

# Impact of urban land use on land value: Kurseong Town

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## Abstract

Urban land use is the surface utilization devoted to fulfilling one or more functions or types of utilization, used either intensively or extensively, ultimately satisfying the needs of the urban residents (Northam, 1975). Therefore, land use is a spatial feature of the types of human activities on a piece of land to meet numerous human needs such as residential, commercial, industrial and so on. The land use planning in an area expresses the interactions between the land acquisitions and land quality on the one hand and its regional relationship and land use on the other. There has always been a need for land because of its resilience and investment. Land, which is one of the most basic and limited resources for human existence, is open to annihilation and exploitation due to the growing demand and rapid population growth in Kurseong Town. Almost everywhere, different types of land uses are associated with different land values. Rapid urban sprawl and continuous population growth in Kurseong Municipality have resulted in an increase in land prices in recent years as is evident from field research and information gathered from the second data. The current paper attempts to unravel the changes occurring in the patterns of various land uses of Kurseong Municipality over a period of 13 years and their impact on land value. The analysis was undertaken by taking a number of indicators into account and focusing on the use of GIS tools and statistical methods. The study shows a sharp decline in vacant land and an increase in the developed area. In addition, there is a strong positive correlation between the price of the land and a range of existing urban facilities and population density in different wards of Kurseong town.

**Keywords:** Land use, land use change, urbanisation, population growth, land value

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## Introduction

A proper study of past and existing land use focusing on the intensity of its use and misuse, the development of the potentialities of vacant lands and identification of land use types and the associated land values is of immense significance in the overall planning of urban places as it is through the systematic utilization of the land that economic and cultural development of an area can be made possible. Proper planning, considering the knowledge of broad characteristics of urban pattern and quantitative analysis of the space devoted to each type of land use, is crucial for ensuring the quality of urban life. Hence, in a hill town like Kurseong with variations in relief and where the growth has not been uniform in different directions, mainly due to physical controls, the study of land use becomes fundamental for human sustenance as it plays an instrumental role in bringing out the variations in land value of the concerned area.

## Review of literature

Scholars across the globe have studied land use in urban centres and its impact on land value with different perspectives. Singh (1980) examines the existing land use pattern of Shillong agglomeration laying emphasis on the functional structure of markets, various categories of land uses, their problems and prospects; Sharma (1985) after undertaking an empirical study of morphological and functional analysis of Rohtak city in Haryana reveals his bold proposal, practice and operation of perspectives, parameters and principles avoiding the western models in

explaining the urban growth and ecological processes as he opines that the Indian cities do not yet possess the social mobility and economic vitality of western cities. Upadhyay (1992) brings out the salient features of Jaipur's urban landscape laying emphasis on its evolution and land use pattern and after carefully analysing and interpreting all the pertinent social and economic facts, recommends a proposal for a comprehensive urban land use planning. Detail investigation on the urban morphology of large and medium towns and urban land use pattern and changes is also found in the works of scholars like Katakey and Sharma (2002) - Jorhat in Assam, Malik et al. (2007) - Bolpur town, Swamy and Mahesh, 2010 - Gulbarga city, Tiwary et al. (2010) - Mirzapur city, Jangra and Kaushik (2014) - Kaithal Town, Haryana etc. to name a few. Likewise, many scholars such as Northam (1975), Balchin and Kieve (1988), Mahadevia and Bhatt (2002), Palekha (2006), Topcu and Kubat (2009), Albouy and Ehrlich (2014), Kolowe (2014), Kahraman and Kubat (2015), Gwamna, E. and Zahari (2015) etc. have focussed their studies on topics such as factors affecting urban land values, combined influence of geographical factors on the origin, nature and characteristics of land values in urban centres, incorporation of information regarding land value in future urban planning, factors controlling the urban housing values in relation to structural, environmental and neighbourhood attributes.

### Study Area

Kurseong town, the sub-divisional headquarter is located at 26°51'42"N to 26°53'36"N latitude and 88°15'12" E to 88°17'32" E longitudes in Darjeeling district of West Bengal. Kurseong was established as a Municipality in 1879, prior to which it was under Darjeeling Municipality. Later in 1880 this small settlement developed into a travellers' paradise for British authorities and a favoured destination for a sanatorium, where the ailing would recover. It lies at a distance of 48 km from Siliguri and 30 km from Darjeeling. Kurseong is located on the southern slope of the Senchal-Mahaldiram range which extends from the Ghoom ridge in the Darjeeling Himalayas to the north and gradually descends to the plains of Terai. The town is at an elevation of 4864 feet (1482m) above sea level. Kurseong Municipality at present consists of 20 wards covering an area of 7.85 km<sup>2</sup>. In 2011 the municipality recorded the population density of 5659 persons per square kilometre. The name of the town is assumed to have been attained from the Lepcha word "Kursonrip" meaning the small White Orchid which grows extensively in and around Kurseong, thus Kurseong meaning "The Land of White Orchids."

### Objectives

The study has been taken up with the following specific objectives:

1. To examine the temporal change in land use pattern of Kurseong Municipality.
2. To study the impact of land use change on land value.
3. To investigate the land value pattern variations in different wards in Kurseong Municipality.
4. To analyse the relationship between the land value and different variables.

### Data base and methodology

The current study is based on primary and secondary data collected by intensive field research and various government institutions respectively. Three separate years i.e. 2003, 2010 and 2016 have been considered for an analysis of land values in Kurseong municipality. Various statistical methods such as Karl Pearson's correlation coefficient method have been used to examine the relationship between land value and other variables with the help of SPSS Version 23. The present and past land use maps of Kurseong Municipality have been prepared from Google Earth, 2003 and 2016 with 0.61 metre resolution.

Few senior citizens were also interviewed in order to collect the land use information. The ward boundary has been prepared from the municipality map collected from the Municipality Office. The available satellite data has been visually interpreted and integrated with intensive field checks and the maps were digitized and attributed with the help of GIS software ArcGIS 10.3.1. based on the attribute tables for respective years. Statistical analysis of land use changes has been analysed in MS Excel package.

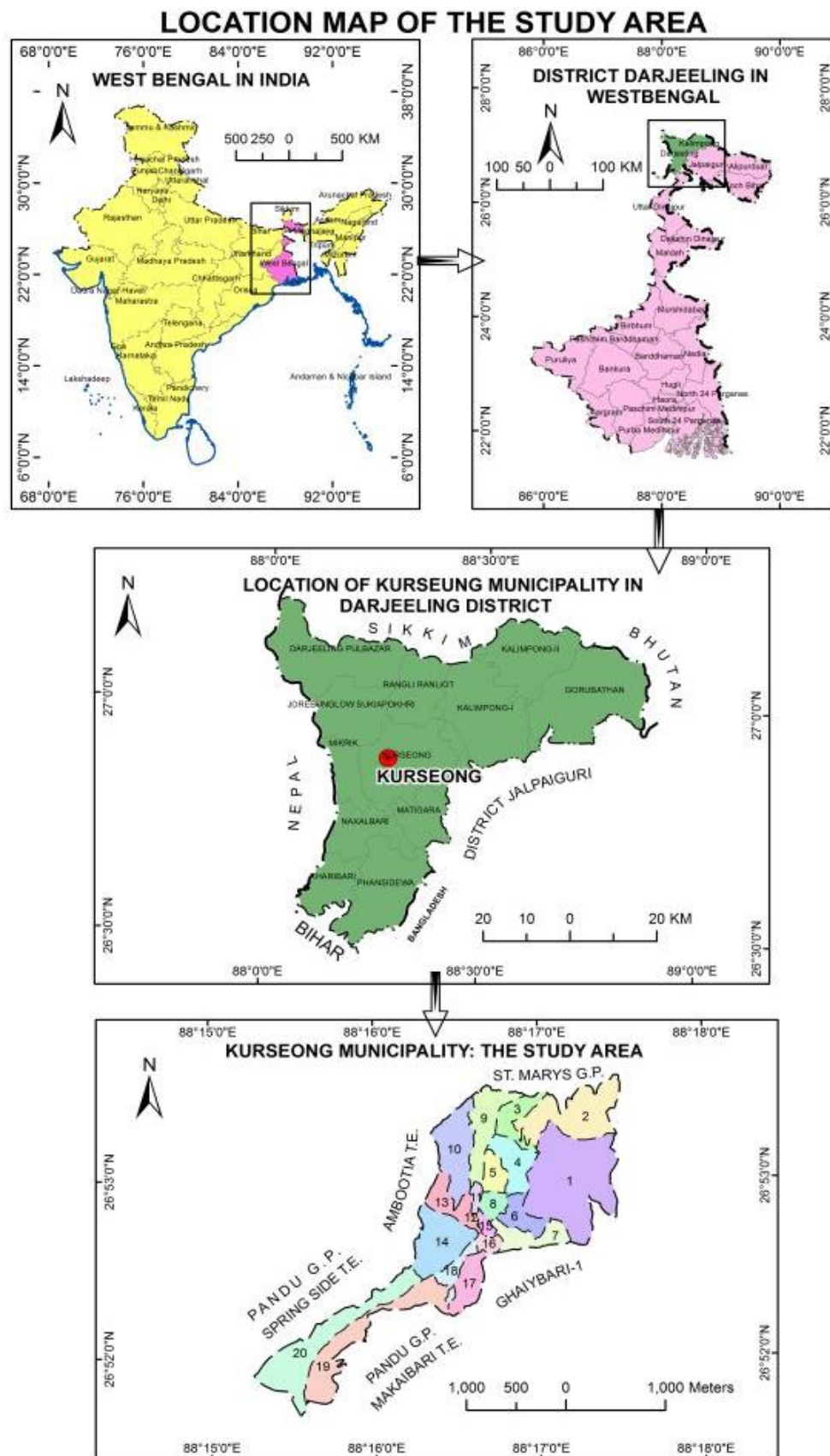


Figure 1 Location Map of the Study Area

## Result and Discussion

Land use of any place varies according to the variation in physical factors and the location of habitations with respect to the market centres and transportation lines. Owing to urban growth in terms of time and space Kurseong town has witnessed several changes in land use pattern. These modifications evolved through history, reflect the changes in the functional character of the town and the level of development of its inhabitants. Based on U.S.G.S. classification system (Anderson, 1971) and depending upon the existing features of land use in Kurseong Municipality, two broad land use categories are discussed for the present study *viz* Developed Area and Under-developed Area which are further classified into residential, commercial, industrial, transport and communication, mixed (commercial cum residential), open space, forest, agriculture and vacant land. As time goes by, the use of land in both natural and man-made environments is influenced by the pressures associated with development and increasing population (Rongmei and Singh, 2013). The need for the study of land use in different time lines, monitoring its change and the factors associated with it, therefore, is essential which can aid, to a great extent, in balancing the present requirements of land considering the future needs.

### Changes in Land Use Pattern (2003-2016)

The change in land use is instigated by socio-economic, political, cultural as well as technological factors on the one hand and restrained by physical factors such as soil, climate, availability of resources, accessibility etc. on the other. When the population decreases the urban functions begin to shrink and when it increases the functions begin to expand and decentralize (Singh, 1980). Land use change is a complex and dynamic process which is closely associated with human activities involving nature. In Kurseong town settlement and transportation area has increased due to growing urbanization and area under forest and agriculture has been precariously diminishing.

The areal expansion of Kurseong town in different directions is affected because of physiographic limitations and anthropogenic interventions. It has been noticed that the total area of the town is changing from time to time as the pressure of population is increasing and the land occupancy on agricultural land is spreading to meet the urban demand and hence the urban expansion has taken place rapidly in the past and steadily in recent years. The changing urban land use has been studied during the period 2003 – 2016. The town under study has been experiencing growth of the built-up area within and outside the municipal limits. The total area of the town also has increased from 5.05 sq. km. in 2003 to 7.85 sq km in 2016.

**Table 1 Change in land use pattern in Kurseong Municipality, (2003 - 2016)**

| Land use category                  | Area in km <sup>2</sup> |               | Change in land use (in km <sup>2</sup> ) |
|------------------------------------|-------------------------|---------------|------------------------------------------|
|                                    | 2003                    | 2016          | 2003 – 2016                              |
| Residential                        | 1.8156                  | 3.1229        | 1.3073                                   |
| Commercial                         | 0.0063                  | 0.0382        | 0.0319                                   |
| Mixed (Commercial cum Residential) | 0.0469                  | 0.0989        | 0.052                                    |
| Industrial                         | 0.0048                  | 0.0076        | 0.0028                                   |
| Transport & communication          | 0.0131                  | 0.0154        | 0.0023                                   |
| Public & semi public utilities     | 0.1526                  | 0.3157        | 0.1631                                   |
| Open space                         | 0.1530                  | 0.2244        | 0.0714                                   |
| <b>Total</b>                       | <b>2.1923</b>           | <b>3.8231</b> | <b>1.6308</b>                            |
| Forest                             | 1.4535                  | 2.2409        | 0.7874                                   |
| Agriculture                        | 1.388                   | 1.7619        | 0.3739                                   |
| Vacant Land                        | 0.0162                  | 0.0241        | 0.0079                                   |
| <b>Total</b>                       | <b>2.8577</b>           | <b>4.0269</b> | <b>1.1692</b>                            |
| <b>Total</b>                       | <b>5.05</b>             | <b>7.85</b>   | <b>2.8</b>                               |

Source: Google Earth, 2003 and 2016

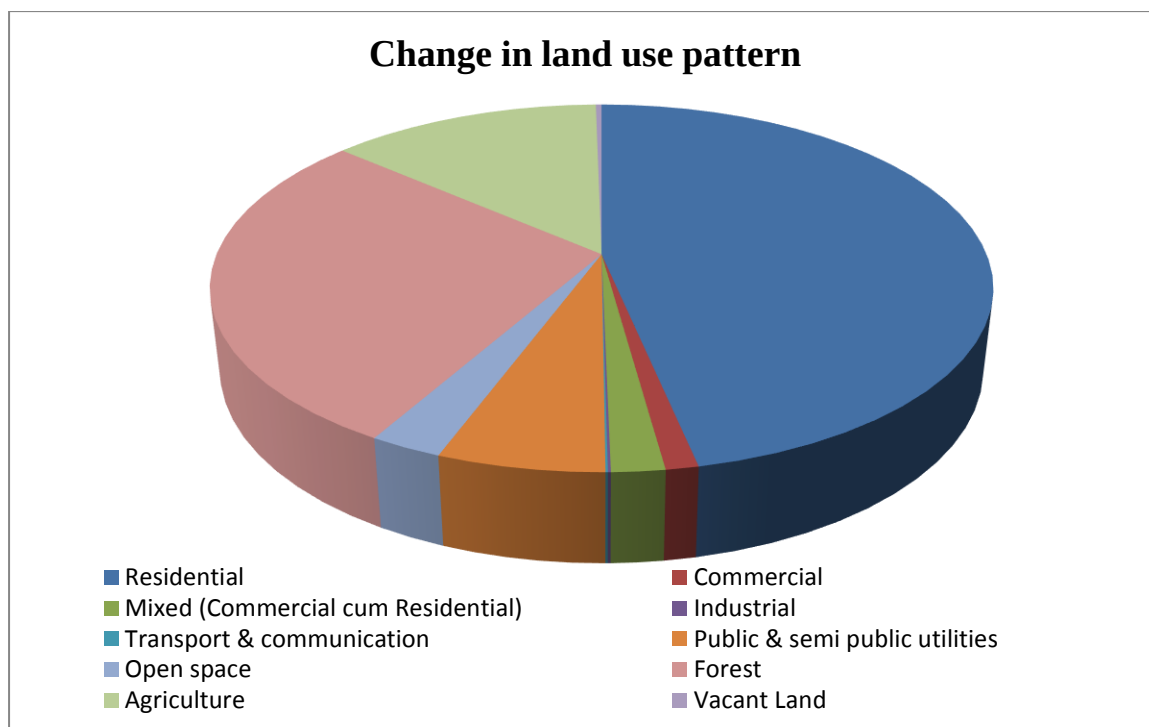


Figure 2 Change in land use pattern (2003 - 2016)

Land under different functions increased to fulfill the increasing requirements of the people as the population of the town increased rapidly after independence. This resulted into growth and expansion of Kurseong town as a whole as well as various land uses. There was an increase in the municipal area from 5.05 km<sup>2</sup> in 2003 to 7.85 km<sup>2</sup> in 2016. The highest

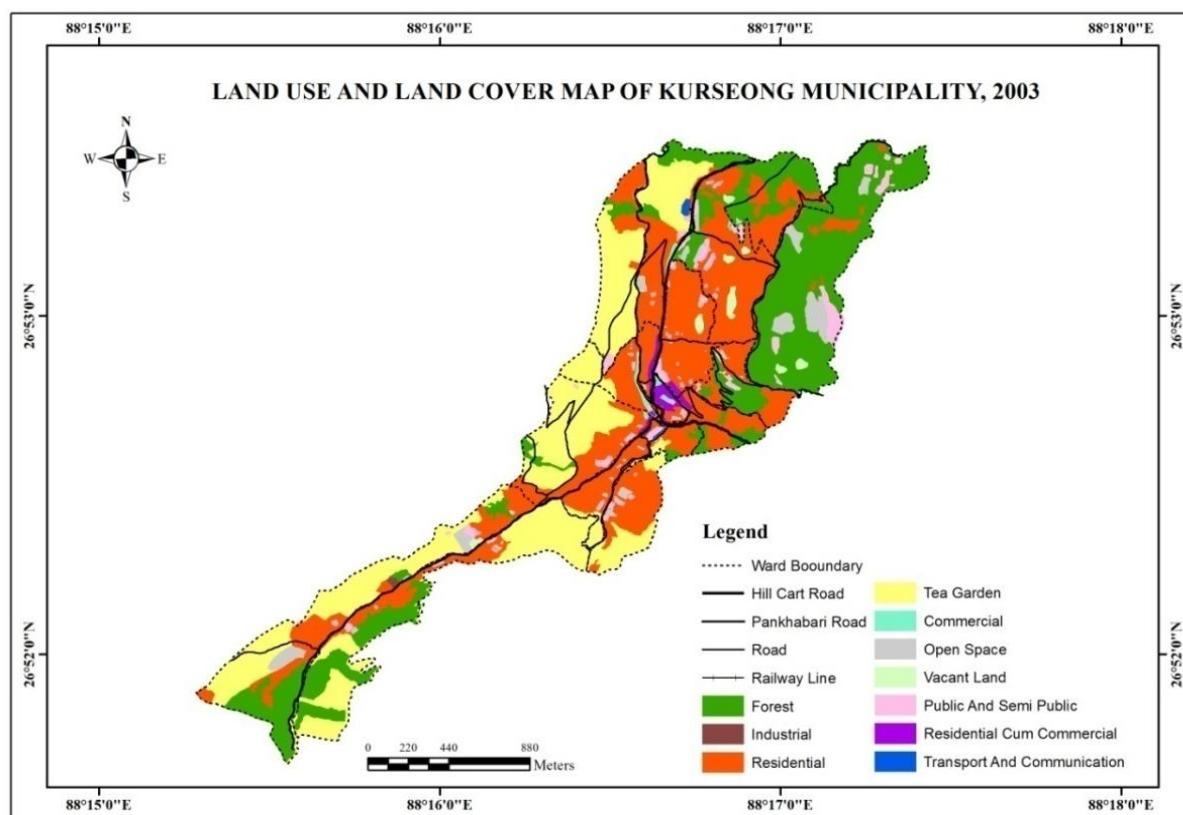


Figure 3 Land use and land cover map of Kurseong Municipality, 2003



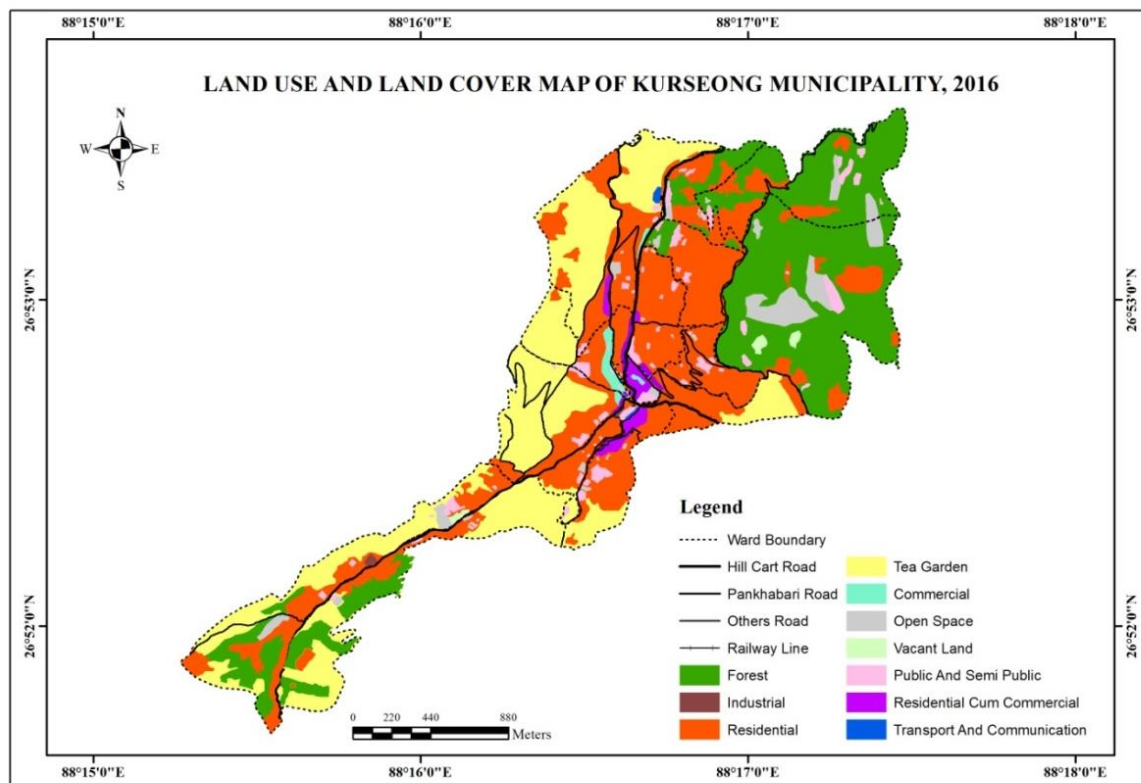


Figure 4 Land use and land cover map of Kurseong Municipality, 2016

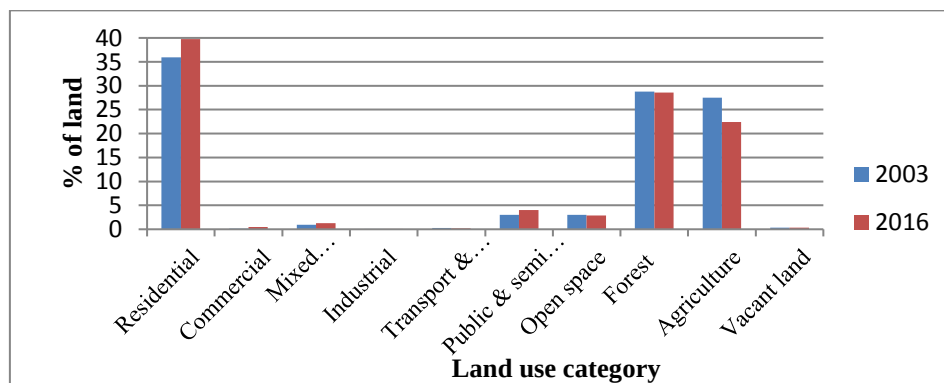


Figure 5 Percentage of land under different categories in Kurseong Municipality, 2003 and 2016

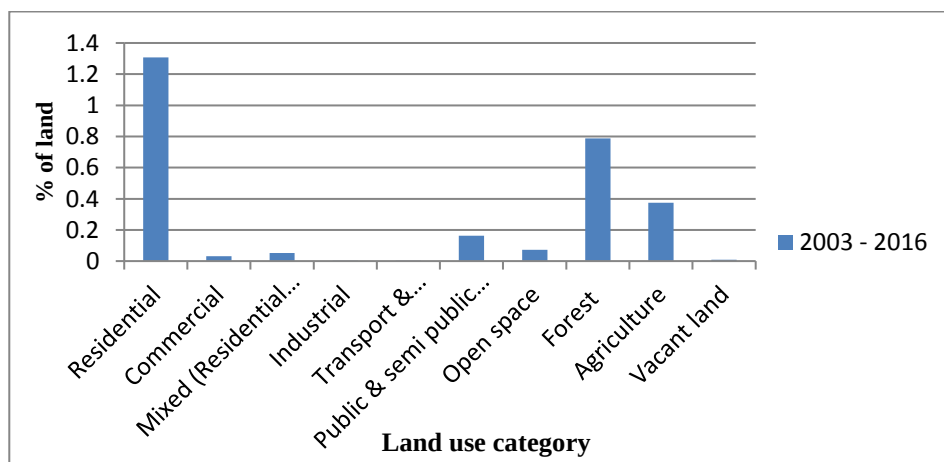


Figure 6 Change in different land use categories, Kurseong Municipality(2003 – 2016)

quantity of land has been increased in residential land use (1.3073 km<sup>2</sup>) while very little growth is observed in land under transport and communication and vacant land. It is clear from the table that the urban land use has increased at the expense of agricultural and vacant lands. Thus, the growth pattern of various land uses and its change has been dominated by residential land use.

### **A. Developed Area**

The developed area increased from 2.0738 km<sup>2</sup> in 2003 to 3.8231 km<sup>2</sup> in 2016. The developed area occupied by residential land use has increased by 1.4258 km<sup>2</sup> which is highest among all the land use categories. This was possible due to the availability of a good amount of vacant land in different parts of the town. The land under commercial use has increased from 0.0063 km<sup>2</sup> in 2003 to 0.0382 km<sup>2</sup> in 2016. The reason is attributed to rapid increase in population and Kurseong town being developed as an educational hub. Transfer of land for commercial use has taken place mostly from residential land use. There was a significant increase of land under mixed (Residential and Commercial) category from 0.0469 km<sup>2</sup> in 2003 to 0.0989 km<sup>2</sup> in 2016. This category has replaced the land under commercial use and to some extent residential use because of urbanization and the associated intensive use of land. There was an insignificant increase of only 0.0028 km<sup>2</sup> during 2003 – 2016 with regard to industrial land use as no new industries has emerged and closure of earlier ones. The lowest amount of change in land use has been observed in transport and communication. This land use category increased from 0.0131 km<sup>2</sup> in 2003 to 0.0154 km<sup>2</sup> in 2016, thus with an increase of only 0.0023 km<sup>2</sup> as there is a very little scope for the widening of roads within the municipal area. With increase in population and expansion of town, land under public and semi-public utilities has a significant increase as the demand for public utility facilities such as government offices, educational institutions, public halls, libraries etc. increase with the increase in population. The significant increase of land under open space from 0.1530 km<sup>2</sup> in 2003 to 0.2244 km<sup>2</sup> in 2016 is attributed to the fact that a significant amount of new areas has been incorporated in 2011 in the north, north-eastern, western and southern part of the town.

### **B. Under-developed Area**

There was a significant increase of 0.7874 km<sup>2</sup> of land under forest during 2003 – 2016, which was highest of the under-developed area. This is mainly because of the incorporation of new areas to the north-eastern and southern part of the town. The land under agriculture category increased from 1.388 km<sup>2</sup> in 2003 to 1.7619 km<sup>2</sup> in 2016, which is attributed to the fact that the incorporation of new areas to the north-western, western, southern and eastern part of the town caused some land under tea gardens to be included in the municipal area. A negative growth has been observed in vacant land as the land under this category decreased from 0.1347 km<sup>2</sup> in 2003 to 0.0241 km<sup>2</sup> in 2016. This is due to the fact that the vacant land available in the form of land as a portion of already closed tea garden later came up with many new settlements.

### **Impact of land use on land value**

The impact of urban land use on land value may operate either individually or in a group. Land price varies according to the type of use, the location of a particular parcel of land and the associations linked to it. Proximity to certain areas or facilities can have a significant or diminishing impact on land value depending on the owner's perspective. Therefore, in a broader sense, distance is an influential factor affecting the value of urban land such as distance from the CBD, distance from the shopping malls, distance from transportation intersections etc. It is to be pointed out here that distance and land value are negatively related as the greater the distance from the heart of the town possessing all the urban amenities, lower the land value.

With variations in relief the growth has not been uniform in Kurseong town in different directions, mainly due to physical constraints. At the time of the initiation of the town, attempts were made by the local authorities for its organised development which, with the passage of time, gradually became a far difficult dream in view of its rapid and high population growth in recent decades. This ultimately has resulted into disorganised development of land

uses characterised by emerging haphazard mixed land uses. The remarkable impact of land use can be observed on the land value of the municipal area. With the expansion of cities and consistent process of economic development, there is a mounting demand for land for setting up residential and commercial constructions. Due to its limited availability, land has become a scarce resource and continuous swell in population density associated with urbanisation in Kurseong Municipality has led to rise in land prices over the years.

Haig (1926) and Alonso (1964) pointed out that the accessibility, space and mobility are important variables, in shaping the value of a land parcel. However, there are other variables that affect the value of a given parcel and its use such as soil and terrain that may hinder or facilitate constructions and prevent or promote certain urban services such as water supply, sewerage, educational and recreational facilities. On the other hand, value of land ascends when demand for land surpasses the supply of available land or if a particular land parcel has a higher value than the surrounding areas.

The concept of urban land value is closely related to the Central Business District (CBD). Many economists and philosophers have embraced the view that CBD is the centre of highest number of activities and largest number of potential customers and is tied to other establishments in the production process. CBD, therefore, has the highest land value with gradual decreasing gradients in different directions. Kurseong town is no exception. The CBD of the town includes Haat/Gundri Bazar, Park Location, Burdwan Road, Hill Cart Road, Hammond Road and Pankhabari Road comprising 87.4% of the town's total shops. The value of land is high in the CBD and the surrounding area which shows a steadily decreasing trend with increasing distance from the CBD. Therefore, it is clear that the factor i.e. 'distance from the CBD' is one of the most powerful factors that plays a major role in determining the value of land in Kurseong town. Looking at recent market prices, distinct differences can be noticed in various wards of Kurseong Municipality.

### Spatial variation in land value

Based on the 2016 land value, the entire municipal area can be divided into five categories (Figure 2). For the purpose of discussion here, the first two and the last two classes have been merged to form the areas of high and low land value areas respectively.

**Table 2 Identification of wards based on land value (2016)**

| Land value (in Rupees per decimal*) | Category  | Wards              | No. of wards | Percentage of wards |
|-------------------------------------|-----------|--------------------|--------------|---------------------|
| Below 3,00,000                      | Very low  | 1, 2, 3, 6, 19, 20 | 6            | 30                  |
| 3,00,000– 4,70,000                  | Low       | 4, 7, 10, 17, 18   | 5            | 25                  |
| 4,70,000– 6,40,000                  | Moderate  | 5, 8, 9, 14        | 4            | 20                  |
| 6,40,000– 8,10,000                  | High      | 11, 13, 16         | 3            | 15                  |
| Above 8,10,000                      | Very high | 12, 15             | 2            | 10                  |
| Total                               |           |                    | 20           | 100                 |

Source: Computed by the author

**i) Areas with very high and high land value.** In 2016, the market value of two wards (12 and 15) was more than Rs. 8, 10,000 per decimal. The reason for very high market land value in these areas is the highest concentration of commercial activities and transportation network. N.H. 55 and Darjeeling Himalayan Railway pass through the central part of the CBD. Most of the establishments in the heart of the CBD are high rise buildings of which ground floors are utilised for commercial purposes and upper floors for residential purposes. The magnetic pull factor of proximity to different urban facilities available in and around the CBD like hospital, motor stand, railway station, community hall, libraries, banks, ATM counters, various government offices and educational institutions attract people from other areas. In recent years large apartments have emerged along



Pankhabari Road, Hill Cart Road, J.M. Goenka (Bank) Road, Park Location and in and around the junction of Burdwan Road and Dow Hill Road. One of the reasons for very high land value in these areas is due to the fact that owing to very high demand of apartments, the promoters are taking huge sum of money from the buyers. Therefore, the price of the apartments in these areas is associated with the high price of land which in turn is the result of high demand. 15% of the total wards (11, 13 and 16) have high land value ranging from 6, 40,000 to 8, 10,000 per decimal due to its nearness to the CBD. Most of these wards have high population density. Again the demand for land in these areas is due to the presence of government offices, educational institutions and shops.

**ii) Areas of moderate land value:** 20% of the total wards (5, 8, 9 and 14) fall under this category. Some government and private educational institutions and government offices are located in these wards. Educational institutions include government schools like Scot's Mission Girls Higher Secondary School and private schools like Bethany School, Daisies School and Dawn Boarding School. Important government establishments include All India Radio, Construction Board Office (Kurseong Engineering Division), DIB (Directorate of Intelligence Bureau), Fire Brigade, Municipality Office, P H E Office, SDPO Office, PWD Office to name a few. Therefore, these wards though located away from the CBD have moderate land value ranging from Rs. 4, 70,000 – 6, 40,000 per decimal.

**iii) Areas of low and very low land value:** When we gradually move away from the CBD, the price of the land becomes low ranging between Rs. 3, 00,000 – 4, 70,000 per decimal in wards 4, 7, 10, 17 and 18. Further, wards in the peripheral area (1, 2, 3, 19 and 20) and ward 6 with steep unsuitable slope for construction which lack the required facilities record land value less than Rs. 3, 00,000 per decimal. These wards have moderate to low population density.

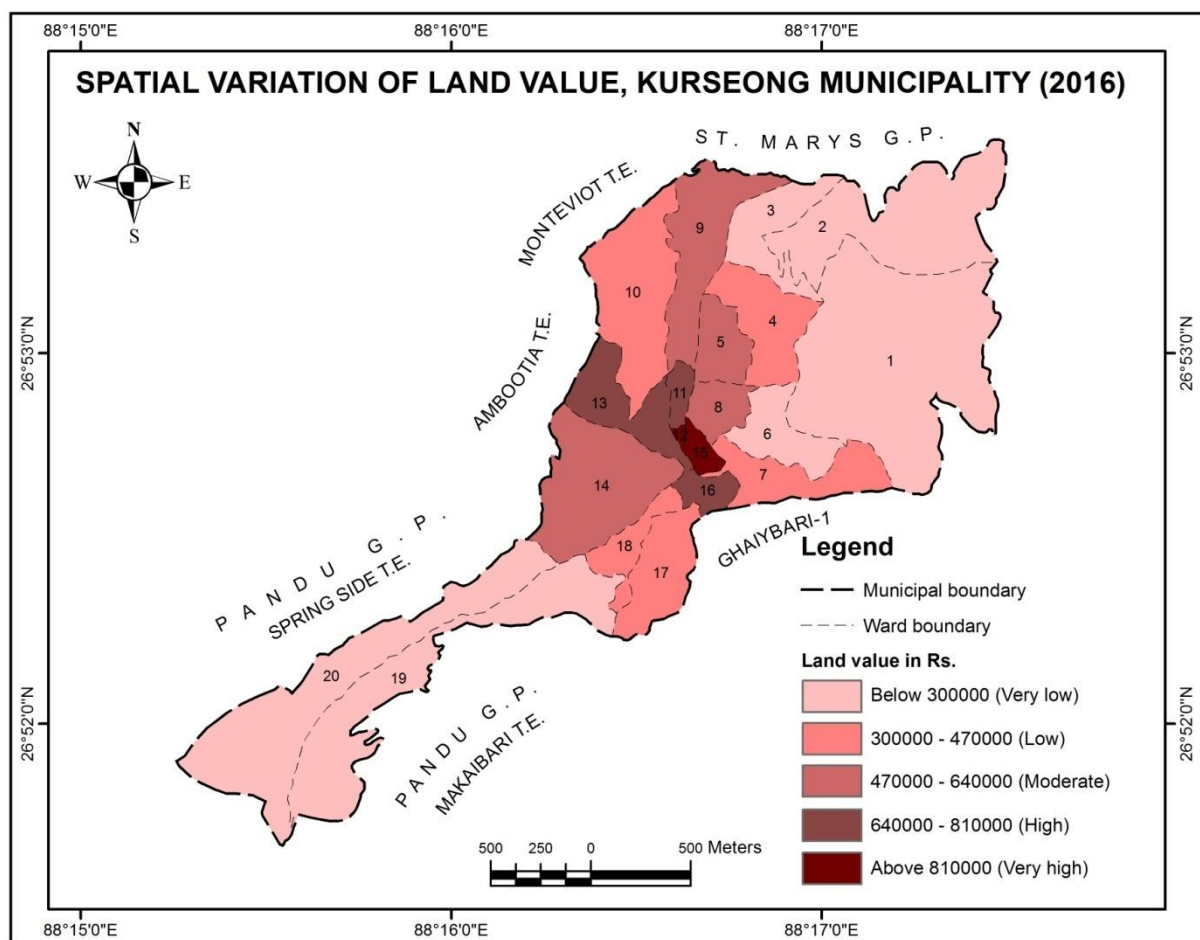


Figure 7 Spatial variation of land value, Kurseong Municipality (2016)

### Relationship between land value and other variables

Rapid urbanization and continuous increase in population density in Kurseong Municipality has resulted in tremendous increase in land value in recent years. For a parametric measure of relationship between land value (dependent/Y variable) of 2016 and a number of independent variables (independent/X variable) namely population density (X1), medical shops (X2), public library (X3), hotels and lodges (X4), restaurants (X5), petrol pump (X6), banks (X7), ATM counters (X8) and shops (X9) in different wards, Karl Pearson's correlation coefficient method has been employed.

**Table 3 Relationship between land value and other variables**

|            | Population density ( $X_1$ ) | Medical shops ( $X_2$ ) | Public library ( $X_3$ ) | Hotels & lodges ( $X_4$ ) | Restaurants ( $X_5$ ) |
|------------|------------------------------|-------------------------|--------------------------|---------------------------|-----------------------|
| Land value | 0.577**                      | 0.791**                 | 0.689**                  | 0.621**                   | 0.727**               |
|            | Petrol pump ( $X_6$ )        | Banks ( $X_7$ )         | ATM counters ( $X_8$ )   | Shops ( $X_9$ )           |                       |
| Land value | 0.485*                       | 0.656**                 | 0.623**                  | 0.800**                   |                       |

Source: Computed by the author

\*\* Correlation is significant at the 0.01 level

\*Correlation is significant at the 0.05 level

The bi-variate analysis reveals that a strong positive correlation exists between the value of land and most of the urban amenities available in Kurseong town. The 'r' value for land value and shops and with that of medical shops are 0.800 and 0.791 respectively. Similarly, the 'r' value for land value and restaurants, public library, banks, ATM counters, hotels and lodges and population density is 0.727, 0.689, 0.656, 0.623, 0.621 and 0.577 respectively. A strong positive correlation exists between the land value and the above-mentioned urban amenities in Kurseong Municipality at 99% level of significance. Similarly, the land value and petrol pump are moderately positively correlated at 90% level of significance. The analysis clearly indicates that the existence of shops and medical stores are principal variables that have a major impact on the value of a land parcel. Equally powerful is the factor of accessibility to other urban amenities such as public library, banks, ATM counters, hotels and lodges and population density in determining the value of a land parcel in Kurseong town. The developed sections of the study area which are densely populated and have more concentration of urban amenities reveal high land value.

### Conclusion

With the rapid process of urbanization the percentage of land under developed area has increased. Residential land use covered the highest percentage (81.69%) of the developed area followed by public and semi-public land use (8.26%) and open space (5.87%). Paucity of land has caused the emergence of land under mixed category where residential and commercial activities exist simultaneously. There was a change of 1.6308 km<sup>2</sup> and 1.1692 km<sup>2</sup> of land in the developed and the un-developed area respectively during 2003 – 2016. The developed area, therefore, has increased at the expense of undeveloped area.

Owing to rapid population growth, land under different functions increased to fulfill the increasing requirements of the people. Rapid urban sprawl, population growth, increase in population density and resultant increase in land under various categories in Kurseong Municipality have caused steep increase in land value in recent years. There is a strong positive correlation between the land value and population density in different wards. The densely populated wards located in the central part of the town comprising the CBD and those surrounding it, enjoying most of the urban amenities reveal very high land value. The less densely populated wards located away from the CBD, on the other hand, deficient in most of the urban facilities display low land value. Like in metropolitan cities, this increasing trend of land value towards the CBD and the surrounding areas and declining trend away from it in Kurseong Municipality is likely to continue in future too. Varying land values are closely associated with different kinds of land uses. Thus, the use to which a given parcel of land is put in Kurseong Municipality has a dominating impact on its land value.

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