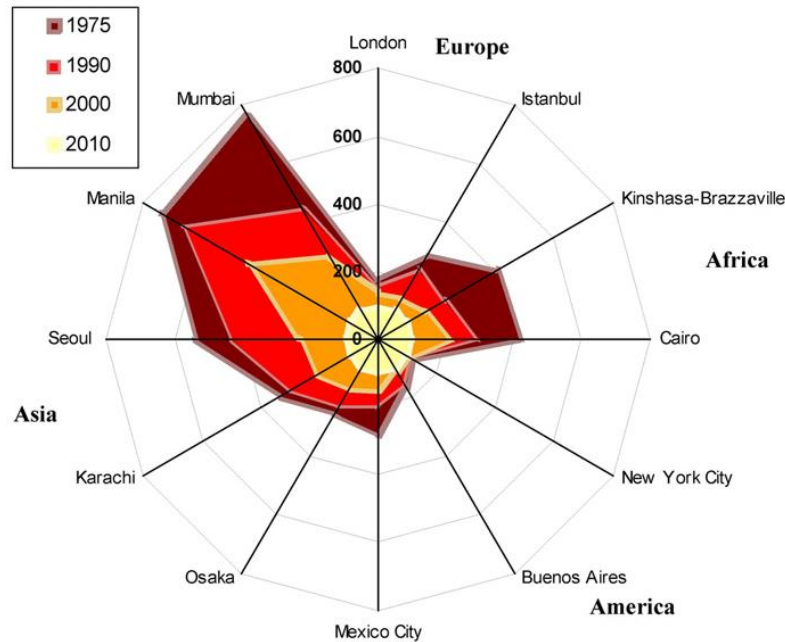
Fig. 5.Relative Spatial Growth of Mega Cities in Percent with 1975 as Baseline.

(Source: Taubenböck *et al.,* 2012)

However, the various results from spatial urbanization in mega cities across the world shows the urban dimensions, form of outlines and patterns are heterogeneous. The change detection results show the immense urban sprawl in developing countries and a marginal spatial two dimensional urban sprawl in cities in the developed countries such as London or New York City (Taubenböck *et al.,* 2012).

A post-classification change detection algorithm is applied to identify spatial urban growth over time. Among all other algorithm post-classification comparison was found to be the most accurate procedure and had the advantage of indicating the nature of the changes (Mas, 1999).

Identification and monitoring of LULC change pattern by GIS and Remote Sensing

Land use land cover change is an important factor for global change because of its interactions with climate, ecosystem processes, biogeochemical cycles, biodiversity and even more important, human activities, land use land cover change researches has become an important aspect of global change, or global warming studies in recent decades (L´opez *et al.,* 2001). Much

more attention has been paid to urban land use land cover change in the last few years, because ecosystems in urban areas are strongly affected by human activities and life of almost half of the world's population related with it (Stow and Chen, 2002).

For measuring qualitative and quantitative terrestrial land-cover changes, satellite imagery has been well utilized by the natural science communities. With remote sensing quantitative and qualitative change of land cover can be identified. The spatially consistent data sets provided by remote sensing that cover large areas with both high spatial detail and high temporal frequency. During the time of 1960, the historical time series data can be provided by remote sensing. The importance of remote sensing was emphasized as a "unique view" of the spatial and temporal dynamics of the processes in urban growth and land use change (Herold *et al*., 2003).
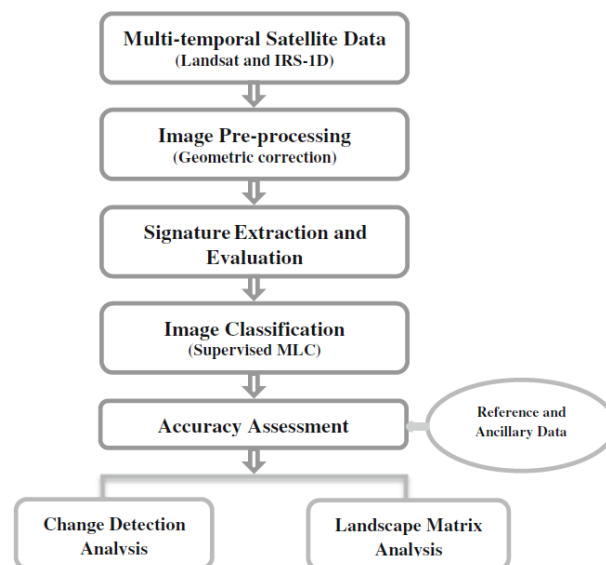

Fig. 6.Flow Chart of Satellite Image Processing and Change Detection.

(Source: Byomkesh *et al.,* 2012)

Fig. 6 shows the steps of satellite image classification. The image can be collected from different sources and then further processing is required to classify the image in different category and to find out the changing pattern. Satellite remote sensing techniques have widely been used in detecting and monitoring land cover change at various scales with useful results (Stefanov *et al*., 2001). At present remote sensing in combination with Geographical Information Systems (GIS)

and Global Positioning Systems (GPS) has been widely used to assess land cover change more effectively than by remote sensing data only. It has already proved useful in mapping urban areas, and as data source for the analysis and modeling of urban growth and land use land cover change (Herold *et al*., 2003).

Land use/cover classification and change detection of Dhaka City

Like any other developing countries Bangladesh is also experiencing a faster increase of urban population, 14.1 million in 1981, 22.51 million in 1991, 31.1 million in 2001 (BBS, 2001) and35 million in 2005 (Cus and Zuperl, 2006) . This rapid urban development leads to the transformation of rural or agricultural land into built-up areas. It is estimated that in Bangladesh every year more than 809km^2 of agricultural land being transferred into buildings, roads or other physical infrastructures (BBS, 1996).
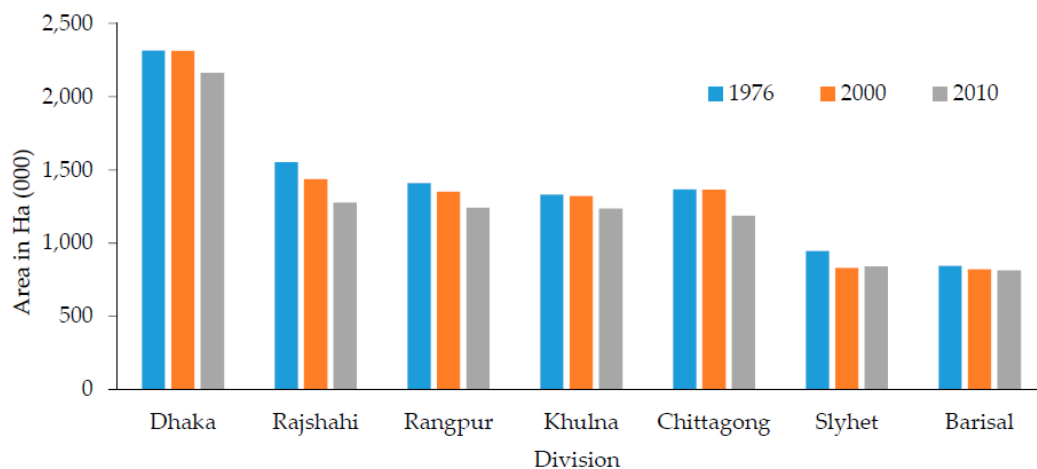

Fig. 7.Changing the Pattern of Cropland in Different Division of Bangladesh.

(Source: Rai *et al.,* 2017)

Dhaka is the capital of Bangladesh and one of the best example of showing the increasing activities of people and the associated environmental changes. Dhaka is expanding quickly and the rate of expansion is 4.24% per year and it is expected to be the third largest megacity of the world by the year of 2020 (World Bank, 2007).

Land use land cover classification and change detection is an important tool to identify global change at various spatial and temporal scale. It reflects the pattern and area of human activities in

a given environment (López *et al*. 2001). The population on earth is increasing rapidly as a result the environment is changing at an alarming rate and diversely. At present condition the rate of land use land cover change is faster than before, particularly in developing countries (Jat *et al*. 2008) due to land degradation by agricultural practices, tourism industry, rapid urbanization and shrimp cultivation in agricultural land and these activities resulting in fatal cost to environment (Abduallah and Nakagoshi, 2005).
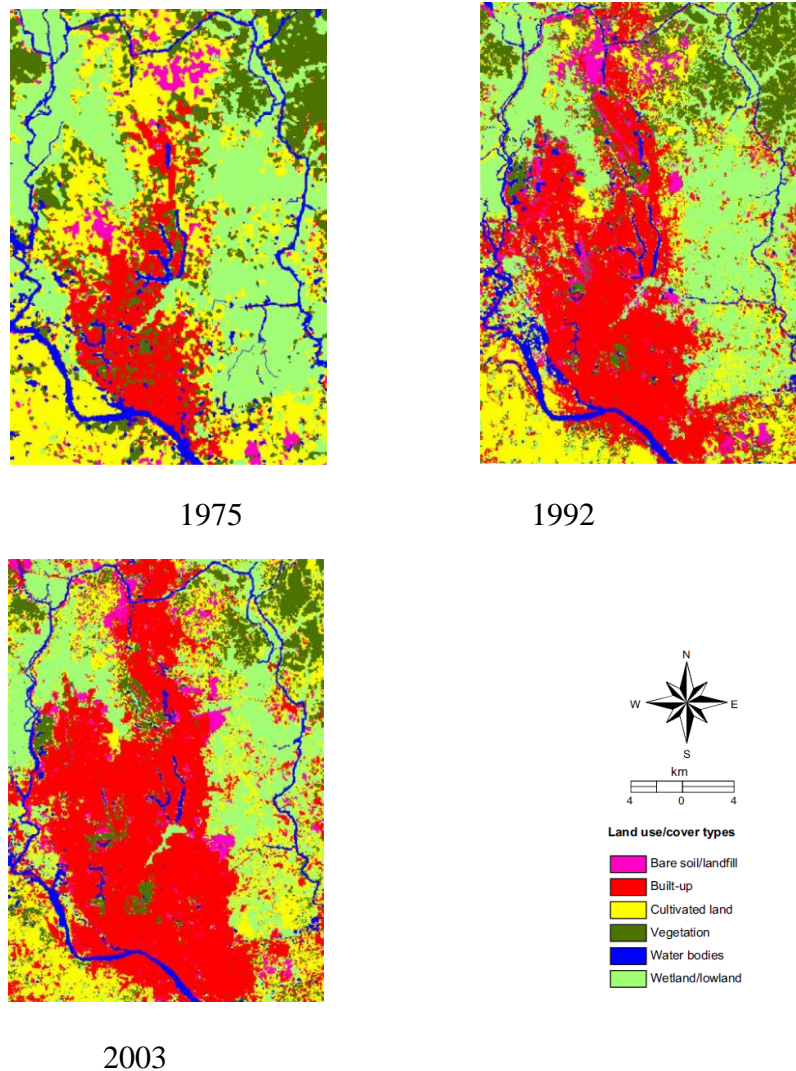

Fig. 8.Classified Land Use/Cover Maps of Greater Dhaka in 1975, 1992 and 2003.

(Source: Dewan and Yamaguchi, 2009)

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The population of Greater Dhaka is projected to continue growing at a rate of about 3–4 percent a year, one of the highest rates among Asian cities (BBS, 2011; UN, 2015).Spatial patterns of LULC changes in the Greater Dhaka area for 1975, 1992 and 2003 are shown in the figure.7. In 1975, lowlands, cultivated areas and water bodies were the dominant land use types, and the direction of urban expansion was northward. The built-up category replaced most of the water bodies and depressions within the city as well as the cultivated land in 1992. Studies of historical maps and the available literature suggest that the depressions and water bodies within the city disappeared relatively quickly after independence as areas were developed for residential, commercial, academic, and business purposes (Siddiqui, 2000).Urban expansion extended further to the north, northwest and to the west. The patterns of LULC change in 2003 revealed that Dhaka started to expand in all directions, primarily at the expense of vegetated and wetland/lowland areas. The construction of a bridge over the Buriganga River accelerated urban expansion in the southerly and northwesterly directions (Dewan and Yamaguchi, 2009).

Table 4.Amount of Land Use land Cover Changes between 1990 and 2010

Land use/cover types	1990		2003		2010	
	Area(ha)	Percentage	Area(ha)	Percentage	Area(ha)	Percentage
Water body	1715.4	12.33	1166	8.38	799.65	5.74
Built-up area	4759.92	34.20	7268.4	52.25	7970.67	57.26
Agricultural land	5414.67	38.91	3009.6	21.63	2232.63	16.04
Bare soil	2026.71	14.56	2467.9	17.74	2917.44	2.96

(Source: Mamun *et al.,* 2013)

The table 4.shows the area obtained from the land cover classification of four types (i.e. Water body, Built-up area, Agricultural land and Bare soil) and their percentage of total area. Analysis of the LULC changes in Dhaka over time revealed a considerable increase in the built-up areas over the period; built-up areas increased by 2508 ha from 1990 to 2003 and 702 ha from 2003 to 2010.

Table 5.shows the conversion of land use land cover from year 1975 to year 2005. During this period all category of land use decreased only the built-up area increased.

Table 5.Land Use Land Cover Conversion in Dhaka from 1975 to 2005

Land-use/cover type	1975		1988		1999		2005	
	Area	%	Area	%	Area	%	Area	%
Green spaces	18626.0	44.8	14818.7	35.7	12966.6	31.2	10009.7	24.1
Built-up	5550.5	13.4	11928.2	28.7	15913.4	38.3	20549.7	49.4
Other category	17387.5	41.8	14817.1	35.6	12684.0	30.5	11004.6	26.5
Total	41564.0	100.0	41564.0	100.0	41564.0	100.0	41564.0	100.0

(Source: Byomkesh *et al.,* 2012)

From table 6 we can see the major conversion classes. Water body and wetlands and all other classes first converted into bare soil then to built-up area.

Table 6.Major Land Use Land Cover Conversion

From class	To class	1975-1992(ha)	1992-2003(ha)
Water body	Built-up	655.7	269.5
	Bare soil	71.4	82.7
Wetland	Built-up	660.0	1414.7
	Cultivated land	2007.8	2743.6
	Bare soil	416.8	492.5
Cultivated land	Built-up	3944.3	23.9.0
	Bare soil	794	391.8
Vegetation	Built-up	1725.1	1069.1
	Cultivated land	932.4	1387.5
	Bare soil	333.7	287.3
Bare soil	Built-up	453.8	1047.4

(Source: Dewan and Yamaguchi, 2009)

Figure 8.shows trend of land use transformation analyses, it can be seen that vegetation to built-up, wetlands to bare soil and then to built-up transformations are prominent. The figure revealed that cultivated and vegetated land was used for urban development in the period of 1990–2003 and 2003-2010, accordingly resulted in 44% and 26% loss. Also, from 1990 to 2003 and 2003 to 2010, water bodies and mainly wetlands were converted to bare-soils and then to built-up areas.
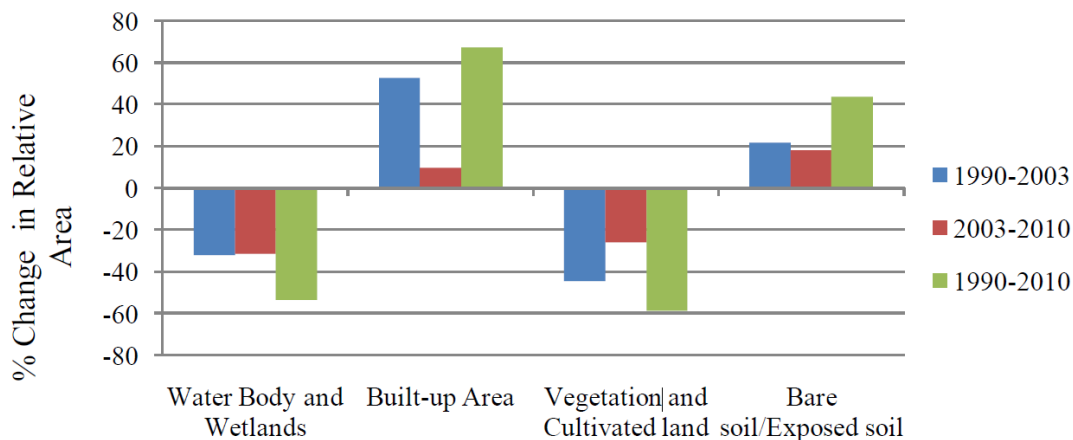

Figure.9.Relative Changes in Land Cover (%) in Dhaka.

(Source: Mamun *et al.,* 2013)

As a result of urbanization 1% of agricultural land per year has been decreasing in Bangladesh. One of the major cause of this is the land conversion for housing and developers, cooperatives and individuals turning it into urban areas (Alam and Ahmad, 2010). Here Table 7.shows the gradual increase of non-availability of agricultural land in Greater Dhaka.

Table 7.Gradual Increase of Non-Availability of Agricultural Land in Dhaka

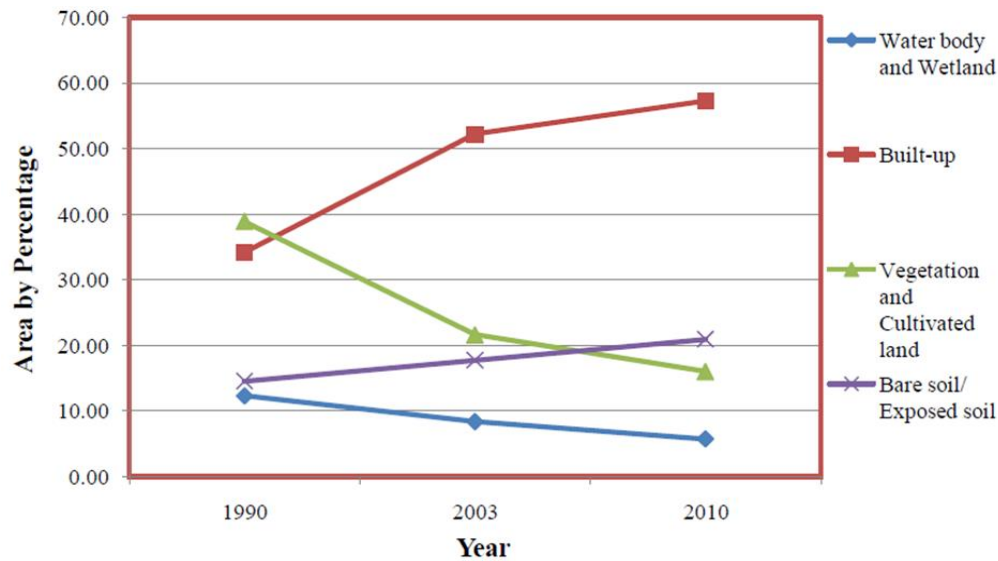| Year	Amount of land not available for cultivation (ha)
2000-2001	2,87,044
2001-2002	2,88,259
2002-2003	2,90,688
2003-2004	3,02,834
2004-2005	3,03,643

(Source: Alam and Ahmad, 2010)

Fig. 10.Temporal Pattern of Land Use/Cover Change in Dhaka.

(Source: Mamun *et al.,* 2013)

Figure.9 shows that during 1990-2003, the conversion pressure was mainly onto cultivated and vegetated land as it shows the maximum loss. But in case of 2003-2010, the pressure transferred to wetlands because all cultivated lands had already been converted to built-up areas.

Threats and challenges of urbanization in Dhaka Megacity

1. Unplanned housing and haphazard development, absence of proper land use policy, inequity of lands, pitiable coordination among responsible organizations and absence of reliable information on the current land use practice, all are contributing to the urban sprawling and leading to emergence of slums and squatters (Byomkesh *et al.,* 2012).As a consequence of Dhaka's messiness, air, soil and water pollution have reached dangerous levels.

2. Current and accurate information on land use cover is a prerequisite to the management and planning of urban areas. In the absence of such information, sustainable urban development cannot be achieved and may lead to the mismanagement of scarce resources which is prevalent in Dhaka (Dewan and Yamaguchi, 2009).

3. Traffic congestion is the flip side of higher productivity when large numbers of people live and work in a relatively small area. The driving speed in Dhaka reduced from21 kilometers per hour 10 years ago to 7 kilometers per hour today (Bird *et al*., 2018).

4. Effective local governments need a sound fiscal basis to meet their functional obligations, respond to the demands of their constituents, and support the development of their jurisdictions.Figure.11 represents that Dhaka's financial resources are inadequate even in comparison with other megacities in the region.
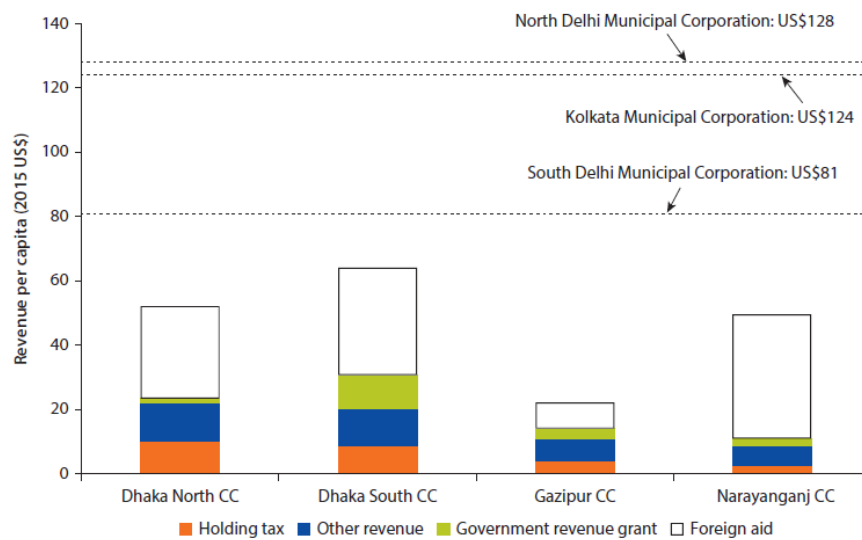

Fig.11.Financial Resources for Urban Development in Dhaka Compared to Other Megacities.

(Sources: BBS, 2011 and World Bank, 2017)

Scopes of improvement

1. Proper planning of urban development and coordination among responsible authorities so that the city can be managed in a proper way (Byomkesh *et al.,* 2012).

2. Maintenance of current and accurate information for proper management and sustainable urban development. For this space-borne remotely sensed data can be very useful for Dhaka Metropolitan, as there is a lack of reliable spatial information. Timely and reliable land cover

information is not only imperative to perceive the past and present condition of the land but also used to facilitate the development of integrated resource management policies, to achieve sustainable urban development and to derive sound environmental planning (Dewan and Yamaguchi, 2009).

3. Construction of mass rapid transportation system for mass population of Dhaka city. Metro rail and underground railway system can play an important role in this case (Bird *et al*., 2018).

3. Decentralization of the development and construct developmental activities outside of the city so that people find work around the country (Bird *et al*., 2018).

Chapter IV

Conclusions

Currently there are 27 megacities around the world and Dhaka is one of the highest growing megacity. The population of Greater Dhaka grew from 3.4 million in 1981 to nearly 18 million in 2015 and projected to continue growing at a rate of about 3–4 percent a year, one of the highest rates among Asian cities. Dhaka is expanding quickly and the rate of expansion is 4.24% per year and it is expected to be the third largest megacity of the world by the year of 2020. Initially direction of urban expansion of the city was northward later with time the patterns of LULC change revealed that Dhaka started to expand in all directions. The developmental activities took place on agricultural land and by filling up the wetlands.

Integrated use of GIS, RS and socio-economic data can be very effective to understand the spatial and temporal dynamics of LULC changes. Different study revealed that greater Dhaka experienced a rapid changes in LULC, particularly in built-up/urban areas. The urban areas increased by 6131 ha during 1975-1992 and 4422 ha from 1992 to 2003, which resulted in a substantial reduction in the area of water bodies, vegetation, cultivated areas and wetlands/lowland.

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