



Spatio-Temporal Assessment of Selected Demographic Characteristics in Pune District, Maharashtra

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Abstract:

The demographic structure of a region plays a pivotal role in shaping its developmental trajectory. While population can serve as a valuable resource, it may also pose challenges to regional development if not managed effectively. Unplanned population growth can exert significant pressure on existing resources, leading to socio-economic and environmental issues. Pune District in Maharashtra is one of the most historically, culturally, socially, economically, and politically advanced regions in the state. It accounts for approximately 8.39 percent of Maharashtra's total population, reflecting its prominence. Rapid urbanization in tehsils such as Haveli, Maval, and Khed has contributed to substantial demographic shifts within the district. Migration from rural to urban areas—driven by aspirations for better education, employment opportunities, healthcare services, and overall quality of life—has significantly altered the population structure. At the national level, India's population increased by 377.1 million between 1901 and 2011. Maharashtra, with an urbanization rate of 45.23 percent, surpasses the national average of 29.5 percent, indicating its accelerated urban growth. This study aims to examine the spatial and temporal distribution of population in Pune District using data from the 2001 and 2011 Census. It further explores the variability in population distribution across the region and identifies key factors contributing to these demographic disparities.

Keywords: Population, Sex Ratio, Density, Occupation, Urbanisation.

1. Introduction:

Pune district is situated in the state of Maharashtra, India, which is renowned for its rich historical heritage, vibrant cultural diversity, and rapid urban development. As a key urban centre and one of the most economically significant regions in Maharashtra, Pune has witnessed notable shifts in its demographic profile over the past few decades (Deshpande, 2017). These shifts underscore the importance of understanding the spatio-temporal dynamics of demographic characteristics in the district,

especially given its increasing role as a hub of economic activity, education, and innovation (Jadhav & Patil, 2021).

Demography, the scientific study of human populations, is central to analyzing the socio-economic and political dimensions of a geographical area (Weeks, 2020). A spatio-temporal assessment of demographic parameters such as population distribution, growth rate, age and sex structure, migration patterns, and socio-economic indicators offers critical insights into regional development trends and future planning needs (Kundu, 2012). Such an understanding is vital for formulating data-driven policies that address urban challenges and foster sustainable development (UN-Habitat, 2020).

In recent years, Pune District has experienced a demographic transformation driven by rapid industrialization, urbanization, and advances in infrastructure and technology (Kulkarni & Kale, 2019). These forces have drawn migrants from various parts of the country, contributing to the district's increasing population diversity and complexity (Chandna, 2016). As a result, new demographic patterns are emerging, which warrant a detailed spatial and temporal analysis to assess their implications for urban planning, resource allocation, and public service delivery (Bhat & Xavier, 2021).

This study aims to conduct a spatio-temporal assessment of selected demographic characteristics in Pune District, Maharashtra. By analyzing population trends, spatial distribution, age and gender structures, migration flows, and socio-economic factors, the study seeks to shed light on the evolving demographic landscape of the district. Additionally, this research has identified potential challenges and opportunities arising from the changing population dynamics and offer valuable insights to policymakers, researchers, and stakeholders involved in urban planning, infrastructure development, and social welfare initiatives. The study has utilized a combination of quantitative and qualitative research methodologies, including data analysis, geographic information systems (GIS) mapping, and literature reviews. By drawing upon primary and secondary data sources, we aim to ensure the credibility and accuracy of our findings. However, it is essential to acknowledge that demographic studies are subject to uncertainties and may require periodic updates as the region continues to evolve.

2. Background of the Study:

The demographic landscape of Pune District has been dynamically shaped by a combination of urbanization, migration, and socio-economic transformation. Historically, Pune city has acted as the district's primary urban nucleus, attracting migrants from rural Maharashtra and neighbouring states due to its robust educational institutions, expanding job opportunities, and improving infrastructure.

Mhaskar and Kulkarni (2015) analyzed census data and noted a discernible shift in population concentration toward suburban and peri-urban areas, a trend that has contributed to urban sprawl and complicated urban planning and service delivery efforts. Singh and Kapoor (2021) further substantiated this trend through their analysis of satellite imagery and census data, identifying rapid urban growth and its corresponding demographic shifts, particularly in the Pune Metropolitan Region.

Multiple studies have emphasized the demographic transition currently underway in the district. Deshmukh et al. (2018) and Kumar and Sahu (2020) observed declining fertility rates and an increasing proportion of elderly residents, consistent with broader demographic shifts occurring in urban India. This aging population poses new challenges for public policy, especially in terms of healthcare infrastructure, pension coverage, and intergenerational support systems. Rao and Verma (2020), using both quantitative surveys and qualitative interviews, revealed significant gaps in geriatric healthcare infrastructure in Pune, stressing the need for more age-friendly policies and dedicated medical services for the elderly.

In terms of gender dynamics, existing literature reveals substantial disparities in access to education, employment, and resources. Sharma and Mehta (2019) employed GIS tools to analyze spatial variations in educational attainment across the district, uncovering a divide between rural and urban regions. These findings are reinforced by Dandekar and Kulkarni (2017), who examined gendered access to services and opportunities, advocating for more inclusive, gender-sensitive development policies. Furthermore, migration has emerged as a central force shaping the region's demographic evolution. Chaudhari and Deshmukh (2019) focused on rural-to-urban migration patterns, highlighting their impact on informal settlements and urban infrastructure. Complementing this, Joshi and Naik (2018) conducted survey-based research to explore the experiences of migrants, identifying barriers related to housing affordability, access to basic services, and social integration.

Migration has also contributed to the cultural diversification of Pune. Naidu and Iyer (2016) documented the formation of culturally distinct enclaves within the city, formed largely along linguistic and regional lines. While this diversity enhances Pune's cosmopolitan identity, it also raises concerns about social fragmentation and access inequality. Beyond population growth and migration, socio-economic indicators provide critical insights into the quality of life in the district. Patel et al. (2017) and Ghosh and Mishra (2019) investigated spatial disparities in literacy rates, poverty, and employment across different talukas, noting that rural areas such as Velhe and Ambegaon remain underserved compared to urbanized centers.

Bhosale and Patwardhan (2021) employed spatial econometric techniques to identify regional disparities in income and employment patterns, arguing for policy measures tailored to local socio-economic realities. Furthermore, Pai and Dhawan (2019) evaluated how well Pune's demographic indicators align with the United Nations Sustainable Development Goals (SDGs). Their study found promising developments in education and healthcare but pointed out the need for more effort in achieving gender equity, reducing urban-rural disparities, and strengthening climate resilience. Kulkarni and Sharma (2020) emphasized the utility of geospatial technologies in monitoring demographic changes and assessing policy outcomes, suggesting the integration of GIS and remote sensing for better governance.

The cumulative findings from these studies underscore the complexity of demographic change in Pune District. Urban expansion, migration, demographic aging, and socio-economic inequalities interact in multifaceted ways. While the literature provides significant insights, there is a notable gap in fine-grained, spatio-temporal assessments that explore these changes at the sub-district level. This research seeks to address that gap by providing a geographically grounded, data-driven analysis of selected demographic characteristics across time and space in Pune District.

3. Significance of the Study:

Demographic characteristics constitute a comprehensive framework of statistical data that delineates the intricate aspects of a population. This multifaceted dataset encompasses vital dimensions such as age distribution, gender composition, ethnicity, educational attainment, marital status, income levels, and more. These demographic indicators collectively offer a panoramic view of a society's intricacies and serve as foundational pillars for informed decision-making across a spectrum of domains. The significance of demographic characteristics transcends mere enumeration, extending into the realms of policy formulation, resource allocation, economic planning, and social equity endeavors.

For policymakers, demographic data is akin to a compass guiding them through the complexities of governance. It illuminates the unique needs and challenges faced by different demographic segments, facilitating the tailored design and implementation of policies and programs that cater to specific groups. The allocation of resources in sectors such as education, healthcare, and social services is intricately linked to demographic insights. By understanding the age distribution, governments can anticipate the demand for educational facilities and formulate curricula that address the diverse learning needs of different age cohorts. Similarly, analyzing healthcare requirements based on age, gender, and other

demographic factors aids in allocating medical resources, devising preventive health initiatives, and planning for the medical needs of an aging population.

Furthermore, demographic characteristics hold a mirror to societal disparities, illuminating the gaps in income distribution, educational attainment, and healthcare access. This knowledge forms the bedrock for initiatives aimed at fostering social equity. By recognizing the specific challenges faced by marginalized groups, policymakers can work towards creating inclusive opportunities and uplifting underserved communities. In the economic realm, demographic insights serve as invaluable guides for planning and forecasting. Labor force trends, consumption patterns, and market demands are all influenced by demographic characteristics. Businesses can tailor their products and services to cater to the preferences and needs of different demographic segments, thus enhancing market competitiveness and responsiveness.

In essence, the distribution of demographic characteristics serves as a compass, guiding societal decision-making and initiatives. By comprehending the intricate nuances of their distribution, societies can navigate the complexities of governance, foster inclusivity, and create tailored strategies that harness the strengths and address the challenges of their diverse citizenry.

4. Results and Discussion:

In order to comprehensively understand the demographic dynamics of Pune District, this study focuses on six key demographic characteristics that significantly influence the region's socio-economic development. These include Population Growth, Population Density, Literacy, Sex Ratio, Urbanization, and Occupational Structure. Each of these indicators provides crucial insights into the distribution, composition, and functional attributes of the population across different tehsils and time periods.

Population Growth reflects the rate at which the population has increased over time and serves as a fundamental parameter for assessing the pressure on regional resources and infrastructure. Population Density indicates the spatial concentration of people within a given area, helping to identify regions of high human settlement and potential overutilization of land and services. Literacy, as a vital measure of human capital, reveals the educational status of the population and is directly linked to economic productivity and quality of life. The Sex Ratio offers a glimpse into gender dynamics and social equity, often reflecting broader cultural and health-related trends.

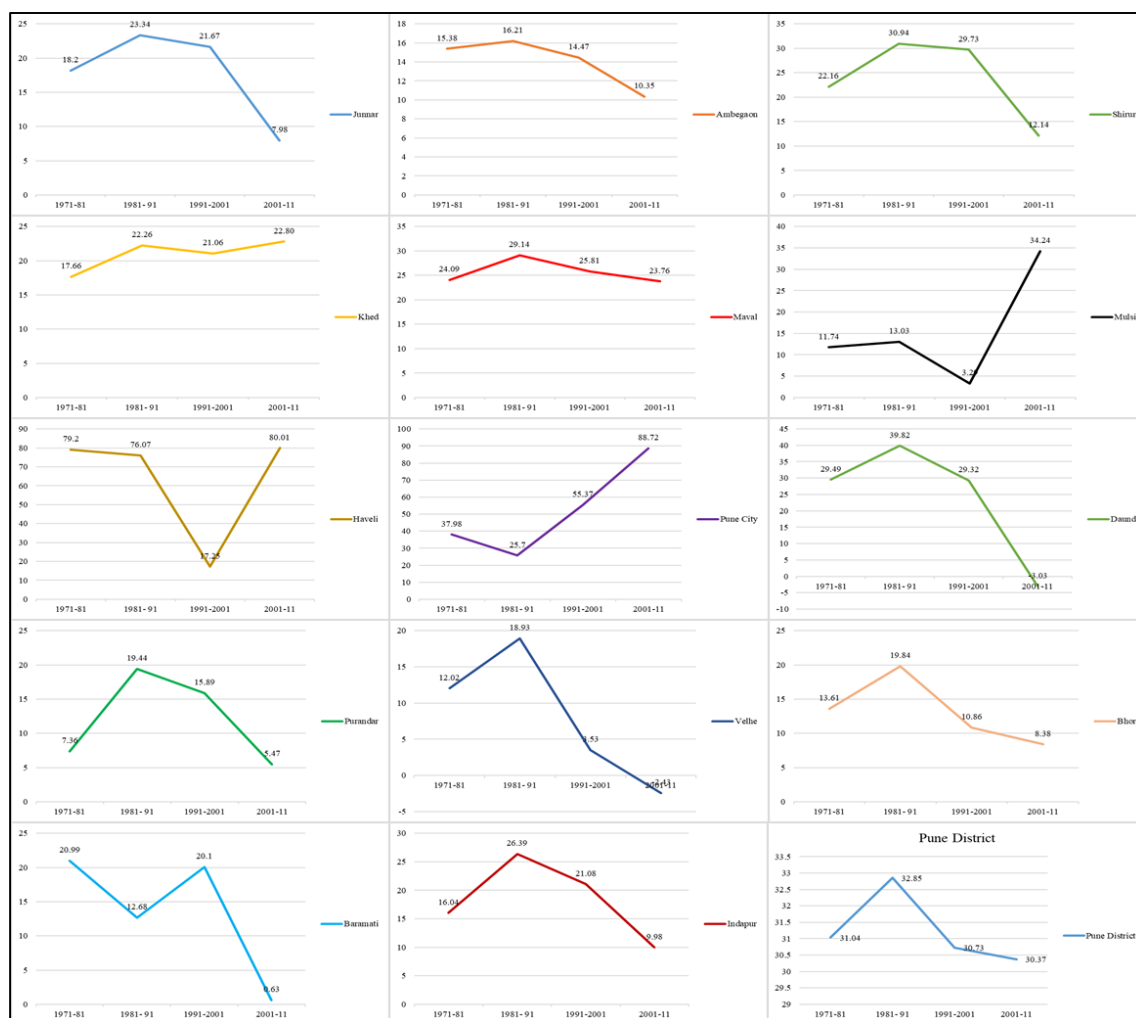
Urbanization, a defining feature of modern demographic change, captures the shift from rural to urban living and is associated with changes in employment patterns, lifestyles, and access to public

amenities. Finally, the Occupational Structure reveals how the working population is distributed among different sectors of the economy—primary, secondary, and tertiary highlighting the region's level of economic diversification and development. By examining these six characteristics through both spatial and temporal lenses, the study aims to identify patterns, disparities, and transformations occurring across the district. This analysis will contribute to a deeper understanding of how demographic forces interact with broader regional development processes in Pune.

4.1 Population Growth:

A growing population can lead to increased demand for essential resources such as food, water, energy, and housing. This can strain existing infrastructure and natural ecosystems, potentially leading to resource shortages and environmental degradation. The population of Pune district has undergone significant growth over the period from 1971-81 to 2001-11. This trend is depicted in Figure 1, which illustrates the growth rates for these four decades. During the initial two decades, spanning from 1971 to 1991, the population growth rate exhibited an upward trajectory. However, in the subsequent two decades, there was a consistent decline in the rate of population growth for Pune district.

Figure 1: Population Growth Rate of Different Tahsils in Pune District



Source: Figured from Census Data of 1971-2011

The population growth at the tahsil level appears to differ from the overall district-level population growth. Haveli and Pune City experienced high population growth rates in the first decade, which decreased significantly in the following decades. Pune City had the highest growth rate in the last decade (88.72%), possibly due to urbanization and economic development. Some tahsils like Junnar, Ambegaon, Shirur, Khed, and Maval demonstrated steady growth over the four decades, suggesting favourable conditions for population increase. Mulshi had a relatively low growth rate in the first two decades, but experienced a sharp increase in the last decade (34.24%). Daund has reported fluctuating growth rates during the decade. It had a high growth rate in the second decade (39.82%) but experienced a negative growth rate in the last decade (-3.03%). Velhe and Bhore had relatively low growth rates across the decades and experienced negative growth rates in the last two decades. Indapur had substantial growth in the second decade (26.39%), followed by relatively consistent growth. Purandar saw moderate

growth rates throughout the four decades. The last decade (2001-11) showed a general trend of decreased growth rates for most tahsils, possibly indicating saturation or changing socio-economic factors.

4.2 Population Density:

Population density, reflecting the number of individuals per unit area, profoundly shapes socio-economic development. High density often drives urbanization, necessitating robust infrastructure and services, while also fostering economic activities and innovation. However, challenges emerge, including housing scarcity, strained resources, environmental degradation, and congestion. Densely populated areas offer employment opportunities and cultural diversity but can exacerbate social inequalities and strain social services.

The district's population density increased from 462 in 2001 to 603 in 2011 (Table 1), indicating a notable overall growth in population density. The population densities in individual tahsils have shown mixed patterns over the decade. Junnar, Ambegaon, Shirur, and Purandar experienced a decrease in population density (Fig. 2), suggesting potential shifts in settlement patterns or development strategies. Khed and Indapur witnessed an increase in population density, possibly due to local factors such as economic opportunities or infrastructure improvements. Maval and Daund displayed a decrease in population density, indicating potential changes in demographic dynamics or land use. Mulsi, Velhe, and Bhore had increases in population density, suggesting potential growth or changes in land use patterns. Haveli experienced a significant decrease in population density, which could be attributed to urbanization trends or other factors affecting land use. Pune City showed substantial growth in population density, reflecting its role as an urban centre attracting population.

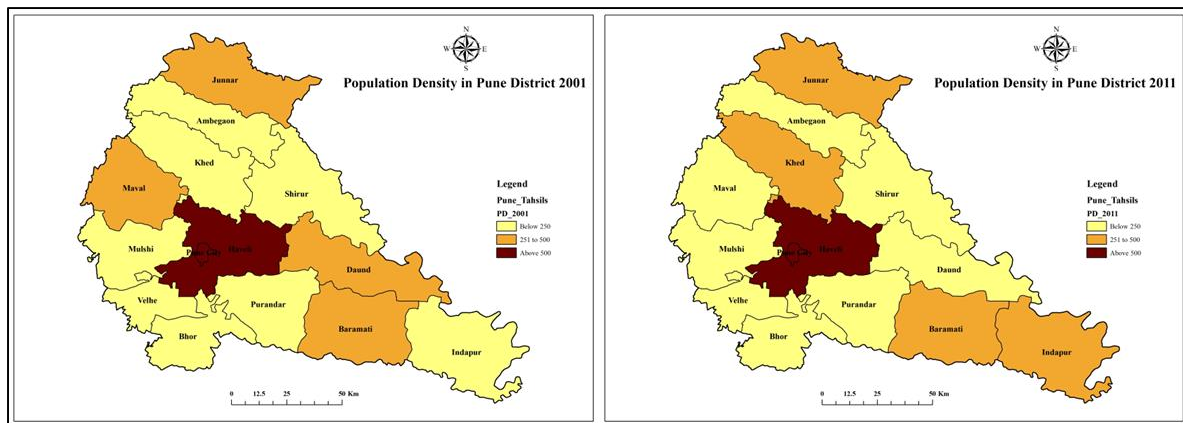
Notably, some tahsils with higher initial population densities, such as Pune City, Haveli, and Junnar, experienced changes in density, likely influenced by urbanization and development trends. The data highlights the diverse population dynamics across different tahsils, with varying rates of change in population density reflecting different local influences. The decrease in population density in Haveli and the significant increase in Pune City align with urbanization trends, as urban centres often experience rapid population shifts. Changes in population density could be influenced by factors like infrastructure development, economic opportunities, migration, and changes in land use policies.

Table 1: Tahsil Wise Population Density in Pune District

Sr. No.	Tahsil	Population Density	
		2001	2011
	Pune District	462	603
1	Junnar	267	254
2	Ambegaon	205	212
3	Shirur	199	195
4	Khed	245	288
5	Maval	269	239
6	Mulsi	122	166
7	Haveli	1027	641
8	Pune City	14643	19728
9	Daund	264	238
10	Purandar	202	164
11	Velhe	112	103
12	Bhor	192	194
13	Baramati	269	271
14	Indapur	237	260

Source: District Census Handbook, Pune District 2001 & 2011

Figure 2: Spatial Distribution of Population Density in Pune District 2001 & 2011



Source: Figured by Authors

4.3 Literacy:

Literacy is a cornerstone of personal and societal development. It empowers individuals to participate fully in education, economy, governance, and cultural activities. The provided Table 2 presents data on the literacy rates (%) for different tahsils within Pune district for the years 2001 and

2011, along with the decadal variation between 2001 and 2011. The overall literacy rate for Pune district increased from 80.5% in 2001 to 86.15% in 2011, indicating significant improvement in literacy levels over the decade. Most tahsils witnessed an increase in literacy rates between 2001 and 2011, reflecting a positive trend in education and awareness. Velhe stands out with a remarkable increase of 13.66 percentage points, suggesting substantial efforts in education and literacy promotion.

Table 2: Tahsil Wise Literacy Level in Pune District

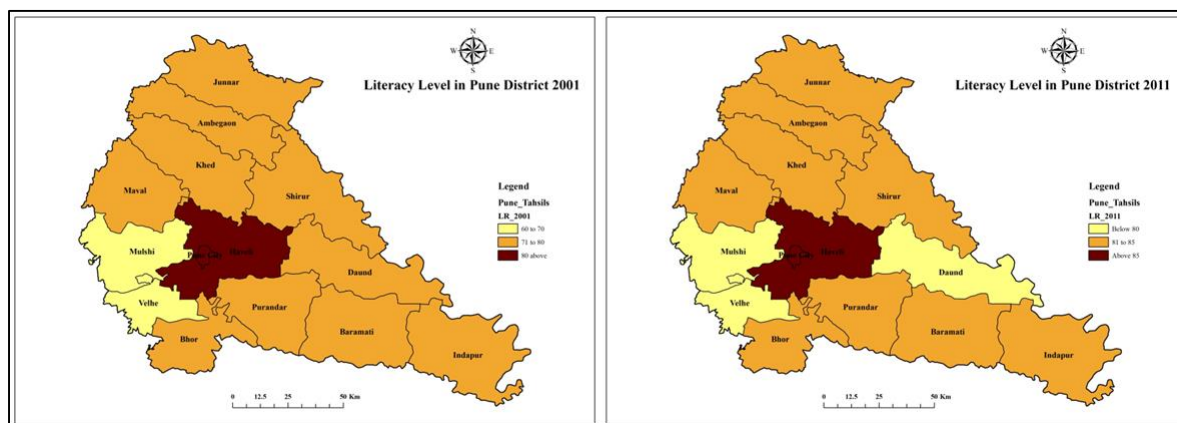
Sr. No.	Tahsils	2001	2011	Decadal Variation (%)
				2001-2011
	Pune District	80.5	86.15	5.65
1	Junnar	75.2	83.8	8.6
2	Ambegaon	74	82.94	8.94
3	Shirur	73.2	82.37	9.17
4	Khed	72.5	80.77	8.27
5	Maval	76	82.38	6.38
6	Mulsi	67.9	78.34	10.44
7	Haveli	83.6	88.18	4.58
8	Pune City	86.6	89.7	3.1
9	Daund	73.8	79.09	5.29
10	Purandar	77.3	82.55	5.25
11	Velhe	62.3	75.96	13.66
12	Bhor	75.2	81.42	6.22
13	Baramati	75.4	82.27	6.87
14	Indapur	71	81.53	10.53

Source: District Census Handbook, Pune District 2001 & 2011

Mulsi, Indapur, and Bhor also showed notable improvements, emphasizing local initiatives for educational enhancement with an increase in literacy level by 10.44, 10.53 and 6.22 percent respectively. The Urban Influence is displayed on the literacy level of Pune City having relatively high initial literacy rates in 2001 (86.6%) and continued to improve, indicating the impact of urbanization and educational opportunities. Despite improvements, some tahsils like Junnar, Ambegaon, Shirur, and Khed still had literacy rates below the district average in 2011, indicating potential disparities between urban and rural areas. Haveli had one of the highest literacy rates in both years, showing a steady increase. This might be attributed to its urban character and better access to educational resources. Some tahsils, including Maval, Daund, and Purandar, displayed moderate improvement in literacy rates (Fig. 3). Interestingly, Mulsi experienced a substantial increase in literacy rates (10.44%), suggesting focused educational

efforts. Despite overall improvements, certain tahsils like Velhe and Indapur still had literacy rates below the district average, indicating ongoing challenges in education and literacy.

Figure 3: Spatial Distribution of Literacy Level in Pune District 2001 & 2011



Source: Figured by Authors

4.4 Sex Ratio:

Sex ratio plays a crucial role in demographic analysis and provides insights into gender demographics within a society. Understanding sex ratio trends and imbalances is essential for addressing issues related to gender equality, social dynamics, and population composition. An equitable sex ratio is vital for a balanced and inclusive society, ensuring that both males and females have equal access to opportunities, resources, and representation.

The sex ratio for Pune district in 2001 stood at 919 females per 1000 males, which experienced a slight decline to 915 females per 1000 males by 2011 (Table 3). This marginal decrease of -4 indicates a minor shift in the gender distribution over the decade. The Junnar, Ambegaon, and Maval tahsils displayed relatively stable sex ratios with variations ranging from -8 to -3. The minor shifts suggest that the gender balance in these areas remained relatively consistent during the decade. Shirur, Khed, Mulshi, Haveli, Daund, Velhe, and Bhore tahsils exhibited more pronounced negative variations, ranging from -35 to -15. These substantial decreases suggest a significant decline in the number of females compared to males. While, Shirur and Bhore experienced particularly notable decreases with variations of -18 and -34, respectively.

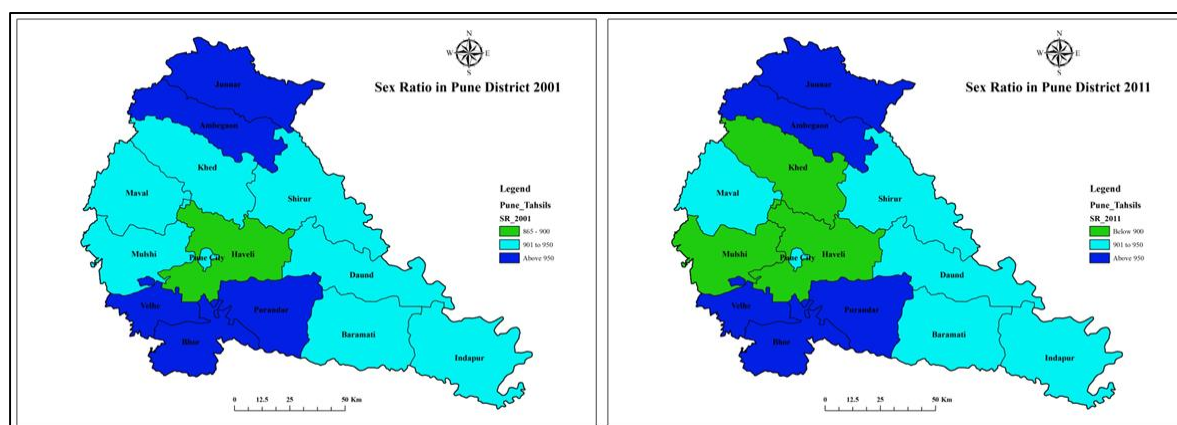
In contrast to the general trend, Pune City displayed a positive variation of 26, indicating an increase in the number of females relative to males. This positive shift could reflect urbanization, educational empowerment, or local gender equality initiatives. Similarly, Purandar saw a positive variation of 7, suggesting an improved gender balance within the tahsil. Interestingly, Indapur mirrored the district's minor negative variation of -3. This suggests a relatively stable sex ratio in this tahsil over the decade.

Table 3: Tahsil Wise Sex Ratio in Pune District

Sr. No.	Tahsils	2001	2011	Decadal Variation (2001-2011)
	Pune District	919	915	-4
1	Junnar	976	973	-3
2	Ambegaon	987	979	-8
3	Shirur	934	916	-18
4	Khed	927	892	-35
5	Maval	903	902	-1
6	Mulsi	921	899	-22
7	Haveli	865	850	-15
8	Pune City	917	943	26
9	Daund	927	939	12
10	Purandar	958	965	7
11	Velhe	1008	982	-26
12	Bhor	1011	977	-34
13	Baramati	936	943	7
14	Indapur	930	927	-3

Source: District Census Handbook, Pune District 2001 & 2011

Figure 4: Spatial Distribution of Sex Ratio in Pune District 2001 & 2011



Source: Figured by Authors

The district's marginal decrease in sex ratio contrasts with some tahsils' positive variations like Pune City and Purandar, indicating encouraging progress towards better gender balance. Conversely, the more substantial negative variations in tahsils like Shirur, Khed, and Velhe highlight localized challenges in maintaining equitable gender ratios (Fig. 4). The fluctuations in sex ratios can be influenced by a multitude of factors including birth and mortality rates, migration patterns, socio-economic development, healthcare facilities, cultural practices, and gender awareness campaigns. The positive variations in certain tahsils underscore the potential impact of gender equality efforts, education programs, and policies promoting women's empowerment.

4.5 Urbanisation:

Urbanization has profound effects on various aspects of society, the economy, and the environment. As people move from rural to urban areas in search of better livelihoods, urbanization impacts infrastructure, housing, transportation, and social services. While it offers opportunities for employment, education, and cultural exchange, it also poses challenges like housing shortages, traffic congestion, and environmental pollution.

Over the decade, Pune district experienced a gradual increase in urbanization, with the urban population percentage rising from 58.09% in 2001 to 61% in 2011 (Table 4). This growth highlights the ongoing shift towards urban areas and the expansion of urban infrastructure and amenities. "The growth of towns and large urban agglomeration has fostered near the port or industrial area" (Nagarale and Telang, 2019).

At tahsil-level variations in urbanization pattern is observed across the district of Pune. Junnar, Ambegaon, and Maval tahsils displayed consistently low levels of urbanization, with figures ranging between 6.3% and 8% in 2011 (Fig. 5). This indicates that the majority of their populations still reside in rural settings, maintaining traditional livelihoods. Shirur, Khed, Purandar, Daund, Baramati, and Indapur tahsils showcased varied degrees of increased urbanization over the decade. Notably, Shirur experienced a significant surge from 8.7% in 2001 to 16.5% in 2011. This could be due to factors like industrialization, improved connectivity, and urban economic opportunities. Khed also witnessed substantial urban growth, with the urban population percentage rising from 16.6% to 28.7%. Other tahsils like Purandar, Daund, Baramati, and Indapur displayed notable increases in urbanization rates, indicating shifts in population distribution. Mulsi, Bhore, and Velhe tahsils stood out with remarkable increases in urbanization. Mulsi and Bhore surged from 6.3% and 10.4% in 2001 to 15% and 9.9% in 2011, respectively. Velhe has no available data for 2001, but a noticeable urbanization rate emerged by 2011, potentially signifying the influence of neighboring urban centers. Haveli and Pune City started the decade with relatively high urbanization rates. Haveli decreased from 78.7% in 2001 to 74.9% in 2011, possibly due to suburbanization trends or migration towards peripheral areas. Pune City maintained its urban character with a near-constant 99.1% urbanization rate in 2011.

The diverse urbanization rates across tahsils mirror the complex socio-economic dynamics within Pune district. The trends highlight the varying paces of urban growth and the district's efforts to balance urban development with rural preservation. The surge in urbanization rates can be attributed to industrialization, job opportunities, improved infrastructure, and accessibility to urban amenities. High urbanization rates can signify improved access to resources but may also raise concerns about urban sprawl, environmental sustainability, and the need for efficient urban planning.

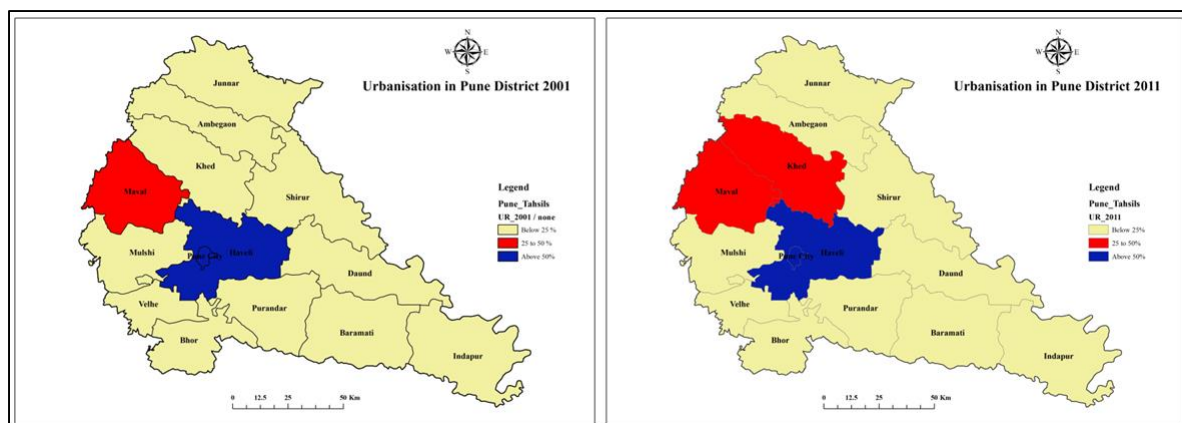
Table 4: Proportion of Urban Population in Pune District

Sr. No.	District/Tahsil	2001	2011
	Pune District	58.09	61
1	Junnar	6.7	6.3

2	Ambegaon	6.5	8
3	Shirur	8.7	16.5
4	Khed	16.6	28.7
5	Maval	41.9	41.8
6	Mulsi	6.3	15
7	Haveli	78.7	74.9
8	Pune City	100	99.1
9	Daund	12.4	14.8
10	Purandar	21.9	24.4
11	Velhe	-	-
12	Bhor	10.4	9.9
13	Baramati	13.8	17.2
14	Indapur	6.2	6.7

Source: Calculated by Authors from Census Data

Figure 5: Spatial Distribution of Urban Population in Pune District 2001 & 2011



Source: Figured by Authors

4.6 Occupational Structure:

Occupational structure analysis is essential for understanding the economic composition of a region and its workforce dynamics. It typically categorizes workers into different groups, such as main workers (engaged in primary occupation) and marginal workers (engaged in secondary or occasional

occupations). The occupational structure reflects the industrial landscape, technological advancements, and economic trends. It influences factors like employment opportunities, income distribution, and overall economic development. Changes in the occupational structure can indicate shifts in a region's economic focus, technological advancements, and shifts from agrarian to industrial or service-based economies.

Table 5: Occupational Structure in Pune District (2001 & 2011)

Sr. No.	Decades →	2001				2011			
	Working Group →	Main	Marginal	Total	Non	Main	Marginal	Total	Non
1	Junnar	42.93	7.19	50.13	49.87	50.24	3.57	53.81	46.19
2	Ambegaon	45.51	7.30	52.80	47.20	50.26	3.90	54.16	45.84
3	Shirur	45.79	5.15	50.93	49.07	51.30	2.44	53.74	46.26
4	Khed	43.51	7.16	50.68	49.32	46.01	4.37	50.39	49.61
5	Maval	35.31	6.31	41.62	58.38	37.64	5.65	43.28	56.72
6	Mulsi	42.97	8.98	51.94	48.06	41.36	6.14	47.50	52.50
7	Haveli	33.69	2.89	36.58	63.42	38.29	3.35	41.64	58.36
8	Pune City	32.11	2.09	34.20	65.80	36.31	2.53	38.79	61.21
9	Daund	42.28	5.14	47.42	52.58	46.30	3.75	50.05	49.95
10	Purandar	43.38	6.33	49.71	50.29	51.13	4.84	55.97	44.03
11	Velhe	41.77	11.39	53.17	46.83	43.71	6.96	50.67	49.33
12	Bhor	37.65	11.06	48.71	51.29	42.24	6.93	49.17	50.83
13	Baramati	42.40	4.60	47.00	53.00	43.84	4.09	47.93	52.07
14	Indapur	35.83	7.42	43.25	56.75	45.37	3.06	48.43	51.57

Source: Calculated by Authors from Census Data

The data Table No. 5 highlights the division of the working population into two categories: main workers who engage in significant economic activities, and marginal workers who participate in occasional or secondary employment. Junnar, Ambegaon, Shirur, and Khed tahsils maintained relatively consistent proportions of main and marginal workers. In Junnar, for instance, main workers constituted 42.93% in 2001, increasing slightly to 50.24% in 2011, indicating a shift towards more consistent economic engagement. Similar patterns can be observed in Ambegaon, Shirur, and Khed, signifying stable work structures with minor variations. Notably, the Mulshi tahsil reported a slight decrease of

about 1% in the main workers in the decade 2001-2011 while, the total working population in this tahsil has decreased from 51.94% in 2001 to 47.49% in 2011 increasing the non-working populations by about 4% in the same decade. Similarly, Khed and Velhe tahsils reported an increase in the non-working population in the 2001-2011 decade.

Both urban tahsils, Haveli and Pune City, showcased an increase in the proportion of main workers. In Haveli, main workers increased from 33.69% to 38.29%, and in Pune City, they increased from 32.11% to 36.31%. Daund displayed a decrease in marginal workers from 5.14% to 3.75%, while Purandar observed an increase in main workers from 43.38% to 51.13%. Baramati showcased a consistent proportion of main workers, while Indapur experienced a significant increase, moving from 35.83% to 45.37%. Increases in the proportion of main workers signify an improvement in the stability of employment within these tahsils. This shift reflects a positive trend towards more consistent economic engagement. The shifts in occupational composition might be influenced by economic diversification, urbanization, technological advancements, and local development initiatives.

5. Conclusion:

The comprehensive analysis of various demographic indicators for Pune district's tahsils over the decades from 2001 to 2011 provides valuable insights into the region's evolving dynamics. From population growth and literacy rates to sex ratios, urbanization, and occupational structures, each aspect contributes to a nuanced understanding of the district's development trajectory. Some tahsils experienced consistent growth, while others displayed fluctuations that can be attributed to factors such as urbanization, economic opportunities, and infrastructural developments. The examination of literacy rates highlights encouraging improvements across most tahsils, reflecting efforts to enhance education accessibility. However, disparities among tahsils still persist, underscoring the need for targeted initiatives to ensure equitable education for all. The analysis of sex ratios unveils both positive and negative shifts, indicating changes in gender demographics. The need to address declining sex ratios in certain tahsils and understand the underlying causes remains essential to promote gender equality and balanced demographics. The urbanization trends shed light on the rapid growth of urban areas, with some tahsils experiencing significant increases in urban populations. This underscores the importance of urban planning and infrastructure development to accommodate growing urban populations while maintaining a sustainable environment. The occupational structure data provides insights into shifts between main and marginal workers, showcasing economic changes within tahsils. The varying trends suggest that local economies are adapting to evolving industrial landscapes, necessitating informed

policy interventions to ensure stable and diverse employment opportunities. Collectively, these analyses underscore the dynamic nature of Pune district's development journey. While positive advancements are evident, challenges such as gender imbalances and the need for equitable growth persist. A comprehensive approach, informed by accurate data interpretation, will be crucial for policymakers and stakeholders to ensure that Pune district continues to progress in a sustainable, inclusive, and well-balanced manner in the years to come.

6. References:

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