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Levels of Education among General and Scheduled Caste Population: A Comparative Analysis

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Authors' contributions

This work was carried out by author Shamshad who designed the study, performed the statistical analysis, wrote the protocol, managed the analyses of the study, managed the literature searches and wrote the all draft of the manuscript. Author JHK read, checked and approved the final manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

The present study aims to analyse the spatial patterns of literacy rate of general population and scheduled caste population, variations in the level of education and relationship of literacy rate of general population and scheduled caste population (dependent variables) with the selected variables of education (independent variables) among the districts of the state of West Bengal. The entire research work is based on secondary sources of data, collected from Census of India publications (2001), New Delhi and Bureau of Applied Economics and Statistics, West Bengal state Govt. publications (2002-03), Kolkata. The boundary of the district has been taken as the smallest unit of the study. The spatial analysis reveals the facts that the majority of the districts of the state have medium and high level of literacy rate of general population and these districts are concentrated in the whole southern part and northern tip of the state of West Bengal, and more or less same pattern is followed by literacy rate of scheduled caste population, while, levels of education in the state are characterised by gradual increase from north-central part of the state towards north and towards the south, and from western to eastern directions, but the cap districts of the state, namely, Darjeeling, Jalpaiguri, Koch Behar and Dakshin Dinajpur, a little distort this pattern of educational levels.

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Keywords: Literacy rate; general population; scheduled caste population; level of education; region; West Bengal.

1. INTRODUCTION

The Simon Commission in 1935 firstly coined the term 'Scheduled Caste'. It is primarily a juridical category with all-India applicability, while, at the local level; there exists a congeries of sub-castes each with a strong sense of its own identity and separateness from the others. These castes were previously referred to as untouchables, depressed classes, out castes or exterior castes. These untouchables or castes were officially defined as depressed castes in 1932 and they were systematically listed in the Census of India 1931. Mahatma Gandhi gave them a new name as 'Harijans', wherein 'Hari' stands for 'God' and 'Jan' for 'Men' i.e. 'Men of God' which was free from traditional notions associations. The Government of India, for the first time in 1930, decided to list these castes in a 'Scheduled Castes' in order to have an accurate estimate of their numbers and to provide special socio-economic benefits for them through legislative and executive action with the help of Government of India Act of 1935. The list of castes was first issued in the Scheduled appended under the Government of India (Scheduled Castes) Order, 1936. Later it was incorporated in the Constitution of India (SC) Order-1950 and the 'Scheduled Castes and Scheduled Tribes List (Modification) Order-1956' [1].

The constitution of India guarantee of equality and fraternity has existed for more than six decades in India [2]. It is well known the imperial conquest by Britain confronted Indian society with the help of capitalist economic relations, modern industry, science and technology, modern learning, bourgeois legal system involving the concepts of freedom and equality of all citizens before law, on the one hand, and its agents in the form of civil and military officers, engineers, contractors, traders, plantation owners, missionaries, etc, on the other. Which gave the backward sections of Indian society including the Scheduled Castes for the first time an opportunity for a significant social advance. It is in the context of this total situation that one has to see the role of the spread of education [3]. Therefore, since Independence of the country, the Government has been continuously intensifying its efforts to improve the socio-economic conditions of the scheduled caste population as rapidly as possible [4]. Article 29 (2) of the Constitution reads: "No citizen shall be denied admission into any educational institution maintained by the State or receiving aid out of State funds on ground only of religion, race, caste, language or any of them". As, education and literacy are the keys to personal growth, preparation for suitable employment, building strong families and making a meaningful contribution to the society in which we live [5].

Education and literacy are the keys to attain the Millennium Development Goals, personal growth, preparation for suitable employment, eradicating poverty and mental isolation, for cultivating peaceful and friendly international relations, building strong families and making a meaningful contribution to the society in which we live [6,7]. Education is generally assumed to have far-reaching benefits. At the individual level, better education is associated with better health, more economic opportunities, and greater autonomy [8]. The empirical observations about space-time diffusion of literacy transition reveal a direct correlation between literacy transition and socio-economic transformation, though it may be difficult to establish as to which cause is and which was

effect. That is why, Khan Shamshad and Mustaquim (2011) expressed that the health facilities, educational opportunities, urbanization, industrialization, means of transportation and communication and other infrastructural facilities are the major ailments of literacy rate [9].

Education plays a dominant role in influencing the quality of human resources as it is the medium of exchange for ideas, thoughts and beliefs over time and space [10]. While educational levels among the general population itself are not very high in the country as compared to the developed countries of the world, the general population itself in India needs a lot of educational infrastructural facilities to enjoy the good quality of life. Furthermore, the progresses in education among the Scheduled Castes has lagged very much behind than the other sections of the Indian society and have least access to educational opportunities in the country therefore this section of population have acute need of educational infrastructural facilities so that these scheduled caste people can walk with the general population. The various social disabilities and handicaps from which they have been suffering from time immemorial have resulted in wide disparities in the levels of education among the general population and the Scheduled Castes [4]. Scheduled Caste families, usually live in spatially segregated clusters or habitations in multi-caste villages. These residential patterns have important implications for physical and social access. School provision in predominantly Scheduled Caste habitations is much less as compared to general rural habitations¹. The general population includes the people of all religions, castes creeds, races & sections of the society either they belong to high castes or to lower castes, while scheduled caste population comprises of those sections of society who are socio-economically deprived as declared by Constitution of India.

Tripathi (1999) stated that the inherent problems of scheduled caste population are poverty, ignorance, lack of options in employment opportunities and non-existence of organisation which can fight for their right and facilitate the continuance of age old exploitations. The involvement of scheduled caste people is more in primary sector than the involvement of general population. Majority of scheduled caste people do not hold productive assets or land and constitute the bulk of agricultural workers, and work in the unorganised or informal sector. They do not come under the purview of the protective laws like Minimum Wages Act and Prevention of Land Alienation Act, etc [11,12]. It is undeniable that despite several shortcomings, special schemes launched by government of India, had a key role to play in facilitating social mobility and status change for scheduled castes and the creation of political leadership. However, the coverage of programmes continues to be inadequate and there is no monitoring arrangement for the actual operation of these programmes, quantifying achievement targets and determining financial outlays. Thus, the actual benefits are limited and accrue largely to the relatively more powerful and better off SC groups. Poor implementation deprives these people much more [13].

According to Census 2001, the state of West Bengal is one, out of four states of India, which have larger proportion of the scheduled caste population as compared to other states in the country i.e. Himachal Pradesh (24.72 per cent), Punjab (28.85 per cent),

¹*For each population slab, including those with more than 5000 persons, a relatively smaller proportion of Scheduled Caste habitations had primary schooling when compared to rural habitations in general. Only 15.3 per cent of predominantly Scheduled Caste habitations that had a population of less than 300 persons as compared to 21.4 per cent of general rural habitations within the same population slab had primary schools/sections within them in the year 1993 [12].*

Uttar Pradesh (21.15 per cent) and West Bengal itself (23.02 per cent). The rural and urban figures for the state of West Bengal are 26.88 per cent and 13.23 per cent. On the other hand, total population of the Scheduled Castes in the country (excluding the population of Mao Maram, Paomata and Purul sub-divisions of Senapati district of Manipur) is 166,635,700 which constitute 16.2% of the total population. Uttar Pradesh (35,148,377) has the largest Scheduled Caste population, followed by West Bengal (18,452,555) and Bihar (13,048,608). Thus, the present study aims to analyse the literacy rate of scheduled caste population and their levels of educational infrastructural facilities, and moreover, this section of population is compared with the general population of India in this regard.

2. OBJECTIVES OF THE STUDY

The present study has been under taken with the following specific objectives:

- i. to inspect the spatial patterns of literacy rate of general population in West Bengal,
- ii. to examine the regional variations of literacy rate of scheduled caste population in state,
- iii. to analyse the geographical perspective of educational levels in study area, and
- iv. to find out relationship among literacy rate of general population and scheduled caste population (dependent variables) with the selected indicators of education (independent variables).

3. STUDY AREA

The state of West Bengal has been selected as a study area in the present research work which is located between 21°25' to 26°50' north latitudes and 86°30' to 89°58' east longitudes with three international boundaries i.e., Bangladesh, Nepal and Bhutan (Fig 1). It occupies a geographical area of about 88,752 sq. km. (2.70 per cent of the India's total geographical area) and extending from the Himalayas in the north to the Bay of Bengal in the south. It is surrounded by Sikkim and Bhutan in the north, Assam and Bangladesh in the east, the Bay of Bengal in the south and Orissa, Jharkhand, Bihar and Nepal in the west. According to 2001 Census, its total population is 80,176,197 (7.79 per cent of India's total population), density is 904 persons per sq. km. (in terms of population density West Bengal is on the top among the Indian states). The Scheduled Castes constitute around 16.2 per cent of the Indian population today [14]. Literacy rates vary widely in terms of male/female, rural/urban and total population in the state. According to 2001 Indian Census, 77.02 per cent males and 59.61 per cent females are literate in the general population of the state of West Bengal, while, the total literacy rate is 68.64 per cent; the corresponding figures for scheduled caste have been recorded 70.54 per cent, 46.90 per cent and 59.04 per cent respectively [15].

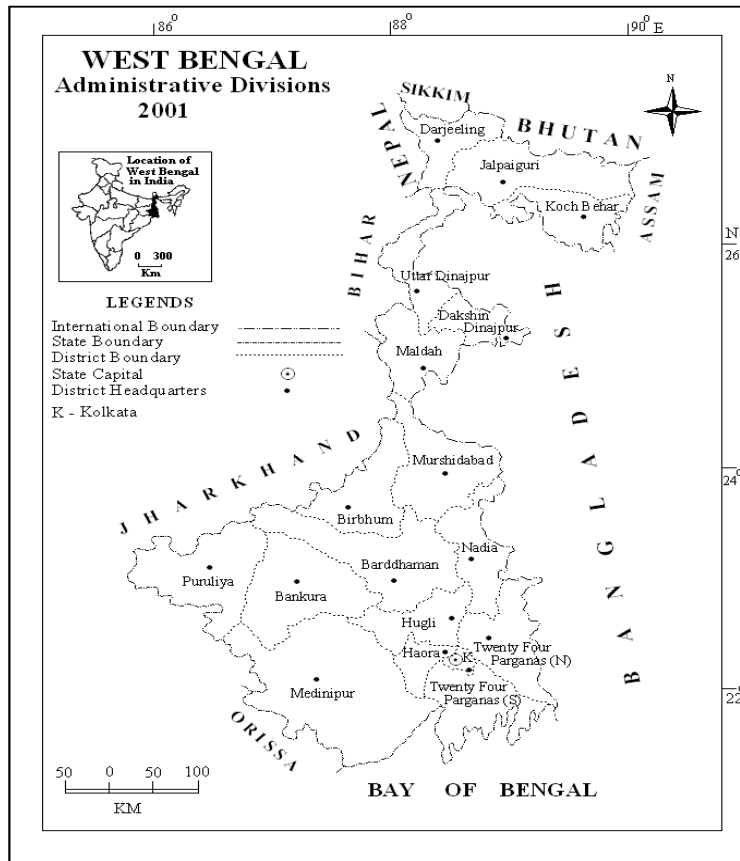


Fig. 1. Administrative Divisions of West Bengal
 Source: Census of India 2001

4. DATABASE AND METHODOLOGY

The present research work is based on secondary sources of data collected from Census of India publications (2001), New Delhi, and district wise indicators of educational infrastructure facilities collected from Bureau of Applied Economics and Statistics, Govt. of West Bengal publications (2002-2003), Kolkata [16]. In the present analysis, a set of twenty indicators of education have been taken into account to determine the levels of education at one hand and literacy rate of general population and scheduled caste population on the other hand in the eighteen districts of state of West Bengal. In the first step, the raw data for each variable which determines the areal variations of literacy rate of general population and scheduled caste population, and levels of education have been computed into standard score. It is generally known as Z value or Z-score. The score quantify the departure of individual observations, expressed in a comparable form. This means it becomes a linear transformation of the original data [17].

In the second step, the Z-scores of all variables have been added district wise and the average has taken out for these variables which may be called as composite score (CS)

for each district. The positive values relating to the districts' Z-score explain high level of literacy rate of general population and scheduled caste population, while, negative values indicate the low level of literacy rate of general population and scheduled caste population. Similarly, the positive values of composite score (CS) of educational levels stands for high and negative for the low in the study area. The correlation co-efficient is worked out among dependent variables (literacy rate of general population and scheduled caste population) and independent variables (selected variables of education) and it has been computed on the basis of the Karl Pearson's correlation co-efficient (r) method. The student t-test technique is applied to find out the determinants which are significant at 1 per cent and 5 per cent levels.

Besides, advanced statistical techniques, GIS-Arc view programme (Version 3.2a) has been applied to show the spatial variations of literacy rate of general population and scheduled caste population, and educational levels among the districts of the state West Bengal through figures.

5. RESULTS AND DISCUSSION

Table 1 shows the district wise Z-score and composite score values of literacy rate and levels of education in West Bengal respectively and depicts that there is a large range of variations in literacy of general population as well as scheduled caste population among the districts of the state, the literacy rate of general population varies from the lowest - 2.953 score in Murshidabad district to the highest 1.213 score in Kolkata district while the literacy rate of scheduled caste population ranges from the highest 1.524 score in Twenty Four Parganas (North) district to the lowest -1.628 score in Bankura district. The range of levels of education varies from -0.675 score in Murshidabad district to the 0.966 score in Kolkata district in the state. These ranges of spatial variations may be arranged into three categories such as, high (above 0.500 score), medium (0.500 to -0.500 score) and low (below -0.500 score) as given in Table 2.

5.1 Regional Analysis of Literacy Rates

Table 2 exhibits that there are six districts of the state, namely Darjeeling, Twenty Four Parganas (North), Hugli, Medinipur, Haora and Kolkata which have high level (above 0.500 score) of literacy rate of general population and all of them form a remarkable region in the southern part of the state excluding the Darjeeling district which is located in the extreme north. The eight districts of the state that fall under the medium grade (0.500 to -0.500 score) of literacy of general population, they are Jalpaiguri, Koch Behar, Dakshin Dinajpur, Birbhum, Barddhaman, Nadia, Bankura and Twenty Four Parganas (South) which constitute two distinct regions in the state. First one region lying in the northern part of the state comprises only two districts (Jalpaiguri and Koch Behar) and the second region being contiguous in nature located in the central part of the study area includes the districts of Birbhum, Barddhaman, Nadia and Bankura while Dakshin Dinajpur and Twenty Four Parganas (South) districts fail to share a contiguous boundary with adjacent districts to form any region in the state (Fig. 2).

Table 1. District wise distribution of Z-Score values of literacy among the general and scheduled caste population, and educational levels in West Bengal, 2001

Districts	Literacy of General Population	Literacy of Scheduled Caste Population	Educational Levels	Literacy of General Population vis-a-vis Educational Levels	Literacy of Scheduled Caste Population vis-a-vis Educational Levels
1	2	3	4	(2+4) = 5	(3+4) = 6
Darjeeling	0.545	0.578	0.509	LGP ₁ EL ₁	LSP ₁ EL ₁
Jalpaiguri	-0.115	0.515	0.011	LGP ₂ EL ₂	LSP ₁ EL ₂
Koch Behar	0.140	0.795	0.174	LGP ₂ EL ₂	LSP ₁ EL ₂
Uttar Dinajpur	-1.217	-0.821	-0.548	LGP ₃ EL ₃	LSP ₃ EL ₃
Dakshin Dinajpur	-0.060	-0.313	-0.207	LGP ₂ EL ₂	LSP ₂ EL ₂
Maldah	-1.041	-0.695	-0.526	LGP ₃ EL ₃	LSP ₃ EL ₃
Murshidabad	-2.953	-0.951	-0.675	LGP ₃ EL ₃	LSP ₃ EL ₃
Birbhum	-0.215	-1.310	-0.386	LGP ₂ EL ₂	LSP ₃ EL ₂
Bardhaman	0.426	-0.603	-0.227	LGP ₂ EL ₂	LSP ₃ EL ₂
Nadia	0.128	0.653	0.171	LGP ₂ EL ₂	LSP ₁ EL ₂
Twenty Four Parganas (North)	1.007	1.524	0.597	LGP ₁ EL ₁	LSP ₁ EL ₁
Hugli	0.789	-0.138	0.108	LGP ₁ EL ₂	LSP ₂ EL ₂
Bankura	-0.071	-1.628	-0.482	LGP ₂ EL ₂	LSP ₃ EL ₂
Puruliya	-0.651	-1.377	-0.602	LGP ₃ EL ₃	LSP ₃ EL ₃
Medinipur	0.774	0.707	0.335	LGP ₁ EL ₂	LSP ₁ EL ₂
Haora	0.929	0.431	0.204	LGP ₁ EL ₂	LSP ₂ EL ₂
Kolkata	1.213	1.496	0.966	LGP ₁ EL ₁	LSP ₁ EL ₁
Twenty Four Parganas (South)	0.372	1.136	0.244	LGP ₂ EL ₂	LSP ₁ EL ₂

Source: Calculation is based on District Level Published Data, Census of India, 2001 and Statistical Abstract, Govt. of West Bengal, 2002-2003.

Note: LGP₁= High Level of Literacy of General Population, LGP₂= Medium Level of Literacy of General Population, LGP₃= Low Level of Literacy of General Population, LSP₁= High Level of Literacy of Scheduled Caste Population, LSP₂= Medium Level of Literacy of Scheduled Caste Population, LSP₃= Low Level of Literacy of Scheduled Caste Population, EL₁= High Educational Levels, EL₂= Medium Educational Levels and EL₃= Low Educational Levels

Table 2. Levels of education in West Bengal, 2001

Category	Z-Score	No. of District	Name of the District
Literacy Rate of General Population			
High	Above 0.500	06	Darjeeling, Twenty Four Parganas (North), Hugli, Medinipur, Haora and Kolkata
Medium	0.500 to -0.500	08	Jalpaiguri, Koch Behar, Dakshin Dinajpur, Birbhum, Barddhaman, Nadia, Bankura and Twenty Four Parganas (South)
Low	Below -0.500	04	Uttar Dinajpur, Maldah, Murshidabad and Puruliya
Literacy Rate of Scheduled Caste Population			
High	Above 0.500	08	Darjeeling, Jalpaiguri, Koch Behar, Nadia, Twenty Four Parganas (North), Medinipur, Kolkata and Twenty Four Parganas (South)
Medium	0.500 to -0.500	03	Dakshin Dinajpur, Hugli and Haora
Low	Below -0.500	07	Uttar Dinajpur, Maldah, Murshidabad, Birbhum, Barddhaman, Bankura and Puruliya
Overall Educational Levels			
High	Above 0.500	03	Darjeeling, Twenty Four Parganas (North) and Kolkata
Medium	0.500 to -0.500	11	Jalpaiguri, Koch Behar, Dakshin Dinajpur, Birbhum, Barddhaman, Nadia, Hugli, Bankura, Medinipur, Haora and Twenty Four Parganas (South)
Low	Below -0.500	04	Uttar Dinajpur, Maldah, Murshidabad and Puruliya

Source: Based on Table 1

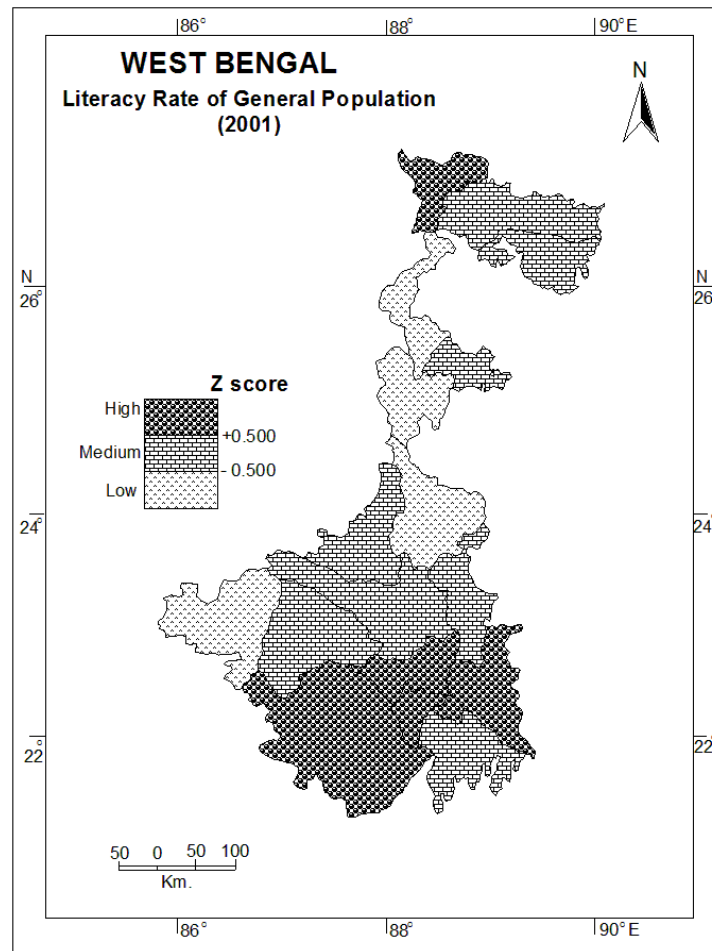


Fig. 2. Literacy Rate of General Population in West Bengal
 Source: Based on Table 2

Remaining four districts of the state experience the low level (below -0.500 score) of literacy of general population, in which, three districts i.e. Uttar Dinajpur, Maldah, and Murshidabad form a long linear longitudinal region in the northern part of the state and district Puruliya does not make any region (Fig. 2). The regional analysis of the Fig. 2 reveals that the majority of the districts of the state have medium and high level of literacy rate of general population and these districts are concentrated in the whole southern part and northern tip of the state of West Bengal.

Table 2 shows that there are eight districts which have high level (above 0.500 score) of literacy rate of scheduled caste population, in which, the districts of Nadia, Twenty Four Parganas (North), Medinipur, Kolkata and Twenty Four Parganas (South) constitute a remarkable interconnected region in the southern and south-eastern parts, while, Darjeeling, Jalpaiguri and Koch Behar districts make a notable region in the northern part of the state. The medium grade of literacy rate of scheduled caste population (0.500 to - 0.500 score) is witnessed only in three districts of the state viz., Dakshin Dinajpur in the north and Hugli and Haora in the south-central part make two very small

distinct regions in the state. The seven districts namely Uttar Dinajpur, Maldah, Murshidabad, Birbhum, Bardhaman, Bankura and Puruliya have low level (– 0.500 score) of literacy rate of scheduled caste population and all these districts form an outstanding contiguous region in the north-central and north-western parts the state (Fig. 3). An analysis of the Fig. 3 reveals that the level of literacy rate of scheduled caste population is high in the districts lying in the southern and northern parts of the state in comparison to the districts having in the central and north-western location.

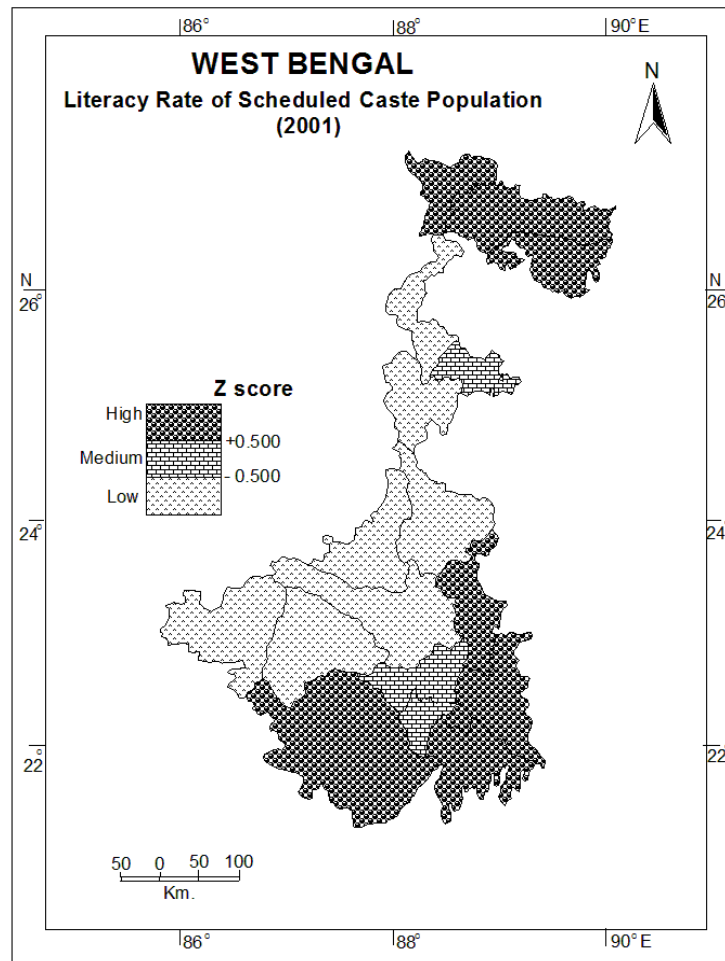


Fig. 3. Literacy Rate of Scheduled Caste Population in West Bengal
Source: Based on Table 2

5.2 SPATIAL ANALYSIS OF OVERALL EDUCATIONAL LEVELS

Table 2 indicates that there are three districts which have high score (above 0.500 score) of educational levels, in which, Darjeeling in the north and Twenty Four Parganas (North) & Kolkata in the south-east form two separate distinct regions in the state Fig. 4. The eleven districts of the state come under the medium grade (0.500 to – 0.500 score) of educational levels and make two regions in the study area. The first region comprises

the districts of Jalpaiguri and Koch Behar in the north, and second region composes of the districts of Birbhum, Bardhaman, Nadia, Hugli, Bankura, Medinipur, Haora and Twenty Four Parganas (South) in the south while the Dakshin Dinajpur district does not share a contiguous boundary with adjacent district to form any region in the state. Remaining four (23 per cent) districts of the study area fall under the low level (below - 0.500 score) of educational levels i.e. Uttar Dinajpur, Maldah, Murshidabad and Puruliya, among them, seventy five per cent districts constitute a contiguous longitudinal region in the northern part, and a very small region of same grade is formed by Puruliya district in the south-western part of the state (Fig. 4). The spatial patterns of educational levels of the state are characterised by gradual increase from north-central part of the state towards north and towards the south, and from western to eastern directions, but the cap districts of the state, namely, Darjeeling, Jalpaiguri, Koch Behar and Dakshin Dinajpur, a little distort this pattern of levels of education.

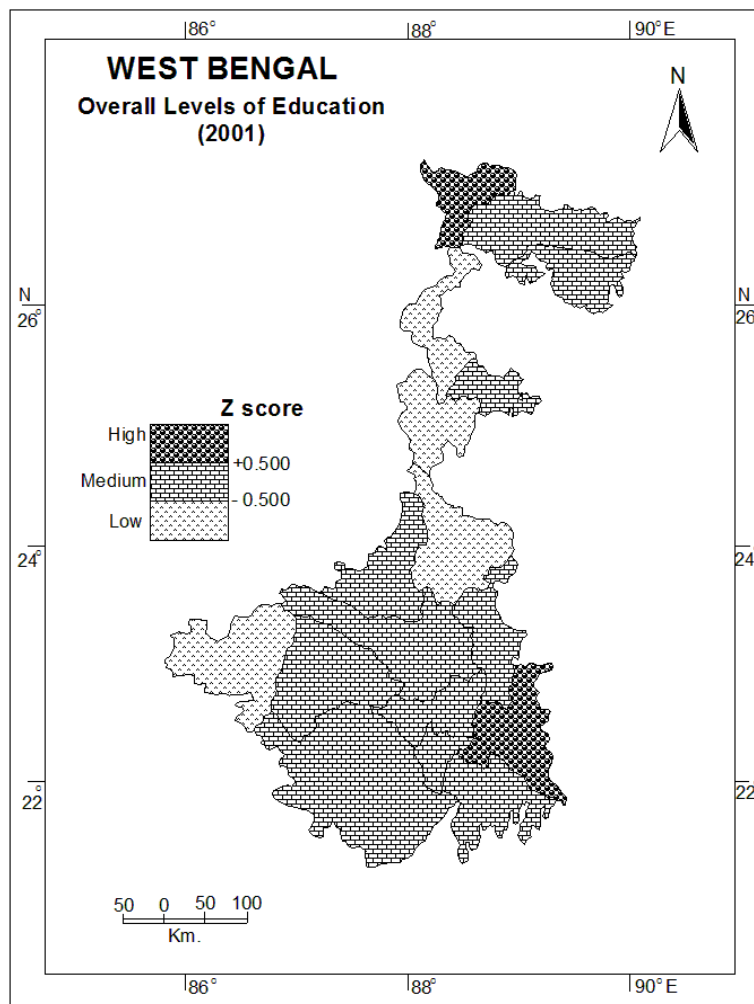


Fig. 4. Overall Levels of Education in West Bengal
 Source: Based on Table 2

5.3 Relationship of Literacy Rate of General Population as Well as Scheduled Caste Population with Educational Levels

The spatial relationship of literacy rate of general population and scheduled caste population, and educational levels among the districts of the state is dimensionally shown in Figs. 5 and 6. The abscissa shows the levels of literacy and ordinate represents the educational levels. The districts with reference to Z-score of these variables may be categorised into three groups i.e. High (above 0.500 score), Medium (0.500 to -0.500 score) and Low (below -0.500 score).

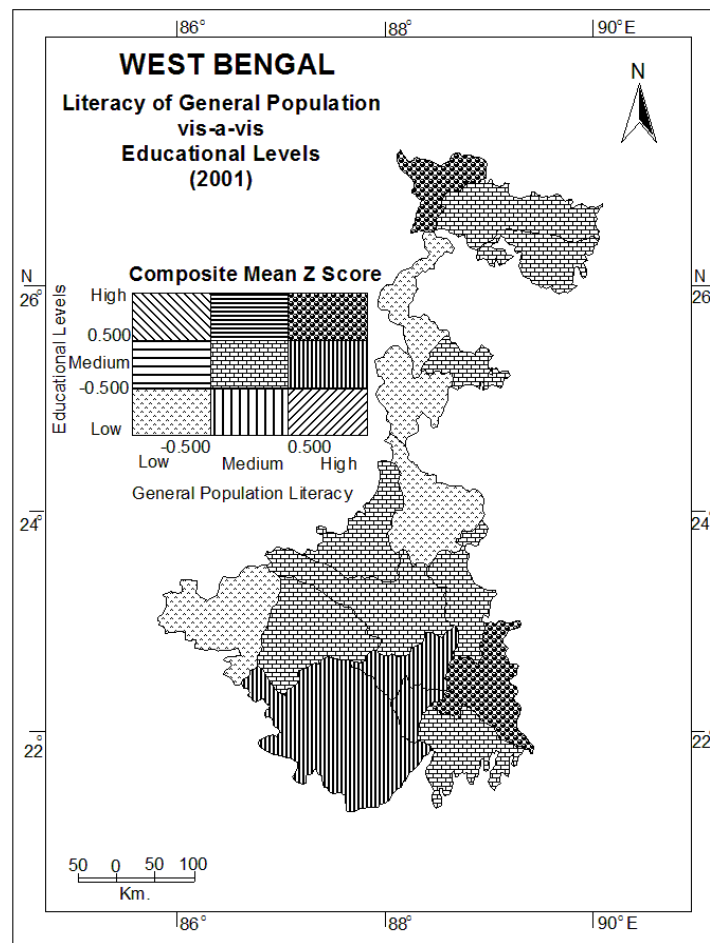


Fig. 5. Relationship Between Literacy of General Population and Educational Levels in West Bengal

Source: Based on Table 1, Column 5

Fig. 5 exhibits that six districts of the state have high level of literacy rate, namely, Darjeeling, Twenty Four Parganas (North), Hugli, Medinipur, Haora and Kolkata, in which, Darjeeling district in the extreme north and Twenty Four Parganas (North) and Kolkata districts in the extreme south-west having high educational level make two small regions in the state, while, Hugli, Medinipur and Haora districts have medium level of

education form an identifiable region in the southern part of the state (Fig. 5). On the other hand, Jalpaiguri, Koch Behar, Dakshin Dinajpur, Birbhum, Bardhaman, Nadia, Bankura and Twenty Four Parganas (South) districts of the state having the medium level of literacy rate of general population and educational level form two regions in the northern and north-western parts, excluding the districts of Dakshin Dinajpur and Twenty Four Parganas (South) which are scattered in the study area (Fig. 5).

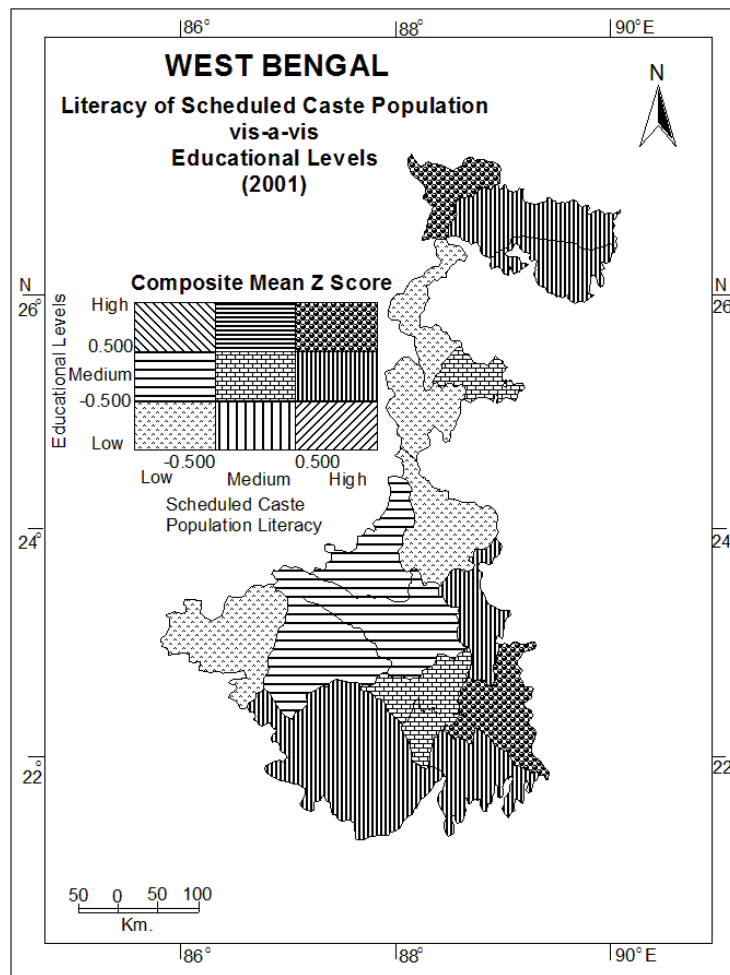


Fig. 6. Relationship between literacy of scheduled caste population and educational levels in West Bengal

Source: Based on Table 1, Column 6

There are four districts of the state which have low level of literacy rate of general population i.e. Uttar Dinajpur, Maldah, Murshidabad and Puruliya. The hundred per cent area of these districts also fall under the low levels of education, in which, seventy five per cent districts, namely, Uttar Dinajpur, Maldah and Murshidabad constitute a contiguous linear region in the northern part of the state (Fig. 5). Although, the relationship between literacy rate of general population and educational level is very high and have positive correlation with each other in all the districts of the state, except

the three districts, namely, Hugli, Medinipur and Haora which have high level of literacy rate of general population but medium level of education.

Fig. 6 depicts that eight districts of the study area have high literacy rate of scheduled caste population i.e. Darjeeling, Jalpaiguri, Koch Behar, Nadia, Twenty Four Parganas (North), Medinipur, Kolkata and Twenty Four Parganas (South), and among them, Darjeeling district in the northern part and Twenty Four Parganas (North) and Kolkata districts in the south-western part having high educational levels make two small regions in the state, while, the districts of Jalpaiguri, and Koch Behar in the north, Nadia in the east, and Twenty Four Parganas (North) and Medinipur in the south having medium educational levels constitute three small distinct regions in the state.

There are three districts in the study area which having medium level of literacy rate of scheduled caste population also experienced the medium educational levels. Dakshin Dinajpur in the north-central part and Hugli & Haora in the south-central part make two very small distinct regions in the state. The low grade of literacy rate of scheduled caste population is revealed in seven districts of the state, in which, four districts of the state namely, Uttar Dinajpur, Maldah, Murshidabad and Puruliya also have low educational level and they are forming a long linear region in the northern part of the state excluding the Puruliya district in the west, whereas, remaining three districts i.e. Birbhum, Bardhaman and Bankura witnessed the medium educational levels and constitute a dominant region in the north-western part of the state (Fig. 6).

Though the relationship of literacy rate of scheduled caste population vis-à-vis educational levels shows that about fifty percent districts of the state of West Bengal are perfectly positive correlated with each other but fifty per cent districts of the state do not follow the same pattern with each other in this regard.

6. CORRELATION OF LITERACY RATE OF GENERAL POPULATION AND SCHEDULED CASTE POPULATION WITH THE SELECTED VARIABLES OF EDUCATION

The analysis of simple correlation of literacy rate of general population and scheduled caste population (dependent variables) with selected educational indicators (independent variables) has been listed in Table 3. The correlation between literacy rate of general population and educational indicators shows that out of twenty independent indicators, the coefficient of correlation of nine indicators ($X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_{15}$ and X_{20}) has a higher level of significant relationship with the literacy rate of general population. Among these nine indicators, eight indicators ($X_2, X_3, X_4, X_5, X_6, X_7, X_{15}$ and X_{20}) are significant at the confidence level of 95 per cent, and all these indicators positively correlated with the literacy rate of general population excluding one indicator i.e. X_{20} (number of students per teacher) that is negatively correlated with the literacy rate of general population because teacher-taught ratio is more unfavourable means there is large number of students per teacher. While remaining one indicator (X_8 = female literacy rate of scheduled caste population) is significant at the confidence level of 99 per cent and positively correlated with the literacy rate of general population.

Table 3. Results of Correlation (r) between Literacy Rate and Other Selected Indicators of Educational Infrastructure Facilities in West Bengal, 2001

Variables	Definition of Variables	Literacy of General Population (Y1)	Literacy of Scheduled Caste Population (Y2)
X ₁	Literacy Rate	1.00	.626**
X ₂	Male Literacy Rate	.887**	.578*
X ₃	Female Literacy Rate	.810**	.757**
X ₄	Rural Literacy Rate	.824**	.591*
X ₅	Urban Literacy Rate	.762**	.578*
X ₆	Literacy Rate of Scheduled Caste Population	.626**	1.00
X ₇	Male Literacy Rate of Scheduled Caste Population	.664**	.964**
X ₈	Female Literacy Rate of Scheduled Caste Population	.575*	.981**
X ₉	Rural Literacy Rate of Scheduled Caste Population	0.391	.852**
X ₁₀	Urban Literacy Rate of Scheduled Caste Population	0.025	0.169
X ₁₁	Number of Primary Schools per Lakh of Population	-0.109	-.549*
X ₁₂	Number of Primary Schools per 100 sq. km. of Area	0.362	0.409
X ₁₃	Number of Middle Schools per Lakh of Population	0.126	0.072
X ₁₄	Number of Middle Schools per 100 sq. km. of Area	0.423	.513*
X ₁₅	Number of High and High Secondary Schools per Lakh of Population	.677**	0.25
X ₁₆	Number of High and High Secondary Schools per 100 sq. km. of Area	0.34	0.402
X ₁₇	Number of Collages per Lakh of Population	0.439	0.449
X ₁₈	Number of Collages per 100 sq. km. of Area	0.316	0.386
X ₁₉	Number of Students per School	0.026	.520*
X ₂₀	Number of Students per Teacher	-.605**	0.057

Source: Calculation is based on District Level Published Data, Census of India, 2001 and Statistical Abstract, Govt. of West Bengal 2002-2003

*Significance at 1 per cent level, **Significance at 5 per cent level

The result of correlation between literacy rate of scheduled caste population and selected educational indicators is also given in Table 3 which exhibits that among the twenty independent indicators, the coefficient of correlation of eleven indicators ($X_1, X_2, X_3, X_4, X_5, X_7, X_8, X_9, X_{11}, X_{14}$ and X_{19}) has a higher level of significant relationship with the literacy rate of scheduled caste population. Among these eleven indicators, six indicators ($X_2, X_4, X_5, X_{11}, X_{14}$ and X_{19}) are significant at the confidence level of 99 per cent, which are positively correlated with the literacy rate of scheduled caste population excluding the indicator X_{11} (number of primary schools per lakh of population). Whereas rest five indicators (X_1, X_3, X_7, X_8 and X_9) are significant at the confidence level of 95 per cent all these indicators are positively correlated with the literacy rate of scheduled caste population.

Instead of one star and double star indicators, other indicators of education are also correlated with the literacy rate of general population and literacy rate of scheduled caste population but not up to a significant level.

7. CONCLUSION

The geographical patterns of literacy rate of general population, literacy rate of scheduled caste population, educational levels and their relationship clearly depict that there are a wide range of variations among the districts of the study area. The regional analysis of the literacy rate of general population reveals the facts that the majority of the districts of the state have medium and high level of literacy rate of general population and these districts are concentrated in the whole southern part and northern tip of the state of West Bengal. Likewise an analysis of the literacy rate of scheduled caste population exhibits that the level of literacy rate of scheduled caste population is high in the districts lying in the southern and northern parts of the state in comparison to the districts having in the central and north-western location.

The spatial patterns of levels of education in the state are characterised by gradual increase from north-central part of the state towards north and towards the south, and from western to eastern directions, but the cap districts of the state, namely, Darjeeling, Jalpaiguri, Koch Behar and Dakshin Dinajpur, a little distort this pattern of educational levels. Although, the relationship between literacy rate of general population and educational level is very high and have positive correlation with each other in all the districts of the state, except the three districts, namely, Hugli, Medinipur and Haora which have high level of literacy rate of general population but medium level of education. Though the relationship of literacy rate of scheduled caste population and educational levels shows that about fifty percent districts of the state of West Bengal are perfectly positive correlated with each other but fifty per cent districts of the state do not follow the same pattern with each other in this regard.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Z- Score may be expressed as:

$$Z_{ij} = \frac{X_{ij} - \bar{X}_i}{\sigma_i}$$

Where: Z_{ij} = Standardised value of the variable i in district j ,
 X_{ij} = Actual value of variable i in district j ,
 \bar{X}_i = Mean value of variable i in all districts,
 σ_i = Standard deviation of variable i in all districts.

Composite Score may be algebraically expressed as:

$$CS = \frac{\sum Z_{ij}}{N}$$

Where: CS stands composite score,
 $\sum Z_{ij}$ indicates Z-scores of all variables i in district j ,
 N refers to the number of variables.

The correlation co-efficient has been computed on the basis of the Karl Pearson's correlation co-efficient (r) method which is as follows:

$$r = \frac{\Sigma xy - \Sigma x \Sigma y / n}{\sqrt{\Sigma x^2 - \frac{(\Sigma x)^2}{n}} \sqrt{\Sigma y^2 - \frac{(\Sigma y)^2}{n}}}$$

Where: r is the co-efficient of correlation,
 x, y are the two given variables,
 n is the number of observation.

To find out the computed 't' value, student t-test technique is used which is given below:

$$t = r \sqrt{\frac{(n-2)}{1-r^2}}$$

Where: t is the calculated value of 't' in the test of significance,
 r is the computed value of co-efficient of correlation,
 n is the number of observation.

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