

Rural–Urban Disparity in Lucknow District: A Comparative Analysis of Male–Female Literacy Using Dissimilarity Index (2001–2011)

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Abstract

This study examines rural–urban disparity in literacy within Lucknow district, with a specific focus on gender differences between males and females for the census years 2001 and 2011. Using secondary data from the Census of India, the research employs the Index of Dissimilarity (ID) to quantify the degree of inequality in the spatial distribution of literacy across rural and urban areas. The findings reveal that the dissimilarity index declined from 0.048 in 2001 to 0.030 in 2011, indicating a reduction in rural–urban gender disparity over the decade. This improvement reflects significant progress, particularly in female literacy, which increased at a faster rate compared to male literacy. The study highlights the role of government initiatives, such as universal education programs and targeted schemes for girls' education, in enhancing literacy levels, especially in rural areas. Additionally, the expansion of urban influence and improved access to educational infrastructure have contributed to narrowing the gap between rural and urban populations. Despite these positive trends, the persistence of a non-zero dissimilarity index suggests that complete equality has not yet been achieved. Socio-economic and cultural barriers continue to affect female literacy, particularly in rural regions. Overall, the study underscores the importance of sustained policy interventions and continuous monitoring to achieve balanced and inclusive educational development.

Keywords- Rural–Urban Disparity, Literacy, Gender Inequality, Index of Dissimilarity

Introduction

The study of regional development is fundamentally rooted in understanding the spatial variations of socio-economic progress. Among the various lenses through which development is viewed, the rural-urban disparity remains one of the most critical and enduring challenges. This phenomenon refers to the persistent gaps in socio-economic conditions between rural and urban sectors manifesting in unequal levels of literacy, employment opportunities, income distribution, infrastructure quality and general access to essential services. In developing regions, such as the state of Uttar Pradesh in India, these disparities are not merely statistical

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facts but are deeply visible consequences of the unequal distribution of resources and development opportunities over time.

Uttar Pradesh serves as a primary example of a region where the struggle to bridge the rural-urban divide is ongoing. Within this state, Lucknow district, which houses the capital city, represents a unique case study in rapid transformation. Over the last two decades, Lucknow has undergone significant urbanization. This growth has been driven by the physical expansion of urban boundaries, a burgeoning service sector and a concerted effort to improve educational and institutional facilities.

However, urbanization is often an uneven process. While the metropolitan core of Lucknow has become a hub for modern services and advanced educational infrastructure, the peripheral rural areas often lag behind. Despite the overall progress seen in the district's macroeconomic indicators the socio-economic structure remains fractured. The benefits of modernization do not always percolate seamlessly across the administrative borders of the city into the village communities leading to persistent differences in the quality of life and opportunities available to rural versus urban populations.

Beyond the spatial divide of geography, gender serves as a vital dimension of development. It is widely recognized that development is not gender-neutral rather the experiences of progress are often mediated by one's gender. Literacy, as a primary indicator of human capital is a field where this mediation is most apparent. In many societies male and female literacy rates differ significantly due to a complex interplay of social, economic and cultural factors. Traditional societal norms often prioritize male education while economic constraints may force families to limit educational investments in female members.

To provide a rigorous quantitative foundation for this analysis, the present study utilizes the Index of Dissimilarity (ID). The ID is a widely recognized demographic and geographic tool used to measure the degree of inequality or segregation in the spatial distribution of two distinct groups. In the context of this research, it allows for a precise calculation of how "dissimilar" the literacy distributions are between different populations or regions. This study applies the dissimilarity index to examine rural-urban disparity in male and female literacy in Lucknow district for the census years 2001 and 2011.

Literature Review

The study of spatial inequality and rural-urban disparity has been an important theme in geography, sociology and regional development studies. Several scholars have developed theoretical frameworks and statistical techniques to measure inequality in the distribution of population and socio-economic characteristics.

Duncan and Duncan (1955) introduced the Index of Dissimilarity as a statistical measure to analyse segregation between two population groups. Their study demonstrated that the index can effectively measure the degree of uneven distribution between two groups across geographical units. The dissimilarity index indicates the proportion of one group that would need to relocate in order to achieve a uniform distribution. Because of its simplicity and clarity, it has become one of the most widely used measures of spatial inequality.

Massey and Denton (1988) further expanded the study of segregation by identifying multiple dimensions of spatial inequality such as evenness, exposure, concentration, centralization and clustering. Their work emphasized that spatial segregation is not only a demographic phenomenon but also a reflection of socio-economic inequalities and development patterns.

Max O. Lorenz (1905) developed the Lorenz Curve, a graphical representation used to measure inequality in the distribution of income or other variables such as literacy or wealth. The Lorenz curve compares the cumulative proportion of a population with the cumulative proportion of a resource or attribute. The deviation of the curve from the line of equality indicates the degree of inequality in distribution.

Corrado Gini (1912) introduced the Gini coefficient, which provides a numerical measure of inequality derived from the Lorenz curve. The coefficient ranges from 0 to 1, where 0 represents perfect equality and 1 represents complete inequality. The Gini coefficient has been widely used in studies of income inequality, regional development and social disparities.

In the context of rural–urban studies, several researchers have used these indices to examine disparities in literacy, employment and socio-economic development. Studies on Indian regional development have shown that urban areas generally have higher literacy rates and better access to educational infrastructure compared to rural areas. However, the expansion of education programs and rural development policies has gradually reduced these disparities in many districts.

The present study builds upon these theoretical and methodological contributions by applying the Index of Dissimilarity to examine rural–urban disparity in male and female literacy in Lucknow district for the census years 2001 and 2011. The use of this index helps in understanding the extent of spatial inequality and changes in gender-based literacy distribution over time.

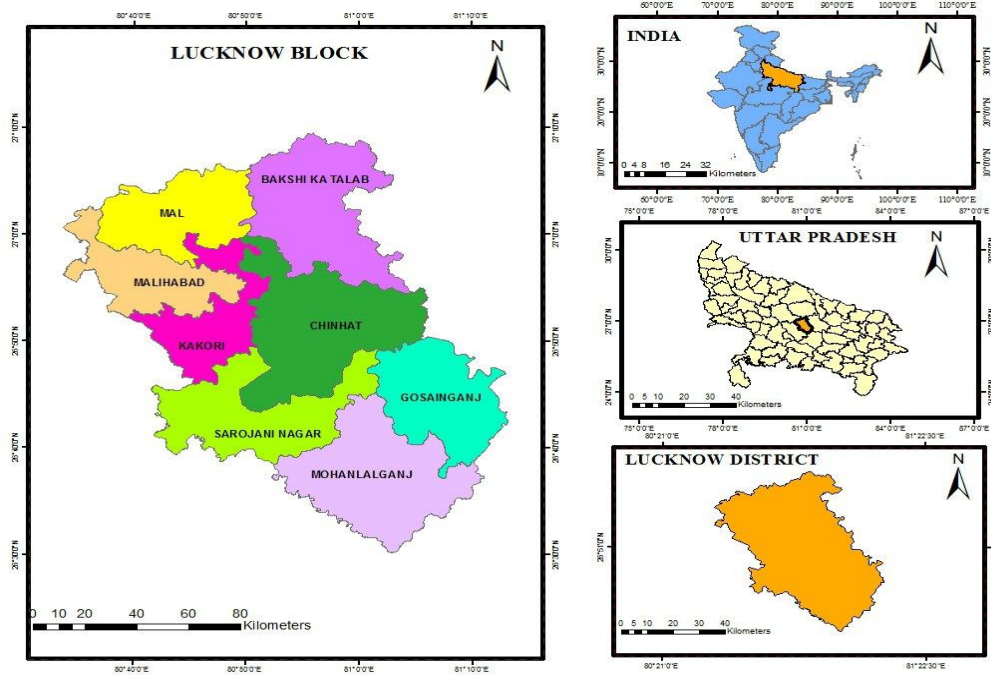
Objectives of the Study

The main objectives of this study are:

1. To examine rural–urban disparity in Lucknow district.
2. To analyse male and female literacy distribution in rural and urban areas.
3. To measure disparity using the Index of Dissimilarity.
4. To compare the level of disparity between 2001 and 2011 census decades.
5. To identify whether rural–urban gender disparity has increased or decreased during the decade.

Study Area

Lucknow district is located in the central part of Uttar Pradesh. It lies between approximately 26°30' N latitude and 80°30' E longitude. The district is situated in the middle Ganga plain and is characterized by fertile alluvial soil and a flat topography



Lucknow city serves as the administrative and economic centre of the district. The district includes several development blocks such as:

- Malihabad
- Bakshi Ka Talab
- Kakori
- Sarojini Nagar
- Mohanlalganj
- Chinhat

The district has experienced significant urban expansion due to administrative importance, educational institutions, and growth of service industries.

Data Source

The present study is based on secondary data collected from reliable and authoritative sources namely, the Census of India 2001 and 2011 and the District Census Handbook of Lucknow. These sources provide comprehensive data suitable for analytical purposes. For the analysis of this study, key indicators employed include male literacy, female literacy, rural population and urban population, which collectively facilitate a detailed understanding of demographic and literacy dynamics in the study area.

Methodology

The Index of Dissimilarity (D) is used to measure rural–urban disparity between male and female literacy.

Formula: -

$$D = \frac{1}{2} \sum \left| \frac{M_i}{M} - \frac{F_i}{F} \right|$$

Where:

- M_i = Male literates in area i
- F_i = Female literates in area i
- M = Total male literates
- F = Total female literates

The value of D ranges from **0 to 1**.

Value Interpretation

Value Range	Interpretation
0	No disparity
0 – 0.25	Low disparity
0.25 – 0.50	Moderate disparity
0.50 and above	High disparity

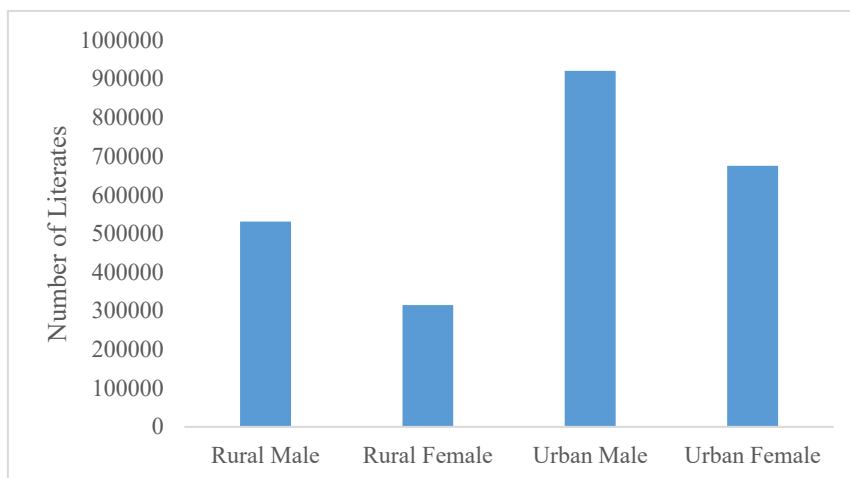
The index indicates the proportion of population that would need to shift locations for both groups to be evenly distributed.

Literacy Data for 2001

Area	Male Literates	Female Literates
Rural	531000	315000
Urban	921000	675000
Total	1452000	990000

Source: Census of India 2001

Lucknow District Literacy Distribution (2001)



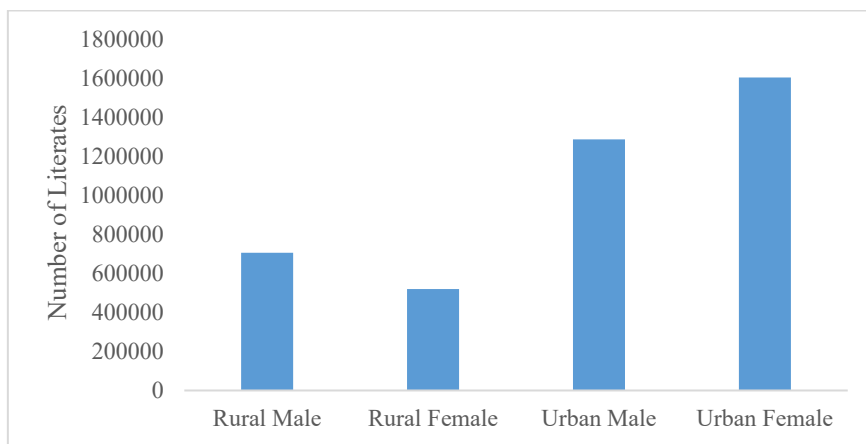
Source: Census of India 2001

Literacy Data for 2011

Area	Male Literates	Female Literates
Rural	707000	520000
Urban	1289000	1086000
Total	1996000	1606000

Source: Census of India 2011

Lucknow District Literacy Distribution (2011)



Source: Census of India 2011

Calculation of Dissimilarity Index

(A) Dissimilarity Index for 2001

Area	Male Proportion	Female Proportion	Absolute Difference
Rural	$531000 / 1452000 = 0.366$	$315000 / 990000 = 0.318$	$ 0.366 - 0.318 = 0.048$
Urban	$921000 / 1452000 = 0.634$	$675000 / 990000 = 0.682$	$ 0.634 - 0.682 = 0.048$

Final Calculation

$$D = 1/2 (0.048 + 0.048) = 0.048$$

$$\text{Dissimilarity Index (2001)} = 0.048$$

(A) Dissimilarity Index for 2011

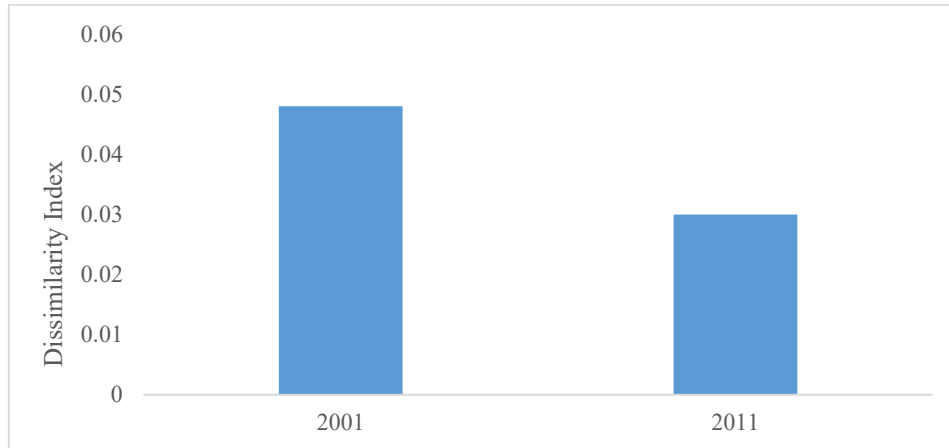
Area	Male Proportion	Female Proportion	Absolute Difference
Rural	$707000 / 1996000 = 0.354$	$520000 / 1606000 = 0.324$	$ 0.354 - 0.324 = 0.030$
Urban	$1289000 / 1996000 = 0.646$	$1086000 / 1606000 = 0.676$	$ 0.646 - 0.676 = 0.030$

Final Calculation

$$D = 1/2 (0.030 + 0.030)$$

$$\text{Dissimilarity Index (2011)} = 0.030$$

Dissimilarity Index Comparison (2001 vs 2011)



Sources: Calculated and compiled by the authors

Results

Year	Dissimilarity Index	Interpretation
2001	0.048	Low disparity
2011	0.030	Very low disparity

The table presents the result of the dissimilarity index for the year 2001 and 2011. In 2001, the value of the dissimilarity index is 0.048 which falls under the category of low disparity, indicating a relatively small level of inequality. By 2011, the index decreases to 0.030, reflecting a further reduction in disparity. The decrease in the index suggests a reduction in rural – urban gender disparity in literacy over the decade.

Analysis and Discussion

The comparative analysis indicates several important trends:

- Improvement in Female Literacy
- Female literacy improved significantly between 2001 and 2011.
- Decline in Rural–Urban Disparity

The results of the study indicate a clear decline in the dissimilarity index from 0.048 in 2001 to 0.030 in 2011, reflecting a reduction in rural–urban gender disparity in literacy over the decade. This trend highlights a gradual convergence between rural and urban areas in terms of gender-based literacy outcomes.

The observed improvement can be attributed to a combination of policy interventions and increased awareness regarding the importance of education particularly for females. During

this period, several government initiatives such as the Sarva Shiksha Abhiyan, Mid-Day Meal Scheme and targeted programs for girls' education played a significant role in enhancing school enrolment and retention rates especially in rural areas. These efforts helped in reducing the traditional barriers to female education including socio-cultural constraints and economic limitations.

The narrowing gap also indicates that rural areas have experienced relatively faster progress in literacy improvement compared to urban areas, where literacy levels were already comparatively high. As a result, the disparity between the two has diminished over time.

Despite the encouraging trend, the persistence of a non-zero dissimilarity index suggests that complete equality has not yet been achieved. Structural challenges such as regional imbalances, quality of education and socio-economic disparities may still influence literacy outcomes. Therefore, while the results reflect progress, they also underline the need for continued policy focus and targeted interventions to eliminate the remaining gaps.

Conclusion

The present study has examined the rural–urban disparity in Lucknow district with a specific focus on male–female literacy patterns for the census years 2001 and 2011. By applying the Index of Dissimilarity, the study aimed to quantify the extent of inequality in the spatial distribution of male and female literacy across rural and urban areas. The findings provide important insights into the changing dynamics of literacy and gender disparity within the district.

The analysis clearly indicates that rural–urban gender disparity in literacy has declined over the decade. The value of the dissimilarity index decreased from 0.048 in 2001 to 0.030 in 2011, reflecting a movement towards a more balanced distribution of male and female literacy between rural and urban regions. This decline suggests that the gap between the two population groups, in terms of their spatial distribution has narrowed over time. According to the interpretation scale of the index both values fall within the category of low disparity with 2011 approaching a condition of very low disparity.

One of the key drivers behind this improvement is the significant rise in female literacy during the decade. Government initiatives such as universal education programs, expansion of schooling facilities and increased awareness regarding the importance of education for girls have contributed to this progress. Rural areas, which traditionally lagged behind urban centres in terms of educational access have experienced noticeable improvements. The spread of educational infrastructure and better connectivity with urban areas have played a crucial role in enhancing literacy levels in these regions.

Urbanization has also emerged as an important factor influencing the observed trends. The expansion of Lucknow city and the development of peri-urban areas have facilitated greater access to educational institutions, thereby reducing the rural–urban divide. The diffusion of urban characteristics into surrounding rural areas has helped improve literacy outcomes, particularly for females.

Despite these positive developments the study also highlights the persistence of gender inequality in literacy. Although the disparity has reduced, female literacy levels continue to remain lower than those of males, especially in rural areas. Socio-cultural factors, economic constraints and limited access to higher education still act as barriers to achieving complete gender parity. Therefore, the decline in disparity should not be interpreted as the elimination of inequality but rather as a step towards greater inclusiveness.

In conclusion, the study demonstrates that while Lucknow district has made significant progress in reducing rural–urban gender disparity in literacy, still some challenges persist. Future policy interventions should focus on strengthening rural educational infrastructure, promoting female education and addressing socio-cultural barriers that hinder women's access to education. Special attention must be given to marginalized and backward regions to ensure equitable development. Continuous monitoring using statistical measures like the Index of Dissimilarity can further help in assessing progress and guiding policy decisions. Overall, the findings underscore the importance of sustained efforts towards achieving balanced and inclusive educational development in the region.

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