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REVIEW ARTICLE

TRENDS AND PATTERNS OF URBANIZATION IN UTTAR PRADESH: A DISTRICT-WISE SPATIO-TEMPORAL ANALYSIS

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ABSTRACT

“Urbanization in Uttar Pradesh, India’s most populous state, has been a defining socio-economic transformation over recent decades, yet comprehensive district-level assessments of its spatio-temporal dynamics remain scarce. This study therefore aims to (1) quantifying district-level rates and magnitudes of urban expansion over three census decades and, (2) Map and analyzes spatial patterns of urban concentration and identifies high-growth and low-growth districts. Secondary data from the District Census Handbooks and decennial Census reports (1991, 2001, and 2011) were used to calculate each district’s urbanization level via the range method; districts were then classified into five urbanization categories, and choropleth maps and trend graphs were generated in the ArcGIS to visualize temporal and spatial shifts. Results show that the statewide urban share rose modestly from 19.68 percent in 1991 to 22.27 percent in 2011, with western and National Capital Region-adjacent districts (e.g., Ghaziabad, Gautam Buddha Nagar, Kanpur Nagar, Meerut, Lucknow) consistently in the “very high” urbanization category (>54 percent) while eastern plains and Bundelkhand districts remained in the “very low” category (<10 percent). The 1990s saw concentrated “boom” growth in a few districts i.e., Varanasi (+47.7 percent), Etawah (+46.5 percent), Banda (+23.0 percent) whereas the 2000s witnessed a broader diffusion of gains, with 28 districts achieving double-digit increases in urban share. These pronounced east-west and north-south disparities highlight the need for balanced infrastructure investment, enhanced services in under-urbanized areas, and coordinated metropolitan governance in high-growth corridors; future work should incorporate latest Census data and socio-economic indicators to capture post-2011 dynamics and guide evidence-based planning.”

KEYWORDS

Urbanization, Trends and Patterns, Uttar Pradesh, Level of Urbanization, Spatio-Temporal.

1. INTRODUCTION

Urbanization has emerged as a defining socio-economic and cultural trend of the twenty-first century, characterized by the mounting concentration of people in cities and towns (Ganguly and Ghosh, 2015). It manifests as a dynamic spatial process in which individuals migrate from rural areas into urban centres, driving both the expansion and intensification of urban settlements (Jha and Gavsker, 2022). This shift transforms the built environment turning formerly agrarian landscapes into urbanized zones and reflects wider economic and social changes (UNWUP, 2018). Urbanization refers to the gradual increase in the number of people living in urban areas or cities (Davis, 1965). From a demographic perspective, urbanization is measured by the rising share of city dwellers in the total population over time, while sociologically it captures the rapid proliferation and growth of towns and cities (Chandrasekarayya and Ganesh, 2009).

Urbanization is the shift from rural to urban life either by expanding cities or redefining areas as urban and is tied to both industrialization and modernization. In developed countries, it has unfolded slowly alongside agricultural and industrial revolutions, raising incomes and living standards. In contrast, developing nations see rapid urban growth driven mainly by a booming service sector rather than concurrent industrial expansion (Kumar and Rai, 2014). Globally, more people live in urban areas than in rural areas. In 2018, 55 per cent of the world’s population resided in urban areas (Hugo, 2019). In developing countries like India, challenge of urbanization becomes even more serious in the context of

overpopulation and its consequences. Urbanization in India has occurred more slowly compare to other developing nations (Chakraborty et al., 2015).

According to the 2018 World Urbanization Prospects, approximately 4.2 billion people lived in urban areas compared to 3.4 billion in rural regions. Since 1950, when about 70 percent of humanity resided in rural areas, the global population has shifted markedly toward cities. In 2007 urban dwellers outnumbered rural residents for the first time in history, marking a milestone in human settlement patterns. Urban growth has since outpaced rural expansion, and projections indicate that by 2050 roughly 68 percent of people will live in urban areas, reversing mid-20th century distributions. Yet this trend is uneven: developed nations are already predominantly urban while rural populations remain dominant in developing countries. Moreover, Asia and Africa host a significant share of the world’s urban inhabitants. Economic development, migration, and infrastructure investment drive these shifts (Mundhe and Jaybhaye, 2014)

Urbanization in India has progressed through intricate historical, economic, and demographic pathways. It is viewed both as a result of economic advancement and as a driving force behind structural change and regional development. Since 1951, the country has experienced a steady rise in its level of urbanization. However, this growth has been uneven across different regions. The proportion of the urban population increased from 11.4% in 1901 to 31.16% in 2011, reflecting rapid urban expansion alongside notable inter-state disparities (Ganguly and Ghosh, 2015). India’s urban transition accelerated post-1991 economic reforms, triggering service-sector growth and foreign investment in urban centres

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(Singh, 2015).

Urbanization in Uttar Pradesh, India's most populous state, has been shaped by a complex combination of demographic changes, economic developments, and policy efforts (Bhagat and Mohanty, 2009; Kumar and Rai, 2014). Although the state had a population nearing 200 million in 2011, its pace of urban growth remained slower than the national trend, with just 22.28% of its population living in urban areas compared to the national average of 31.16% (Raj and Singh, 2017; Sharma and Rana, 2017). Various factors, including socio-economic inequalities, insufficient infrastructure, and limited industrial expansion in several parts of the state, have been identified as key reasons behind this slower urbanization.

While existing studies document UP's urbanization levels and migration contributions, few adopt a century-long spatio-temporal perspective. Despite considerable advances, district-level analyses of urbanization in Uttar Pradesh remain scarce. A handful of district-level investigations, such as Sinha's (2018) study of Gautam Buddha Nagar and Yadav's (2015) assessment of Delhi's National Capital Territory, have illuminated local patterns, but they neither capture the diversity of all districts in Uttar Pradesh nor cover a sufficiently long temporal window to discern enduring trends. This study addresses these gaps by combining historical census trends with spatial clustering analysis to unpack both temporal shifts and geographic patterns.

The main objectives include: (1) quantifying district-level rates and magnitudes of urban expansion over three census decades; and (2) Map and analyze spatial patterns of urban concentration and identify high-growth and low-growth districts. Through this integrative framework, the study will generate a nuanced, district-wise portrait of urbanization in Uttar Pradesh, advancing theoretical understanding and offering empirical evidence to inform regional planning and policy. The findings will support targeted interventions to manage urban growth sustainably, enhance infrastructure provision, and promote balanced regional development across one of the world's most rapidly urbanizing regions.

2. DEFINITION OF URBAN AREA IN INDIA

Urbanization in India progressed relatively slowly during the last century compared to many other developing countries. Between 1901 and 1951, the Census definition of an "urban area" remained largely unchanged. It was only during the 1961 Census that several modifications were introduced to make the definition more statistically robust. By the 1981 Census, the classification of "urban" areas was based on several empirical criteria: (a) a minimum population density of 1,000 persons per square mile, (b) a total population of at least 5,000, (c) at least three-fourths of the working population engaged in non-agricultural activities, and (d) the presence of distinct urban characteristics and civic amenities, as identified by the State Superintendent. This last criterion, while somewhat subjective, was intended to encompass newly developed industrial regions, major housing complexes, and tourist centers equipped with modern infrastructure.

According to the Census of India, 2001, an "urban area" is defined as follows:

Statutory Towns: All places that have a municipality, corporation, cantonment board, or a notified town area committee, as recognized by state legislation.

Census Towns: Areas that meet the following criteria:

- A minimum population of 5,000;
- At least 75 percent of the male working population engaged in non-agricultural activities;
- And, a population density of at least 400 persons per square kilometre.

3. STUDY AREA

Uttar Pradesh, the most populous and the fourth largest state in India, covers a geographical area of 240,928 square kilometers, making it an important context for studying urbanization trends and patterns. The state is located between latitudes 23°52' N and 30°28' N and longitudes 77°03' E and 84°39' E, constituting 7.3% of the country's total area (Figure 1). In 2011, Uttar Pradesh's population accounted for 16.5% of India's total population. According to the 2011 Census, the state's population was 199,812,341, with 104,480,510 males and 95,331,831 females, resulting in a sex ratio of 912 females for every 1,000 males, which is lower than the national average of 940. On a positive note, Uttar Pradesh has seen an

increase in its literacy rate, which reached 67.68%. The male literacy rate

stands at 77.28%, while the female literacy rate is 57.18%. As of 2011, the state's urban population was 44,495,063, representing 22.3% of the total population, while the rural population was 155,317,278, comprising 77.7%. This urban share is notably lower than the national average of 31.5%, indicating a predominantly rural demographic. The decadal population growth rate from 2001 to 2011 was 20.23%, a decline from the 25.8% growth observed in the previous decade, suggesting a slowdown in population growth. Key urban centers like Kanpur, Lucknow, and Varanasi have experienced significant growth, driven by factors such as migration, economic development, and improved infrastructure. However, this rapid urbanization has also brought challenges, including overcrowding, inadequate infrastructure, and environmental concerns, making Uttar Pradesh a critical area for analyzing urbanization dynamics in India.

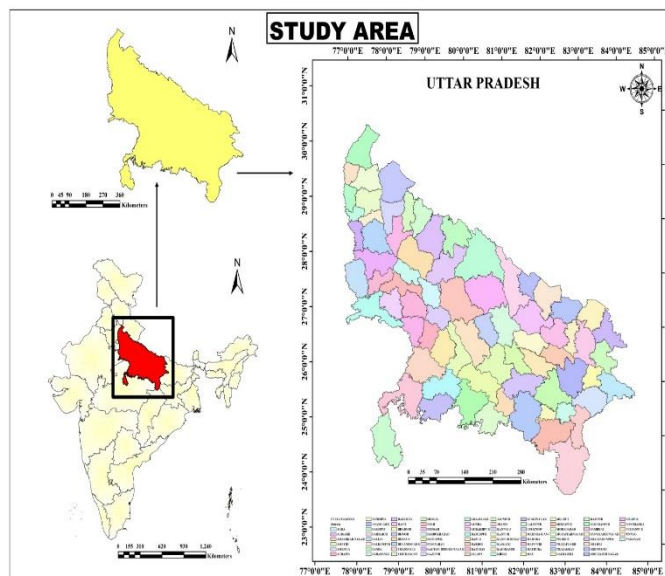


Figure 1: Map of Uttar Pradesh (Study Area)

4. DATABASE AND METHODOLOGY

The current research relies on secondary data obtained from various sources, including the District Census Handbook of Uttar Pradesh, Statistical Abstracts of Uttar Pradesh, and the 2011 Census of India. In addition, other secondary sources such as books and published research papers have also been referenced. To quantify the level of urbanization at the district level, the study employs the range method. The district-wise patterns of urbanization are presented visually through choropleth maps, while bar and line graphs are used to illustrate the trends and magnitude of urbanization for better clarity. The maps were created using ArcGIS.

5. RESULTS AND DISCUSSIONS

5.1 Spatio-temporal Analysis Trends and Patterns of Urbanization in Uttar Pradesh

According to the 2011 Census of India, Uttar Pradesh remains the nation's most populous state, with just under 200 million inhabitants. Of these, about 155.3 million (77.7 percent) live in rural areas, while approximately 44.5 million (22.3 percent) reside in urban centres. That urban share rose from 20.8 percent in 2001 to 22.3 percent in 2011. During the decade from 2001 to 2011, the state's urban population grew by roughly 10.9 million, accounting for 11.3 percent of India's total urban population (Table 2) and 16.5 percent of its entire population, even though its overall level of urbanisation remains well below the national average of 31.16 percent. Projections suggest that by 2021 Uttar Pradesh's urban population could reach around 58.3 million, an increase of 13.8 million compared with the 2001 to 2011 period. Yet this growth is uneven across the state: the western division is the most urbanised, with 32.5 percent of its residents in towns and cities, followed by Bundelkhand at 22.7 percent, the central division at 20.1 percent and the eastern division at 13.4 percent. Larger urban centres are expanding fastest. Class I towns, those with more than 100 000 inhabitants, increased in number from 14 in 1991 to 64 in 2011 and now house 60 percent of the state's urban residents, up from 33.7 percent in 1951. Meanwhile, the number of metropolitan cities rose from six to seven between 2001 and 2011. In contrast, smaller towns, particularly those in Classes V and VI, have seen their populations decline, reflecting a clear movement of people toward larger cities in search of employment and services.

Table 1: Trends of Urbanization in Uttar Pradesh (1901-2011)

Census Years	No. of UAs/Towns	Total Population	Urban Population	% of Urban Population
1901	349	48,627,670	5,223,025	11.20
1911	350	48,154,921	4,720,939	10.26
1921	367	46,672,411	4,728,727	10.61
1931	375	49,779,552	5,354,962	11.28
1941	385	56,535,170	6,749,767	12.52
1951	410	60,273,743	8,225,068	13.65
1961	215	73,754,573	8,983,900	12.81
1971	256	88,341,521	11,653,740	13.90
1981	598	110,862,512	18,749,979	17.83
1991	631	132,061,653	25,971,891	19.68
2001	670	166,197,921	34,512,624	20.78
2011	704	199,812,341	44,495,063	22.27

Source: Census of India, Office of the Registrar General & Census Commissioner, India

The level of urbanization in Uttar Pradesh has advanced only gradually since the early twentieth century. In 1901 the state accounted for 21 percent of India's total urban population (Table 2), but by 1991 that share had fallen to 12.97 percent, then to 12.11 percent in 2001 and to 11.30 percent in 2011 (Census of India). A devastating plague in 1911, which struck mainly in towns, caused a temporary setback in urban growth. From 1921 to 1931 the urban population growth rate rose steadily, with only minor fluctuations, and by the period 1941 to 1951 it had reached 21.86 percent. In 1961 the decadal growth rate plunged to 9.23 percent, largely because the census that year introduced a new definition of what constitutes an urban area. The decade from 1971 to 1981 then saw an extraordinary surge of 60.89 percent, the highest increase in any ten-year period during the century (Table 2 and Figure 2). Thereafter growth eased to 31.80 percent by 2001 and to 28.75 percent by 2011, reflecting both the rapid pace of urban expansion and its gradual moderation over time.

national average of 31.16 percent. Over the long term, the level of urbanisation in Uttar Pradesh has risen steadily. In 1901 just 11.20 percent of the state's residents lived in urban areas; by 2011 that share had climbed to 22.27 percent. Meanwhile, Uttar Pradesh's contribution to India's total urban population fell from 21.0 percent in 1901 to 11.3 percent in 2011, despite brief increases in 1981 and 1991. The most rapid expansion occurred during the 1970s, when the urban share rose from 13.90 percent in 1971 to 17.83 percent in 1981. Looking at the period since the 1960s underscores this gradual shift. In 1961 the urban population accounted for 12.81 percent of the state total. That proportion reached 19.68 percent in 1991, 20.78 percent in 2001 and finally 22.27 percent in 2011, reflecting a persistent move towards towns and cities over the past five decades (Table 1).

Table 2: Percentage Growth of Urban Population in Uttar Pradesh (1901-2011)

Census Year	Decadal growth rate	% of Urban Population	Share in India's Urban Population (%)
1901	---	11.20	21.0
1911	-9.61	10.26	19.0
1921	0.16	10.61	17.4
1931	13.24	11.28	17.0
1941	26.06	12.52	16.0
1951	21.86	13.65	14.0
1961	9.23	12.81	12.0
1971	29.72	13.90	11.3
1981	60.89	17.83	12.4
1991	38.52	19.68	12.97
2001	31.80	20.78	12.11
2011	28.75	22.27	11.3

Source: Census of India, Office of the Registrar General & Census Commissioner, India

5.2 District-wise Trends of Urbanization in Uttar Pradesh

The 2011 Census shows that urbanization varies dramatically across the districts of Uttar Pradesh (Table 3). As per the 2011 Census, Ghaziabad district recorded the highest total urban population in Uttar Pradesh, with an urban population of 3,162,547. This was followed by Lucknow with 3,038,996, Kanpur Nagar with 3,015,645, Agra with 2,024,195 and Meerut with 1,759,182. Across the state, the share of urban residents ranges from a low of 3.46 percent in Shrawasti district to a high of 67.55 percent in Ghaziabad. Twenty-three districts exceeded the state average urbanization rate of 22.27 percent. These are Ghaziabad (67.55 percent), Lucknow (66.21 percent), Kanpur Nagar (65.83 percent), Agra (45.81 percent), Meerut (51.08 percent), Saharanpur (30.77 percent), Muzaffarnagar (28.75 percent), Bijnore (25.13 percent), Moradabad (32.98 percent), Rampur (25.20 percent), Gautam Buddha Nagar (59.12 percent), Firozabad (33.35 percent), Mathura (29.68 percent), Aligarh

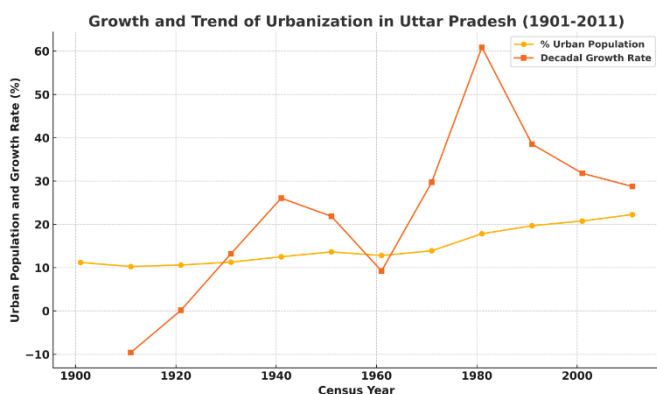


Figure 2: Decadal Growth Rate and Trend of Urban Population in Uttar Pradesh

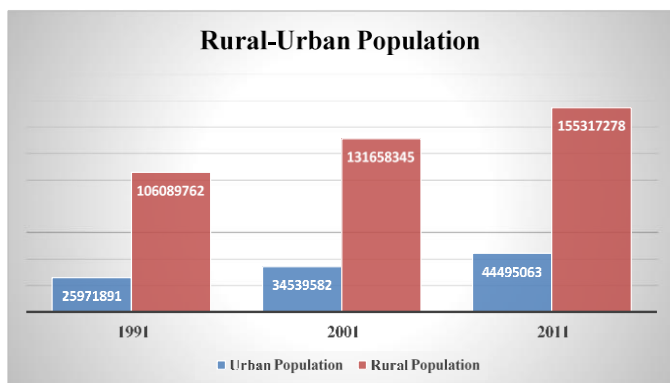


Figure 3: Rural-Urban Population in Uttar Pradesh (1991-2011)

As per the 2011 Census, Uttar Pradesh had a total population of 199,812,341. Of these, 155,317,278 people resided in rural areas and 44,495,063 lived in urban centres (Table 1 and Figure 3). The proportion of urban inhabitants was 22.27 percent, considerably lower than the

(33.13 percent), Bulandshahar (24.79 percent), J. P. Nagar (24.93 percent), Mau (22.63 percent), Bareilly (35.26 percent), Etawah (23.16 percent), Jalaun (24.79 percent), Jhansi (41.70 percent), Allahabad (24.74 percent) and Varanasi (43.44 percent).

Seventeen districts recorded urbanization levels of ten percent or less, underscoring their predominantly rural character. These are Shrawasti (3.46 percent), Maharajganj (5.02 percent), Ghazipur (7.58 percent), Kaushambi (7.78 percent), Sant Kabir Nagar (7.49 percent), Kushinagar (4.72 percent), Basti (5.60 percent), Gonda (6.55 percent), Sultanpur (5.26 percent), Balrampur (7.74 percent), Bahraich (8.14 percent), Azamgarh (8.53 percent), Jaunpur (7.71 percent), Rae Bareli (9.04 percent), Kanpur Dehat (9.66 percent), Ballia (9.39 percent) and Chitrakoot (9.71 percent). Shrawasti district has the lowest urban population in the state, with just 38,649 people living in urban areas, followed by Chitrakoot (96,332), Kaushambi (124,456), Sant Kabir Nagar (128,531) and Maharajganj (134,730). These figures highlight the uneven pace of urban expansion

across the state.

The district-level data from the 2011 census paint a clear picture of uneven urban growth in Uttar Pradesh. The distribution reveals a pronounced divide from east to west and from south to north. Districts in the western part of the state and those clustered around the National Capital Region tend to be far more urbanized, whereas those in the eastern plains and Bundelkhand remain overwhelmingly rural. This pattern reflects the concentration of industrial development, transport networks, and administrative functions in Lucknow, Kanpur, Ghaziabad, and Meerut, compared with the predominantly agricultural economies of the eastern plains and Bundelkhand. It underscores regional disparities in infrastructure development, industrial investment, and employment diversification. This spatial imbalance highlights both the challenges and the opportunities for fostering more inclusive urbanization across the state.

Table 3: Trends and Growth of Urbanization across districts of Uttar Pradesh (1991-2011)

Districts	%age of Urban Population			Decadal Urban Population Growth (%)	
	1991	2001	2011	1991-2001*	2001-2011*
Saharanpur	25.5	25.81	30.77	1.22	19.22
Muzaffarnagar	24.6	25.51	28.75	3.70	12.70
Bijnore	25.1	24.31	25.13	-3.15	3.37
Moradabad	27.7	30.54	32.98	10.25	7.99
Rampur	26.1	24.97	25.20	-4.33	0.92
J. P. Nagar	NA	24.56	24.93	NA	1.51
Meerut	37.0	48.44	51.08	30.92	5.45
Baghpat	NA	19.71	21.11	NA	7.10
Ghaziabad	46.2	55.20	67.55	19.48	22.37
G. B. Nagar	NA	37.39	59.12	NA	58.12
Bulandshahar	20.8	23.15	24.79	11.30	7.08
Aligarh	25.1	28.90	33.13	15.14	14.64
Mahamaya Nagar (Hathras)	NA	19.80	21.26	NA	7.37
Mathura	23.6	28.30	29.68	19.92	4.88
Agra	40.4	43.30	45.81	7.11	5.80
Firozabad	26.6	30.32	33.35	13.98	9.99
Etah	16.7	17.33	15.11	3.77	-12.81
Mainpuri	13.2	14.60	15.44	10.61	5.75
Budaun	17.6	18.15	17.51	3.12	-3.53
Bareilly	32.8	32.93	35.26	0.40	7.10
Pilibhit	18.5	17.88	17.30	-3.35	-3.21
Shahjahanpur	20.8	20.63	19.76	-0.83	-4.19
Farrukhabad	18.6	21.75	22.08	16.94	1.51
Kannauj	NA	16.70	16.95	NA	1.49
Etawah	15.7	23.01	23.16	46.52	0.65
Auraiya	NA	14.32	16.98	NA	18.62
Kanshiramnagar	NA	NA	20.06	NA	NA
Kheri	10.7	10.77	11.46	0.65	6.40
Sitapur	12.0	11.95	11.84	-0.42	-0.92
Hardoi	11.7	11.99	13.24	2.40	10.42
Unnao	13.6	15.24	17.10	12.06	12.23
Lucknow	62.7	63.63	66.21	1.55	4.06
Rae Bareli	9.0	9.54	9.04	6.00	-5.24
Kanpur Dehat (Ramabai Nagar)	5.7	6.89	9.66	20.88	40.24
Kanpur Nagar	84.2	67.12	65.83	-20.28	-1.91
Fatehpur	9.9	10.30	12.23	4.04	18.74
Barabanki	9.3	9.30	10.15	-0.32	9.14
Jalaun	22.1	23.41	24.79	5.93	5.89
Jhansi	39.6	40.79	41.70	3.03	2.22
Lalitpur	14.0	14.52	14.36	3.71	-1.10

Table 4 (cont): Trends and Growth of Urbanization across districts of Uttar Pradesh (1991-2011)

Hamirpur	17.4	16.65	19.00	-4.31	14.06
Mahoba	NA	21.86	21.16	NA	-3.22
Banda	12.9	15.87	15.32	23.02	-3.49
Chitrakoot	NA	9.99	9.71	NA	-2.81
Pratapgarh	5.5	5.29	5.46	-3.82	3.22
Kaushambi	NA	7.10	7.78	NA	9.58
Allahabad	20.8	24.45	24.74	17.63	1.18
Faizabad	11.7	13.46	13.77	15.04	2.33
Ambedkar Nagar	NA	8.93	11.71	NA	31.10
Sultanpur	4.5	4.74	5.26	5.33	11.02
Bahraich	7.8	10.00	8.14	28.21	-18.60
Shrawasti	NA	2.84	3.46	NA	21.83
Balrampur	NA	8.06	7.74	NA	-3.98
Gonda	7.4	7.03	6.55	-4.95	-6.84
Basti	6.4	5.56	5.60	-13.13	0.72
Sant Kabir nagar	NA	7.08	7.49	NA	5.74
Maharajanj	4.9	5.09	5.02	3.88	-1.38
Gorakhpur	18.8	19.59	18.83	4.20	-3.88
Kushinagar	NA	4.58	4.72	NA	3.06
Deoria	7.3	9.89	10.22	35.48	3.34
Azamgarh	7.2	7.55	8.53	4.86	12.98
Mau	16.9	19.44	22.63	15.03	16.41
Ballia	9.9	9.77	9.39	-1.31	-3.89
Jaunpur	6.9	7.40	7.71	7.25	4.19
Ghazipur	7.4	7.68	7.58	3.78	-1.30
Chandauli	NA	10.56	12.42	NA	17.61
Varanasi	27.2	40.16	43.44	47.65	8.17
Sant Ravidas Nagar	NA	12.82	14.53	NA	13.34
Mirzapur	13.8	13.54	13.92	-1.88	2.81
Sonbhadra	13.4	18.82	16.88	40.45	-10.31
Siddharth nagar	3.5	3.81	6.28	8.86	64.83

Source: District Census Handbooks, Uttar Pradesh, 1991, 2001, 2011

*Calculated by Authors

NA: Data is not available

5.3 Growth of Urbanization across districts of Uttar Pradesh

The urban growth data for Uttar Pradesh's districts between 1991 and 2011 reveal a highly uneven urban transition, marked by both saturation in core cities and rapid expansion in peripheral and newly created districts (Table 3). In 1991, only two districts Kanpur Nagar (84.2%) and Lucknow (62.7%) already exhibited urban shares above 60 percent. Over the next two decades, however, these metros saw very modest gains (Lucknow reaching 66.2%) or even declines (Kanpur Nagar falling to 65.8%), reflecting both the stabilization of their built-up footprints and administrative re-classifications that shifted peri-urban populations into adjoining districts. Surrounding the National Capital Region and other major economic corridors, several districts experienced explosive growth. Ghaziabad surged from 46.2 percent urban in 1991 to 67.6 percent by 2011; Gautam Buddha Nagar climbed from 37.4 percent in 2001 to 59.1 percent in 2011; and Meerut rose from 37.0 percent to 51.1 percent. These three, along with districts like Baghpat and Hapur, absorbed much of Delhi's spill-over growth, driven by new industrial parks, residential townships, and improved rail and highway connectivity.

In the decade 1991-2001, a handful of second-tier cities also saw remarkable leaps. Varanasi's urban share exploded by almost 48 percent, Etawah's by 46.5 percent, and Banda's by 23.0 percent, likely reflecting targeted civic infrastructure investments and the emergence of localized manufacturing clusters along historic transport arteries. Yet these early booms were geographically limited with fewer than ten districts registering double-digit percentage rises. Between 2001 and 2011, most districts experienced an increase in the percentage of their urban

population, reflecting the steady but uneven urbanization happening across the region. On average, the urban share across districts grew by around 7 percent over the decade. However, this overall growth hides a lot of interesting differences between places. Some districts witnessed very rapid changes. Siddharth Nagar, for example, saw the most dramatic rise, with its urban share growing by nearly 65 percent. Similarly, G. B. Nagar and Ghaziabad also recorded very large increases, suggesting that urban sprawl from the nearby National Capital Region, infrastructure development, and possibly the reclassification of rural areas into urban ones played major roles. Kanpur Dehat and Ambedkar Nagar too showed significant urban growth, indicating that smaller cities and towns around major hubs like Kanpur and Ayodhya were expanding outward and becoming more urbanized.

Beyond these few fast-growing districts, there was a large group of places where urbanization grew moderately. Districts like Unnao, Fatehpur, Hamirpur, Aligarh, and Mathura saw growth rates between 10 and 19 percent. Their growth likely came from gradual developments, such as better road connectivity, small industries setting up, expansion of educational or health services, and nearby rural areas getting absorbed into expanding municipal limits. Meanwhile, larger and already highly urbanized districts such as Lucknow, Meerut, Moradabad, and Agra showed only moderate growth of around 4 to 8 percent. This smaller increase makes sense because these districts were already quite urban by 2001, so the room for further expansion was more limited compared to less urbanized areas.

On the other side, about nineteen districts experienced a fall in the proportion of their urban population (Table 3). Some of the steepest declines were observed in Bahraich, Etah, and Sonbhadra. In these cases, rural population growth might have been faster than urban growth, possibly because of factors like improvements in agriculture, rural employment programs, or migration patterns that favoured the

countryside. It is also possible that stricter rules for defining urban areas during census operations led to some towns being reclassified back as rural areas if they no longer met certain criteria. Districts like Rae Bareilly, Shahjahanpur, and Budaun also showed small but steady declines, reflecting similar dynamics.

Among all the districts, around 70 percent showed an increase in urbanization. For many districts, the changes were small but steady, reflecting a gradual shift rather than a sudden transformation. However, the few districts with extremely high urban growth had a major impact, reshaping the overall urban landscape of the state. Comparing the two decades, the 1990s emerge as a period of concentrated “boom in a few” districts, whereas the 2000s represent a “spread of the boom” across many more. In the first decade, only a small cluster of districts exceeded 20 percent growth in urban share. By contrast, the second decade saw nearly eighteen districts cross that threshold, indicating a maturing of Uttar Pradesh’s urban transition and the creation of multiple new centres of urban gravity.

5.3 Pattern of Urbanization across districts of Uttar Pradesh

5.3.1 Areas of Very High Urban Population

Table 5: Pattern of Urbanization in Uttar Pradesh, 1991

Category	Range (%age of Urban Population)	No. of Districts	District Names
Very High	68.07–84.2	1	Kanpur Nagar
High	51.93–68.06	1	Lucknow
Medium	35.79–51.92	4	Meerut, Jhansi, Agra, Ghaziabad
Low	19.65–35.78	14	Bulandshahar, Shahjahanpur, Allahabad, Jalaun, Mathura, Muzaffarnagar, Aligarh, Bijnore, Saharanpur, Rampur, Firozabad, Moradabad, Varanasi, Bareilly
Very Low	3.5–19.64	34	Siddharth Nagar, Sultanpur, Maharajganj, Pratapgarh, Kanpur Dehat, Basti, Jaunpur, Deoria, Ghazipur, Gonda, Bahraich, Azamgarh, Rae Bareilly, Barabanki, Fatehpur, Ballia, Kheri, Faizabad, Hardoi, Sitapur, Banda, Unnao, Sonbhadra, Mirzapur, Lalitpur, Etawah, Etah, Mau, Hamirpur, Budaun, Farrukhabad, Pilibhit, Gorakhpur

Source: Authors’ calculation from District Census Handbooks, Uttar Pradesh, 1991.

5.3.3 Areas of Moderate Urban Population

In 1991, four districts i.e., Meerut, Jhansi, Agra, and Ghaziabad belonged to the moderate urbanization category, with urban population shares between 35.79 % and 51.92 %. These districts were largely concentrated in Western and Central Uttar Pradesh. By 2001, the moderate category (28.55 %–41.41 %) expanded to seven districts: Aligarh, Bareilly, Firozabad, G. B. Nagar, Jhansi, Moradabad, and Varanasi. These districts represented a broader spread across Western, Central, and Eastern Uttar Pradesh. In 2011, eight districts, including Moradabad, Bareilly, Aligarh, Firozabad, Saharanpur, Mathura, Mau, and Jhansi, fell into the moderate urbanization band (29.12 %–41.94 %), showing steady urban growth particularly in the western and central parts of the state (Table 4, 5, 6 and

In 1991, only one district out of the total districts demonstrated a very high level of urbanization. This district was Kanpur Nagar, located in Central Uttar Pradesh. By 2001, three districts fell within the very high urban population range (54.26 %–67.12 %), including Kanpur Nagar, Lucknow (both from Central Uttar Pradesh), and Ghaziabad from Western Uttar Pradesh. In 2011, the number increased to four districts Kanpur Nagar, Lucknow, Ghaziabad, and G. B. Nagar with urban population percentages between 54.78 % and 67.60 %, reflecting the rapid suburban and metropolitan growth particularly in the western and central regions of the state (Table 4, 5, 6 and Figure 4).

5.3.2 Areas of High Urban Population

In 1991, only Lucknow district exhibited a high level of urbanization. In 2001, two districts, namely Agra and Meerut, were classified under the high urban population category (41.41 %–54.26 %). Both districts are located in Western Uttar Pradesh. By 2011, three districts Agra, Meerut (both from Western Uttar Pradesh), and Varanasi (from Eastern Uttar Pradesh) fell within the high urbanization range of 41.95 % to 54.77 %, indicating a gradual expansion of urban centres across different regions of the state (Table 4, 5, 6 and Figure 4).

Figure 4).

5.3.4 Areas of Low Urban Population

In 1991, fourteen districts showed low levels of urbanization, with urban population shares between 19.65 % and 35.78 %. These districts included Bulandshahar, Allahabad, Rampur, and others, mostly spread across Western and Eastern Uttar Pradesh. By 2001, twenty-four districts fell under the low urbanization category (15.70 %–28.55 %), including Allahabad, Baghpat, Banda, Bijnore, and others, mainly from Central and Eastern Uttar Pradesh. In 2011, nineteen districts, including Kannauj, Auraiya, Farrukhabad, Rampur, and Pilibhit, were categorized as low urban population areas (16.29 %–29.11 %), with most districts located in Central and Eastern regions (Table 4, 5, 6 and Figure 4).

Table 6: Pattern of Urbanization in Uttar Pradesh, 2001

Category	Range (%age of Urban Population)	No. of Districts	District Names
Very High	54.26 – 67.12	3	Ghaziabad, Kanpur Nagar, Lucknow
High	41.41 – 54.26	2	Agra, Meerut
Medium	28.55 – 41.41	7	Aligarh, Bareilly, Firozabad, G. B. Nagar (Noida), Jhansi, Moradabad, Varanasi
Low	15.70 – 28.55	24	Allahabad, Baghpat, Banda, Bijnore, Budaun, Bulandshahar, Etah, Etawah, Farrukhabad, Gorakhpur, Hamirpur, J. P. Nagar, Jalaun, Kannauj, Mahamaya Nagar (Hathras), Mahoba, Mathura, Mau, Muzaffarnagar, Pilibhit, Rampur, Saharanpur, Shahjahanpur, Sonbhadra
Very Low	2.84 – 15.70	34	Ambedkar Nagar, Auraiya, Azamgarh, Bahraich, Ballia, Balrampur, Banda, Barabanki, Basti, Chandauli, Chitrakoot, Deoria, Faizabad, Fatehpur, Gonda, Hardoi, Jaunpur, Kaushambi, Kanpur Dehat (Ramabai Nagar), Kheri, Kushinagar, Lalitpur, Maharajganj, Mainpuri, Mirzapur, Pratapgarh, Rae Bareilly, Sant Kabir nagar, Shrawasti, Siddharth nagar, Sitapur, Sant Ravidas Nagar, Sultanpur, Unnao

Source: Authors’ calculation from District Census Handbooks, Uttar Pradesh, 2001.

5.3.5 Areas of Very Low Urban Population

In 1991, a very large number thirty-four districts, exhibited very low urbanization levels, with urban populations between 3.5 % and 19.64 %.

These districts were primarily rural and scattered across Eastern Uttar Pradesh. In 2001, again thirty-four districts belonged to the very low urbanization category (2.84%–15.70%), with areas like Ambedkar Nagar, Auraiya, Azamgarh, and Gonda remaining heavily rural (Raj and Singh, 2017; Varshney and Munir, 2013). By 2011, the number of very low urbanized districts declined to twenty-two, with regions like Shrawasti, Maharajganj, Deoria, and Ballia continuing to show predominantly rural

characteristics, reflecting slow urban transformation in Eastern and northern parts of the state. It is significant to note the regional variation in the pattern of Urban Population. Western Region with 32.45% urban population is the most urbanized and Eastern Region with 13.40% urban population is the least urbanized region of the state (Table 4, 5, 6 and Figure 4) (Census 2011).

Category	Range (%age of Urban Population)	No. of Districts	District Names
Very High	54.78 – 67.60	4	Ghaziabad, Lucknow, Kanpur Nagar, G. B. Nagar
High	41.95 – 54.77	3	Agra, Varanasi, Meerut
Moderate	29.12 – 41.94	8	Moradabad, Bareilly, Aligarh, Firozabad, Saharanpur, Mathura, Mau, Jhansi
Low	16.29 – 29.11	19	Kannauj, Auraiya, Farrukhabad, Mahoba, Mahamaya Nagar (Hathras), Kanshiram Nagar, Rampur, J. P. Nagar, Jalaun, Baghpat, Etawah, Banda, Mainpuri, Etah, Fatehpur, Sonbhadra, Pilibhit, Unnao, Gorakhpur
Very Low	3.46 – 16.28	22	Shrawasti, Maharajganj, Sultanpur, Basti, Gonda, Siddharth Nagar, Jaunpur, Ghazipur, Balrampur, Azamgarh, Bahraich, Kaushambi, Deoria, Barabanki, Kheri, Ambedkar Nagar, Sitapur, Hardoi, Pratapgarh, Chitrakoot, Rae Bareli, Ballia

Source: Authors' calculation from District Census Handbooks, Uttar Pradesh, 2011.

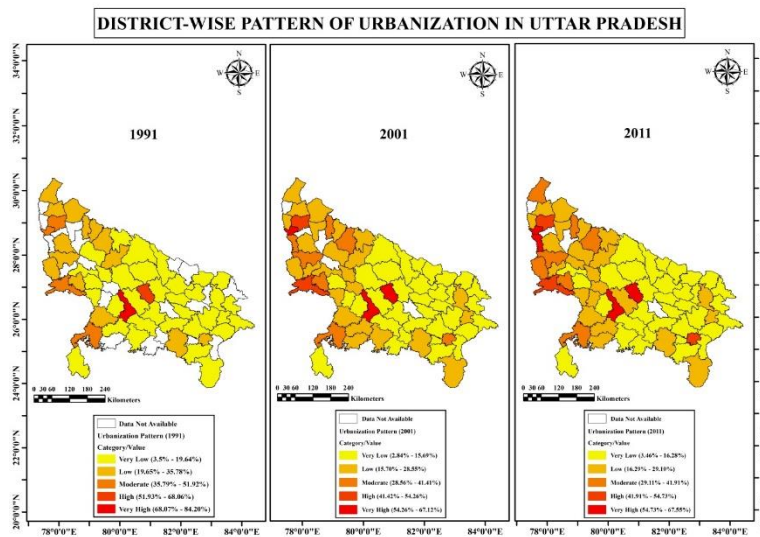


Figure 4: District-wise Pattern of Urbanization; 1991, 2001, and 2011

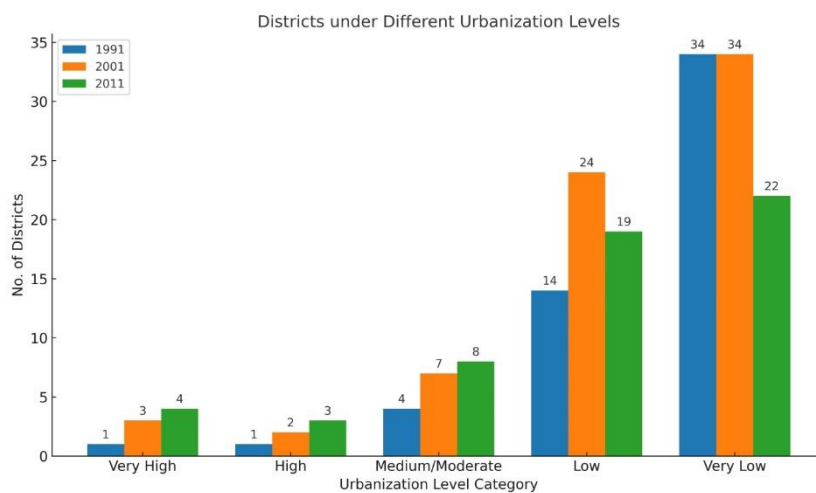


Figure 5: No. of Districts in Different Urbanization level Category over the Years (1991-2011)

Uttar Pradesh ranks twenty-third nationally in terms of urbanization, but its districts exhibit marked regional disparities. The sections that follow analyze how the urban population is distributed at the district level. Table and Figure illustrate this distribution by grouping districts into four distinct categories.

- **Highly Urbanized** (districts having percent of urban population more than world average percent of urban population),
- **Moderately Urbanized** (districts including percent of urban population in between world and national average of urban population percent),

- **Less Urbanized** (districts having urban population percent between national and state average of percent of urban population), and
- **Least Urbanized** (districts having percent of urban population less than state average of percent of urban population)

Table 8: Classification of Districts in terms of Level of Urbanization in Uttar Pradesh, 2011

Level of Urbanization	District Names	No. of Districts
Highly urbanized Above world average i.e. 54.50%	Gautam Buddha Nagar, Ghaziabad, Kanpur, Lucknow	4
Moderately Urbanized Between world & national average i.e. 54.50 % to 31.16%	Agra, Aligarh, Bareilly, Firozabad, Jhansi, Meerut, Moradabad, Varanasi	8
Less Urbanized Between state and national average i.e. 22.28% - 31.16%	Badaun, Mathura, Muzaffarnagar, Saharanpur, Jalaun, Jyotiba Phule Nagar, Mau, Rampur, Bijnor, Bulandshahr, Etawah, Hathras, Prayagraj	13
Least Urbanized Below state average i.e. 22.28%	Ambedkar Nagar, Auraiya, Azamgarh, Baghpat, Bahraich, Ballia, Balrampur, Barabanki, Banda, Basti, Chandauli, Chitrakoot, Deoria, Etah, Ayodhya, Farrukhabad, Fatehpur, Ghazipur, Gonda, Gorakhpur, Hamirpur, Hardoi, Jaunpur, Kannauj, Kanpur Dehat, Kaushambi, Kheri, Lalitpur, Mahoba, Mainpuri, Mirzapur, Pilibhit, Rae Bareli, Sant Kabir Nagar, Sant Ravidas Nagar, Shahjahanpur, Siddharthnagar, Sitapur, Sonbhadra, Unnao, Kasganj, Maharajganj, Shrawasti, Sultanpur, Kushinagar, Pratapgarh	46

Source: Authors' calculation

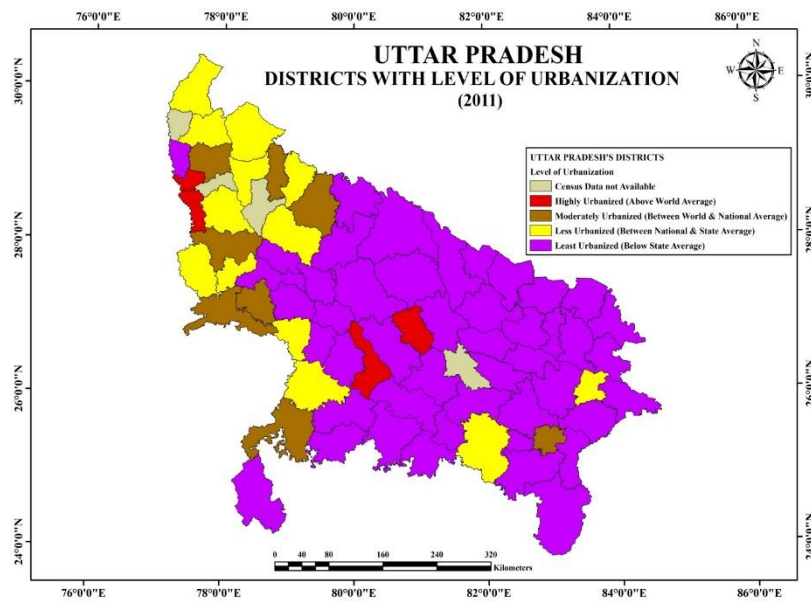


Figure 6: Classification of Districts in terms of Level of Urbanization in Uttar Pradesh, 2011

6. CONCLUSION

This study has offered a comprehensive district-wise, spatio-temporal analysis of urbanization trends and patterns in Uttar Pradesh between 1991 and 2011, fulfilling the objectives of quantifying rates of urban expansion and mapping regional disparities. Utilizing census data and GIS-based choropleth mapping, the research has illuminated both the magnitude of urban growth across nearly seven hundred administrative units and the uneven distribution of urbanization within India's most populous state.

Overall, the share of urban dwellers in Uttar Pradesh rose from 19.68% in 1991 to 22.27% in 2011. While this upward trajectory signifies a continuing shift towards urban living, the pace of change was moderate compared to national averages. The decade of the 1970s marked the highest decadal spike (+60.89%), but growth rates subsequently stabilized, reflecting a maturing urban transition characterized by slower but more widespread expansion. Spatially, the analysis reveals stark east-west and north-south divides. Districts in the western division and those adjacent to the National Capital Region most notably Ghaziabad, Gautam Buddha Nagar, Meerut, and Lucknow, exhibited very high urbanization levels (exceeding 54%). In contrast, eastern plains and Bundelkhand districts, such as Shrawasti, Maharajganj, and Chitrakoot, remained predominantly rural with urban shares below 10%. The classification of districts into five urbanization bands underscores this imbalance and provides a clear framework for targeted regional interventions.

Temporally, the 1990s witnessed concentrated "booms" in a small cluster

of districts—Varanasi (+47.65%), Etawah (+46.52%), and Banda (+23.02%)—driven by infrastructure upgrades and localized industrialization. The following decade saw a diffusion of these gains across a broader set of districts, with twenty-eight districts registering double-digit percentage increases in urban share, indicating that urbanization had begun to spread beyond traditional centres. These findings carry significant implications for policy and planning. The persistent rural-urban disparities call for balanced infrastructure development, including transportation, healthcare, and education, in under-urbanized districts. Moreover, the rapid expansion in peri-urban areas of the NCR highlights the need for coordinated metropolitan governance and sustainable land-use practices to manage sprawl and environmental pressures.

This study's reliance on Census data up to 2011 limits insights into more recent trends. Future research should incorporate upcoming latest census results and socio-economic indicators to capture post-2011 dynamics, particularly in the wake of accelerated urbanization driven by economic reforms and infrastructural investments. Such work would further enrich our understanding of Uttar Pradesh's evolving urban landscape and guide evidence-based policymaking for inclusive and sustainable regional growth.

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DATA AVAILABILITY

The District Census Handbooks and decennial Census data used in this study are publicly available from the Census of India website (<http://censusindia.gov.in>). Additional data can be made available upon reasonable request to the corresponding author.

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Informed Consent: Not applicable, as no primary data were collected from human participants.

AUTHOR'S CONTRIBUTION

Conceptualization: Prof. Tariq Mahmood Usmani and Mohd Sajid Rayeen; Methodology & Analysis: Mohd Sajid Rayeen; Results, Discussion and Conclusion: Mohd Sajid Rayeen; Final Review: Prof. Tariq Mahmood Usmani and Mohd Sajid Rayeen; Supervision: Prof. Tariq Mahmood Usmani

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