

MICRO-REGIONAL DISPARITIES AND DEMOGRAPHIC VARIABILITY IN SINGRAULI DISTRICT (MADHYA PRADESH): A VILLAGE LEVEL STUDY

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Abstract: *Demographic variability and micro-regional disparities are two important concepts in the study of population and development. Demographic variability refers to changes in the size, structure, and composition of a population over time, which are influenced by birth and death rates, migration patterns, and other factors. Micro-regional disparities, on the other hand, refer to the unequal distribution of economic, social, and environmental resources within a small geographic area. These disparities can lead to unequal outcomes for different population groups and negatively impact their quality of life. Understanding the interplay between demographic variability and micro-regional disparities is essential for developing effective policies and programs aimed at promoting equitable and sustainable development. The purpose of this study to analyse the micro-regional disparities and demographic variability in the demographic development across 727 inhabited villages and 17 are un-inhabited/forest villages of Singrauli district of Madhya Pradesh, 2011. The study is mainly based on secondary sources of data collected from various sources like, the District Census Handbook, 2011 and official websites of the government of Madhya Pradesh. To examine the status of demographic variability and the level of demographic development in the study area, have been applied the composite index (CI) method by considering 10 indicators at the village level. The study reveals that the villages of Singrauli district have huge micro-regional disparity and demographic variability and it is classified into various levels.*

Keywords: Micro-Regional Disparities, Demographic Development, Composite Index

Introduction

India is a country with a diverse and complex rural landscape, characterized by significant variability in terms of geography, culture, language, religion, and socio-economic conditions. The rural population in India is estimated to be around 800 million, which is roughly 70 percent of the total population. Despite the overall growth and development of the Indian economy in recent decades, rural areas in India continue to face numerous challenges, such as poverty, low levels of human development, limited access to basic services, and limited economic opportunities (Census of India, 2011). Micro-regional disparities refer to the uneven distribution of economic, social, and environmental resources and opportunities within a small geographic area. These disparities can result in unequal access to education, healthcare, employment, and other essential services, leading to unequal outcomes and lower quality of life for certain populations. These disparities are often caused by a combination of historical, economic, and political factors, and can persist even in economically developed countries. Addressing micro-regional disparities is a complex issue that requires a multi-faceted approach, including investment in infrastructure, education, and community development, as well as targeted policies to address specific needs and challenges in affected areas (Baig & Salam, 2019; Diwakar, 2009; Ghosh, 2011; Report, 2009; Sharma, 2021).

Demographic variability refers to the differences and variations in demographic characteristics, such as age, gender, ethnicity, education, and income, within a population. Demographic variability can have a significant impact on the development and well-being of a population, as different demographic groups may have different needs, preferences, and opportunities. Understanding demographic variability is important for policymakers, organizations, and individuals to effectively address the needs of diverse populations and promote sustainable development. The demographic variability in rural India is a result of various historical, cultural, and economic factors, such as the caste system, ethnic diversity, and migration patterns. This variability has a significant impact on rural development, as different groups within rural communities have varying levels of access to resources, opportunities, and services. Additionally, demographic factors, such as age structure, gender, and migration patterns, also play a crucial role in shaping the socio-economic conditions and development prospects of rural areas in India (Sharma, 2020).

Demographic development refers to the changes in a population's characteristics such as size, age structure, distribution, and composition over time. These changes are influenced by birth and death rates, migration patterns, and other factors such as economic development, educational attainment, and technological advancements (Behl & Singh, 2017). The level of material well-being, employment of household members, housing security, tightness, etc. are economic elements that shape the population's demographic behaviour. As a result, the demographic development of the region is most directly influenced by these factors (reproductive, self-preservation, marital and migration) (Kabashova, 2021). Geographic, economic, social, political, pure demographic, and other factors all have an impact on demographic development, particularly the distribution of populations (Nejašmiæ, Ivo & Njegač, Dražen, 2001).

The level of development in each district of Assam is based on the best possible combination of 48 demographic development indicators that consider the industrial sector, the agricultural sector, and the availability of infrastructure. They discovered that the development of agriculture and the availability of infrastructure were both positively correlated with general socio-economic conditions. They went on to say that the level of literacy has not affected the state of progress in the agricultural, industrial, or general socioeconomic sectors. In many state districts, they noticed significant regional differences in the degree of development (Rai &

Bhatia, 2004). Pana, V. and Pana, I. (2010) investigated several demographic indices in both established and developing nations, including population distribution, density, growth, life expectancy, literacy, and urbanisation. They concluded that while demographic concerns for sustainable development differ in developed countries with small populations and developing countries with big populations, there are no predetermined solutions for addressing them. Singh, R. (2015) evaluate based on four indicators—the percentage of people living above the poverty line, the literacy rate for women, the proportion of non-agricultural workers in rural areas, and urbanization—researchers examined regional differences in the levels of demographic development in post-reform India and found that inter-state disparities had widened while intra-state disparities had decreased. Borah, S. and Borah, M.(2017)investigated the demographic differences between two Assamese groups. They discovered significant disparities amongst the districts in terms of demographic factors. They noticed that the Muslim group had higher crude birth rates, total fertility rates, and child women ratios than the Hindu society.

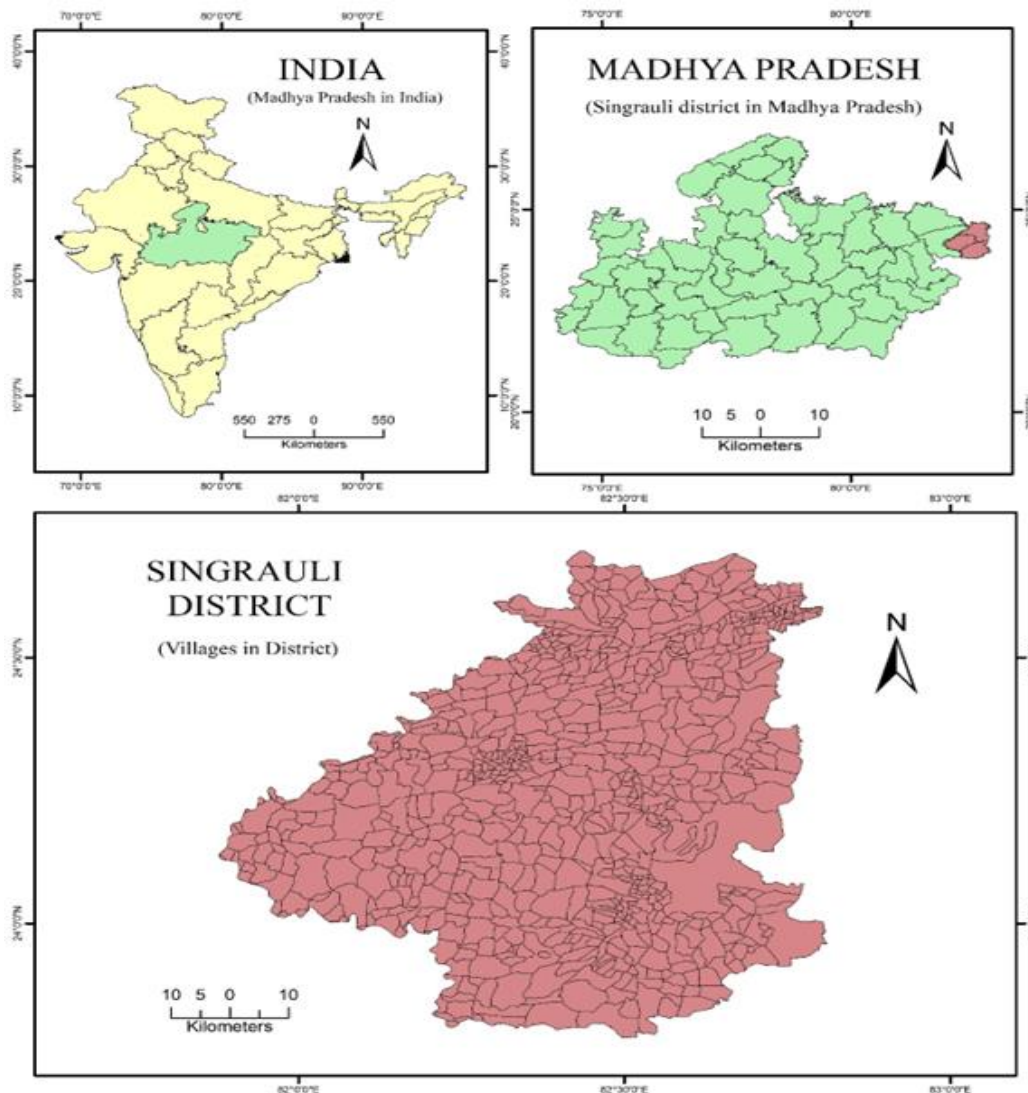
In recent years, the Indian government has launched several programs aimed at promoting rural development, such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), the Pradhan Mantri Gram Sadak Yojana (PMGSY), and the Swachh Bharat Abhiyan (Clean India Campaign). However, the impact of these programs is often limited by the demographic variability and heterogeneity of rural areas in India. Understanding the demographic variability in rural development in India is critical to designing and implementing effective and inclusive policies and programs that can address the challenges and opportunities facing rural communities.

Study Area

The study area falls in the Singrauli district is situated in the northeastern part of Madhya Pradesh extending between latitudes 23°49' and 24°42' North and longitudes 81°18' and 82°48' East. The district is bounded in the North by Rewa and Sidhi districts, in the east by Uttar Pradesh, in the south by Sarguja and West by Shahdol district. The district is also known as the northeastern frontier of the state. The district is spread across a total geographical area of 5675 sq. km² and the area wise rank of the district is 28th in the state. The highest topographic elevation in the district is 609 meters above sea level in Chitrangi. The Son River traverses the district flowing from west to east. The watershed area lies in between the two boundaries of Kaimour Hills and Son River. Singrauli is one of the districts of the Baghelkhand region and one of the remotest districts in the state of Madhya Pradesh (Census of India, 2011; Singh & Kharwar, 2019). There are 3 development blocks Deosar, Chitrangi and Waidhan, and Among the 744 villages of the study region, 727 villages are inhabited and 17 villages are uninhabited (Census of India, 2011).

The total population of the district is 11,78,132 which constitutes 1.62 percent of the state population. The population growth in Singrauli during the 2001-2011 period is about 28 percent. The total population of Singrauli district, living in rural areas is 951,487 (80.75 percent) of which males and females are 493,324 and 458,163 respectively. In rural areas of Singrauli district, the sex ratio is 929 females per 1000 males. The district comprises 744 villages having a population density of 208 persons per sq. km in 2011. Singrauli has an average literacy rate of 62.4 percent which is less than the national literacy rate of 74.04 percent whereas male and female literacy rates are 73.8 percent and 49.9 percent respectively (Census of India, 2011).

Figure 01: Location Map of Singrauli District, Madhya Pradesh



Objectives

The main objectives of the study are:

- To analyses the demographic variability in villages of study area based on demographic indicators.
- To identify the cause and sources of demographic disparity and classify into various categories.
- To examine the level of micro-regional disparities in the level of demographic development of Singrauli district.

Database and Methodology

The present study is mainly based on secondary sources of data which collected from the primary census abstract and census of Madhya Pradesh, 2011 and The Socio Economic and Caste Census 2011. Some other data collected from sources like directorate of Economics and Statistics, department of Agriculture, and other government official websites of Madhya Pradesh. To measure the micro-regional disparities in the demographic development in villages of Singrauli District, Madhya Pradesh, 10 indicators are considered to evaluate the demographic development by the composite index method of each village of the district. For the analysis of level of demographic development, we merged the demographic and educational indicators. The indicators are adopted from the census of India, 2011 that mentioned in Table 01.

Table 01: Indicators Used to Measure Levels of Demographic Development

Variables	Demographic and Educational Indicators
X1	Literacy Rate
X2	Female Literacy Rate
X3	Sex Ratio
X4	Sex Ratio for the Age group of 0-6 Year
X5	Percentage of Non-SC / ST Population
X6	Percentage of Total Workers to the Total Population
X7	No. of Integrated Child Development Service (Nutritional Centres)
X8	No. of Anganwadi Centre (Nutritional Centres)
X9	No. Educational facilities (Primary and secondary school)
X10	No. Educational facilities (Higher secondary school)

Source: Computed by author

These statistics may not be all-inclusive, but they do represent the main interacting factors in the demographic growth of the research area. The indicators of all the different demographic development indices have been combined to create a composite index that measures the demographic development of the districts. The methodology used in the present study is illustrated as follows:

- The first step is to select the indicators (**X1..... Xn**) that you want to include in the composite index.
- The next step is to standardize the indicators by converting them into a standard scale, such as Z-scores. This allows for the comparison of indicators across different areas or time periods.
- The formula for calculating the Z-score for a particular indicator is:

$$Z_{ij} = X_i - \bar{X} / \sigma$$

Where,

Z_{ij} = standard score of the i^{th} observation

X_i = original value of the observation

\bar{X} = mean of all the values of x

σ = standard deviation

- calculate the composite index by combining the standardized indicators into a single index by dividing ($X - \bar{X}$) by Standard Deviation (SD). i.e. ($X - \bar{X} / SD$).
- In next step the Gross Value have been calculated by the formula:
Gross value = Mean + (Z-score * SD)
- and the composite index scores are computed by dividing the gross value by the total number of the development indicators.

After the analysis the value noted here that higher the value of composite score will indicate the high level of demographic development whereas smaller value of composite score indicates the low level of demographic development. Based on composite score all the inhabited villages of the study area categorised into the different levels of development that ranged from (< -0.50) to (> +0.50) values shown in Table 2.

Table 02: Levels of Demographic Development

Composite index (CI)	Level of Accessibility	Block wise No. of Village			Total No. of Villages
		Singrauli	Chitrangi	Deosar	
Above 0.50	Relatively high developed	8	24	23	55
0.00 to 0.50	Moderately high developed	107	115	108	330
-0.50 to 0.00	Low developed	79	132	84	295
Below -0.50	Very low developed	10	29	8	47
-	Uninhabited/forest villages	10	5	2	17
	Total	214	305	225	744

Source: Computed by author

Results and Discussion

The Demographic development of any region depends on changes in population's characteristics such as size, age structure, distribution, and composition over time. These changes are influenced by birth and death rates, migration patterns, and other factors such as economic development, educational attainment, and technological advancements. Here the demographic indicators like literacy rate, female literacy rate, sex ratio, sex ratio for the age group of 0–6-year, non-SC and ST population ratio, nutritional centres, and educational facilities on the village level of Singrauli district. And that indicators are directly associated with the level of demographic development at village level in the district based on NITI Aayog's Aspirational district program Singrauli district comes under the backward region in Madhya Pradesh. In this study, we have considered villages of Singrauli district of Madhya Pradesh and there are 744 villages in which 727 villages are inhabited and 17 are forest/uninhabited villages. The outcome of analysis that obtained for 727 villages of Singrauli district to examine the level of demographic development and here we are classified into four categories of level of development.

Relatively High Demographic Development (CI = >0.50)

The relatively high developed category is the highest level of demographic development in the study and ranges from 0.50 to 1.81 composite score value (Fig 2). In this category of development level having 55 villages (Table 2) among 727 villages of 3 blocks of Singrauli district in which Chitrangi block (24) has many relatively high developed villages than the Deosar (23) and Singrauli block (8) shows in Table 4. Development indicators are well performed in this category of the village but indicators like women's literacy rate and literacy rate are not performing well according to educational facilities available in the area. The size of the settlements in this category is large and some villages are nearly the property of towns and are situated near the large towns and development blocks that is why available of all the necessary facilities are to the people of the villages and they are performing well than the other villages.

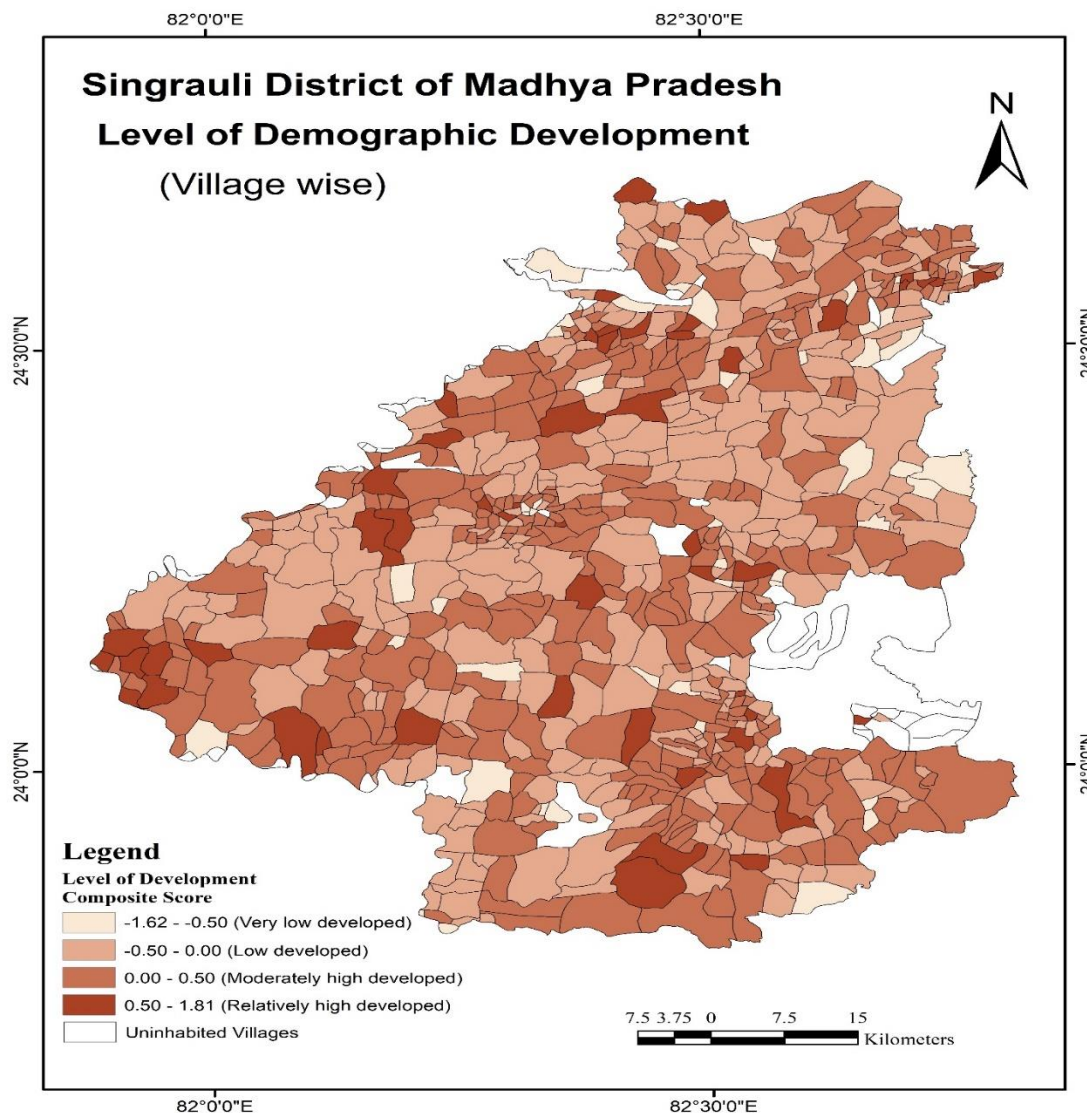
Moderately High Demographic Development (CI = 0.00 to 0.50)

Moderately high developed category is second highest level of demographic development it varies from 0.00 to 0.50 composite score value (Table 2). There are 330 villages that come under this category (Fig 2). It shows that there are nearly half villages come under the category among the total villages in the district. The nutritional centres and the educational facilities are not performing well that is why the literacy rate is affected and low. The education is most valuable indicator to associate the demographic development. In this category, the Deosar block has the highest number of villages followed by the Chitrangi and Singrauli block of the study area. the highest CI score was secured by Daga village (0.49) and the lowest by Khaira (0.00) and some other villages of the district in this category.

Low Demographic Development (CI = -0.50 to 0.00)

In this category the level of demographic development is low and it is third highest level it varies from -0.50 to 0.00 composite score value (Fig 2). There are 295 village comes under this category (Table 2) and Chitrangi block (132) having large number of villages in this category followed by Deosar (84) and Singrauli (79) block. It shows that the backwardness and low level of development in more than half villages the area due to lack of awareness and unavailability of facilities the condition of villages is miserable. In this category many villages having more than 50 percent population are workers and in education facilities secondary and higher secondary school facilities are very low. Many villages are needed better facilities to enhance the level and living standard of the people.

Figure 02: Level of Demographic Development in Singrauli District, Madhya Pradesh



Very Low Demographic Development (CI = < -0.50)

It is the lowest category and level of demographic development in this study. It varies from below to -0.50 composite score value (Fig 2). In this category, there are only 47 villages having very low development levels (Table 2). The Kharkhauri village (-1.62) of the Chitrangi block secured the lowest composite score value. The level of demographic development reveals the condition of villages and how indicators are performing in this category. It shows that the micro-regional disparities are very high in the villages of this category. Somehow in this category having a smaller number of villages that means the resources and facilities are needed less in the region. In this level of demographic development, the worst condition is found in the villages of this category. Many indicators are not performing well in these villages. Due to lack of infrastructure and unavailability of basic facilities like education and health care facilities. It is the major concern to focus on these villages to better rural development and better facilities provide to local people.

Conclusion

The different levels of demographic development of Singrauli district, Madhya Pradesh showed in Fig. 2. It represents the huge micro-regional disparities in the level of development. Relatively developed villages are scattered in the study area and have small population sizes and situated nearly to towns and cities. Many relatively developed villages are large villages

like a small town. The study reveals that the large numbers of villages are very backward and the condition is miserable in terms of facilities and standard of living of people of the area. Due to physical imbalances, there is a lack of connectivity in the study area. The villages of the son river basin have a level of development are high due to farming condition and the availability of favourable resources. The key findings and trends related to demographic variability and its impact on rural development highlight the importance of understanding the demographic characteristics of rural areas and the need for inclusive and effective policies that respond to the unique needs and challenges faced by different demographic groups. These findings and trends can inform the design and implementation of policies aimed at promoting rural development in India.

In order to reduce regional inequities and imbalances, coordinated efforts should be made to enhance the sectors of education, health care, transportation, and communication, particularly in the district's extensive rural areas. Our findings have strong policy implications. the villages whose development has trailed substantially behind that of comparatively high-developed villages should receive special attention if the government seeks a fair distribution of development facilities (Chauhan, 2011). Future research and policy development in the area of demographic variability and rural development in India should prioritize a comprehensive and interdisciplinary approach that addresses the unique challenges and opportunities faced by different demographic groups in rural areas. By doing so, research and policy can promote the development of effective policies and programs that address the complex and evolving needs of rural populations in India.

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