# Mapping Marginality: A Study of SC and ST Population Distribution in North Bengal, India

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## Abstract

This study analyses the spatial distribution and demographic inequality of Scheduled Caste (SC) and Scheduled Tribe (ST) populations in North Bengal, covering six districts-Koch Bihar, Jalpaiguri, Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, and Maldah-using Census 2011 data. The research combines graphical techniques (pie charts and bar diagrams) with quantitative measures such as the Lorenz Curve and Gini Coefficient to assess inequality across rural and urban areas. Findings reveal that the SC population is relatively evenly distributed (G = 0.194), with the highest concentration in Koch Bihar (50.17%). In contrast, the ST population shows greater spatial unevenness (G = 0.37), particularly in urban areas where inequality is pronounced (G = 0.65). The region remains predominantly rural, with over 85% of residents living in rural areas in most districts. Urban SC and especially ST populations are comparatively low, with ST representation falling below 1% in several districts. The study highlights persistent rural-urban disparities and recommends spatially targeted welfare initiatives, improved urban inclusion policies, and regular inequality monitoring to promote equitable and inclusive regional development.

**Keywords:** SC, ST, Spatial Inequality, North Bengal, Rural-Urban Divide, Gini Coefficient.

## Introduction

The socio-spatial arrangement of population groups in India is shaped not only by physical geography and ecological conditions but also by longstanding structures of social hierarchy and inequality. Among the constitutionally recognized marginalized communities, the Scheduled Castes (SCs) and Scheduled Tribes (STs) have historically faced systemic discrimination, economic vulnerability, and restricted access to education, employment, and basic services. Examining their spatial distribution-particularly across rural and urban contexts-is therefore essential for informed planning, equitable resource allocation, and the advancement of social justice, as reflected in the Census of India (2011).

North Bengal, comprising Koch Bihar, Jalpaiguri, Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, and Maldah, represents a distinctive sub-region of West Bengal marked by ecological contrasts, ethnic diversity, and uneven development. Located between the Eastern Himalayas

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and the Gangetic Plains, the region is predominantly rural and demographically varied (Datta, 2012).

Although the Census of India (2011) offers detailed statistical data on caste-wise population patterns, deeper analytical engagement is required to interpret spatial disparities. A systematic examination of rural-urban differentials in SC and ST distribution can provide critical insights for designing context-specific, inclusive development strategies.

**Objectives**

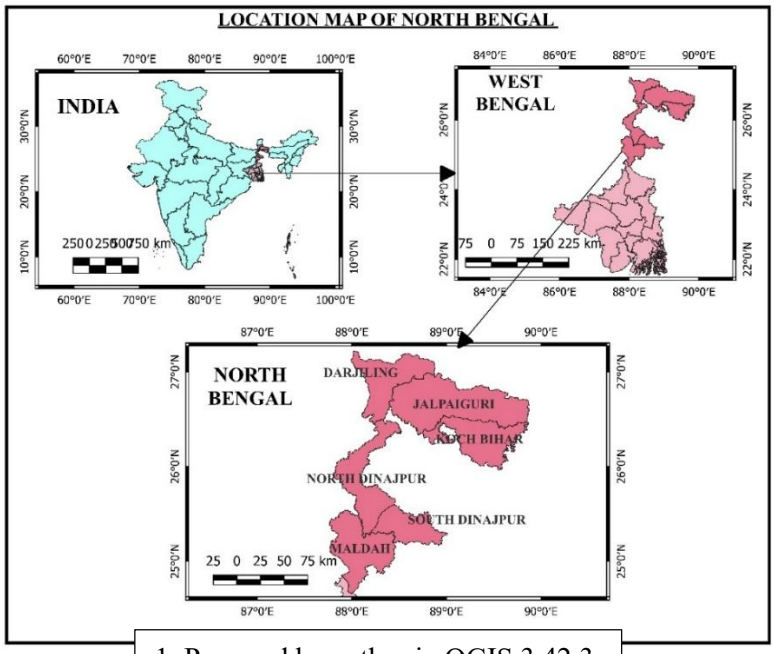
The following objectives are discussed in this paper-

i. To examine the district-wise inequality of Scheduled Caste (SC) and Scheduled Tribe (ST) populations in North Bengal as per the 2011 Census.
ii. To analyse the rural-urban composition of the population across the six districts, with specific attention to the SC and ST groups.
iii. To compare rural and urban SC and ST population distributions and identify areas of concentration or marginalization.
iv. To provide a spatial understanding of social disparities in the region for facilitating data-driven decision-making and targeted policy interventions.

**Location of the study area**

North Bengal (Figure-1) consists of six districts (Koch Behar, Jalpaiguri, Darjeeling, North Dinajpur, South Dinajpur and Maldah in 2011) in the northern part of the West Bengal. The climate of the study area is characterized by hot, humid and heavy rainfall although in the northern hilly areas a cool climate prevails. It extends approximately from 24˚ 45′ / N to 27˚ 20′ / N and from 87˚ 45′ / E to 89˚50′ / E. The total area of the region is about 21859 sq. km (26322 sq. km).

Figure-1: Location Map of North Bengal




1. Prepared by author in QGIS 3.42.3

Geographically, the region is located in the Teesta-Torsha-Mahananda basin in between Darjeeling and the Himalayas in the north and the Gangetic plains in the south. It is bounded on the north by Sikkim and Bhutan; on the east by Assam and the Rangpur and Rahsahi divisions of Bangladesh; on the south by the Presidency division of West Bengal; and on the west by Bihar and Nepal. The Ganges separates North Bengal from South Bengal (Karmakar, 2011).

**Methodology**

The distribution of SC and ST population is represented by Pie chart. Distribution of Rural and Urban population is represented by Compound Bar graph. Rural and Urban SC and ST population distribution is represented by Comparative Bar graph. The inequality in population distribution has been illustrated by using Lorenz Curve. Furthermore, the extent of this inequality has been measured using the Gini's Coefficient (Saha and Basu, 2021).

**(a) Lorenz Curve:** The Lorenz curve was developed by Max O. Lorenz in 1905 to represent inequality in wealth distribution. The Lorenz curve is represented by a straight diagonal line at the 45-degree angle shows perfectly equal distribution, while the other line shows the actual distribution of population. The further away from the diagonal, the more unequal the size of the distribution of income.

The following steps have followed to calculate Lorenz Curve-

i. Calculated the percentage of SC population to Total Population
ii. Rearranged the district in rank wise by ascending order based on the percentage of SC population
iii. Calculated the percentage of Total population to Sum of Total Population
iv. Calculated Cumulative percentage of Total population
v. Calculated the percentage of SC population to Total SC population
vi. Calculated Cumulative percentage of SC population
vii. Drew Lorenz Curve in Excel based on Cumulative percentage of Total population (X) and Cumulative percentage of SC population (Y)

**(b) Gini Coefficient or Gini Index**

The Gini index was devised by an Italian statistician named Corrado Gini in 1912. The Gini Coefficient, which is derived from the Lorenz Curve, it can vary from 0 (perfect equality) to 1 (perfect inequality). The Gini coefficient is defined as a ratio of the areas on the Lorenz curve diagram. The total area of the square being 100×100 i.e. 10000, the area of the triangle considering the line of equal distribution is 5000 i.e. $\frac{100\times100}{2}$. In the case of highest concentration or perfect distribution, the area below the curve would be very close to the area of this triangle. An uneven distribution will show much smaller area below the curve. The area is calculated as multiplying the 1st element of $X_i$ with 2nd element of $Y_i$ i.e. $Y_{i+1}$ and so on and so forth. On the other hand, 1st element of $Y_i$ to be multiplied by the 2nd element of $X_i$ i.e. $X_{i+1}$ (Saha, and Basu, 2021).

$$Gini's\ Coefficient\ (G) = \frac{1}{100 \times 100} \left| \sum_{i=1}^{n} X_i Y_{i+1} + 1 - \sum_{i=1}^{n} Y_i X_{i+1} \right|$$

The Gini's coefficient varies from 0 to 1, where 0 means perfect equal distribution and 1 means perfect inequal distribution. The nature of distribution has done in the following way (Table-1)-

Table-1: Nature of distribution of 'G' value

| Gini coefficient | Nature | Gini coefficient | Nature |
|---|---|---|---|
| 0.0 | Perfectly uniform distribution or perfect equality | 0.6 | Non-uniform or unequal distribution |
| 0.2 | Uniform distribution | 0.8 | Highly non-uniform or unequal distribution |
| 0.4 | Nearly uniform distribution | 1.0 | Perfectly non-uniform or completely clustering distribution or perfect inequality |

Source: Adhikari, S. 2020, Statistical Method in Geography and Weather Map & Environmental Lab. Work (Theory & Lab). Dove Publishing House, Kolkata. pp 245-256.

**Result and discussion**

The distribution of Scheduled Caste (SC) and Scheduled Tribe (ST) populations in North Bengal has been analysed through a structured framework. First, the overall distribution of SC and ST populations is examined in relation to the total population. Second, the rural-urban composition of the total population is assessed. Third, the distribution of rural SC and ST populations is analysed with respect to the total population. Finally, the urban SC and ST population distribution is discussed in proportion to the total population, enabling a comparative understanding of spatial disparities.

As per the Census of India (2011), caste-wise population data are categorized into Scheduled Castes (SC), Scheduled Tribes (ST), and General population, with no separate enumeration for the Other Backward Classes (OBCs). Consequently, the term "Other Population" in this study refers to the combined share of OBC and General population groups. In the Indian context, SCs and STs are constitutionally recognized historically marginalized communities entitled to affirmative action and protective measures aimed at promoting equality, social justice, and inclusive development.

| Table-2: Population Distribution in North Bengal-2011 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Districts | % of Caste wise Population to Total Population | | | % of Rural Population to Total Population | | | % of Urban Population to Total Population | | |
| | SC % | ST % | Other % | Rural % | Rural SC % | Rural ST % | Urban % | Urban SC % | Urban ST % |
| Jalpaiguri | 37.65 | 18.89 | 43.46 | 72.62 | 29.94 | 17.82 | 27.38 | 7.72 | 1.07 |
| Koch Bihar | 50.17 | 0.64 | 49.19 | 89.73 | 47.91 | 0.60 | 10.27 | 2.26 | 0.04 |
| Darjiling | 17.18 | 21.52 | 61.30 | 60.58 | 12.17 | 17.28 | 39.42 | 5.01 | 4.24 |
| Uttar Dinajpur | 26.87 | 5.41 | 67.72 | 87.95 | 24.65 | 5.27 | 12.05 | 2.22 | 0.15 |
| Dakshin Dinajpur | 28.80 | 16.43 | 54.77 | 85.90 | 26.26 | 15.98 | 14.10 | 2.54 | 0.44 |
| Maldah | 20.94 | 7.87 | 71.19 | 86.42 | 19.24 | 7.71 | 13.58 | 1.70 | 0.16 |
| Source: Data has collected from Census of India 2011 and calculated by author. | | | | | | | | | |

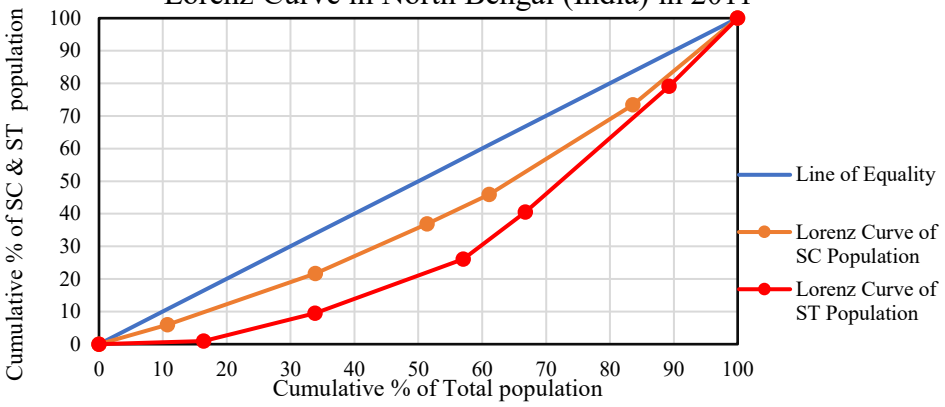
**SC & ST Population Distribution**

According to Census 2011 data (Table 1), the proportion of the 'Other' caste category (General + OBC) is highest in Darjeeling, Uttar Dinajpur, Dakshin Dinajpur, and Maldah, with Maldah recording the highest share (71.19%). In each of these four districts, more than half of the population belongs to the 'Other' caste group. In contrast, the proportion is comparatively lower in Jalpaiguri (43.46%, the lowest) and Koch Bihar.

Koch Bihar has the highest concentration of Scheduled Caste (SC) population in North Bengal, accounting for nearly 50% of its total population. Jalpaiguri ranks second, with 37.65% of its population categorized as SC. In the remaining districts, the SC share remains below 30% of the total population.

With respect to Scheduled Tribes (ST), Darjeeling records the highest proportion, where STs constitute 21.52% of the total population. The lowest ST share is observed in Koch Bihar (0.64%). In all other districts of North Bengal, the ST population accounts for less than 20% of the total population, indicating moderate but uneven spatial distribution across the region.

Fig.-2
Distribution of SC & ST population to Total population by Lorenz Curve in North Bengal (India) in 2011




(Prepared by author in MS. Excel)

**Measures of Inequality:** To understand the extent of inequality in this population distribution, the Lorenz Curve and Gini's Coefficient ('G' value) have been calculated and illustrated through a line graph as well in Fig.2.

The concentration of SC and ST population has been measured by Lorenz Curve. If there was perfect equality, if everyone had the same percentage of population like the 20% of the population would have 20% of the total SC or ST population. The 60% of the population would have 60% of the SC or ST population.

But in this Lorenz curve (Fig.-3), the bottom 10.73% of population have 5.97% of the SC population. 83.62% of population holds 73.39% of SC population. That means the left 16.38 % of population have 26.61% of SC population. On the other hand, the bottom 16.38% of population have 0.95% of the ST population. 89.27% of population have 79.08% of ST population. That means the left 10.73% of population have 20.92% of ST population.

It is also observed that in all six districts in North Bengal (W.B., India) mentioned here the concentration of SC and ST population is unevenly distributed. The curve of SC population formed has little concavity and the curve of ST population formed has sufficient concavity with reference to the line of perfect distribution. To quantify the unevenness in the distribution of SC and ST population Gini's coefficient has been calculated. The perfect distribution line and the Lorenz Curve together bounds this area.

For SC population, the value obtained is 0.194. Now if we multiply the 'G' value, i.e. 0.194 with 100, it gives the unevenness of distribution in perfect value. Hence, 0.194*100=19.4% unevenness in the distribution of SC population is marked. So, in this graph, the Lorenz Curve is closer to the Line of Equality, so the area of A is small. And the Gini coefficient is low. The value of Gini coefficient is 0.194 which indicates Uniform distribution.

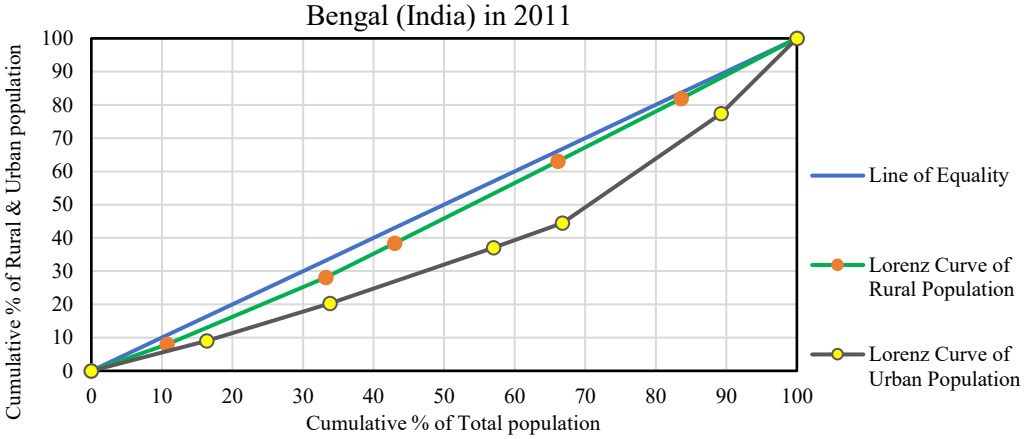
For ST population, the value obtained is 0.37 or 37%, it gives the unevenness of distribution in perfect value. Hence, 37% unevenness in the distribution of ST population is marked. The value of Gini coefficient indicates nearly uniform distribution.

**Rural & Urban Population Distribution**

According to the Census of India (2011) (Table 1), all districts of North Bengal are predominantly rural in character. In four districts, more than 85% of the population resides in rural areas, while in the remaining two districts, over 60% of the population is rural. Koch Bihar ranks first in terms of rural concentration, with 89.73% of its total population living in rural areas. In contrast, Darjeeling records the lowest rural share at 60.58%, though it still maintains a rural majority.

Regarding urban population distribution, Darjeeling ranks first, with 39.42% of its total population residing in urban areas. Jalpaiguri holds the second position, where 27.38% of the population lives in urban centres. In the remaining districts, the level of urbanization is comparatively low, with less than 15% of the total population residing in urban areas. Koch Bihar records the lowest urban share, with only 10.27% of its population living in urban settlements. These figures clearly highlight the predominantly rural demographic structure of North Bengal.

Fig.-3
The distribution of Rural & Urban population by Lorenz Curve in North Bengal (India) in 2011




(Prepared by author in MS. Excel)

**Measures of Inequality:** It is observed (Fig.-3) that in all six districts in North Bengal (W.B., India) mentioned here the concentration of Rural population is almost evenly distributed and Urban population is unevenly distributed. The curve of Rural population formed has very less concavity but the curve of Urban population formed has sufficient concavity with reference to the line of perfect distribution.

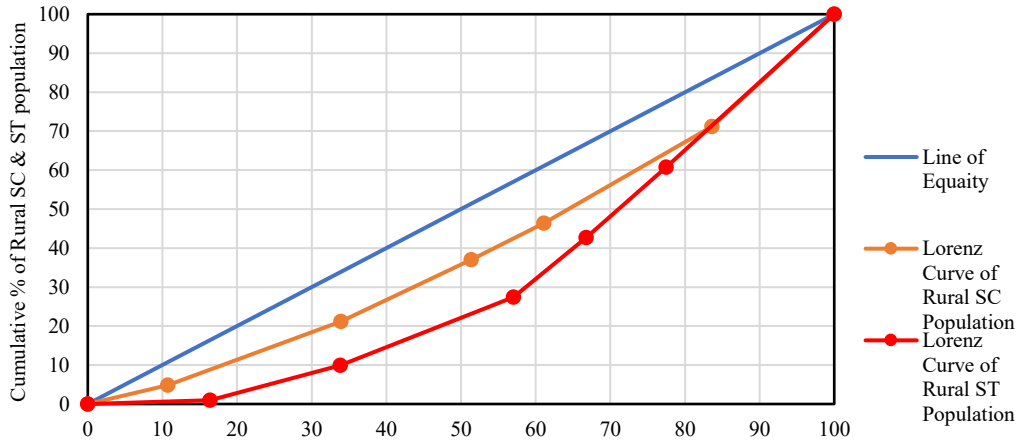
For Rural population, the value obtained is 0.059 or 5.9% unevenness in the distribution of Rural population is marked. The value of Gini coefficient (0.059) indicates almost Perfectly uniform distribution or almost perfect equality.

For Urban population, the value obtained is 0.26 or 26.0% unevenness in the distribution of Urban population is marked. The value of Gini coefficient (0.26) indicates approximately uniform distribution.

**(3) Rural SC & ST Population Distribution:** According to the 2011 Census (Table-1), Koch Bihar district has the highest rural SC population, comprising 47.91% of the total population. Jalpaiguri district ranks second, with rural SC population i.e., 29.94% of the total population. Darjiling district has the lowest, with only 10.17%. In remaining districts, rural SC population constitutes less than 25% of the total population. However, in every district, the rural SC population is significantly higher than the rural ST population.

In terms of rural ST population, Jalpaiguri district ranks first, with 17.82% of the population being rural ST. Darjiling district comes second, also with 17.28%. in South Dinajpur, the figures stand at 15.98%. however, in the remaining three districts, the percentage is very low-less than 8% of the total population. Koch Bihar district has the lowest, with only 0.60%.

Fig.-4
The distribution of Rural SC & ST population by Lorenz Curve in North Bengal (India) in 2011




(prepared by author in MS. Excel)

**Measures of Inequality:** It is observed (Fig.-4) that in all six districts in North Bengal (W.B., India) mentioned here the concentration of Rural SC and ST population is unevenly distributed, as the curve formed has sufficient concavity with reference to the line of perfect distribution.

For Rural SC population, the 'G' value obtained is 0.21 or 21.0% unevenness in the distribution of Rural SC population is marked. The value of Gini coefficient (0.21) indicates uniform distribution.

For Rural ST population, the 'G' value obtained is 0.35 or 35.0% unevenness in the distribution of Rural ST population is marked. The value of Gini coefficient (0.35) indicates Nearly uniform distribution.

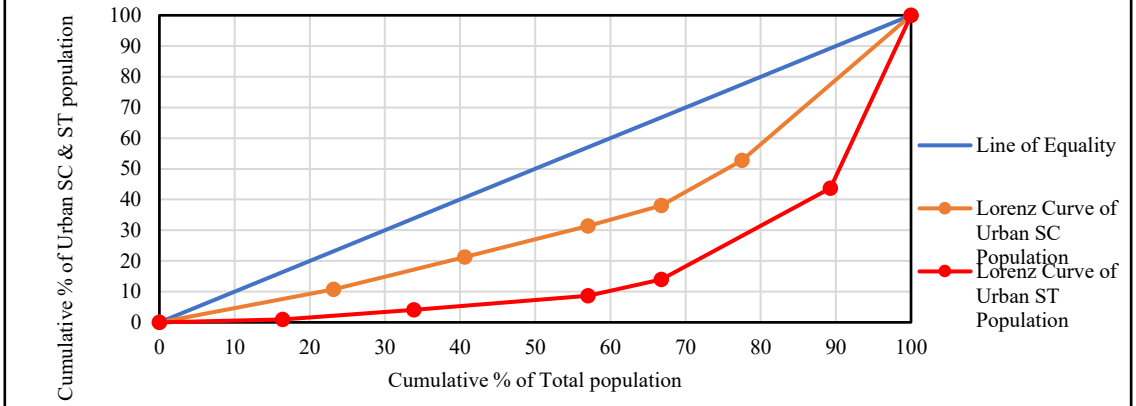
**(4) Urban SC & ST Population Distribution**

According to the Census of India (2011) (Table 1), the proportion of urban Scheduled Caste (SC) and Scheduled Tribe (ST) populations in North Bengal is markedly lower than their rural counterparts. In the case of urban SC population, all districts record less than 8% of their total population in this category. Jalpaiguri ranks first with 7.72%, whereas Maldah has the lowest

share at only 1.7%. Except for Darjeeling (5%), the proportion in most other districts remains close to 2%, indicating limited urban concentration of SC communities.

The share of urban ST population is even more marginal. Apart from Darjeeling (4.24%) and Jalpaiguri (1%), all other districts report less than 1% of their total population as urban ST. Koch Bihar records the lowest proportion, with only 0.04%. These figures highlight the extremely limited urban presence of ST communities and point toward a predominantly rural pattern of settlement across the region.

Fig.-5
The distribution of Urban SC & ST population by Lorenz Curve in North Bengal (India) in 2011




(prepared by author in MS. Excel)

**Measures of Inequality:** It is observed (Fig.-5) that in all six districts in North Bengal (W.B., India) mentioned here the concentration of Urban SC and ST population is unevenly distributed, as the curve formed has sufficient concavity with reference to the line of perfect distribution. To quantify the unevenness in the distribution of Urban SC and ST population, Gini's coefficient has been calculated.

For Urban SC population, the value obtained is 0.32 or 32.0%, it gives the unevenness of distribution in perfect value. Hence, 32.0% unevenness in the distribution of Urban SC population is marked. The value of Gini coefficient is 0.32 which indicates Nearly uniform distribution.

For Urban ST population, the value obtained is 0.65 or 65.0%, it gives the unevenness of distribution in perfect value. Hence, 65.0% unevenness in the distribution of Urban ST population is marked. The value of Gini coefficient is 0.65 which indicates Non-uniform or unequal distribution.

**Major Findings**

i. District-wise Caste Composition: Koch Bihar has the highest proportion of SC population (50.17%), followed by Jalpaiguri (37.65%). ST population is concentrated in Darjeeling (21.52%) and Jalpaiguri (18.89%), while Koch Bihar shows the lowest ST presence (0.64%).

ii. Rural-Urban Divide: All six districts are predominantly rural, with Koch Bihar being the most rural (89.73%). Darjeeling has the highest urban population (39.42%).

iii. Inequality Analysis: SC distribution across districts shows relatively low inequality (G = 0.194), indicating a uniform pattern. ST distribution shows moderate inequality (G = 0.37), suggesting more uneven concentration. Urban ST population reveals high inequality (G = 0.65), indicating significant urban marginalization.

iv. Rural vs. Urban Composition: Rural SC and ST populations are more evenly distributed than their urban counterparts. Urban SC and especially urban ST groups are severely underrepresented, with values below 1% in most districts.

**Remedies / Suggestions**

i. Targeted Development Programs: Launch district-specific schemes for SC/ST populations, especially in districts with lower representation or higher inequality.

ii. Urban Inclusion Initiatives: Improve access to urban housing, education, and employment for SC/ST populations, especially in districts with high Gini values.

iii. Enhance Data Disaggregation: Ensure updated and disaggregated caste data, especially for OBC groups, to better inform policies.

iv. Localized Affirmative Action: Implement spatially sensitive reservation policies in jobs and education tailored to local caste concentrations.

v. Strengthening Rural Infrastructure: Invest in rural health, education, and connectivity in SC/ST dominated areas to reduce forced urban migration.

vi. Monitoring and Evaluation: Create a state-level task force to monitor caste-based inequalities using Lorenz and Gini-based assessments every census cycle.

**Conclusion**

This study highlights the uneven spatial distribution and inequality in the representation of Scheduled Castes and Scheduled Tribes across rural and urban landscapes in North Bengal. While SC populations exhibit relatively uniform distribution, the ST population-especially in urban areas-shows high spatial inequality, signalling deep-rooted structural disparities. These patterns are critical in guiding data-driven, inclusive development policies. By identifying the areas of concentration and marginalization, the findings offer a basis for spatially targeted interventions that can bridge social gaps, improve equity, and ensure the constitutional goals of justice and equality for marginalized communities are more fully realized in the region.

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