A STUDY ON DEVELOPMENT TREND OF TEJGAON INDUSTRIAL AREA

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Dedicated to our beloved parents

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ABSTRACT

Dhaka city has experienced significant urban growth during last fifty years. Land uses have undergone a massive unplanned development since the liberation war of Bangladesh in 1971. The rapid growth of population and increasing demand for better livelihood act as a major propelling force for this unplanned development. This resulted in outward expansion of Dhaka city toward its peripheral vicinity. Eventually Tejgaon become the major attraction for immense industrial activity to meet the ever increasing demand of growing population and finds it location in the core of the city from the peripheral location as designated in 1959 master plan of Dhaka city. Incessant changes in land uses have altered the physical characteristics of the area from the state as it was designed by Dhaka Improvement Trust (DIT) in 1968. Recently government of the People's Republic of Bangladesh has taken a decision to develop the area as a commercial cum residential hub. Therefore this research explores the existing land use scenario and development trend of Tejgaon industrial area from land use perspective. Land use information of the study area includes information on characteristics, ownership and value of land parcel and detail information on existing structures. Development trend of the study area is investigated by means of information like growth of major land uses in the study area, change in land use pattern, structure type and structure height within the plots, change in ownership pattern and land value. Finally as a major outcome, this research has revealed that there exists an increasing trend of commercial activities and the rate of growth of commercial activities in this area greater than that of industrial one. The findings can be used to provide targeted solutions by addressing specific problems in the parking tendencies. This research can act as a base line study for future development plan related to the study area.

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GLOSSARY OF TERMINOLOGY

Pucca structures: Structures those built with permanent plinth and walls material as burnt bricks, stones (packed with lime or cement), cement concrete etc and roof material as RCC (reinforced cement concrete), iron, or other metal sheets.

Semi–Pucca structures: It consist of plinth made of permanent materials as burnt bricks, stones (packed with lime or cement), walls and roof made up of tin or other metal sheets.

Katcha structures: katcha structure are those with temporary plinth made up of bamboo, wood or other non durable materials and walls and/or roof are made of materials same as "Semi-Pucca" buildings.

Under construction: The buildings which were under construction activity during the period of data collection are termed as "Under construction" building.

High rise building: According to the final draft of Bangladesh National Building Code (BNBC-2014), the buildings with a height of eleven stories or more has been redefined as high-rise building against the previous consideration of buildings with a height of more than six stories as high-rise building in Bangladesh National Building Code (BNBC-2006) (The Financial Express, 2014; Public work department, 2006). In this research the existing buildings with height of eleven storeys' or more are termed as high rise buildings. For the buildings in 2009 the definition of high rise buildings as per Bangladesh National Building Code-2006 is considered.

Private property: Refers to individual private owner of a land or ownership of a business enterprise over a land.

Group property: Means that a group of individual has common stake or proprietorship over a piece of land.

Leasehold property: Refers to the property that is leased from government either by individual owner or a group for a specific period of time.

Government or Khas land: Means that the land owned by the Ministry of Land, as representative Collectors are custodian of the land.

Residential use: If the total floor area of residential use of a mixed use plot is higher than the other land uses, the use of the plot will be denoted as residential use. It includes staff quarter, dormitory, family housing, industrial worker mess and apartment.

Commercial use: If the total floor area of commercial use of a mixed use plot is higher than the other land uses, the use of the plot will be denoted as commercial use. It comprise of bank, electrical and electronic equipment wholesale center, automobile showroom, restaurant, export oriented business, printing press, retail shop, informal market place, shopping complex and vehicle service center.

Industrial use: If the total floor area of industrial use of a mixed use plot is higher than the other land uses, the use of the plot will be denoted as industrial use. It includes chemical industry, food industry, pharmaceutical industry, warehouse, garments, electrical and electronic equipment production industry and metal industries.

Institutional use: If the total floor area of institutional use of a mixed use plot is higher than the other land uses, the use of the plot will be denoted as institutional use. It comprises of administrative office use, university, college, school, training center and mosque.

Service category: If the total floor area of service category land use of a mixed use plot is higher than the other land uses, the use of the plot will be denoted as service category use. It consists of hospital, medicine shop, petrol pump.

Chapter 01

Introduction

CHAPTER 01: INTRODUCTION

The introductory chapter introduces the background of the study followed by specific objectives and further scope and limitation associated with the study.

1.1 Background of the study

Development of Tejgaon was started during 1950s by Public Works Department (PWD) as an industrial area (RAJUK, 1995). The first ever Master Plan of Dhaka (1959) also proposed an industrial district in Tejgaon. Industrial development in such a central location of the prime city of the then East Bengal resulted in a number of dreadful impacts on the area itself and its surroundings (Oakil and Sharmeen, 2007). In the circumstances, the then DIT (Dhaka Improvement Trust) planned Tejgaon as light industrial area in 1968. After liberation in 1971, with rapid growth of Dhaka City, the area has gone through a massive level of unplanned development (Khan *et al*, 2005). Such development eventually has created land use conflicts due to insufficient capacity in terms of emerging demand of goods for ever increasing population. Furthermore it has attracted different non-industrial uses like residential, commercial, office etc with a wider variation of people living and working there (RAJUK, 2004).

According to the latest Detailed Area Plan (DAP), gazetted in 2010, one of the major hindrances behind the improvement or expansion of Tejgaon industrial area is the constantly changing land use of this city core. The DAP suggests that industrial use may exist in the planned segment of the area with further subdivision of medium weight industrial plots and commercial use may be allowed in place of light industries with conversion fees. There is also an additional proposition that if possible then this industrial area should be relocated outside the boundary of Group-C area of the Detailed Area Plan (DAP) and the area should be kept as an extension of Kawran Bazar for future commercial cum office zone or a large scale open space cum recreation zone (RAJUK, 2004). The research work of Khan *et al* (2005) also supports the proposals made in the DAP as the commercial use of the study area had been increasing rapidly from 2000 whereas the industrial development had gradually declined thereby. The government of the People's Republic of Bangladesh has recently decided to turn the entire Tejgaon industrial area along with its major roads

into a commercial as well as residential district through a comprehensive master plan (The Daily Star, 2014).

In contrast nowhere in the master plan of Dhaka city or DMDP structure plan, urban area plan or DAP there exists a single government policy or proposal to develop or plan residential use in Tejgaon industrial area. Rather the literature supports the emerging commercial use in the place of light industries in the study area (Khan *et al*, 2005). So in this circumstances, the study wishes to explore the development trend of the study area.

1.2 Objectives of the study

- ☐ To prepare a land use inventory of Tejgaon industrial area.
- ☐ To investigate development trends of Tejgaon industrial area based on land use variables.

1.3 Scope and limitation

Scope of the study

- ☐ The study results in documentation of detail existing land use information of Tejgaon Industrial area.
- ☐ It can serve the purpose of scrutinized analysis of the existing land price and ownership pattern of the study area which is a major determinant of existing degree of development.
- ☐ Identification of the changes in the land use pattern and trend of development of the study area is a major scope of the study.
- ☐ This research can act as base line study for any future development plan related to the study area.

Limitations of the study

- ☐ **Survey reletaed problem:** Several problems arose during conduction of field survey. Execessive subdivision of land makes it difficult to identify the holding number that indicated in the previous land use map. Moreover all the existing holding numbers did not match with previous land use map which made the survey more difficult to collect required information. Collection of

information on land price and ownership of the plots also poses great difficulties. In some cases respondants did not respond in proper manner either they were not interested to respond or afraid of expressing true opinion.

- **Problems associated with trend analysis:** As the study aims to investigate the development trend of Tejgaon industrial area, a comprehensive preceding database on ownership of the plots, land value of the plot etc is a pre requisite for this course of action. But in the previous works of Khan *et al*, 2005 and the database of Dhaka city in 2009 collected from Dhaka city corporation, land ownership and land price data of Tejgaon industrial area was missing. As a consequence it was quite difficult to make a comprehensive analysis of development incorporating all relevant variables.

- **Unavialability of updated statistical database related to the study area:** The database collected from Bangladesh Bureau of Statistics for the inscription of demographic characteristics was not updated and hence can not trully represent the existing population, population density of the study area.

Chapter 02

Methodology of the study

CHAPTER 02: METHODOLOGY

Methodology is a system of precise rules and procedures upon which the research is based. This chapter introduces the procedures to be adapted for the collection and analysis of the database. To achieve the objectives, the study executes the following steps:

2.1 Study area selection and preparation of base map

The development trend of Tejgaon industrial area exhibits a rigorous shift from intensive industrial development to growing commercial establishment follwed by a subsequent mixed use development (Khan *et al*, 2005). Recently government of the People's Republic of Bangladesh has taken a decision to develop the area as a commercial cum residential hub. Therefore, the research is designed to identify the development trend of the area.

The 500 acres of Tejgaon industrial area with around 430 plots is the study area of this research. The base map of the study area is collected from the research work of Khan *et al* (2005) and updated during field survey in April 2015.

2.2 Preparation of questionnaire

Based on co-ordination schema, draft questionnaires for land use information was prepared. For checking the validity of questionnaire, pilot survey was conducted. After the completion of pilot survey, the draft questionnaire was remoulded and ultimately the final questionnaire was prepared. The final questionnaire for collecting land use information is added in the appendix (Appendix -A).

2.3 Data collection

The required data is collected both from primary and secondary sources by means of questionnaire survey, checklists and/or literature works subsequently. Primary data collection includes land use information of the plots and people's perception regarding development of the site. Secondary information includes preceding land use pattern, structure type and structure height of the study area. Data was collected on weekdays.

2.3.1 Primary data collection

Land use inventory of the study area includes information on characteristics of land

parcel as plot size, ownership and market value of the plot. Detail information on existing structure including structure type, ground coverage, number of stories, number of units at each floor, area and use of each unit or floor were also incorporated in this inventory. The wide spread practice of creating land use information of an area includes these explanatory variables. Literatures also strongly support the use of these variables in the preparation of existing land use inventory of Tejgaon industrial area.

For collecting land use information each of the 430 plots of the study area is surveyed through physical survey in April 2015. Land ownership and market value of the plots were collected by surveying corresponding owner or the caretaker of the lands. Market value of the plots is verified by interviewing key informants as Ward Commissioner of this area.

2.3.2 Secondary data collection

The secondary database primarily serves as an important basis for already studied information related to the research work. Secondary data was collected from different research work, articles, journals, conference papers and websites. The study of Khan *et al*, 2005 was acted as a key source of secondary database for this research. The land use pattern, structure type and structure height of Tejgaon industrial area in the year of 2005 was identified from this study. The required database was also collected from Dhaka City Corporation. This database includes the land use information of Dhaka city in the period of 2009. The demographic information of the study area was collected from population cencus of 2011 from Bangladesh Bureau of statistics.

2.4 Updating base map, data analysis and interpretation

Base map collected from the study of Khan *et al* (2005) was updated based on the field survey database of 2015 to exhibit the existing land use pattern of the study area. This also acts as a significant basis for spatial analysis of change in land use over years in Tejgaon industrial area. Furthermore by means of other relevant maps the spatial variation of different variables as market value of the plots was exhibited which helps to identify the spatial variation of land values within the study area.

Different statistical tool were used for the analysis of the data. These tools include frequency distribution, trend line analysis, co-relation analysis and cross tabulation

between relevant variables. Co- relation analysis is conducted to test the correlation among variables for further proper and scrutinized interpretation of analysis outcomes. The value of “Pearson co-efficient of co-relation” greater than .5 the represent positive co-relation between variables and hence apposite for authentic interpretation.

Most of the primary database was used to prepare land use profile of the study area. This profile helps to identify the scale of existing development pattern of the study area. Change in land use pattern of the study area was exhibited both by means of primary and secondary database through trend line analysis. Secondary data was also used in this research for the inscription of study area profile, demographic feature, literature review and for further recommendations.

Development trend of the study area is investigated by means of information like growth of major land uses as commercial and industrial one in the study area, change in land use pattern, structure type and structure height within the plots. However the variables under consideration somehow truly represent the trend of development of an area to a great extent. Appropriation of these variables for the exploration of development trend of an area is strongly supported by relevant literature works both in home and abroad.

The growth of major land uses in the study area is exhibited by means of actual growth percentage of that specific use in relation to total land uses in a specific period. This endows with a clear insight of incessant growth scenario of Tejgaon industrial area. Change in land use pattern of Tejgaon industrial area is analyzed both by means of number of plots and total plot area occupied by different land uses between 2005 and 2015. This analysis has only been possible for the plots whose holding number at present and in 2005 year period matches. This analysis envisages the changing land use pattern of the area. Change in structure type and height provides a basis for analysis of the changing structural characteristics and associated degree of development of Tejgaon industrial area.

Chapter 03

Literature Review

CHAPTER 03: LITERATURE REVIEW

This chapter summarizes some studies from home and abroad and the reasons of taking the variables for analyzing the development trend. Government intervention in shaping a area's development trend is also a major topic of this chapter.

3.1 Location of industry

Industrial location plays an important role in shaping the pattern of economic development of an area. It also influences the trend and regional development of the area. Industrial location largely depends on factors like transport, labor, agglomeration and market (Losch, 1954). But, the above variables are not always support equitable spatial distribution of industry in an area.

Every industry owner tries to gain maximum efficiency in both production and distribution of goods and services. So to reduce the production cost and increase their monetary benefit, industrialists tends to locate industries where adequate infrastructural facilities are available. It causes concentration of industries to a particular location and eventually deprives the less developed area (Huda, 1993).

3.2 Locational requirement for an industrial area

A large number of factors contribute to the choice of industrial location to a particular area. In Bangladesh, most of the industries are situated at the places where labor and raw materials are available.

Factors for locational requirement of an industrial area can easily be divided into two sections: Physical factors and socio-economic (human) factors. Physical factors mainly include accessibility to market and raw materials, characteristics of the land, condition of infrastructure facilities etc. Socio-economic factors include availability of labor, capital, transportations and communications, government policies etc. (Khan, 1996).

Physical factors

Area with easy access to the market places shows high potential for industrial development. Markets places can be local, regional and international. Some areas are lack of accessibility due to geographical location or lack in transport facilities. So, area with better market accessibility is a better place for an industrial development.

For an industrial location, access to the raw materials is also very important. That is why most of the heavy industries are located close to the area where large amounts of raw materials are available.

The site of an industry needs to be accessible to enhance easy import of raw materials and export of finished products. Industries in the earlier period used water routes for transporting raw materials. Nowadays, better accessibility to major transportation routes is a prerequisite of industrial development in an area.

The topological feature of an area is very important for the establishment of an industry. A flat and fallow land with good accessibility has a foremost importance for the location of an industry. As a result most industry tries to find vast areas to expand their production.

Socio-economic factors

A company cannot set up its desired industries without investment of money. So, capital is very important for setting up of an industry. The investment may come from private sources or from the government. Mainly, area within the incentive policy of the government attracts different types of large industry.

Probably, the most important factor for establishment of new industries nowadays is better communication facility. Better communications links are needed not only with the adjacent areas but also with the core areas of a country. Area with easily accessible transport routes such as the motorways, railways and ports can easily attract industry.

Governments can greatly influence the location of industries, by imposing tax incentives, inexpensive rent and other forms of facilities to companies located in certain areas of the country. In 1968, RAJUK (formerly known as DIT) approved a plan to build Tejgaon area as a light industrial area which changes the whole development trend of the area.

Labor availability is very important for old, labor-intensive industries. This is why many of them located in the inner locations of the cities, so that there was a huge pool of potential workers living close to these locations.

3.3 Land use pattern of an area

"Land in its natural and urban states in both an input to, and a product of, the planning process. It represents potential opportunity for social and economic mobility, urban change and growth pattern of an area (Edward *et al*, 1995, pp. 196-197)."

There are four perspectives that must be recognized to create land use information for an area as land as functional space, land as a setting for activity systems, land as a commodity to be developed and land as esthetic resource. Land use characteristics, Structures, Space uses are important to identify the land as functional space. Location, area of the plot, ownership pattern is major characteristics of land. Building type, ground coverage, number of stories and floor area are for identifying the structural characteristics of the plot and existing use, number of units per floor etc. are indicators of space use (Edward *et al*, 1995).

Land use analysis is a means of identifying broadly how land is used. Each type of use has its own characteristic that can be determined by compatibility, location and preference to other land uses. The first step in the land use analysis is to conduct an inventory of existing uses. In case of preparation of land use inventory for town of Cloverland, the land use inventory classified land uses into twenty five categories. The major categories include the structural development on the plot, space use, location and proximity with the other land use etc. (Foth and Dyke, 2000).

Numerous factors can impact land use, including economic activity, population growth and redistribution, transportation facilities and the presence of natural resources. In determining the existing land use pattern of Mercer County, all of these factors are considered influential. Almost fifty percent of the total land area is classified as agricultural, with an additional thirty seven percent in the forest category. Less than ten percent of the county is classified as either high- or low-density urban areas. Land uses within these areas include residential, commercial, industrial, and public and semi-public uses (City planning authority of Mercer County, 2006).

3.4 Development trend

Development trend of an area is particularly influenced by a number of variables. Change in any of the variables or all of them can easily modify the development pattern of an area. Major variables like land use change, change in ownership pattern,

change in structural type and height, change in land price etc. are mainly responsible for shaping the development trend of an area.

Land use change

Land use information is used to understand how a community is changing the landscape of an area. It provides a basis for the planning new development and the management of its consequent potential impacts on the environment. Major land use categorizes are residential, commercial, industrial, institutional, forest areas, vacant areas and similar uses.

The documentation of land use change of an area provide a better views for analyzing the development trends and to a large extent also outlines the direction of the future development (Matisovs, 2011). Change in land use or change in any or the entire category that are mentioned above can determine the development trend of an area.

Tejgaon is a major industrial hub in Dhaka city gradually losing its characteristics due to the haphazard and unplanned development. The area is constantly to cope with the increasing demand of rapid urbanization changing into a mixed use hub. Heavy industries have shifted and commercial activities have increased a lot in the last two decades. Most of the plots with industrial uses is now converting into commercial one (Oakil and Sharmeen, 2007).

After the establishment of RAJUK (formerly known as DIT) in 1987, the trend of mixed use development increased. Since Tejgaon was adjacent to the core area of Dhaka city, much more commercial activities have emerged in this area. Different types of commercial groups like Rangs group, Orion group, Kallol group etc. established their main corporate office in Tejgaon area. More commercial use emerged and heavy industries relocated due to the planning policies of RAJUK. Thus the area was became the core economic zone of Dhaka city. But absence of a comprehensive planning, unplanned development increased and the area lost its typical industrial characteristics (Oakil and Sharmeen, 2007).

The study of Khan *et al* (2005) also indicated the trend of land use change in Tejgaon industrial area. The area was developed mainly as a planned industrial zone but the land use change of surrounding areas, better proximity with the central area, higher land value etc. attracted different commerce groups to establish their corporate office,

export oriented business office, automobile showroom etc. in Tejgaon. This change in land uses now shape the typical industrial area into a commercial cum industrial based area.

Chowdhury (2014) in his study analyzed the trend and direction of the development of Chittagong district. The study indicated some factors responsible for the current development pattern of the city. He criticized that though the city has vast opportunity, resources and geographical advantages; there is no growth pattern analysis for the future development of the city whatsoever. The study also aimed at developing a GIS based map showing the existing land use and the development pattern of the area.

In Nevada, USA land with higher accessibility and elevation attracts the residential use. Change in land use mainly depends on the surrounding uses. The pine nut allotments areas are suited only for recreational, cultural or resource uses. But new development of the area attracted the developers for building residential apartment as it offered a better view because of the elevation gains (Rodrik, 2013). Due to rapid urbanization rate agricultural land and fallow land changes its characteristics which shape the direction of development of the area (Alphan, 2003).

The land use change can influence a development trend in three major ways.

a) Changing in the plot use of an area can change the total development pattern of the area.
b) Increase in the number of plot of a particular use or decrease in a land use can indicated the trend.
c) Cluster size change of different land use categories (Delden, 2008).

There are several studies that can be found where due to increasing demand of land and changing land use encroached the agricultural land and converts it into industrial or commercial use (USDA, 2008).

Structural type and height

Structure type of an area indicates the development pattern of the area. Katcha house are found prominent in case of poor, informal type of development and hence subject to the risk of further demolishment. Change in structure type is one of the major criteria of identifying development trend. Increase in permanent structures

traditionally reveals that the area undergoes a massive commercial based development (Ali and Moon, 2007). In Bangladesh, informal settlements generally dominated by the slums or squatters development. Majority of the structural development of these areas are poor, unplanned and Katcha (Rodrik, 2013). This indicates that change in structural type indicates the development pattern of an area.

Most of the high rise buildings in Dhaka city are commercial one and uses of these buildings are mainly Bank, mixed use development, hotel, corporate office, residential etc. Tejgaon was developed as an industrial area. But its land use gradually shifting toward a mixed use development dominated by the commercial use (Oakil and Sharmeen, 2007).

Land price

Development trend of an area is shaped by the structural condition of the area. This structural development is highly influenced by the land price. Area with a higher land value is dominated by the high rise buildings.

Though land price derived from the survey data is less reliable as a real market price than transaction figures, it presents more exact pictures of existing development trends (Darin-Drabkin, 2013). Analysis of previous year data on land price indicates that development trends of USA and Switzerland from the early 50's is mainly industrial cum commercial based. Area with commercial development changes its characteristics towards mixed use development (Hoyt, 1960). Between the years from 1950 to 1960 in the USA, Rapid urbanization and increased in income of the residents, increased the demand of the land. The area with high land price mainly developed as a commercial area (Darin-Drabkin, 2013). Land price also bring change in the structural condition of an area. In Japan, sites with utility services and higher land price are the major choice of the developers to develop residential apartment (Ministry of Land, Infrastructure and Transport, 2007).

Higher land price attracts corporate groups, developers that can change the entire land use pattern of an area. There exists high a correlation between land price and land use pattern as any new development of an area can also increase the land price.

Ownership pattern

Policy or plan regarding an area is largely influenced by the existing ownership pattern of the area. If large parcel of land of an area is under the government ownership, then it is easy to take development decision. But, area with higher private property is difficult to incorporate in any planning decision.

Ownership pattern can largely persuade the land price and structural height of an area. The best method of evaluating land price of an area is to compare between the ownership pattern and the land price for each plot (Darin-Drabkin, 2013).

3.5 Policies regarding industrial development in Bangladesh

After the liberation war, government of Bangladesh established some major corporations and ministries working for dispersing the industrial development all over the country. But instead of dispersing the industries, policies and programs taken by the governmental organizations leads to concentrate in or around the Dhaka, Chittagong and Khulna districts (Huda, 1993).

In the first five year plan, incentives had been given to attract industries in less developed areas. In second five year plan the whole country was divided into developed and less developed zone and in 3rd there are three categories i.e. developed, less developed and least developed area. The segments help to allow government to take informed decision for incentive distribution (Khan *et al*, 2005).

Major steps have been taken by the government to developed more industry oriented plans and policies came into light after the formulation of "National industrial policy 2010". The major concern of this policy is to provide incentives for the private sector interested in small and cottage industries. In this process government acted as a facilitator and encouraged private- public partnership in order to build a vibrant and dynamic private sector. The policy helps to disperse some industries in less developed area.

3.6 Role of Government policies to shape development trend of an area

The National industrial policy (2010) is a major pronouncement undertaken by the government. The policy is a successful one to disperse industries to a location with less infrastructural facilities. Because of the incentive policy some of the industries

relocated outside the Dhaka city. Small and medium industries are increasing in and outside the Dhaka city (Huda, 1993).

According to DMDP, "Tejgaon was developed as a mixed use development. The DPZ-6 is the Tejgaon Industrial area, policy decision is necessary now in regards to underutilized plots. Plots for women entrepreneurs, together with housing/dormitories for women (single and women headed households) has been proposed. Sick industries and other obnoxious industries shall be replaced with suitable light industries. Because of the proximity with the densely developed city, the area needs to be restricted to light industries only (RAJUK, 1995, p. 89)". Because of the decision taken by the government, commercial activities increased in TIA. Main characteristics of the area are changed and the development pattern of the area is a mixed use type.

In developing countries, despite of high industrialization and economic growth, percentage of poor people increased during late 90's. Government role to sponsor the capital intensive industries and provide incentives for medium industries led rich and middle people richer and unskilled and lower industries are falling behind (Adelman, 1999).

In early 1980s, the Indian government made policy decisions for infusing fuel-efficient technologies and competition into the automotive industry. Promotion of automotive exports, foreign equity collaborations, relaxation on new entries etc. are also some major policies taken by the government of India led to a increase in automotive industries (Ranawat and Tiwari, 2009).

Chapter 04

Tejgaon Industrial Area

CHAPTER 04: TEJGAON INDUSTRIAL AREA

This chapter summarizes information on historical background and physical characteristics of Tejgaon as an industrial area in different phases. Initially the chapter introduces the chronological development of Tejgaon industrial area followed by a diminutive description of the study area.

4.1 Historical Background

4.1.1 Evoluation of the Tejgaon as an industrial area

The development of Tejgaon as an industrial area includes a number of phases in different period. These are discussed under the following headings:

4.1.2 Tejgaon before 1950

In Mughal period, the present Tejgaon area was totally a forest land. Then in colonial period, the Portuguese people who came to Dhaka and established some 'vacation House' in Begun Bari near Tejgaon area. For further development they demolish the forest land and left the area as a fallow land. After then in 1948, the Public Works Department (PWD) started developing the area as an industrial area adjacent to the Dhaka city (Khan *et al*, 2005).

4.1.3 Tejgaon industrial area in master plans

In 1948, East Pakistan Planning Sub-Committee prepared a questionable physical plan of Dhaka city which includes the development of an industrial area on the fallow land of Tejgaon area. The area was basically developed to encourage industrial development and to provide employment to basically non-Bengali immigrants. But, industrial development in such a central location of socio-economic and political center of East Bengal resulted in a number of dreadful impacts on the area itself and its surrounding areas (Oakil and Sharmeen, 2007). But in absence of planning body, it is not possible to accommodate the sudden growth in Tejgaon area (Mowla, Q. A., 2007).

The Dacca master plan (1959) indicated the Tejgaon industrial estate located outside the Dhaka city in 1959. Since the fallow land of Tejgaon was suitable for further industrial development, there was an indication of developing the Tejgaon area as an

industrial hub in the master plan of 1959. The master plan also incorporated the policies of East Pakistan Planning Sub-Committee regarding the Tejgaon area. The policy of the government was to provide necessary technical, economic, and physical supports in order to build the site as typical industrial area (Kabir and Parolin, 2013).

The jurisdiction of DIT (Dhaka Improvement Trust) was 385 square kilometer and then Tejgaon was outside the Dhaka city. The function of the Trust was to carry out the development in all areas of the city and making improvement of old areas including slum areas, widening of the roads and creation of new areas for residential, commercial, industrial and other purposes. The Trust was also responsible for planning the development of the area within its jurisdiction. The main reason is that, in the period between 1960s to mid-1980s Tejgaon area was developed slowly and steadily as an industrial area. Then the 'growth rush' has been started. In the early 90s commercial and informal housing settlement and relocation of heavy industries led to a mixed use land development (Ahmed and Mohuya, 2013). Land uses of Dhaka city in the period of 1962 is exhibited in figure- 4.1.

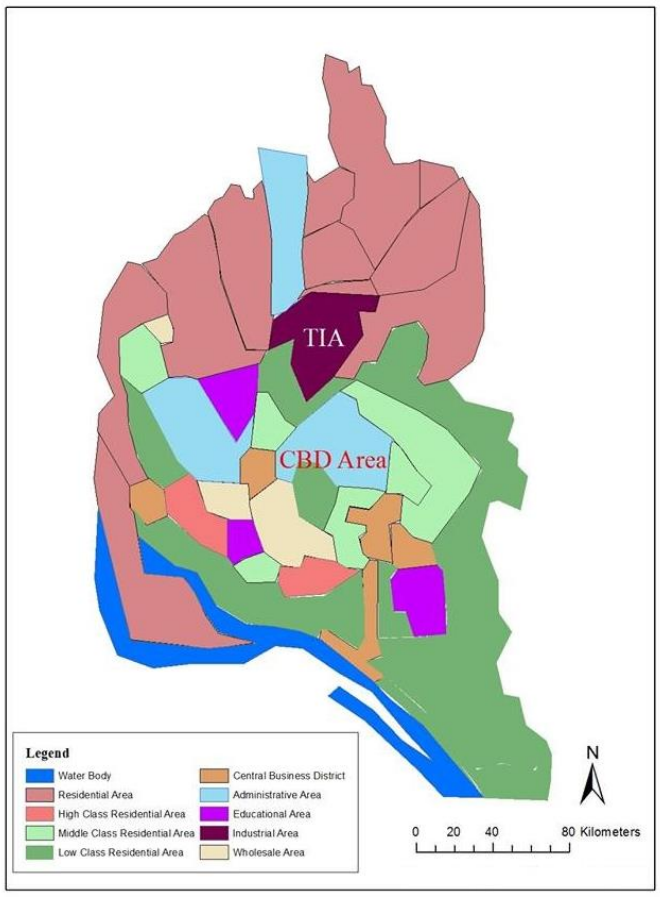

Fig 4.1: Land use of Dhaka city in 1962

(Source: Khan *et al*, 2005)

4.1.4 Development trend of Tejgaon industrial area after 1971

In 1968, RAJUK formerly known as DIT (Dhaka Improvement Trust) planned Tejgaon as a light industrial area. After 1971, the area has gone through a massive level of unplanned development because of the rapid growth of Dhaka city. After then Tejgaon industrial area was included in Dhaka city area to support that growth which is shown in Dhaka city Land use map in 1975. From the map we can see that different types of commercial uses has been increased in the Tejgaon industrial area (Oakil and Sharmeen, 2007). Land uses of Dhaka city in the period of 1975 is shown in figure-4.2.

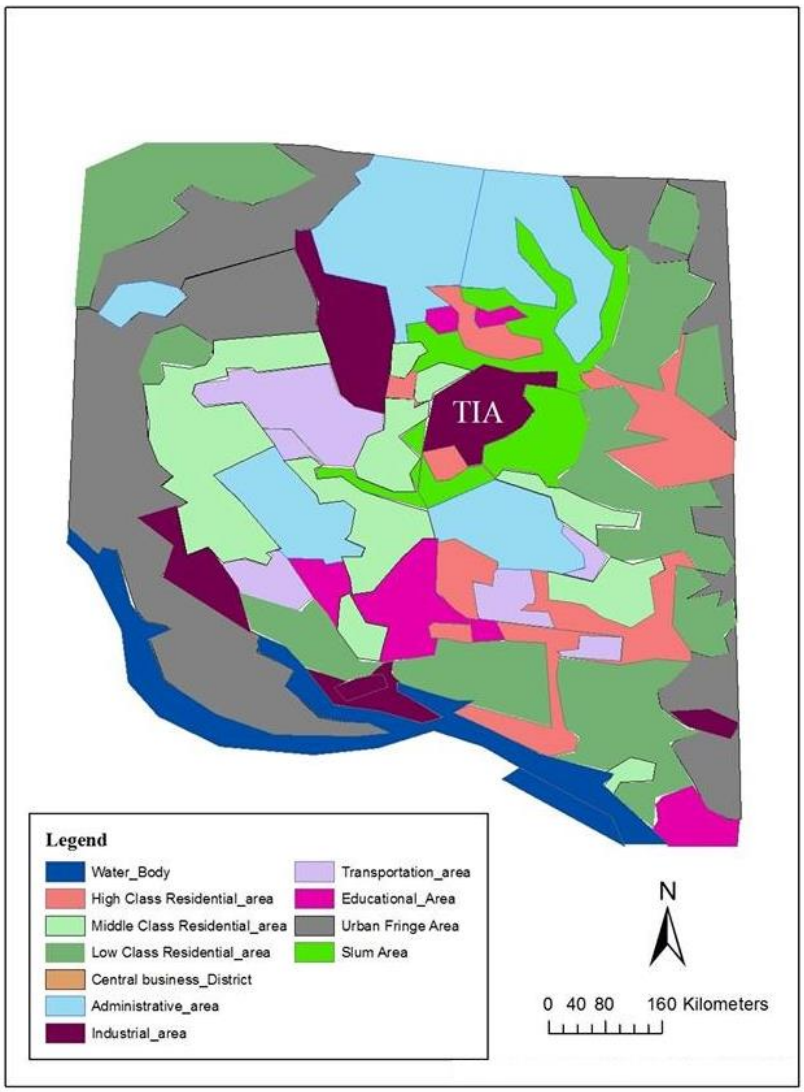

Fig 4.2: Land use of Dhaka city in 1975

(Source: Khan *et al*, 2005)

4.1.5 Tejgaon industrial area in 1995 Structure plan

As non industrial land uses (commercial, residential, office etc.) increased rapidly in Tejgaon industrial area, so that RAJUK proposed different types of mixed land uses in Detailed Area Plan (DAP) for this area. RAJUK also proposed that industrial use may exist in the planned segment of the area with further subdivision of medium weight industrial plots. Furthermore industrial area should be relocated outside the boundary of Group-C area of the Detailed Area Plan (DAP). It also proposed that to cope with ever-increasing demand of the growing population Tejgaon industrial area should kept as an extension of Kawran Bazar for commercial use (RAJUK, 2004). Land uses of Dhaka city in the period of 1995 is exhibited in figure- 4.3.

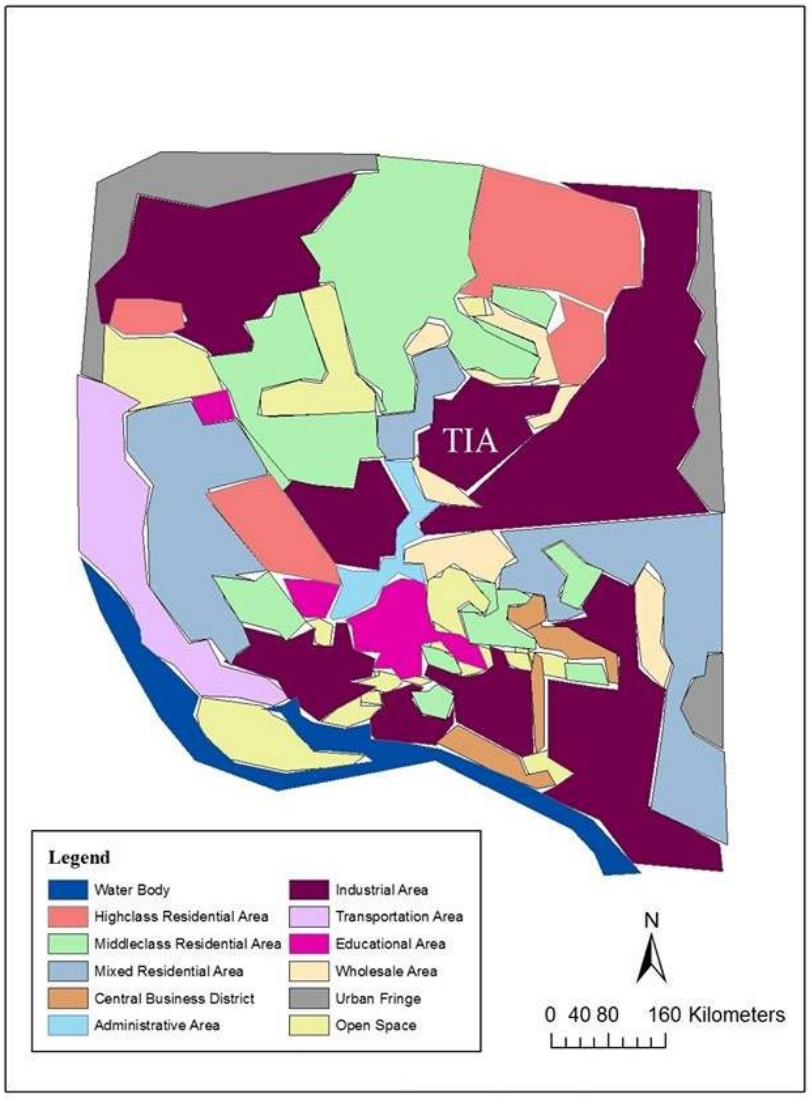

Fig 4.3: Land use of Dhaka city in 1995

(Source: Khan *et al*, 2005)

4.2 Present State of the Study area

4.2.1 Physical Characteristics of the Study area

4.2.1.1 Location

Tejgaon industrial area is a part of Tejgaon Thana which is located between 23°25' north latitudes and between 90°25' and 90°25' east longitudes. This area is under ward number 24 of Dhaka North City Corporation. It is bounded on the North of Mahakhali Gulshan Road, on the South by Begunbari area. On the East by Begunbari Khal and on the West by Dhaka-Tongi rail lines (Banglapedia, 2015). Figure – 4.4 shows the location of Tejgaon industrial area in relation to Dhaka city.

4.2.1.2 Area

The total area of the Tejgaon industrial area is about 500 acres. Area for each plot is about 1.16 acres (Khan *et al*, 2005).

4.2.1.3 Existing Land use Pattern

At first Tejgaon industrial area was developed solely for industrial use but the present land use is mixed in character. Commercial use had been increased whereas industrial use had been decreased gradually. A number of important institutions like Ahsanullah University of Science & Technology, Textile University, Polytechnic institute, institutes of Glass and Ceramic are established in this area. Many government institutions like DLRS, BSTI, BITAC and banks are found here. Most of the lands are under private ownership and group property. Government also leases the land to different organizations for long time period. Existing land use map of Tejgaon industrial area is shown in figure-4.5.

4.2.1.4 Types of Land Use

The following table (Table-4.1) shows different types of land uses of the study area and their total occupied area.

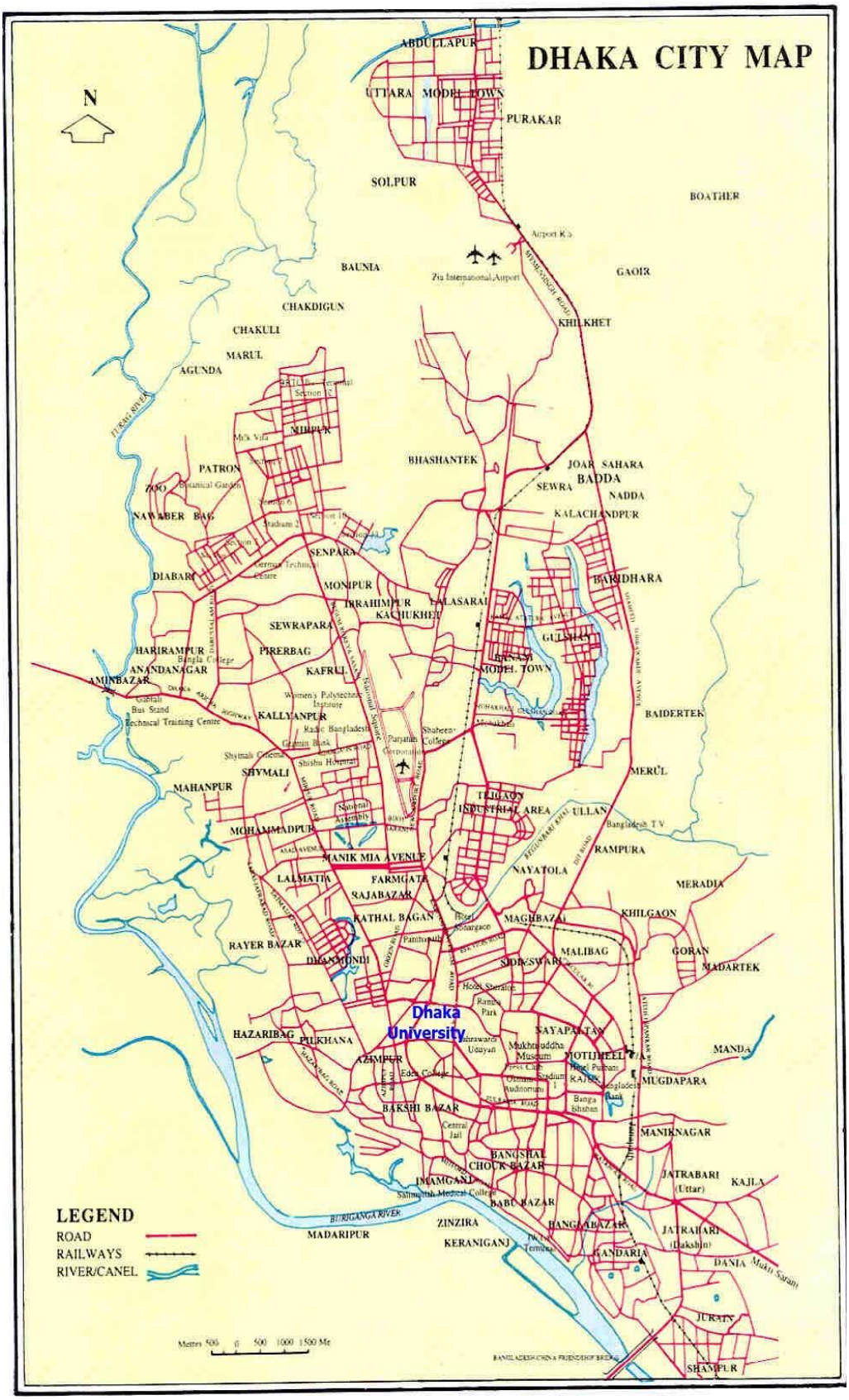

Fig 4.4: Location Map of Tejgaon Industrial Area in Dhaka City Map

(Source: Website, 2015)

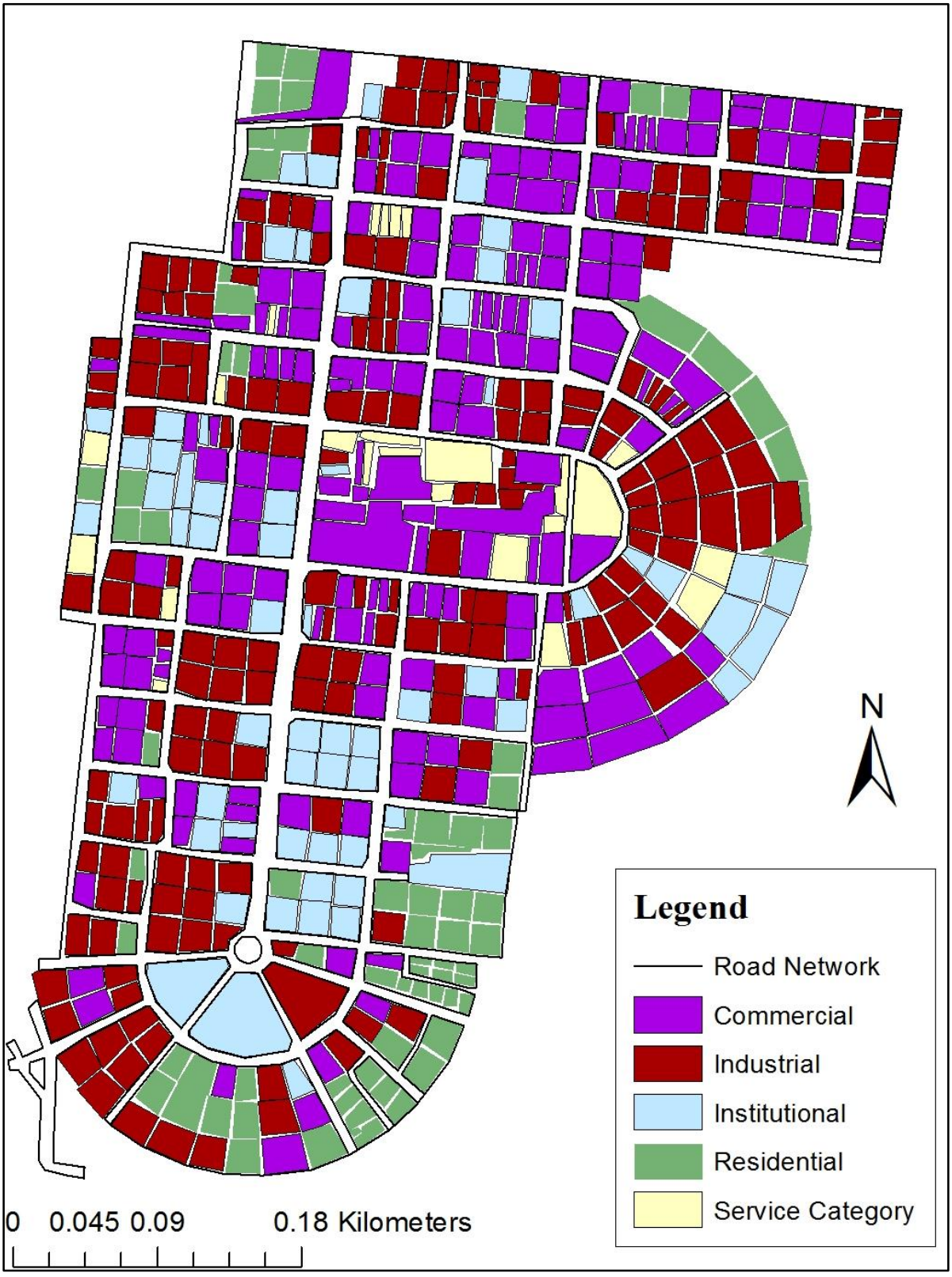

Fig 4.5: Land use map of Tejgaon Industrial Area in 2015

(Source: Field Survey, 2015)

Table- 4.1: Different types of land uses in the study area

Land use category	No. of Plots	Total area (in acres)
Commercial	147	150
Industrial	141	200
Institutional	61	65
Residential	61	60
Service Category	20	25
Total	**430**	**500**

(Source: Field Survey, 2015)

4.2.2 Demographic information of the study area

4.2.2.1 Population

Tejgaon industrial area is located in ward no. 24. It has a total population of around 113657 among which 68377 are male and 45280 are female. The literacy rate of the area is around 62.74% (BBS, 2011).

4.2.2.2 Population Density

The population density of the study area is 14641 per square kilometer (BBS, 2011).

4.2.2.3 Employment Pattern

The employment pattern of the study area is mixed in nature. Most of the peoples of this area work indifferent industries within the area. Some people work outside but live in the study area.

Chapter 05

Data analysis and Interpretation

CHAPTER 05: DATA ANALYSIS AND INTERPRETATION

This chapter introduces relevant analysis of database to fulfill the objectives. In this study the existing land use information and development trend of the study area are analyzed. From the analysis of the relevant data it becomes possible to demonstrate overall existing development pattern and trend scenario of the study area.

5.1 Land use perspective

5.1.1 Existing land use information of Tejgaon industrial area

The descriptive statistical analysis of variables associated with land uses provides a clear perception of existing land use information of the study area. Table-5.1 represents the descriptive statistics of the relevant variables representing existing characteristics of land parcel and structures within the study area. From the analysis it is found that there exists a large variation in size of the plot in the study area varies between .5 katha to 200 katha. The average size of the plot is about twenty katha. Whereas average ground coverage of plots is about fifteen katha which implies that on an average about seventy percent space of any plot is utilized by the structures built on it. The distribution of plots on the basis of area along with its land uses is exhibited in table-5.2. The analysis reveals that most of the average (around twenty katha) and over sized plots (greater than fifty katha) are occupied by the industrial land uses within the study area. The size of the plots with most of the commercial and residential land uses varies between zero to fourteen katha. The residential land uses within the study area mainly occupies small sized plots within the study area.

Structure height within the study area varies between one storey to twenty stories and average heights of buildings are of four storied. The existing distribution of buildings on the basis of structure height is exhibited in figure-5.1. Most of the existing buildings in the study area are under five stories. There exist a few proportions of high rise buildings in the study area. The buildings with height of eleven stories or above are considered as high rise buildings as per the final draft of Bangladesh National Building Code (BNBC-2014) (The Financial Express, 2015). A further detail analysis of relationship between structure height and land use is shown in table-5.3. The crucial analysis of these variables demonstrates that most of the buildings commercial and industrial land uses within the study area are of high rise categories. The height of

Table-5.2: Relationship between plot size and land use of the plot in 2015

			Land use of the plot in 2015					
			Residential	Institutional	Commercial	Industrial	Service category	Total
Plot size (measurement Unit-katha)	0-4	Count	13	4	14	4	1	36
		% within plot size	38.9%	11.1%	36.1%	11.1%	2.8%	100.0%
		% within Land use of the plot in 2015	22.4%	6.6%	10.9%	2.8%	4.0%	8.6%
		% of Total	3.1%	1.0%	3.4%	1.0%	0.2%	8.6%
	5-14	Count	33	24	55	31	8	151
		% within plot size	21.9%	15.9%	39.2%	20.5%	5.3%	100.0%
		% within Land use of the plot in 2015	56.9%	39.3%	42.6%	21.5%	32.0%	36.2%
		% of Total	7.9%	5.8%	13.2%	7.4%	1.9%	36.2%
	15-25	Count	10	11	29	47	9	106
		% within plot size	9.4%	10.4%	27.4%	44.3%	8.5%	100.0%
		% within Land use of the plot in 2015	17.2%	18.0%	22.5%	32.6%	36.0%	25.4%
		% of Total	2.4%	2.6%	7.0%	11.3%	2.2%	25.4%
	25-50	Count	2	14	26	50	5	97
		% within plot size	2.1%	14.4%	26.8%	51.5%	5.2%	100.0%
		% within Land use of the plot in 2015	3.4%	23.0%	20.2%	34.7%	20.0%	23.3%
		% of Total	0.5%	3.4%	6.2%	12.0%	1.2%	23.3%
	>50	Count	0	8	5	12	2	27
		% within plot size	0.0%	29.6%	18.5%	44.4%	7.4%	100.0%
		% within Land use of the plot in 2015	0.0%	13.1%	3.9%	8.3%	8.0%	6.5%
		% of Total	0.0%	1.9%	1.2%	2.9%	0.5%	6.5%
Total		Count	58	61	129	144	25	417
		% within plot size	13.9%	14.6%	30.9%	34.5%	6.0%	100.0%
		% within Land use of the plot in 2015	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	13.9%	14.6%	30.9%	34.5%	6.0%	100.0%

(Source: Field survey, 2015)

Table-5.3 : Relationship between number of stories and land use of the plot in 2015

			Land use of the plot in 2015					Total
			Residential	Institutional	Commercial	Industrial	Service category	
Number of stories	1-2	Count	7	20	72	50	10	159
		% within Number of stories	4.4%	12.6%	45.3%	31.4%	6.3%	100.0%
		% within Land use of the plot in 2015	12.1%	32.8%	55.8%	34.7%	40.0%	38.1%
		% of Total	1.7%	4.8%	17.3%	12.0%	2.4%	38.1%
	3-5	Count	36	30	31	52	12	161
		% within Number of stories	22.4%	18.6%	19.3%	32.3%	7.5%	100.0%
		% within Land use of the plot in 2015	62.1%	49.2%	24.0%	36.1%	48.0%	38.6%
		% of Total	8.6%	7.2%	7.4%	12.5%	2.9%	38.6%
	6-9	Count	14	7	11	28	3	63
		% within Number of stories	22.2%	11.1%	17.5%	44.4%	4.8%	100.0%
		% within Land use of the plot in 2015	24.1%	11.5%	8.5%	19.4%	12.0%	15.1%
		% of Total	3.4%	1.7%	2.6%	6.7%	0.7%	15.1%
	10 and above	Count	1	4	15	14	0	34
		% within Land use of the plot in 2015	1.7%	6.6%	11.6%	9.7%	0.0%	8.2%
		% of Total	0.2%	1.0%	3.6%	3.4%	0.0%	8.2%
Total		Count	58	61	129	144	25	417
		% within Number of stories	13.9%	14.6%	30.9%	34.5%	6.0%	100.0%
		% within Land use of the plot in 2015	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	13.9%	14.6%	30.9%	34.5%	6.0%	100.0%

(Source: Field survey, 2015)

structures with residential, institutional and service category land uses mainly varies between single to nine stories. The analysis of number and area of each unit at each floor of buildings within the study area it is revealed that on an average most of the buildings have two unit and the average area of the units area about ten katha.

Table-5.1: Descriptive Statistics of different variables associated with land use

List of variables	Minimum	Maximum	Mean	Std. Deviation
Size of the plot (Measurement Unit-Katha)	.50	200	20.40	19.62
Ground coverage (Measurement Unit-Katha)	.50	90	14.94	12.01
Number of stories	1.00	20.00	4.11	3.08365
Number of unit at each floor	1	8	1.88	1.01
Area of each unit (Measurement Unit- Katha)	.25	112.5	9.61	10.22

(Source: Field survey, 2015)

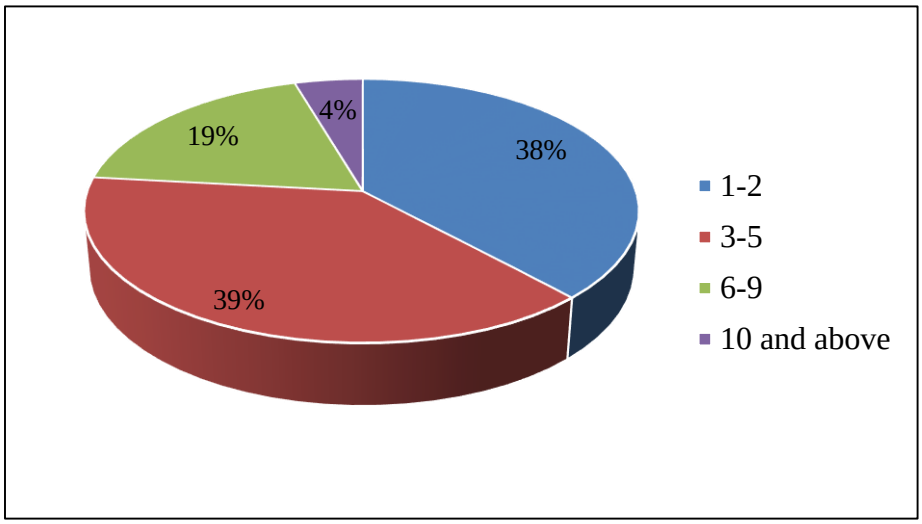

Fig- 5.1: Distribution of existing building of different height (number of stories)

From the analysis of types of structure (Fig-5.2) it is instituted pucca structures constitutes the major proportion of existing structures in Tejgaon industrial area. There exist a few numbers of semi pucca structures within the study area and no katcha structures observed during the field survey, 2015. The distinctive characteristics of different types of structures are provided in the glossary.

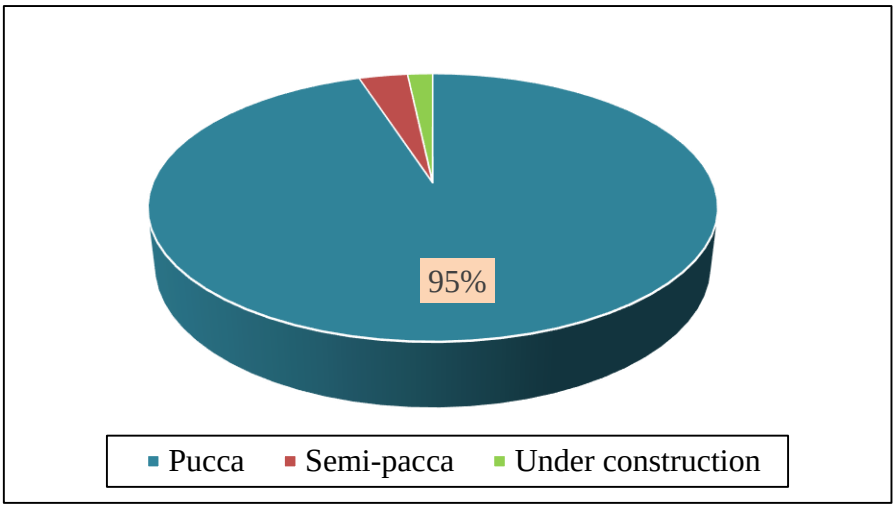

Fig-5.2: Distribution of different types of structure in Tejgaon industrial area

5.1.2 Existing land use pattern of Tejgaon industrial area

Land use pattern based on distribution of plots

Tejgaon industrial area (TIA) consists of around 430 plots in total. The distribution of different land uses are shown in figure-5.3. The analysis shows that a significant proportion of existing land uses are constituted by the industrial and commercial land use. The plots with a mix of different land uses are categorized as a single distinctive use based on the priority of a single use within the plot. If a distinctive land use within a plot exceeds at least fifty percent of total land use then the land uses of the plot is categorized as per that distinctive land use. For example if a building has mixed land uses in its ten stories then the distinctive use that exists in areas equivalent to five or more sorties of the buildings are categorized as the land use of the plot on which the building is located .That is, if the total floor area of residential use of a mixed use plot is higher than the other land uses, the plot will be denoted as residential plot. The findings from the study of Foth and Dyke (2000) also support that land use analysis is a means of broadly analyzing how land is being used and each type of use has its own

characteristic that can determine compatibility, location and preference to other land uses.

The government institutions within Tejgaon industrial area mainly constituted a few proportion and located along a major thoroughfare namely Shaheed Tajuddin Ahmed Avenue. Residential development in this area is not prominent still now the industrial and commercial land uses dominates the area. Commercial land uses dominates the major land uses of this area mainly due to never ending demand of the increasing population, emerging commercial use and the transition of industrial plots into commercial one. The spatial distribution of different land uses within this area is exhibited in figure-5.4.

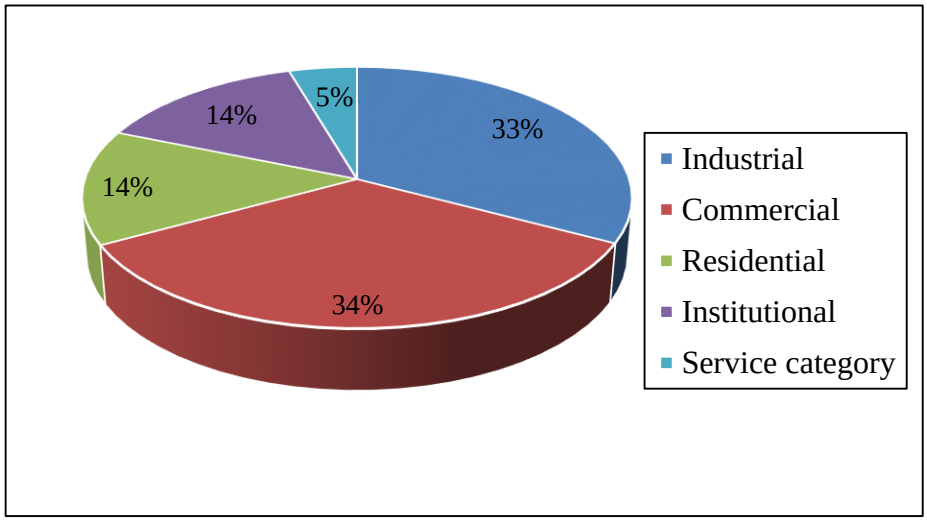

Fig-5.3: Land use pattern of Tejgaon industrial area (on the basis of number of plot)

Land use pattern on the basis of total occupied floor area

The existing land use pattern on the basis of total floor area occupied by individual land uses is exhibited in figure-5.5. Land use pattern based on area can analyze the impact of a land use in an area more exactly than the pattern based on plot distribution (Matisovs, 2011). Distinctive land uses of plots is determined in the same way as described in land use pattern based on distribution of plots section. This analysis provides somehow incongruous result than those of with land use pattern based on number of plots. The total number of commercial plot exceeds the number of industrial plot in this area. But the total plot area covered by the industrial land uses is higher than the commercial one. Commercial developments within this area are

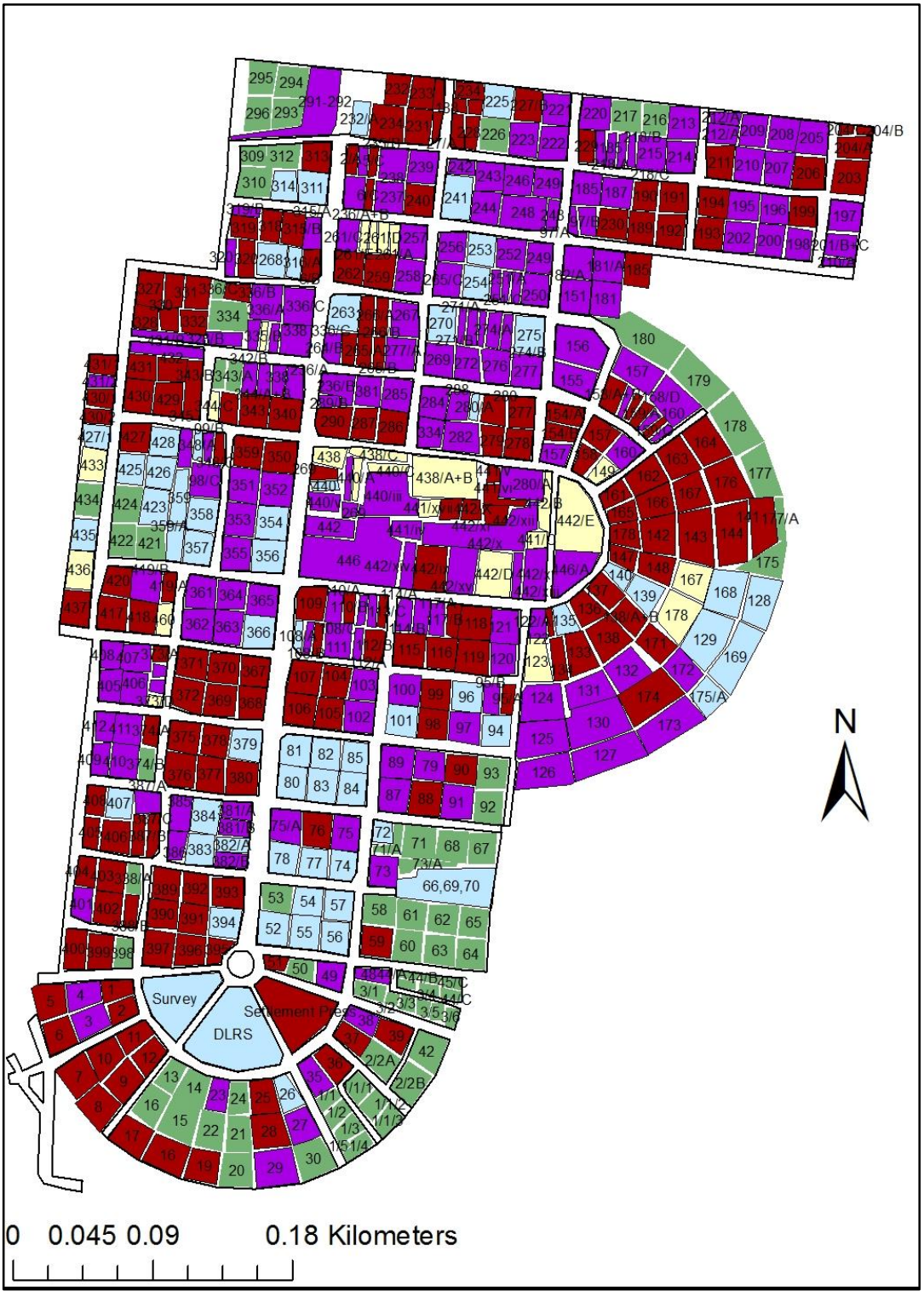

Fig 5.4: Existing land use pattern of Tejgaon Industrial Area

(Source: Field survey, 2015)

mainly encouraged by vertical expansion and thereby less plot area are occupied than the industrial one. As a result the impact of the industrial activities in Tejgaon industrial area is greater than those of commercial activities.

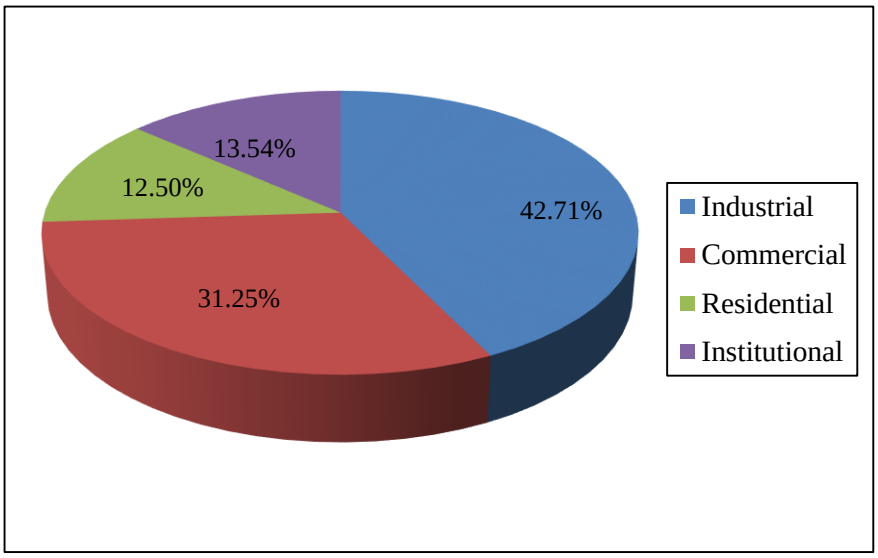

Fig-5.5: Land use pattern of Tejgaon industrial area (on the basis of total floor area)

Further detail categorization of land uses within each major land uses of the area as commercial, industrial, residential, institutional and so on are exhibited in figure-5.6. The categorization of major land uses are provided in the glossary.

Three major industrial land uses dominates the total industrial establishment within the area namely chemical, pharmaceuticals, garments industries. Garment industries constitute the major share as there exists many bulky garment industries like Brothers garments, Urmi garments; Alam garments etc. Commercial development mainly vertical and less plot area require than the industrial development. Major commercial activities of Tejgaon industrial area (TIA) consists of bank, automobile showroom, export oriented business, printing press, retail shop etc. Some major governmental printing press largely adds to the area covered by the commercial use. Recent development trend of Tejgaon encourages establishment of different types of export oriented business offices. Orion groups, Rangs groups, HNS group like all high class business groups' have established their corporate offices in Tejgaon industrial area. Governmental organization like Directorate of land records and survey of Bangladesh (DLRS), Dhaka electric supply authority (DESA) etc. are located in Tejgaon

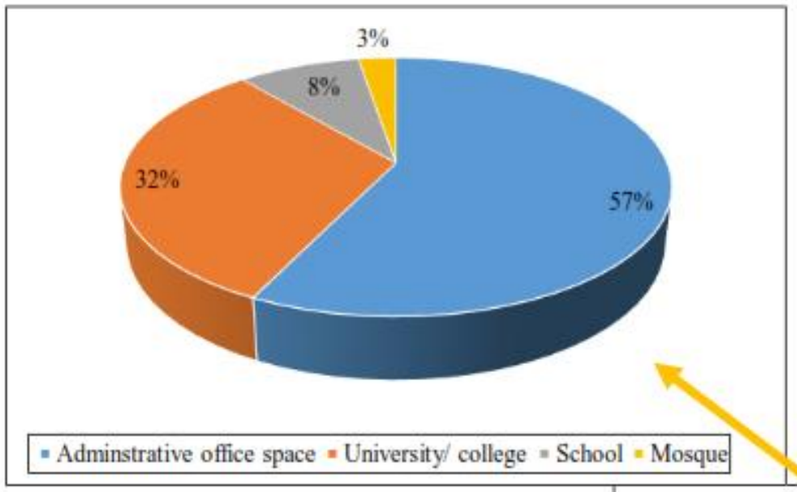

Fig -5.6.1: Different category of institutional land use

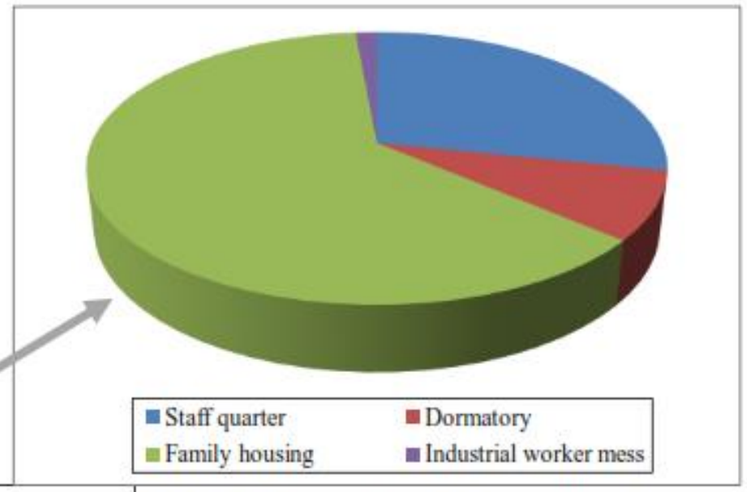

Fig-5.6.2: Different category of residential Land use

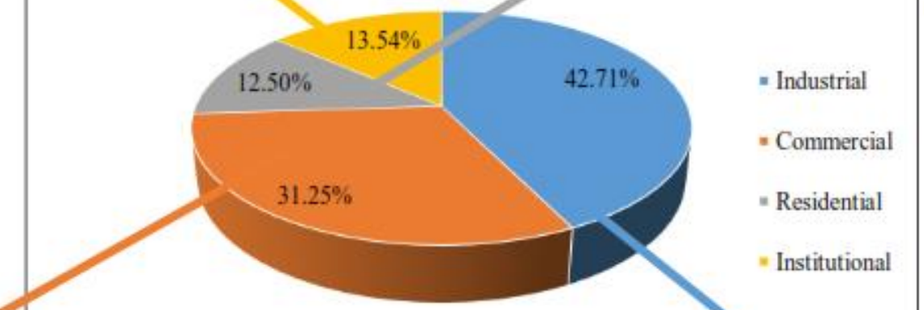

Fig-5.6: Distribution of different land use of the plot (based on floor area occupied)

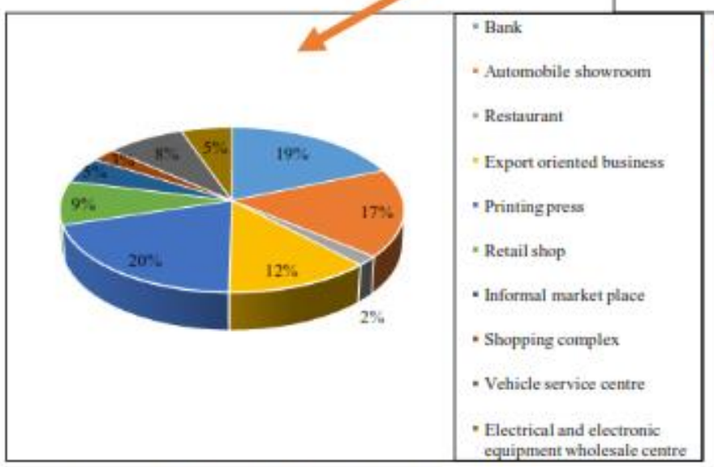

Fig-5.6.3: Different category of commercial land uses

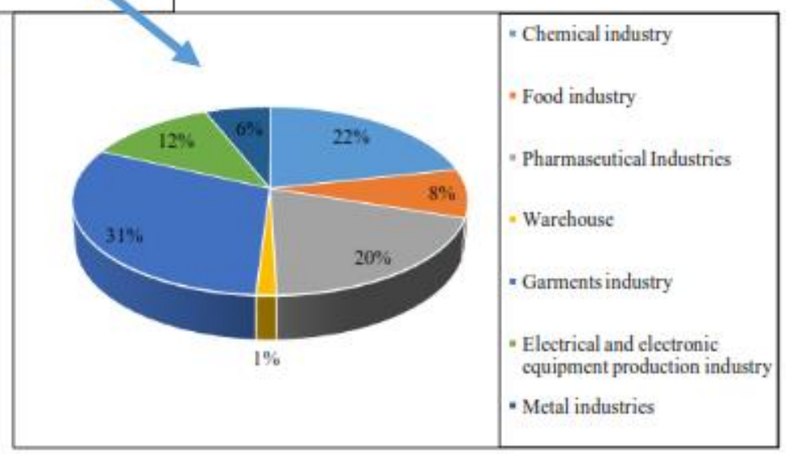

Fig -5.6.4: Different category of industrial land use

industrial area. Some educational institutions like Ahsanullah University, Butex, and Polytechnical institute add to the mixed use development in TIA. Most of the residential land uses within the area is located adjacent to the Hatirjheel lake along Hatirjheel-Gulshan link road. Family housing units are mainly located on the Khas land or government property. Some large private apartment building like Maitrye chaya, Orion house also exist in TIA. Different dormitory housing and staff quarter for governmental employees like BG press staff quarter, polytechnic institute staff quarter etc. cover the major portion of residential land uses in TIA. There also exists a few number of semi-pucca informal industrial worker mess in TIA which may be subjected to the risk of evacuation if any kind of further development policies related to the area are adopted by the government.

Existing ownership pattern and relationship with ownership of the plots

The ownership pattern of Tejgaon industrial area is of paramount importance for effective analysis of trend of land use change in this area. Different literatures suggest that ownership pattern highly influence the variables that are indicators of development trends of an area. For the purpose of the study the ownership of different types of land uses in Tejgaon industrial area is categorized into four distinct classes namely "Private property", "Group property", "Leasehold property" and "Government or khas land". The unambiguous distinction between different ownership categories is stated in the glossary. This analysis helps to identify clearly the explicit ownership pattern of existing different land use categories of Tejgaon industrial area (Fig-5.7).

From the analysis it is found that "Private property" constitutes significant proportion of the existing ownership of different land uses in this area (about 50 percent of the total ownership) whereas both "Group property" and "Leasehold property" contributes approximately equal proportion. The share of "Leasehold property" is quite diminutive in this area. The study of Darin-Drabkin (2013) suggests that land price varies depending on the ownership pattern of the area. If the share of private property in any area exceeds the other one, sometime it is found difficult to incorporate the private sectors in any sort of development planning decision and implementation. As a consequence the major share of private property in the study

area can create further obstructions related to any kind of government policy implication connected with this area.

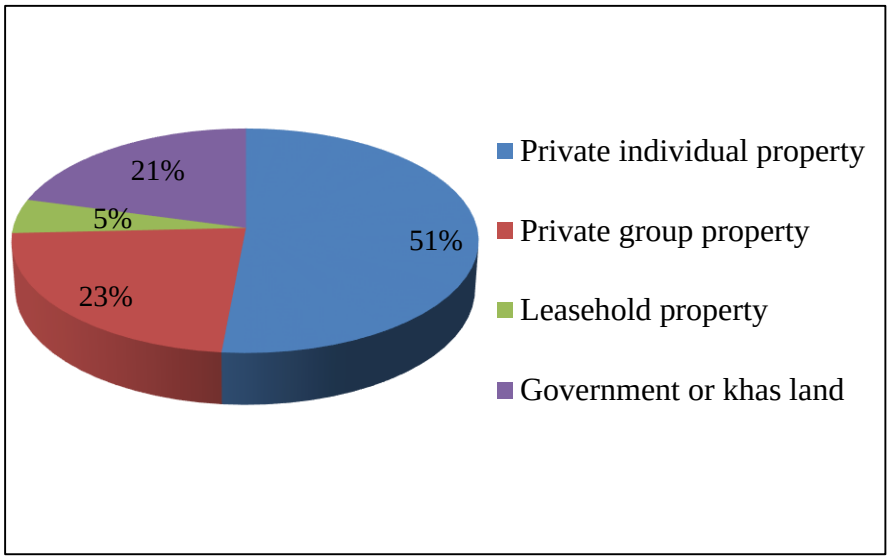

Fig-5.7: Existing ownership pattern of land in Tejgaon industrial area (on the basis of number of plot)

A further detail analysis regarding the existing land uses and the ownership of the corresponding plots of Tejgaon industrial area seeks to identify the crucial relationship between these two variables (Table-5.4). The analysis reveals that most of the residential, commercial and industrial land uses of this area are under private ownership. A significant portion of industrial land uses are also group property. One of the basic reasons behind this is that along with private ownership most of the large industries are owned by group of owners or several industries clustered into a single land. Institutional land uses mainly falls under government ownership. In case of service category land uses both private owner and government ownership constitutes the equal proportion.

5.1.3 Land price distribution in Tejgaon industrial area

An important findings of the study of Darin-Drabkin (2013) is that land price can reveal a more exact pictures of existing development trends of an area. Land price can also change the structural condition of an area. In Japan, sites with utility services and higher land price are the major choice of the developers to develop residential appartment (Ministry of Land, Infrastructure and Transport, 2007).

Table-5.4: Relationship between Land use and Ownership of the plots in 2015

			Ownership of the plot in 2015				Total
			Private property	Group property	Leasehold property	Govt. property or khas land	
Land use of the plot in 2015	Residential	Count	41	4	3	10	58
		% within Land use of the plot in 2015	70.7%	6.9%	5.2%	17.2%	100.0%
		% within Ownership of the plot in 2015	19.7%	4.1%	14.3%	11.2%	13.9%
		% of Total	9.9%	1.0%	0.7%	2.4%	13.9%
	Institutional	Count	14	5	1	41	61
		% within Land use of the plot in 2015	23.0%	8.2%	1.6%	67.2%	100.0%
		% within Ownership of the plot in 2015	6.7%	5.1%	4.8%	46.1%	14.7%
		% of Total	3.4%	1.2%	0.2%	9.9%	14.7%
	Commercial	Count	73	35	10	11	129
		% within Land use of the plot in 2015	56.6%	27.1%	7.8%	8.5%	100.0%
		% within Ownership of the plot in 2015	35.1%	35.7%	47.6%	12.4%	31.0%
		% of Total	17.5%	8.4%	2.4%	2.6%	31.0%
	Industrial	Count	71	52	3	18	144
		% within Land use of the plot in 2015	49.3%	36.1%	2.1%	12.5%	100.0%
		% within Ownership of the plot in 2015	34.1%	53.1%	14.3%	20.2%	34.6%
		% of Total	17.1%	12.5%	0.7%	4.3%	34.6%
	Service category	Count	4	2	9	9	24
		% within Land use of the plot in 2015	16.7%	8.3%	37.5%	37.5%	100.0%
		% within Ownership of the plot in 2015	4.3%	2.0%	19.0%	10.1%	5.8%
		% of Total	2.2%	0.5%	1.0%	2.2%	5.8%
Total		Count	203	98	26	89	416
		% within Land use of the plot in 2015	50.0%	23.6%	5.0%	21.4%	100.0%
		% within Ownership of the plot in 2015	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	50.0%	23.6%	5.0%	21.4%	100.0%

(Source: Field survey, 2015)

The price of the plots in Tejgaon industrial area varies between thirty lakh to ninety lakh BDT per katha unit (Table-5.5). The average price of land is around fifty eight lakh BDT per katha. To clearly demonstrate the distribution of land price in Tejgaon industrial area the land prices are categorized into five categories. The even distribution of data in each class is taken as the major selection criteria of the best suited frequency distribution method for this analysis.

Table-5.5: Descriptive Statistics of price of land (BDT. Lakh per katha)

	Number	Minimum	Maximum	Mean	Std. Deviation
Price of the plot (BDT lakh per *katha*)	417	30	90	57.98	7.02

(Source: Field survey, 2015)

From the analysis (Fig-5.8) it is found that most of the market price of land in Tejgaon industrial area varies between fifty four lakh to sixty five lakh BDT per katha and covers maximum proportion of Tejgaon industrial area.

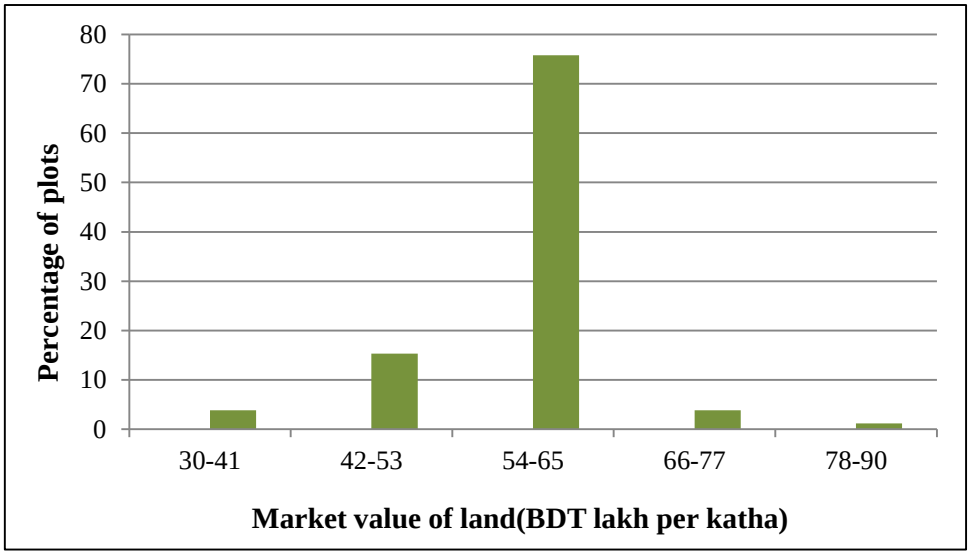

Fig-5.8: Distribution of plots according to land price in Tejgaon industrial Area

To analyze the spatial variation among different categories of market price of existing plots in Tejgaon industrial area, the price of the lands are exhibited in figure-5.9. Land price along this major thoroughfare varies between .The highest priced plots in this

area is situated at first row on both sides along Shaheed Tajuddin Ahmed Avenue which is a four lane major thoroughfare passing through the centre of Tejgaon industrial area. Most of the commercial and industrial land uses along this road exhibit high market price comparative to other land uses as most of them are under institutional or service category land uses.

The reasons behind this is that most of the institutional land uses along this road as university, polytechnique institutes etc are under government ownership and service category land as petrol pump fall under leasehold properties. Better loading and unloading facility and good connectivity also contribute to high land price in this regard which is basically facilitated by close proximity to a major thoroughfare namely Shaheed Tajuddin Ahmed Avenue .

The land acquisition process in this area deviated in actual scenario from as described in the "Acquisition and requisition of immovable properties ordinance, 1982". The price of plots near Hatirjheel at Kunipara and Begunbari area along Hatirjheel-Gulshan link road is lowest among prices of all other plots in this area. The underlying reason is that formal transfer of ownership of land in this area is not allowed approximately since 2008 when the proposal for Hatirjheel development project was initiated. For this reason the previous market price of land in Kunipara and Begunbari area is considered as the current market price of land. Land in this zone varies between thirty to fifty three lakh BDT per katha. The information of the land value collected from the word commissioner of Tejgaon industrial area also supports the above result (Safi, 2015).

The critical analysis between land use and price of the plots in 2015 (Table-5.6) reveals that though major proportion of the unit prices (per katha) of plots with commercial, industrial, residential and service category land use category varies between fifty four to sixty five lakh taka, most of the highest price plots in the study area are occupied by commercial land use. The maximum proportion of minimum priced land (price varying between thirty to forty one lakh BDT per katha) of the study area is under residential land uses.

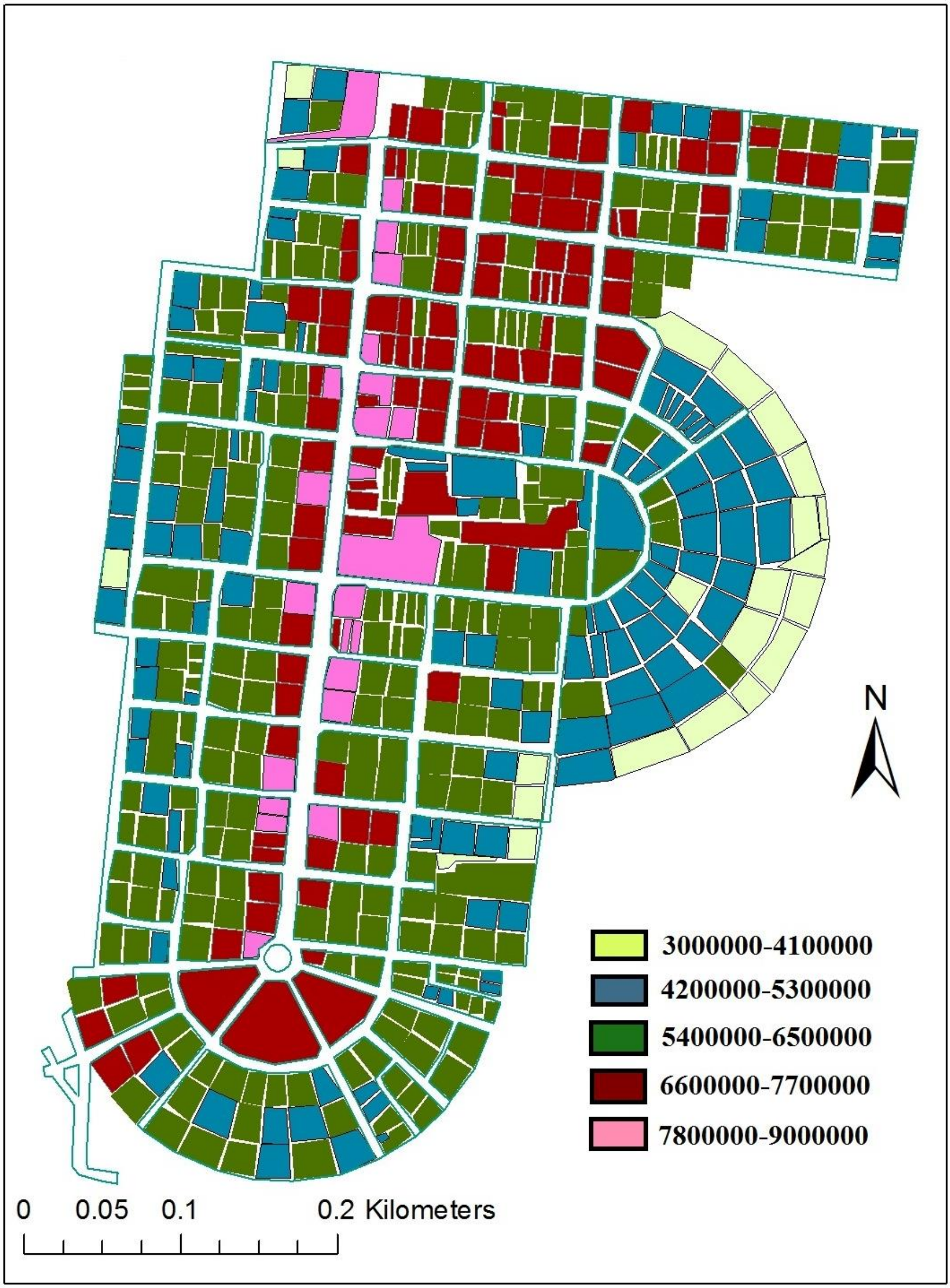

Fig-5.9: Map Showing Land price of Different Plot in 2015

(Source: Field Survey, 2015)

Table- 5.6: Relation between Land use and price of the plot in 2015

			Land use of the plot in 2015					Total
			Residential	Institutional	Commercial	Industrial	Service category	
Price of plot (In lakh BDT)	30-41	Count	12	0	2	2	0	16
		% within Price of plot	75.0%	0.0%	12.5%	12.5%	0.0%	100.0%
		% within Land use of the plot in 2015	3.4%	0.0%	9.3%	1.4%	0.0%	3.8%
		% of Total	0.5%	0.0%	2.9%	0.5%	0.0%	3.8%
	42-53	Count	15	7	24	15	3	64
		% within Price of plot	23.4%	10.9%	37.5%	23.4%	4.7%	100.0%
		% within Land use of the plot in 2015	25.9%	11.5%	18.6%	10.4%	12.0%	15.3%
		% of Total	3.6%	1.7%	5.8%	3.6%	0.7%	15.3%
	54-65	Count	30	50	89	125	22	316
		% within Price of plot	12.7%	15.8%	25.0%	39.6%	7.0%	100.0%
		% within Land use of the plot in 2015	69.0%	82.0%	61.2%	86.8%	88.0%	75.8%
		% of Total	9.6%	12.0%	18.9%	30.0%	5.3%	75.8%
	66-77	Count	0	3	12	1	0	16
		% within Price of plot	0.0%	18.8%	75.0%	6.2%	0.0%	100.0%
		% within Land use of the plot in 2015	0.0%	4.9%	9.3%	0.7%	0.0%	3.8%
		% of Total	0.0%	0.7%	2.9%	0.2%	0.0%	3.8%
	78-90	Count	1	1	2	1	0	5
		% within Price of plot	20.0%	20.0%	40.0%	20.0%	0.0%	100.0%
		% within Land use of the plot in 2015	1.7%	1.6%	1.6%	0.7%	0.0%	1.2%
		% of Total	0.2%	0.2%	0.5%	0.2%	0.0%	1.2%
Total		Count	58	61	129	144	25	417
		% within Price of plot	13.9%	14.6%	30.9%	34.5%	6.0%	100.0%
		% within Land use of the plot in 2015	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	13.9%	14.6%	30.9%	34.5%	6.0%	100.0%

5.2 Development trend of Tejgaon industrial area

5.2.1 Growth of industrial and commercial land use

In 1948, a typical industrial area is developed in the fallow land of Tejgaon in the jurisdiction of East Pakistan Planning Sub-Committee. The development trend of Tejgaon was mainly industrial and establishment of industries increased up to the period of 2005 (fig-5.10). But the recent trend of industrial development is declining due to increased commercial development, relocation of heavy industries, strategies for reduction of pollution etc. As stated in DMDP, being close to the core of Dhaka city Tejgaon attracts numerous commercial activities in this area. Thus there exists an increasing trend of commercial activities and the rate of growth of commercial activities in this area greater than that of industrial one.

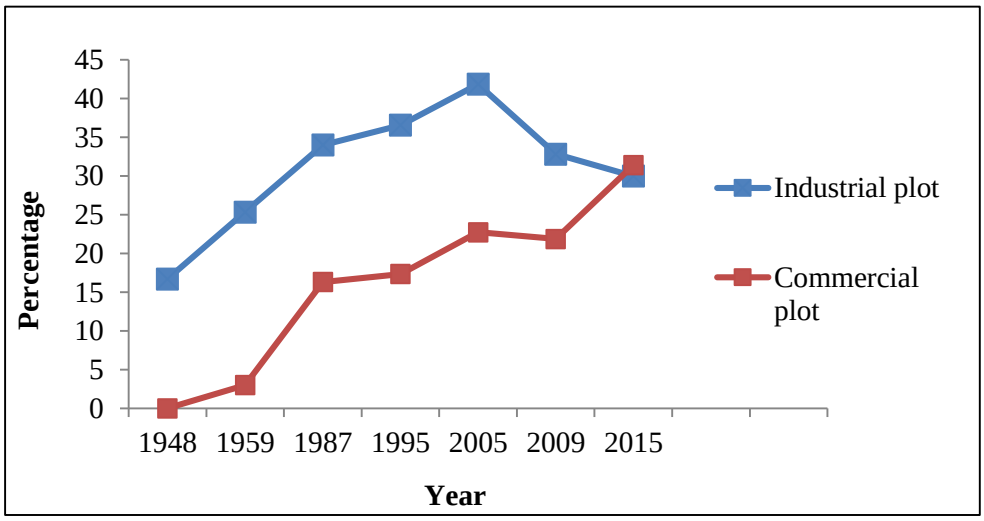

Fig-5.10: Growth of industrial and commercial land use in TIA

(Source: Khan *et al*, 2005; DCC, 2009; Field survey 2015)

5.2.2 Change in land use pattern of TIA

<u>Change in land use pattern on the basis of number of plot</u>

Change in land use in Tejgaon industrial area between 2005 and 2015 has been exhibited by means of analysis of relationship between land uses of this area for the relevant two years under consideration (Table-5.7). This analysis has only been possible for the plots whose present holding number matches that of in 2005 year period (Khan *et al*, 2005). About 85 percent of the holding number of the present plots matches the holding numbers of the relevant plots of Tejgaon industrial area in

Table-5.7: Change in land use of the plot between 2005 and 2015

			Land uses of the plot in 2015					Total
			Residential	Institutional	Commercial	Industrial	Service category	
Land uses of the plot in 2005	Residential	Count	22	4	16	12	0	54
		% within land use of the plot in 2005	35.0%	10.0%	30.0%	25.0%	0.0%	100.0%
		% within land use of the plot in 2015	53.8%	11.1%	11.1%	9.4%	0.0%	13.9%
		% of Total	4.9%	1.4%	4.2%	3.5%	0.0%	13.9%
	Institutional	Count	0	12	19	7	2	40
		% within land use of the plot in 2005	0.0%	29.4%	**47.1%**	17.6%	5.9%	100.0%
		% within land use of the plot in 2015	0.0%	27.8%	14.8%	5.7%	16.7%	11.8%
		% of Total	0.0%	3.5%	5.6%	2.1%	0.7%	11.8%
	Commercial	Count	13	2	19	2	5	41
		% within land use of the plot in 2005	7.7%	7.7%	61.5%	7.7%	15.4%	100.0%
		% within land use of the plot in 2015	7.7%	5.6%	14.8%	1.9%	33.3%	9.0%
		% of Total	0.7%	0.7%	5.6%	0.7%	1.4%	**9.0%**
	Industrial	Count	5	15	76	105	7	208
		% within land use of the plot in 2005	5.4%	9.7%	**34.4%**	47.3%	3.2%	100.0%
		% within land use of the plot in 2015	38.5%	50.0%	59.3%	83.0%	50.0%	64.6%
		% of Total	3.5%	6.2%	22.2%	30.6%	2.1%	**64.6%**
	Service category	Count	0	2	0	0	0	2
		% within land use of the plot in 2005	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%
		% within land use of the plot in 2015	0.0%	5.6%	0.0%	0.0%	0.0%	0.7%
		% of Total	0.0%	0.7%	0.0%	0.0%	0.0%	0.7%
Total		Count	40	35	130	126	14	345
		% within land use of the plot in 2005	11.5%	10%	**37.5%**	**36.8%**	4.2%	100.0%
		% within land use of the plot in 2015	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	11.5%	10%	37.5%	36.8%	4.2%	100.0%

(Source: Khan *et al*, 2005; Field survey, 2015)

2005. The remaining holding numbers of the plots have been changed in the subsequent years and hence not been included in the analysis of land use change in Tejgaon industrial area over years.

From the analysis it is found that major changes has occurred in commercial and industrial land uses of the area between the 2005 and 2015 year period. In 2005, Industrial land use constituted major portion of the total land uses (64.6%). But in 2015 a massive change has been noticed in the land use of Tejgaon industrial area. At present commercial and industrial land uses constitute major portion of the area and approximately both contribute equal proportion. Most of the industrial and institutional land uses that existed in 2005 have been converted into commercial land uses by the period of 2015. A clear indication of this continuing trend of shift of industrial land uses to mainly commercial, residential and other uses for the last few decades is also exhibited in the study of Khan et al (2005). The study of Oakil and Sharmeen (2007) also identified that Tejgaon industrial area as a major industrial hub gradually losing its typical characteristics due to the unplanned development. Heavy industries were shifted and commercial activities were increased in last two decades. Most of the industrial plot is now being converted into commercial use.

One of the basic reasons behind that is the location of this area in the core of the Dhaka city generates several problems for industrial production. High land value and high land taxes also contribute greatly to make the area quite unsuitable for profitable industrial production (Khan *et al*, 2005). Consequently commercial land uses grows in this area over years. A little or no variation is exhibited in the proportion of residential and service category land uses in Tejgaon industrial area between 2005 and 2015 year period. Figure-5.11 and Figure-5.12 exhibit the land use pattern of Tejgaon industrial area in the year of 2005 and 2015 subsequently and hence a provide a basis for the analysis of the land use change in this area within 2005 to 2015 year period.

Change in land use pattern on the basis of plot area occupied

From the analysis (Fig-5.13) it is found that there exists a massive transformation in industrial and commercial land uses of Tejgaon industrial area between 2005 and 2015 year period from the perspective of plot area occupied by different land use category. Both land use has increased in the year of 2015 in comparison to the period

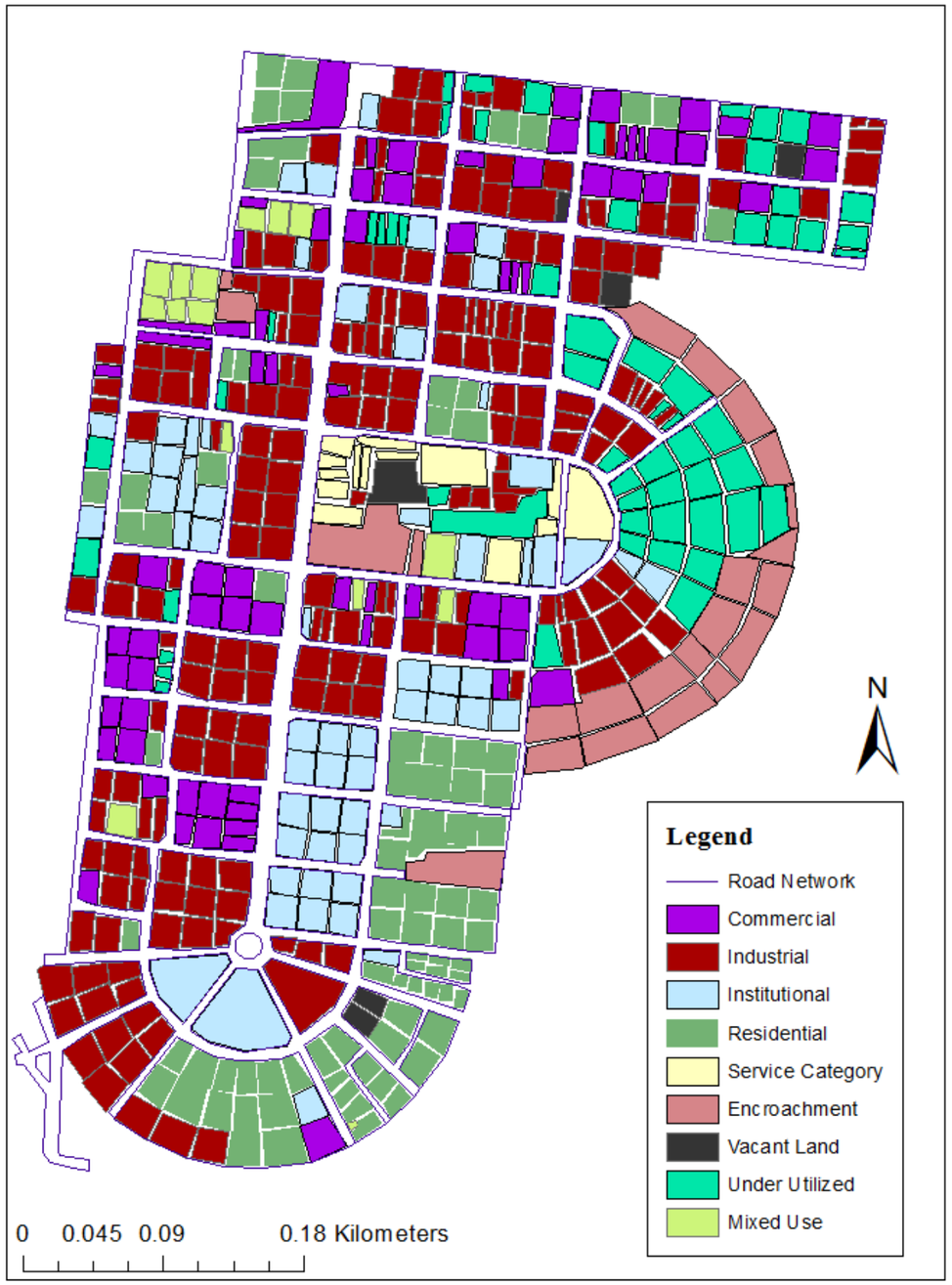

Fig-5.11: Land use map of Tejgaon industrial area in 2005

(Source: Khan *et al*, 2005)

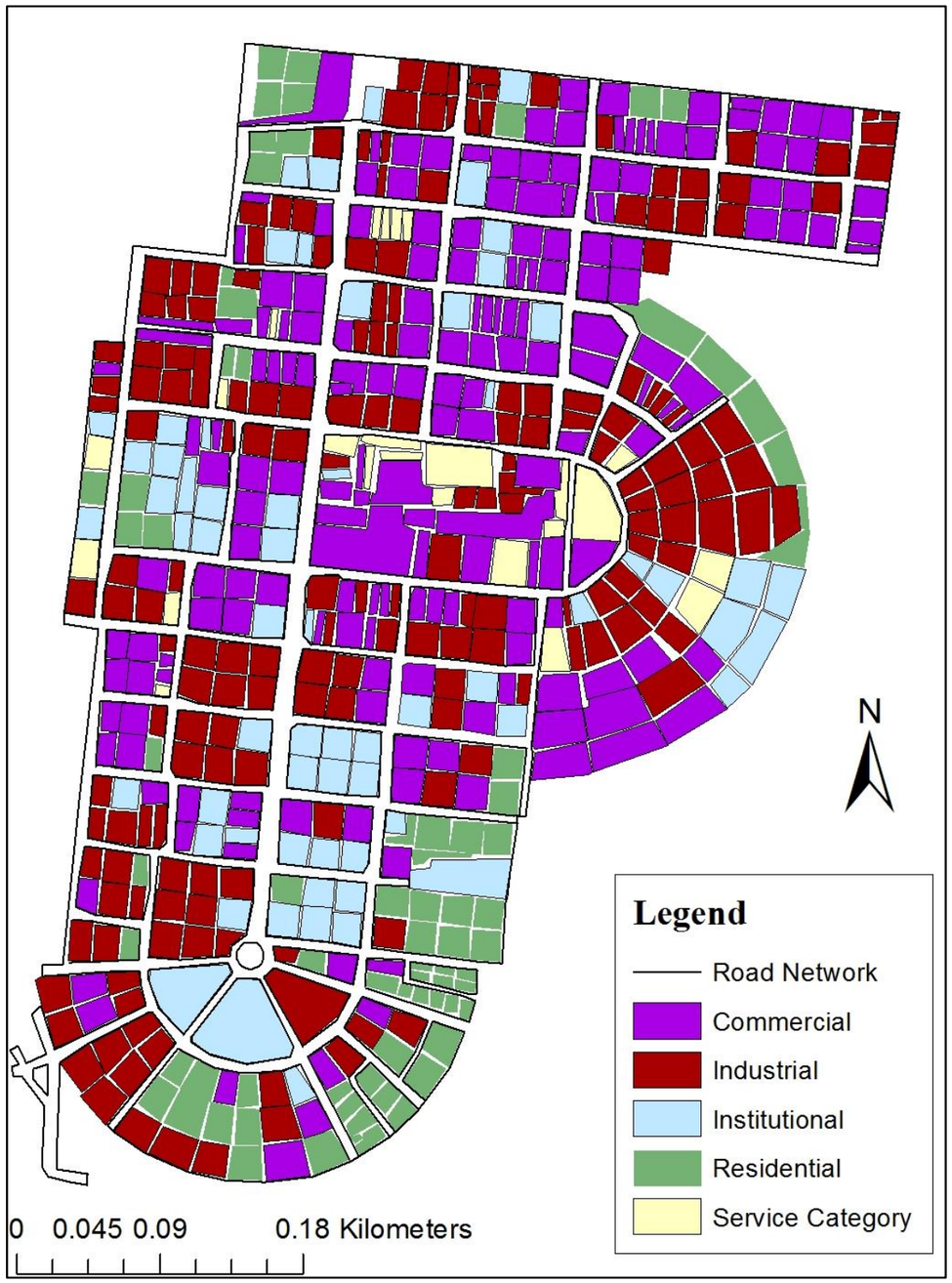

Fig-5.12: Land use map of Tejgaon industrial area in 2015

(Source: Field Survey, 2015)

of 2005. Very diminutive or no variation is exhibited in the residential or institutional land uses of this area.

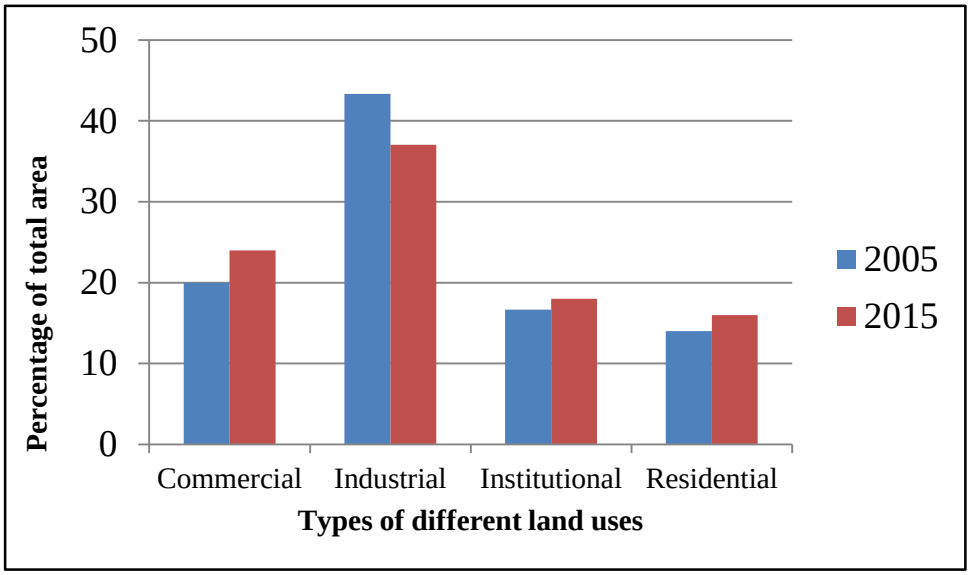

Fig-5.13: Change in land use pattern based on total plot area occupied

(Source: Khan *et al*, 2005; Field survey 2015)

5.2.3 Change in structure type between 2009 and 2015

Change in structure type is one of the major criteria of identifying development trend. Increase in structural buildings traditionally shows that the area exhibits a growing trend of commercial development (Rodrik, 2013).

The structural condition of the buildings in Tejgaon industrial area has changed a considerable amount throughout the period of 2009 to 2015 (Table-5.8). For the analysis structure of the buildings in this area has been categorized into four different types namely “Pucca”, “Semi-Pucca”, “Katcha” and “Under construction”. The analysis reveals that the share of “Pucca” building has been increased in Tejgaon industrial area in between 2009-2015 year period. The structure type of all the “Pucca” buildings that existed in year 2009 remains same in year 2015 and a new proportion of have been added into this. Whereas most of the “Semi-Pucca” buildings in the area have been converted into “Pucca” building by the year of 2015 and a little proportion are still “Semi-Pucca” or under construction. There exists no “Katcha” structure in the area now and the previous one has already been converted into “Pucca” buildings. Most of the buildings under construction in 2009 have developed as “Pucca” buildings by the period of 2015. One of the basic reasons behind that is the

Table-5.8: Modification in structure type of the buildings between 2009 and 2015

			Structure type of the buildings in 2015			Total
			Pucca	Semi-Pucca	Under construction	
Structure type of the buildings in 2009	Pucca	Count	234	0	0	234
		% within Structure type of the buildings in 2009	100.0%	0.0%	0.0%	100.0%
		% within Structure type of the buildings in 2015	66.4%	0.0%	0.0%	60.3%
		% of Total	60.3%	0.0%	0.0%	60.3%
	Semi-Pucca	Count	71	22	6	99
		% within Structure type of the buildings in 2009	72.2%	22.2%	5.6%	100.0%
		% within Structure type of the buildings in 2015	20.3%	88.9%	50.0%	25.5%
		% of Total	18.4%	5.7%	1.4%	25.5%
	Katcha	Count	30	0	6	36
		% within Structure type of the buildings in 2009	84.6%	0.0%	15.4%	100.0%
		% within Structure type of the buildings in 2015	8.6%	0.0%	50.0%	9.2%
		% of Total	7.8%	0.0%	1.4%	9.2%
	Under construction	Count	17	3	0	20
		% within Structure type of the buildings in 2009	85.7%	14.3%	0.0%	100.0%
		% within Structure type of the buildings in 2015	4.7%	11.1%	0.0%	5.0%
		% of Total	4.3%	0.7%	0.0%	5.0%
Total		Count	352	25	12	389
		% within Structure type of the buildings in 2015	100.0%	100.0%	100.0%	100.0%
		% of Total	90.8%	6.4%	2.8%	100.0%

(Source: DCC, 2009; Field survey, 2015)

growing trend of commercial development in the Tejgaon industrial area supports the over increasing growth of “Pucca” structure in the area.

5.2.4 Change in structure height between 2009 and 2015

The analysis demonstrates that the proportion of high rise building has increased in the Tejgaon industrial area than that of in the period of 2009 (fig-5.14). The categories of structure heights are so selected to clearly distinguish between small storied buildings and high rise buildings both in accordance with Bangladesh National Building Code (BNBC-2006) and the final draft of Bangladesh National Building Code (BNBC-2014). The comprehensive definition of high rise building according to BNBC-2006 and the final draft of BNBC -2014 are provided in the glossary.

In accordance with the definition of high rise building as per BNBC-2006 the proportion of high rise buildings was larger in 2009 than in comparison to that of in 2015. In 2009, major proportions of the buildings in Tejgaon industrial area were high rise buildings. Buildings above ten stories which are recently termed as high rise building constituted a small proportion. But with continuous rapid development there exists a rising trend of high rise building in Tejgaon industrial area. The basic reason behind this is that the location of the Tejgaon industrial area at the core of Dhaka city accompanied with city scale better connectivity and accessibility. Increasing trend of commercial development in the area also contribute greatly in this regard.

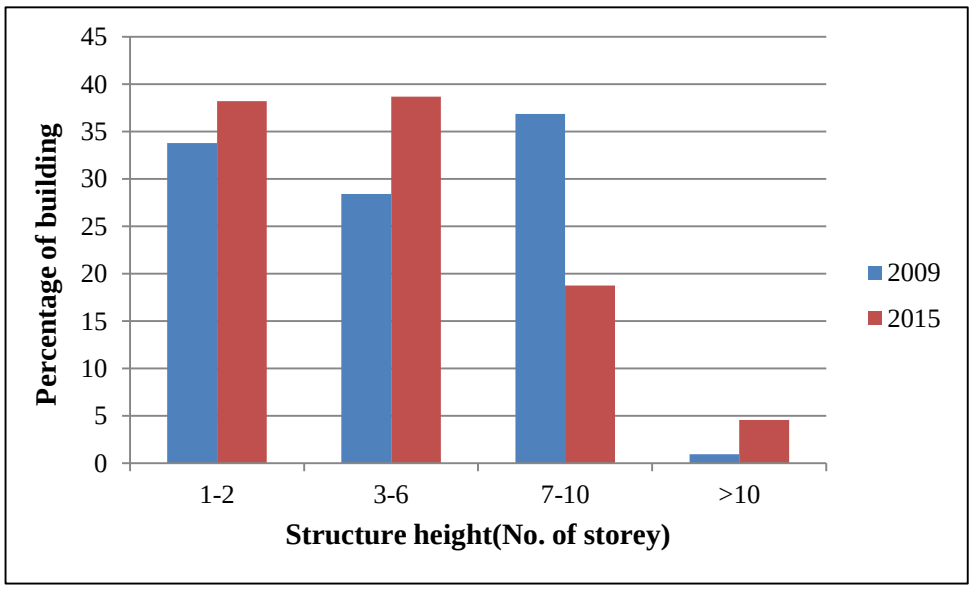

Fig 5.14: Change in structure height in Tejgaon Industrial area

5.3 People's perception regarding development of the site

From the analysis (Fig-5.15 and Fig-5.16) of awareness of people of Tejgaon industrial area regarding the recent government decision of changing the present state of the area into a commercial cum residential hub it is found that most of the people are not aware and informed about this decision. Most of the people who are informed of the decision have known this by means of newspaper or information from other people. This reveals that newspaper and mass media have performed an effective role in disseminating this government decision among people. Social media also contributes to this process of information dissemination among local people.

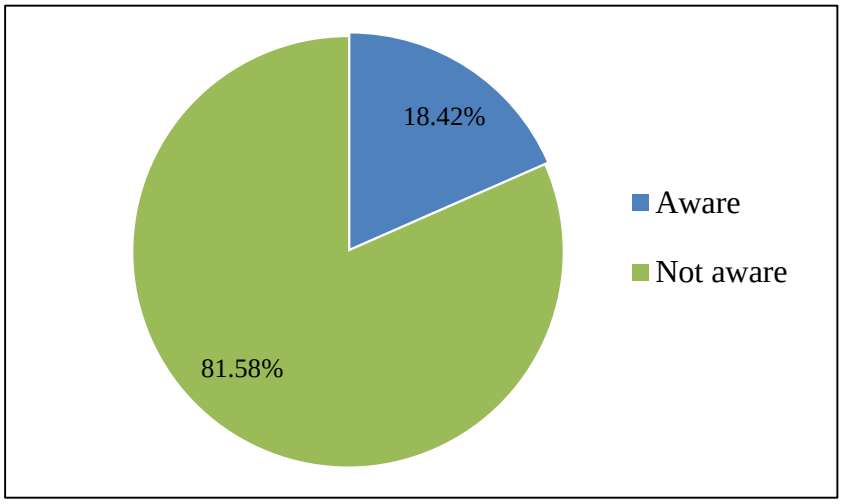

Fig-5.15: Awareness of the people about the recent government decision

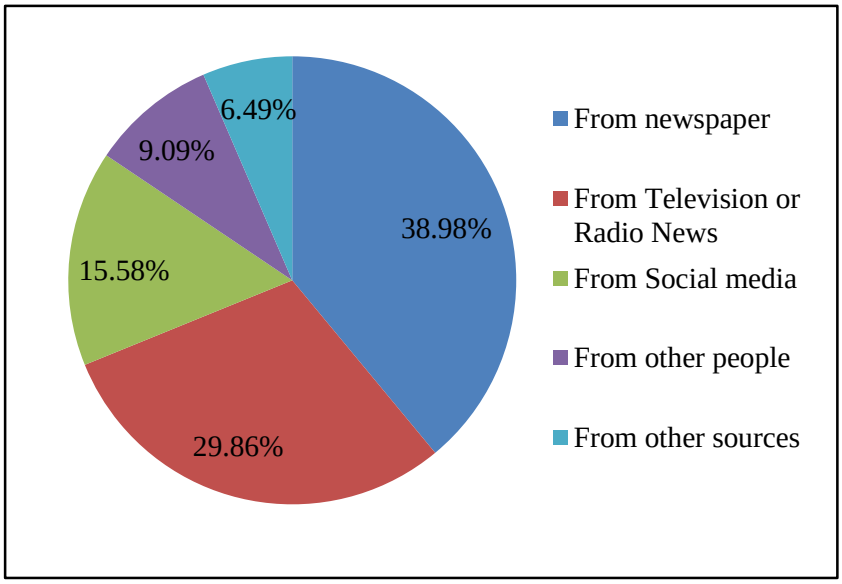

Fig-5.16: How the aware people informed about the decision

Chapter 06

Conclusion and Recommendation

CHAPTER 06: CONCLUSIONS AND RECOMMENDATION

This chapter introduces the overall findings and conclusionary ideas of the study. Furthermore specific recommendation relevant to the study is shaped based on the study findings and authors perspective .

6.1 Conclusion and major findings of the study

Tejgaon was planned as an industrial area to have a great contribution to the national GDP and thus improving the overall national economy. But the changing land use pattern of Tejgaon industrial area exhibits a lethal effect on the area itself and its surroundings. Furthermore it has attracted different non-industrial uses like residential, commercial, office etc with a wider variation of people living and working in this area. The recent development trend of Tejgaon industrial area exhibits a rigorous shift from intensive industrial development to growing commercial establishment follwed by a subsequent mixed use development. There exists an emerging trend of commercial uses in the place of industrial activity and the rate of growth of commercial activities in this area greater than that of industrial one. A little or no variation is observed in the proportion of residential and service category land uses in this area.

A significant change is also observed in prospect of ownership pattern of land of this area. At present private property constitutes about half of the different land uses in this area and the share of “Leasehold property” is quite diminutive in this area. Most of the residential, commercial and industrial land uses of this area are under private ownership. A significant portion of industrial land uses are also group property.

The price of the plots in Tejgaon industrial area varies between a wide range and the average price of land is quite high in this area comparing to other areas of Dhaka city. Most of the highest price plots in the study area are occupied by commercial land use. The maximum proportion of minimum priced land (price varying between thirty to forty one lakh BDT per katha) is under residential land uses.

The highest priced plots in this area are situated at first row on both sides along Shaheed Tajuddin Ahmed Avenue. Most of the commercial and industrial land uses along this road exhibit high market price comparative to other land uses as institutional or service category land uses. The price of plots near Hatirjheel at

Kunipara and Begunbari area along Hatirjheel-Gulshan link road is lowest among prices of all other plots in this area because of the formal transfer of ownership of land in this area is not allowed approximately since 2008.

The structural condition of the buildings in Tejgaon industrial area has changed a considerable amount throughout the period of 2009 to 2015. Percentage of "Pucca" building has been increased in the area compared to that of 2015. There exists no "Katcha" structures in the area and most of the buildings under construction in 2009 have developed as "Pucca" buildings by the period of 2015.

With continuous rapid development there exists a rising trend of high rise building in Tejgaon industrial area because of the location of the Tejgaon industrial area at the core of Dhaka city. The share of high rise building has increased in the Tejgaon industrial area than that of in the period of 2009. Structure height within the study area varies between one storey to twenty stories and most of the existing buildings are under five stories.

There also exists a large variation in size of the plots in the study area. As land price is considerably high in this area, major portion of a plot is utilized by the structures built on it. The residential land uses within the study area mainly occupies small sized plots. Most of the average (around twenty katha) and over sized plots (greater than fifty katha) are occupied by the industrial land uses within the study area. The size of the plots with most of the commercial land uses varies between zero to fourteen katha.

Furthermore most of the people of this area are not aware and informed about the government decision of changing the present state of the area into a commercial cum residential hub.

In earlier studies regarding Tejgaon industrial area the land use information of this area was gathered and trend of development is investigated up to that very period. But for any further policy implication it is very important to have updated information related to this area. Existing ownership pattern and land price is very crucial in this regard which was somehow neglected in the previous studies. Detail information on existing structure including structure type, ground coverage, number of stories, number of units at each floor, area and use of each unit or floor were not incorporated in that study.

Thereby this research provides a detail updated information of existing land use and present development trend of this area. Incorporating these information this research can act as a major base line study for future development plan related to the study area and can be very helpful for further policy implications.

6.2 Recommendation

Tejgaon was initiated as a planned industrial area in 1968. But gradually due to excessive pressure of ever growing population and their increasing demand, absence and enforcement of proper land use control the physical characteristics of this area has changed a lot from the state as it was designed by Dhaka Improvement trust (DIT) in 1968 . As a consequence the location of such an industrial area is quite not justifiable in the core of Dhaka city which as indicated in the DMDP Detail Area Plan (gazetted in 2010).

Again the study recognized a growing trend of commercial activities in Tejgaon industrial area. At present private property constitutes major share of different land uses in this area. As a major outcome state control on further development of Tejgaon industrial area will be reduced to a great extent unless and until strict development control is followed to the land use practice of this area. Private land owners can continue haphazard and unplanned development to maximize their personal interest. In the absence of proper development control, the growing trend of commercial development may furthermore results in such development which may deteriorate and more unlikely to collapse the entire cityscape.

As a consequence this study strongly recommends the introduction and enforcement of strict development control in context of any existing and further development initiative associated with Tejgaon industrial area to fabricate a better and more livable cityscape.

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Appendix

Bangladesh University of Engineering and Technology (BUET), Dhaka.

Department of Urban and Regional Planning, BUET

Questionnaire on

Development Trends of Tejgaon Industrial Area: Spatial and Socio-Economic Analysis

Assalamualaikum/Adab. We are the Level-4, Term-2 students of Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology (BUET). We are conducting a research titled "Development Trends of Tejgaon Industrial Area: Spatial and Socio-Economic Analysis". To fulfill the objectives of our research we need information on land use and socio-economic characteristics of the inhabitants of Tejgaon industrial area. This research is designed solely for academic purpose and all your responses will remain confidential. We shall be extremely grateful if you agree to co-operate with us and give some of your time to answer a set of questions we have. We thank you in advance for your kind co-operation.

For further query, please feel free to contact Department of Urban and Regional Planning (URP), Bangladesh University of Engineering and Technology (BUET), Dhaka-1000, on this number: +88029665634

Questionnaire No.:_____ Date: _____

1. **Land use Information:**

a) Holding number								
b) Plot size								
c) Ownership								
d) Market value of the plot								
e) Structure type								
f) Ground coverage								
g) Number of stories								
h) Number of units at each floor								
i) Area of each unit/floor								
j) Use of each unit/floor	1st	2nd	3rd	4th	5th	6th	7th	8th

2. Awareness of people regarding recent government decision concerning Tejgaon Industrial Area

a) Do you aware about the recent government decision of changing the current land use of this area as commercial cum residential one?

a. Yes b. No

b) 11. What do you know about the development decision?
……

c) 12. How do you know about the government decision?
……..

Thanks for your kind co-operation

Name of the interviewer:…….

Signature:…….

Codes for land use information:

Ownership	Structure type	Floor wise space use		
1.Private Owner 2.Group property 3.Leasehold property 4.Government or Khas land	1.Pucca 2.Katcha 3.Semi-pucca	1. Staff quarter 2. Dormitory 3.Family housing 4.Industrial worker mess 5.Apartment housing 6.University/ college 7. School 8. Petrol pump 9.Vehicleservice centre 10.Institutional office space 11.Adminstrative office space 12. Bank 13.Printing press	14.Informal market place 15.Medicine shop 16. Parking space 17. Retail shop 18.Shopping complex 19.Automobile showroom 20.Chemical industry 21. Food industry 22.Pharmaseutical Industries 23. Warehouse 24.Garments industry	25.Electrical and electronic equipment production industry 26.Security office 27.Training centre 28.Electrical and electronic equipment wholesale centre 29. Restaurant 30.Metal industries 31. Mosque 32.Export oriented 33. Hospital