

Urban Sprawl in Delhi – Faridabad Corridor

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Abstract

Urban sprawl considered being an unorganised development of built-up areas along the fringe of the cities, along highways and the road joining a city. The sprawl is outcomes in the engulfing and transforming of villages into peri-urban regions, peri-urban regions to cities and cities into megacities. The Faridabad sprawl is one of the outputs of Delhi influence of growth story in NCR region. The paper focused on an explanation about urban sprawl and population change in the study area, built up area, transformation of agricultural land into built up or settlements, decreasing open space, infrastructure centers, complex city system. The study comprises satellite data in form of satellite images for understanding the changes over the land and remote sensing and GIS techniques have been used to process the images. There uneven planning and unplanned growth causes major problem in growth of urban centres like Faridabad and Delhi.

Key words: *Urban Sprawl, Remote Sensing, Unplanned Sprawl, Peri-Urban*

Introduction

Sprawl is also considered to be an unorganised urban development of built up areas along the fringe of the cities, along highways, and along the road connecting a city. The cities have two system compact of sprawled which among them are better for future is matter of discussion (Gordon and Richardson 1997; Burgess 2000; Catalán et al. 2008; Echenique et al. 2012). The Delhi Faridabad corridor is major centre of industrial development as well as population growth. Urban sprawl is the uncontrolled and uncoordinated urban growth. Towns and cities are growing in definite areas with a change in the land use along the roads and in the close areas of the cities due to temporary changing in urban land approaches in planning and decision-making. This disseminated expansion outside of compact urban and rural centres along highways and in rural countryside is also referred as sprawl. The urban sprawl has led to environmental degradations in particularly in last few years (Guttikunda and Calori, 2013; Maiti and Agrawal, 2005; Nagar et

al.,2017).Sprawl confers some type of development with negative impacts such as loss of agricultural land, green space, and ecologically sensitive habitats in and around the urban areas. These areas lack primary services due to the unplanned boom and absence of prior statistics and predictions of such increase throughout planning, coverage and choice-making. However, in one of this phenomenon of development to have basic infrastructure, local planning requires an information of the sprawl dynamics.

Study Area

Delhi-Faridabad corridor is a suburb and peripheral city of Delhi which lying along with the districts of south Delhi and south east Delhi. The metropolis is bounded at the north via Delhi State, on the east by using the Agra and the Gurugram canals and at the west by the Aravali Hills. Faridabad is a city in transition which is in a quest of newer identities. The cities have required dynamic way of development to survive the changing urban system of the world.

Faridabad is one of the emerging centre for real estate, education, health, tourism and sport. The city is multi-functional.

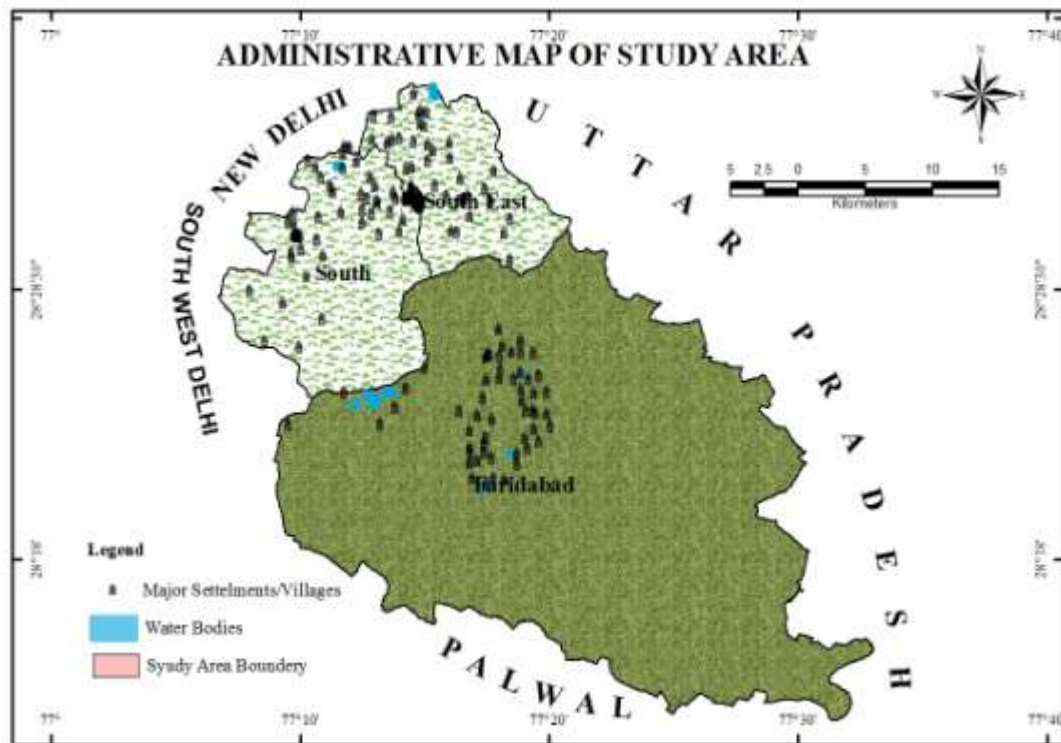


Figure 1: Study Area

The city is attached via railways at the Delhi-Mathura highwaybroad-gauge line of the Central Railways. Hence accessibility of the city is very excessive. The district is bounded at the north by means of Delhi, from south through Palwal district, at the east via Uttar Pradesh and at the west with the aid of Gurugram district (Figure 1).

Methodology

The sprawl is outcomes in the submerging of surroundings area into urban regions, semi urban regions tocities and cities into mega cities. However, in any occurrence of improvement to have primary infrastructure, local developmentneeds an expertise of the sprawl change. The secondary records is amassed from diverse sources which include the Census of India (2001), District Census of Handbook for NCT- Delhi (2018) census tables which offer information on households, basic amenities, and the property, and many others. for Delhi. We use Indian Remote Sensing, USGS (United States Geological Survey) for remote sensing records within the form of satellite images.Cloud-unfastened imageries of the have a look at location have been obtained from Landsat and Indian Remote Sensing (IRS) satellites for the years 1990, 2000, 20010 and 2018. The Software like ERDAS Imagine 14.2 and ArcGIS 14.1has been used for creation of the GIS database.Since the satellite imagesobtained from Landsat had moderate spatial resolution, and explicit use ofbuilt-up areas became currently not required, the class was constrained to thestage I scheme (Anderson et al. 1976).Spatial and spectral sample observation,which includes the use of factors like tone, texture, shape, and place of pixel agencieswithin the images, had been used for identification of urban area.In addition, because the demographic information for the area of Delhi and Faridabad supplied within the India census statistics had been decadal in nature, they were thereforeinterpolated for every study 12 months.

Result and Discussion

Spatial Pattern of Urban Sprawl of Delhi

Delhi is the national capital territory of India. Delhi has total 1483 sq. Km area. After

independence Delhi received out of control and un-comprehensive population. This is secondlargest most populated city of the country. This is completely land locked metropolitan region. There are total 11 districts which hold the complete population. Every five year Delhi added 15 to 18 lakh people in its population. From 1991 to 2018, 10 million human beings were brought within the population. It is observed that more than 10 lakh population added in from 2015 to 2018 which is lowest during the whole study period (Table 1).

Table1:Urban Population in Delhi

Year	TotalPopulation	UrbanPopulation	UrbanGrowth%
1991	94,20,644	84,71,625	46.87
1995	1,12,35,126	1,02,10,213	48.32
2001	1,38,50,507	1,29,05,780	52.34
2005	1,53,19,229	1,39,15,652	38.21
2011	1,67,87,941	1,53,66,599	26.80
2015	1,82,41,187	1,68,23,541	28.29
2018	1,94,78,872	1,89,25,156	19.25

Sources:District Census Handbook, 1991-2018

The highest population was added during the period of 2001 which comprises nearby 26 lakh person added in the total population from 11.2 million to 13.8 million. According to District Census Handbook, 2018,During last 20years data shows that, this population has almost doubled.After 2011, the increase of population in urban area declined.

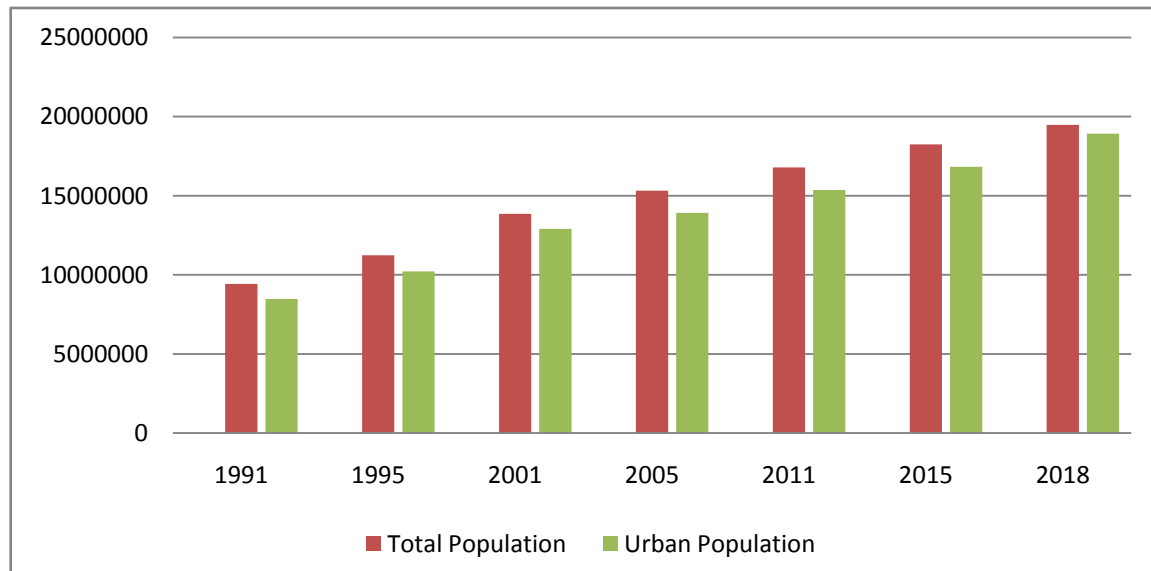


Figure 2: Increasing Trend of Urban Population

This urban population comprises the population of 110 census towns in the Census of 2011. The half decadal period's population growth from 1991 to 2018 showing positive change and it was continuously growing. The total as well as urban population is growing in positive manner. The total and urban both the population are reaching towards the 20 million mark. Delhi population is mostly urban due to percentage of urban population is high due to which graph seems similar (Figure 2). The graph shows that the level of saturation of urbanization in Delhi. It has surfaced the growth of urban population is declining and it also demarcated the people behavior to move out from the highly urban area to less urban area or peri urban area (Figure 3). The highest urban growth in Delhi can be seen in 2001 and later period is showing the continuous declining trend. It means city people are moving outward from the city. As per the district census, these census towns are located in the fringe area of Delhi and they are not a part of the certified urban area of Delhi. The decadal growth rate of population at some point of 1990-2018 changed into recorded at 100 per cent and 2011-2018 has 19 percent.

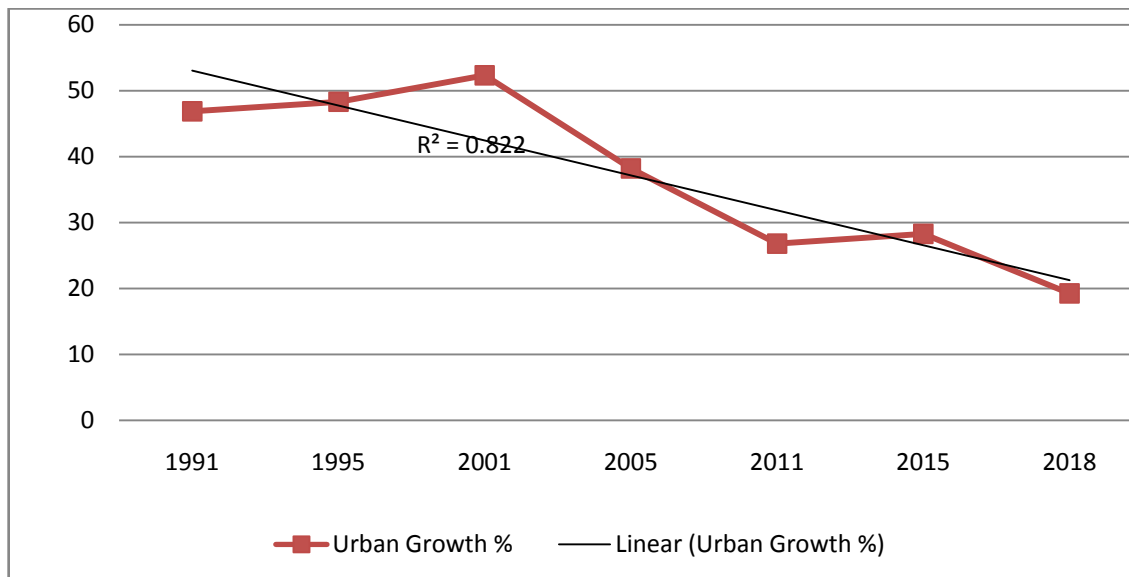


Figure3:Increasing Trend of UrbanArea (In Percentage)

The trend of urban growth is negative but the population growth is continuously moving upward. There are total 112 villages in Delhi which only 03 villages exist in the study area which are inhabitant. The rural area holds 12,193 population of the district. These 03 villages cover only 13.15 sq. km area. The distribution of census town of South and South-East Delhi. Asola, Deoli, Molar band, Pehladi Pul, Sultan Pur, Tajpul, and Tigri are the only urban agglomeration which had achieved the census town status in 1991 census of India. During the Delhi census handbook 2001, Aali, Bhati, Chandanhola, Chhatarpur, Maidangari, Mithapur, Saibabad, Saizul Azaib etc were recorded in the census, in 1991 census they were absent. The Jaitpur and Ayanagar were recorded in 2011 census of Delhi.

Urban sprawl and Built-Up area in Delhi, 1990–2018

It has been observed that the growth and change in total constructed land in NCT-Delhi and Faridabad have greatly changed from the years 1990 and 2018. Spatial pattern of built up can be

easily understood from the map. As mentioned in the methodology section, the built up area is the major feature in the maps for the evaluation of occupancy of urban land for urban features such as residential or other constructed facilities. The urban land has been emphasized the use of the supervised type methods in the course of the duration to acquire the built-up area and in addition reinforced by way of built up making procedure.

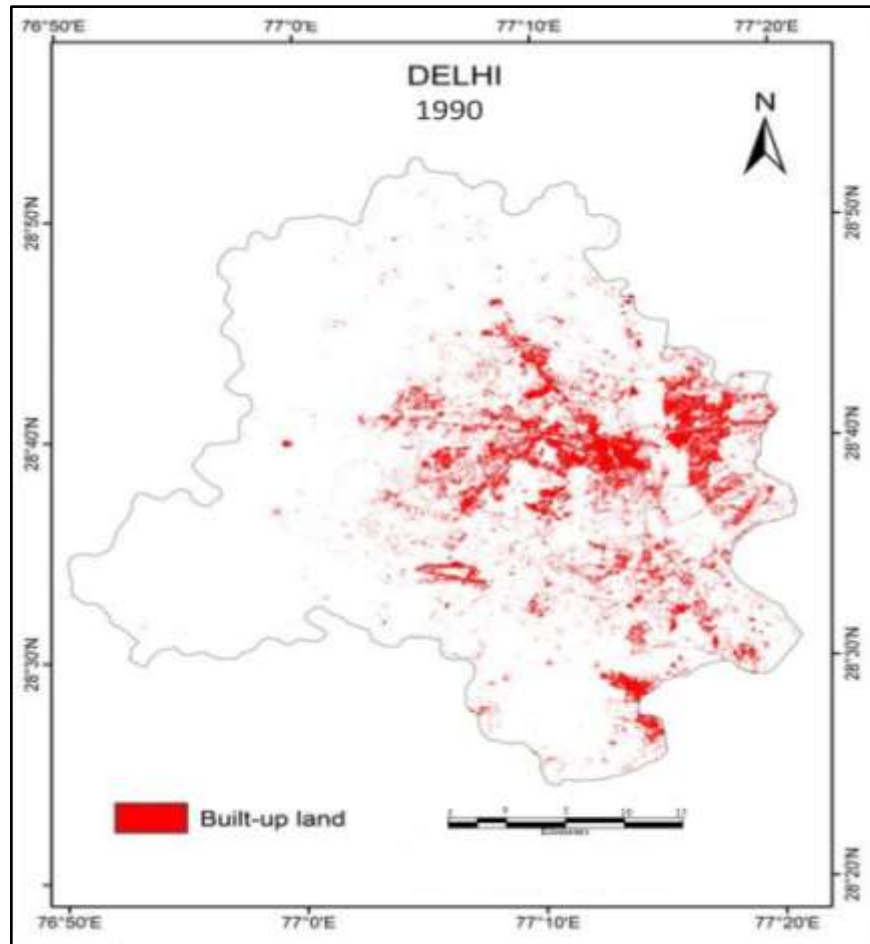


Figure 4 Urban Sprawl through Built-Up in 1990

The urban sprawl in Delhi was very scattered and irregular and only comprised less than 35 percent of total built up area out of total land area in 1990 (Figure 4). The vicinity of built up during this period was very low due to low level of influx of population in Delhi. The highest concentration of built up can be observed from the specifically in centre and south region in Delhi. The continuous outgrowth and influx of population changed the situation in Delhi. This city

sprawl may be ascribed to the improvement of National Highways No. 8 and 24, passing by the south-west and the south route respectively—joining Gurugram and Faridabad newly evolved satellite cities.

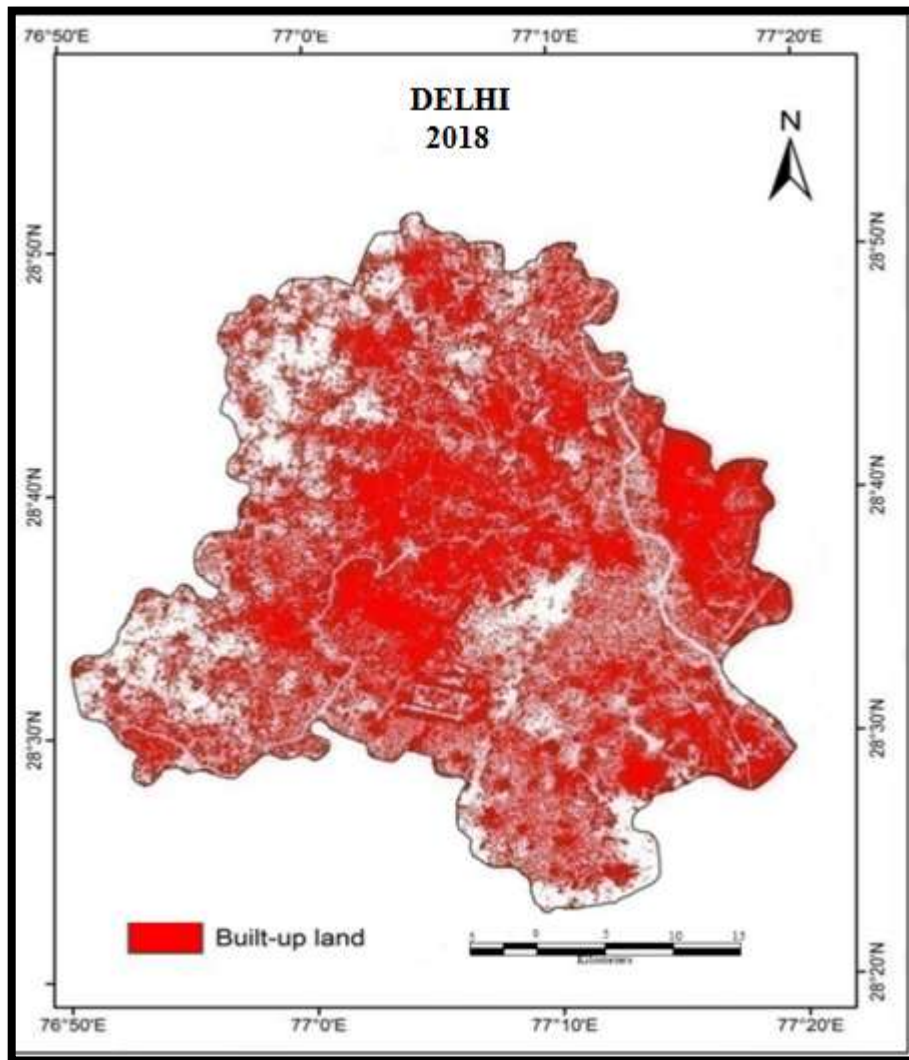


Figure 5 Urban sprawl through Built-Up in 2018

The area of built-up land is also evident in the north path, mainly in Faridabad sub-district, which is placed at the manner to NH-2 linking Amritsar in Punjab. These phenomena played role for development in urban centre along with Delhi region. These urban expansions are taking place on the cultivated land located within the peripheral regions of Delhi. The continuous growth in

population increases the urbanization in Delhi. The urban sprawl in 2018 is very high. The most of the land in Delhi is converted for urban facilities (Figure 5). The built up map of 2018 are showing the highest built up ratio in comparison to 1990. The majority of area during this period is occupied by built up. The urban area in 2018 has increased to 97 percent. And the pattern of built up is moving south ward and west ward in the recent period. This trend is taking place due to movement towards the Gurugram and Faridabad. These two cities are playing important role in increasing the urban sprawl in Delhi NCR region. Transportation and other communication mechanism of city and Delhi metro are major player for the outgrowth of population and built up in Delhi region. These development facilities have directed the transformation of land-use/land cover of NCT-Delhi for the reason that start of the 21st century. Later, in the year 2020 after 3 decades the urban occupancy in Delhi was 97.37 percent.

Spatial Pattern of Urban Sprawl in South and South East District

The urban sprawl is easily visible with the help of built-up map that has been developed to highlight the use of land for residential and other related purposes. The supervised type techniques in the course have been used for acquire the built-up land and in addition supported by way of built up making procedure. It has been observed that the change in total built-up area in south and south east district of Delhi was very scanty or less but with the passage of time it can be observed that density of built up increased.

The urban sprawl in south and south east Delhi was very irregular and only comprises less than 45 percent of total land area in 1990 (Figure 6). The area of built up during 1990 was very low and it was concentrated nearby residential colonies like Huajkhas, Nehru place, green park, Jorbagh, kalkaji, etc. The concentration of built up can be observed from the specifically in northern region in or south and south east Delhi. This is because that region was lying along with New Delhi. The contiguous outgrowth forces the city to grow. These phenomena played role for development in urban centre along with Delhi region. These urban expansion are taking place on the agricultural land located within the periphery of residential area. The urban sprawl in 2018 is very high in south and south east Delhi. The most of the land in area is converted into residential and recreational facilities.

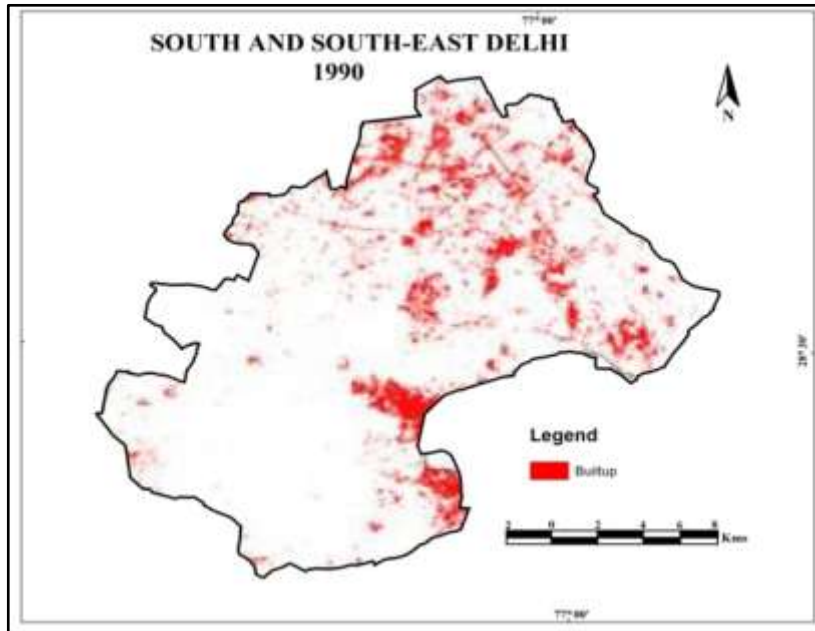


Figure 6 Built Up Area in South and South East Delhi in 1990

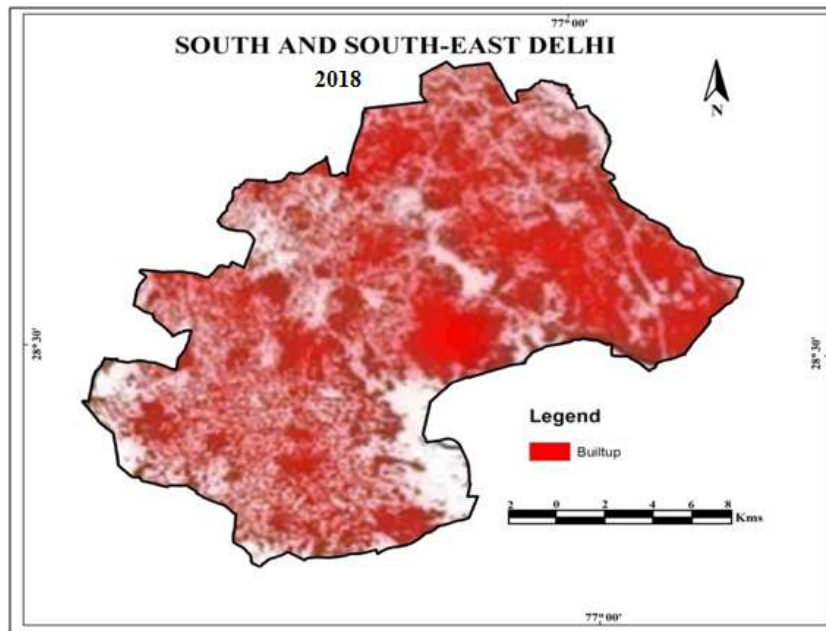


Figure 7 Built Up Area in South and South East Delhi 2018

High rise structure have replaced on the vacant spaces. The built up map of 2018 shows the very different picture from the level of 1990 (Figure 7). The majority of area during this period is occupied by built up and built up density increases with good speed. The percentage of built

up land in 2018 increased to 87 percent. The pattern of built up shows spread south ward and East ward in the present time period. This trend is taking place due to movement towards the Gurugram and Faridabad. These two cities are playing important role in increasing the urban sprawl in Delhi NCR region.

Pattern of Urban Sprawl in Study Area from 1990 -2018

Urban sprawl is increase of a metropolitan region through the procedure of catered improvement of miscellaneous varieties of land use in remote places on the fringe, followed by means of the slow filling-in of the intervening spaces with comparable uses. Urban sprawl, and the monetary and regulatory systems which create it, now not only produce inefficient and unpleasant surroundings at the urban fringe, but adversely have an effect on the inner town and the agricultural regions as well (Gupta 2001).

The pattern of urban sprawl can be observed from the given table which shows that there was continuous increase in urbanization through increase in built up density and area. That is identical to urbanization in the south, south-east and Faridabad district. There was 361 sq. kms land was under built up areas in the period of 1990 which increased to 452 sq. kms in 1995. Similarly, from 2000 to 2010 the increase was manifold with almost more than 1712 sq. kms of land came under the built up area (Table 3). From 2010 to 2015 it was observed that there was slightly slow growth but after 2015 the built area gained momentum and acquired maximum land under built up area.

Table 3: Pattern of Urbanization in South, South East Delhi and Faridabad

Year	Area (In Hectare)	Area (In Sq. kms)
1990	3614.144	361.41
1995	4523.613	452.36
2000	9894.954	989.49
2005	12317.152	1231.75
2010	17124.367	1712.43
2015	19564.289	1956.42
2018	22202.235	2220.22

Source: Prepared by satellite imageries data of built up

The following figure is showing a linear trend of increasing urbanization in the study area with continuous positive growth in built density. This trend is example of rapid urbanization and showing positive trend of growth in urban sprawl (Figure8).

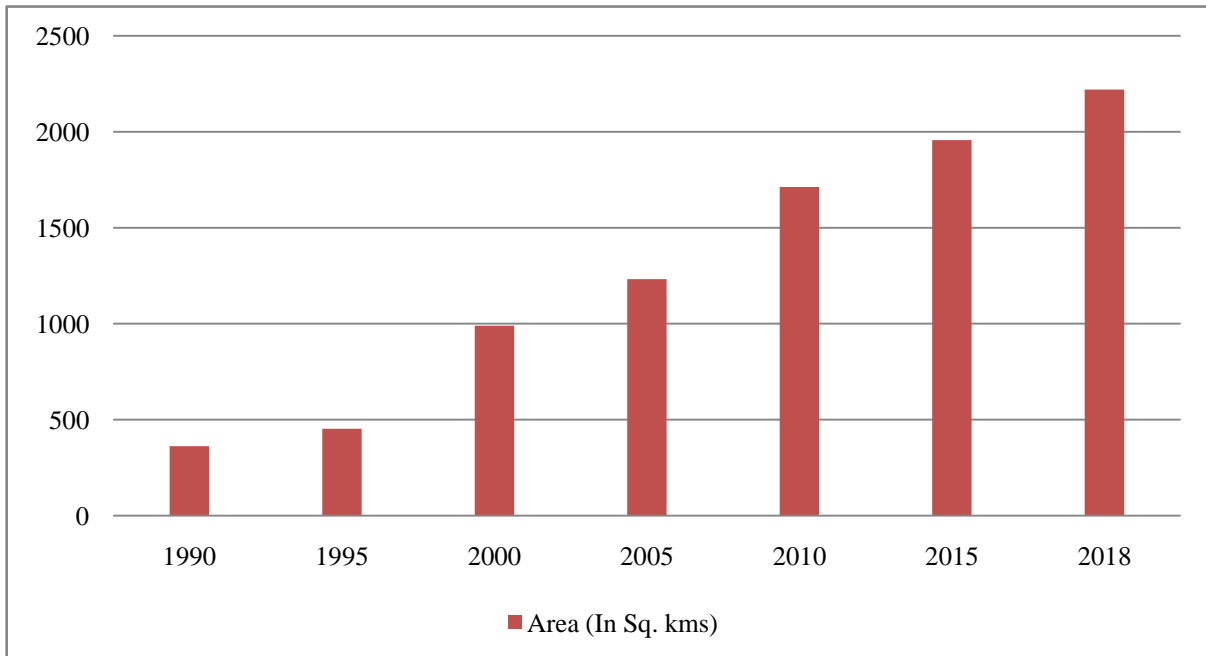


Figure 8:Pattern of Urbanization in South and South East and Faridabad

The urban sprawl in Delhi was very scattered and irregular and only comprised less than 35 percent of total built up area out of total land area in 1990. The continuous outgrowth and influx of population changed the situation in Delhi. This city sprawl may be accredited to the improvement of National Highways No. 8 and 24, passing through the south-west and the south route respectively—linking Gurugram and Faridabad newly evolved periphery cities. These phenomena played role for development in urban centre along with Delhi region. These urban expansions are taking place at the cost of depletion of the agricultural land of semi urban regions of Delhi. The continuous growth in population increases the urbanization in Delhi. The pattern of built up is moving south ward and west ward in the recent period. This trend is taking place due to movement towards the Gurugram and Faridabad. These two cities are playing important role in increasing the urban sprawl in Delhi NCR region.

Conclusion

Urban Sprawl is also considered to be an unorganized development of urban areas along the fringe of the cities along with roads and trains routes. Delhi and Faridabad are highly changed from the years 1990 and 2018. Spatial pattern of built up can be easily understood from the map. The built up is the major feature in the maps for the evaluation of occupancy of urban land for urban features such as residential or other constructed facilities. The area of built up during 1990 was very low and it was concentrated nearby residential colonies like Huajkhas, Nehru place, green park, Jorbagh, kalkaji, etc. The concentration of built up can be observed from the specifically in northern region in or south and south east Delhi. This is because that region was lying along with New Delhi. Remote sensing and GIS has helped to assess to measure the sprawl, natural resources, land characteristics like rural land use pattern etc. these technical tools helped in this chapter. Land development decreased the distances between remaining fragmented habitats. In 2018, the urban influence spread all over the district of Faridabad and both district of Delhi also have very high number of built up patches. During this time maximum part of the region was developed in form of scattered cluster urban centers. The Faridabad and south and south east district of Delhi have advantage of continuous development activities and growing industrial activities which are helping this region to grow faster.

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