



COMPARATIVE ANALYSIS OF URBANIZATION IN WEST BENGAL: A QUANTITATIVE STATISTICAL APPROACH

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Abstract: The state of West Bengal is one of the important states in respect of its population structure in India. Being a populated state with four positions among the other 28 states in India. As a result, through comparative quantitative analysis, an attempt has been made in this paper to detect the levels of urbanization for understanding the demographic and socioeconomic status from a spatial perspective. The datasets have been collected from Indian census abstracts for 2001 and 2011. There is no gap in the temporal series of demographic datasets. In this paper, we used the 'Z' score statistic to examine the tendency of % of urban population data. After all, the standardization of every individual value (considered as x) is concentrated through this method. The results of this calculation exhibit a range of +3.09 to -0.89. According to this calculation, the main 3 categories of high (above +0.50), medium (-0.50 to +0.50), and low (below -0.50) have been taken for the mention of the status of urbanization in West Bengal in 2001 and 2011, respectively. In 2001, four districts had a high level of urbanization; since then, in 2011, this pattern has changed minutely and is now concentrated in three districts. In 2011, 7 districts lying in the medium range in respect of the level of urbanization before it was 5 districts in 2001. Hence the low category level of urbanization concentration in nine districts lying between these ranges in both cases. The analysis further reveals that there is a positive correlation between the availability of modern amenities and the level of urbanization in 2001 and 2011, respectively.

Keywords: Level of Urbanization, Urban Population, 'Z' Score, West Bengal

INTRODUCTION

The history of world urbanization is very old. Urbanization is the most common problem in any country. Urbanization began when humans practised agriculture and animal husbandry. The Jordan Valley, Tigris-Euphrates Basin, Nile Basin, Indus Basin, and Maya civilization are examples of global urbanization. Indian urbanization has little history in the context of world history. Originally from Mohenjo-daro, the Harappan civilization highlighted the urbanization of India. In India, urbanization and socio-economic development are influenced by internal migration (Lusome & Bhagat, 2006). The causes of urbanization have changed over time. According to the 2011 Census of India, an urban area should have the following characteristics: a minimum population of 5,000. At least 75 percent of the working population is engaged in non-agricultural occupations. A population density of at least 400 people per square kilometer is required. Goa (62.17%) is the most urbanized state in India. Chandigarh (97.25%) is the most advanced in terms of urbanization among union territories. Looking at the urbanization of West Bengal, it can be seen that the urbanization of West Bengal has been increasing at a rate on par with India since independence. In 1951, the difference in the level of urbanization between India and West Bengal was 6.61, it decreased to only 0.78%, in 2011. According to the 2001 census report, 780 cities are

mentioned in West Bengal. West Bengal ranks fourth in India in terms of population density (382 sq km) and area per person (1029 sq km). Many cases of population growth in West Bengal are the result of immigration from Bangladesh. Calcutta has a center that draws people from the surrounding area, and as a result, Calcutta is the most popular urban sector in our state and country (Sarkar, 2017). 31.89% of people in West Bengal lived in cities, which marks the direction of growth for urbanization in the state. Since the beginning of time, the demographic structure of West Bengal has been more diverse. From north to south, the urban sectors in this state behave in a variety of ways. Urbanization has a positive relationship with HDI. Kolkata, Howrah, Bardhaman, and the North 24 Parganas districts have higher urbanization due to higher HDI (Anisujjaman, 2015). Different types of economic facilities and livelihood statuses make a difference in every urban sector. The urbanization process is indexed by the natural growth rate, decadal growth rate, and rural-urban displacement factor (Ghosh & Chakma, 2014). It is necessary to implement some population-related policies. In this paper, we reveal that the population concentration of the state is compressed into 19 consecutive districts.

Study Area

The state of West Bengal is comprised of nineteen (19) districts (census 2011). It lies between 21°25' N and 26°50' N latitudes and 86°30' E and 89°58' E longitudes (Fig. 1). Respectively, with an area of about 88,752 square kilometres. Extending from the foot of the Darjeeling Himalaya in the north to the Bay of Bengal in the south. According to the 2011 Census, the total population is 91347736 people. This state encompasses 7.55% of India's population.

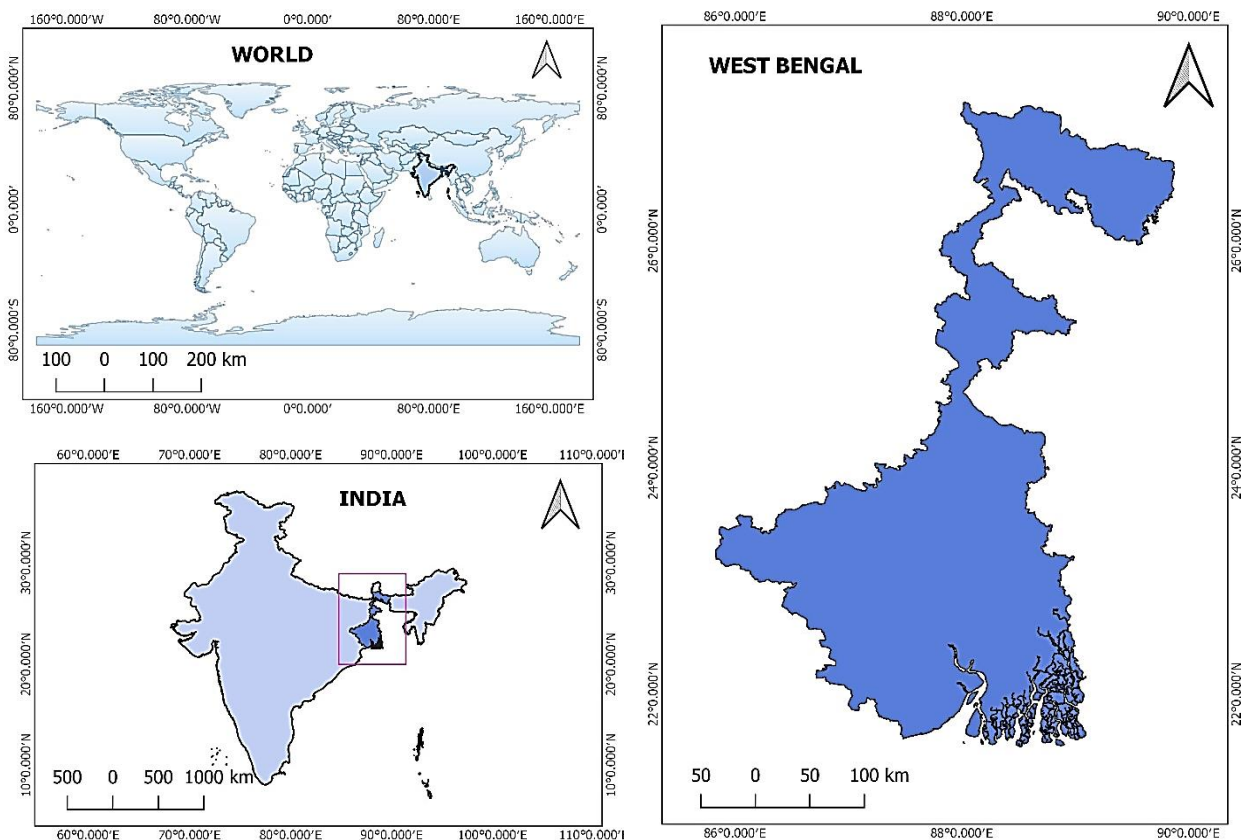


Fig. 1: location map of study area
(Source: prepared by Authors)

Objectives:

- To identify the level of Urbanization.
- To identify the magnitude of population increase in West Bengal.
- To identify the changing profile of district-wise urban populations in West Bengal.

DATA AND METHODOLOGY

The study is based on district-wise secondary data drawn from the District Statistical Handbook and Census Handbook of 2001 and 2011. All of this information is secondary. To assess the level of urbanization, we calculated the percentage of the urban population in relation to the district population. The percentage of the urban population was then used to calculate the level of urbanisation using the Z-score statistic. The series of data does not have any gaps. To achieve standardization, the raw data for each variable is computed into a standard score (Z-score). The scores measure the departure of individual observations, expressed in a comparable form. This means it becomes a linear transformation of the original data.

$$Z_c = \frac{X_i - \mu}{\delta}$$

Where Z_c is the standard score of its variable, X_i is the individual observation, (μ) is the mean for the variable, and SD denotes the standard deviation (δ). The whole process is shown in the following chart (Fig. 2).

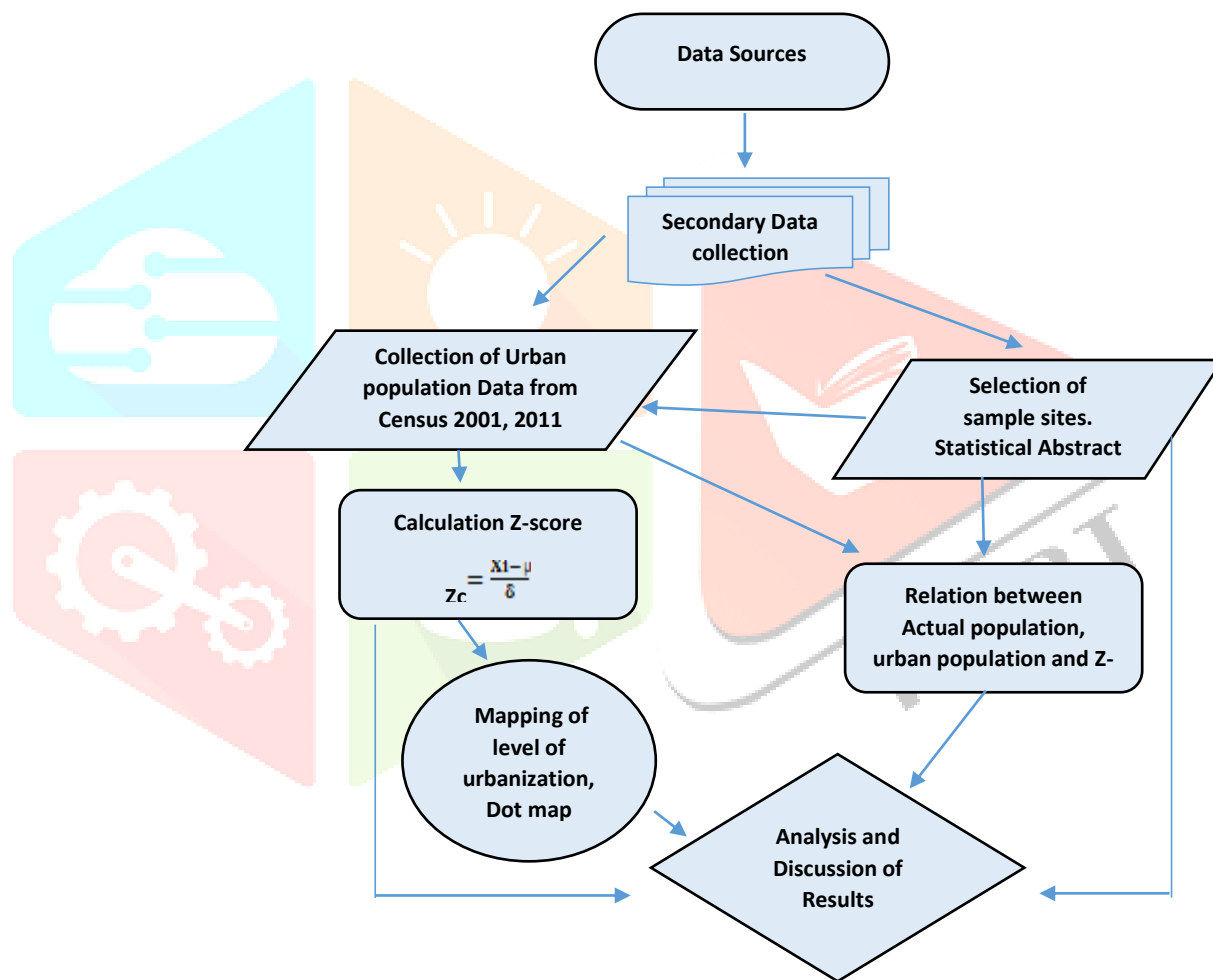


Fig. 2: methodological flow chart of the study
(Source: prepared by Authors)

RESULTS AND DISCUSSION

Urbanization Scenario in West Bengal (1911-2011)

In the nineteenth-century 1911 census, 13.054% of the total population was urban. However, the 2011 Census shows that this has increased to 31.18 percent, and West Bengal is now the fourth-most populous state in our country (Fig. 3). According to the data, West Bengal's urban population has grown from 23.5 lakh in 1911 to 2.91 crore in 2011. West Bengal had a total population of 91276115 people as of the 2011 census, with 46809027 men and 44467088 women (Table 1).

Table 1: Urban Population of West Bengal (1911-2011)

Census Year	Total Population	Urban Population	% Urban population
1911	17998769	2349608	13.054
1921	17474348	2517874	14.409
1931	18897036	2895867	15.324
1941	23229552	4740222	20.406
1951	26299980	6281642	23.885
1961	34926279	8540842	24.454
1971	44312011	10967033	24.750
1981	54580647	14446721	26.469
1991	68077965	18707601	27.480
2001	80176197	22427251	27.972
2011	91276115	29134060	31.918

Source: calculated from census of India (1901-2011)

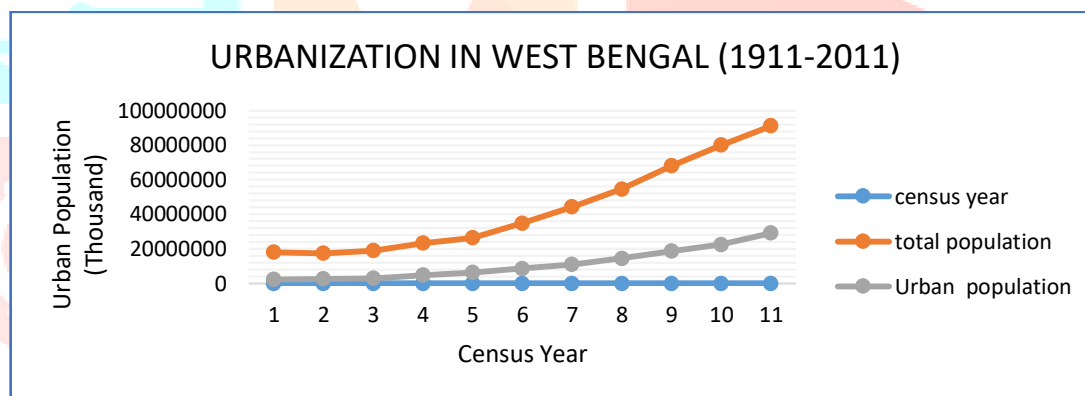


Fig 3: Urbanization Scenario in West Bengal (1911-2011)
(Source: prepared based on Authors calculation)

Pattern of urbanization in West Bengal, 2001

According to the 2001 census, the population of West Bengal is about 8,01,76,197. Out of this, about 22427251 people (27.97%) live in urban areas (Fig. 4). From this, it is possible to understand the urban situation in West Bengal. We primarily used the statistical Z-score in the paper to determine the progress of urbanization in 18 districts in 2001. Kolkata is the only district where 100% of the population lives in cities, indicating a high level of urbanization (Table. 2).

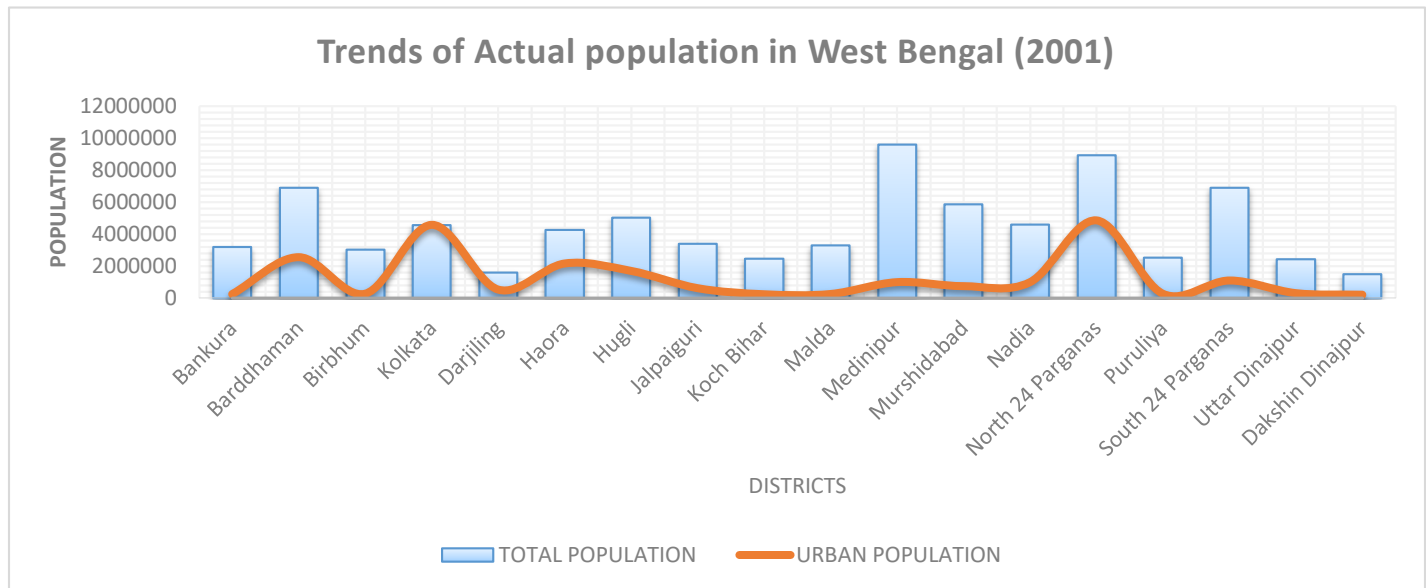


Fig 4: Trends of actual population in West Bengal, 2001
(Source: prepared based on Authors calculation)

Table 2: Total Population, Urban Population in West Bengal, 2001

Sl no	Districts	Total Population	Urban population	Z- Score
1.	Bankura	3192695	235248	-0.77
2.	Bardhaman	6895514	2547048	0.50
3.	Birbhum	3015422	258420	-0.72
4.	Kolkata	4572876	4572876	3.24
5.	Darjiling	1609172	520432	0.31
6.	Haora	4273099	2151990	1.09
7.	Hugli	5041976	1687749	0.36
8.	Jalpaiguri	3401173	606882	-0.32
9.	Koch Bihar	2479155	225618	-0.69
10.	Malda	3290468	240940	-0.77
11.	Medinipur	9610788	983905	-0.64
12.	Murshidabad	5866569	732734	-0.55
13.	Nadia	4604827	979519	-0.17
14.	North 24 Parganas	8934286	4850947	1.26
15.	Puruliya	2536516	255426	-0.65
16.	South 24 Parganas	6906689	1086220	-0.41
17.	Uttar Dinajpur	2441794	294443	-0.57
18.	Dakshin Dinajpur	1503178	196854	-0.52

Source: Statistical Abstract (2011-2012).

Trends of Urbanization, 2001

According to the 2001 census, the rate of urbanization has risen to approximately 0.492% in the ten years since 1991 (Table. 1). West Bengal has experienced rapid urbanization. The proportion of the population living in cities as a percentage of the total population. The 2001 demographic data is calculated by the Z-score (Fig. 5). Only Kolkata has a higher Z-score value than the other districts. The scores of Bardhaman, Darjiling, Haora, Hugli, and North 24 Parganas are greater than zero. They indicate negative values for less urbanization in the remaining districts.

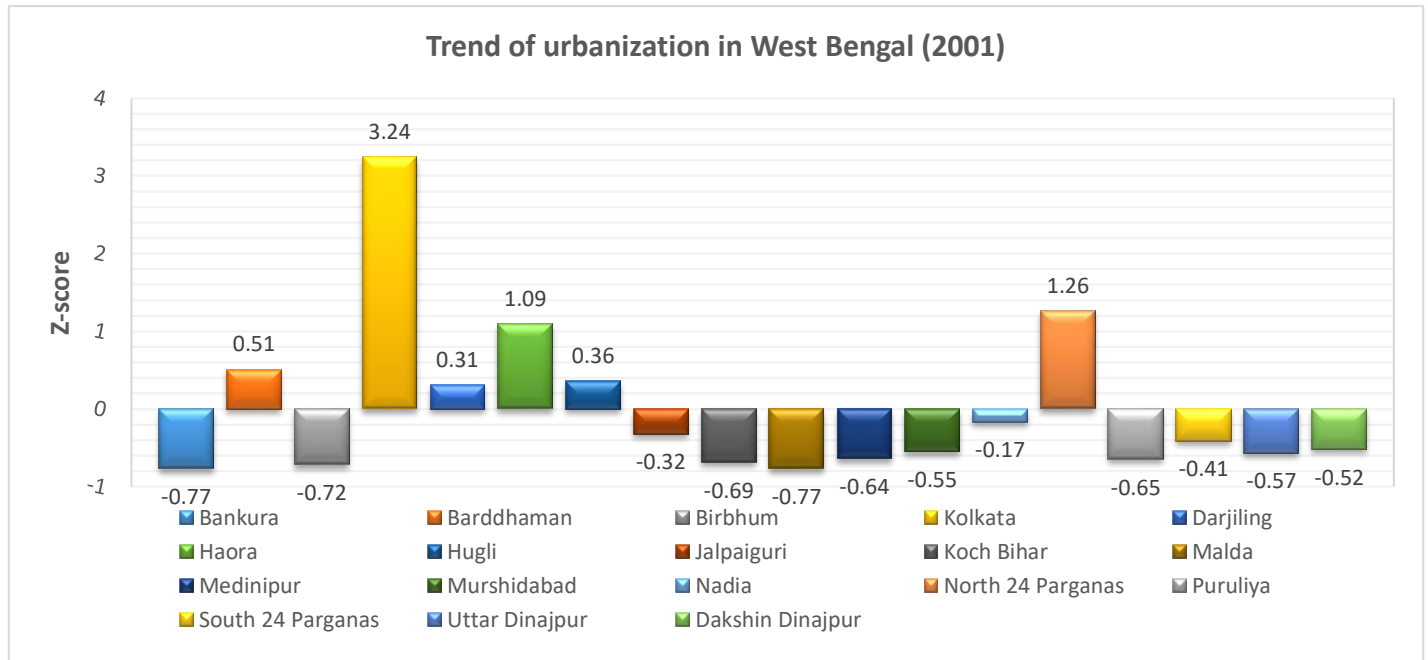


Fig 5: Trend of Urbanization in West Bengal, 2001
(Source: prepared based on Authors calculation)

Urbanization level among the districts of West Bengal, 2001

According to the population data, urbanization has been divided into three parts. High (Above +0.50), medium (-0.50 to +0.50) and low (Below -0.50) categories (Table. 3).

Table 3: level of Urbanization among the districts of West Bengal, 2001

Category	Z-score	No. of Districts	Name of the Districts
High	Above +0.50	03	Kolkata, North 24 Parganas, Haora.
Medium	-0.50 to +0.50	06	Nadia, Jalpaiguri, South 24 Parganas, Hugli, Darjiling, Bardhaman.
Low	Below -0.50	09	Malda, Uttar Dinajpur, Murshidabad, Bankura, Medinipur, Dakshin Dinajpur, Koch Bihar, Puruliya, Birbhum.

Computed by Author

Districts in the High category:

Districts with an urbanization score greater than +0.50 are classified as high. Only three districts had Z-scores above +0.50. Basically, a district where 50.36% to 100% of the population lives in urban areas is called "highly urbanized." Kolkata (100%), North 24 Parganas (54.30%) and Haora (50.36%) districts have high categories of urbanization (Fig. 6).

Districts in the Medium category:

Urbanization levels ranging from -0.50 to +0.50 are classified as medium. Six districts had Z-scores between -0.50 to +0.50. Basically, a district where 15.73% to 36.94% of the population lives in urban areas is called "mediumly urbanized." Nadia (21.27%), Jalpaiguri (17.82%), South 24 Parganas (15.73%), Hugli (33.47%), Darjiling (32.34%) and Bardhaman (36.94%) districts have medium urbanization.

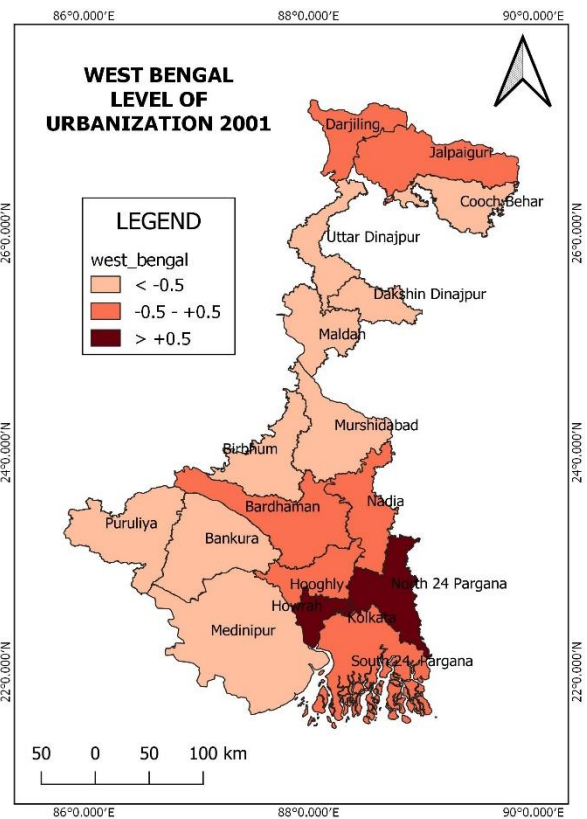


Fig 6: level of Urbanization, 2001
(Source: prepared based on Authors calculation)

Districts in the Low category:

Low urbanization is defined as a score less than -0.50. Nine districts had Z-scores below -0.50. Basically, a district where 7.32% to 13.09% of the population lives in urban areas is called "low urbanized." (Fig. 7). Malda (07.32%), Uttar Dinajpur (12.06%), Murshidabad (12.49%), Bankura (07.37%), Medinipur (10.24%), Dakshin Dinajpur (13.09%) Koch Bihar (09.10%), Puruliya (10.07%), and Birbhum (8.57%). Districts have low levels of urbanization.

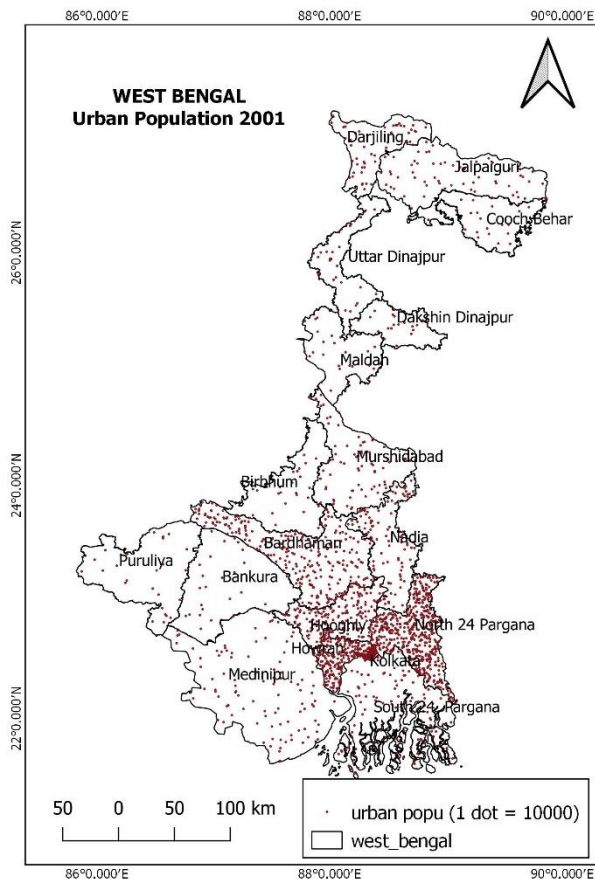


Fig 7: Urban Population, 2001
(Source: prepared based on Authors calculation)

Pattern of urbanization in West Bengal, 2011

In the 2011 census, the population of West Bengal was about 91276115. Out of this, about 29134060 people (31.918%) live in urban areas. (Fig. 8). This paper used the statistical Z-score in the paper to determine the progress of urbanization in 19 districts in 2011. Kolkata is the only district where 100% of the population lives in cities, indicating a high level of urbanization (Table. 4).

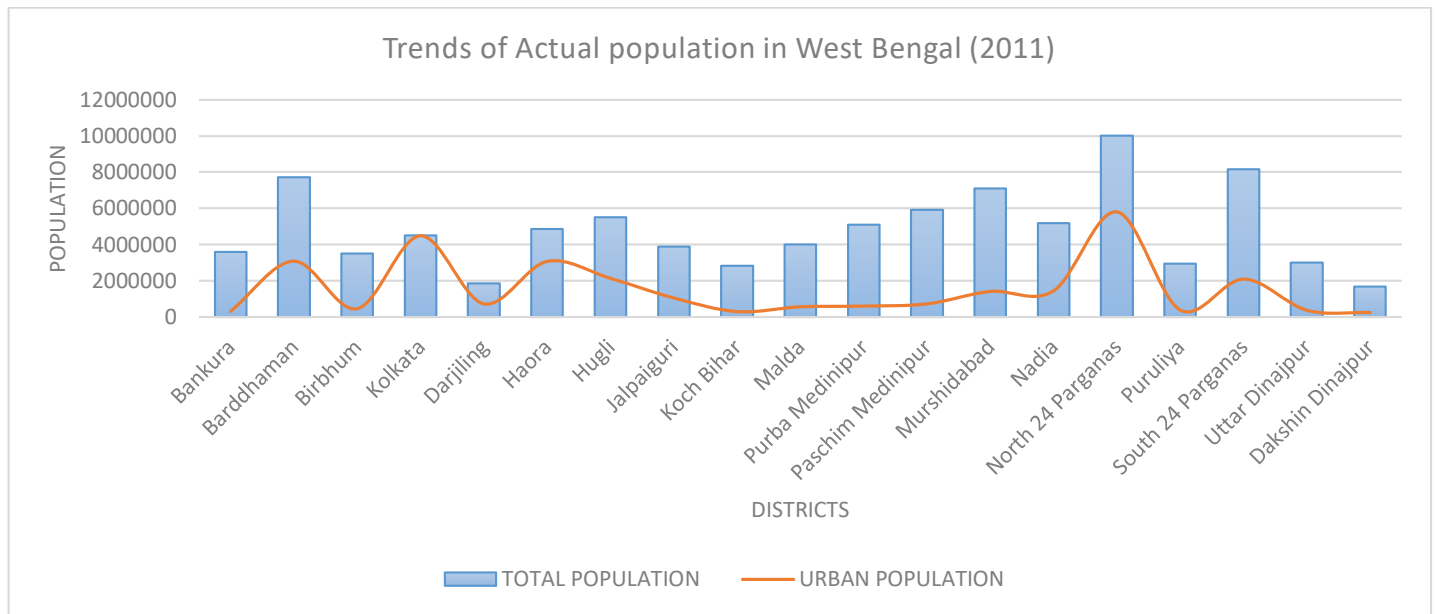


Fig 8: Trends of actual population, 2011
(Source: prepared based on Authors calculation)

Table 4: Total Population, Urban Population in West Bengal, 2011

Sl no	Districts	Total Population	Urban population	Z- Score
1.	Bankura	3596674	300679	-0.89
2.	Bardhaman	7717563	3079584	0.48
3.	Birbhum	3502404	448368	-0.69
4.	Kolkata	4496694	4486679	3.09
5.	Darjiling	1846823	718175	0.44
6.	Haora	4850029	3064668	1.5
7.	Hugli	5519145	2131994	0.43
8.	Jalpaiguri	3872846	1044674	-0.08
9.	Koch Bihar	2819086	289300	-0.8
10.	Malda	3988845	551914	-0.65
11.	Purba Medinipur	5095875	593468	-0.74
12.	Paschim Medinipur	5913457	714992	-0.73
13.	Murshidabad	7103807	1405206	-0.39
14.	Nadia	5167600	1437591	-0.04
15.	North 24 Parganas	10009781	5807128	1.25
16.	Puruliya	2930115	373381	-0.7
17.	South 24 Parganas	8161961	2087997	-0.14
18.	Uttar Dinajpur	3007134	362187	-0.72
19.	Dakshin Dinajpur	1676276	236075	-0.64

Source: Statistical Abstract (2011-2012)

Trends of Urbanization, 2011

In the 2011 census, the rate of urbanization had risen to approximately 3.946% in the ten years since 2001 (Table 1). The proportion of the population living in cities as a percentage of the total population is calculated by the Z-score (Fig. 9). Kolkata has a higher Z-score value than the other districts. The scores of Bardhaman, Darjiling, Haora, Hugli, and the North 24 Parganas are greater than zero. The remaining districts indicate negative values for less urbanization.

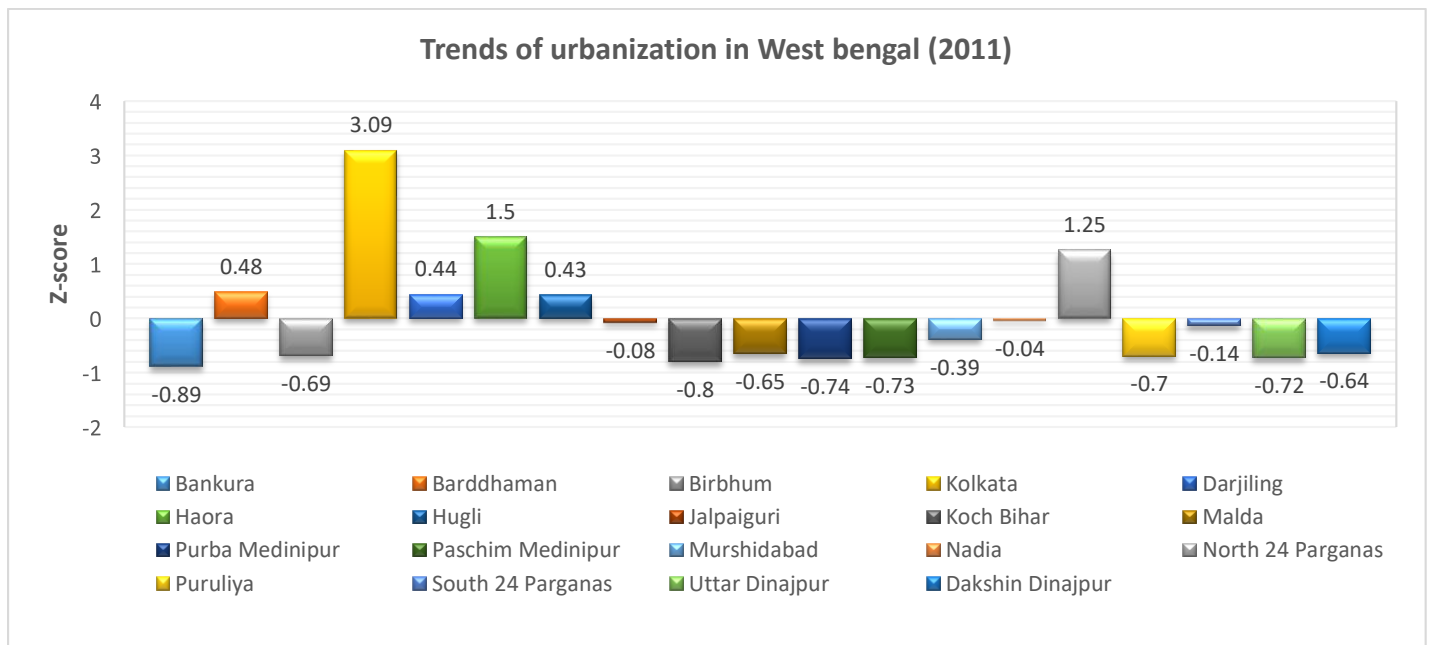


Fig 9: Trends of urbanization, 2011
(Source: prepared based on Authors calculation)

Urbanization level among the districts of West Bengal, 2011

In this paper urbanization has been divided into three parts. High (Above +0.50), medium (-0.50 to +0.50) and low (Below -0.50) categories (Table. 5).

Table 5: level of Urbanization among the districts of West Bengal, 2011

Category	Z-score	No. of Districts	Name of the Districts
High	Above +0.50	3	North 24 Parganas, Haora, Kolkata.
Medium	-0.50 To +0.50	7	Bardhaman, Darjiling, Hugli, Murshidabad, Nadia, South 24 Parganas, Jalpaiguri.
Low	Below -0.50	9	Bankura, Birbhum, Koch Bihar, Malda, Purba Medinipur, Paschim Medinipur, Puruliya, Uttar Dinajpur, Dakshin Dinajpur.

Computed by Author

Districts in the High category:

Districts with an urbanization score greater than +0.50 were classified as high category districts in 2011. Basically, a district where 57.59% to 100% of the population lives in urban areas is called "highly urbanized." North 24 Parganas (57.59%), Haora (63.30%), and Kolkata (100.00%) districts have high levels of urbanization (Fig. 10).

Districts in the medium category:

The Z-score levels ranging from -0.50 to +0.50 are classified as medium. Seven districts had Z-scores between -0.50 to +0.50. Basically, a district where 19.78% to 39.87 % of the population lives in urban areas is called "mediumly urbanized." Bardhaman (39.87%), Darjiling (38.99%), Hugli (38.62%), Murshidabad (19.78%), Nadia (27.81%), South 24 Parganas (25.61%), Jalpaiguri (27.00%).districts have medium urbanization.

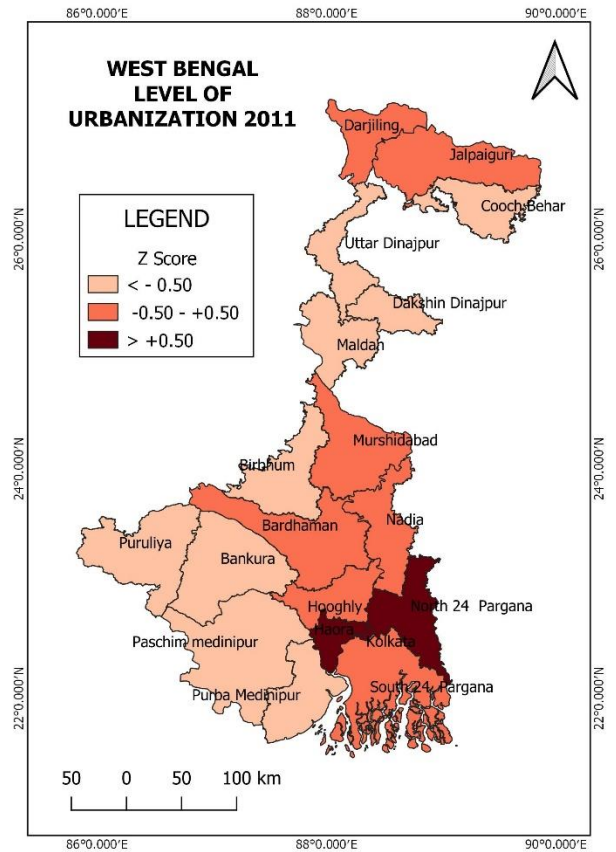


Fig 10: Level of urbanization, 2011)
(Source: prepared based on Authors calculation)

Districts in the Low category:

Low urbanization is defined as a score less than -0.50. Nine districts had Z-scores below -0.50. In this decade, a district where 8.36% to 14.13% of the population lives in urban areas is called "low urbanized." (Fig. 11). Bankura (8.36%), Birbhum (12.80%), Koch Bihar (10.25%), Malda (13.80%), Purba Medinipur (11.65%), Paschim Medinipur (12.03%), Puruliya (12.75%), Uttar Dinajpur (12.07%), and Dakshin Dinajpur (14.13%). Districts have low levels of urbanization.

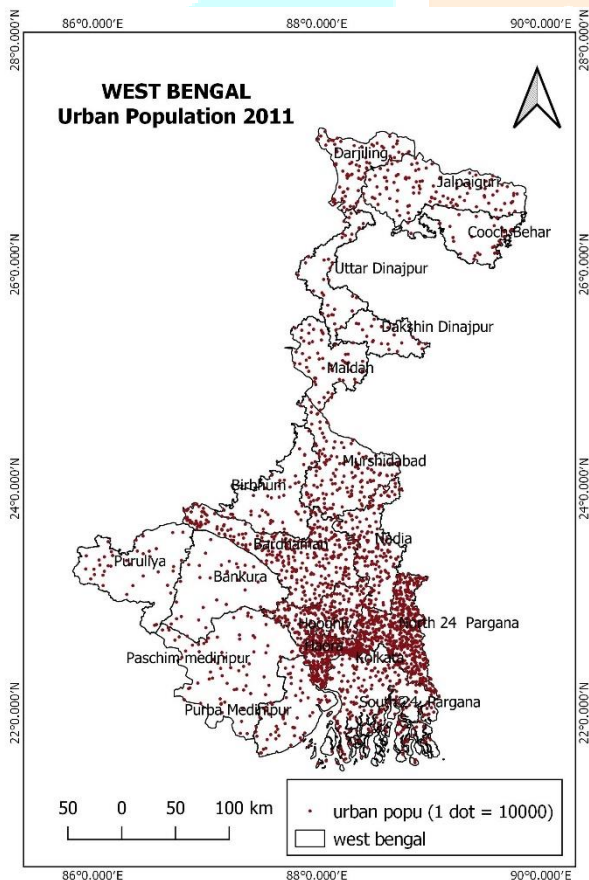


Fig 11: Urban population 2011)
(Source: prepared based on Authors calculation)

CONCLUSION

The study focused on a comparative analysis of urbanization in West Bengal during the last two census years. Because of basic amenities such as a high HDI, a high per capita income, a high standard of living, etc., people are attracted to increasing their urban population in west Bengal. West Bengal has more immigrants than it does migrants. The urban population increased by 3.94% between the 2001 and 2011 censuses. For my study, the statistical Z-score has been calculated, and it separates into three categories: high (+0.50), medium (-0.50 to +0.50), and low (-0.50). Kolkata is the only district in West Bengal, and their level of urbanization was very high in 2001 and 2011. Murshidabad was promoted from the low to the medium category in the 2011 census. The districts of North 24 Parganas, Haora, and Kolkata are highly urbanized. Bardhaman, Darjiling, Hugli, Murshidabad, Nadia, South 24 Parganas, and Jalpaiguri districts have medium urbanization. Bankura, Birbhum, Koch Bihar, Malda, Purba Medinipur, Paschim Medinipur, Puruliya, Uttar Dinajpur, and Dakshin Dinajpur districts had low levels of urbanization in 2011 census. In this analysis, it is clear that the urbanization rate of West Bengal is gradually increasing in relation to an Indian perspective.

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