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Regional Urbanisation, Rise and Significance of Census Towns, and the Challenges: A Geographical Study of Eastern Uttar Pradesh, India

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Abstract

Urbanisation is an irreversible process and large cities grow at an unprecedented rate. Contemporary urbanisation is driven by increasing number of non-statutory urban centres, i.e. Census Towns in India. The eastern part of the state of Uttar Pradesh is a least urbanised region, but it has a significant number of Census Towns which contribute to *quasi* urbanisation. This paper aims to study trends and patterns in urbanisation and analyse district-level variation in Eastern Uttar Pradesh. Based on the secondary sources of data largely retrieved from the Census of India and various reports, this study unfolds that the distribution of Census Towns is highly uneven and many of them are located in the vast rural environments of highly urbanised districts and raise concerns of governance and urban management.

Keywords

Census Town, Eastern Region, Urban Growth, Urban Population, Urbanisation.

Introduction

Urbanisation is a process which causes gradual concentration of people in an urban unit (Davis, 1965). People increase in numbers and in due course of time size of urban areas expands. It takes time for human settlement patterns to change from being dispersed to being concentrated in the form of built-up regions (Datta, 2006). Urban population worldwide has grown fast since the second part of the twentieth century. It has nearly doubled since then, because urban population has overtaken rural population for the first time in human history, the twenty-first century is known as the Urban Century

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(Mohan and Dasgupta, 2004). As of now, 52 per cent of urban people live in urban areas in the developing countries and will increase to 57 per cent in 2030 and to 66 per cent in 2050. The trends suggest that future urban growth will occur primarily in developing nations in Africa and Asia (World Cities Report, 2022). Living in urban centres enables people to have an access to livelihood opportunities and possibilities. In this process “rural flight” is a significant contributing element (Lok Sabha Secretariat, India, 2013). India’s 377 million people live in 7935 urban centres. The urban percentage of Indian population has increased from 17.3 per cent in 1951 to 31.16 per cent in 2011. The Census of India stated that the total population of India grew five times whereas the urban population increased gradually by 17 times.

Basically, the Census of India is entrusted to define and enumerate number of settlements in the country. There are two types of urban centres: a) the Statutory Towns, and b) the Census Towns. The latter is based on set criterion of population and occupation. The Census Towns and their numbers have increased over the period of time and they are being governed under rural local bodies which have a limited capacity to provide urban facilities such as sanitation, water supply and street lighting (Samanta, 2014). The pattern of urbanisation at the state level shows wide spatial variations. In fact, the economically developed states have higher levels of urbanisation. Majority of central, eastern, and north-eastern regions of India have lower levels of urbanisation. In contrast, all southern states as well as those in northern and western India, including Punjab, Haryana, Gujarat, and Maharashtra, have higher levels of urbanisation than the national average. Level of urbanisation in Uttar Pradesh (22.30 per cent) is below the national average (31.16 per cent) (Bhagat, 2018).

As per Census 2011, 16.5 per cent of total population of India lives in state of Uttar Pradesh. It is also the fourth largest state covering 6.88 per cent of the country’s total geographical area. According to Planning Department of Uttar Pradesh, the state is divided in four economic regions. Eastern Uttar Pradesh is one of the four regions. This region lies between 23°51’N to 28°30’N latitudes and 81°31’E to 84°39’E longitudes and covers an area of 85298.79 km² that covers 29.10 per cent of Uttar Pradesh as shown in Figure 1. Presently, eastern region comprises 28 districts and 8 divisions. The division applied here is as demarcated by the State Planning Division. This study is to analyse demographic aspects of urbanisation in Uttar Pradesh, with special reference to eastern region, one of the economic regions of Uttar Pradesh. The major objectives are: (a) To analyse the growth pattern of urbanisation and growth in districts of Eastern Uttar Pradesh: (b) To assess and share the significance of Statutory Towns and Census Towns in districts of Eastern Uttar Pradesh: and (c) To explore the role of locational and economic factors in the emerging demographic scenario of Census Towns in eastern Uttar Pradesh. Though the study is based on Census Data and latest being available up to year 2011, the estimations are also made to comprehend the future of urban demographic scenario and the changing character of urban growth in the state of Uttar Pradesh particularly its eastern region.

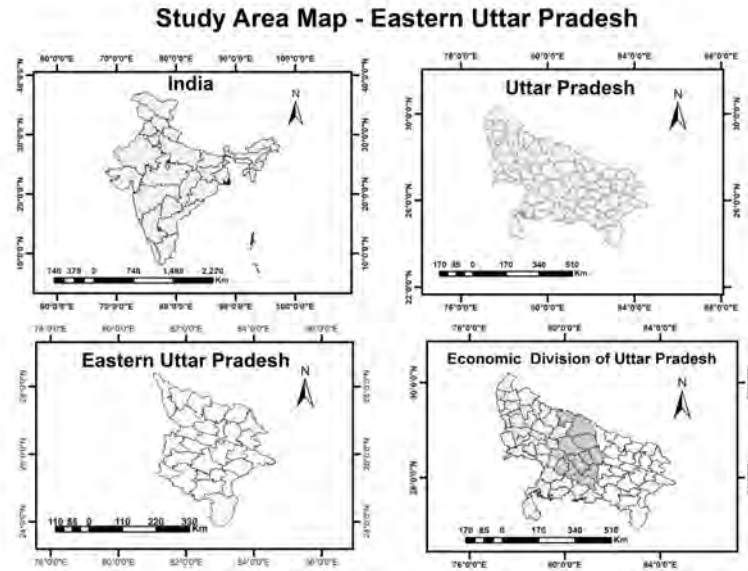


Figure 1: Locational Setting of Eastern Uttar Pradesh.

Source: State Planning Board, Uttar Pradesh.

Background to the Study

In the process of urbanisation, a larger concentration occurs around the major urban centres. In due process of time, large cities grow further and, however, its effects are also seen in the rising small urban centres in the region around. This leads to occurrence of regional urbanisation. Soja has observed that regional urbanisation processes are marked by a rising convergence of (core) city and suburban spaces (Soja, 2011). On the one hand, the population density of the formerly densely occupied historic city centres is decreasing, while the formerly less densely populated suburbs' population density is increasing. In other words, density gradients in metropolis are leveling out. Suburbia is getting more urbanised as mono-centric modern metropolises transform into poly-centrist regional cities. Simultaneously, the periphery is becoming increasingly urbanised, accompanied by a growth in economic, social, and cultural diversity. In developing cities/regions, the periphery is manifested by the natural and economic conversion of large rural settings into the urban character and they are termed as *Census Towns*. They contribute to *quasi urbanisation* around and away from the large urban centres or cities.

Mitra and Kumar (2015) elaborated that Census Towns are located in the neighbourhoods of large cities and found that urbanisation is a major factor for intensive growth in economic opportunities. Their study shows that there is a simple positive correlation between the number of Statutory Towns and the number of Census Towns (0.43 and 0.44 respectively) and states with a higher number of Statutory Towns saw

a great increase in the Census Towns over 2001-2011 (0.45), states with more Census Towns in 2001 also saw a greater growth in Census Towns between 2001 and 2011, the correlation is strong (0.89).

Pradhan (2012) in a study brought to the focus that one-third of the people in these Census Towns live close to Class I urban centres. If the boundary of city jurisdiction gets increased in the future, they may get to be governed by formal urban system. From a functional view point, Pradhan's study highlighted that these Census Towns are related to city centres but they are governed under rural *panchayati* system. This kind of contradictions in urban management and planning fall in the purview of governance. There is a clear disparity in basic services and amenities between Statutory Towns and Census Towns as clearly studied by Ghosh and Khatun (2022). This is more because of differential governance with regard to Census Towns (non-statutory) and Statutory Towns. The overall urbanisation of a state does dominate and gets influenced by its regional pattern since urban population is highly uneven and confined to metro cities located at key routes, resource areas, cultural and historic location and strategic significance. Gavsker's study highlighted that "the level of urbanisation in the State is quite low (22.28 per cent) as compared to the all-India figure. There are marked regional imbalances in the level of urbanisation in the state. Eastern region of Uttar Pradesh is least urbanized" (Gavasker, 2020).

Singh has argued that "the urban landscape of India is characterised by the presence of metropolitan apex with few large cities and large number of small and mini towns and North East Bihar is not an exception. There is no metropolitan city in the entire region" (Singh, 2017). This signals that much of urbanisation in such regions is driven by the small and medium urban settlements which are linked in many ways to large cities located in upward urban hierarchy. Spread of urban fabric into rural-urban fringe areas is accompanied by "planetary urbanisation as a process"- blurring relationship between two distinct spatial entities rural and urban and it has been "internalised". In this context, a study by Jain and Korzhenevych showed that "in this process, the socio-economic and socio-ecological linkages and infrastructural networks that lie well beyond traditional city cores in the rural areas, have become integral parts of urban areas," (Jain and Korzhenevych, 2020). Thus the Census Towns emerge as *nodes* in between rural settings and urban agglomerations.

Data Sources and Methodology

This paper is based on secondary data sources including Primary Census abstract, Village and Town Directory, District Census Handbooks of Eastern Uttar Pradesh Region (1951-2011), Uttar Pradesh Statistical Abstract (2009), and Uttar Pradesh Statistical Diary (2018, 2021). Data is used as classified by the Census of India which has the six size-classes: Class 1 (above 100,000 population), Class 2 (50,000 to 99,999 population), Class 3 (20,000 to 49,999 population), Class 4 (10,000- 19,999 population), Class 5 (5,000 and 9,999 populations), and Class 6 (less than 5,000 population). For Cartographic representation of data, Arc GIS 10.8 has been used. For measurement and calculation of data, the following descriptive techniques are applied as shown in Box 1.

BOX 1

To project the population for 2021 and 2031, geometric projection method using the formula

$$P_{2021} = P_{2011} (1+K/100)^n, P_{2031} = P_{2011} (1+K/100)^n$$

Where, P_{2021} is the projected population for 2021, P_{2031} is the projected population for 2031, and P_{2011} is population for 2011, n is the number of decades since last census and $\sqrt[4]{K1 \times K2 \times K3 \times K4}$ and $K1, K2, K3$ and $K4$ are population growth rate for 1981, 1991, 2001 and 2011 respectively.

$$> \text{District level of urbanisation} = \frac{\text{Total Urban Population of each district for each census}}{\text{Total Population of the each district for each census}} \times 100$$

$$> \text{Compound Annual Growth Rate for each district} = \left(\frac{P_{\text{Final}}}{P_{\text{Begin}}} \right)^{1/n} - 1$$

Where P_{final} is population for latest year and P_{begin} is the population of pervious census and n is the number of year.

$$> \text{District level Degree of Urbanisation} = \frac{\text{Total Urban Population of each district for each census}}{\text{Total Rural Population of each district for each census}} \times 100$$

$$> \text{Tempo of Urbanisation} = 1/n [1 + n (\text{PU}_{t+n} / \text{PU}_t)] \times 100,$$

where $1/n$ = natural log, PU_{t+n} and PU_t = per cent urban in $t+n^{\text{th}}$ census and t^{th} census respectively, n = census interval=10

$$> \text{Pearson's Correlation Coefficient} = \frac{\sum xy}{\sqrt{\sum x^2 \times \sum y^2}}$$

Where x and y are deviation from respectively independent variable X and Y .

Source: Author's Own.

Results

The current study systematically delves into the evolving dynamics of urbanisation in Uttar Pradesh, the most populous state in India. The census data from 2001-2011 reveals a mere 1.5 per cent increase in urban population, while the number of towns surged by approximately 30 per cent, notably in the case of Census Towns, which witnessed a staggering 404.57 per cent rise from 66 to 267.

Rising Urbanisation in Eastern Uttar Pradesh

In the region, Census of India 1981 reported only 10.67 per cent of the urban population lived in eastern Uttar Pradesh, which was lower than the state average. Districts of eastern Uttar Pradesh can be grouped into five categories on the basis of urbanisation in 1981, 1991, 2001, 2011, and projected for 2021 and 2031 (see Figure 2). Three classes were shown. As the Figures indicate, Varanasi district recorded the highest level of urbanisation in the region during the census period (1981-2011). Faizabad, Gorakhpur, Mau, Sant Ravidas Nagar, Mirzapur and Sonbhadra districts were grouped in 10-20 per cent class in the census period 1981 but, in 1991, Bahraich had joined the above 10-20 per cent class. Surprisingly, in 2001 census, Bahraich recorded the level of urbanisation below 10 per cent, so this district had excluded from 10-20 per cent class group and Chandauli joined the 10-20 per cent level of urbanisation class group in 2001

census. In 2011 census Ambedkar Nagar and Deoria joined the 10-20 per cent class of per cent of urban population. Allahabad district was the only district in 20-30 per cent of urban population class in census period (1981-2001) but, in 2011, Mau district joined this 20-30 per cent class distinct. By estimating the population for the districts of eastern Uttar Pradesh, studies revealed that Varanasi would be recorded as the highest urbanised district of the region during 2021 to 2031 period. By 2031, Gorakhpur and Mau district will enter 20-30 per cent and above 30 per cent of urban population class respectively. During 1981-2031, Shravasti has had low level of urbanisation.



Figure 2: Level of Urbanisation of Eastern Uttar Pradesh For the Period of 1981-2031.

Source: Census of India Data, 1981, 1991, 2001 and 2011. Based on past data, projections made for the years 2021 and 2031.

Growth Rate of Urban Population in Eastern Uttar Pradesh

Figure 3 shows that Maharajganj (87.7 per cent) recorded the highest decadal growth rate of the urban population followed by Sultanpur, Sant Ravidas Nagar, Gorakhpur, Mau, Sonbhadra, Kushinagar and others during the period from 1981 to 1991. During 1991-2001, the highest decadal growth rate of urban population was recorded in

Sonbhadra (91.2 per cent) followed by Chanduali, Kaushambi, Siddharthnagar and others. In the period 2001-2011, Siddharthnagar (106.54 per cent) showed a dramatic increase in decadal growth rate. This was followed by Ambedkar Nagar, Amethi, Chanduali and Mau. For the projected period of 2011-21, a higher decadal growth rate in urban population occurred in Siddharthnagar, Mau, Ambedkar Nagar, Maharajganj, and Sant Ravidas Nagar. Ballia with 12.65 per cent shows the lowest growth rate during 2001-2011 periods and is projected to have 19.05 per cent 2011 to 2021. For projected population for 2021 and 2031, study used the geometric population method. Basti district recorded a decrease in census period 1991-2001 and 2001-2011 and Siddharthnagar district recorded a dramatic increase 1991-2001 and specially in 2001-2011 census period. Devipatan division recorded a low growth rate of urban population. In Gorakhpur division, Gorakhpur recorded a low growth rate of urban population. In Ayodhya division, Sultanpur recorded a low decadal growth rate of urban population in census period 2001-2011 as shown in Figure 3.

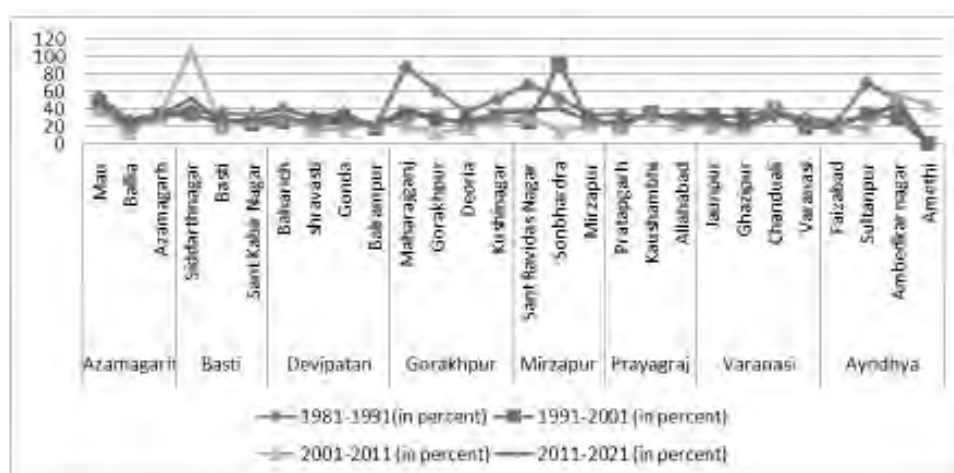


Figure 3: Divisional Pattern of Decadal Growth Rate of Eastern Uttar Pradesh (1981-2021).

Source: Census of India Data, 1981, 1991, 2001 and 2011.

*Based on past data, projections made for the years 2021 and 2031.

Compound Annual Growth Rate of Urban Population

The annual compound growth rate is the mean annual growth rate of the urban population over a specified period longer than one year. As shown in Figure 4, Bahraich, Shravasti, Gonda, Sultanpur, Allahabad, Basti, Jaunpur, Sant Ravidas Nagar, Maharajganj, Gorakhpur, Mau, Deoria, Kushinagar, Ballia, districts had shown a decrease in the Compound Annual Growth Rate (CAGR) in the period of 1991 to 2011. These districts depict an increase in projected period of 2021–2031. In Varanasi division, only Chanduali had shown a continuous increase in the CAGR in the period of 1991-2031. This indicates that urbanisation process is accelerated in the districts.

Faizabad, Pratapgarh, Kaushambi, Sonbhadra, Mirzapur, and Ghazipur districts have not shown any encouraging trend in their CAGR. In the 1991 census, Maharajganj in Gorakhpur division had the highest CAGR, while Ghazipur in Varanasi division recorded the lowest. Moving to the 2001 census, Sonbhadra in Mirzapur division had the highest CAGR, while Sultanpur in Ayodhya division had the lowest. In the 2011 census, Siddharthnagar in Basti division showed the highest CAGR, and Ballia in Azamgarh division exhibited the lowest. Looking ahead to the projected period of 2021-2031, Siddharthnagar is anticipated to have the highest CAGR, while Ballia is expected to have the lowest.

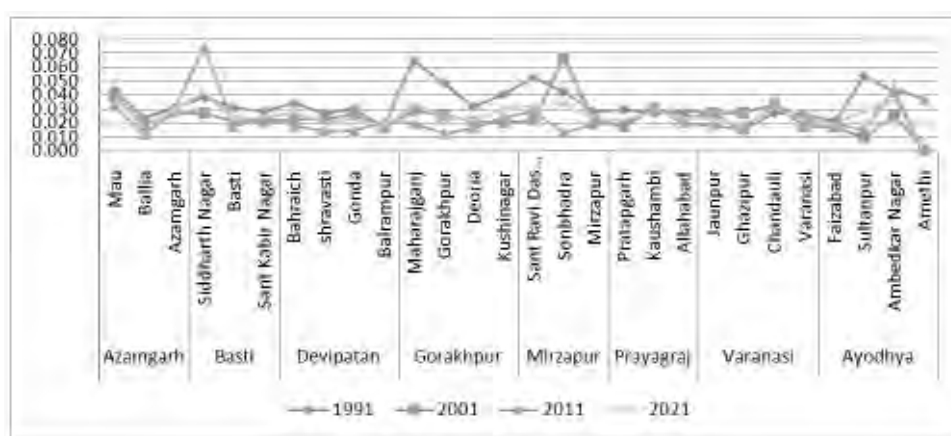


Figure 4: Compound Annual Growth Rate (1991-2031).

Source: Using Census of India Data, 1981, 1991, 2001 and 2011.

*Based on past data, projections made for the years 2021 and 2031.

Degree of Urbanisation

Urban-Rural ratio $[(U/R)*100]$ is used here to measure the degree of urbanisation (where U-urban population, R-rural population). The urban-rural ratio has a lower limit of zero and an upper limit of α , i.e. $0 < U/R < \alpha$. Theoretically, upper limit will be infinite when there is no rural population ($R=0$). Figure 5 shows that only Varanasi and Ghazipur have shown a decrease in their degree of urbanisation during the Census period 1981 to 1991. Although, Varanasi district is the highest urbanised district of the eastern Uttar Pradesh, this indicates the urbanisation process of Varanasi district is continuously going down. Bahraich, Shrivasti, Mirzapur, Balrampur, Faizabad, Pratapgarh, Allahabad, Sant Ravidas Nagar, Deoria, Varanasi, and Ballia have shown a decrease in their degree of urbanisation during the Census period 1991 to 2001. Bahraich, Gonda, Sultanpur, Sonbhadra, Maharajganj, Gorakhpur, Kushinagar, Balrampur, Ballia, and Ghazipur have shown a decrease in their degree of urbanisation during the period from 2001 to 2011.

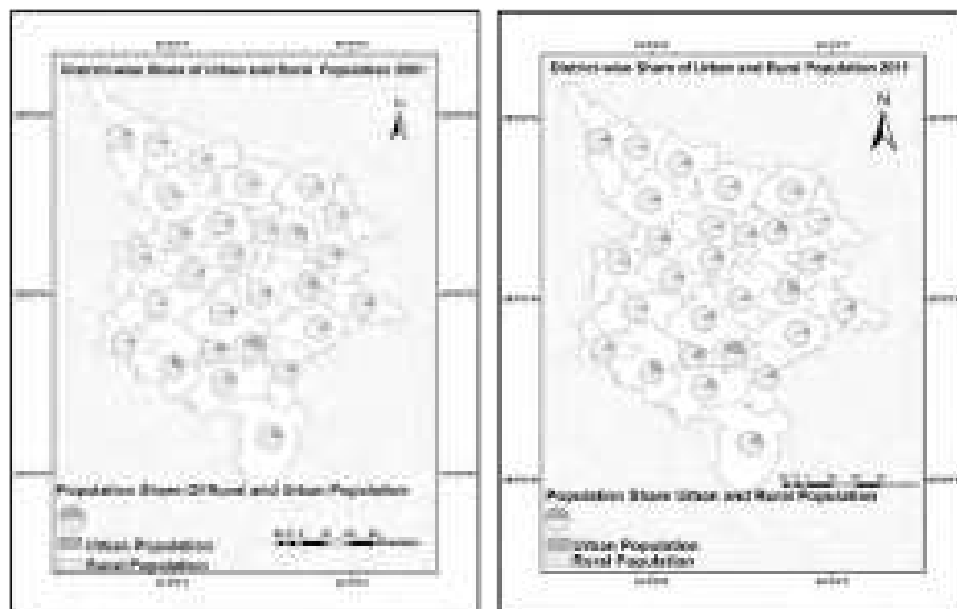


Figure 5: District-Wise Share of Urban and Rural Population in Eastern Uttar Pradesh (2001 & 2011).

Source: Using District Census Handbooks, Census of India Data 2001 and 2011.

Most of the districts of the region except Balrampur and Mirzapur, have shown an increase in their degree of urbanisation during the Census period 2011 to 2021 and 2021 to 2031. Varanasi district consistently recorded the highest urban-rural ratio from 1981 to 2011 and is expected to maintain this position during the projected period from 2021 to 2031. See Figure 6.

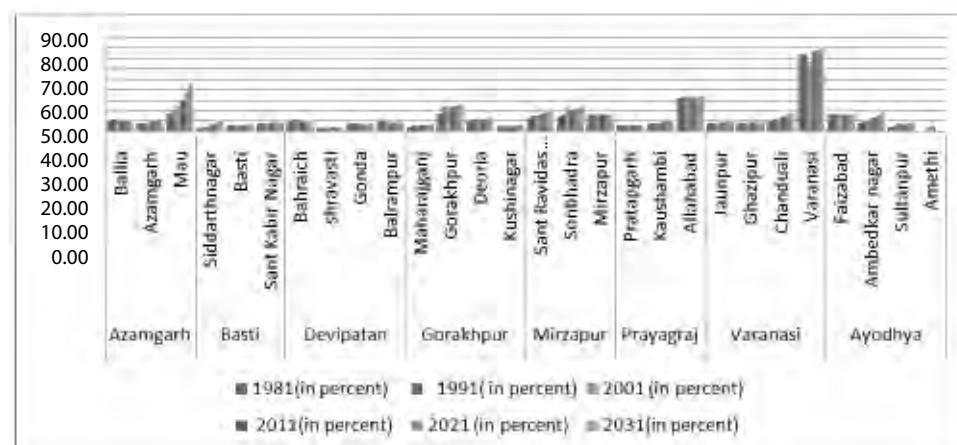


Figure 6: Degree of Urbanisation (1981-2031).

Source: Using Census of India Data, 1981, 1991, 2001 and 2011.

*Based on the past data, projections made for the years 2021 and 2031.

Tempo of Urbanisation

The tempo of urbanisation is a term which is used to describe the rate of urbanisation. It is defined as the change over time in the intensity or level of urbanisation. As shown in Figure 7, all the districts of Eastern Uttar Pradesh except Sant Kabir Nagar, Basti, Allahabad, Sonbhadra, Kaushambi, and Jaunpur have shown a decrease in their tempo of urbanisation during the period 1981-1991 and 1991-2001. However during the period of 2001-2011, studies found that Shravasti, Faizabad, Varanasi, Mirzapur, Ghazipur, Pratapgarh, Mau, Deoria, Kushinagar, Kaushambi, Siddharthnagar, Ambedkar Nagar, Azamgarh, Sant Ravidasnagar, Chandauli districts have shown an increase in the tempo of urbanisation. Under the projected population, a handful of districts have witnessed acceleration in the tempo of urbanisation in the region. Maharajganj district has recorded the highest tempo of urbanisation from 1981 to 1991, while Ghazipur district exhibited the lowest tempo in the region. During the period 1991-2001, Allahabad and Kushinagar districts recorded the highest and lowest tempo of urbanisation, respectively. In subsequent periods (2001-2011, 2011-2021, and 2021-2031), Allahabad, Shravasti, and Ghazipur districts registered the slowest tempo of urbanisation, while Siddharthnagar consistently has recorded the highest.

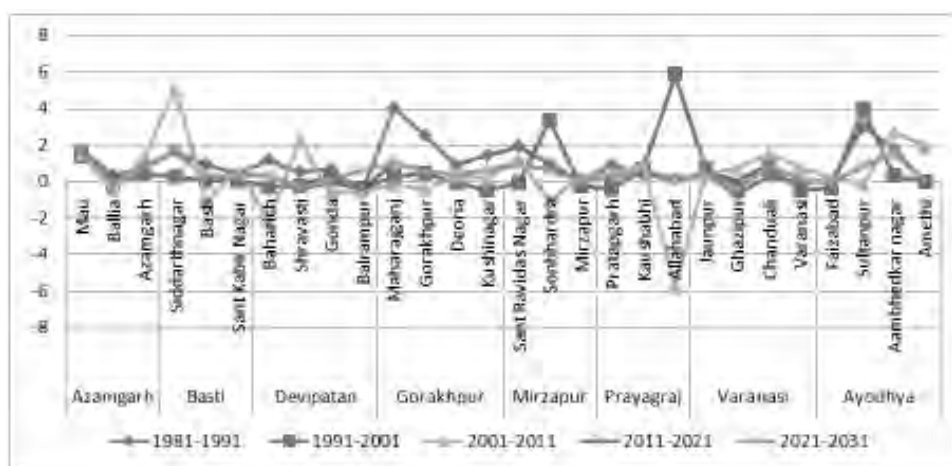


Figure 7: Tempo of Urbanisation of Districts of Eastern Uttar Pradesh (1981-2031).

Source: Using Census of India Data, 1981, 1991, 2001 and 2011.

*Based on past data, projections made for the years 2021 and 2031.

Growth of Census Towns in Eastern Uttar Pradesh

According to Census 2011, Uttar Pradesh has recorded 267 Census Towns which was a higher number than the previous census having 66 Census Towns. It indicates a 304.50 per cent increase in the number of Census Towns in Uttar Pradesh. Eastern Uttar Pradesh had recorded 29 Census Towns in the 2001 Census. It increased to 127 Census Towns by the year 2011. The number of Census Towns in districts is shown by the

Figure 8. This is registered as a whopping growth of 337.93 per cent increase. Some of the districts did not report Census Towns in the region during 2001-2011. In the Census 2001, Varanasi, Sonbhadra recorded six Census Towns each, which were the highest in the region. Gonda, Sultanpur, Sant Kabir Nagar, Jaunpur, Gorakhpur, and Chandauli have recorded one Census Towns each. In census 2011, Varanasi district recorded the highest number of Census Towns (i.e.34) in the region. Bahraich, Maharajganj districts have lowest number of Census Town in each district. The increment of Census Towns in Varanasi is very high at 466.66 per cent. Sonbhadra District has recorded only 8 Census Towns, but their share is 34.83 per cent of the urban population of district, highest in the region.

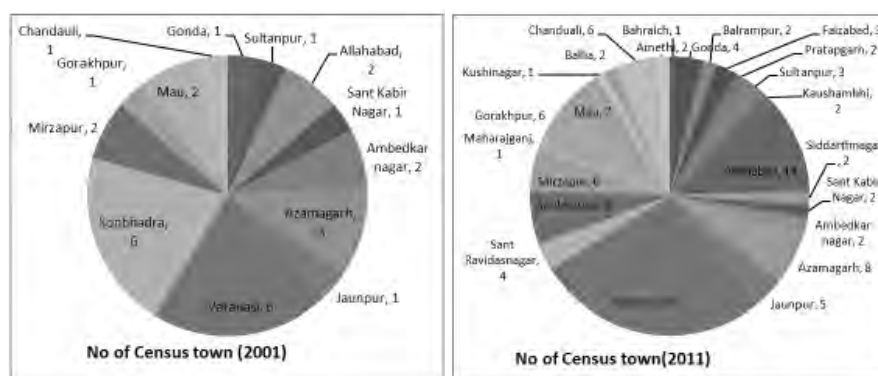


Figure 8: District-wise Distribution of Number of Census Towns in Eastern Uttar Pradesh, during the years 2001 & 2011.

Source: Data Used from Districts Census Handbooks, Census of India, 2001 & 2011.

Class Composition of Census Towns

In Eastern Uttar Pradesh, large share of urban population is of Class I and Class III towns and cities. Table 1 shows that more than 80 per cent of Census Towns of region fall within the Class IV and Class V categories. Therefore, the bulk of Census Towns house population between 5000 and 20000 people.

Table 1: Size-Class Composition of Census Towns in Eastern Uttar Pradesh (2011 Census)

Class of Census Towns	Number of Census Towns	per cent
III	7	5.51
IV	26	21.25
V	80	62.99
VI	13	10.23
Total	127	100

Source: Districts Census Handbooks, 2011, and Census of India 2011.

Discussion

Dynamics of Urban Agglomerations in the Eastern Uttar Pradesh

Table 2 depicts the urban agglomerations and urban centres having population more than one lakh. During 1991-2011, Varanasi was the largest city of the region. In 1991, only 14 urban agglomerations recorded the population of more than one lakh. While in 2001 census, this number had increased to 15. In 2011, in addition 17 urban agglomerations had crossed one lakh population. Azamgarh and Akbarpur cities joined the class in 2011. The trio — Varanasi, Allahabad and Gorakhpur hold together highest share of region's urban population. In 1991 census, Mirzapur-cum-Vindhyachal have occupied fourth position. In 1991, 16.83 per cent of urban population was concentrated in only Varanasi city, but it was reduced to 14.03 per cent in 2001 and 12.24 per cent in 2011. In 1991, 13.79 per cent of urban population of region was resided in Allahabad city, but it was reduced to 12.94 per cent in 2001 and 11.93 per cent in 2011. This indicates that there is a gradual decrease with time in terms of share of urban agglomerations. It shows early signs of fragmentation of urban population in the region from big cities to small and medium towns.

Table 2: Ranked Listing of Urban Agglomerations/Cities

Sl. No	1991			2001			2011		
	Cities	Population	Share to Region's Total Urban Population	Cities	Population	Share to Region's Total Urban Population	Cities	Population	Share to Region's Total Urban Population
1	Varanasi	1030868	16.83	Varanasi	1103952	14.03	Varanasi	1198491	12.24
2	Allahabad	844546	13.79	Allahabad	1018092	12.94	Allahabad	1168385	11.93
3	Gorakhpur	505566	8.25	Gorakhpur	622701	7.91	Gorakhpur	673446	6.88
4	Mirzapur-cum-vindhyacahal	169336	2.76	Maunath Bajan	212657	2.70	Mau	278745	2.85
5	Maunath Bhajan	136697	2.23	Mirzapur	205053	2.61	Mirzapur	234871	2.40
6	Jaunpur	136062	2.22	Bahraich	168323	2.14	Bahraich	186223	1.90
7	Bahraich	135400	2.21	Jaunpur	160055	2.03	Jaunpur	180362	1.84
8	Gonda	95553	1.56	Faizabad	144705	1.84	Ayodhya	165228	1.69
9	Basti	87371	1.43	Gonda	120301	1.53	Deoria	129479	1.32
10	Ballia	84063	1.37	Maugal-sarai	116308	1.48	Ghazipur	121020	1.24

Sl. No	1991			2001			2011		
	Cities	Population	Share to Region's Total Urban Population	Cities	Population	Share to Region's Total Urban Population	Cities	Population	Share to Region's Total Urban Population
11	Chanduali	82748	1.35	Basti	107601	1.37	Basti	114657	1.17
12	Deoria	82168	1.34	Deoria	104227	1.32	Gonda	114046	1.16
13	Ghazipur	76547	1.25	Ghazipur	103298	1.31	Akbarpur	111447	1.14
14	Sultanpur	76533	1.25	Ballia	101465	1.29	Azamgarh	110983	1.13
15	-	-	-	Sultanpur	100065	1.27	Mugal-sarai	109650	1.12
16	-	-	-	-	-	-	Su-ltanpur	107640	1.10
17	-	-	-	-	-	-	Ballia	104424	1.07

Source: Census of India, 2011 and Uttar Pradesh Statistical Diary, 2009.

Nature of Urban Primacy in the Eastern Uttar Pradesh

In general, the urban primacy refers to at least twice as large and more than twice as valuable as the next largest city. In India, urban primacy can be defined on a national or territorial scale. As shown in Table 3, Bhinga (NP) of the district has 60 per cent urban population of the district. Varanasi, Allahabad, Gorakhpur, which are highly urbanised districts of the region, above 75 per cent of urban population of the districts is concentrated in district headquarters. In Allahabad, Gorakhpur and Varanasi districts, the ratio between the population of the largest and second largest town of the district is respectively above 40 per cent, 20 per cent and 24 per cent. The level of urbanisation in Basti district is below six per cent, but concentration of urban population in district headquarters is above 83 per cent, which indicates how urbanisation is concentrated in the district headquarters. In Bahraich, Jaunpur, Mau, Mirzapur districts, there is more than 50 per cent of urban population concentration in the district. For the projected population in Mau district for 2021 and 2031, level of urbanisation in Mau district would increase. Concentration of urban population in Maunath Bajan (NPP), which is district headquarters of Mau district, is more than 55 per cent. In most of the districts, except Chanduali, Kaushambi, Siddharthnagar and Sonbhadra district of the Eastern Uttar Pradesh, major urban concentration is in the district headquarters.

Table 3: Urban Primacy at district level in Eastern Uttar Pradesh, 2011

District	Primate city	Percentage share of population of the largest urban centre in the total urban population of the district	Ratio between the population of the largest and the second largest towns\ cities of the districts
Allahabad	Allahabad (M Corp. + OG),	79.326	41.30
Ambedkar Nagar	Akbarpur (NPP)	39.69	1.16
Azamgarh	Azamgarh (NPP)	28.21	1.57
Bahraich	Bahraich (NPP)	65.56	3.85
Ballia	Ballia (NPP)	34.33	3.28
Balrampur	Balrampur (NPP + OG)	49.57	2.56
Basti	Basti (NPP)	83.02	8.02
Chandauli	Mughalsarai (NPP)	45.20	4.76
Deoria	Deoria (NPP)	40.87	3.55
Faizabad	Faizabad (NPP)	48.56	2.95
Ghazipur	Ghazipur (NPP + OG)	44.10	3.15
Gonda	Gonda (NPP)	50.68	3.87
Gorakhpur	Gorakhpur (M Corp.)	80.54	20.47
Jaunpur	Jaunpur (NPP)	52.04	6.79
Kaushambi	Sarai Aquil (NP)	15.69	1.13
Kushinagar	Padrauna (NPP)	29.57	2.11
Maharajganj	Maharajganj (NPP)	25.18	1.00
Mau	Maunath Bhanjan (NPP)	55.83	6.67
Mirzapur	Mirzapur-cumVindhy- achal (NPP)	67.57	6.31
Pratapgarh	Bela Pratapgarh (NPP)	43.44	2.80
Sant Kabir Nagar	Khalilabad (NPP)	37.22	1.71
Sant Ravidas Nagar (Bhadohi)	Bhadohi (NPP)	41.26	3.64
Shrawasti	Bhinga (NP)	61.52	1.59
Siddharth-nagar	Bansi (NPP)	25.55	1.33
Sonbhadra -	Obra (NP)	14.81	1.26
Sultanpur	Sultanpur (NPP)	73.27	7.68
Varanasi	Varanasi (M Corp.)	75.04	24.39

Source: Census of India, 2011 and Uttar Pradesh Statistical Diary, 2021.

The Pearson's Correlation Coefficient between urban population (X_1) and number of Census Towns (Y_1) at district level in Eastern Uttar Pradesh for census 2011 shows a very strong positive relation (0.860225). It indicates that as urban population has increased, the number of Census Towns has also increased in the region.

The Pearson's correlation between number of Statutory Towns in the district (X_2) and number of Census Towns (Y_2) in the district of eastern Uttar Pradesh for census 2011 shows very low level of positive relation, i.e., 0.09 between these X_2 and Y_2 variables. This indicates that as the number of Statutory Towns increased, the number of Census Towns is slightly increased in the district of eastern Uttar Pradesh. Many districts in eastern Uttar Pradesh have not reported Census Towns but have few Statutory Towns. It indicates that it is not necessary that Census Towns develop in those districts where a significant number of Statutory Towns are present. A significant number of Census Towns develop near the major highways, rivers and big Statutory Towns as shown in Figure 9 and Figure 10.

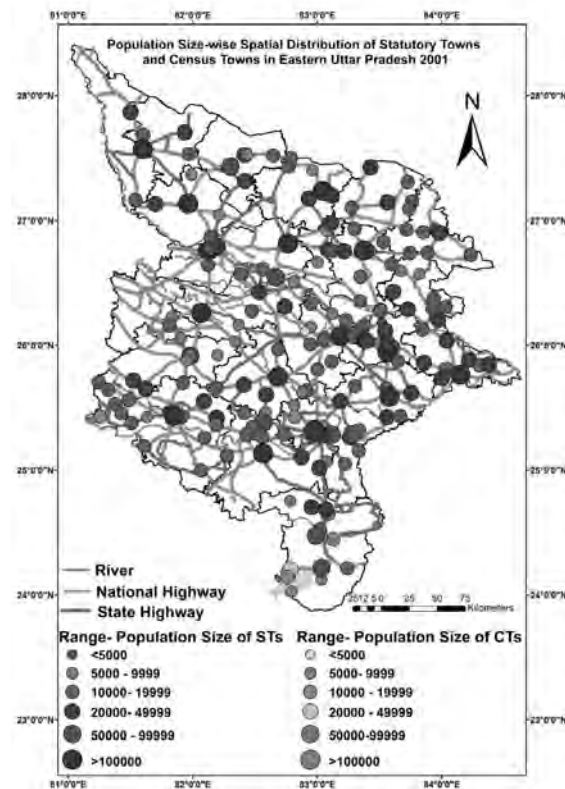


Figure 9: Population Size-Wise Spatial Distribution of Statutory Towns and Census Towns in Eastern Uttar Pradesh 2001.

Source: Prepared Using Data from District Census Handbooks, 2001 and Census of India 2001 and Uttar Pradesh Statistical Diary, 2018.

Both these Figures show population size-wise spatial distribution of both towns—Statutory and Census Towns. This map shows majority of towns are situated either periphery of Class I and Class II or near national and state highways indicating the result of population agglomerations around the Class I and Class II. These figures also indicate that major towns of Sonbhadra district, which is located in the southern part of the region, are situated near state highways and Rihind Dam. A good number of Statutory Towns are outspreaded in the upper part of region which is located at the foothills of Shivalik Himalaya.

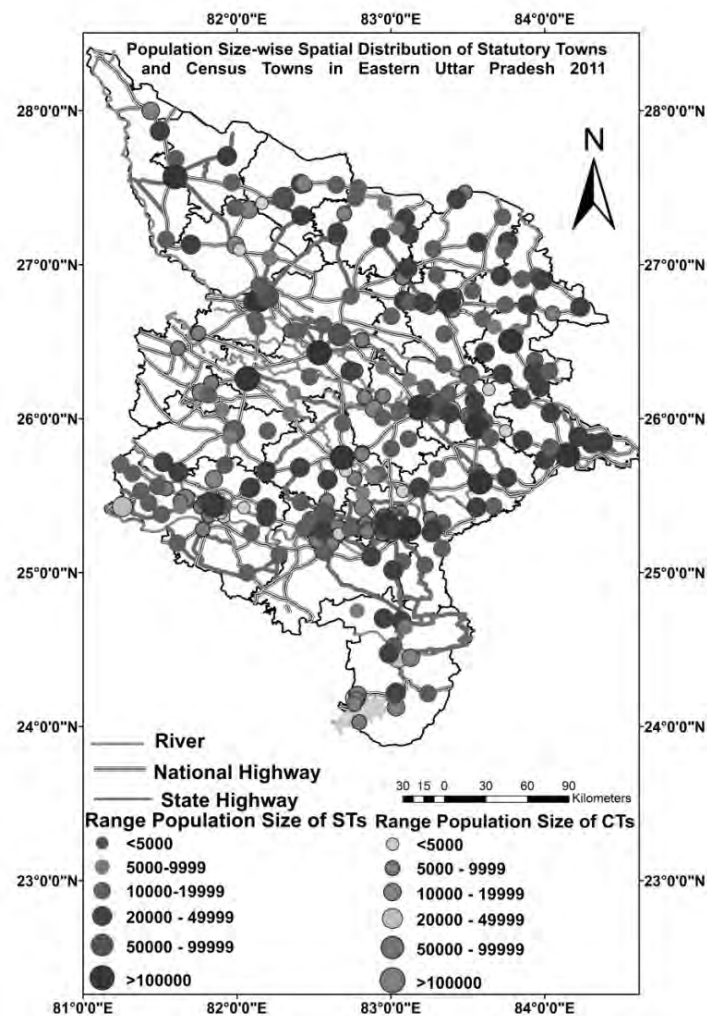


Figure 10: Population Size-Wise Spatial Distribution of Statutory and Census Towns in Eastern Uttar Pradesh, 2011.

Source: District Census Handbooks, 2011 and Census of India 2011 and Uttar Pradesh Statistical Diary, 2018.

A very few Census Towns are reported in the upper parts of the region. Figure 10 shows that number of towns, majority of Census Towns has increased in the existing trio. Specially, in Varanasi district, a good number of Census Towns are developed in the periphery of the Varanasi city. This shows that increase in the number of Census Towns is the result of population agglomeration around the Varanasi Urban Area.

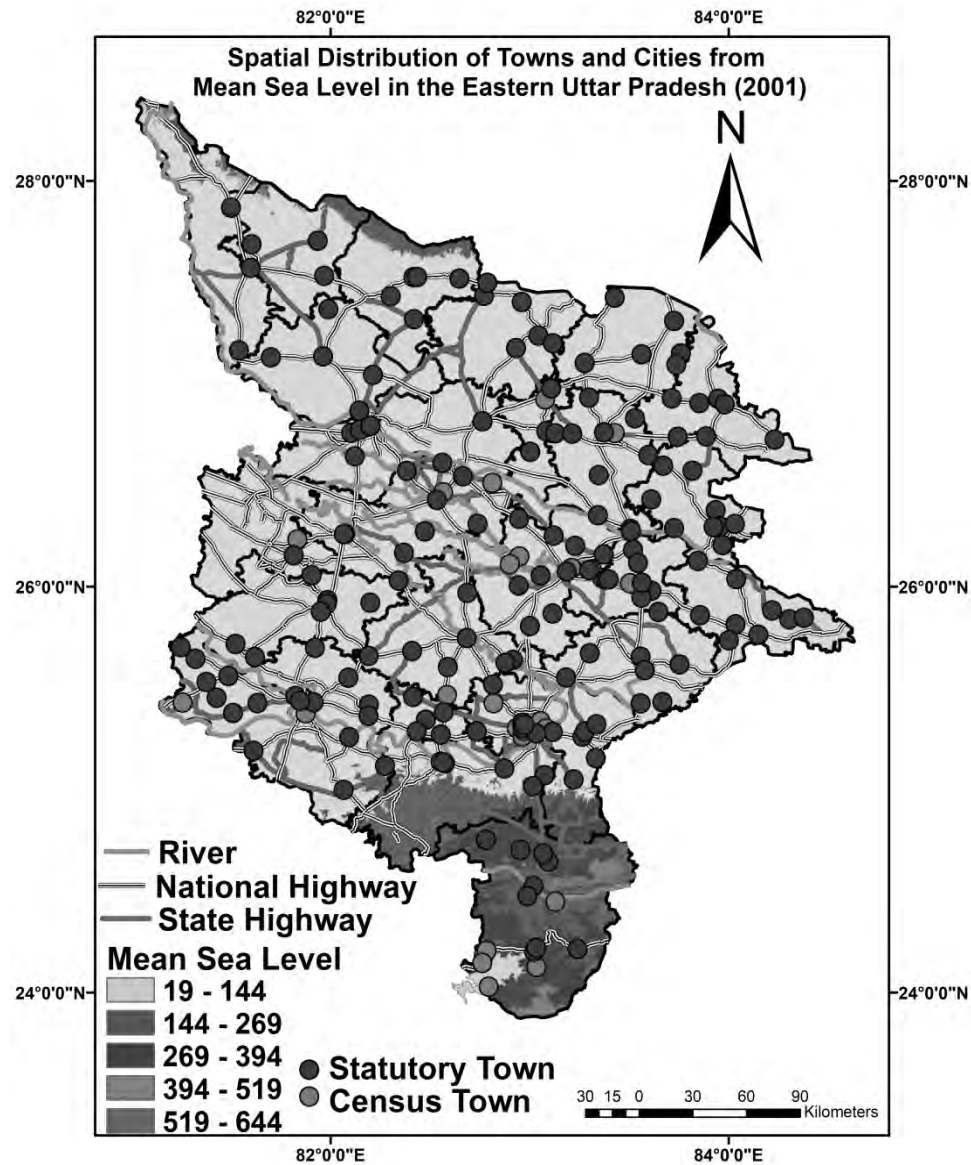


Figure 11: Spatial Distribution of Towns and Cities from Mean Sea Level in the Eastern Uttar Pradesh, 2001.

Source: Census of India 2001, USGS, SRTM Data and Uttar Pradesh Statistical Diary, 2018.

A large portion of the region is located at 19-144 meter above the mean sea level. A large number of towns are also located in this part of the region. Figure 11 & 12 show that elevation of place also determines location of the towns. In the southern part of the region where mean sea level is higher to middle part of the region, indicates that towns are outspreaded in this part of the region. In the southern part number of state highways and national highways is comparably low due to the plateau region.

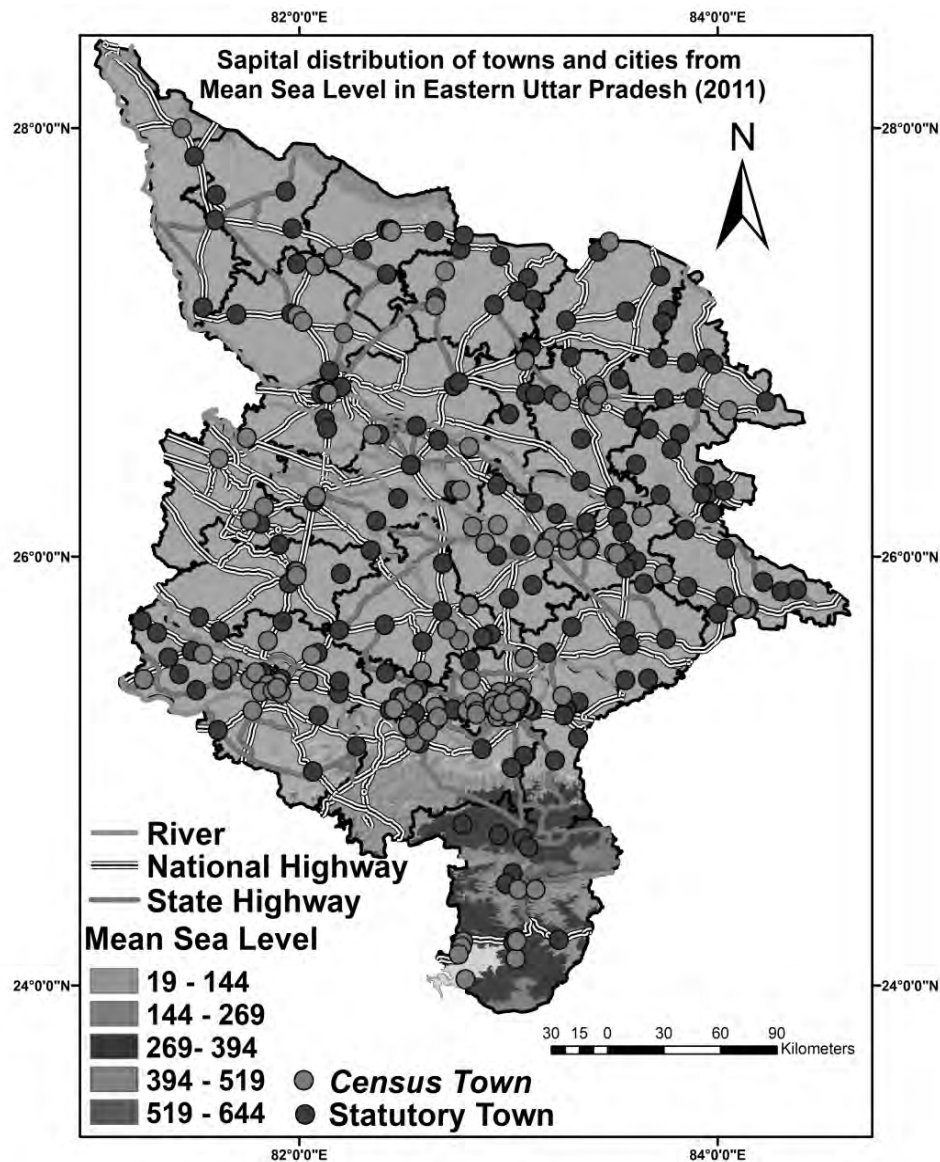


Figure 12: Spatial Distribution of Towns and Cities from Mean Sea Level in the Eastern Uttar Pradesh, 2011.

Source: Census of India 2011, USGS SRTM Data and Uttar Pradesh Statistical Diary, 2018.

Governance Concerns: Management and Planning

Along with Statutory Towns, the increasing number of Census Towns has drawn the attention to the governance issues. The past studies have noted that Census Towns must wait nearly for three decades to become statutory entities. In comparison to panchayats, Statutory Status has a better administrative structure and a resource base. The Statutory Towns have a sound revenue base which is a prerequisite for infrastructure development. However, the small Statutory Towns also struggle with many issues such as lack of adequate funds, resources, urban planning, public services and inadequate infrastructure. At the governance level, rural areas are governed through the system of three-tier Panchayati Raj under the 11th Schedule of the Indian Constitution (73rd Constitutional Amendment Act). The rural panchayats which govern Census Towns lack such an economic base. In the Eastern Uttar Pradesh, only a few big cities like Varanasi, Mirzapur, Azamgarh, Prayagraj and Gorakhpur cities, dominate the urban scenario. Equally important is the phenomena of Census Towns which can be associated to the rural urbanisation— an increasing number of small towns in the rural landscape of the region. They seem to be independent, and serve the rural needs and requirements. In fact, many of them are confined to large city region, but a good number of them are also located in backward locations away from the large cities. This indicates their historical journey of growth and development which is being reshaped in the context of changing circumstances of interconnectivity and information flows across the large urban spaces and the small and medium towns. For spatial planning, and controlling unplanned growth and expansion, the small and medium towns be monitored under a sound governing framework and mechanisms.

Conclusion

Huge chunk of urban population is confined to large urban agglomerations in the region. The study identifies a trio of districts—Allahabad, Gorakhpur, and Varanasi—where urban dominance and primacy is manifested. Fragmented urbanisation is associated with rising Census Towns. Thus, Census Towns and various new towns on urban peripheries witness a deviation from metro cities like Allahabad, Varanasi, and Gorakhpur. Economic vitality of the region is primarily steered by a large number of urban centres. Census Towns act as fragmented economic hubs in rural countryside in the Eastern region. The study finds a strong positive correlation between level of urban population and the number of Census Towns in the district. This highlights that more of Census Towns rise wherein urban population increases. A lower positive correlation is observed between the number of Statutory Towns and Census Towns, indicating that the latter's growth is not solely dependent on Statutory Towns.

Population projections for 2021 and 2031 indicate a continuous increase in urban population across all Eastern Uttar Pradesh districts, suggesting a rise in Census Towns throughout the region. Census Towns, predominantly falling into Class V categories,

are clustered in specific districts along national highways, state highways, rivers, and other strategic locations. This concentration presents an opportunity for effective integrated rural planning and the alleviation of population pressure from major urban centres. Study underscores the significance of strategic development in Census Towns for achieving optimal urbanisation outcomes. The study emphasizes the importance of thoughtful planning in Census Towns and asserts that, if strategically executed, they possess more potential than Statutory Towns in addressing urban challenges.

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Metamorphosis of Urban Governance in Delhi: Historical Insights from the Lens of the Municipal Corporation of Delhi

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“Cities are people’s future, places where tomorrow’s civilisations are built.”

—Erik Orsenna

Abstract

Delhi, being a national capital and a complex city with a multiplicity of different agencies of governance, providing civic amenities to 20 million people, has a lot of responsibilities and challenges. Similar to other metropolitan cities, Delhi has experienced rapid expansion, diverse land use patterns, and a significant shortage of civic amenities, making it the most densely populated and administratively complex city among India’s metros, all while being historically rich and uniquely distinct. In 1901, Delhi’s population was just 400,000, but it steadily rose to 9.42 million by 1991, surpassed 13 million by 2000, and is now estimated at 33,807,403 in 2024, indicating a significant and ongoing increase over the last hundred years. Delhi’s governing structure is complex, with overlapping sub-national jurisdictions and over 100 para-statal organisations offering services. It has undergone significant changes since Independence. This paper explores the development of urban administration and governance in Delhi, specifically looking at the formation of elected bodies within the National Capital Territory and the Municipal Corporation. It aims to understand the structure of the Delhi Municipal Corporation (DMC) and track its evolution over time.

Keywords

Administration, Delhi urban structure, Municipal Corporation, Governance.

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Introduction

Being the hub of India's Central government, Delhi has a rich past of being administered by bureaucratic authorities. Nevertheless, a process of democratic decentralisation, initiated by means of two Constitutional Amendments — the 73rd and 74th Amendment Acts of 1992 — commenced during the 1990s. Given that it has an Assembly and a Chief Minister, Delhi appears to be just another state to the outsiders, in India. The 69th Amendment gave an elected administration a few limited powers in 1991, but in practice, it is still a Union Territory (UT). Land, police, and public order remained under the control of all succeeding Central governments, with the L-G acting as the conduit for this authority. Delhi, located in the National Capital Territory (NCT), serves as both India's administrative and financial capital. With 23 million inhabitants in 2011, it surpassed all other urban agglomerations (Shrinivasan & Chhappia, 2011). Post- Independence, and even now, Delhi's government system has seen major changes. This implies that the outlook and governance system in Delhi has undergone a number of significant radical changes.

Study Objectives

- To examine the evolution of urban administration and governance in Delhi, including subsequent adaptations.
- Examine and understand the Municipal Corporation of Delhi (MCD)'s (with relation to governance) organisational structure.

Research Methodology

This study has a descriptive and analytical approach. Additionally, the information has been taken from secondary sources such as online databases and published research.

Historical Perspectives of Governance of Delhi

Delhi holds the unique reputation of being the 'most governed' metro city organisation that controls its governance, leading to overlapping of powers and works. The governance of Delhi involves the participation of various entities including the Municipal Corporation of Delhi (MCD), New Delhi Municipal Council (NDMC), the State Assembly of Delhi, and the Central Government—all have a role in its governance. Delhi's governing structure has seen notable changes. The Mughals introduced a system of municipal administration the '*Mohalla*', the actual municipal governance began in 1862 when the Delhi Municipal Committee came into existence. Its operational activities commenced in April 1863, encompassing tasks related to sanitation, public health, birth and death records, law enforcement via the police, fire services, and provision of primary education. The composition of the committee included a total of 21 members who were nominated for their positions. Among these members, six were government officials, and the remaining members were individuals

who did not hold official positions. This diverse group consisted of three Europeans, six Hindus, and six Muslims, representing different backgrounds and perspectives within the committee. (Marina Pinto, 2000).

The first elections based on the adult franchise were held in 1885. The committee now consisted of four government officials, five nominated and twelve elected members representing the twelve wards. In 1912, when the Province of Delhi was created, the Committee was reconstituted and now comprised three ex-officio members, eleven elected and eleven nominated members. In 1922, the number of members got increased to thirty-six, of whom twenty-four were elected, six appointed and six were government officials. composition of the committee changed from time-to-time and so did the balance of European, Hindu and Muslim Members. But by 1915, the committee did not attract people active in the national and State level politics and it mainly involved local politicians. Dissatisfaction with the performance and functioning of the committee grew steadily and reached a climax level in the late 1930s. There was an insistent clamour for a corporation or a responsible provincial legislature, but the municipal reorganisation did not happen. By 1958, the number of elected members increased from 56 to 69. Different civic entities were established at various points in time to oversee the local requirements of Delhi. These encompassed the District Board for Rural Areas in 1883, the Notified Area Committee in Mehrauli in 1901, the Notified Area Committee in Najafgarh in 1910, the Notified Area Committee in Civil Lines in 1913, the Municipal Committee in Shahdara in 1916, (Roy, 2012) the Notified Area Committee in Narela in 1919, the Notified Area Committee in Red Fort Area in 1924, the New Delhi Municipal Committee in 1925, the South Delhi Municipal Committee in 1954, and the West Delhi Municipal Committee in 1955 (Pushkarna, 2022). In order to ensure essential amenities like water, electricity, and transportation, the Government of India established three important organisations. These organisations were— the Delhi Joint Water and Sewage Board, responsible for managing water and sewage systems; the Delhi State Electricity Board, responsible for electricity distribution; and the Delhi Transport Authority, responsible for transportation services. These statutory bodies were established in the years 1926, 1951, and 1952 respectively, and they operated under the control of the Government to cater to the basic needs of the people in Delhi (Civic Guide, MCD, 2007).

In December 1953, the State Reorganization Commission proposed that Delhi, being the capital of India, should remain directly governed by the central authority. Consequently, Delhi was designated as a Union Territory and its administration was entrusted to the President of India. A Chief Commissioner was appointed under Article 239 to oversee the governance of Delhi until the Delhi Administration Act of 1966 was enacted. The Act provided for a Metropolitan Council and an Executive Council, which along with the Administration had certain specific functions. The Metropolitan Council had fifty-six elected members and could have a maximum of five non-official members nominated by the Central government (Pathak, 2023). Its term was prescribed for five

years and could be extended, one year at a time, for a maximum of three years. The Administrator appointed by the President had powers to summon, prorogue and even dissolve the Council. The Metropolitan Council had no legislative powers but could discuss and make recommendations in legislative and budget proposals, development programmes and schemes and any other matter referred to it.

The Delhi Administration Act created a governing body called the Executive Council, which consisted of four members. One member held the position of Chief Executive Councillor, while the other three served as Executive Councillors. This Council played a key role in the administration of Delhi, making important decisions and overseeing various aspects of governance. The advice of the Executive Council was not binding on the Administrator; it could at best, only assist and advise. The Executive Council and its members were not responsible to the Metropolitan Council, collectively or otherwise. Each Councillor was assigned a group of departments, subject to certain rules made by the President. Certain subjects were excluded from the purview of both the Metropolitan Council and the Executive Council. These were the 'reserved' subjects on which the Administrator had complete discretion. The reserved subjects included law and order, services, land, police and buildings and these could not be discussed in the Executive Council (Marina Pinto, 2000).

In federal countries, the governance of capital cities can be classified into three main models. The first model establishes the capital as a federal district, where it operates under federal control to different extents. Examples of this model include Abuja, Brasilia, Canberra, and Washington, D.C. The second model involves city-states, such as Berlin, Brussels, and Buenos Aires. In this arrangement, the local government not only governs the city but also takes on state-level responsibilities. The third model is the city-within-a-state model, in which the capital city operates as a standard municipality within the broader state structure. It reports to the state government for administrative purposes, operating as an integral part of the state. These different models reflect the various approaches to governing capital cities in federal systems, each with its own degree of local autonomy and interaction with federal or state authorities (Forum of Federations, 2022).

In the last two models, there existed federal territories within the state or city limits that fall under federal jurisdiction; however, the Central government did not engage in governing the broader urban region. Delhi can be appropriately compared to other federal districts as a UT as it has characteristics in common with Abuja, Canberra, Brasilia, and Washington, DC.

Delhi Municipal Corporation: An Investigative Analysis

For over a hundred years, Delhi has held the distinguished honour of being India's capital, growing in importance and recognition on the global stage. Today, it stands among the top ten megacities in the world, commanding attention and influence (Ruet

& Lama-Rewal, 2012). Within Delhi, the Municipal Corporation holds a significant position as one of the most extensive municipal entities worldwide. This emphasizes the significant role of the MCD within the administrative framework of Delhi. Established on April 7, 1958, in accordance with the provisions of the Delhi Municipal Corporation Act of 1957, this governing body operates under the purview of a Central Government Act. This means that any modifications or changes to its functioning can only be made by the central authority. This underscores both the immense stature of Delhi as a major city and the pivotal role played by the Central government in shaping its governance and development. In late 2011, the Municipal Corporation of Delhi underwent a division through an official notification. This led to the formation of three separate municipal corporations consisting of North Delhi, South Delhi, and East Delhi. These newly created corporations were anticipated to commence their operations in the first half of 2012.

Delhi, which serves as the capital city of India, is positioned within the confines of the National Capital Territory of Delhi (NCTD). It is positioned between latitude 28-240 -1700 and 28-530 -0000 North, and longitude 76-500 -2400 and 77-200 -3700 East. Delhi shares its borders with two neighbouring Indian states: Uttar Pradesh to the eastern side and Haryana to the northern, western, and southern sides. From a geographical standpoint, Delhi is located within the vast expanse of the Ganges plain and includes two prominent geographical elements: the floodplains of the Yamuna River and the Delhi Ridge. Furthermore, Delhi holds substantial importance within the National Capital Territory of Delhi (NCTD) and is integral to the larger scope of the National Capital Region (NCR). The formation of the NCR was facilitated through the implementation of the National Capital Region Planning Board Act in 1985, a collaborative effort involving the states of Haryana, Rajasthan, and Uttar Pradesh. (Ahmad et al., 2013). The formation of the National Capital Region (NCR) was driven by the objective of fostering equitable and structured progress across the area. Its goal was to deter haphazard and uncontrolled urban sprawl by orchestrating and steering economic advancement in a harmonised approach. The focus was on creating a harmonious and well-structured framework for sustainable development, ensuring that the region grows in a balanced and well-managed way.

Structure of Municipal Corporation of Delhi

In 2012, the Municipal Corporation of Delhi, formerly the second-largest municipal entity, underwent division into three distinct bodies. These were the South Delhi Municipal Corporation, responsible for various zones including Centre, South, West, and Najafgarh, the North Delhi Municipal Corporation, overseeing areas like Rohini, Civil Lines, Karol Bagh, Sadar Paharganj, Keshav Puram, and Narela, and the East Delhi Municipal Corporation was formed, consisting of the Shahdara North and Shahdara South zones. However, on May 22, 2022, these three entities were amalgamated back into a unified organisation, named the Municipal Corporation of

Delhi. This corporation is a significant governing body responsible for delivering essential services to approximately 20 million residents in Delhi. Functioning over an expansive expanse of 1397.3 square kilometres, the territory is subdivided into 12 zones including Centre, South, West, Najafgarh, Rohini, Civil Lines, Karol Bagh, SP-City, Keshavpuram, Narela, Shahdara North, and Shahdara South. Alongside the elected government, Delhi has five distinct civic bodies responsible for providing essential services to the city.

Delhi, a vibrant and expansive city spanning 1,484 sq. km, is home to not just one, but five distinct municipal bodies. With a population exceeding one million, it's a requirement set by the Government of India to have a Municipal Corporation in place. However, Delhi's governance intricacies arise from its prestigious capital status, accommodating a multitude of public institutions at various levels—Central, state, and local. This rich tapestry of administrative entities often leads to dynamic challenges of coordination and healthy competition in the realm of policy-making. Despite ongoing efforts towards decentralisation, the Central government's influence remains strong, as Delhi's administration comprises several layers of governance structures tailored to specific needs. The National Capital Territory of Delhi (NCTD) stands prominently, characterised by its independent elected assembly, a cabinet of ministers, and a distinguished Lieutenant Governor designated by the President.

In the governance framework of Delhi, the Lieutenant Governor assumes a crucial role as the head of the Delhi Development Authority (DDA), a responsibility conferred upon it by the Central Government. Following the division of the Municipal Corporation of Delhi, three local corporations now operate under the leadership of elected bodies, led by mayors. However, it is the commissioner who plays a pivotal role in decision-making, serving as the head of the executive and appointed by the Central government. In this intricate system, the Central and state governments exert considerable influence, taking charge of service provision and administrative control, while the urban local bodies find themselves with limited administrative authority (Ahmad et al., 2013).

The Five Municipal Entities as of 2021

The administrative organisation in charge of governing New Delhi, India, is known as the New Delhi Municipal Council (NDMC). Encompassing a land area of 42.7 square kilometres, this region is often called Lutyens' Delhi due to its notable concentration of government structures, official premises, and residential compounds. More than 80 per cent of the buildings in New Delhi are under the ownership of the NDMC, which is solely possessed by the Indian government. The leadership of the council is headed by a chairperson, typically a senior civil servant holding the role of Joint Secretary within the Indian government. The Chief Minister of Delhi holds an ex-officio position on the council. The NDMC, along with the Municipal Corporation of Delhi and the Delhi Cantonment Board, constitutes one of the trio of local governing bodies in

the National Capital Region of Delhi. Its inception dates back to the Imperial Delhi Committee, established in 1913 to supervise the construction of the new capital of India. The Raisina Municipal Committee was established in 1916, eventually attaining the status of a second-class municipality under the Punjab Municipal Act in 1925. The committee formally adopted the title “New Delhi Municipal Committee” in 1927, a designation that was subsequently changed to the “New Delhi Municipal Council” in 1994, replacing the provisions of the Punjab Municipal Act of 1911.

The region of New Delhi, which includes significant government edifices, office spaces, residential compounds, and diplomatic missions, is under the authority of the New Delhi Municipal Council (NDMC). This council operates under the direct governance of the Central government. The members of the council are not elected; instead, they are appointed by the Central government in deliberation with the state government (Heller et al., 2015). However, in an effort to enhance representation, a few sitting Members of the Legislative Assembly (MLAs) have also been nominated to serve on the council.

The administration and management of the Delhi Cantonment region is the duty of the Delhi Cantonment Board (DCB), which functions under the Ministry of Defence. The DCB is led by the Army’s Station Commander, who holds the position of ex-officio Chairman, and a member of the Indian Defense Estates Service cadre takes on the responsibilities of the Chief Executive Officer (CEO). In addition, the board includes eight elected members. In the 2015 elections, the Bharatiya Janata Party (BJP) emerged victorious in five seats, while the Congress Party secured two seats, and the Aam Aadmi Party (AAP) clinched one seat. The Delhi Cantonment Board (DCB) oversees various regions including Airforce Station, Arjan Vihar, Camero Complex Subroto Park, Jharera village, Naraina, Hoshiyar Singh Park, Ring Road Colony, Uri Enclave, Railway Colony, RR Colony, Karan Vihar, Mehram Nagar, and Sadar Bazar, along with various other localities (Singh, 2023).

Following the New Delhi Municipal Council and Delhi Cantonment Board (DCB), there exist three municipal corporations in Delhi: East, North, and South. In the past, these corporations were directly accountable to the Central government through the Ministry of Home Affairs (MHA). Nevertheless, in 2009, the city government was granted substantial authority over various functions of the Delhi Municipal Corporation, which included aspects like building regulations, allocation of central funds, and performance evaluations. However, the MHA retained control over matters such as dissolving the corporation and appointing commissioners. In 2012, a major restructuring occurred within the Municipal Corporation of Delhi (MCD), resulting in the formation of three separate entities: the North Delhi Municipal Corporation, the South Delhi Municipal Corporation, and the East Delhi Municipal Corporation. See Figure 1.



Figure 1: Government of Delhi. (2022). Three Municipalities of Delhi as of 2022.

Source: Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Three_Municipalities_of_Delhi_as_of_2022.png

To strengthen collaboration among the three bodies, the Directorate of Local Bodies was founded in 2011. This organisation, overseen by a high-ranking secretary within the Delhi government, serves as a link that connects the three municipal corporations and facilitates communication with the Delhi government. Prior to the split, the Municipal Corporation of Delhi (MCD) comprised 272 wards, with four wards within each of the 68 assembly constituencies, excluding New Delhi and Delhi Cantonment. After the division, the South Delhi Municipal Corporation and North Delhi Municipal Corporation were designated 104 wards each, while the East Delhi Municipal Corporation was apportioned 64 wards. The functions of the East, South, and North DMCs are similar to those of other municipal corporations in the country. These corporations have a wide range of responsibilities in city management. They operate hospitals and dispensaries, ensuring accessible healthcare services for residents. They manage the water supply system, drainage infrastructure, and waste management to maintain a clean and sustainable environment. Furthermore, they manage markets, parks, and parking facilities, and they also supervise the building and maintenance of roads and bridges to ensure effective transportation.

Municipal corporations handle street lighting, operate schools, collect taxes, manage toll booths, maintain cremation grounds, and keep records of births and deaths. Overall, their role is crucial in enhancing the quality of life and facilitating the development of the city.

The Delhi government and the Municipal Corporation of Delhi (MCD) share some common responsibilities and tasks, where their functions and roles overlap. For example, both entities share responsibilities in road construction and maintenance, as well as cleaning drains. However, there are distinctions based on road width, where the Delhi government handles wider roads while the MCD takes care of narrower

ones. Licensing differs as well, with the Delhi government issuing licenses for larger motorised vehicles, while the MCD deals with licenses for pushcarts and cycle-rickshaws.

In the realm of education, the MCD administers elementary schools, while the Delhi government assumes the responsibility for secondary and tertiary education, colleges, and vocational training. Concerning healthcare, the MCD operates dispensaries and certain hospitals, whereas the Delhi government supervises larger and more specialised medical institutions. Taxation procedures differ as well: the MCD gathers toll taxes, advertising income, and property taxes at borders, whereas the Delhi government manages excise duties, service taxes, and value-added taxes on goods and services.

These distinctions in responsibilities ensure a division of tasks and resources between the MCD and the Delhi government, allowing for a more efficient and organised governance structure. Nevertheless, it is important to acknowledge that it also gives rise to conflicts and disagreements between the two entities.

The municipal corporations generate income through diverse activities and taxes, along with receiving financial assistance from both the Delhi government and the Central government. Property tax stands as a substantial revenue stream for these corporations. In 2016, out of their combined earnings of Rs. 8,351 crore, property tax accounted for Rs. 1,371 crore. Specifically, the Southern, Northern and Eastern Corporations earned Rs. 775 crore, Rs. 404 crore and Rs. 192 crore, respectively (Bhatnagar, 2017).

Diverse Committees within the Municipal Corporation Underlining Varied Objectives and Goals

The Standing Committee is formed by electing six members from among the councillors within their own group, while each ward committee selects one member from its own constituents. When it comes to executive contracts involving expenditures exceeding Rs. 25,000,00, the Commissioner seeks the endorsement of the Standing Committee. Regular examinations and audits of the municipal accounts are conducted by the Municipal Chief Auditor, who then presents a report to the Standing Committee (Praja Foundation, n.d.). This committee holds significant responsibility in handling matters related to financial and policy decisions, and their recommendations are conveyed to the Corporation. So, the Standing Committee plays a crucial role in handling financial and policy matters, providing recommendations to the Corporation.

MCD has a Ward Committee system comprising twelve committees. These committees hold the power to authorise municipal works within their designated zones, with a budget of up to one crore rupees. However, this authority does not extend to projects that cover the entire city or multiple zones. The Ward Committees primarily concentrate on executing projects within their specific zones or wards, while the responsibility for initiatives spanning multiple zones falls under the purview of the Delhi government.

Since the attainment of India's Independence, the governance framework of Delhi has witnessed noteworthy alterations, illustrating a dynamic and forward-thinking stance towards governance. These substantial changes underscore the city's adaptability and commitment to adopting progressive methodologies in its administrative structure.

Reunification of MCD

The governance structure of Delhi is defined by two key acts: the Delhi Municipal Corporation (Amendment) Act of 2022 and the NCTD (Amendment) Act of 2021. Under the 2022 Act, the three municipal corporations of Delhi (MCDs) have been merged to promote fairness, efficient resource management, transparency, and improved governance. The Central government now has greater control over the MCD, leading to changes such as reducing the number of seats from 272 to 250, streamlining administrative functions, introducing e-governance for citizen services, and enhancing cost-effectiveness by saving Rs 1500 million annually. This Act also brings about structural changes, including a single Mayor and Commissioner instead of three, and a reduction in the number of committees from 75 to 25. Similarly, the 2021 Act designates the Lieutenant Governor (LG) as the representative of the Central government, consolidating governance in the National Capital Territory of Delhi (NCTD). The governance structure in Delhi stands out from other states due to three key factors. Firstly, it follows a three-tier system, which distinguishes it from the traditional two-tier structure. Secondly, various municipal responsibilities and functions are assigned to each of these three tiers. Lastly, while accountability at the grassroots level is diverse, it can sometimes come at the expense of citizen-focused approaches and streamlined resolution of grievances.

The existing framework and structure of the Municipal Corporation of Delhi (MCD) exhibit several weaknesses resulting from the three governance characteristics mentioned earlier. These weaknesses have gradually emerged over time. To begin with, there has been a decline in the MCD's functional domain as certain functions like water management, sewage, road infrastructure, slum development, city transportation, poverty alleviation, and electricity have been gradually withdrawn. Second, the role of the mayor has been diluted due to their short tenure of only one year. Third, there is a lack of downward accountability in the municipal administration below the town hall or zonal level, which hampers effective governance. Fourth, there is a widening resource gap, making it challenging to meet the financial requirements even for the current set of responsibilities. Lastly, there exists a notable absence of coordination among the diverse urban local bodies in the city region, encompassing locations such as Faridabad, Gurugram, Kundli, Noida, and Ghaziabad (Central NCR). This lack of coordination is particularly evident in crucial areas such as waste management, connectivity, mobility, pollution control, and disaster management. The absence of effective coordination is notably conspicuous in critical domains like waste management, connectivity, mobility, pollution regulation, and disaster preparedness. (Pandey, 2022).

Conclusion and Suggestions

Delhi, known as India's administrative hub, has traditionally been associated with a bureaucratic governance style. However, a notable change took place in the 1990s when decentralisation, supported by two Constitutional Amendments, introduced a more democratic system. The implementation of the 69th Constitutional Amendment Act of 1991 resulted in the establishment of the National Capital Territory of Delhi. As a result, Delhi acquired a quasi-state status, granting it the ability to have its own legislative assembly and council of ministers. Given the Union Government, Parliament, and diplomatic enclaves in Delhi, specific security concerns emerged. Therefore, the need for a distinct governance approach was recognised, resulting in the Central government maintaining authority over specific aspects of public activities, such as land development and law enforcement. This arrangement was justified by the need to address security considerations effectively while ensuring coordinated governance in the city. In 1993, after a gap of nearly four decades, Delhi held its Legislative Assembly elections, offering representation to 70 elected members known as MLAs. This significant development aimed to provide a platform for the voice and concerns of the city's residents to be heard and addressed. Prior to that, in 1992, the 74th Constitutional Amendment Act was enacted, emphasising the area's distribution of authority in urban regions and the establishment of relevant policies (Ahluwalia, 2017). Following that, in 1997, Delhi effectively put this Amendment into action, leading to the reinstatement of the Municipal Corporation of Delhi (MCD) which had been temporarily halted since 1989. As a result, 134 councillors were elected to serve in the reinvigorated MCD, marking an important step in the city's governance and administration (ST Lama-Rewal, 2011).

Thus, Delhi, being a major metropolitan city with its unique system and culture, needs a customised governance model to address its specific requirements. As discussed above, the Capital cities in federal countries are generally organised in three ways. First, as federal districts like Abuja, Brasilia, Canberra, and Washington DC, where varying degrees of federal control are exercised. Abuja is highly centralised with its administration as a federal ministry, while Washington DC's laws are reviewed by Congress, which is considering full statehood for the city (Sahoo, 2021). Canberra and Brasilia have elected governments with substantial autonomy over local matters, despite not having full statehood. Second, some cities, like Berlin, Brussels, and Buenos Aires, function as city-states, where the city government also handles state functions, providing a high degree of self-governance. Third, capitals like Bern and Ottawa operate as cities within a state, where the state government oversees them. Delhi, as a Union Territory, is similar to federal districts such as Canberra and Brasilia, having an elected government with considerable local autonomy but lacking full statehood (Chattopadhyay, 2021). However, the ongoing influence of party politics complicates the implementation of any governance model. Therefore, while Delhi can draw insights from other cities, it must develop a unique model that fits its distinct

circumstances. Continuous adaptation and practical implementation will determine the most effective governance structure for Delhi, addressing its complex urban challenges and reflecting its unique evolution.

Delhi's governing structure is renowned for its exceptional complexity compared to other capital cities. It encompasses numerous intersecting sub-national jurisdictions, which comprise the Delhi government, New Delhi Municipal Council, Municipal Corporation of Delhi, and Cantonment Board. Each of these entities operates under the control of separate agencies or government bodies, further adding to the intricate nature of Delhi's governance. Furthermore, Delhi is home to over 100 para-statal organisations that offer a variety of services, frequently repurposing one another's efforts. Throughout its history, Delhi's governance system has experienced substantial transformations since India gained Independence. These changes continue to unfold, indicating the city's frequent and significant shifts in perspective and administrative structure. As a result, residents find themselves uncertain about the appropriate avenues for seeking assistance or expressing grievances. It is crucial for the government to operate in a manner that effectively addresses citizens' needs and concerns, fostering a sense of trust and responsiveness. For Delhi to progress effectively, it is crucial to establish a harmonious relationship between power dynamics and governance. This entails fostering collaboration among various stakeholders involved in driving the city's development. By encouraging active engagement and cooperation between the Central and state governments, local bodies, and other key entities, we can collectively work towards addressing the unique challenges and requirements of Delhi. This inclusive approach will pave the way for a promising future, enabling the city to flourish and meet the ever-changing needs of its residents.

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Urban Local Body in Mizoram: A Study and Analysis of The First Lunglei Municipal Council (LMC) Election

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Abstract

The present paper aims to examine the origins of the Urban Local Body (ULB) in the state of Mizoram. Furthermore, it highlights the significance of the development and electoral processes pertaining to the Urban Local Body (ULB) in the state. The research further examines a comparative analysis of voting behaviour in various rural local body elections and the first Lunglei Municipal Council (LMC) election. Additionally, the paper examines the electoral performance of major political parties in the first Lunglei Municipal Council (LMC) election.

Keywords

Municipal, Mizoram, Lunglei, Election, Ward.

Introduction

An Urban Local Body (ULB) is an administrative institution responsible for governing the urban areas within various states of India. It administers urban affairs, which are local in nature and character. The institution is responsible for the maintenance and development of urban areas. The Urban Local Bodies (ULBs) are entrusted with the task of strategically planning and efficiently providing essential civic amenities within their jurisdictional areas or regions. The Urban Local Bodies (ULBs) play a significant role in the urban areas of Indian democracy. The ULBs are responsible for

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ensuring the provision of adequate public facilities and amenities within the urban areas. The Councillor/Corporator of the ULBs are elected directly by the electorate. The responsibility for managing and supervising the electoral process in Urban Local Bodies (ULBs) lies with the State Election Commission. The State Election Commission sets the polling date based on the convenience and time of the incumbent government in urban regions.

In the post-Independence era, Articles 244 (2) and 275 (1) of the Indian Constitution established the Lushai Hills District Council and Pawi-Lakher Regional Council in 1952 and 1953, respectively, in the former Lushai Hills (then the Mizo Hills District of Assam). On the basis of adult franchise, the first Lushai Hills District Council election was held on January 4, 1952 for a term of five years. It had 18 elected seats and six nominated seats, which accounted for a total of 24 seats. The nominated seats were appointed by Governor of Assam as per the recommendation of Executive Committee of the District Council (Zakhuma, 2001). Following the abolition of the chieftainship in 1954, the District Council developed a body of local government known as village council. The first election for the village council took place in July 1954. Lushai Hills District Council was changed into Mizo District Council with effect from September 1, 1954, as per the Lushai Hills District (change of name) Act, 1954, enacted by the Parliament of India (Lawmzuala, 2002).

The Mizo district in the state of Assam was elevated to a Union Territory in 1972 and given the name Mizoram. The first general election to the Mizoram Assembly took place in 1972. The Mizo Union won 21 of the 30 elected seats and formed the government, with Ch. Chhunga as the first Chief Minister of Mizoram. After a span of 14 years, Mizoram was elevated to the status of a fully-fledged state within the Indian Union in the year 1987. The first election for the State Legislative Assembly took place on 16th February, 1987 (Chaltuakhuma, 2001). Since then, Mizoram has experienced a total of eight State Legislative Assembly elections.

Urban Local Body in Mizoram

 The Urban Local Body (ULB) in Mizoram was established through the Mizoram Municipalities Act, 2007. This Act paved the way for the formation of the Aizawl Municipal Council on July 1, 2008. Aizawl has been officially designated as a city under the Mizoram Municipalities Act of 2007 (Mizoram Municipal Act, 2007). This transition from a cluster of villages governed by Village Councils to a Municipal government aligns with the provisions of the 74th Constitutional Amendment Act. The implementation of this Act is seen as a positive measure for urban development and administration, as it empowers the people and ensures effective governance.

The state of Mizoram held its first election for the Urban Local Bodies (ULBs) on November 3, 2010. In accordance with the provisions of the 74th Amendment Act, a

total of six wards had been designated for the representation of female candidates. It is important to note that these reserved wards would undergo a rotation process every five years. The Aizawl Municipal Council (AMC) is comprised of 19 elected members representing 19 wards in the city of Aizawl and 12 members appointed by the Governor of Mizoram, known collectively as the Board of Councillors (BOC). The BOC serves as the supreme governing body of the Aizawl Municipal Council (AMC), with the Chairman leading its proceedings. The election of both the Chairman and the Vice Chairman is carried out by the elected councilors. In addition to the BOC, there is also an Executive Council (EC), which is made up of the Chairman, Vice-Chairman, and three Executive Councilors, who are chosen by the Chairman. All executive functions are carried out by the EC. (State Election Commission, Mizoram, 2010).

In 2015, the Aizawl Municipal Council (AMC) exceeded the population threshold of three lakh. According to the provisions outlined in the Mizoram Municipalities Act of 2007, an urban area with a population exceeding three lakh has the potential to be designated as a larger urban area. Consequently, the entity underwent an upgrade to the status of a Municipal Corporation and was officially designated as the Aizawl Municipal Corporation (AMC) in October 2015. The election for the Aizawl Municipal Corporation took place on November 26, 2015, followed by a subsequent election on February 16, 2021. (State Election Commission, 2015 & 2021).

Urban Local Body in Lunglei

The setting up of a municipal council has been a longstanding demand of the residents of Lunglei, the second largest town in the state, following the capital city of Aizawl. According to the 2011 census, the population of Lunglei is recorded as 57,011. In order to expedite the process of development with a focus on inclusive growth, Lunglei came up with a planning board known as the High Powered Committee (HPC). This committee has been tasked with addressing the various challenges faced by the Lunglei district. The High-Powered Committee (HPC) is authorised to develop district plans and schemes as well as execute district-level plans using the allocated discretionary funds. However, given its extensive scope, the High-Power Committee (HPC) does not possess a comprehensive mandate for the development of the district, particularly in relation to Lunglei town. According to the provisions outlined in the Mizoram Municipalities Act of 2007, the establishment of a municipal council is authorised for the purpose of governing smaller towns and cities with a population ranging from 25,000 to one lakh. To address the needs of Lunglei town, the Mizo National Front (MNF) ministry, led by Chief Minister Zoramthanga, called a state cabinet meeting on November 16, 2021. During the meeting, a resolution was passed to form a new municipal council in Lunglei town.

Election to Lunglei Municipal Council (LMC)

The first and highly contentious Lunglei Municipal Council Election (LMC) in Mizoram was successfully held on March 29, 2023, with many pros and cons being meticulously deliberated. A total of 40,548 individuals were deemed eligible to cast their votes in this first LMC election, comprising 19,123 men and 21,425 women, with the latter outnumbering the former by a staggering 2,302 (Press Note, 2023). A total of forty-four individuals put forward their candidatures to contest the eleven seats up for grabs in the LMC Wards. It is noteworthy that, owing to the 33 per cent reservation of seats in the Urban Local Body (ULB) election, four of the 11 wards were reserved for women candidates.

The national parties --- Indian National Congress (INC) and Bharatiya Janata Party (BJP), along with the two regional parties --- Mizo National Front (MNF) and Zoram People's Movement (ZPM), each nominated candidates for all 11 seats. However, the BJP encountered a setback as one of its candidates had been disqualified for failing to meet the minimum age requirement, and another candidate withdrew, leaving the party with just nine candidates. As a result, the first LMC election features 42 candidates vying for 11 seats.

In this election, there were a total of 44 polling stations and 55 polling parties. (Press Note, 2023). Four seats in the ULB were reserved due to the 33 per cent seat reservation, and each party ran a female candidate for each of these seats. Furthermore, it is noteworthy that ZPM nominated a female candidate for the open seat in Ward-I (Pukpui, Zotlang). It is pertinent to mention that only in this ward's unreserved seat, did a woman become a candidate.

The success of every election, including this first LMC election, is generally acknowledged to be considerably influenced by the overall number of votes cast. In this first LMC election, a total of 29,841 votes were cast with 13,907 men and 15,934 women cast their votes (Mizoram Government, 2023). There was a 2,028 votes discrepancy between male and female voters.

It is noteworthy to acknowledge that within the Lunglei district, the ULB elections garner more public attention than the Rural Local Bodies (RLBs) elections. Nevertheless, when juxtaposed with the votes cast in the LMC election, the voting behaviours for the ULB and RLB elections do not exhibit any significant disparities. In certain localities (Veng), such as Chanmari, Ramthar, Lunglawn, and Serkawn, the total number of votes cast is still higher than that of the VC elections in 2015 and 2020. Conversely, fewer votes were cast overall in various localities (veng) such as Salem, Hrangchalkawn, Lungpuizawl, Rahsiveng, Szaikawn, and Venghlun as compared to the VC elections in 2015 and 2020. The remaining localities' vote totals fall within the range of the 2015 and 2020 VC elections.

Table 1: A comparative analysis of the voting behaviour within the LMC Covered Area, the LMC Election, and the 2015 and 2020 Village Council Elections.

Sl. No	Veng	2015 VC Election Results in per cent	2020 VC Election Results in per cent	2023 LMC Election Results in per cent
1.	Chanmari	67.60	60.34	70.14
2.	Electric Veng	73.02	66.97	72.05
3.	Farm Veng	78.00	73.75	75.26
4.	Ramthar	70.84	61.95	71.50
5.	Salem	80.52	76.85	74.32
6.	Lunglawn	71.88	71.63	74.47
7.	Luangmual	8.25	72.95	87.79
8.	Sethlun	84.14	Uncontested	79.19
9.	Hrangchalkawn	86.27	85.35	76.54
10.	Theiriat	72.34	75.51	73.48
11.	Lungpuizawl	90.36	90.45	87.79
12.	Zobawk North & South	59.80	80.42	79.27
13.	Venglai	74.02	66.55	68.02
14.	Rahsiveng	71.04	68.73	67.82
15.	Szaikawn	87.45	89.36	82.59
16.	Hauruang	13.38	81.95	80.31
17.	Venghlun	80.83	83.01	77.96
18.	College Veng	49.71	83.70	80.36
19.	Bazar Veng	75.23	63.02	68.88
20.	Zohnuai	81.80	77.56	75.43
21.	Serkawn	72.83	72.19	75.39
22.	Zotlang	76.22	71.66	74.57
23.	Pukpui	86.04	81.51	82.05
	Total	69.88 per cent	71.54 per cent	73.59 per cent
				Postal Ballot-0.67
				74.26 per cent

Source: Voter Turn-Out & Results of the General Election to Village Council, 2015 published by SEC, Mizoram / Voter Turn-Out & Results of the General Election to Village Council, 2020 published by SEC, Mizoram.

As illustrated in table 1, the votes garnered from localities encompassed by LMC outstripped those obtained in the 2015 VC election by a margin of 4.38 per cent. Moreover, the 2020 VC election revealed a similar pattern, with a voting percentage

that remained elevated by 2.05 per cent in this LMC election. MNF maintains control over 11 village councils situated in LMC-affected regions, with the Indian National Congress (INC) trailing closely behind in eight localities and the Zoram People's Movement (ZPM) in two localities. Furthermore, it is worth noting that ZPM and INC have forged alliances in two village councils.

From previous records, it has been observed that the number of votes cast in the State Legislative Assembly elections has exceeded those in the RLB elections. The year 2013 witnessed the highest voter turnout in the State Legislative election, with a staggering 83.41 per cent, whereas the year 1987 was marked with the lowest voter turnout with a mere 74 per cent of votes cast. Notably, there was a significant discrepancy in voter turnout between the 2015 and 2020 VC elections, where the former recorded 67.42 per cent of the votes cast, while the latter showed a substantial increase with 75.82 per cent of the votes cast.

The first LMC election reveals a captivating narrative. In light of the 2020 VC election results, the position of the state's ruling party in various LMC wards appears precarious. The INC may adopt more assertive measures in response, while the emergence of the formidable Third Front, ZPM, in the 2018 state election contributes another intriguing account. As demonstrated by the candidacy of an MNF VC running for ZPM LMC in Ward IX, all of these elements coalesce to form the enthralling chronicle of the first LMC election.

Furthermore, the observation that the voter turnout in the LMC election had persistently exceeded that of previous RLB elections engenders two crucial inquiries. These inquiries pertain to whether non-partisan voters cast their votes in the LMC as a gesture of gratitude towards the present state government or as an expression of dissent against the incumbent administration. If the elevated voter turnout was due to anti-incumbency sentiment, which political party stood to benefit the most from the non-partisan voters?

LMC Election Result

On April 3, 2023, the first Lunglei Municipal Council (LMC) election result was declared, revealing the ZPM as the triumphant party in all 11 wards. It is noteworthy to mention that the absence of an opposition councilor was conspicuously observed in the first LMC election. A total of 30, 117 votes were cast during this election, with the Mizo National Front (MNF) securing 88, 58 votes (29.41 per cent), the Indian National Congress (INC) securing 60, 37 (20.04 per cent), the Bharatiya Janata Party (BJP) securing 226 (0.75 per cent), and the None of the Above (NOTA) option securing 144 (0.47 per cent). The ZPM secured a total of 14852 (49.31 per cent) of the entire votes cast, thereby assuming power. The most soundly defeated candidate was in Ward VIII, where the ZPM candidate outperformed the MNF candidate by a margin of 904 votes.

While Ward IV witnessed the least defeat, the ZPM candidate emerged victorious, with the closest competitor, the INC candidate, receiving a mere 109 votes. (<https://sec.mizoram.gov.in/page/ge-to-lmc-2023>).

In this election, a significant proportion of the valid votes cast were garnered by six candidates from ZPM, amounting to 50 per cent from Wards II, VI, VII, VIII, IX and X. In contrast, no MNF candidate was able to secure more than 40 per cent of the votes in the various wards. It is noteworthy that only one candidate from INC was able to obtain 30 per cent of the total votes cast in Ward IV. It is also noteworthy that the Bharatiya Janata Party (BJP) candidates were not able to make any significant progress beyond their mere participation in the election.

The fact that the ruling party (MNF) was only able to amass 72 ballot votes, which corresponds to 26.76 per cent of the total ballot votes cast, adds an interesting dimension to this election. In contrast, the ZPM was able to secure 148 ballot votes, which corresponds to 55.01 per cent of the total ballot votes cast. This raises several pertinent questions as to why the ruling party received fewer votes than the ZPM. One plausible reason could be attributed to potential irregularities in the monthly salaries of government employees, and above that, Lunglei region has had significant deficiencies in infrastructure development, particularly in the realm of road construction. Furthermore, the Lunglei people lost faith in the state government led by MNF party due to delaying the installation of Reverse Transcription-Polymerase Chain Reaction (RT-PCR) machine during the COVID pandemic in Lunglei.

Brief Analysis on the Performance of Three Major Political Parties

Mizo National Front (MNF)

The underlying factors contributing to the significant setback suffered by the MNF in the LMC election necessitate a thorough and diligent assessment. Despite the commendable endeavours undertaken by the headquarters of the party, the ruling party of the state has not experienced much triumph. The MNF village council has been effectively entrenched in a dozen out of the twenty-four VCs amongst the eleven LMC Wards. Based on estimates that hinge on the 2020 VC election, two localities from LMC Ward VIII (namely Ramthar and Farm Veng) are unequivocally poised to furnish the MNF with a resounding 42.71 per cent of the votes. It is noteworthy that this is the position of the elected Mizoram Legislative Assembly (MLA) for the Lunglei East constituency. Nevertheless, the MNF could only muster a paltry 26.29 per cent of the vote in this ward, as declared by the LMC election results.

The situation observed in LMC Ward IX, which happens to be the domicile of Lunglei South constituency MLA, reflects a similar pattern. The MNF party garnered more votes during the 2018 MLA election and the 2020 VC election. It is noteworthy that the MNF party received only 31.68 per cent of the total votes cast during the

LMC election. Furthermore, the status of the MNF party in Ward I, the abode of Lunglei North constituency MLA elect, and Ward III, the residence of Lunglei West constituency MLA elect, remains inferior to its position during the 2018 MLA election and the 2020 VC election.

The aforementioned analysis unequivocally highlights the need for the MNF party to undertake rigorous efforts in these LMC-covered localities for the state election. It is imperative to devise new strategies and policies that can effectively win over the hearts of the Lunglei people. The MNF party must demonstrate a renewed commitment to the welfare of the people and prioritise their needs and aspirations.

Indian National Congress (INC)



The Indian National Congress (INC), being the oldest and most well-established national political party in Mizoram, has been eagerly anticipating the LMC election due to the attention and efforts devoted by its party leaders. Despite having sole representation in the village council for eight localities within the LMC area, the party's vote bank has regrettably dwindled, causing great concern for the party. Comparing the LMC election to the 2018 State Assembly and 2020 VC elections, the difference in performance is vast. It is noteworthy that the ZPM party has reaped the maximum benefits from the significant decrease in INC votes, signifying a shifting political landscape in Mizoram.

The veracity of the matter lies in the fact that the INC's inability to secure a vote count of more than 20 per cent in certain wards, where they have previously emerged victorious and established their dominance for two consecutive terms in State Assembly elections, only serves to further pique curiosity. In the meantime, it would be unwise for the party to remain mute spectators and attribute their defeat to the differentiation between local and state-level elections. It is quite evident that the INC's newfound zeal and fervor under the guidance of its new leadership has permeated the grassroots level of Lunglei district.

Zoram People's Movement (ZPM)

The massive victory of the ZPM party in the first LMC election, notwithstanding the reality that the party solely possesses a meagre two village councils in the LMC precinct, can be explicated by an assortment of multifarious factors.

- i) One obvious reason for the LMC election result is the manifestation of the prevalent anti-incumbency sentiment among the general populace.
- ii) Upon juxtaposing the ZPM party's nominees with those of other political parties, it is discernible that the former's candidates are comparatively more youthful in age.
- iii) Furthermore, while the elder ZPM candidates are bereft of considerable political exposure, they are endowed with a higher level of educational qualifications.

When considering the pool of candidates from both the MNF and INC parties, it is apparent that the majority of the both male and female candidates can be deemed experienced and mature. Specifically, these individuals have held the position of village council members for a significant period of time or are presently serving in this capacity. Additionally, many of these candidates have also served as leaders within their respective block or unit parties for an extended period of time. However, despite their extensive involvement in their local communities and recognition as prominent figures, they were unable to secure victory in the election against the ZPM party's first-time candidates. This outcome serves as a testament to the strong faith that the public has in the ZPM party. It further highlights the general populace's yearning for a novel and improved political system as they grow increasingly weary of the current political landscape. Furthermore, it is noteworthy that the overwhelming support that the ZPM party received during the first LMC may not simply be attributed to the party's policies and programmes alone.

Table 2: A Comparative Analysis of the votes polled by MNF, INC, ZPM and other Political Parties within the LMC Cover Area in the 2018 State Assembly Election, the 2015 and 2020 Village Council Elections and the 2023 LMC Election

Sl.No	Veng/Constituencies	Vote Polled of 2018 State Assembly Election (in per cent)				Vote Polled of 2020 VC Election (in per cent)				Vote Polled of 2023 LMC Election (in per cent)			
		MNF	INC	ZPM	Others	MNF	INC	ZPM	Others	MNF	INC	ZPM	Others
	Lunglei North Consti.												
Ward I	Pukpui, Zotlang	41.01	27.89	30.90	0.20	36.38	30.97	25.54	7.11	33.96	22.67	40.91	2.44
Ward II	Serkawn, Zohnuai	24.69	23.52	50.72	1.07	38.18	32.61	27.36	1.85	26.28	14.48	58.70	0.52
	Lunglei West Const.												
Ward III	Bazar, College Veng	35.51	30.98	31.91	1.60	33.88	38.68	19.23	8.21	28.87	26.11	44.01	0.99
Ward IV	Venglai, Venghlun	31.69	30.23	36.43	1.65	32.81	35.37	24.13	7.69	24.22	35.67	39.69	0.40
Ward V	Rahsiveng, Sazaikawn, Hauruang	34.26	38.38	26.17	1.19	34.83	37.04	16.04	12.09	33.78	21.37	43.69	1.13
	Lunglei East Consti.												
Ward VI	Electric Veng	31.41	25.93	39.46	3.20	43.72	48.19	Nil	8.09	31.42	11.10	55.15	2.31
Ward VII	Chanmari	22.41	33.44	42.10	2.05	36.12	36.03	27.85	Nil	18.75	23.56	56.84	0.83
Ward VIII	Ramthar, Farm Veng	38.90	26.98	28.99	5.13	42.71	33.91	18.99	4.39	26.29	17.63	55.17	0.89
Ward XI	Lungpuizawl, Zobawk (N, S)	34.91	34.47	27.76	2.86	40.70	31.45	24.28	3.57	33.96	18.99	45.30	1.73
	Lunglei South Consti.												
Ward IX	Salem, Lunglawn	40.81	19.66	36.38	3.15	40.94	26.55	28.61	3.90	31.68	15.38	52.08	0.84
Ward X	Sethlun, Luangmual, Theiriat, Hrangchawkawn	40.55	18.98	36.45	4.02	31.57	24.44	18.50	25.49	32.49	13.35	52.61	1.53

Source: <https://sec.mizoram.gov.in/> & District Election Office Archive, Lunglei District.

Table 3: Proposed Percentage Share of AMC and LMC by Finance Department, 2023

City	Population (as per 2011 Census)	Percentage Share	Area in Sq.Km	Percentage Share
Aizawl	29,3416	83.73per cent	129.91	74.69 per cent
Lunglei	57,011	16.27per cent	44	25.31per cent
Total	3,50,427	100per cent	173.91	100 per cent

Source: Finance Department, Government of Mizoram.

Table 2 delineates the intricate details pertaining to voter turnout. It can be observed that the ZPM vote bank emanates from a cohort of neutral voters. The electoral history has witnessed undulations in voting patterns, such as in Ward V, where the ZPM party garnered an impressive 26.17 per cent of the total votes cast during the 2018 State Assembly election, which was subsequently reduced in the 2020 VC election. Nevertheless, the LMC election witnessed a meteoric rise in votes, surging to 43 per cent. This can be predominantly attributed to the neutral voters. By analysing the voting patterns in other wards, it can be affirmed that the role played by neutral voters is quite salient. Despite the variations in the number of voters and votes polled, it is possible to glean considerable insight into the status of the political parties.

Financial Status and Challenges for LMC

The primary focus of development in urban areas was its financial aspect. India's urban areas are home to more than 400 million residents. The urban population is projected to exceed 800 million by 2050. By 2030, it is anticipated that over 70 per cent of India's GDP and new job opportunities will originate in urban areas (Municipal Finance Blueprint for India, 2022). Urban areas are essential due to their impact on quality of life, economic development, and democracy. The success of achieving these goals relies heavily on the financial sustainability and accountability of Urban Local Bodies (ULBs).

The LMC encountered financial difficulties due to its recent establishment. The Urban Development & Poverty Allevation Department under Government of Mizoram allocated Rs. 80 lakhs in December, 2022 out of the state budget allocation for the creation and expenses of its first Lunglei Municipal Council (LMC) election. The 2023–24 Mizoram State Budget allocated Rs. 127.97 lakh from the State Fund for the efficient functioning of the LMC (Annual Financial Statement 2023-2024, GoM). On the other hand, Table 3 displays the proposed percentage shares of the Urban Local Body (ULB) grant from the 15th Finance Commission managed by the Finance Department of the Government of Mizoram on April 17, 2023, for Aizawl Municipal Corporation (AMC) and Lunglei Municipal Council (LMC) based on population and area data. The ZPM government's projected budget for the LMC in the 2024–25 financial years is Rs. 602.97 lakhs. An amount of Rs. 124.59 lakhs will be allocated for salaries and Rs. 478.38 lakhs for various works (Annual Financial Statement 2024-2025, GoM).

Lunglei Municipal Council is in its developing stage but requires significant improvement in various aspects. The state government's allocated funds cannot be increased in a quick process due to the state's poor fiscal standing. As a result of that, it is crucial to discover innovative methods to gather financial resources. ULBs have various revenue streams at their disposal to generate income. These consist of property tax, building permit fees, various land-related charges like betterment levy, valorization, impact fees, exaction, stamp duty, octroi, hawker/vendor fees, PPP, usage charges, and advertisement fees. An effective financial framework is crucial for cities and towns to successfully address the increasing demands of urbanisation. Therefore, the newly elected LMC ward councilor must consider the overall growth of Lunglei town, along with financial stability and resource mobilisation.

Conclusion

The outcome of the LMC election significantly influenced the 2023 Mizoram State Assembly election held in November. The ZPM party won 27 out of 40 seats in assembly constituencies, forming a majority government as anticipated by many. The ZPM party has consistently sparked enthusiasm in the LMC election by winning all four assemblies constituency seats in Lunglei town. The residents of Lunglei have shown greater confidence in the ZPM party, which led them, won the Lunglei Municipal Council (LMC) elections and overthrew the four incumbent Mizo National Front (MNF) MLAs in the 2023 State Legislative Assembly election in Lunglei east, west, north, and south constituencies. Thus, it is crucial for the state government to make substantial investments in the urbanisation and development of Lunglei town in order to meet the expectations of the people.

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Urban Poverty Alleviation through Better Microfinancing and Urban Livelihood Strategies

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Abstract

The paper focuses on urban poverty as a multisided problem. The marginalised section of the population often struggles regarding accessibility to financial services. Microfinancing has the potential for poverty alleviation and empowering urban population. The paper examines microfinance initiatives by the government and explores the significance of community-based organisations as a tool for financial inclusion. The paper identifies the issues and concludes with recommendations and suggestions for developing resilient urban livelihood strategies.

Keywords

Urban, Poverty alleviation, Microfinance.

Introduction

Urban population in India, is growing fast and it is estimated that by the year 2050, 900 million people of India will be living in urban areas. (FICCI, 2011) Apart from the natural increase and net rural-urban classification, rural-to-urban migration is the major component of increase in the rate of urbanisation. Urban centres being the focal point of economic growth act as a magnet for the rural male migrants who come for employment opportunities and form the part of the informal sector. Most of the migrant workers are exposed to different types of vulnerabilities. The informal sector gives a chance to employ the poor people who come from different regions of the country in search of daily sustenance. Nevertheless, this class of people has the burden of pressure from eviction, relocation and confiscation of equipment, leaving them with no short-term job security. On one hand, a group of urban poor might not be classified

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as extremely poor based solely on their income. On the other hand, these individuals may still endure inadequate public facilities, poor hygiene, and substandard living conditions in urban areas.

Poverty in urban areas can be simply described as a multifaceted problem where housing, employment and socialisation are interconnected challenges. Women, children, the elderly, marginalised groups, and those who are physically challenged often struggle to navigate these intertwined problems. To ensure the effective implementation of tactical programmes, it is crucial not to overlook the interconnected vulnerabilities faced by the urban poor. These programmes should be prioritised to help lift the urban poor out of their hazardous living conditions. Homeless individuals in urban areas are especially at risk, lacking proper accommodation, including access to safe drinking water and sanitation systems.

The National Urban Housing and Habitat Policy was launched in 2007 to combat issues of urban housing. The idea of the policy was to foster the socially responsible investment in the housing sector by providing the sustainable infrastructure development, ensuring an equitable supply of land, housing and service at affordable prices to all sections of the society. Rightly so, the rights to decent shelter have been articulated as an essential component of the right to life under Article 21 of the Constitution of India.

The Government of India has devised a holistic strategy to ameliorate the conditions of the poor. The Rajiv Awas Yojana (RAY) has been launched to address residential vulnerability (shelter/housing and basic services). One of the major tasks of the Deendayal Antyodaya Yojana – National Urban Livelihood Mission (DAY-NULM) is to deal with the problems of livelihoods faced by the urban poor. Strategising the 12th Five -Year Plan deployment, it prioritises cities that are accessible for everyone, a city that dedicates equal opportunities to all its people hence achieving a just and equitable urban environment. The DAY-NULM document mentions that urban poverty is multi-dimensional and there are various vulnerabilities faced by the poor in urban areas. These vulnerabilities can be related to livelihood, housing or to social aspects. These vulnerabilities can be tackled simultaneously in a comprehensive and integrated manner with a targeted focus on the vulnerable groups to provide a definitive impact.

Likewise, housing and shelter related vulnerabilities-- albeit partly-- are also being covered in flagship programmes of urban development such as Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Rajiv Awas Yojana (RAY), which were launched in 2005 and 2011 respectively. The urban poor have a number of threats to deal with when it comes to socio-economic stability. These vulnerabilities can be addressed by establishing tenure rights that empower people through skill development initiatives and participation in job absorption programmes, or by providing the necessary support for them to start their own businesses. Effective employment programmes for the poor, particularly those focused on self-employment, require skill training and

credit access. This is where the Deendayal Antyodaya Yojana (DAY) - National Urban Livelihood Mission (NULM) plays a crucial role in the broader mission to eradicate urban poverty.

Urban poverty is closely connected to the informal sector, which employs more than half of the urban poor. As per the report of National Commission on Enterprises in the Unorganised Sector (NCEUS) (2007) - “about 77 per cent people in India were living below INR 20 per day. The report also stated that 79 per cent of the informal sector or unorganised sector were in the category of poor. These workers lived in poverty and were excluded from the gains of economic reforms. It was then realised that the number of urban poor engaged in informal activities is so large that even a small improvement in the productivity of this segment of population through skill upgradation can make a huge impact on GDP which would lead to inclusive growth.” (MoHUPA, 2014)

Eradication of the grinding poverty has always been the utmost aim of the Government of India since the first Five-Year Plan. Most of the poverty alleviation programmes focused on rural poor and were scheme-based. Swarna Jayanti Shahari Rozgar Yojana (SJSRY) was the only programme which focused on livelihood promotion of the urban poor. Evaluation of the SJSRY reveals that the urban poverty is multi-dimensional and urban poverty alleviation programmes must be skilled and credit-access oriented. (12th Five-Year Plan, Approach Paper)

The 12th Five - Year plan focuses on ‘Building inclusive cities with equal opportunity for all’. The plan document gives due emphasis on urban poverty and therefore includes a special section on — *Alleviating Urban Poverty: Creating Sustainable Livelihoods and Enterprises* which suggests for adopting a multi-pronged strategy for urban poverty. These strategies include imparting relevant skills, facilitating self-employment, proactive and mandatory creation or allocation of spaces within city boundaries to ensure livelihood opportunities and financial inclusion of urban poor. (12th Five-Year Plan, Approach Paper).

Deendayal Antyodaya Yojana—National Urban Livelihood Mission (DAY-NULM)

A flagship programme for urban poverty alleviation – ‘Deendayal Antyodaya Yojana-National Urban Livelihood Mission’ was launched by the Ministry of Housing and Urban Poverty Alleviation, Government of India on September 23, 2013. It replaced the Swarna Jayanti Shahri Rozgar Yojana (SJSRY), ongoing since December 1997. Unlike DAY-NRLM that focuses on rural poor population, DAY-NULM is focused to improve the livelihoods and vulnerabilities of the urban poor households by providing them skills and supporting them in getting credit. Under the programme, the methodology applied

is similar to DAY-NRLM wherein grassroots level primary informal collectives of the poor are formed. These groups are further federated into second-level institutions. The Mission also addressed livelihood concerns of the urban street vendors by facilitating their access to suitable spaces, institutional sources of credit, social security and skills to enable them to access the emerging market opportunities.

DAY-NULM is a focused, mission-driven initiative aimed at reducing urban poverty through skill development and job creation, including opportunities in daily wage work and self-employment. Shifting from traditional resource distribution based on regional allocation to a demand-driven approach, states could be granted greater authority to design and implement policies that address the needs of the urban poor, while taking local characteristics into account. It is important to note that the mission further touches on equipping the urban poor with institutions and capacity building skills empowering them to develop and implement the programmes independently with government support. This approach signifies that community ownership and self-reliance are the key components that make sustainable poverty alleviation efforts in the urban context well-driven.

In the first phase, the DAY-NULM covered all cities with a population of 100,000 or more and all District Headquarters Towns with a population of less than 100,000 as per 2011 Census. For Hill, North-Eastern and very small States, cities with a population of less than 100,000 were also covered under NULM with suitable justification. (NULM Mission, 2013).

The key objective of DAY-NULM is to establish social mobilisation of urban poor to form Self-help Groups (SHGs). Members will join the SHGs first and then form the Area Level Federation (ALF) and the City Level Federation (CLF). Resource organisations will facilitate SHG formation, bank linkages, federation formation, and capacity building, spending up to Rs. 10000 per SHG. A Revolving Fund support of Rs. 10,000 per SHG (with more than 70 per cent urban poor members) and Rs. 50,000 per registered ALF will be provided. There will be around eight City Livelihood Centres (CLCs) according to the population which will be set up with a capital of Rs. 10 lakh per CLC providing one-stop solution for urban poor for both services and information. SHGs and federations along with institutions to conduct prescribed training and capacity building programmes with the maximum amount of Rs.7,500 per trainee to be expended.

Capacity Building and Training (CB&T) and Employment through Skills Training and Placement (EST&P) aims to transform the Ministry and State agencies into technical assistance providers for urban livelihoods promotion. The EST&P component focuses on skills development and upgrading the urban poor, targeting 30 per cent women, proportionate representation of SCs/STs, three per cent differently abled, and 15 per cent minorities. Skill training, preferably through PPP mode involving reputed institutions will be linked to accreditation and certification. The cost per beneficiary

shall not exceed Rs. 15,000 (Rs. 18,000 for NE and special category states), including training, certification, and placement expenses. Part payment will be linked to establishment of micro-enterprises or job retention for six months, with 50 per cent mandatory placement for placement-linked training. (NULM Mission, 2013).

Urban Poverty Alleviation Through Better Microfinancing

There has been an increase in informal settlements and slums due to rapid urbanisation aggravating poverty and inequality. For the marginalised communities, the traditional banking system does not reach them due to which they do not have an access to essential financial services of credit and saving. Microfinancing promotes both financial and social inclusion. Financial inclusion is promoted by bringing banking services to the underserved. Microfinance Institutions (MFIs) provide micro loans and various financial products which can be customised as per the needs of small urban entrepreneurs and households with low income. Social inclusion is promoted by empowering the marginalised sections, the small entrepreneurs and advancing gender equality. By providing women entrepreneurs with financial literacy and support, MFIs enable women to participate actively in socio-economic activities. The group lending models, and community-based saving schemes help in reducing poverty and lead to inclusive growth.

Initiatives on Microfinance to Urban Poor for Livelihood Promotion

‘Microsate branches of Indian Bank – The first public sector bank to have an exclusive branch for microcredit to SHGs was the Indian Bank. Empowering the urban poor through financial inclusion, Indian Bank ran a ‘Microsate’ in Chennai to specifically facilitate these services. (Microsate is a satellite branch for micro loans) The Chetpet branch was the first Microsate Branch started in May 2005. The Bank extended its network to the rest of the country with an objective not only to help these communities but also to equip them with the most sustainable self-employment opportunities. The types of activities that can generate environmentally-sustainable self-employment include food processing and marketing, trading in construction materials like cement bags, engineering equipment, motor vehicle repair, carpentry, plumbing, electrical and electronic appliances services, child care or senior citizen home maintenance, running supermarket, hair salon, audiovisual syndication and even organisation among others. These are some examples of the successful ways through which Self-Help Groups (SHGs) operate in urban areas. Thus, becoming the most desired bank for the promotion of microfinance bank services and SHG empowerment, the Indian Bank is going to open 12 new Microsate branches within the coming year. This expansion is set to bring the number of Indian Bank branches under the exclusive authority of SHGs

to 24, helping the bank in its provision of finance and facilitate sustainable livelihood.

Urban Microenterprise development by ‘Bandhan’ Bank—Among microfinance borrowing products, Bandhan Bank (Personal Banking. Bank when you want, the way you want, easy accounts, deposits, cards, loans and insurance) introduced the novel idea of micro-loan and offered a microenterprise programme targeting mature clients from urban segments for sustainable livelihood. Bandhan Bank, is basically a provider of financial products and services in rural areas. (Bandhan Bank, July, 2022_Impact Assessment study for Bandhan Bank CSR Initiative).

Bandhan Bank launched the Bandhan Skill Development Centres (BSDCs) to combat unemployment in India. These vocational learning centres provide skill training to unemployed youth, offering a range of courses in fields such as sales, hospitality, IT-enabled services (BPOs), computerised accounting, and refrigerator and AC repair. The programme is uniquely designed for the extremely poor, targeting the hardcore poor community. It provides destitute women with grants in the form of productive assets, along with free professional consultations and mentoring support. Additionally, participants receive a weekly stipend to meet their basic needs until the agricultural schemes they implement begin to generate income. Financial literacy is also provided to help participants make informed financial decisions. The efforts of Bandhan Bank have proved to be very useful and have changed poor peoples’ lives in many ways. The ‘Targeting the Hard-core Poor Programme’ helped 29,362 women to lift themselves above the poverty line with an average monthly income of INR 7,456 during the FY 2016-2022. During this period the ‘Bandhan Health Programme’ effectively covered an average of 12,49,009 people with the focus on maternal and childcare. ‘Bandhan Education Programme’ offered standard primary schooling to 1,12,786 students impacting 80 enhanced academic results and 27 per cent decrease in monthly expenditure on education in FY 2017-2022. Employment generation campaign ‘Employing the Unemployed’ imparted training to 11,487 candidates and successfully placed 7,791 candidates with an average monthly income INR 13,591 and escalated household incomes increased by 28 per cent for FY 2018-2022. The ‘Financial Literacy Programme’ reached 312,715 women, contributing to their financial empowerment. (Bandhan Bank, July, 2022_Impact Assessment study for Bandhan Bank CSR Initiative).

Variety of Microfinance services to Urban people by ‘Arohan’ – ‘Arohan’, a leading, digitally advanced, NBFC-MFI (Non-Banking Financial Company-Microfinance Institution), started providing financial services to socio-economically disadvantaged sections to improve the quality of life for its beneficiaries in the urban areas of West Bengal. ‘Arohan’ offers a broad range of credit and non-credit products and financial inclusion services to its growing customer base. While Arohan’s credit products include income generating loans and other loan products for various household purposes, its non-credit products include Life and Non-Life covers, issued and underwritten

by leading Indian insurance companies, along with facilitation for various lifestyle improvement products like mobile phones, refrigerators, pressure cooker, television, mixer grinder, induction cooktop, inverter bulbs, etc. Through its inorganic business vertical, 'Arohan' also offers term loans to small Micro-Finance Institutions for onward lending to customers. In FY 2023, the Company has also introduced working capital loans for Micro Enterprises with ticket sizes starting from INR 1,05,000 from its pilot branch in Kolkata, West Bengal. (*Annual Report, 2022-23, Arohan Microfinance*).

Initiatives by Cooperative sector for urban microfinance—There are many good examples of initiatives undertaken by some of the prominent financial and livelihood promotional cooperatives in India. These are Urban Cooperative Banks, Urban Thrift and Credit Cooperatives and multipurpose cooperatives that are providing microfinance and support services to the urban poor.

Some of the successful examples include SEWA bank, Ahmedabad, Cuttack Urban Cooperative Bank, Cuttack, Bhagini Nivedita Sahkari Bank, Pune, Mann Deshi Mahila Sahakari Bank (MDMSB), Maharashtra, Apni Sewa Sahkari Samiti, Rajasthan and Mahila SEWA Urban Cooperative Thrift and Credit Society, New Delhi. There are some multistate urban cooperative banks like Cosmos and Saraswat Urban Cooperative Banks that function in more than one State.

SEWA (Self Employed Women's Association) was registered on April 12, 1972, and is a confluence of union, cooperatives and women movements. It is the largest union of 2.9 million of poor, self-employed women workers from the informal economy across 18 states in India. (*SEWA_about_us*).

Financial Products of SEWA Bank:

- Jeevan Asha (Daily Recurring Scheme)
- Chinta Nivaran Scheme (Worry Riddance Scheme)
- Kishori Gold Yojana (Buying Gold Scheme)
- Mangal Prasang Yojana (Special Occasion Scheme)
- Ghar Fund Yojana (House Fund Scheme)
- Regular Recurring Scheme
- Pension Scheme – National Pension Scheme
- Pension Scheme – UTI Retirement Benefit Pension Fund

Self-employed women are predominantly classified as small and petty vendors, home-based workers, and labourers in various sectors such as incense stick-making, vegetable vending, rag - picking, agriculture, and head loading. These women are economically active, often working long hours, yet they lack ownership of assets and capital, live in poor conditions, have limited professional skills, and are mostly illiterate or semi-literate. They are trapped in a vicious cycle of poverty and vulnerability.

The objective of Sewa Bank is to help poor women to come out of the vicious cycle of poverty by helping them to come out of the clutches of money lenders, build their own capital and assets, build their business and minimise their risks.

To improve their working and living conditions, the Sewa Bank emphasises on the financial services being provided to the women in the form of savings (direct), pension (direct), credit (direct), insurance along with non-financial services like financial literacy and business counselling. Financial literacy is imparted through trainings, campaigns, financial camps, individual counselling and collective meetings. Its various components comprise the importance of financial planning, savings, borrowings, consumption, investment, insurance and preparing the budget and future plan. The Bank provides secure loan in the form of ornament loan, NSC loan, house loan, fixed deposit overdraft and recurring overdraft. The unsecured loan is provided as working capital loan, for repayment of old debt, house repair, etc. They pay an interest on fixed and recurring deposit.

It is important to emphasise the service delivery methods used to reach self-employed women, including door-to-door services, hands-on support, collateral-free lending, and other similar approaches. “*Bank Saathis*,” incorporated under SEWA Bank, play a crucial role in this process by sharing their trade knowledge with clients within their communities. These “*Bank Saathis*” work closely with the bank, providing personalised services that meet customers’ needs. During the loan evaluation process, they assess a borrower’s credit score, offer guidance on loan applications, repayment schedules, and limits, and explain the consequences of delayed payments. Beyond financial education, “*Bank Saathis*” also offer comprehensive support to women, including childcare services, legal advice, medical assistance, and other essential services that help everyone in the community to prosper and thrive.

Loans to youth by J&K Bank for Sunday Flea Market in Jammu and Kashmir— Jammu & Kashmir Bank provided micro loans to more than 300 unemployed youth to set up shops in the Sunday flea market in Srinagar. Bank collaborated with the state administration to distribute ration cards, doing survey of the potential clients and communicating Bank’s MF products. Bank encouraged youth to set up shops in Sunday market and provided zero mortgage loans that could be paid back in easy instalments.

Customised loans to Urban Clients — Grameen Koota, a microfinance institution based in Bangalore, operates in both urban and rural areas, with some variations in its loan products. In urban areas, clients often request larger loan amounts compared to those in rural regions. To meet this demand, Grameen Koota offers slightly larger loans to its urban clients. While the primary focus of these loans is income generation, a small portion of the loan portfolio also includes consumption loans.

Financial services to Urban Slums — *Swabhimaan*, based in Pune, is engaged in urban microfinance, primarily serving as a technical support organisation. They collaborate with several NGOs to provide financial services to slum dwellers in Pune and Mumbai. *Swabhimaan* employs a sustainable model that incorporates scoring to aid in decision-making. They successfully work with both individuals and Joint Liability Groups (JLGs).

Access to credit for poor women through a SHG Federation — Sri Padmavathy Mahila Abyudaya Sangam (SPMAS), a federation of SHGs was formed due to demand for access to credit from poor women involved in providing goods and services to pilgrims, domestic work, rag picking, garland making and unskilled labour work. With 100 per cent of SPMAS members living in the slums of Tirupati, it collaborated with Tirupati Municipal Corporation for providing collective water connections to the members.

SHG Federation works with City Authorities, Madurai, Vizag — DHAN Foundation promoted SHG federations and partnered with local municipal corporations on Slum Infrastructure through microfinance. Efforts were made to involve the community right from the planning stage of the intervention. Involvement of visionary officers in the local Municipal Corporation was pivotal in the creation of infrastructure. Management of the infrastructure was later turned over to the community.

Microfinance Services provided at the “Doorstep” of urban cities — The Government of Kerala has introduced “*Kudumbashree*” a poverty alleviation scheme by setting up of micro credit and productive enterprises. Under this scheme, Thrift and Credit Societies are set up at neighbourhood level to facilitate the poor and to avail easy credits, which have now grown up to Informal Banks of the poor women at their doorsteps. It has been able to cover 58 urban towns with 10,687 Thrift and Credit Societies. (*Kudambashree_about_us*).

Kudumbashree has emerged as a pioneering model for women empowerment and poverty alleviation in Kerala. As per the official statistics, it has mobilised over 4.4 million women into 3,17,663 Neighbourhood Groups (NHGs) who have cumulatively accessed Rs. 5,500+ crores in loans¹. Its focus on micro-enterprises has yielded remarkable results, nurturing over 2.3 lakh units with a collective turnover of Rs. 8,103 crore in 2021-22. Kudumbashree’s ‘Ayalkoottam’ initiative has mobilised over 1.2 million elderly members², providing them with care and support services. The scheme’s transformative impact has inspired replication across India and abroad.

Most recently, the National Urban Cooperative Finance & Development Corporation Limited (NUCFDC) was inaugurated by the Minister for Cooperation on March 2, 2024, as an umbrella organisation of Urban Cooperative Banks (UCB) which are tools for financial inclusion, poverty alleviation, promoting startups and empowering youth.

Issues, Suggestions and Recommendations on Urban Poverty

Issue -1: Poverty encompasses more than just a lack of income; it also includes various forms of deprivation, such as inadequate shelter and limited access to employment opportunities. The urban poor often suffer from a lack of basic civic services, as the quality and availability of these services in slums are generally poor and insufficient, significantly impacting their quality of life.

Suggestion: To tackle these challenges, stratifying the poor into different categories can be useful. A significant portion of the poor includes homeless individuals and pavement dwellers. Many of the poor work in the informal sector, where their income is inconsistent and unreliable. Lacking alternative income sources, they have little to fall back on during crises. Even those who manage to rise slightly above the poverty line are at risk of falling back into poverty during emergencies like illness, floods, or famines.

Issue -2: Identifying and achieving 100 per cent coverage of the urban poor remains a significant challenge, with many poor families often being overlooked.

Suggestion: The socio-economic caste census conducted by Census of India in 2011 can be taken up as a starting point, but it needs revision in terms of additional information that is more robust in its process of identification of urban poor. A participatory approach for identification of poor (PIP) must be applied.

While identifying tools for identification of the urban poor, the already existing tool Socio-Economic Caste Census (SECC) can be used with some modification. A methodology for SECI needs to be adopted to make a composite index wherein scoring needs to be changed according to the level of being poor. S.R. Hashim Committee formed by Planning Commission, submitted the report to the Government of India in December 2012, has also suggested a score-based mechanism for identification of poor based on indicators of residential, social and occupational vulnerability.

Mapping of urban poor is a *sine qua non* for devising any poverty alleviation scheme. Moreover, Geographic Information System (GIS) based mapping will help in assessing the condition of urban poor. While identifying and targeting the poor, the overall policy framework should also be considered as many a times the policy itself puts forth certain limitations. Also, many of the projects have budgetary constraints which limit the number of beneficiaries to be targeted under the scheme.

Issue -3: Urban Local Bodies lack the necessary capabilities to effectively target the poor. To improve identification and targeting efforts, the insights from research institutions and community-based organisations should be considered. The Census of India and the National Sample Survey Organisation do not fully capture all aspects of poverty. Reconciling these two data sources is essential for a comprehensive analysis of the current conditions faced by the poor.

Suggestion: It is important to put stress on identifying different segments of the poor in urban areas, classification of the urban poor based on occupation, category, geographic location, etc., are tools for identification of urban poor. While identifying the segments of urban poor, in terms of geographic location, people living in all types of slums (notified or non-notified) should be considered as poor. Though there will be some exceptions, but large proportion of poor do live in slums. Income should not be the only criteria for identification of poor.

When identifying the poor based on occupation, all vulnerable jobs, such as those of beggars, rag pickers, domestic workers, sweepers, sanitation workers, and gardeners, should be recognised as indicative of poverty. Other categories to include are hawkers and street vendors, cobblers, plumbers, construction workers, painters, tailors, drivers, conductors, coolies or head loaders, and washermen, among others.

Issue -4: The concept of poverty should also include lack of access to basic services and different types of residential, social and occupational vulnerabilities.

Suggestion: Ownership of household assets should not be the sole criterion for identifying the poor, as many individuals, such as domestic workers and drivers, acquire these items from their workplaces. In addition to slums, areas like construction sites, railway tracks, and low-lying marginal regions often serve as squatting grounds for the urban poor and should be considered for identification. Migrants and disabled persons should also be recognised separately in the assessment. A significant portion of the poor includes homeless individuals and pavement dwellers.

Recommendations on Institutional Building, Capacity Building and Partnerships

- **Under Collectivisation** — Social mobilisation is not just the ‘formation’ of groups, but empowerment, financial self-reliance, and participation and access to government, its schemes and programmes for the urban poor. Focus should be on these elements with special attention to bank linkages for purpose neutral loans to meet the credit needs of the urban poor. Urban poor are collectivised in various possible groups/ primary institutions, centred around the entry of the urban poor and their degree of freedom to collectivise and form groups. The fact that different cities have different characteristics which may affect the correlates of affinity. Inter-sectoral groups which may be market-driven along with new forms of savings and occupation groups, are needed in urban areas.
- **Second-level Institutions** — Institutional development can be strengthened by establishing area-level federations and multipurpose societies, which would function as both primary and secondary structures. While group-based initiatives are present, there is still a gap in the formation of second-level institutions, such as urban federations, which are currently missing.

- **Preparing the Groups for Business** — It is also recommended to codify the urban SHGs, allocate separate funds for strengthening them through re-engineering, training or preparing them for business development services.
- **Empowering for the Entitlement of the Urban SHG Members** — While looking for different types of collectives, geography and demography of the area, the entitlement of the SHG members to health and other benefits and linking them to the needs of the poor will be useful. Sometimes, poor join for entitlements and then start savings and taking credit.
- **Engaging Specialised Agencies for Skill Development** — To strengthen the existing institutions, skill component and specialised agencies need to be considered for holding capacity building at various levels in the form of training, awareness generation initiatives, knowledge sharing, etc.
- **Capacity Building of the Urban Poor** — The CSR efforts of the industry should have capacity building of the urban poor as one of its components. The Central and State Public Sector Enterprises and National Skill Development Agencies should promote capacity building.

Recommendations on Livelihood Promotion

- **Urban Local Bodies (ULBs) to Take Lead Role** – The 74th Constituent Amendment requires all Urban Local Bodies (ULBs) to pursue urban poverty alleviation first. Correspondingly, ULBs must launch programmes which will focus on the all-encompassing necessities of the urban poor; these will include skills training, job opportunities and holistic empowerment all within city/town confines.
- **Comparable Opportunities like MGNREGA required in Urban Areas** — Viable and scalable business opportunities and models need to be made available and further linking them to the markets and marginalised groups (seasonal self-employed persons). According to the present scenario, there are minimum guaranteed employment opportunities that exist in the rural areas, but no such comparable opportunities exist in the urban areas e.g.: a parallel of MGNREGA.
- **Promotion of Self-Employment** — Promoting Self-employment is very important. Individual, Group Enterprises and Cooperatives should be promoted and linked with banks for financial support and facilitate linkage with Credit Guarantee Fund Scheme.
- **Promoting Street Vendors in an Organised Manner** — Street vendors from the bottom of urban elite design protection system work towards the top of the economic pyramid. Street vending is among key self-employment sources which is, in many cities, a visible element of the local supply chain and a contributor to the economies. Urban poor alleviation programmes aim to fulfil the street vendors'

needs by way of planned initiatives, providing support and aid in getting access to credit for establishing and expanding businesses, including funds for infrastructure and day-to-day work requirements, which are critical in making the livelihoods of these vendors sustainable.

To conclude, with urbanisation and cities growing and evolving, urban poverty is a critical priority for inclusive and sustainable development. Microfinancing does provide opportunities for urban poverty alleviation but there are challenges as well. The challenges can be addressed with policy reforms and capacity building of the urban poor. Investing in inclusive financial systems and supporting grassroots and community-based initiatives like cooperatives can help to build equitable and prosperous cities and provide opportunity for everyone to survive and thrive.

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Public Perception of Urban Green Spaces and its Tree Diversity in Delhi

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Abstract

The relationship between man and nature plays an important role in the everyday lives of human societies. Places like Delhi and its people face major challenges and issues of urbanisation affecting their health and well-being. Urban greens such as parks play a major role in bringing greenness into the lives of urban dwellers. Trees are seen as a major green component in the urban greens. This paper attempts to understand how public sees green spaces and their uses. Tree diversity index (The Shannon Index also known as Shannon Weiner Index, is a statistical index that measures diversity by estimating species richness and evenness.) canopy cover, and tree trunk diameter have been taken as indicators of greenness of park. Tree distribution at the species level is studied in one of the parks managed by Delhi Development Authority as 'Landmark greens'. The park users' perception is studied using an ethnographic method. Whereas the Shannon index is 2.2, which is a moderate value, 50 per cent of the visitors could only identify the popular species namely Neem, Banyan, Ashok, and Peepal. People are aware of the potential benefits of trees and plants or the role of green spaces in their overall well-being. Some of the visitors are the regular ones as they use the park with a purpose to heal from respiratory tract infection, obesity, diabetes, and palpitation, while there are 22 per cent visitors who found the park unsafe during certain instances.

Keywords

Landmark greens, Urban parks, Tree diversity, Perception, Benefits.

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Introduction

The literature on urban green spaces shows the conceptualisation of urban greens, their significance, and their challenges. The European Union defines it as “a private or public open space” covered with vegetation that can be used for recreation purposes (Baycan et al., 2009); the Ministry of Housing and Urban-Rural Development, China defines it as “the form of natural and artificial vegetation in urban areas” (CJJ / T85-2017 as cited in Xu, Z., Zang, Z and Li, C 2019). Warren (1973) defines it as “land that is covered with certain vegetation.” According to Li et al., (2004), it is defined as a “network system composed of the urban forest, green corridor, garden green space, and urban farmland.” It is also defined as “all kinds of green spaces within cities which serve the needs of production, living, and ecology” (Xu et al., 2019). Therefore, the urban green spaces are defined using different contexts such as conditions of the locations, open spaces, ecological functions and services, and quantitative standards. Studies in Latin America focused on environmental benefits and ecosystem services, however they neglected the aspect of management (Breen et al., 2020). Recently, urban green infrastructure has become a strategy for resilience and sustainability of the cities (Badiu et al., 2016). The greens act as critical biodiversity hotspots in urbanised, concrete, and crowded cities (Nagendra and Gopal, 2010). They provide physical, mental, ecological, and social well-being. They also offer various ecosystem services, the benefits that we receive directly or indirectly through natural systems, which include services like human survival, health, livelihood, and well-being. Others include carbon sequestration, soil fertility, air quality regulations, mitigating the urban heat island effect, reducing air pollution, spiritual values, tourism, aesthetic values, recreational opportunities, nutrient recycling, moderation of disturbances, etc. They further provide critical habitat to urban flora and fauna (Khera et al., 2009; Kong, Yin and Nakagoshi, 2010). They also act as spaces for environment education, spiritual, recreational, cultural, and therapeutic healing (Bolund and Hunhammar, 1999). Thus, urban green spaces have been proved beneficial for human health and well-being (Scott et al., 2016) by reducing noise pollution (Margaritis and Kang, 2016), improving air quality (Nowak et al., 2006), preventing heat stress and improving psychological wellbeing (Sandifer et al., 2015). Green cities not only provide human health and well-being (an agenda of SDGs) but also promote urban sustainability (Arnberger, 2006; Bennett, et al., 2009; Bolund and Hunhammar, 1999).

Some studies have shown that urban green spaces might bring disservices to the cities, fostering the spread of diseases. (Palliwoda and Priess 2021). Ecological Studies have suggested that the conservation regimes should be extended to the urban greens as they act as an oasis of biodiversity to the expanding cities (Chiesura, 2004). Some studies have revealed that urban green spaces nurture a higher floral diversity (Angold et al., 2006, Dana et al., 2002, Godefroid, 2001, Kent et al., 1999, Ricotta et al., 2001, Zerbe et al., 2003) which may be a result of diverse human activities that gave rise to high species richness and diversity in cities (Muratet et al., 2015). Contrary to this, it has also been observed that human alterations have resulted in loss of biodiversity at

regional and global scale (MEA, 2003; Thomas et al., 2004; Balmford and Bond, 2005). In recent decades the emphasis of policy making on the stakeholders' engagement is gaining the limelight. Biodiversity conservation is critically subject to human attachment values (Lindemann-Matthies, P ; Junge, X & Matthies, D 2010). The conservation process of these green spaces rarely considers the user's knowledge, needs, and perception (Muratet et al., 2015). Understanding the human factors responsible, can be the trigger for a better design, management and attractiveness which will increase people's participation in the conservation programmes (Shwartz, Turbé, Simon, & Julliard, 2014), increasing residential satisfaction (Gersternberg and Hofman, 2016) and ultimately leading to better policy making for the urban environment. (Malik et al., 2021).

The world population is expected to reach 8.5 billion by 2030 with 66 per cent living in the cities (UN 2022). In 2018, the urbanisation rate in India was 0.25 per cent, expected to double by 2050 (UN 2018). Urbanisation leads to various environmental and health problems (Manzoor et al., 2009). Urban green areas within or nearby human habitation are always ignored in conservation initiatives (Chiesura, 2004). For urban dwellers, parks are the only green spaces used for recreational purposes (Nagendra and Gopal, 2011; Taylor et al., 2020) where public views and perceptions are considered important for improvement (Malik et al., 2021). Even during the Covid-19 pandemic, urban parks ensured a nature-based solution(s) (Nesshover et al., 2017; Kleinschroth and Kowarik., 2020). Tree Diversity provides ecosystem services and evaluates a city's ability to support a healthy green space ensuring resilience to ecological disturbances (Dobbs et al., 2014; Riley et al., 2018; Galle et al 2021) and other challenges/vulnerabilities (Isbell et al., 2011; Morgenroth et al., 2016; Ordóñez and Duinker, 2014; Paul and Nagendra 2017). Simultaneously, the diverseness of tree species indicates different levels of people's attachment thereby bringing perception and understanding of green spaces in multiple ways. Understanding the perception of green spaces is significantly linked to urban planning and development (Atiqul Haq SM et al., 2021). Most of the studies are conducted in developed countries such as North America and Europe. Fewer studies are conducted in South East Asia, Russia, and Australia (Mckinney, 2008). Less information on urban forestry, specifically the urban parks in South Asia, is available (Paul and Nagendra, 2017). It is also found that the conservation of greens rarely considers the user's knowledge, needs, and perception (Muratet et al., 2015). Therefore, sustained holistic use of urban green spaces requires public support, and participation (Paul and Nagendra 2017; Atiqul Haq SM et al., 2021) for this, a perception study is a must.

Materials and Methods

Swarn Jayanti Park, Rohini, New Delhi

Swarn Jayanti Park is a prominent green space within Delhi, recognised as the largest park in the North West Delhi district, which itself is the largest district in the city

(Figure 1). Given North West Delhi's size, the quest for green spaces, particularly parks, is of considerable significance. The identification of these green areas is vital. Notably, Swarn Jayanti Park takes the spotlight as the largest park in the North West district. It is worth noting that despite its considerable size, this district has the least forest cover. Delhi Development Authority (DDA) has divided green spaces in Delhi into Landmark Greens (LGs), Master Plan Greens, Ecological Greens, Reclaimed Greens, Historic Greens, Consultancy Projects, and Projects in making. For this study, one of the Landmark Greens was selected from a total of 12 LGs in Delhi (Figure 2). The landmark greens are anticipated to be a 'joyous and blooming garden' by the DDA. Out of the 17 landmark greens, listed by DDA, five have been leased out to NGOs or transferred to other authorities like the Municipal Corporation of Delhi (MCD). Swarn Jayanti Park in Rohini, North West District Delhi has been selected for this study.

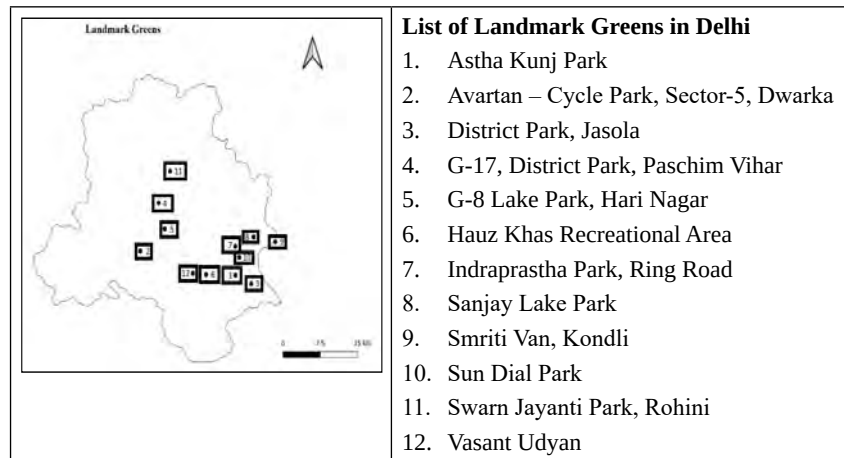


Figure 1: List of Landmark greens in Delhi



Figure 2: Swarn Jayanti Park, Rohini.

Source: Google Earth.

Methods of Data Collection

The study is a triangulation of anthropological, ecological and GIS methods in the form of qualitative and quantitative data. Stratified random sampling was used for tree diversity. On the basis of Google earth and reconnaissance visits to the park, the strata were identified and divided in four with the help of Google Earth and Quantum Geographic Information System (QGIS). Random points were generated with the help of QGIS and treated as the representative sample of the whole park. The basis for categorisation was the availability of trees. Using QGIS 3.20.3, random points (4) in each of the strata were generated and studied (Figure 3). A minimum of 100-200 m distance was kept among the random points within a stratum to ensure the maximum tree coverage.

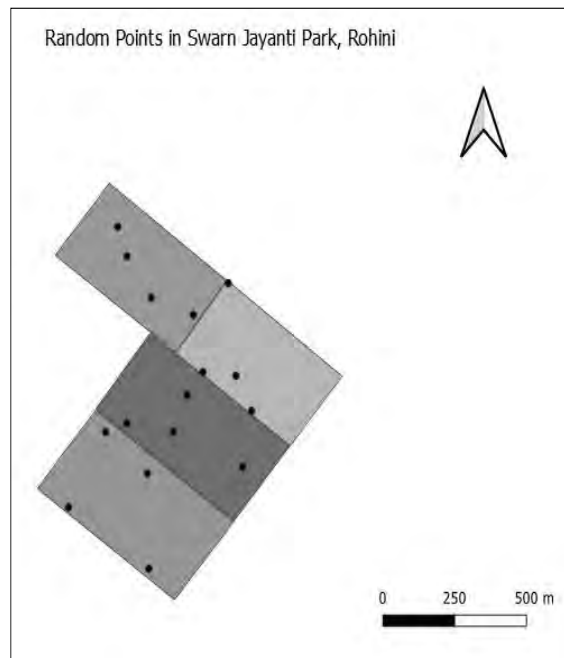


Figure 3: Distribution of random quadrat points in the four selected strata

Source: This is made from the primary data using QGIS.

A quadrat is usually a square frame laid down on a specific area to be sampled. 10m x 10m quadrat plot was plotted to assess the tree diversity. Within each quadrat, trees were counted and identified at species level, and their Diameter at Breast Height (DBH) was measured. The canopy cover of the tree was observed with the help of a Densiometer, and it can be categorised into six categories (Nagendra and Gopal, 2011) such as 0-5 per cent, 5-25 per cent, 25-50 per cent, 50-75 per cent, 75-90 per cent and 90-100 per cent. Several phyto-sociological characteristics of the vegetation like density, distribution, and diversity were also calculated using quadrats. The number of

trees available was used to find the density. Identification of the trees was done with the help of local gardeners, a mobile app called 'itrees' and the book, '*Trees of Delhi*' by Pradip Krishen, 2006. Shannon's diversity index at the species level per plot was used to find the diversity. Trees were assigned six different classes as per GBH: 0-15cm, 15-30cm, 30-45cm, 45-60cm, 60-75cm, 75cm above (Nagendra and Gopal 2011). The collected data were added together and considered collectively making it an adequate sample of the community. Ethnographic methods such as observation and interviews were used. Observation of the park and activities performed around it helped in getting an overview of the social aspects. Answers to queries like— who are the park users, what timings are the peak hours and which activities are mainly performed by whom, how do they maintain the park were observed. The perception study was conducted from 40 respondents using a semi-structured interview schedule. The respondents were selected using convenient sampling. Consent forms were filled by the respondents before conducting the interview sessions. The data collected were coded and entered into MS excel document for frequency data generation.

Results

Tree Diversity

For the selection of the above-mentioned 16 quadrats randomly, the areas with water bodies and places that are not accessible to the public were excluded. A total of 41 trees of 11 species in 16 quadrat plots of 10m x10m each in four different parts of the park were recorded (Table 1).

Table 1: Number of trees present in the 16 quadrats selected

Strata	Quadrat	Number of Trees	Strata	Quadrat	Number of Trees
I	Quadrat 1	1	III	Quadrat 1	1
	Quadrat 2	2		Quadrat 2	1
	Quadrat 3	5		Quadrat 3	5
	Quadrat 4	5		Quadrat 4	1
II	Quadrat 1	0	IV	Quadrat 1	0
	Quadrat 2	3		Quadrat 2	1
	Quadrat 3	2		Quadrat 3	8
	Quadrat 4	4		Quadrat 4	2
Total number of trees= 41					

Source: Primary Data Collection.

Table 2: Identification and Abundance of Tree Species

S. No.	Common Name	Scientific Name	Abundance (in number)
1	Neem	<i>Azadirachta indica</i>	4
2	Ficus	<i>Ficus benjamina</i>	5
3	Ashoka	<i>Polyalthia longifolia</i>	12
4	Peepal	<i>Ficus religiosa</i>	3
5	Katsagon	<i>Fernando adenophyllum</i>	1
6	Putranjiva	<i>Drypetes roxburghii</i>	1
7	Teak	<i>Tectona grandis</i>	5
8	Maulsari	<i>Mimusops elengi</i>	2
9	Mahua	<i>Madhuca longifolia</i>	4
10	Siris	<i>Albizia lebbbeck</i>	1
11	Toot	<i>Morus alba</i>	3
	Total		41

Source: Primary Data Collection.

Out of 16 quadrats generated, 41 trees belonging to 11 species were found (Table 2). The most common species present and found in our study were *Polyalthia longifolia* and *Tectona grandis*.

Table 3: The canopy covers (percentage)

Range (in Percentage)	Number of Quadrats
0-5	1
06-25	1
26-50	7
51-75	4
76-90	2
91-100	1

Source: Primary Data.

From Table 3, it has been observed that the average canopy cover in all the quadrats is 52 per cent ranging from 0 per cent to 99 per cent. The maximum number of quadrats, i.e. seven falls in the 26-50 per cent category of canopy cover.

Table 4: Diameter at Breast Height

Range (in cm)	Number of Trees
0-15	0
16-30	5
31-45	3
46-60	5
61-75	13
<76	15

Source: Primary Data.

From the Table 4, it has been observed that the average diameter at breast height (DBH) was 77cm ranging from 210 cm to 20 cm. As per the diameter at breast height, most of the trees are 40-60 years of age.

In order to understand the tree diversity, the following formula for Shannon's diversity index has been used.

$$H' = - \sum_{i=1}^s p_i \ln p_i$$

H': Shannon's index of diversity

s: The number of species

p_i : The ratio of individuals of species i divided by all individuals N of all species.

Σ : Sigma (Sum symbol)

ln: Natural logarithm

The overall diversity by Shannon's index of diversity indicates moderate diversity in the park. The maximum diversity is found to be present in Strata 1. The maximum number of species observed is six. The value of Shannon's diversity indices is 2.2, which implies moderate diversity. Its range value is 1.5-3.5. (Nagendra, 2011). As the index value is 2.2., we can say that the park has sparse/moderate tree diversity at the species level. However, the park as a whole has trees in clusters at the same species level. The trees with the same species-level present in clusters are present in the areas that didn't fall under the randomly generated quadrats of our study. However, this does not affect the species-level information on trees present in the park. The status of moderate diversity indicates that much attention has been given to the diversification process of the trees present in Swarn Jayanti Park. In addition, many exotic and alien species like *Prosopis juliflora* and Bamboo are also observed. These species look good though they do not provide as many benefits as beneficial to the users. In the coming days, if they become dominant, we may expect that their presence will hinder the growth of native species.

Public Perception: Socio-cultural Aspects of the Swarn Jayanti Park

It has been observed that most of the visitors were in the age group of 21-50 years (Table 5). The aged population above 60 years couldn't be observed as their availability was less in the park. Number of women visiting the park, especially during the afternoon, was almost negligible. About 52 per cent of the visitors were educated up to the graduate and post-graduate levels. About 47 per cent of the visitors were found to be regular salaried persons and 17 per cent were self-employed. 40 per cent of the visitors visit the park on a daily basis which is quite a good number in terms of the utilisation of the park and its facilities. 32 per cent of visitors use the park on a monthly basis, majorly on national holidays or occasionally. As the DDA recorded about 10,000 visitors visiting the park on national holidays, it is also pertinent for us to observe that 32 per cent of the visitors are available once a month only. The maximum number of visitors that we observe is during the morning and evening hours which are also suitable times for walking, exercise, and relaxation. Most of the respondents were not aware of the ecosystem services and benefits of the park trees. 50 per cent of the visitors could only identify the popular species namely Neem, Banyan, Ashok, and Peepal. Park users are not aware of the geographic origin of the tree species. They know the names due to their common presence in parks. The gardeners expressed their limitations on bringing many more species from selected nurseries as there are shortages of funds.

Table 5: Demographic features of the park visitors and their knowledge of trees present in the park

Features of the visitors to the park		Age Group (years)						
		0-10	11-20	21-30	31-40	41-50	51-60	>60
Gender	Male	0	1	6	5	6	5	0
	Female	0	0	7	5	3	0	2
Education	Illiterate	0	0	0	0	1	0	0
	Primary	0	0	0	0	2	0	1
	Middle	0	0	0	0	1	1	0
	Matriculation	0	0	1	1	2	1	0
	Intermediate	0	1	3	0	0	2	1
	Graduate	0	0	6	6	0	0	0
	Post Graduate	0	0	3	3	2	1	0
	PhD	0	0	0	0	1	0	0
Occupation	Casual Wager	0	0	1	0	3	1	0
	Housewife	0	0	2	2	0	0	1
	Regular Salaried	0	0	5	7	4	2	1
	Self Employed	0	0	2	1	2	2	0
	Student	0	0	4	0	0	0	0

Features of the visitors to the park		Age Group (years)						
		0-10	11-20	21-30	31-40	41-50	51-60	>60
Park Visits	Daily	0	1	3	1	6	4	1
	Once a Week	0	0	1	2	1	0	0
	Once a month	0	0	5	5	2	0	1
	Rarely (once a year)	0	0	4	2	0	1	0
Identification of trees	Yes, all of them	0	0	2	1	3	1	0
	Yes, popular ones	0	1	7	6	2	3	1
	None	0	0	4	3	4	1	1

Source: Primary Data Collection.

The information gathered from the survey indicates that urban green spaces do fulfill the intangible needs of the people. Mixed observations are recorded in terms of the purpose of the visit to the park; about 45 per cent of visitors come to the park for rest, fresh air, and to get relief from the stressful urban lifestyles (Figure 4).

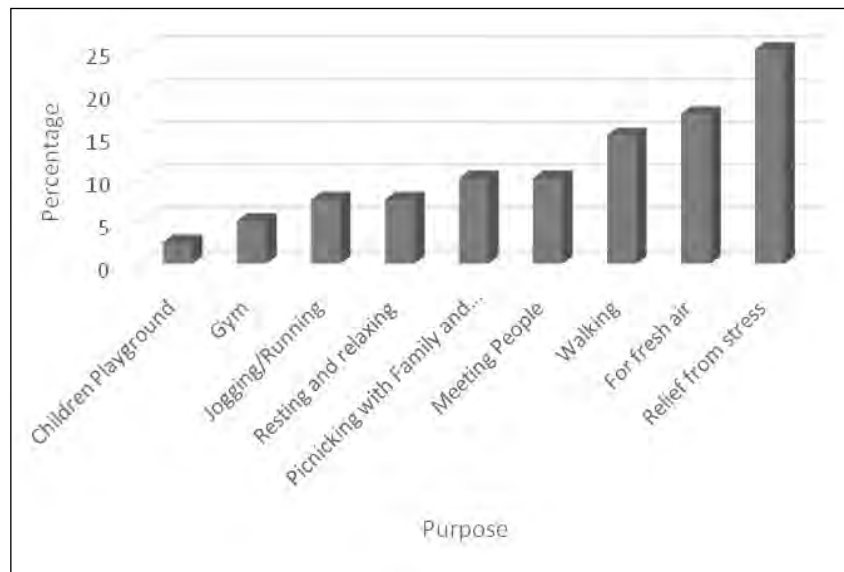


Figure 4: Purpose of visiting the park by park users.

Source: Figure made using the primary data.

The purpose of visiting the park has been found to be mainly for relaxation, fresh air, exercise, and walking. People do realise that visiting parks has improved their lifestyle, health, and social well-being. It is also known to us that it acts as one of the best picnic sites convenient to visit with family members. Nine respondents (22 per cent) from our study felt unsafe in park spaces, especially during the evenings (Figure 5). They also didn't like the conditions of public toilets and garbage bins. A good aspect for them is

the green scenic landscape and fresh air. The drinking water facilities available are not satisfactory to all. There are expectations for more floral trees and plants in the park. All of them agreed that more types (diverse) of trees should be planted in the park along with name tags as majority of them are unaware of the native and alien species of trees and their importance in the garden. A very evident complaint with each visitor is the smell of the water used for watering purposes in the park. It comes from the sewage treatment plant that is present adjacent to the park. Variations in their responses are observed in relation to age, education, and occupation.

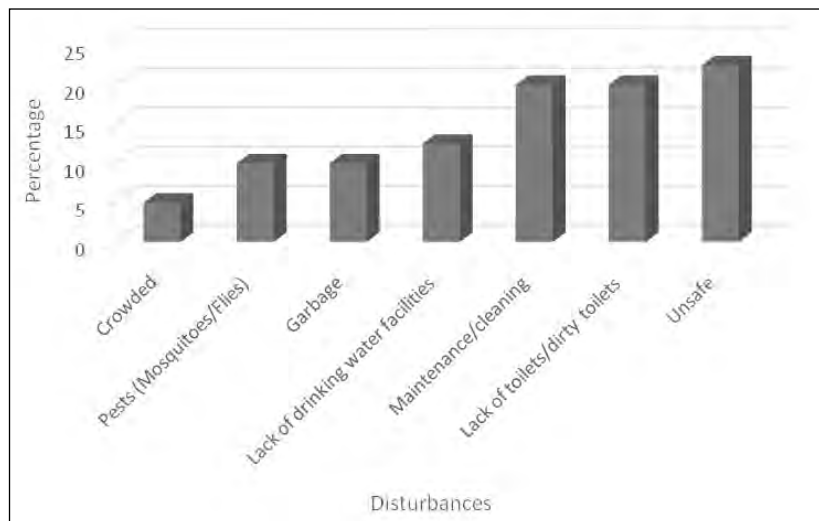


Figure 5: Negative aspects of the park from the visitors'viewpoints.

Source: Primary data.

Discussion

From this study, it is observed that parks represent one of the main components of the urban green spaces with ecological values from diverse tree species and social values for the urban population. The Swarn Jayanti Park provides a satisfactory level of ecosystem services starting from space for fresh air, social gatherings, relaxation, greeneries, playground, birds, and flowering plants. It further adds employment opportunities to the staff and mobile food vendors. People are also aware about the significance of parks in terms of releasing oxygen, absorbing pollutants, controlling noise pollution, and CO₂ sequestration, relieving stress, etc. (as observed in Jim and Chen, 2006; Bennett et al., 2009; Nagendra and Gopal, 2011; Scott et al., 2016). It is observed that the canopy cover with the range 26-50 per cent is found to have occurred in seven quadrats which is the highest number of quadrats specific range. The maximum species found is *Polyalthia longifolia*, commonly known as 'Ashoka.' The tree has both medicinal and religious values (Krishnen, 2015). The Shannon-Wiener index for understanding diversity of trees is 2.2 which is very close to 2.42 of Divakara et al., (2022) study

which studied the diversity patterns alongwith rural and urban gradients in Bangalore, it indicated a decline in diversity of trees in the rural plots. This could be the result of management of the area under the category of green spaces. The tree diversity index is at moderate level despite its location in the city which is usually not considered as a popular trend when comparing with the diverse species present outside the city. The canopy cover observed is comparatively satisfactory. Regarding perception from the public about the urban green spaces and its diverse tree species, the park visitors felt that there is negligence in management of some sections (as observed in Breen et al., (2020) particularly pertaining to the strong pungent stench coming from the untreated water. The park has its vegetation cover (as also observed in Warren 1973; Baycan et al., 2009), which is both natural and artificial vegetation (Tzoulas et al., 2007). There is lack of knowledge and awareness about the identification of trees in the park at species level (Jim and Chen, 2006). People are aware of the potential benefits of trees and plants or the role of green spaces in the overall well-being. Some of the visitors are the regular visitors as they use the park with a purpose to heal from respiratory tract infection, obesity, diabetes, palpitation, etc. (as can be observed in Grahn and Stigsdotter, 2003; Paul and Nagendra, 2017). Most of the visitors explore such spaces to relax and release all their stress and strain. Relaxation, freedom, escapism, beauty, happiness, connectedness and wholesomeness are some of the common benefits that the park visitors seek for (as also mentioned in Renema et al., 1999; Coeterier et al., 1997; Klijn et al., 2000; Gobster, 2001; Viebrantz and Fernandes-Jesus, 2021). So, it is known to us that the urban green spaces cater to population for recreational activities and simultaneously it facilitates the scope for biodiversity conservation in urban spaces where, diverse species of trees rejuvenate as well as enhance the ecological aspects of a sustainable urban development.

Conclusion

The urban green spaces particularly the parks of Delhi provide a good number of beneficial features to the ecology and well-being of the urban environment and population respectively. The green cover in Delhi and its expansion are still continuing to a greater extent through various efforts of plantation and planning measures taken by the government, agencies and organisations. The amount of green cover in Delhi has been appreciated worldwide. However, the planning and management do neglect the strategisation of species-based plantations, including trees. There are limitations involved in such short-sighted strategy-based actions. It connects directly with the availability of funds (cost factor), species-level availability issues, availability of products in close-by areas, use of selected nurseries, etc. Despite the existing challenges, the selected park in this study satisfies the tree species diversity with moderate level. From the perception-based data, the authors conclude that the park, Swarn Jayanti in North West Delhi is utilised by visitors for various purposes mainly as a site for

relieving stress, social gathering and other rejuvenation purposes to maintain health and well-being. There is an overall satisfactory ecosystem services except minor concerns. There is a need for regular feedback from the visitors to make possible improvements in the urban parks.

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Developing Sidewalk Assessment Tool: Towards Evaluation of Pedestrian Environment in Urban Areas

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Abstract

Streets are one of the important means of transportation where sidewalks are one of their integral parts of which pedestrians are prime users. To plan for qualitative environment for pedestrians, existing sidewalk situations need to be assessed. In western countries several tools and models are developed for evaluation of sidewalks. However, most of these tools have neglected the importance of considering pedestrians' perception in assessing Pedestrian Level of Service (PLOS) of sidewalks. A more accurate and sensitive tool would incorporate and account for the planning or improving of existing pedestrian environments in any city. The aim is to develop sidewalk assessment tool for evaluation of existing sidewalk environment from level of pedestrians' satisfaction. This tool will help the municipal authorities to identify the sidewalk attributes that need to be measured, how to measure them and, finally, incorporating them into an appropriate assessment framework. The result of the study is interpreted in terms of Pedestrian Satisfaction Index defining PLOS and it contributes in identifying shortcomings of sidewalk attributes from pedestrians' perspective.

Keywords

Sidewalks, Sidewalk Assessment Tool, Pedestrian Satisfaction Index, Pedestrians Level of Service, Pedestrian Environment.

Introduction

In the era of globalisation and rapid urbanisation, motorised traffic now dominates the roads in most Indian cities and towns. Streets, once vibrant public spaces, have



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become mere corridors for transportation, largely overlooked due to technological and societal advancements. In this shift, the importance of pedestrians—the original users of streets—and walking as a mode of mobility, has been largely forgotten by local authorities. The roads have lost the meaning of streets as interactive public places and seldom address the basic needs of the ‘Pedestrian.’ The balance between the needs of the people and that of motor vehicles is seen to be missing (Meenakshi, 2009). The primary reason being the lack of pedestrian-friendly streets and major lacunas in planning and implementation of street space attributes and pedestrian infrastructure.

Excessive environmental pollution, non-functional street geometry, inadequate or non-existent street dimensions and pedestrian crossings, inadequate and unattractive street furniture and many such other issues deter pedestrians’ comfort needs and their environment. Generating qualitative street environment addressing the pedestrians’ needs has seen little study as compared to the other modes of transportation. Additionally evaluating the pedestrian environment is a much more complex and subjective process than the vehicular roadway as it deals with the qualitative assessment of needs such as safety, security, comfort, convenience, and attractiveness, etc. Hence there is a need to evaluate the sidewalk environment, pedestrian amenities and infrastructure facilities as per pedestrians’ comfort needs which will further contribute in enhancing the spatial quality of the streets as a part of public environment.

The street design guidelines are put forth by Indian Road Congress (IRC) and Institute for Transportation and Development Policy (ITDP) so as to cater to street users’ needs of all categories from pedestrians to vehicles (ITDP, 2012). However, there is an urgent need to analyse and evaluate the sidewalk parameters and their attributes from pedestrians’ perspective, qualitatively as well as quantitatively. Walkability is a measure of extent to which the pedestrian environment (henceforth termed as sidewalk environment) provides for movement and other activity on foot in the ways that are both efficient and enjoyable. It is measured in terms of “Pedestrian Level of Service (PLOS) and expressed in the form of ‘Pedestrian Satisfaction Index’ (PSI). The decision to walk is usually based on a complex interaction of sidewalk parameters and their attributes both physical and psychological.

The aim of this research paper is to develop a sidewalk assessment tool for evaluation of existing sidewalk environment from pedestrians’ perspective and their level of satisfaction. Pedestrian Satisfaction Index (PSI) derived, will represent physical and psychological attributes of existing sidewalk environment by incorporating pedestrian perception through their responses. This article further illustrates the application of proposed sidewalk assessment tool as an evaluation model of pedestrians’ satisfaction in the context of Pune city in Maharashtra and which can be further scaled up to any Indian city, irrespective of socio-cultural context.

Review of Existing Assessment Methods on Pedestrian Level of Service and Their Limitations



In foreign countries such as USA, New Zealand, and Australia, a significant amount of research related to the quantitative and qualitative evaluation of sidewalks and experiments to create ideal pedestrian environment have been conducted. Also issues related to pedestrian behaviour, their needs, their satisfaction, etc. have been addressed in these evaluation methods. Diverse walkability audit tools such as 'Pedestrian Environment Quality Index', 'Pedestrian Level of Service (PLOS)' standards, Scottish Walkability Assessment Tool, Pedestrian Environment Review System, and Global Walkability Index, etc. are developed and applied by these nations with regards to their city context to assess pedestrian facilities. Initially this concept of PLOS was incorporated in Highway Capacity Manual (HCM) designed by Transportation Research Board (TRB) of USA in 1985 for quantifying sidewalk capacity which recommended that environmental factors contributing to the walking experience such as comfort, convenience, safety, security, and attractiveness should also be considered.

Later Highway Capacity Manual (TRB, 2000) became one of the most influential manual in the development of transport facility design guidelines in different countries for determining the capacity and quality of service values for all modes of surface transportation. It recommends six Pedestrian Levels of Service (LOS) from LOS 'A' to LOS 'F' where in LOS 'A' indicates free flow condition and LOS 'F' indicates a stand-still condition of pedestrian flow. Later 'Global Walkability Index' (GWI) method developed by Holly Krambeck of World Bank in 2008 was implemented (Holly Krambeck and Jitendra Shaha, 2006) to facilitate the comparison of walkability scenario of different cities in Asian countries, the basic objective being to raise awareness about deteriorating walkability conditions and promote better air quality and liveable cities. Later the Clean Air Initiative for Asian Cities Centre (CAI, 2011) established by the Asian Development Bank, World Bank, and the United States conducted pilot walkability survey of sidewalks in six Indian cities, namely Pune, Chennai, Bhubaneshwar, Rajkot, Indore and Surat based on Global Walkability Index (GWI) method. This method provided a qualitative analysis of walking conditions including the safety, security, and convenience of the pedestrian environment.

However in this survey, a large variation was found in assessment of quality of pedestrian infrastructure in Indian cities and these indices were very less robust. In 2008, Ministry of Urban development (MoUD) assessed the quality of pedestrian infrastructure in 30 Indian Cities. They have developed the concept of walkability index which is the function of availability of footpaths and rating of pedestrian facilities. However, it was difficult to assess which sidewalk parameter needs improvement on priority basis. (Ministry of Urban Development and Wilbur Smith Associates, 2008)

Discussing about the existing standards for pedestrian facilities, Indian Road Congress in 2012 had designed guidelines for pedestrian facilities. However, it lacked

the tool of quantitative and qualitative evaluation of sidewalks. Similarly Central Road Research Institute of India has proposed similar measurement tools which calculate PLOS based on physical characteristics of sidewalk as well as user characteristics. Ordinal scale of five-point rating is developed for identified ten sidewalk parameters to determine walkability score in terms of PLOS. (Parida Purnima, 2009). However, it has been noticed that the existing PLOS methodologies are inaccurate and do not incorporate the parameters that define how much walkable the sidewalk environment is from pedestrian perspective, mostly quality-wise. These models neglect to account for other subjective parameters defining the quality of the walking environment and as a result, may contribute in perpetual redevelopment of truly unwalkable sidewalk spaces. Many of the studies have included quantitative parameters like capacity and width, but neglected qualitative parameters. And the studies that have included qualitative parameters were biased due to the judgment of survey personnel giving limited importance to pedestrians' perceptions.

In India, walkability audit needs to be performed periodically for assessing the service quality of sidewalks that rely on the perceptions and needs of pedestrians. The sidewalk constructions done by local government should satisfy the recommended walkability indices. To serve as walkability audit tool, the present study develops a model for the performance assessment of the sidewalk parameters and their attributes which can be applied in million-plus cities. It also explores the level of importance and satisfaction of pedestrians for sidewalks. During this study, a comprehensive set of physical and psychological attributes of sidewalk parameters is addressed to investigate various aspects of pedestrian satisfaction. For this purpose, it is necessary to develop an appropriate methodology for PLOS assessment of the sidewalk environment from pedestrians' perspective. To do so, three key aspects are considered. These are identifying what street sidewalk parameters and their attributes need to be measured; how to assess these attributes and finally how to incorporate these into an appropriate and efficient evaluation framework?

Sidewalk Attributes From Pedestrians' Perception

To measure walkability from pedestrians' perception, following are the sidewalk attributes identified for the research:

- **Physical Attributes:** The physical attributes included physical characteristics of sidewalks such as footpath width, kerb height, accessibility, surface condition, footpath continuity, footpath obstructions and pedestrian infrastructure such as road side plantation, street lighting, bus stop locations, seating benches, other street amenities, traffic signage, etc.
- **Psychological Attributes:** The psychological attributes included pedestrians' perception about safety (from vehicles), security (from crime), walking comfort (in terms of maintenance and cleanliness), weather protection (from sun, rain etc.), street aesthetics, street activities and adjacent land uses.

Figure 1 presents a list of physical and psychological attributes of sidewalk parameters used to derive Pedestrian Satisfaction Index (PSI) and define level of pedestrian satisfaction.

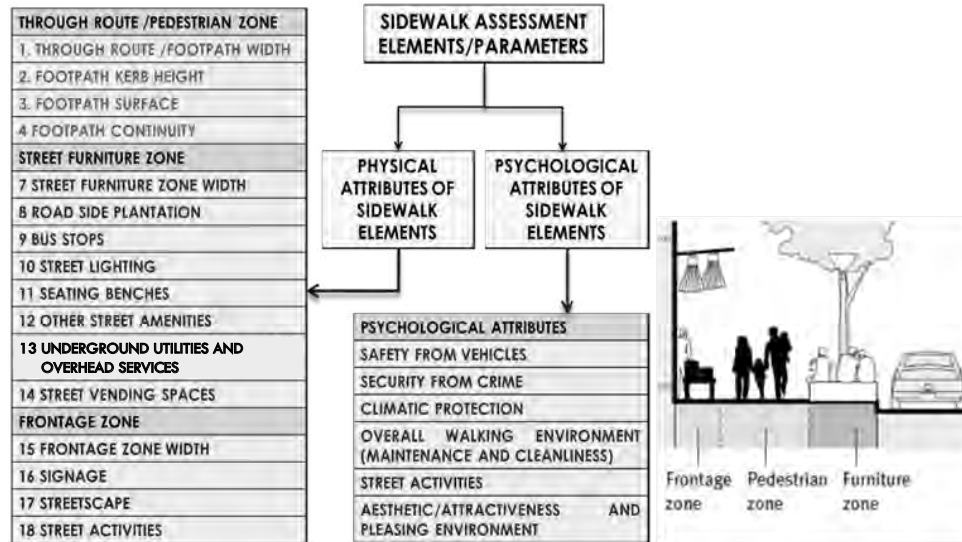


Figure 1: Identification of Sidewalk Assessment (Elements) Parameters and their Attributes

Source: Prepared by Authors.

Research Framework

Mixed research method using research tools associated with both quantitative and qualitative approaches as explained in Figure 2 was combined to collect the primary and secondary data. These tools were literature review, field observation survey, formulation of questionnaires and on-street pedestrians' interview survey conducted on Pune streets. The initial step of the study was to identify sidewalk parameters and their attributes which are to be included in the questionnaire to contemplate the pedestrian environment and aspects of PLOS of sidewalks. For this purpose, the sidewalk design guidelines, existing sidewalk assessment tools and PLOS models implemented in Indian context, their advantages and disadvantages are reviewed. In this research, PLOS is assessed in form of 'Pedestrian Satisfaction Index' (PSI). Total 20 attributes which include physical attributes and psychological attributes of sidewalk parameters are identified for formulation of field interview questionnaire and on-street pedestrian interview survey, based on which PSI is derived. For field interview survey, stratified random sampling was adopted, where nine streets from Pune city were identified and delineated for evaluation. The street selection was based on road width having different sidewalk widths and types of land uses (commercial and commercial-cum-residential land use) where high number of pedestrian volume and their activities were observed and recorded. The sidewalks selected were of width less than 1.5 m, 1.5 m to 2.0 m and

more than 2.0 m on streets of 12 to 15 m width, 16 to 20m width and 21 to 30 m width respectively as per IRC. Also the streets have been selected from three zones of Pune city – Central Pune (CP), Inner Pune (IP) and Outer Pune (OP) which are defined based on the factors of population density of the urban areas and the era of evolution and development of the Pune city. The purpose of this categorisation is to have different streets of different width occupied with varied pedestrian density and diverse activity pattern, reflecting their local character and related pedestrian issues. Table 1, Figure 3, Figure 4, Figure 5 present the streets identified for the research.

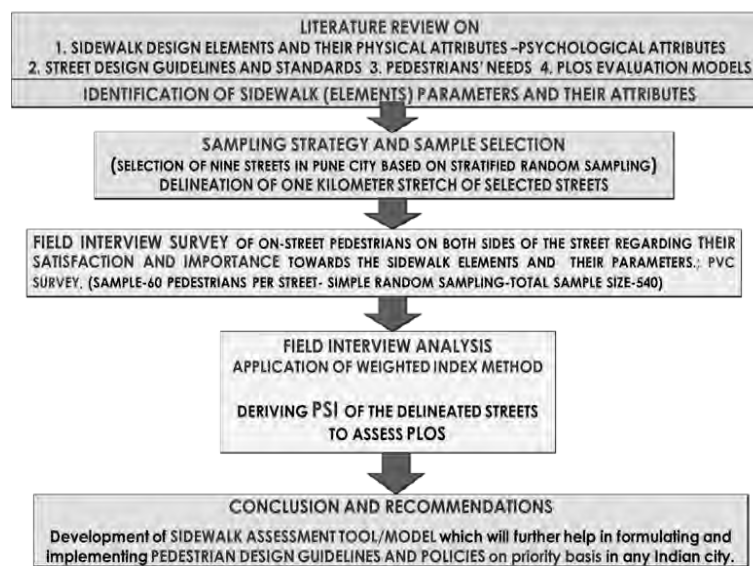


Figure 2: Research Framework

Source: Prepared by Authors.

Table 1: Sample Selection (Street Identification)

ROAD WIDTH (m)	AVERAGE SIDEWALK WIDTH (m)	Ward wise Persons/Ha		
		OUTER PUNE (OP) 40 To 100 pph (Development After-1970/Radius above 5000m)	INNER PUNE (IP) 100 To 200 pph (Development between 1950-1970) (Radius 3000 m to 5000m)	CENTRAL PUNE (CP) Above 200 pph (Development Before 1950) (Radius within 3000m with Mandai as center point of the city)
12 to 15	Less than 1.5	Shivarkar Road, Fatimanagar, Hadapsar (900m)	North Main Road, Koregaon, Park. (1100m)	Tilak Road (800m)
16 to 20	1.5 to 2.0	ITI Road, Sanewadi, Baner (1150m)	Mahatma Gandhi Road. (815m)	Jawaharlal Nehru Road (700m)
21 to 30	More than 2.0	Bibwewadi Road (1000m)	Paud Road (500m)	Fergusson College Road (900m)
TOTAL		9 STREETS; 18 SIDEWALKS		

Source: Prepared by Authors.

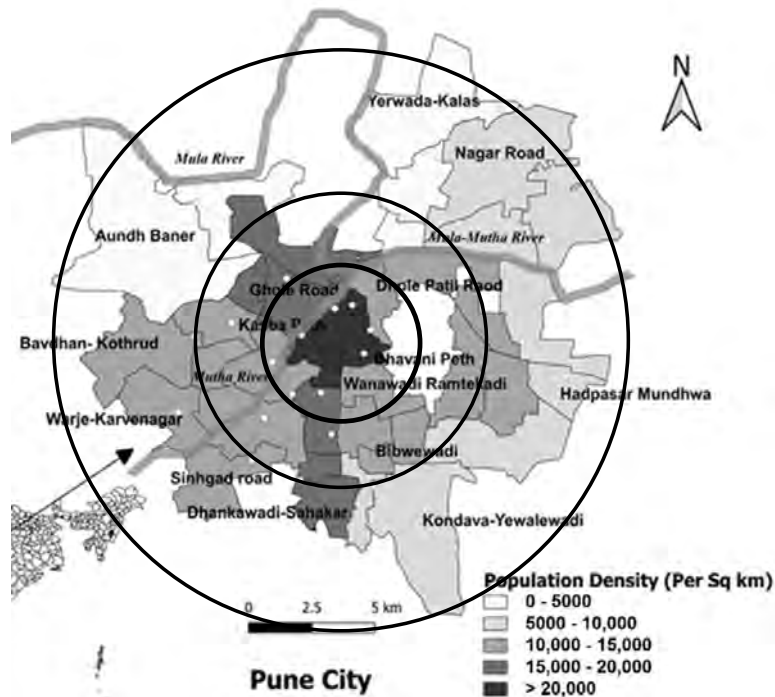


Figure 3: Plan of Pune city presenting ward-wise population density for defining different zones in Pune city – Central Pune (CP), Inner Pune (IP) and Outer Pune (OP)

Source: Provisional figures of Census India, 2011.

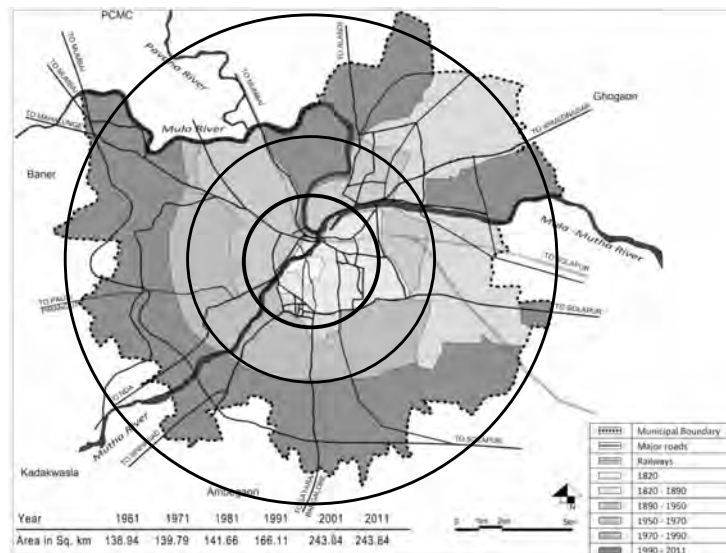


Figure 4: Plan of Pune city presenting chronological development of Pune city (from 1820 to 2011) for defining different zones in Pune city – CP, IP, OP

Source: Town Planning Department, Pune- 2011

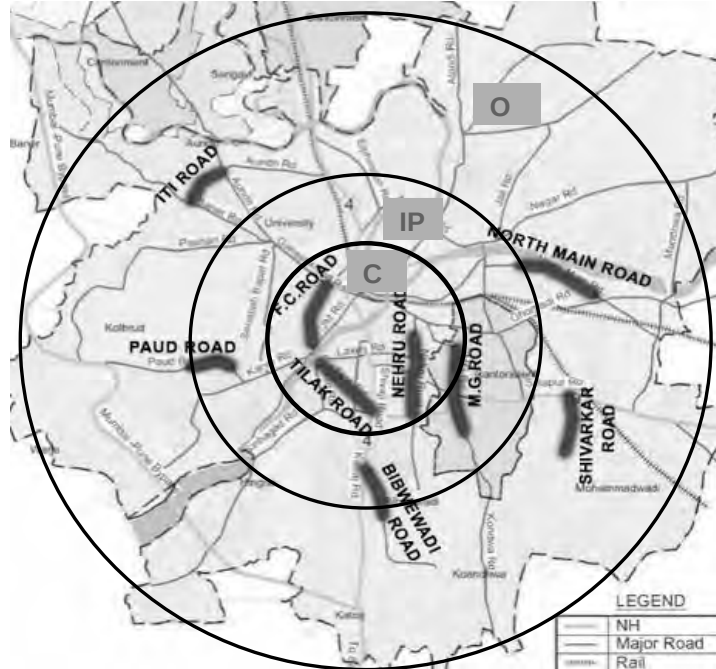


Figure 5: Key Plan of Pune city presenting the streets (in red) selected for the research.

Source: Prepared by Authors.

Research Analysis Method

One of the simplest and mostly used methods for measuring the performance of sidewalk elements is numerical rating scale. In order to measure pedestrians' satisfaction level with respect to the existing sidewalk conditions, it was decided to derive 'Pedestrian Satisfaction Index' (PSI). This was based on an on-street pedestrians' interview survey, where pedestrians' satisfaction regarding the sidewalk attributes (physical and psychological) and its weightage (relative importance) was measured on five-point rating scale. To calculate weightage, the respondents were asked to rate the important factors to them while walking, from one (least important) to five (very important).

Figure 6 presents the research analysis method adopted for interview survey analysis. Taking into account the sample of sixty pedestrians for each street, thus for nine streets, a sample of 540 pedestrians were interviewed based on which the average was calculated for each of the sidewalk attribute. Thus averages of pedestrians' opinion for all 20 sidewalk attributes were calculated, based on which the pedestrians' preferences were decided. The attribute having highest average was given first preference while the attribute having lowest average was given as 20th preference. Then the weightages were allocated to the attributes in the reverse order of preferences. The attribute having first preference was given highest weightage while the attribute having least preference

was given lowest weightage. Table 2 presents pedestrians' preferences and weightages of sidewalk attributes derived from pedestrians' interview survey.

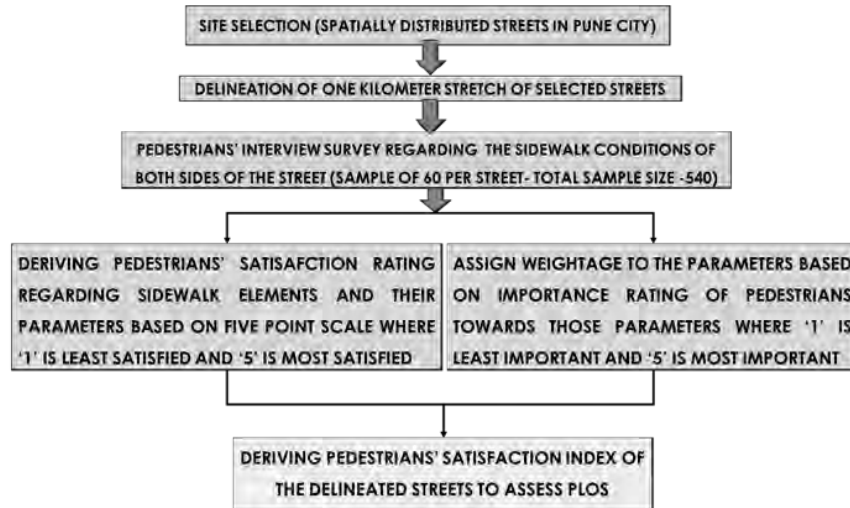


Figure 6: Weighted Index Method for Field Interview Analysis

Source: Prepared by Authors.

Table 2: Pedestrians' Preferences and Weightages of Sidewalk Parameters from Pedestrian Interview Survey

No	Sidewalk Parameters	Average of 540 Sample	Preference	Weightage
1	Footpath Width	3.903	5	16
2	Footpath Kerb Height	3.957	4	17
3	Footpath Accessibility	3.977	3	18
4	Footpath Surface Condition	3.987	2	19
5	Footpath Continuity	4.004	1	20
6	Footpath Obstructions	3.865	6	15
7	Safety from Vehicles	3.794	9	12
8	Adequacy of Street Lighting Facility	3.829	7	14
9	Weather Protection (Protection From Sun and Rain)	3.734	12	9
10	Overall Walking Environment (Includes Maintenance and Cleanliness)	3.334	20	1
11	Security from Crime	3.816	8	13
12	No. of Seating Benches	3.751	11	10
13	No. of Public Toliets and Drinking Water Facility	3.595	15	6
14	No. of Garbage Bins/ Dust Bins	3.446	17	4
15	Traffic Signages	3.439	18	3

No	Sidewalk Parameters	Average of 540 Sample	Preference	Weightage
16	Road Side Plantation	3.756	10	11
17	Location and Accessibility to Bus Stop	3.657	14	7
18	Street Activities	3.704	13	8
19	Street Aesthetics (Overall Beauty of Sidewalk Environment)	3.586	16	5
20	Use of Street Sidewalks for Relaxation/Hanging Out, etc.	3.348	19	2

Source: Prepared by Authors.

To assess the sidewalk conditions, pedestrians were asked to rate their satisfaction towards each sidewalk parameter from one to five, one indicating least satisfied while five indicating most satisfied. Sixty pedestrian interviews were conducted on each street. Thus for each street and each sidewalk attribute 60 satisfaction ratings given by pedestrians were recorded, based on which average rating for that sidewalk attribute for that particular street, was calculated. This average satisfaction rating derived was considered as the rating for that parameter and for that street.

Thus, ‘Pedestrians’ Satisfaction Index’ (PSI) was calculated as below:

$$\text{PSI} = (\sum \text{WR} \div \sum \text{W})$$

Where W = Weightage of the sidewalk parameter from Pedestrians’ Preferences.

R = Average Satisfaction Rating of Pedestrians’ (60 Nos) towards each parameter.

Thus in this research method following factors should be noted:

- The PSI will put forth the present existing condition of sidewalks where sidewalk attributes which need to be addressed, will be identified on priority basis. The lowest PSI will be one and highest PSI will be five. Highest PSI indicates that pedestrians are highly satisfied.
- To improve the sidewalk condition, weighted walkability index of each parameter will indicate which parameter should be addressed or undertaken first for improvement.
- There will be same weightage (importance) of sidewalk parameters for each street irrespective of the road hierarchy.
- PSI for different streets can be compared and analysed. The application of this method can also be used for comparative analysis of different sidewalks in the city, identifying their lacunas and issues to be dealt with.
- PSI provides scope for conducting sensitivity analysis of the sidewalk.
- PLOS with respect to a particular sidewalk of street can be assessed and compared with respect to the other sidewalk parameters.

Measuring Walkability

Walkability of a sidewalk environment is expressed in terms of Level of Service (LOS) and there is a range of LOS for pedestrians. This is termed as 'Pedestrian Level of Service' which represents adequacy of physical and psychological attributes of sidewalks. Total twenty attributes are identified for grading of PLOS. PLOS 'A' represents best walking conditions for pedestrians where sidewalk caters to more than 18 attributes out of 20 while PLOS 'E' represents unsuitable walking conditions for pedestrians where sidewalk caters to minimum five sidewalk attributes out of 20. Within this range, five levels of service have been worked out and are presented in Table 3, also presents rating scale of PSI based on sidewalk attributes.

Table 3: Rating Scale of Pedestrian Satisfaction Index based on Sidewalk Attributes

	Excellent Rating-5 LOS –A $4.0 \leq \text{PSI} \leq 5.0$	Good Rating-4 LOS –B $3.0 \leq \text{PSI} < 4.0$	Satisfactory- Rating-3 LOS –C $2.0 \leq \text{PSI} < 3.0$	Poor Rating-2 LOS –D $1.0 \leq \text{PSI} < 2.0$	Very Poor Rating-1 LOS –E $\text{PSI} < 1.0$
Definition of Sidewalk Condition	Ideal condition is defined as the sidewalk possessing more than 18 of 20 attributes (physical and psychological)	Reasonable condition is defined as the sidewalk possessing 15 to 18 of 20 attributes (physical and psychological)	Basic condition is defined as the sidewalk possessing 10 to 14 of 20 attributes (physical and psychological)	Poor condition is defined as the sidewalk possessing 6 to 9 of 20 attributes (physical and psychological)	Unsuitable condition is defined as the sidewalk possessing less than 5 of 20 attributes (physical psychological)

Source: Prepared by Authors.

Results

Figure 7 presents age-wise and sex-wise distribution of pedestrians' interviewed on selected nine streets of Pune city. Table 4 presents the derivation of PSI on nine streets based on weighted index method where the pedestrians' opinion regarding their level of satisfaction towards the sidewalk attributes are rated. Figure 8 presents comparative analysis of PSI of sidewalks based on Road width and Sidewalk Width.



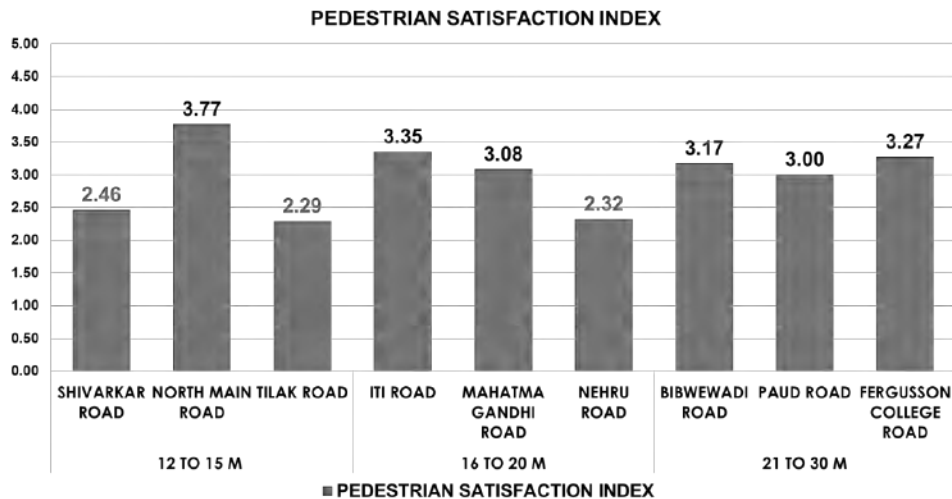
Figure 7: Age-wise and Gender-wise distribution of on-street pedestrians'

Sample Size-540

Source: Prepared by Authors.

Table 4: Comparative Analysis of PSI of sidewalks based on Road Width and Sidewalk Width

Road Width Wise Comparative Analysis Of Pedestrian Satisfaction Index Of Sidewalk Environment Of Delineated Streets in Pune										
ROAD WIDTH		12 TO 15 M			16 TO 20 M			21 TO 30 M		
SIDEWALK WIDTH		1.5 M TO 2.0 M			LESS THAN 1.5 M			MORE THAN 2.0M		
PUNE CITY AREA/ ZONE		OUTER PUNE	INNER PUNE	CP	OUTER PUNE	INNER PUNE	CENTRAL PUNE	OUTER PUNE	INNER PUNE	CP
ROAD NAME		SHIVARKAR ROAD	NORTH MAIN ROAD	TILAK ROAD	ITI ROAD	M.G.ROAD	JAWAHARLAL NEHRU ROAD	BIBWEWADI ROAD	PAUD ROAD	F.C.ROAD
NO.	SIDEWALK PARAMETERS	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
1	FOOTPATH WIDTH	3.27	3.50	3.33	3.25	3.37	3.25	3.15	3.27	3.17
2	FOOTPATH LANE HEIGHT	3.41	3.52	3.49	3.30	3.50	3.25	3.34	3.22	3.14
3	FOOTPATH ACCESSIBILITY	3.20	3.75	3.57	3.37	3.57	3.23	3.33	3.32	3.23
4	FOOTPATH SURFACE CONDITION	3.21	4.35	3.24	3.68	3.26	3.23	3.22	3.23	3.39
5	FOOTPATH CONDITION	3.42	3.80	3.74	3.50	3.23	3.21	3.24	3.22	3.12
6	FOOTPATH PROTECTION	3.22	3.22	3.27	3.22	3.22	3.21	3.21	3.22	3.22
7	SAFETY FROM VEHICLES	3.22	4.45	3.77	3.50	3.20	3.22	3.51	3.22	3.53
8	ADEQUACY OF STREET LIGHTING FACILITY	3.22	4.48	3.72	3.60	3.28	3.22	3.39	3.25	3.50
9	CLIMATE PROTECTION	3.22	3.22	3.27	3.22	3.27	3.22	3.22	3.27	3.21
10	OVERALL STREET ENVIRONMENT	3.42	3.50	3.49	3.47	3.27	3.22	3.22	3.22	3.26
11	SECURITY FROM CRIME	3.22	3.62	3.27	3.92	3.27	3.22	3.80	3.22	3.39
12	STREET FURNITURE	3.22	3.22	3.22	3.55	3.22	3.22	3.36	3.22	3.22
13	NO. OF PUBLIC TOILETS PROVIDED	3.22	3.35	3.22	3.22	3.27	3.22	3.27	3.22	3.27
14	NO. OF PARKING BAY	3.22	4.47	3.22	3.22	3.27	3.22	3.27	3.22	3.27
15	TRAFFIC SIGNAGES	3.22	3.70	3.22	3.33	3.38	3.27	4.15	3.22	3.59
16	ROAD SIDE PLANTATION	3.22	4.22	3.22	3.13	3.22	3.22	3.22	3.13	3.30
17	NO. OF BIKES/VEHICLES IN THE ROAD	3.22	4.27	3.22	3.25	3.22	3.22	3.22	3.15	3.30
18	STREET ACTIVITIES	3.22	4.63	3.22	3.25	3.50	3.22	3.22	3.20	3.46
19	TRAFFIC ACCIDENTS	3.22	3.47	3.22	3.10	3.60	3.22	3.22	3.22	3.30
20	NO. OF JUNCTIONS	3.22	3.40	3.22	3.22	3.22	3.22	3.22	3.22	3.22
PSI		3.42	3.77	3.27	3.33	3.28	3.22	3.17	3.22	3.17
PLOS		C	B	C	B	B	C	B	C	B

**Figure 8:** Comparative Analysis of PSI of sidewalks based on Road Width and Sidewalk Width

Source: Prepared by Authors.

Discussion

Sidewalk Issues in Pune City based on PSI

Based on PSI derived from an on-street interview survey, following are common sidewalk attributes among overall twenty attributes of which pedestrians are not satisfied and have major influence on pedestrians' satisfaction level and PLOS provided by the sidewalks (irrespective of their width and the city zone in which they are located):

- Inadequate footpath width as per maximum pedestrian volume count.
- Poor quality and slippery surface condition.
- Absence of footpath continuity due to presence of driveway breaks, multiple ups and downs, footpath obstructions — temporary such as encroachments of street vendors, adjacent shop activities and protrusions of adjacent shop advertisement display, hoardings and signages as well as permanent obstructions such as LT boxes, light poles, road side plantation, bus stops, etc.
- These multiple footpath obstructions — temporary and permanent makes walking difficult on footpath.
- *Safety from Vehicles*: Somewhat safe, raised footpath but no provision of guard rails, encroachment by on-street parking, few pedestrian-vehicle conflict points.
- Satisfactory street lighting conditions due to their placement being not in conjunction with existing tree locations, though adequately provided in the form of low pressure sodium vapor lamp.
- *Weather protection*: Inadequately provided, roadside plantation provides some protection during different weather conditions such as summer, rains, winds, etc.
- *Overall walking environment*: Poor, somewhat maintained and not very clean.
- *Security from crime provided during night*: Minimum illumination provided by street lighting makes the pedestrian environment emotionally insecure and adds to the night time comfort. However, pedestrians feel unsafe during night on the streets in IP and CP city area while they feel safe during night as well as during day time on the streets in OP city area.
- Inadequate street amenities and infrastructure facilities such as seating benches, garbage bins, public toilets and drinking water facilities, if provided are located haphazardly and not well-maintained.
- Traffic signages are located along the edge through route and frontage zone or parking zone, physically obstructing the pedestrian movement, creating visual conflicts.
- *Road side plantation*: Satisfactorily provided, pleasant, attractive and comfortable.
- *Location and accessibility to bus stop*: Bus stops are located at the edge of the right-of-way in the through route zone partially creating obstruction for pedestrians.
- *Street activities*: Neither attractive nor boring, somewhat balanced mixture of active and passive activities. Activities such as shopping, banking, offices, informal

NO. OF PUBLIC TOILETS DRINKING WATER	4	1.68	1.68	1.68	1.68	1.68	1.68	1.68
NO. OF GARBAGE BINS	4	1.70	1.70	1.70	1.70	1.70	1.70	1.70
TRAFFIC SIGNAGES	3	2.72	2.72	2.72	2.72	2.72	2.72	2.72
ROAD SIDE PLANTATION	11	2.55	2.55	2.55	2.55	2.55	2.55	2.55
LOCATION ACCESSIBILITY TO BUS STOP	7	2.20	2.20	2.20	2.20	2.20	2.20	2.20
STREET ACTIVITIES	8	2.48	2.48	2.48	2.48	2.48	2.48	2.48
STREET AESTHETICS	8	1.98	1.98	1.98	1.98	1.98	1.98	1.98
USE OF SIDEWALKS (STREET VENDING)	2	2.83	2.83	2.83	2.83	2.83	2.83	2.83
PEDESTRIAN LEVEL OF SERVICE		2.40	2.54	2.60	2.61	2.75	3.10	3.22
		C	C	C	C	C	B	B

Source: Prepared by Authors.

Practical Significance of Sidewalk Assessment Tool

Many researchers and urban planners highlighted that the walking environment has the potential to dramatically change the urban fabric. Multiple evaluation models and grading methods for assessment of sidewalks and walkability have been developed and applied in western cities. The proposed sidewalk assessment tool will serve the local government, as one of an important walkability evaluation or audit tools for quantitative and qualitative analysis of street sidewalks.

It will not only help in identifying sidewalk lacunae in street spaces as per the pedestrians' satisfaction and comfort needs but will also help in analysing the gaps in the physical and psychological attributes of the street environment, that needs to be addressed on the priority basis. This tool will be universally applicable, irrespective of land uses, population density pattern, road and sidewalk width, and socio-cultural context (since every street has same weightage for the sidewalk attributes irrespective of road hierarchy) and will contribute in generating pedestrian responsive and interactive spaces in any Indian city. It will help the common public in availing multiple benefits regarding physical, physiological and psychological comfort, from the proposed street environment as well as from the pedestrian responsive policies of the local authorities. This tool will further contribute in evaluating the spatial quality of the street environment, their quantitative and qualitative aspects, lacked by cities in India. This will add multiple benefits in various fields such as health, service infrastructure, city economy, pedestrian traffic and accessibility, society values and principles, environmental and city aesthetics that can be enjoyed by the users.

Further this tool can also contribute in making the local government bodies and policymakers aware of the existing lacunae in pedestrian amenities and facilities on Indian streets. It will also help in planning the pedestrian environment quantitatively better in terms of physical dimensions of sidewalk, qualitatively in terms of safety, comfort, convenience and attractiveness as well as in monetary terms. It will also provide information on the prevailing pedestrian infrastructure and existing sidewalk

scenario in Indian cities, which further can be applied to develop pedestrian-oriented policies and budgetary allocation for pedestrian facilities and help them to improve walking environment in cities. This assessment tool will also be effective in conducting comparative analysis of sidewalks of different width within the city in different density zones as well as analyse and compare different design input scenarios for planning, design and operation of sidewalk elements and facilities. The model will also help in conducting sensitivity analysis of sidewalk environment and contribute in reducing the subjectivity of sidewalk evaluation.

Recommendations

Based on the sidewalk assessment on the streets of Pune city and to encourage pedestrian use on the varied street pattern, following are the recommended planning efforts to be undertaken for implementation at urban and sector level by the local government (presented for case of nine streets of Pune city):

- Incorporation of pedestrian movement planning and design in city development plans focusing on connectivity, obstruction free routes, safety, security and local character.
- Demarcation of pedestrian zones should be done in high density city areas (mostly old core) and dominant pedestrian activities and the areas which require augmentation urgently.
- Identification and demarcation of space for formal hawkers and street vendors in public and commercial space planning based on daily, weekly and timely activity and travel desire lines.
- Built-in pedestrian-friendly norms in new building regulations and make it requisite for private land developers to prioritise pedestrian access and infrastructure facilities in all future developmental projects.
- Financing pedestrian infrastructure and management through levy of congestion tax in the high density areas, partial utilisation of motor vehicle tax and parking charges and fees collected.
- Application of engineering and technological aspect for construction of sidewalks and infrastructure amenities and facilities as per their requirements.
- Promoting walking culture in well-designed commercial places through partnership with local traders and creating awareness among common public and conducting sensitisation programmes for vehicle drivers.
- Recognition of aesthetics by local planning authority (Pune Municipal Corporation) as it has direct effect on the quality of life of residents in the area for attracting consumers and tourists. Parking areas, whether single or multi-storied, should be designed to fit into the existing streetscape and built form.
- Planning of Street furniture and amenities: Street furniture and signs, if not well-designed and coordinated, can cause visual clutter. LPA should take a review on

the amount, design and maintenance of street furniture elements such as garbage bins, public toilets, drinking water facility, paving and signs. This will be a key issue in drawing up a strategy for improving the sidewalk environment of city streets. The treatment of hard and soft landscaping within the pedestrian zone is of considerable importance and should be considered from the outset of the design process to ensure that it complements the architecture of proposals of abutting builtform and improves the overall quality of the existing sidewalk environment.

Local authorities should develop comprehensive traffic management strategy that:

- (a) Reviews the allocation of space for pedestrians, cyclists and public transport in shopping areas and the scope for implementing priority measures.
 - (b) Local authorities should promote the provision of car parking spaces which are shared between shoppers and others requiring parking for short durations. This can best be achieved through public-private partnerships, both in the provision and management of car parking.
 - (c) The streets with high traffic density clearly express the need of separation between pedestrian and vehicular traffic. Clearly defined buffers enhance the attractiveness of the streetscape and promote pedestrian safety. Surface accent strips of brick or textured paving to define pedestrian walkways should be utilised.
 - (d) Provisions for access for disabled persons must be incorporated into the overall pedestrian circulation system.
 - (e) Sidewalks should be made comfortable for use by pedestrians through the use of landscaping, overhangs and canopies in order to provide shade and non-heat absorbing materials. Pavement intended for pedestrian traffic should be stable, firm and skid proof and should not have an irregular surface that is uncomfortable or dangerous to walk on.
- Creation of Public Realm and Access: LPA should work in partnership with other stakeholders, on the provision, rationalisation and maintenance of street furniture, signage and paving, to improve the streetscape and produce accessible and coherent pedestrian environments. Introduction of public domain elements such as arcades, colonnades and landscape design, i.e. trees and paving can create unified landscape.
 - Provision of Public Parking Spaces: Car parking and service areas should be located to the rear, underneath or, above new development so as to minimise visual impact. Where surface car parking is proposed, this should be conceived within the overall landscape proposals for the development and link into the wider area. Multi-storey car parking should also be carefully designed and be well- integrated

with its surroundings. Pedestrian access, security, lighting, signing and publicity, management and maintenance, are all important design considerations. In addition to this, the sidewalks along the street should be given same compatibility.

- **Provision of Street Lighting:** Exterior street lighting should be designed to coordinate with the abutting built-form and landscaping. Building-mounted fixtures should be compatible with the building facades. Overall lighting levels should be consistent with the character and intensity of existing street lighting in the sidewalk areas. Security and parking lights and lighting for sign boards should be shielded or otherwise designed to ensure that light is directed downwards and not onto adjacent properties.

The research also presents an overview of specific actions and relevance for various stakeholders (national government, local government, development agency, NGOs) in participation of improvement in existing pedestrian environment and is highlighted in Table 6. Formulation and implementation of pedestrian-focused policies and guidelines, allocation of institutions and resources for development of pedestrian facilities and formulating and integrating urban transport plans and projects with respect to the needs of pedestrians should be the major actions planned by the city government. The government, whether national or local, must ensure that pedestrian plans are integrated with other transport development plans as well as with national standards for pedestrian facilities for improving walking environment. Development agencies and NGOs should play active roles in establishing and supporting initiatives for improving walking environments such as supporting the development of pedestrian-related policies, reviewing design guidelines for urban transport and pedestrian facilities, and emphasising for the integration of walkability assessment as an integral part of the planning of transport projects.

Table 6: Overview of Actions and Relevance for Various Stakeholders

	National Government	Local Government	Development Agency
Pedestrian Policies and Guidelines	Level of Involvement and participation of stake holders		
Develop comprehensive policies prioritizing the improvement of walking and pedestrian facilities			
Develop policies incorporating pedestrianized streets and open spaces			
Conduct regular walkability surveys and promote improvement starting at the community level			
Develop monitoring system to check whether policies and guidelines are being followed and necessary penalties are implemented			

Institutions and Resources			
Institutionalize non-motorized transport units and/or cells in city governments.			
Increase investments on relevant pedestrian facilities			
Urban and Transport Plans and Projects	Level of involvement and participation of stakeholders		
Mandate inclusion of pedestrian plans in new establishments and transport projects, using the pedestrian levels of service analysis			
Set high pedestrian mode share targets in city master plans			
Use walkability surveys and assessments as a basis for evaluation of transport projects			
Prioritize walking and cycling in traffic management and design			
Provide exclusive space for vendors, utilities, and parking			
Make traveling and streets more accessible to transport-disadvantaged people			

Source: Prepared by Authors.

Conclusion

The Indian Roads Congress (IRC) formulated the “Guidelines for Pedestrian Facilities” in 1989 which were modified in 2012 to prepare strategic plan for integration of pedestrian facilities with vehicular traffic and ensure a continuous pedestrian flow. The ITDP and EPC (2011) have introduced “*Better Streets, Better Cities: A guide for street design in urban India*” which provides toolkit to plan well-designed streets and articulates the concept of ‘equitable allocation of road space.’ Additionally UTTIPEC of the Delhi Development Authority proposed “*Pedestrian Design Guidelines*” for Delhi, India in November 2009, which addressed main goals for “integrated” streets-mobility and accessibility, safety and comfort, and ecology, in Delhi. (UTTIPEC and DDA, 2009). However IRC guidelines, “*Pedestrian Design Guidelines*” for Delhi and manual and guide of ITDP, lack approach for quantitative and qualitative evaluation of sidewalk spaces and their elements from pedestrians’ comfort point of view. They also do not analyse the satisfaction level of pedestrians’ comfort needs of the sidewalk environment and lack evaluation tool for the same.

The sidewalk evaluation method developed will serve as a tool for assessing and evaluating existing physical conditions of the sidewalk and their influence on pedestrians' comfort needs (physical, physiological and psychological) of the overall street environment. It will designate sidewalk conditions in terms of a weighted walkability index and PLOS grade. This tool will also facilitate the policymakers, non-government organisations and local government bodies in evaluating and improving walkability scenario in Indian cities on priority basis as per pedestrians' satisfaction and comfort needs. It will also be useful for planning, design and operation of sidewalk elements and facilities and conducting sensitivity analysis. It will be useful for performing comparative analysis of walkability indices for different sidewalks in the city, qualitatively as well as quantitatively. The model, thus developed illustrates that meticulous attention is required to address the pedestrians' comfort needs of sidewalk environment by applying the street design guidelines or templates based on varying street widths and the different sidewalk conditions existing on the various sites in different cities' context.

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Underlying Causes of Urban Fire with a Case Study of Anaj Mandi Fire, Delhi, India

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Abstract

Fire is one of the crucial resources that helps human beings to satisfy their basic needs, but its transformation from a resource to a disaster inflicts a great negative impact. The occurrence of fire incidences in highly densely populated urban centres like Delhi is very common and repetitive. *Anaj Mandi* fire disaster of December 2019 was very devastating as more than 45 people lost their lives. Further, thousands of people's lives and livelihood got impacted adversely. The immediate cause was a short circuit in the electric meter, but there were numerous other factors that directly or indirectly helped in the development of the *Anaj Mandi* fire. In this research work, it has been highlighted how various institutions, communities, owners, locals and individuals were responsible for this. This work provides a comprehensive view of how intentionally or unintentionally any disaster takes place due to the lack of amenableness of the responsible population.

Keywords

Fire, Fire Disaster, Causes of Fire, Urban Fire, Delhi Fire.

Introduction

Fire is a manmade disaster mainly caused by short-circuits, malfunctioning of power equipment, flammable material, explosives and human negligence, etc. (Sanghavi et al., 2009). Mainly unplanned growth of settlements and land use change leads to

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a fire. In the period of three years from 2012-15 in India, more than 70,000 people lost their lives due to fire (Tomar, et al. 2017). As per an estimate in 2001, more than 1,63,000 fire-related deaths have occurred and which was about two per cent of all deaths (Sanghavi et al. 2009).

In disaster-prone Delhi, fire is one of the major disasters. There is an increasing trend of fire in almost all localities from residential to industrial, which ultimately leads towards loss of life, personal treasures, vital official documents, psychological trauma and air pollution (Kapur A., 2005). After the liberalisation period of the 1990s, unauthorised colonies, clusters of slums came up in most of the middle and lower-middle-class residential areas. Further, in such residential areas many manufacturing units were also mushroomed (Sanu, S. K, 2024).

Anaj Mandi is a very good example of the liberal economy's underbelly which developed with time. It was developed as a flourished wholesale grain market and transformed itself into a hub of SECTER Secondary and Tertiary economic activities over time (Sanu et al., 2022). The fire incident of December 8, 2019 was very devastating that led to the death of 45 workers residing in the Factory premises (Sanu and Sharma, 2022). Workers lost their lives not due to any natural or uncontrollable causes but because of the poor management of commercial activities that flourished without following rules and regulations in an unchecked and messy manner. It shows that the statutory authorities entrusted with powers to regulate such activities were negligent and insensitive towards performing their duties. Most of the laws, rules, and regulations were not followed and enforced at the site. The detailed analysis of the causative factors of the Devil of December can be an eye-opener for the authorities, society, owners and individuals to learn some lessons for a safer future. With proper understanding of causative factors, methods, measures, and models can be developed to safeguard such locations all across India. It is important to note that this research work is not about who is responsible, but it is all about why the incident occurred and what can be learnt from it. This research work examines the contributory circumstances or components for the development of the tinderbox at *Anaj Mandi*. This work becomes extremely essential as it will direct towards the strategy of disaster-resilient urban sphere.

Data Source and Methodology

Both primary and secondary data sources were used in this research. Under primary sources, empirical observation and questionnaire-based interviews were undertaken. Objectives-oriented structured and unstructured sets of questionnaires were developed for primary survey and interview. Most of the respondents in the study area were reluctant to share information about the incident due to fear. Therefore to win the trust of locals, questionnaire-based interview method was adopted and it helped a lot

to collect some crucial pieces of information. According to the Election Commission Electoral Roll 2020 U05 NCT of Delhi, there are a total number of 286 voters in the study area. According to the locals, more than 2000 people live and work in that area. Majority of them are migrant workers. So to represent the whole population of the area, 50 samples were collected through stratified random sampling method during 2000. All sections of the population like migrant workers, local population and businessmen were included in the sample. To substantiate primary data, secondary data were collected from various sources like newspapers, journals, books, Delhi Fire Department, Delhi Police, Committee Reports of Delhi Government, Delhi BJP, North Delhi Municipal Corporation, etc. With the help of an excel sheet, the collected data were compiled and represented through various techniques and further analysis has been done.

Study Area

New *Anaj Mandi*, was developed to release some pressure from Ruhi Mandi, of Sadar Bazar in the 1980s. New *Anaj Mandi* lane extends from *Anaj Mandi* Gate to Katra Atma Ram Gate with a length of about 500 meters. The study area comes under Chowk Nai Basti surrounded by Bara Hindu Rao road in the north and Maharaja Agrasen Marg in South and Mohammad Ismail or Chamelian Marg in East and Rani Jhansi Road in West. The latitudinal extent of *Anaj Mandi* is 28°39'35.8"N 77°12'12.3"E to 28°39'32.9"N 77°12'21.7"E. This place has transformed itself from *Mandi* of *Anaj* to the hub of household and manufacturing industries (Sanu and Sharma, 2022). Its proximity to New Delhi Railway Station, Old Delhi Railway Station, bus terminals, one of the biggest wholesale markets of India, Sadar Bazar, make this site a hub of secondary and tertiary activities or SECTER. The area of *Anaj Mandi* comes under 'Special Development Area' for which specific measures and plans are required as per the requirements of the area. The Sex Ratio as per the Election Commission data of 2019 is 73 females per hundred males. As per the locals, about 93 per cent of the population are outsiders; those who are not registered in the voter list and only seven per cent of the population are registered voters. This fact indicates that people's concentration in the study area is not for residential purposes but for the jobs. Even the primary survey shows that about 72 per cent of the population residing in *Anaj Mandi* is there for job purposes.

Results

In the *Anaj Mandi* fire incident, more than 45 people lost their lives. Building number 8273 was the incident site where fire disaster occurred. Initially, the fire started from the 2nd floor and quickly spread to the 3rd and 4th floors of the five-storey building. It injured the labourers who were living and working in the congested and narrow factory premises. According to doctors, deaths were due to asphyxiation caused by

smoke inhalation and carbon monoxide poisoning produced by the burning of plastic products, and other raw materials. In all the rooms of the building, industrial or commercial activities were flourishing. The lanes and site of incidence were congested so much so that the fire tenders and emergency response team of National Disaster Response Force (NDRF) faced a lot of difficulties in rescuing the affected people. The factory was operating in a residential area and according to the Fire Department, the building lacked a proper fire license, and its use as a factory was illegal. Also there was an absence of provision for water hydrant for adequate water supply. For this incident, Delhi police registered an FIR bearing No. 0204/2019 at PS Sadar Bazar against two owners of the factory and the others accused. First Information Report (FIR) explains that there has been gross negligence not only on the part of the occupier of the building where the tragedy occurred but also on the side of the various concerned agencies and departments. The commercial activities were being carried out by the occupants in a residential area without due permission or no-objection certificates from the concerned departments or authorities. Even workers including children and women were employed by the owner without providing due records and information to the concerned departments. There was no proper arrangement of the entrance to the building; the entrance gate of the premises was very narrow, with no escape route in the event of any accident or fire tragedy. At the workplace, there was no proper ventilation, which led to a high level of suffocation during incident. The location of the building was not proper for carrying out any industrial or commercial activities.

Cause cited for death was inhalation of dangerous gases and burn injuries. But the real cause which developed fire disaster was authorities cutting across political parties and administrative departments who have been asleep by ignoring their basic duties. In the city, there is no absence of laws, rules and regulations. But corruption and political patronage obstruct the enforcement of laws and rules. In a general and predefined format, after any incidence, politicians and officers visit the site, order inquiry, subsequently, inquiry reports come up, and with the passage of time and fading of memory, recommendations remain buried in files and wait for a new tragedy to occur. To understand why the Devil of December occurred, identify its root causes, and grasp the factors that made it so disastrous, this study will categorise the contributing elements into four key areas. First, the role and responsibilities of the statutory authorities and relevant departments at both the State and Central government levels, including the Delhi Fire Service (DFS), Delhi Police (DP), Labour Department, Electricity Department, and North Delhi Municipal Corporation (NDMC). Second, the actions and responsibilities of the factory owner. Third, the awareness and understanding of fire safety among individuals. Finally, the influence and involvement of social institutions such as the *Anaj Mandi* Welfare Society, NGOs, and other social groups. (Figure 1).

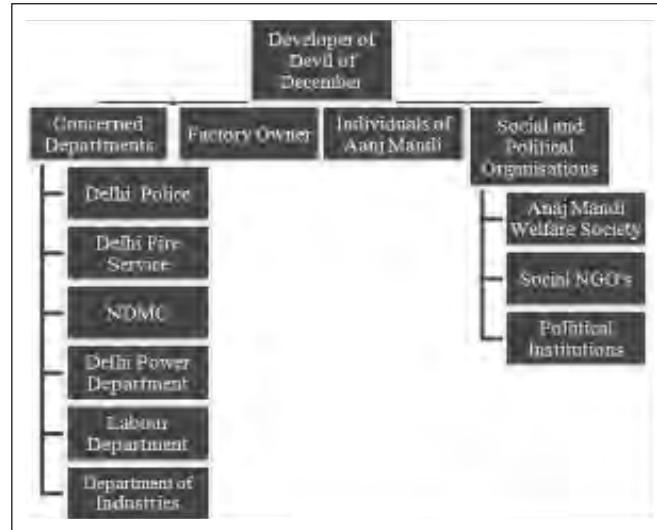


Figure 1: Developer of Devil of December

Source: Created by the author.

Discussion

Role of Departments and Authorities in Creating Devil of December

When any incident occurs in Delhi, we cannot blame one department or authority for wholly being responsible. For example, to establish a factory, a license is issued by the Municipal Corporation but the registration is done under the Department of Industries of Delhi Government. It is also true that behind the occurrence of any incident, the main factors are the negligence and non-performance of authorities. *Anaj Mandi* fire incident has emphasised the lapse in the execution of existing laws and norms by the various governmental agencies, particularly the North Delhi Municipal Corporation (NDMC), Delhi Police and concerned departments of the Delhi Government like Delhi Fire Service, Delhi Labour Department, etc.

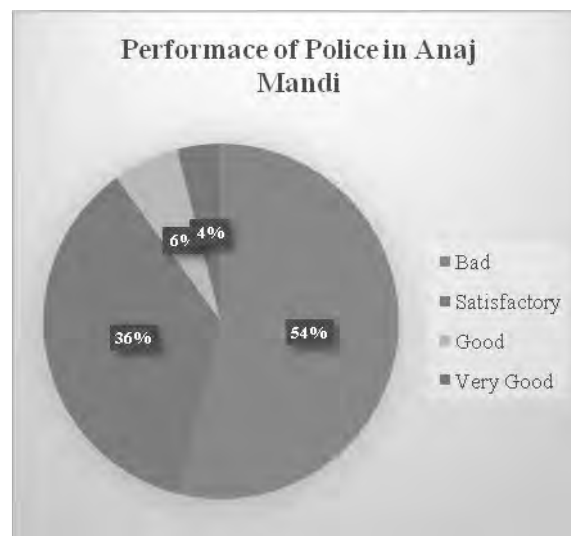
Role of Delhi Police in Development of Devil of December

One of the duties of Delhi Police is to inform the civic bodies about illegal factories being run in a residential area and to conduct regular inspections of the area. But before the occurrence of the fire, they were not performing their duty. As in *Anaj Mandi* lane, the factories were running illegally and the police department was unaware of it. How is this possible? Irfan, a local said illegal manufacturing units have mushroomed in the area with the “help” of police and administration. A local explaining the performance of police told: “in this area, big plastic moulding machines were installed. Police did nothing as they are only concerned with *hafta*.”

Table 1: Awareness of *Anaj Mandi* population about illegal factories of area.

Aware about illegal factory of area	Did complain or not	Percentage of awareness about illegal factory of area
No	-	54
Yes	No	44
	yes	2
Grand Total		100

Source: Primary Survey, 2020.

**Figure 2:**

Source: Primary Survey, 2020.

A senior police officer's statement in the *Hindustan Times* was "everybody gets the cut from factory owners and not just the cops - from MCD officials to Fire Department to Labour Department, etc. So everybody is happy and nobody cares." This statement is sufficient to explain the role of police in creation of disaster. "Most of the residents don't complain because they are aware of the nexus between factory owners and concerned authorities and know that nothing will happen. And if someone gets the courage to file a complaint, then somehow it gets settled by the factory owners with the help of police" (*Hindustan Times*, 2019).

During the Primary survey, it has been witnessed that majority of the population of *Anaj Mandi* is aware of illegal factories in *Anaj Mandi*, but most of them are reluctant to speak about this fact. They try to ignore such questions. Out of the total respondents, only 44 per cent told that they knew about illegal factories of *Anaj Mandi*. On the other hand, 54 per cent of respondents told that they didn't know about any illegal factories. Only one person complained about this to the authorities (Table 1). A respondent told

“Once I complained about the illegal factories of *Anaj Mandi* operational even during night time, but no action was taken. Even before inspection police and authorities inform the factory owners so that they can close their factories and go out on the day of inspection. There is a high level of corruption at the local level.” Even Rehan (the building owner) during questioning told the inspection team that he constructed two more floors in 2008 with the support of local police and civic body officials. In primary survey, 54 per cent respondents said that performance of police is bad in *Anaj Mandi*. On the other hand, 36 per cent of the respondents opined that performance is satisfactory (Figure 2). To stop any illegalities in any area, role of police is the most important; therefore the Sadar Bazar police station was also a key component in igniting disastrous event of *Anaj Mandi*.

Delhi Fire Service (DFS) and Development of Disaster

Delhi Fire service is the crucial department of Delhi Government for fire safety in the capital city. As per the Delhi Fire Service Rules, 2010, appropriate measures must be taken for ensuring fire safety in all localities and DFS should follow all the guidelines and recommendations to make society fire resilient. This is their duty to issue a no-objection certificate to buildings, provide fire safety and prevention measures. As per rules, a building with more than 15 meters of height or ground floor plus four storeys requires No Objection Certificate (NOC). As in this case, the building was with ground plus five floors, so they should have NOC. Regarding this incident, the former Director, Delhi Fire Services (DFS) remarked that the factory where the fire took place was not having any fire clearance and no fire safety equipment was found installed on the premises. It appears that a No Objection Certificate was not obtained from the Fire department (*Hindustan Times*, 2019). The Rani Jhansi Fire station is situated at a distance of 0.5 km or a timing distance of five minutes from the site of the incident and the concerned officers were unaware about it. No doubt, the courage and heroic work done by the fire fighters during the tragedy deserves appreciation, respect, and salute. But how they performed their job in the Ante Phase (pre-disaster period) or the period of development of disaster is important to consider.

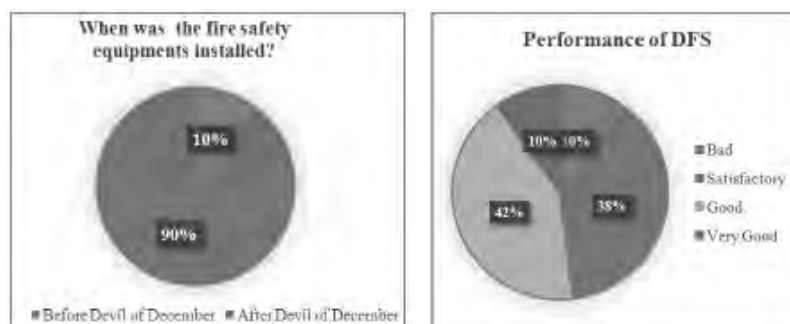


Figure 3 and 4:

Source: Primary Survey, 2020.

When asked about when did the fire safety equipment install in their house or workplace in Anaj Mandi, 90 per cent of the respondents said that it was after the occurrence of the fire. Only 10 per cent told that they installed it before fire incident (Fig. 3). Even during the survey, it was observed that installed fire safety equipment was so new that the safety plastic armour had not been removed as yet from the fire extinguishers. Even most of the workers didn't know how to use those extinguishers. This was also a matter of concern. Forty two per cent locals opined that the performance of Delhi Fire Service in Rani Jhansi Road was good, followed by a satisfactory category with a percentage share of 38 per cent. Only 10 per cent of the respondents said that the DFS staff were not doing their duty honestly. On the other hand, 10 per cent also thought that their performance was very good (Fig. 4). The data show that while the heroic efforts of DFS during the fire incident earned them much respect, there are serious concerns about their overall approach. The installation of fire safety equipment only after the disastrous incident and the residents' lack of awareness about fire safety measures raise questions about DFS's effectiveness. According to Furkan, the factory manager, a fire had broken out in the same building six months earlier, which was extinguished with the help of the fire department and locals. Notably, firefighters and officers had visited the building just six months before the recent incident, yet DFS took no preventive action. It appears that the responsible DFS officers failed to fulfill their duties, which directly or indirectly contributed to the tragic fire on December 8, 2019.

New Delhi Municipal Council (NDMC)

As the area of Anaj Mandi comes under the jurisdiction of NDMC, hence it was their duty to control the development of any illegal factories, mismanagement of property and implementation of building bye-laws. The Municipal Corporation must check the building plan, what type of activity is being carried out in the buildings, how the building was constructed, is it lawful or not, safe for the residents or not, issuing of a license for the factory, etc. all this comes under the duties of NDMC. Illegal factories running in residential areas is not a new problem. In 2003, Supreme Court directed that all industrial units that came up in non-conforming (residential) areas after August 1, 1990, should be closed within a given time frame. Delhi State Industrial and Infrastructure Development Corporation (DSIIDC) of the Delhi Government in June 2018 prepared a list of 51,837 illegal industries operating in different parts of the capital city, and the *Anaj Mandi* factory was one of them (*Hindustan Times*, 2019). These illegal industries had to be closed by the Municipal Corporation. Some officials tried to protect themselves by pointing out that a few of them come under household industries. However, rules mandate that even for domestic household industry units, a maximum of nine workers can be employed; power load can't be more than 11 kW. But the incident site seems to be violating this aspect too.

Forty six per cent, of the respondents told that the performance of MCD was poor in this area as the staff didn't perform its job honestly. On the other hand, another 46 per cent of the population told that they were satisfied and only four per cent of the respondents put their work in a good and very good category (Fig. 5). A respondent told "even after such a big accident, the MCD is not ready to accept it as their fault. They take money and allow people to make more than four floors. They don't take care of the cleanliness of this area (Fig. 6)." His statement about NDMC and overall analysis of all dimensions clearly indicated that the NDMC was one of the crucial elements in the ignition of the Devil of December as per the respondents.



Figure 5 and Figure 6

Source: Primary Survey, 2020

Industrial Department

Factory Inspector and Concerned Government Authority

The site where incidence occurred does not come under the household industries. As only those household industries can run in residential areas that are non-polluting. The amended Master Plan of Delhi-2021 allowed nine people and 11 kW of power connection for the household industries. But most of the people of *Anaj Mandi* run big factories under the shadow of the household industrial tag. To run factories properly in the capital city there is the Factories Act, 1946, with different sections providing the rules and regulations to run the factory. Overall the Factory Act 1946, has very good provisions and rules to make any factory place safe for its occupants. But in *Anaj Mandi* as the factory was running illegally, there was a total absence of safety measures for the occupiers and workers. How was it possible that in the hub of SECTER, illegal factories were running and the concerned mentioned departments were unaware? It indicates that the factory law was at stake and concerned authorities were not performing their duties honestly.

Electricity Department

The work of the electricity department is to provide electricity to houses, to household industries and from factories to industries. In this case, the building was using more than 50 kW of electricity which was much higher than the prescribed limit of 11kW as per the household industrial limit. In majority of fire incidents, electrical short circuits become the primary cause. Providing limited electricity and taking care of electricity wiring all comes under the jurisdiction of the electrical department. Following are the critical issues surrounding the fire incident in Anaj Mandi:

- **Fire Origin and Cause:** While the exact location where the fire started is noted as internal to the buildings, the more pressing concern is why the fire occurred in the first place. Understanding the root cause of the fire is essential to prevent similar incidents in the future.
- **Responsibility for Wiring Management:** The management of overhanging and dangling electricity wires appears to be a significant factor in the incident. The statement from Sanjay Jha, the Water Resource Minister of Bihar, clearly points to the power department as responsible for managing these wires. The mesh of overhanging wires, which he observed at the scene, seems to have been a potential hazard that was not addressed, leading to this tragic event.
- **Negligence and Corruption:** The local resident's account adds another layer to the issue, suggesting that the electricity department personnel may have been negligent in their duties. The allegation that the department would provide electricity connections in exchange for money, without following up for maintenance, paints a picture of systemic issues. This kind of negligence and potential corruption likely contributed to the unsafe conditions that allowed the fire to spread.
- **Indirect Causality:** The local Resident's statement about the electricity department's leniency in providing connections and failing to manage wiring appropriately indicates a form of indirect causality. Although the fire may have started internally, the unsafe external conditions created by poorly managed electrical infrastructure played a role in the incident.

The incident seems to stem not just from the internal issues within the buildings but from broader systemic problems, including poor management of electrical infrastructure, possible corruption, and negligence by the responsible authorities. Addressing these issues would require both accountability and reforms within the electricity department to ensure such incidents do not recur.

Labour Department and Child Labour (Prohibition & Regulation) Act, 1986

The role of labour department is to enforce the labour laws and welfare programmes in the industrial area and take complaint based action in illegal units of area. This is

also their duty to check or prevent factories to employ minors in factories and ensure that the labourers are provided with appropriate working conditions at the workplace. To protect and prevent children below the age of 14 years, there is the Child Labour Prohibition and Regulation Act, 1986. Section 3 of this Act provides a complete prohibition on the employment of child labour in any establishment. In the area of *Anaj Mandi*, child labour is a common thing. Many children are employed in different factories. Even in this incident, five minors died due to fire.

During Primary Survey it was found that even after the occurrence of Devil of December, the scenario has not changed yet, as it was found that a 10-year boy Mithilesh (name changed), from Madhubani, Bihar was working in the mask-making factory. The boy told that “I am here for more than a year” (Fig 7). He was not responding to questions appropriately due to the fear of certain actions from authorities. But when his younger brother was asked about this, he told that “Well here he does nothing, just helps to bring tea and water.” A young boy Nizamuddin, 25- year told that “I have been working here for over 15 years, from the age of 10. In the beginning I was just getting food and shelter.” The Labour department office which is situated in the proximity of 1.2 kilometres, didn’t have any idea about this. This fact is shameful and one of the crucial causes for the occurrence of the Devil of December and casualties of children in the factory fire.



Figure 7: Minor working in Anaj Mandi manufacturing unit

Source: Primary Survey, 2020

Summarised form of Authorities’ responsibility

The *Anaj Mandi* fire is a grim reminder that the authorities concerned have learnt no lessons from the past tragedies. Rampant violation of fire safety norms has turned almost all unauthorised colonies and industrial areas in Delhi into virtual tinderboxes.

Was Owner Responsible?

The owner was the main culprit of the case as per the statement of authorities and perception of the population. The site of incidence was located in a residential area where mixed land use is permitted. According to the rule, commercial activities can take place only on the ground floor and the rest of the floors for residential purposes. But in house no 8273, all the floors were engaged in commercial activities, which were running without due permission from the Municipal Corporation and Delhi Government. The building had no NOC. The owners of the building neglected all the rules and regulations from the construction of illegal two floors in 2008 to the use of heavy plastic moulding machines without permission.

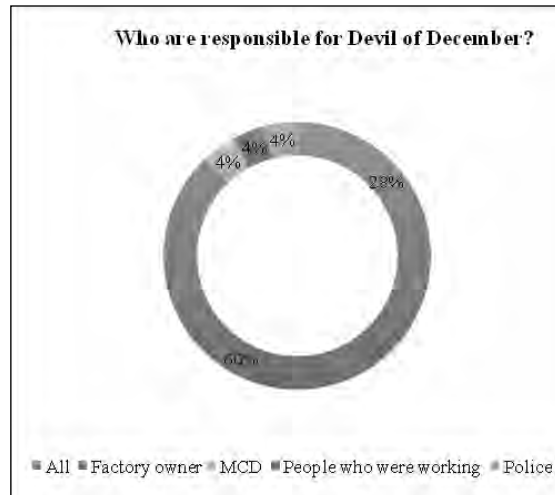


Figure 8

Source: Primary Survey, 2020.

Owners have violated various rules and regulations and also they were ethically unconscious by employing people in such a hazardous condition. Even after the complaints of the workers of the factory about a short circuit in the building a few days before the incident, owners did not take any safety measure to check such incidents in future. This negligence on part of the owners, became the main cause for the occurrence of the Devil of December. During primary survey, it was also found that most of the residents and workers of *Anaj Mandi* think that owner of the building was the main culprit as he was not following rules and regulations and doing his job illegally. As sixty per cent of respondents during the survey told that owner was the main culprit or majorly responsible for this incident (Figure 7).

Individuals in the Creation of Disaster

As every society is made up of individuals so the role played by them and their awareness becomes crucial for a comprehensive understanding of any incident or

mishappening. In the fire incident, individuals of *Anaj Mandi* were also responsible in different ways, as they were unaware of the disastrous aspect of fire and they were tolerating and living in such a hazardous condition. Most of the population of *Anaj Mandi* was unaware of the fire safety measures. During primary survey, it was found that about 76 per cent respondents were unaware of the disastrous aspect of fire. More than 70 per cent of the population had never participated in any fire mock drill. 56 per cent of the population was unaware of the helpline number of fire safety even after the occurrence of such a disastrous fire incident. Only 36 per cent of the population knew do's and don'ts of fire and the rest 64 per cent didn't know (Tables 2, 3 and 4). The unawareness of the *Anaj Mandi* population about these basic safety measures was the main cause of making fire a disaster from hazards which impacted the lives of thousands of people. Even the survey revealed that about 14 per cent of the population think that workers who were working in that factory were more responsible for the development of disaster, as they were working in such a messy condition and did not complain to any authority about that. When the fire broke out, none of the victims called fire department for safety. Five to six victims called their relatives but did not give a call to any emergency helpline number. Even the factory owner in his official statement during the investigation procedure told that he asked a local to go fastly to the fire office and inform the fire department that there has been a fire. This statement was made intentionally or unintentionally but showed the level of unawareness of the factory owner as an individual of society.

Table 2 and 3: Status of awareness of locals with fire safety measures

Helpline no of fire	Keep emergency no	Number of persons who keep emergency no
Don't	No	14
	Yes	14
Don't Total		28
Know	No	5
	Yes	17
Know Total		22
Grand Total		50
Know dos and dont's	Have primary precautionary measures	No. of persons who take primary precautionary measures
No	No	8
	Yes	10
Yes	No	6
	Yes	26
Grand Total		50

Source: Primary Survey, 2020.

Table 4: Locals' knowledge about do's and don'ts of fire safety and status of precautionary measures

Know do and don'ts	Have primary precautionary measures	No. of persons who take primary precautionary measures
No	No	8
	Yes	10
Yes	No	6
	Yes	26
Grand total		50

Source: Primary Survey, 2020.

Locals' role in causing the disaster

The situation in *Anaj Mandi*, where the entire society's efforts to conceal their illegal activities contributed to the development of a disaster, underscores the complex dynamics that can lead to such tragedies. Illegal activities, such as unauthorised construction, unsafe wiring, or improper use of buildings, often bypass necessary safety regulations. In the case of *Anaj Mandi*, the concealment of such activities likely meant that dangerous conditions went unreported and unaddressed. Over time, these conditions can lead to catastrophic events, as seen in the fire incident. After the tragedy, when mediapersons went to the area, they were opposed by the locals while clicking pictures. "Even policemen do not dare to enter these buildings. The locals always stand united against any government agency that plans action in the area. People fear getting exposed by media," said a local. Even during the fire incidence, the reporters alleged that they were stopped by few locals from entering the adjoining lanes. Jagan Mandal, a worker told that "after the fire incident, my employer has instructed all workers not to talk to any person. The employer has even snatched our mobile phones." With such mind-set and attitude, locals played a pivotal role in the development of disastrous fire.

Role of Societal and Political Organisations in Development of Fire Disaster

Anaj Mandi Welfare Association (AMWA)

Welfare associations are generally there for the welfare of society. In the same way, AMWA was formed for the welfare of the workers, businessmen, locals, residents and the population of *Anaj Mandi*. President and general secretary of the Society never complained, despite knowing that illegal factories were very much there in their area. In fact, they were promoting such activities in *Anaj Mandi* with indirect and direct support to the owners. They were deliberately hiding the illegalities that ultimately led to disaster.

NGO's and their Role in the Creation of Devil of December

Non-Governmental Organisations (NGOs) work without the interference of the government and most of the time they work for the welfare of society. After the incident, many NGOs reached the site and questioned lots of things but the question is where were they before the incident. One such NGO, BBA (*Bachpan Bachao Andolan*), which works for children, filed a PIL in court regarding child labour in the factory, that was a good step but why only after the occurrence of the incident? Had they taken steps for the safety of children prior to the occurrence of incident, those dear children could still be alive.

Political Institutions and Development of Devil of December

The situation in *Anaj Mandi*, where local representatives claimed to be unaware of illegal factories in their constituency, raises serious questions about governance, accountability, and the role of elected officials. Elected representatives, from ward members to Legislative Assembly and Lok Sabha members, are expected to be closely connected with their constituents. Their role is to be aware of the needs, issues, and activities within their area to ensure the well-being and safety of the population. The fact that they were unaware of such activities raises questions about their engagement and effectiveness in their roles. The incident in *Anaj Mandi* illustrates a failure of governance at multiple levels. The lack of awareness—or the claimed lack of the incident in *Anaj Mandi* highlights how selective awareness by representatives, driven by political interests, can contribute to the development of disasters. The lack of awareness—by those in power shows a breakdown in the system meant to protect and serve the public.

Conclusion

After every major fire incident in the capital, a committee is set up to formulate plans to prevent such mishaps in the future, but the recommendations made by the panel are never implemented which can be evidenced through various past incidences. In Bawana on January 20, 2018, 17 workers died in a factory fire. Following this, a committee was formed that included officials from civic bodies, fire department, police, power discom, and other concerned agencies but its recommendations were never implemented appropriately at the grassroots level. Similarly, a committee was formed in Delhi after the Surat Coaching fire tragedy, which had recommended that all coaching centres and PGs' accommodations must have No Objection Certificate (NOC) from the fire department, but these recommendations were also not implemented, till now. Strict implementation of rules and regulations under the building bye-laws can prevent mishaps like *Anaj Mandi*, Bawana, or Karol Bagh where dozens of people died in fire incidents. But the problem is that all these recommendations and suggestions are not properly implemented at the grassroots level, which leads to the creation of one after another disaster. To prevent future incidents like the one in *Anaj Mandi* and

to make Delhi more fire-resilient, it is crucial that all stakeholders, including those directly or indirectly responsible, as well as the onus-bound bodies, work with honesty, diligence, and a sense of accountability.

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Urban Floods—A Recurring Disaster in Indian Cities

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Introduction

In recent times, urban floods have become a recurring menace to many Indian cities. An analysis of the recent floods helps in understanding the flood devastation suffered by the urban communities. It is observed that the flood disasters occurred due to uncontrolled urbanisation imparting high vulnerability to the built environment. However, the heavy rainfall has aggravated the severity of the flood hazards. The Fourth Assessment Report of Inter-governmental Panel on Climate Change (IPCC), warns that climate change would increase the risks of hydro-meteorological disasters in South Asia. The weather patterns also indicate more frequent occurrence of such events in future, necessitating a comprehensive strategy for adaptation, mitigation and urban renewal for reducing the vulnerability and strengthening the resilience of our cities.

Indian landmass comprises five unique geographical domains viz. the youthful Himalayan Mountain ranges in the north, spread over a length of 2400 km from Arakan Yoma in the east to Pamir knot in the northwest; thickly populated fertile Indo-Gangetic alluvial plains along the southern extremity of the Himalaya; Thar Desert in the northwest; Peninsular plateau in the central part; and the 7500 km long coastal belt along the southern margin of the Peninsula. These geographical domains are characterised by their unique topography, landforms and climate. They are vulnerable to many hazards, viz. earthquakes, cyclones, landslides, flash floods, extreme temperatures and drought.

In recent times, flash floods are posing a threat to the sustainability of the human settlements in mega cities. Urban areas imbibe high vulnerability to flash floods owing to their unplanned growth which is further accentuated by extreme rainfall events. This is well demonstrated by some of the recent catastrophic floods in Hyderabad, 2020; Kerala, 2018; Chennai, (2015); Srinagar, (2014); Kedarnath, (2013); and Mumbai, 2005. Besides, there are many other incidents of flash flooding in many cities and villages spread over different parts of the country. The magnitude and pattern of devastation depends on the type of terrain, intensity of the rainfall and the state of vulnerability of the built environment. For instance, during 2016 several parts of the

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country had to face the brunt of monsoon floods, affecting around 11 million people, damaging more than 140,000 houses, causing 855 human fatalities, resulting in total economic loss of around 5.25 billion rupees (Ministry of Home Affairs, Government of India). Some of the flash flood events are briefly described below.

Hyderabad Floods 2020

In October 2020 flash floods in the city of Hyderabad resulted in extensive damage to property and loss of life due to unprecedented heavy rainfall caused by deep depression in the Bay of Bengal which slowly migrated towards east coast. The Himayat Sagar reservoir was overfilled and the Musi river got flooded inundating several localities in the city of Hyderabad. The flash floods affected about 3700 families and caused 19 human fatalities in the city (*Deccan Herald*, 15 October 2020). The Greater Hyderabad Municipal Corporation faced a big brunt of flash floods for which about 750 crore rupees (7500 million rupees) grant was sought by the State Government from the Central Government (*The Hindu*, 16 October 2020). About 20,000 tons of waste material was gathered after the floods and a number of teams were deployed for sprinkling bleach to avoid spread of water-borne and vector-borne diseases (*Indian Express*, 18 October 2020).

The city of Hyderabad is gifted with a beautiful landscape having granitic hillocks geologically known as inselbergs and intermittent lakes. The unplanned urbanisation and construction spree has created a havoc in the area destroying hills for construction material, and encroaching the wetlands and lakes for urban growth. The urbanisation has not taken proper cognizance of natural slopes and drainage types, which makes it vulnerable to flash flooding and water-logging. Lot of irreversible damage has already been done to the natural landforms like hills and lakes. Further destruction may be minimised by strictly regulating the quarrying activities and rampant constructions.

Kerala Floods of 2018

Unprecedented high rainfall in August 2018 caused catastrophic floods in the state of Kerala, devastating thousands of houses, damaging about 10,000 km of roads and hundreds of human fatalities. One sixth of the population of Kerala was directly affected, more than a million people had to take refuge in the 3000 relief camps set up at various locations. It was classified as Level 3 Calamity (Calamity of a severe nature) by the Government of India. Heavy monsoon rains (about 116 per cent more than the average) resulted in fast filling of dams to the maximum and 35 of the dams were opened for the first time in the history, causing floods in the low lying downstream areas. A report by the amicus curiae (an impartial adviser to a court of law in a particular case) appointed by the Kerala High Court, stated that the devastating flood of 2018 was the result of bad dam management by the State Government.

Chennai Floods—2015

In 2015, flash floods in Chennai exemplified the state of high vulnerability of the megacities located on the flat Peninsular coastal landscape. The flood hazard was intensified by extreme rainfall event (breaking a record of last 100 years). The floods caused hundreds of human fatalities and huge loss of property. The preliminary analysis suggests that the city had gradually acquired higher levels of vulnerability due to its phenomenal growth encroaching upon the wetlands, natural water courses and the areas meant for spread of water during excessive rains and discharges from the reservoirs. The flood hazard was further intensified by extreme rainfall event attributable to the phenomena of climate change.

The city of Chennai is a peneplained area with signatures of past flooding. It has a landscape strewn with lakes, ponds and natural water courses. The city faced a rapid unplanned urban growth particularly after the year 2000, due to rise in the information technology activities. There was a steep rise in population from 5.8 million in 2001 to 8.9 million in 2011 in the Chennai Metropolitan Area necessitating rapid urban growth. According to an analysis by Indian Institute of Science (IISc), the built-up area in the Chennai city increased from 29.53 per cent in 1991 to 64.4 per cent in 2013. The rampant urban growth has not taken proper cognizance of lakes, ponds and natural water courses, thereby increasing the vulnerability of the city to flash floods.

Srinagar Floods of 2014

The Srinagar floods of 2014 took place in a wide open inter-montane valley in the Himalayas. The uncontrolled urbanisation on the flood plains of Jhelum River, have choked all the natural water ways required for the passage of water during high floods. It became a catastrophe for the inhabitants leading to loss of life and property and totally shattering the urban life. More than 60 sq km of built area was inundated affecting more than two million people. An unprecedented rainfall of 303 mm was recorded in the first week of September 2014 which triggered the disaster in the Himalayan town. The estimated flood at Srinagar was about 3200 cumecs against the carrying capacity of the Jhelum river which was 900 cumecs (CWC). This resulted in overtopping of the banks and inundation of the entire human settlements on the floodplains.

The city of Srinagar witnessed uncontrolled urbanisation in the flood plains of Jhelum river. The government has been ignorant about the unplanned growth of the city as many of the government offices are also located on the vulnerable flood plains of the Jhelum river. Many of such government offices were submerged under deep flood water for several days. The Dal lake had also been encroached reducing its capacity. The drains carrying surplus water from Dal lake to Jhelum river were also vandalised in the process of unplanned developmental activities. This along-with the unprecedented rainfall had caused the flood disaster in the Himalayan city of Srinagar

in 2014. These floods claimed hundreds of human lives and caused damage to houses and infrastructure worth billions of rupees.

Kedarnath Floods 2013

The catastrophic flash floods of Kedarnath during June 2013, occurred in the paraglacial belt of higher Himalaya due to unprecedented high intensity rainfall and breach of a moraine dammed glacial lake known as Chorabari lake. This led to the flooding of Saraswati and Mandakini Rivers in the Rudraprayag district of Uttarakhand. The cumulative effect of heavy rainfall and lake burst created flash floods which washed away the Kedarnath town and other settlements downstream. Thousands of people were killed, and livestock also perished (Dobhal et al., 2013). This was one of the worst Himalayan tragedies in the recent years. There were floods in the area in the past too, but this was the largest and unprecedented. These floods partially damaged the famous Hindu Shrine of Kedarnath and completely washed away the surrounding township. Due to the rise in tourism, the town was expanding towards a palaeo-channel. It is to be noted that in the Himalayan belt, a large number of human habitations occupy the terraces developed on both the flanks of the rivers in the valleys. Landscape degradation due to flash floods has brought these habitations under grave threat of devastation raising the issue for their future adaptation to such weather driven high hazards. Shift in weather patterns is also indicated as the heavy rainfall event occurred in the middle of June which is not a usual phenomena.

Kedarnath Dham being a tourist/pilgrimage destination, the tragedy may have long lasting negative impact on tourism industry of the state of Uttarakhand. To avoid such losses and tarnishing of the image of the place, a proper Disaster Management strategy is to be created with a focus on mitigative measures.

Mumbai Floods 2005

During floods of July 2005, Mumbai city came to a standstill and hundreds of human fatalities took place. The floods were caused by a very high intensity rainfall of 944 mm in 24 hours as recorded at Santacruz gauging station. The heavy downpour was localized as the rain gauge at Colaba about 24 km from Santacruz received a rainfall of 7.3 cm only. (Sahany et al., 2010). This heavy rainfall brought the city life to a standstill with impaired transportation, telecommunication and financial services. The air services were also disrupted due to flooding of the runways. The low lying areas adjacent to Mithi river remained water logged for many days. This exposed the high vulnerability of the city to the flash floods particularly in the extreme rainfall event. The vulnerability is caused by poor drainage system, unplanned constructions, and massive population. The slum dwellers got the maximum brunt of the floods as they inhabit the areas like-hill slopes, nallahs, low lying areas, coastal plains and around open drainages. The rampant urban growth leading to unplanned construction of buildings, and choking of the river due to garbage dump hampered the free flow of water. Additionally the buffer

zone between the city and the sea was also encroached for urban constructions. These floods resulted in a huge damage to the infrastructure and outbreak of disease in the aftermath. Some of the factors for the disaster were---clogged drains, uncontrolled and unplanned urbanisation in northern suburbs, destruction of mangroves for construction along Mithi river and Mahim creek, encroachment on swamps and wetlands which were acting as flood sinks between land and sea.

As per some estimates, more than 500 people lost their lives, about 50,000 residential units damaged, about 40,000 commercial establishments got damaged, about 100 school buildings damaged. Total damages were estimated around Rs. 550 crores (5500 million rupees).

Discussion

Along with loss of life, damage to property and infrastructure, these catastrophic events leave an indelible mark on the human psyche and social fabric in the affected areas, which may take a long time to heal.

The impacts of extreme events enhance the severity of hazards which cause havoc in the cities owing to their high vulnerability inherited from uncontrolled rapid urbanisation. The poorly planned urban growth leads to choking of natural waterways and encroachments upon water bodies and wetlands. The situation gets aggravated due to inappropriate city drainage incapable to withstand the discharge during high intensity rainfall. The situation further gets accentuated due to increase in the frequency and intensity of extreme rainfall events caused by the phenomena of climate change. It is to be mentioned here that the Intergovernmental Panel on Climate Change (IPCC) in its fourth assessment report has warned that climate change would increase the risks of hydro-meteorological disasters and their impacts would be felt more severely in South Asia. The trends indicate frequent occurrence of such events in future. It is high time that our cities adopt all possible measures to minimise/mitigate the impact of climate change related intense hazards, before more such events ruin our urban settlements. At the same time the future urban development may mandatorily adopt the required measures to make the cities resilient to climate driven disasters. Therefore, a comprehensive adaptation and mitigation strategy is required to be formulated for integration in the developmental process to reduce the vulnerability of the human settlements, particularly mega-cities to safer limits.

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