

Dynamics of Land Price with Respect to Land Use Change: A Study of Selected Wards of Rajshahi City Corporation

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Abstract

The population growth and urbanization of Rajshahi metropolitan city shows an increasing trend. This paper attempts to figure out the influence of land use change on land price in Rajshahi city. As resources are limited, land resource is also limited to fulfill the demand for industrial, commercial, residential, and institutional uses of land. Land price varies with different types of land uses. The increasing demand for land is responsible for the increasing land price. To find out the effects of land use change on land price, a field survey was conducted within five selected wards in Rajshahi metropolitan area. Primary data is gathered from the field survey and required secondary data from master plan of Rajshahi prepared in 1984 and 2004. GIS software is used for generating maps and Microsoft Excel is used for analyzing the increasing trend of land price with the land use. The study has found out a correlation between the two factors that land price increases with the land use change.

Introduction

Rajshahi is a metropolitan city situated in the north west of Bangladesh. It is a major and primate urban and industrial Centre of north Bengal. Rajshahi was simply a district town prior to 1947 and gradually it has achieved the status of city corporation in 1987 (RDA, 2004). It is one of the first municipalities and the 4th largest metropolitan city in Bangladesh. According to census (BBS, 1991), Rajshahi city corporation had 284056 population covering an area of 30 sq. km. Gradually in 2011, RCC covers an area of 45 sq. km with about 449757 population (BBS, 2011). The growth rate of population and urbanization of Rajshahi shows an increasing trend. This increasing trend of population, urbanization and advanced technology has a vast effect on dynamics of land use as well as land price of the study area. For the sustainable development of an urban area, it is important to create balance between the land price and land use.

The development of the human civilization including all social, economic, cultural activities depends on the land use pattern of the area. As land is a wealth-creating resource it provides means for livelihood (Sharif and Esa, 2014:83). On the other hand land resource is limited to fulfill the increasing demand for industrial, commercial, residential, institutional uses of land. For all these factors, land is considered as a scarce resource. As a result land price tends to rise owing to the scarcity of land resource (Sharif and Esa, 2014:83). In the context of urban development, land price acts as an important determining factor. Previous studies from several journals, reports, and study papers are reviewed, that are related to land use and land price issues. Land use is any kind of

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permanent or cyclic human intervention that satisfies human needs which can be material, spiritual or both. It emerges from the complex of nature and artificial resources that together are called land (Mohammad, 2009:13). On the other hand, land use change can be defined as a continuous, evolving process and it is the most important appearance of human interaction with the biosphere.

The rapid population growth and technological changes are responsible for the changes in land use at a great rate (Mohammad, 2009:14). A case study was conducted by (Islam and Hassan, 2011:69) on "Land Use Changing Pattern and Challenges for Agricultural Land: A Study on Rajshahi District". They found that the study area is losing 0.46% of agricultural land and the infrastructure is increasing 5.86% per year which may result total elimination of agricultural land within the next 217 years. Another study on "Agricultural Land Conversion in the Sub-urban Area: A Case study on Rajshahi Metropolitan City" was conducted by (Halim et al., 2013:21). It focused mainly on land use pattern of the area, agricultural land conversion and causes and consequences of the conversion. It is found that the land conversion from agriculture to non-agriculture allied in recent time is more than the previous time due to gradually increasing land demand in housing and relevant services. An important case study was undertaken focusing on the effects of expected land use change on land price of Savar municipality. According to the case study on dynamics of land price and land use change (Sharif and Esa, 2014) shows a strong relationship between land use change and land price. Another research by (Hossain, 2015:06) shows that land scarcity is related to demand and it accelerates the increase in land price, especially in urban areas.

There are many studies that are conducted on land use change and land price issue in the different urban areas of Bangladesh. In the recent Years, land use change has become a prime concern for the developing country like Bangladesh. Rajshahi is one of the prominent cities in Bangladesh but yet there has not undertaken any study focusing on land price with regards of land use change. For this reason, the study is conducted to determine the land use change through trend analysis of the land use information and to strike a balance between the land use and land price. It may provide a clear portrait of the urban pattern that will help the local level institutions to undertake any development plan. The study may also help to control the over explosion of land price.

Objectives and Methodology

A number of research works are available using land price as a factor to accelerate land use change. But in case of Rajshahi City Corporation (RCC), no research has yet been conducted focusing land price regarding land use changes. The objective of this paper is to determine the land use changes using trend analysis of the land use information and to find out the relationship between land use changes and land prices. However, it is not possible to assess all the factors affecting land use change and land price due to time and resource constraint. Five representative wards (2, 12, 13, 16, and 26) are considered for the study of Rajshahi City Corporation, which represents the overall land use pattern such as residential, road, agricultural, commercial, industrial and open space. Some factors are considered to select these five wards for the study on RCC, such as: distance from the CBD, accessibility, landscape design, supplies of basic utility services, and environment. Ward 12 and 13 are situated adjacent to the CBD, ward 2 and 16 are situated in the outskirts of the town and ward 26 represents core residential area. Distance from the CBD is measured using Googleearth. Later a number of GIS maps and bar charts are generated using primary and secondary data. Primary data is collected by field survey and the secondary data is acquired from the master plan data 1984 and 2004.

Trend of land use changes are shown among the year 1984, 2004 (data acquired from the master plan) and 2016 (existing land use data collected by field survey).

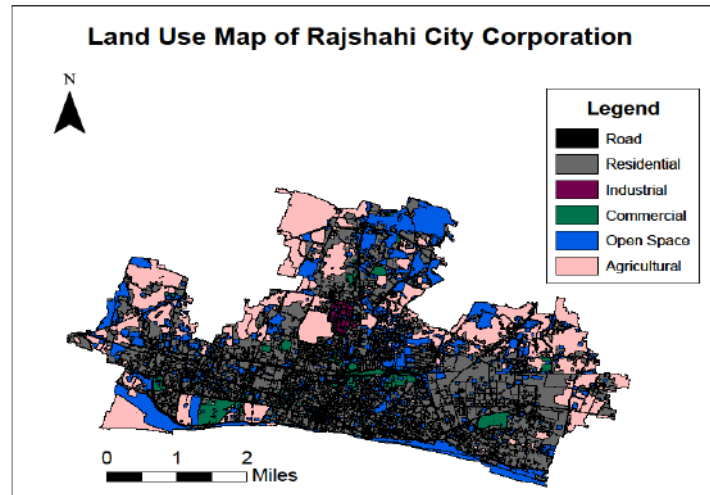
Land Use of the Study Area

With the help of land use data it is easy to understand the future growth scenario of an area. By applying Geographic Information System (GIS) the total land use of the study area is classified into six (6) categories-Road, Residential, Agricultural, Commercial, Industrial, and Open Space (Table 1 and Figure 1). Existing land use information is acquired from master plan data (2004) prepared by Rajshahi Development Authority (RDA), which provides an entire view of land use and spatial characteristics of land area varying with location of the Rajshahi City Corporation (RCC).

Table 3: Land Use Categories of Rajshahi City Corporation.

Category	Total area(acre)	Percentage (%)
Residential	5305.87	44.68
Agricultural	2848.96	23.99
Commercial	598.04	5.04
Industrial	84.14	0.71
Open Space	2636.77	22.20
Road	401.62	3.38
Total	11875.40	100.00

Source: Rajshahi Master Plan (2004)

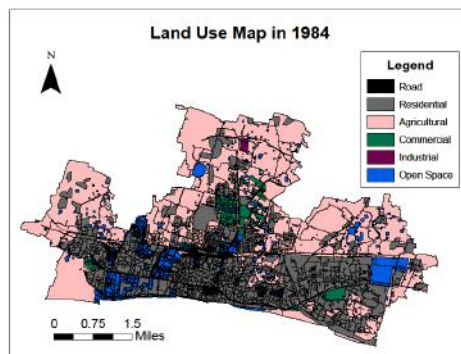


Source: Rajshahi Master Plan, 2004.

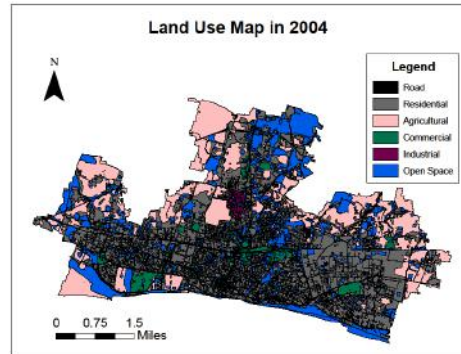
Figure 1: Land Use Map of Rajshahi City Corporation.

Trend Analysis of Land Use Change in Rajshahi City Corporation

The dynamic process of land use change in the recent decades in Rajshahi City Corporation shows an increase in residential, commercial and industrial uses and decrease in agricultural and open spaces (Field Survey, 2016). At the same time changes in land uses given rises to various problems and the transformation process has negative impacts on the overall agricultural and built environment. Changes in land use encourage urbanization and rural to urban migration to a little extent (Sharif and Esa, 2014:85).



Source: Rajshahi Master Plan 1984.

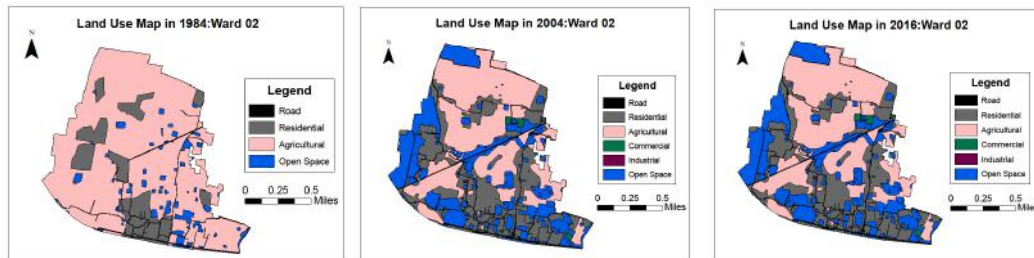


Source: Rajshahi Master Plan 2004.

Figure 2: Land Use Map of RCC in 1984.

Figure 3: Land Use Map of RCC in 2004.

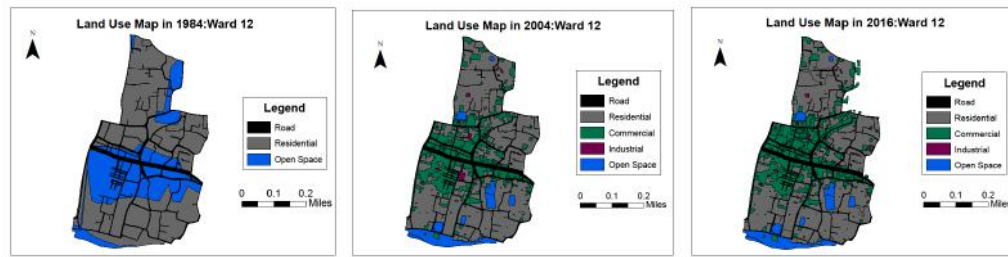
For better understanding of the land use changes, comparison through trend analysis of land use changes among the year 1984, 2004 and 2016 are shown. Land use information of 1984 and 2004 is collected from the master plan and the existing land use information (2016) is collected through field survey. Then the variation of land use changes in different years is shown by bar charts.



Source: Map Prepared by Researcher, 2016 and RDA.

Figure 4: Trend Analysis of Land Use Changes of Ward 2

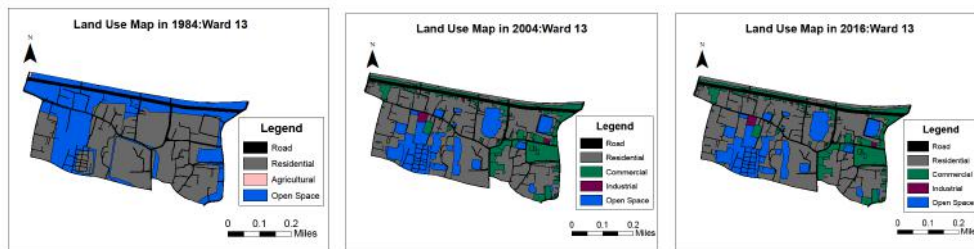
Land use maps of ward 2 (Figure 4) shows significant change in residential, agricultural and open space between the year 1984 and 2004 and the emergence of commercial and industrial land use in 2004.



Source: Map Prepared by Researcher, 2016 and RDA.

Figure 5: Trend Analysis of Land Use Changes of Ward 12.

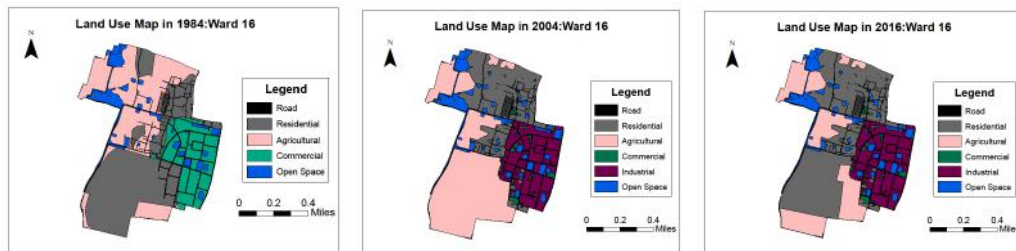
Land use maps of ward 12 (Figure 5) shows significant change in residential and open space between the year 1984 and 2004 and the emergence of commercial and industrial (specially commercial) land use in 2004 to a large extent. There exists no agricultural land in ward 12.



Source: Map Prepared by Researcher, 2016 and RDA.

Figure 6: Trend Analysis of Land Use Changes of Ward 13.

Land use maps of ward 13 (Figure 6) shows significant change in open space and little change in agricultural land between the year 1984 and 2004 and the emergence of commercial and industrial land use in 2004. From the year 1984 to the year 2004 the agricultural land tends to zero.

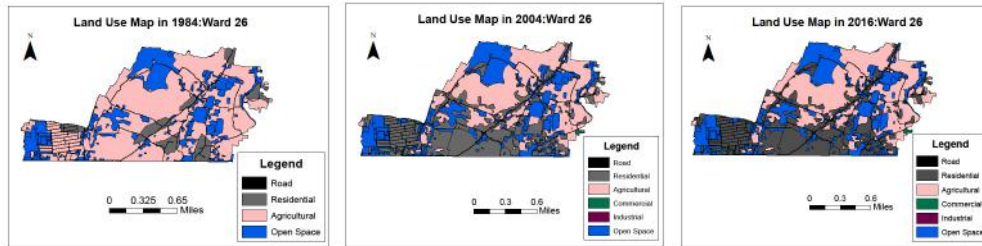


Source: Map Prepared by Researcher, 2016 and RDA.

Figure 7: Trend Analysis of Land Use Changes of Ward 16

Land use maps of ward 16 (Figure 7) shows significant change in residential, agricultural, commercial, industrial and open space between the year 1984 and 2004 and the

emergence of industrial land use in 2004. It also shows the conversion of commercial land use to industrial land use.

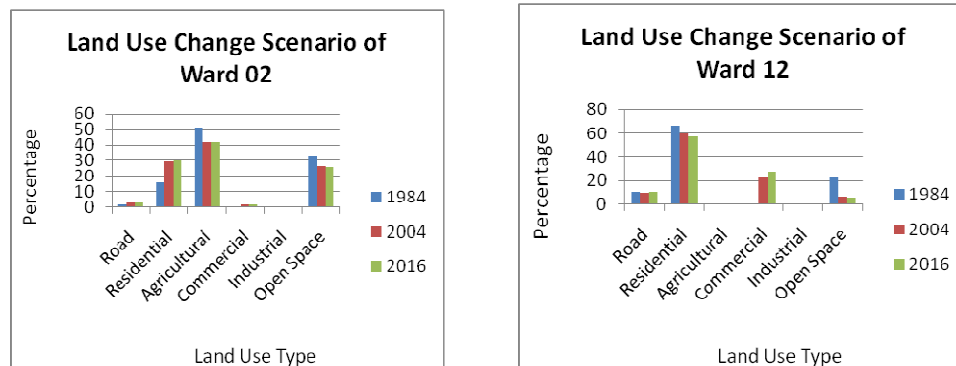


Source: Map Prepared by Researcher, 2016 and RDA.

Figure 8: Trend Analysis of Land Use Changes of Ward 26.

Land use maps of ward 26 (Figure 8) shows significant change in residential, agricultural and little change in open space between the year 1984 and 2004 and the emergence of commercial and industrial land use in 2004 to a little extent.

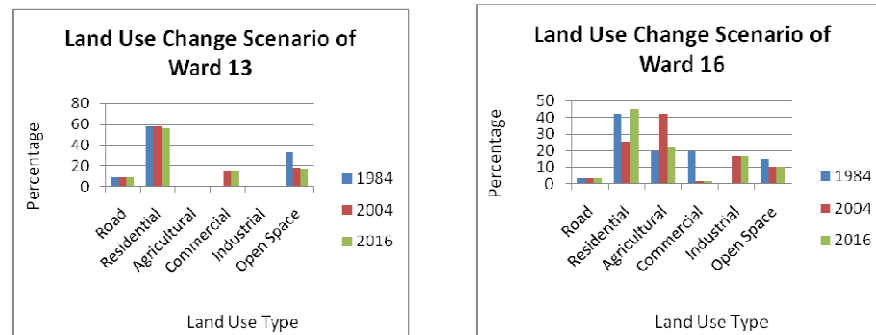
From the bar chart, it is seen that in the year 1984, Agriculture was the dominant sector. With the passage of time agricultural sector decreases and residential, commercial, industrial and other non-agricultural sector flourish, which tends to urbanization and advancement in amenities and facilities in the life of urban people. Between the year 1984 and 2004 there occurs significant change in land uses but from the year 2004 to 2016 land use changes becomes more or less static in RCC and there occurs slight changes among the land uses: Residential, Commercial, Industrial and Open Space. The transportation networks remain more or less the same among 1984, 2004 and 2016.



Source: Rajshahi Master Plan 1984, 2004 and Field Survey, 2016.

Figure 9: Year Wise (1984, 2004, 2016) Land Use Change Scenario of Ward 2 and 12.

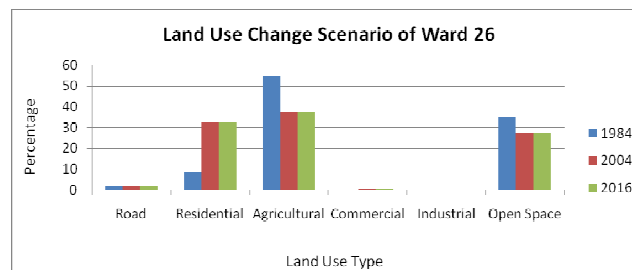
Figure 5 shows that in ward 2 the residential land use varies widely between the year 1984 and 2004 and has been doubled in 2004. The agricultural land use and open space also varies greatly. No significant commercial and industrial land uses. Again, in ward 12 there exist no agricultural and little industrial land uses. The open space varies greatly and decreases from the year 1984 to 2004.



Source: Rajshahi Master Plan 1984, 2004 and Field Survey, 2016.

Figure 10: Year Wise (1984, 2004, 2016) Land Use Change Scenario of Ward 13 and 16.

Figure 5 shows that in ward 13 the open space varies widely between the year 1984 and 2004 and tends to decrease in 2004. There exist no agricultural land in ward 13 at present. Again, in ward 16 the residential land uses and open space have been decreased between 1984 and 2004 and the commercial land uses have been converted to industrial land uses.



Source: Rajshahi Master Plan 1984, 2004 and Field Survey, 2016.

Figure 11: Year Wise (1984, 2004, 2016) Land Use Change Scenario of Ward 26.

In ward 26 there exist negligible commercial and industrial land uses. The residential land uses have been increased and agricultural land uses and open space have been decreased to a large extent between the year 1984 and 2004 but land use change between 2004 and 2016 is not significant for the entire ward.

Existing Land Price of the Study Area

Rajshahi is the oldest municipality of Bangladesh. The existing land price is changing very slowly than the other time. The average land price from 1984-2004 has increased about 1032 percent. But from 2004-2016 these change is about 153 percent. The main cause of increasing land price people of near district would like to stay in city for educational facilities. The price of commercial land is maximum in all wards except ward 16 and 26. In these wards residential land hold maximum price. The commercial land is mainly developed in ward 12 and 13. The development is in linear pattern. The price is 10 million BDT- 30 million BDT (from field survey 2016). In wards 12 and 13, no agricultural and industrial lands are available. The residential land is higher in ward 26 and 2. In ward 26, residential area has been developed in planned way and provided various facilities.

Trend of Land Price Change

From the graph we found that the price mostly changed in commercial area. The land price change among the ward is not same. Somewhere the price of commercial has increased highly, somewhere residential. Agricultural land is also available in ward 02, 16, 26.

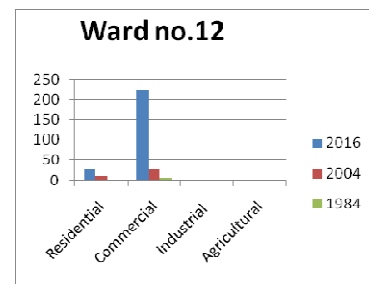
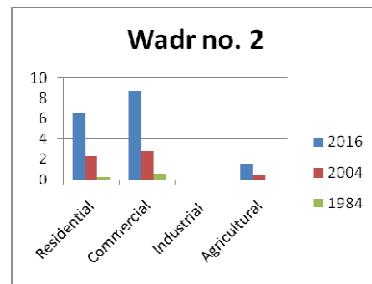


Figure 12: Trend of land price change in ward 2 Figure 13: Trend of land price change in ward 12

In ward 2 and 12, price of commercial land is higher than the other lands. No industrial land is available in this area. The price of commercial land varies highly from ward to ward. The maximum land price is about 8 lakh in ward 2, where two core in ward 12.

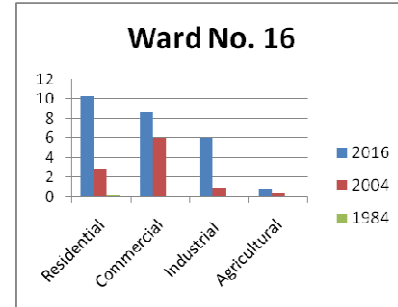
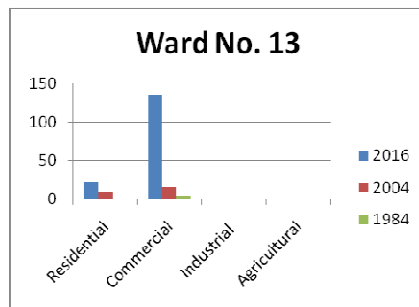


Figure 14: Trend of land price change in ward 13 Figure 15: Trend of land price change in ward 16

Ward 13 is mainly a commercial area, where industrial and agricultural land are not available. But in ward 16, all types of lands are available. It is basically an industrial area.

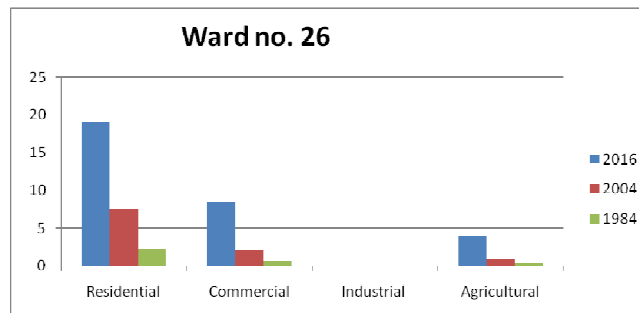


Figure 16: Trend of land price change in ward 26

In these wards, there are two types of residential lands. One is well facilitated land another one is unplanned. The price in the planned area is 3 million BDT per Katha and in the unplanned area it is less than 1 million.

Factors Influencing the Land Price: Land price of a certain area depends on many factors as like, physical factors, environmental factors, social factors and cultural factors etc. From the survey and literature review it is stated that few factors are highly affecting the change of land price.

Distance as a Major Factor: Distance is considered as a major factor to determine the relationship between land use and land price. There are some variables of distance factor. Among them, five important factors are distance from central business district, distance from bus stop, distance from shopping centre, distance from educational institute, distance from recreational centre and distance from healthcare centre. If these facilities are near to important facilities and are easily accessible, the land prices increase and the vice-versa.

Road Accessibility: Various types of roads are found in study area. The price varies with change of road types. The price beside the primary road is higher than the other. For example it's about 30 million BDT beside the primary road where it's 2 lakh BDT (Field survey, 2016) beside access road.

Access to Utility Service: When the utility service (like water supply, gas supply, security system, sewerage system, storm water drainage system) is available and easily accessible the price is higher. With the decrease the availability of these services the land price also decreases.

Location and Shape of the Plot: The location and shape is the important factors for land price. For example the land beside lake or open space or south facing is high price than the other. The shape of the plot may be regular an irregular. The regular shaped land is more demandable. Among regular shaped square and rectangular shaped land is high pricing.

Key Findings

Land is a natural resource. Because of the dynamic nature of land use changes, the demand for residential, industrial and commercial land is growing day by day but the supply of land is not increasing in that proportion because the land is limited (Sharif and Esa, 2014:89). With the increase of population, the stock of open spaces and agricultural lands is declining. As a result, negative impacts on agriculture and built environment are leading to take place. The haphazard growth of urban residential settlements and other infrastructures is acting as a focal point to urban sprawl. The rapid conversion of land use is accelerating urbanization and rural to urban migration. In many areas, people are deprived of sufficient municipal facilities. It is also noticeable that between the year 1984 and 2004, significant change in land uses have taken place but between 2004 and 2016 land use change is not significant in RCC. Again, the rate of land use change is higher adjacent to the services and facilities, and it is lower as the distance from the services and facilities increases (Sharif and Esa, 2014:89). Again, land price is a great indicator of development. Normally, land price changes with change of time. In this study area, the land price has increased highly for commercial lands. The land price of residential,

commercial, industrial and agricultural has changed respectively averaging 683%, 923%, 127% and 223%. The price of agricultural land has increased more than industrial land, because Rajshahi in terms geographical location is not suitable for industrial development. The price change is higher between 1984 and 2004 than 2004 and 2016. The study thus presents an interesting scenario in the relationship of land use and land price for Rajshahi, which helps understanding the dynamism of changes in cityscape.

Conclusion

In the present decades, population growth and urbanization is increasing in a significant manner. Urbanization is closely connected with industrialization which initiates industrialization-led economic growth and transforms agricultural based income and employment to non-agriculture based livelihood opportunities. Urbanization also influences population growth in urban area. Therefore, the land use pattern also changes with the increasing rate of urbanization. As land holds a central position in human existence and development, it plays an important role in society for all development works. Land is a scarce resource and it is not unlimited. So, with the increasing demand for land, land price also increases. From the trend analysis of Rajshahi City Corporation, it is found that there is significant change in land price with regards to land use in between 1984 and 2004. But it is also found that there is no significant change in between the year of 2004 and 2016. It indicates that the land use change is not so dynamic in Rajshahi City Corporation.

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