

ICH 2019**International Conference on Humanities****LEVELS OF URBANIZATION IN BANGALORE URBAN
DISTRICT OF KARNATAKA, INDIA**

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Abstract

Urbanization is a process and good indicator of development of a region. Bangalore Urban district has been experiencing an abnormal rate of urban growth in terms of population explosion increase in urban centres. This paper studies about the shuffling trends and levels of urbanization in Bangalore Urban Districts of Karnataka. The study is based upon analysis of census data from 1901 to 2011. The entire study is based on Secondary data. Taluk is selected as basic unit of study investigation. As stated by 1901 Census data, the entire population of Bangalore Urban District was 3,84,601 which increased to 96,21,551 in 2011. The highest level of urbanization was seen in the year 1961 which was 17.7 %. While negative rate of urbanization was seen in the year 1971 i.e. -4.9%. The over most growth rate was seen in the year of 1951 that is 89.8% followed by 1981 i.e. 74.9 %. The rapid urbanization of Bangalore Urban District may raise many issues that might be positive and negative impact on the environment and even to human health and societal development. Thus, monitoring the trends and levels of urbanization will be a foremost task for the planners, administration, governmental and NGO's for executing policies for the usage of resources and accommodate advancement simultaneously.

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Keywords: Levels, urbanization, census of india, statistical analysis.



1. Introduction

Urbanization is a dynamic process involving changes in the vast expanse of land cover with the progressive concentration of human population (Tv et al., 2012). Geographers use the term urbanization more commonly to a process of transformation (Banerjee & De, 2014). Urbanization is measured by two ways: First, level and growth of urban share of total population and its distribution by size classes of cities and towns (Tripathi, 2016a). More than half the world's population lives in urban areas. The developed countries are more urbanized than developing countries (Tripathi & Mahey, 2018). Urbanization is associated with greater access to employment opportunities, lower fertility levels and increased independence (Mandal, 2017). Urbanization can be defined as “as a process which reveals itself through temporal, spatial and sectoral changes in the demographic, social, economic, technological and environmental aspects of life in a given society” (Kumar & Rai, 2014, p. 55). The fast pace of urbanization can be attributed to many factors such as rural to urban migration, re-classification of cities, and natural growth rate of urban population (Tripathi, 2016b). Development took place between urban and rural areas, industry and agriculture, urban growth and economic growth (Chaolin et al., 2017). Several factors like agricultural revolution, Industrial revolution, Transport revolution, revolution in education and technology, employment opportunity and push & pull factors have been mainly responsible for urbanization (Khanna, 2019). Urbanization in India has occurred more slowly compare to other developing nations (Chakraborty et al., 2015). Similar transformations were observed in Bangalore Urban District of Karnataka state, India during the last two three decades when compared to other parts of the region. Bangalore city became the administrative, commercial, and cultural hub of Karnataka state attracting millions of people and their family members to migrate from rural parts (see Figure 01). Further, Bangalore City advanced to become IT Hub of India which created massive opportunities for employment resulting in migration from other parts of the country as well. Hence, the present paper is designed to understand the level of urbanization in Bangalore Urban District by using data from Census of India (1901-2011).

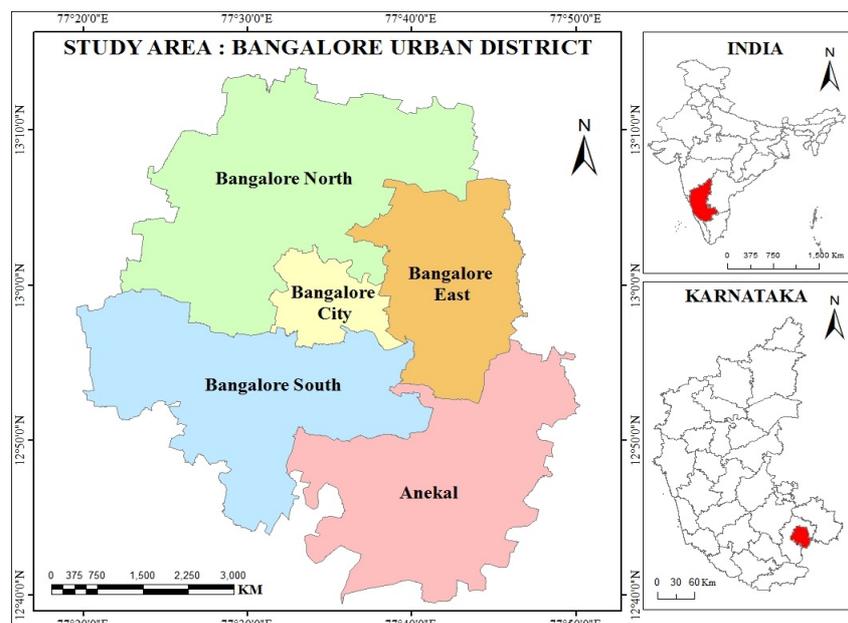


Figure 01. Study Area: Bangalore Urban district

2. Problem Statement

“Industrialization, modernization, globalization, marketization and administrative institutional power are considered to be the main driving forces for rapid urbanization” (Gu, 2019, p. 1359). Due to which, the 5 taluqs of Bangalore Urban District experienced population outburst in last few decades. The district is now facing many issues like deteriorate in air and water quality, housing, traffic congestion, poor infrastructure, sanitation, sewage and solid waste management issues, poor power supply and many other urban issues. The city also fails to provide basic convenience or requirements to the mounting figure of urban population. Hence, it is very essential to make learning on the levels of urbanization in the Bangalore Urban District to know about the drastic change in the district and also to provide efficient management for the city.

3. Research Questions

In light of the above formed objective the following research question has been proposed to explore certain issues related to trends and level of urbanization in the Bangalore Urban District: What are the levels of urbanization in the district? and how the level of urbanization varied from last 100 years.

4. Purpose of the Study

In the modern era of urban expansion, population explosion and abnormal growth of cities and towns have become common phenomena. The growth of population and urban function of cities are expanding beyond the built-in limit towards countryside. In addition to this, many geographical changes in the urban periphery from rural to urban are associated which results to fluctuations in land use within the urban fringe. We can also find out the overall population growth and trends of urbanization in the Bangalore Urban District. Thus, it is very essential to propose a study to find out the pace of urbanization in the district to give suggestions to emphasize on development of newly emphasized urban areas of the district.

5. Research Methods

The present research is grounded upon secondary data collected and compiled from Census of India and Bangalore Urban District at a glance during 1901-2011. Cartographic technique has been used to analysis and interpretation the data. Several indicators have been selected for calculating the urbanization.

5.1. “In order to understand the percentage of urbanization in Bangalore Urban District, it is computed with the help of the following formula.”

$$PU = \frac{U}{P} \times 100$$

PU - is the percentage of Urban Population
U - is the Urban Population, and
P - is the Total Population

5.2. "In order to calculate the ratio of rural urban population in the study area, the following formula is also deduced."

$$UR = \frac{U}{R}$$

UR - is the Urban - Rural Ratio,
 U - is the Urban Population and
 R - is the Rural Population

5.3. The tempo of Urbanization is computed on the basis of annual population growth rate. The formula computed here to calculate the tempo of urbanization is as follow:

$$\text{Tempo of PU} = 1/n [\ln (PU_{t+n} / PU_t)] * 100,$$

$$\text{Tempo of PR} = 1/n [\ln (PR_{t+n} / PR_t)] * 100,$$

Where,

ln = natural log,

PU = t+n and PU t = percent urban in t+nth census and tth census respectively,

PR = t+n and PR t = percent urban in t+nth and tth census respectively,

n = census interval = 10 (Kumari, 2014).

5.4. Moreover, In the present paper, the levels of urbanization have been studied based on Z-Score. The score measures the departure of individual observation, expressed in a comparable form. After calculating the Z score, the level of urbanization of each taluk have been calculated by the following way-

$$Z_i = \frac{X_i - X}{SD}$$

Z_i is the standard score of the variable
 X is the mean for variable
 X is the mean for variable
 S.D. is the standard derivation.

6. Findings

6.1. Trends of urbanization in Bangalore Urban district:

The trends of Urbanization in Bangalore Urban District are seen to change in every decade from 1901 to 2011 (Table 01 & Figure 02). The total population in 1901 was 3,84,601 out of which 1,70,906 were urban population. The main reason for increase in urban population is considered as migration and most of the migrants are from the neighbouring areas of Andhra Pradesh, Tamil Nadu and Kerala whereas most of the labour class population are from West Bengal and Bihar.

Table 01. Level of Urbanization in Bangalore Urban District (1901-2011)

Census Year	Total Population	Urban Population	Growth	Growth in %	Proportion of urban population to total	Rate of Urbanization
1901	384601	170906	-	-	44.4	-
1911	416761	199089	28183	16.5	47.8	3.3
1921	468798	249019	49930	25.1	53.1	5.3
1931	580875	318086	69067	27.7	54.8	1.6
1941	729779	421256	103170	32.4	57.7	3.0
1951	1253542	799338	378082	89.8	63.8	6.0
1961	1499675	1221671	422333	52.8	81.5	17.7

1971	2197293	1681512	459841	37.6	76.5	-4.9
1981	3495566	2941018	1259506	74.9	84.1	7.6
1991	4839162	4169253	1228235	41.8	86.2	2.0
2001	6537124	5759987	1590734	38.2	88.1	2.0
2011	9621551	8749944	2989957	51.9	90.9	2.8

Source: Census of India 1901 and 2011

In 1951, the population increased to 12,53,542 with highest growth percentage of 89.8% compared to all other decades. In 1961, the rate of urbanization was 17.7 which were highest among other decades.

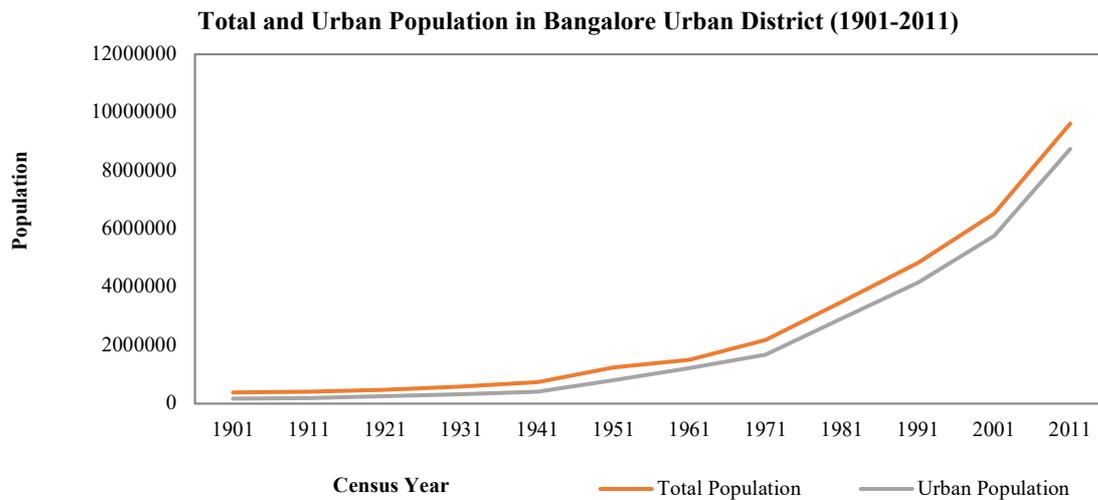


Figure 02. Total and Urban Population in Bangalore Urban District (1901-2011)

In 1951, the population increased to 12, 53,542 with highest growth percentage of 89.8% compared to all other decades. In 1961, the rate of urbanization was 17.7 which were highest among other decades. The reason for expansion during this decade is not known before the year 1971. However, the percentage of urban growth decline to 37.6 percent which showed a negative decline in urban growth rate. The growth rate of urbanization again increased to 74.9 % in 1981. In 2011, the total population in the district was 96,21,551 out of which 87,49,944 were urban population where the growth rate was 51.9%. About 90% of the total population of Bangalore Urban district started staying in urbanized area. Industrialization, commercialization and IT sector attracted not only the rural population within the state but also across the country. Majority of the migrated family members settled in Bangalore due to good weather, educational institutions and affordable medical facilities.

6.2. Level of Urbanization:

“The level of urbanization is defined as relative number of people who reside in urban areas. Percent urban $[(U/P) * 100]$ and percent rural $[(R/P) * 100]$ and urban-rural ratio $[(U/R) * 100]$ are used to measure degree or level of urbanization” (Kumari, 2014, p. 61). These remain utmost frequently required to find out the levels of urbanization.

Table 02. Relative growth of Urban Population in Bangalore Urban District

Census Year	% of Population		% of Increase		Urban-Rural Ratio
	Rural	Urban	Rural	Urban	
1901	55.6	44.4	-	-	0.8
1911	52.2	47.8	1.9	16.5	0.9
1921	46.9	53.1	1.0	25.1	1.1
1931	45.2	54.8	19.6	27.7	1.2
1941	42.3	57.7	17.4	32.4	1.4
1951	36.2	63.8	47.2	89.8	1.8
1961	18.5	81.5	-38.8	52.8	4.4
1971	23.5	76.5	85.5	37.6	3.3
1981	15.9	84.1	7.5	74.9	5.3
1991	13.8	86.2	20.8	41.8	6.2
2001	11.9	88.1	16.0	38.2	7.4
2011	9.1	90.9	12.2	51.9	10.0

Source: Census of India 1901 and 2011

From Table 2 and as shown in figure 03, it can be seen that the percentage of Urbanization has increased from 16.5% in 1911 to 51.9% in 2011. The highest percentage (89.8%) of urbanization was seen in 1951 but the proportion of rural population increased after 1.9 % in 1911 to 12.2 % in 2011. There is negative decline of rural percentage of 38.8% in the year 1961. The maximum percentage of rural population is seen in the year 1971 that is 85.5%. The Rural- Urban ratio trends to increase every year gradually. In 1901 the ratio was 0.8 but increased to 10.0 in 2011. The Bangalore Urban District is at the advance stage of urbanization. The graph with orange line showing urban population in the district shows a positive and trending growth in the level of urbanization whereas the line in blue colour showing rural population is declining in every decade.

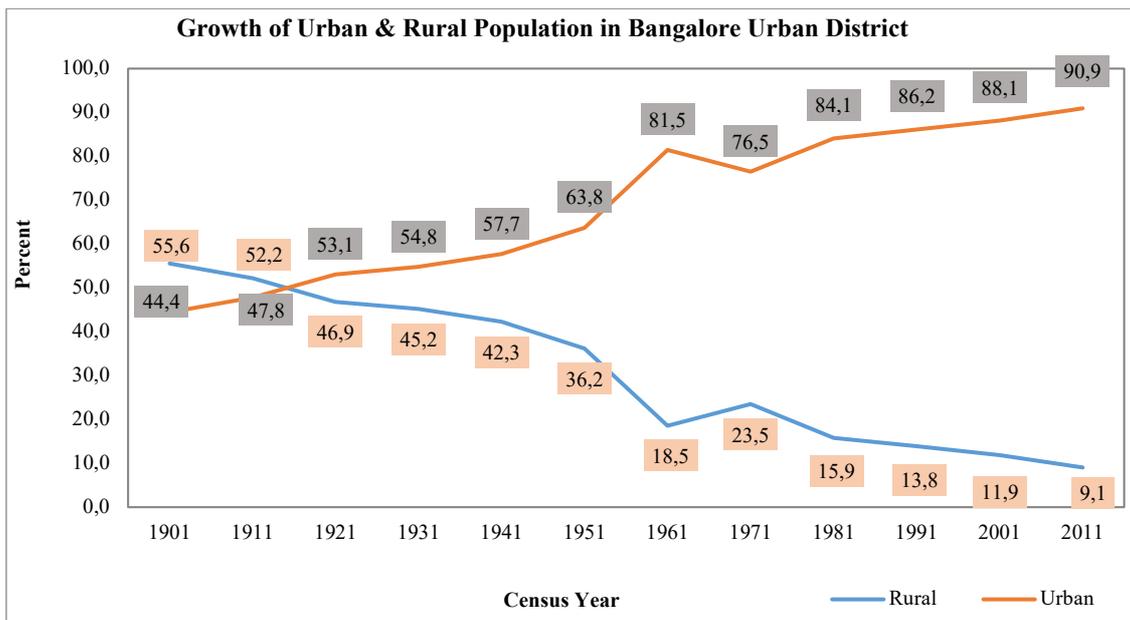


Figure 03. Growth of Urban & Rural Population in Bangalore Urban District

6.3. Taluk wise Trends of urbanization in Bangalore Urban district:

The level of Urbanization in Karnataka is higher in associated to the country level. The table 3 below shows the taluk wise level of Urbanization in Bangalore Urban District in the year 2011. The total urban population in the district is 87,49,944, out of which the highest number of urban population is in Bangalore City (8443675), followed by Anekal (165150), Bangalore North (82225), Bangalore South (50751) and Bangalore East (8143). The percentage of urban population to that of total population is seen to be highest in Bangalore City, Anekal taluk has 31.9% of urban population followed by Bangalore South (24.7%), Bangalore North (23.3%) and Bangalore East (7.9%) with least urban population compared to the total population. The decadal growth percentage of urban population in the district is seen to be highest in Bangalore City followed by Anekal Taluk whereas it shows a negative decline Bangalore North, Bangalore South and Bangalore East.

Table 03. Taluk wise Level of Urbanization in Bangalore Urban District - 2011

Taluks	Urban Population 2011	Proportion of urban population to total	Decadal Growth from 2001 to 2011	Growth in %
Anekal	165150	31.9	106882	183.4
Bangalore North	82225	23.3	-524805	-86.5
Bangalore South	50751	24.7	-300539	-85.6
Bangalore East	8143	7.9	-337545	-97.6
Bangalore City	8443675	100.0	4045964	92.0
District	8749944	90.9	2989957	51.9

Source: Census of India 1901 and 2011

6.4. Taluk wise level of urbanization in Bangalore Urban district - 1991 to 2011:

The degree or level of urbanization is defined as relative number of people who live in urban areas. Percent urban $[(U/P) * 100]$ and percent rural $[(R/P) * 100]$ and urban-rural ratio $[(U/R) * 100]$ are used to measure degree of urbanization. These are most commonly used for measuring degree of urbanization. (Barakade & Todkari, 2014, p. 39)

In the present study, the levels of urbanization have been arranged into two categories (Positive and Negative) on basis of Z-Score as shown in Table 4. The taluk wise level of urbanization in 2011 are shown by Z-Score where the taluks namely Anekal (-0.41), Bangalore North (-0.65), Bangalore South (-0.61) and Bangalore East (-1.09) are having negative Z-Score value which fall in negative level of urbanization category whereas only Bangalore City (1.51) with high Z-Score falls in Positive levels of Urbanization. The table 4 and figure 05 shows that the wide range of variation of levels of urbanization in Bangalore Urban District, ranging from 100% urban population in Bangalore City taluk to 7.9% in Bangalore East Taluk. Standard Deviation of level of urbanization has been calculated as 35.5%.

Table 04. Taluk wise Level of Urbanization in Bangalore Urban District (2011)

Taluks	Urban Population 2011	(%) of Urban Population	Urbanization (Z- Score)
Anekal	165150	31.9	-0.41
Bangalore North	82225	23.3	-0.65

Bangalore South	50751	24.7	-0.61
Bangalore East	8143	7.9	-1.09
Bangalore City	8443675	100.0	1.51
District	8749944	90.9	1.25
X (mean)	46.5		
Standard deviation (s)	35.5		

Source: Census of India 1901 and 2011

6.5. Decadal Growth Rate:

The table 05 & figure 04 shows that the decade wise growth rate of population in Bangalore Urban District in percentage. In the first decade, 1901-1911, the overall growth rate of total population is 0.8%, out of which 1.4% growth for urban population and 0.2 % for rural population. The annual growth of total population increased to 4.2% in the year 1941-1951, out of which 4.7% of the population is urban and 3.2% for rural population.

Table 05. Decadal Growth Rate of Population in Bangalore Urban District (1901-2011)

Census Year	Decadal Growth Rate (Percent)		
	Total Population	Urban Population	Rural Population
1901-1911	0.8	1.4	0.2
1911-1921	1.1	2.0	0.1
1921-1931	1.9	2.2	1.6
1931-1941	2.0	2.4	1.5
1941-1951	4.2	4.7	3.2
1951-1961	1.6	3.5	-6.3
1961-1971	3.2	2.7	4.6
1971-1981	3.7	4.3	0.7
1981-1991	2.8	2.9	1.7
1991-2001	2.6	2.8	1.4
2001-2011	3.2	3.4	1.1

Source: Census of India 1901 and 2011

From, 2001 -2011, the growth rate was 3.2%, of which 3.4% for urban population. The yearly growth rate of the district for urban population started increasing every decade out of which the highest growth rate was seen in the year 1941-1951 i.e. 4.7% and 1971-1981 i.e. 4.3%. Decadal Growth Rate of Population in Bangalore Urban District (1901-2011). The positive growth of population in the Bangalore Urban district from 1951 is mainly result of migration. The centripetal force of migration was because of many opportunities for education, employment, business and non-agricultural activities. The rapidly expansion of the city is the pull factor for population explosion. The vast growth of urban population from 1951 was a period of intensive industrialization. The main reason for increase in Decadal growth rate of Urban population is because Bangalore is now the commercial and IT Hub of India. About 35% of working-class population are engaged in Information Technology sector and related industries in Bangalore and numerous global Information Technology firms are signing employees from other part of the country as well as abroad. "Four new companies start business in this state every week and they create 50,000 new jobs in one year".

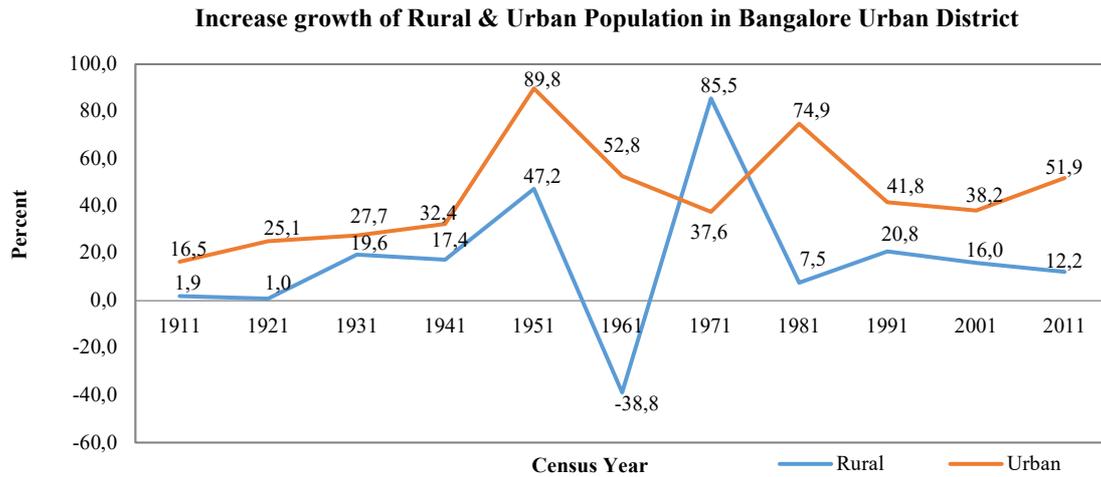


Figure 04. Increase growth of Rural & Urban Population in Bangalore Urban District

6.6. Tempo of Urbanization:

“Tempo of urbanization means the speed of urbanization that shows the rate of change brought by urbanization. It is calculated based on annual population growth rates” (Kumari, 2014, p. 61). Tempo of urbanization refers to speed of urbanization and is measured as change registered in the level or degree of urbanization over the years. The tempo of urbanization is calculating between the rural and urban population from 1901 to 2011. The growth rate for rural population shows a negative decline since 1901 in each decade except 1961-1971. The tempo of urbanization in the district is seen to be highest in between 1951-1961 whereas it shows a negative decline of -0.63% in between 1961-1971 as shown in Table 4. In terms of rural tempo, it showed a negative growth rate of -6.70% in the year 1951-1961 where it showed a positive increase to 2.36% in between 1961-1971 and again it declined to -3.92% between 1971-1981. Thereafter, it shows a sharp decline during the decade 1981-1991. As depicted in the table 06 and figure 05 below, it clearly shows that the tempo of urbanization in Bangalore Urban District is not uniform over the decades. The tempo of urbanization in the graph shows that there is rapid increase from 1941-61 because of industrialization. The migration is the main reason for search of employment, education and technology. Whereas the growth fell down to -0.63 in between 1961-71. Whereas in case of rural tempo the main decline is because of education, backwardness and technology constrains. Moreover, lack of employment leads to decline of rural population tempo.

Table 06. Tempo of Urbanization in Bangalore Urban District (1901-2011)

Census Year	Urban (PU) Tempo	Rural (PR) Tempo
1901-1911	0.72	-0.62
1911-1921	1.06	-1.08
1921-1931	0.30	-0.36
1931-1941	0.53	-0.68
1941-1951	1.00	-1.54
1951-1961	2.45	-6.70
1961-1971	-0.63	2.36
1971-1981	0.95	-3.92
1981-1991	0.24	-1.36
1991-2001	0.22	-1.52
2001-2011	0.32	-2.72

Source: Census of India 1901 and 2011

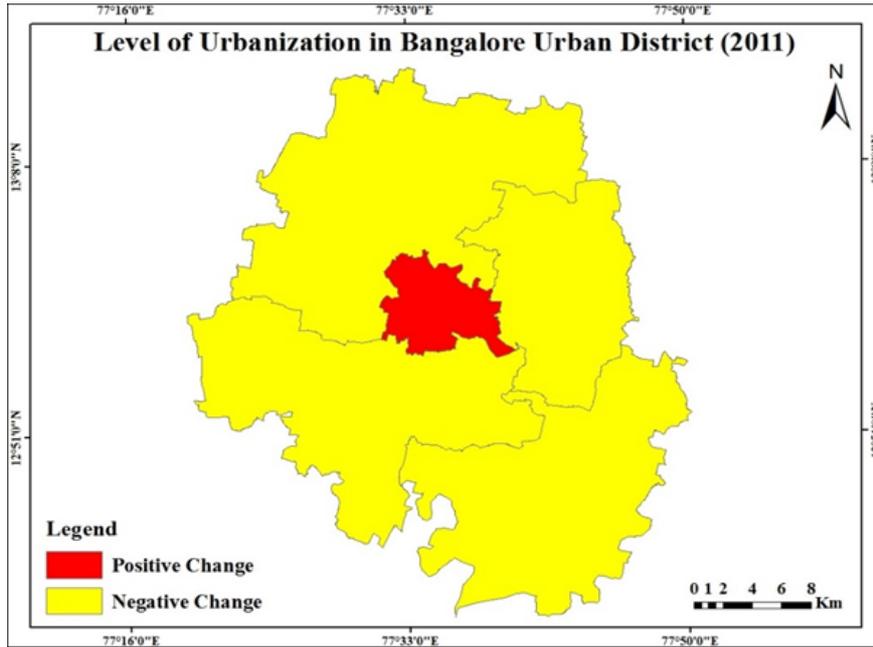


Figure 05. Level of Urbanization in Bangalore Urban District (2011)

7. Conclusion

The levels of urbanization have been analysed for Bangalore Urban district to understand the historical perspective. The analysis reveals taluk wise variation in urbanizations in the Bangalore Urban District. Highest percent of urbanization was observed in Bangalore City Taluk mainly due to industrialization, commercialization and development of IT Hub. While, the lowest percent of urbanization was found in Bangalore East Taluk. Overall, the percentage of urban population in the district was found to be 90.9% which means that most of the population in the district is urbanized. Anekal Taluk have recorded moderate level of urbanization while Bangalore North, Bangalore South and Bangalore East have recorded low level of urbanization. Thus, the growth and trend of urbanization in the District showed to retain high level of Urbanization since 1951 and tends to continue gradually in all the taluks of the Bangalore Urban District. The unplanned and abnormal development of Bangalore Urban District has resulted in several issues like unauthorised and unplanned residential colonies, ribbon development of Highways, Exploitation of Ground water, Poor Sewage, Poor Management of Solid Waste Management, Traffic Management and Congestion, Air and Noise Pollution, Health Issues and many other related issues whereas these issues can be overcome with some strategies like Phase or sector wise Development, Planned Development of Housing, Development of Highways Corridor and Traffic Management, Development of Transport Facilities and Infrastructure Development and Management, Ground Water Conservation and Rainwater Harvesting Methods, proper management of solid waste disposal, waste water disposal and sewage Management, Afforestation and development of green spaces which would result for the proper conservation, management and development of the Bangalore urban district.

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