

Regional Disparities in Determinants of Educational Status in West Bengal, India: A Spatial Descriptive Approach

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Abstract: Education plays a vital role in human life. It is one of the most important factors of development. Despite the tremendous effort of the government towards ensuring equality of educational opportunities, inequality still prevails. The present paper is an attempt to analyse the regional disparities in the level of education in West Bengal. The study is divided into four sections. Section 1 comprises Introduction, objectives and brief description of study area Section 2 tends to discuss the methodology and data base Section 3 presents the empirical results and their interpretation and the last Section i.e., section 4 concludes the study with some suggestions. The data for the analysis have been obtained from the secondary sources, for the analysis of data; the technique of factor analysis has been applied selecting 17 variables. The present study finds out that there are exist large regional variations in the level of education in West Bengal. This regional disparity in educational level is due to various factors, like historical, social, cultural, economical, inefficient government policies etc.

Keywords: Spatial distribution, Educational Level, Factor analysis, Regional disparities.

I. Introduction

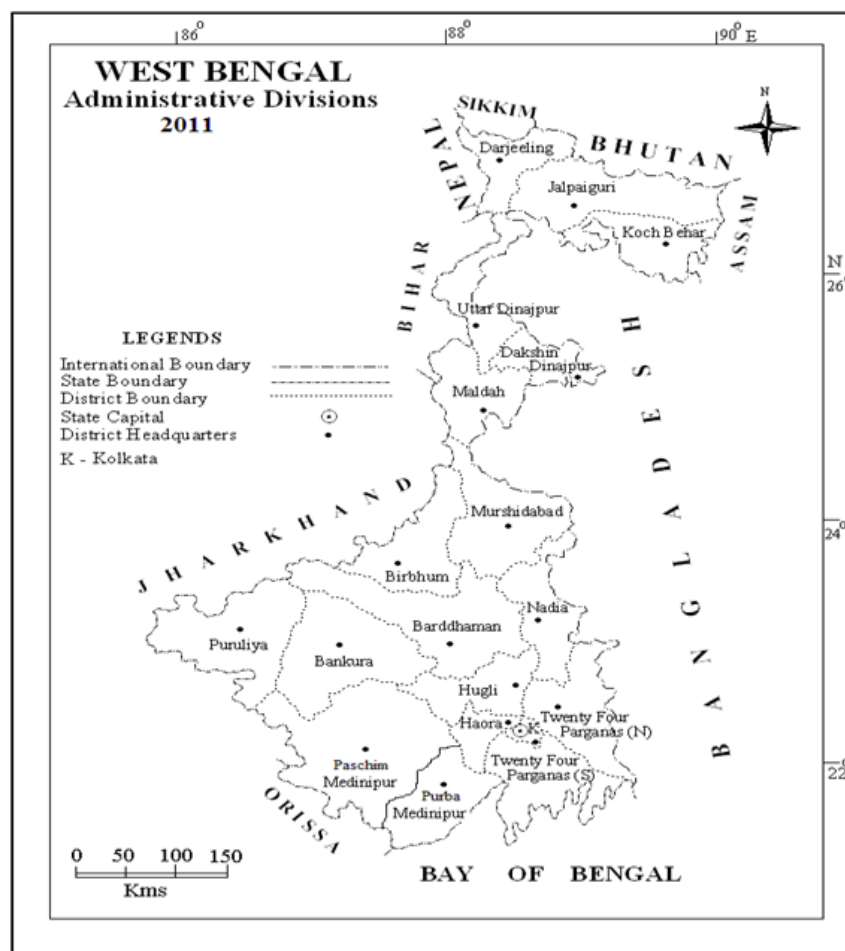
One of the serious problems which world is facing today is the problem of regional disparity in the level of development. The reasons for regional disparity in developing countries are somewhat different than those prevailing in the developed countries. The term disparity means inequality, imbalances, diversity etc. Literary, meaning of disparity is state of being unequal. In general regional disparity means failure of a region to exploit development potential of its initial resources endowments and resources advantages in relation to another region, comprising factors other than the natural. Regional disparity is defined as differences between economic performance and welfare between countries or regions (OECD, 2002-2003). These are determined by the application of quantitative methods, however, these are identified on the basis of classes, ranges or categories. The socio-economic development of a country depends on economic growth, modernization, self reliance and social justice. These attributes can be achieved only through structural changes of economy, socio-cultural change in attitude and motivation of the people. Education is a vital instrument for such changes. Literacy is the quality of educational which developed in our thoughts daily thinking, it is the way we live, we can be called literate with the manifestations of our daily around us, our understanding of ourselves and most importantly the reason for our existence, if these thoughts are being given birth to and processed in our minds then we are literate (Banu,N, 2015). The successful national planning and development policies for ensuring balanced development is possible only when socio-cultural aspect like education is looked into proper perspective. The word 'Education' has a very wide connotation and it is very difficult to give its precise definition. The word education is derived from the Latin word 'Educatum' which means to draw out, to foster growth and to develop (Siddiqui and Yadav, 2005)¹. According to Aristotle education is "the creation of a sound mind in a sound body" (Ashraf, et al., 2008). The concept of education for formal schooling has got replaced by a broader concept, including wide variety of activities which directly or indirectly influence the growth and development of an individual and the society (Surendra and Ashraf, 2011). Now Education does not merely mean the acquisition of knowledge or experience but it means the development of habits, attitudes and skills that help a man to lead a full and worthwhile life. In this regard earlier work has been carried out by persons like Ahmad and Shamim (1998) examines Spatial Dimensions of Social and Economic Inequalities in Bihar. Bhuiyan and Banerjee (1991)¹ have studied Regional Disparities of Lower Level Educational Development of Bangladesh. Siddiqui and Yadav (2005)² have discussed the Health and Educational Development in their district. Thus it is worthwhile to examine the Regional disparities in the level of education in West Bengal.

II. Objectives

The objectives of present study are:

- ✓ To find the regional disparity in spatial distribution of educational amenities in West Bengal.
- ✓ To highlight factors and process responsible for emerging patterns of regional disparity in education.

- ✓ To analyse the impact of factors responsible for disparity and worked out measures at least to minimize the problem of regional disparity if not eradicated fully in West Bengal.



Source: Census of India 2001

Fig 1

West Bengal lies approximately between 21°25'N to 26°50'N latitudes and 86°30'E to 89°58'E longitudes. It covers an area of 88,752 sq. kms and holds a population of about 92.34 millions. The study region comprises 19 districts (Fig 1). Population density is 1029 per sq. km. and sex ratio 947. Decadal growth rate 13.93 from 2001 to 2011. The literacy rate in the study area stands as 77.08% where male 82.67% and female 71.16%, rural literates 72.13% and urban literates 84.74%.

III. Database And Methodology

In the present study of West Bengal, 17 variables have been selected to show spatial variation in levels of education in West Bengal. The period of reference is 2011. The study is based on the following variables:

1. Percentage of total literate to total population. (x_1)
2. Percentage of total male literates to male population. (x_2)
3. Percentage of total female literates to female population. (x_3)
4. Percentage of total urban literates to urban population. (x_4)
5. Percentage of total rural literates to rural population. (x_5)
6. Number of Primary Schools per lakh population. (x_6)
7. Number of Junior High Schools per lakh population. (x_7)
8. Number of High & Higher Secondary Schools per lakh population. (x_8)
9. Number of Degree Colleges per lakh population. (x_9)
10. Percentage of students enrolled in Primary Schools. (x_{10})
11. Percentage of students enrolled in Junior High Schools. (x_{11})
12. Percentage of students enrolled in High & Higher Secondary Schools. (x_{12})
13. Percentage of students enrolled in Degree colleges. (x_{13})
14. Number of teachers per 100 students in Primary Schools. (x_{14})

- 15. Number of teachers per 100 students in Junior High Schools. (x_{15})
- 16. Number of teachers per 100 students in High & Higher Secondary Schools. (x_{16})
- 17. Number of teachers per 100 students in Degree Colleges (x_{17})

In all cases original data have been transformed into percentage and Census of India (2011), and Statistical Hand Book, West Bengal (2011-12), has been referred for generating the data for the selected set of 17 variables.

The methodology adopted here is ‘factor analyses’. Through this technique factor loading and factor score have been calculated. Finally the structural and regional pattern have been analysed with the general notions based on theoretical knowledge and observational ideas (Bhuiyan and Banerjee, 1991)².

Computation for this analysis was carried on A.M.U. ALPHA Computing System which gives a principal component solution. The model for the factor analysis used in the study involves the following steps:

- Correlation Matrix of indicators is computed (Table1)
- The Eigen vectors of the matrix have been worked out (Table2)
- Factor Loading has been done (Table2)

Before working out scores of two factors, it is important to see that whether they can be meaningfully interpreted and which are the variables that help in deriving new component (table3).

Table1: Correlation Matrix

VARIABLES	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂	X ₁₃	X ₁₄	X ₁₅	X ₁₆	X ₁₇
X ₁	1																
X ₂	0.968	1															
X ₃	0.977	0.893	1														
X ₄	0.404	0.392	0.392	1													
X ₅	-0.217	-0.168	-0.247	0.234	1												
X ₆	-0.312	-0.091	-0.483	-0.113	0.181	1											
X ₇	0.082	0.082	0.078	0.028	0.040	-0.051	1										
X ₈	0.659	0.713	0.579	0.185	-0.523	0.162	0.021	1									
X ₉	0.538	0.510	0.535	0.183	-0.791	-0.191	-0.014	0.615	1								
X ₁₀	-0.751	-0.683	-0.772	-0.334	0.346	0.273	-0.018	-0.445	-0.630	1							
X ₁₁	0.812	0.790	0.789	0.301	-0.069	-0.250	0.102	0.532	0.186	-0.474	1						
X ₁₂	-0.105	-0.051	-0.147	-0.098	0.309	0.076	0.069	-0.019	-0.511	0.659	0.350	1					
X ₁₃	0.187	0.140	0.220	0.142	-0.322	-0.075	-0.049	0.079	0.601	-0.682	-0.289	-0.973	1				
X ₁₄	0.519	0.635	0.395	0.439	-0.180	0.413	-0.054	0.810	0.443	-0.361	0.327	-0.105	0.160	1			
X ₁₅	-0.071	0.043	-0.163	-0.062	-0.090	0.471	-0.041	0.083	0.328	-0.107	-0.357	-0.419	0.458	0.238	1		
X ₁₆	0.699	0.652	0.702	0.282	-0.715	-0.312	0.009	0.788	0.837	-0.557	0.534	-0.136	0.224	0.466	-0.045	1	
X ₁₇	0.226	0.216	0.222	0.032	-0.659	-0.154	0.010	0.598	0.605	-0.113	0.194	0.047	0.018	0.359	-0.061	0.677	1

Source: Calculated by the Authors from Statistical Hand Book, West Bengal (2011-12).

Among the 17 variables, total variance is 59.00 per cent. First component explained 40.73 per cent, followed by 18.27 per cent (second component). Factor loading of first component shows that it has significant positive correlation with per cent of total literate (X₁), per cent of female literate (X₃), and per cent of male literate (X₂ in (table3) As all these variables indicate towards literacy percentage; so component-I can be considered as ‘literacy status’. Similarly, the high correlation is associated with the second component that is chiefly related to number of students enrolled in high & higher secondary Schools (X₁₂) followed by students enrolled in Junior high Schools (X₁₁), students enrolled in primary Schools (X₁₀), respectively. Here coefficient of correlation essentially summarized the students enrolled in higher & higher secondary and junior high school; so component-II can be considered as ‘Enrollment of students’.

Table: 2: Eigen Vector Normalised to Unity and Factor Loading

Variables	Eigen Vector		Factor Loading	
	Factor I	Factor II	Factor I	Factor II
X ₁	0.34161	0.15846	0.93732	0.08671
X ₂	0.32975	0.15417	0.90524	0.08579
X ₃	0.33406	0.15254	0.91573	0.08063
X ₄	0.14952	0.08507	0.41601	0.06504
X ₅	-0.20858	0.18837	-0.46807	0.43863
X ₆	-0.09267	-0.11007	-0.27878	-0.13918
X ₇	0.01531	0.07996	0.06864	0.12950
X ₈	0.30919	0.05576	0.81742	-0.06747
X ₉	0.30937	-0.24958	0.70516	-0.59917
X ₁₀	-0.30527	0.15235	-0.73015	0.42930
X ₁₁	0.24619	0.38554	0.77471	0.53031
X ₁₂	-0.11307	0.50011	-0.10823	0.92394
X ₁₃	0.14341	-0.48759	0.19091	-0.91892
X ₁₄	0.24079	-0.00740	0.61715	-0.14420
X ₁₅	0.01810	-0.37520	-0.09058	-0.65674
X ₁₆	0.33826	0.01764	0.87722	-0.15424

X ¹⁷	0.19260	-0.00554	0.49378	-0.11468
Eigen Values	6.92477	3.10602	6.92477	3.10602
Per cent Of Variance	40.73	18.27	40.73	18.27
Cumulative Percentage	40.73	59.00	40.73	59.00

Source: : Calculated by the Authors from Statistical Hand Book, West Bengal (2011-12).

Table 3 Structure of Two Leading Components for Educational Disparity

Component I: Literacy Status
40.73% Variance
 0.93732% of total literate
 0.91573% of female literate
 0.90524% of male literate

Component II: Enrolment of Students
18.27% Variance
 0.92394 students enrolled in high & higher secondary Schools.
 0.53031 students enrolled in Junior high Schools.
 0.42930 students enrolled in primary Schools.

To determine the overall level of education and its uneven distribution in the study area the data of the all variables have been transformed into indices using Z- score technique.

The formula is

$$Z_i = \frac{X_i - \bar{X}}{S}$$

Where, Z_i= Standard score for the ith observation, X_i= original value of the ith observation, \bar{X} is the mean for the variables, S= Standard deviation of X observation (Khan et al., 2009)¹.

In order to classify the districts according to their levels of education the composite Z- score have been grouped into very high, high, medium, low and very low.

Further, the result of the standard score obtained for different indicators, were aggregated by composite standard score (CSS) so that the regional disparities in the level of education of districts may be obtained on a common scale. The composite standard score may be algebraically expressed as-

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

Where, CSS= composite standard score, Z_{ij}= Z- score of an indicator j in district i, N= number of indicators (Khan et al., 2009)². In order to classify the districts, according to the magnitude of the development, the composite score were divided into five classes very high, high, medium, low, and very low.

Regional Disparities In Educational Level

To analyse regional disparity two factors were taken i.e., literacy status and enrolment of students. Among these categories literacy status is indicated by three variables and enrolment of students by three variables (Table 3).

Factor Structure

For the analysis of educational status of different districts of West Bengal, technique of factor analysis has been applied selecting 17 variables, considering two factors i.e., Literacy Status and Enrolment of students. As regards the contribution of these factors to the explanations of total variance it is found that Literacy Status explains 40.73% of the total variance while enrolment of students 18.27 explains 21.10% (Table 3).

Factor I: Literacy Status: Factor first is closely identified with Literacy status accounts for 40.73 per cent of the total variance. (Table 2) shows that the variables which have high positive loading with Literacy status are percentage of total literates to total population (0.93732) which is followed by percentage of female literates to female population (0.91573), these variables are closely followed by percentage of male literates to male population (0.90524) The relationship among these variables of Literacy status is obvious as the high level of literacy status of the region is the outcome of the high literacy rates of the population of various sections. The standardised factor scores (Table 4) have been divided into five grades of very high, high, medium, low, very low.

Table 4: Standardized Factor Score of Literacy Status

S. No.	Districts	Factor I
1	Darjiling	3.6010
2	Jalpaiguri	-3.6109
3	Koch Bihar	-0.7095
4	Uttar Dinajpur	-12.4999
5	Dakshin Dinajpur	0.1665
6	Maldah	-9.7625
7	Murshidabad	-8.8767
8	Birbhum	-1.9542
9	Bardhaman	2.5063
10	Bankura	-0.6505
11	Puruliya	-7.4535
12	Hugli	3.9655
13	Nadia	-1.3882
14	North Twenty Four Parganas	6.5053
15	Haora	4.0698
16	Kolkata	19.9494
17	South Twenty Four Parganas	-1.6730
18	Paschim Medinipur	2.1052
19	Purba Medinipur	4.9535

Source: Calculated by the Authors from Statistical Hand Book, West Bengal (2011-12).

The spatial pattern of literacy factor (Fig 2) reveals that the regions of very high factor scores are concentrated only Kolkata and high literacy factor scores are located in the adjacent to the districts of very high literacy factor scores in the southern part of the West Bengal except Darjiling.

They constitute the districts Hugli, North 24 Paraganas, Haora, and Purba Medinipur. The areas of medium factor score are concentrated in the northern middle and southern part of the region (Fig 2). In northern part one district is Koch Bihar, in middle part Dakshin Dinajpur and in southern part three districts i.e. Birbhum Bankura and Bardhaman.

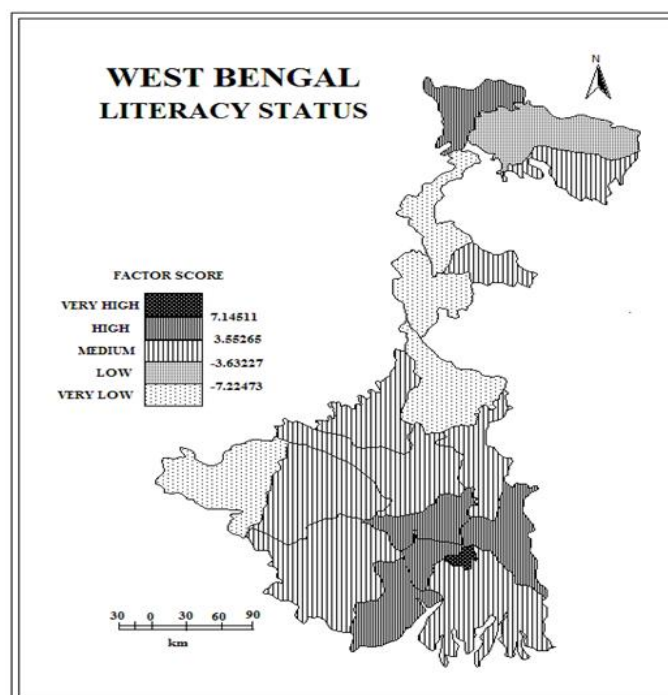


Fig 2

The areas of low literacy factor scores have specialised in one district of Darjiling. The remaining four districts namely Uttar Dinajpur, Malda, Murshidabad, Puruliya located in middle part have recorded very low literacy factor score in the study area. Thus from the above description it is clear that southern districts have high Literacy status and the remaining part of the West Bengal have medium or low Literacy status.

Factor II: Enrolment of students:

The second factor is labelled as Enrolment of students. It accounts for 18.27 per cent of the total variance. It is closely related with the variables of highest positive loading of students enrolled in high & higher

secondary Schools (0.92394), students enrolled in Junior high Schools. population (0.53031), students enrolled in primary Schools (0.42930).

Table: 5: Standardized Factor Score of Educational Institutions Status

S. No.	Districts	Factor II
1	Darjiling	-9.6782
2	Jalpaiguri	2.0581
3	Koch Bihar	-3.2306
4	Uttar Dinajpur	2.8512
5	Dakshin Dinajpur	-1.6573
6	Maldah	-2.3404
7	Murshidabad	0.8468
8	Birbhum	1.0063
9	Barddhaman	1.3961
10	Bankura	-0.3847
11	Puruliya	-0.2519
12	Hugli	0.9538
13	Nadia	3.4173
14	North Twenty Four Parganas	3.1331
15	Haora	3.3346
16	Kolkata	-7.1457
17	South Twenty Four Parganas	1.1872
18	Paschim Medinipur	1.4678
19	Purba Medinipur	1.8113

Source: Calculated by the Authors from Statistical Hand Book, West Bengal (2011-12).

The positively loading of enrolment of students in high & higher secondary school, junior basic school, primary school indicates the high level of enrolment of students in the study area. The Positive loading of number of enrolment of students shows that it higher literacy and vice versa. The higher literacy of an area is the final result of the over all educational development.

The factor scored map (Fig 3) shows that the areas of Enrolment of students factor scores are well distributed in the region .The districts which fall very high category is only Nadia Bareilly lies in the south eastern part of West Bengal. There are five districts which fall under the category of high factor score and these are Jalpaiguri, Uttar Dinajpur, North 24 Paraganas, Haora, Purba Medinipur.

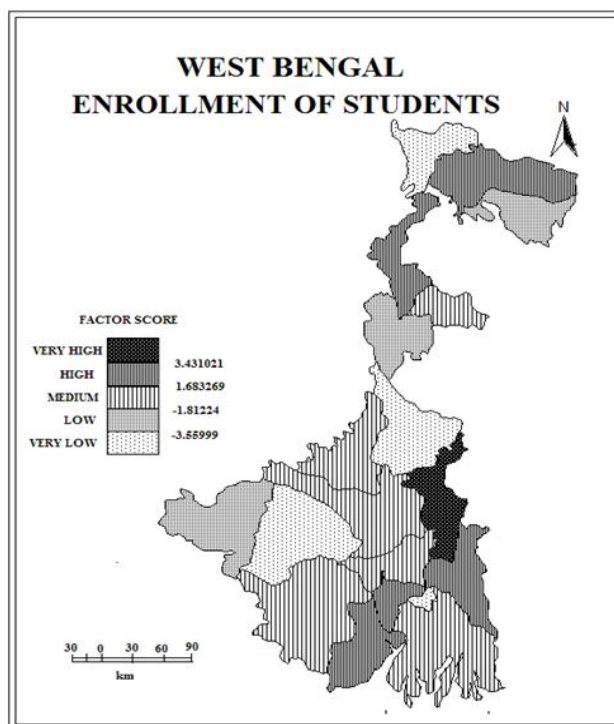


Fig 3

The areas of medium factor scores are also well distributed all over the state and cover most of the districts namely Dakshin Dinajpur, Murshidabad, Birbhum, Bardhaman, Hugli, South 24 Paragans, Paschim Medinipur. The districts of low factor scores are found namely Koch Bihar, Malda, Puruliya. There are four districts who have very low factor score i.e., Darjiling, Kolkata, Murshidabad and Bankura.

Thus from the above description it is clear that southern region of West Bengal have high factor scores while the remaining district have medium and low factor scores.

Level of Education

The composite scores of the educational status, is in fact an aggregate of two factor scores discussed earlier. The positive value of these scores means high level of education while negative value means low level of education. An examination of Fig 4 reveals that there are four districts that scores from a compact region of have very high factor educational level namely Kolkata, Haora, North 24 Parganas, Purba Medinipur in southern region of study area. The districts of high factor scores form a compact region in the southern part of West Bengal including the districts of Paschim Medinipur, Hugli and Bardhaman.

On the other hand Fig 4 shows that the districts of medium factor scores are found in middle and southern part comprising the districts of Dakshin Dinajpur, Birbhum, Bankura, Nadia, South 24 Paraganas and one northern district of Jalpaiguri. There are two districts of northern region that fall under the category of low factor scores namely Darjiling, Koch Bihar while Very low factor score is registered in middle part of West Bengal i.e. Uttar Dinajpur, Malda, Murshidabad, Puruliya.

Table: 6: Standardized Factor Score of Level of Education

S. No.	Districts	Composite Score (Factor Scores I + Factor Scores II)
1	Darjiling	-3.0386
2	Jalpaiguri	-0.7764
3	Koch Bihar	-1.97005
4	Uttar Dinajpur	-4.82435
5	Dakshin Dinajpur	-0.7454
6	Maldah	-6.05145
7	Murshidabad	-4.01495
8	Birbhum	-0.47395
9	Barddhaman	1.9512
10	Bankura	-0.5176
11	Puruliya	-3.8527
12	Hugli	2.45965
13	Nadia	1.01455
14	North Twenty Four Parganas	4.8192
15	Haora	3.7022
16	Kolkata	6.40185
17	South Twenty Four Parganas	-0.2429
18	Paschim Medinipur	1.7865
19	Purba Medinipur	3.3824

Source: Calculated by the Authors from Statistical Hand Book, West Bengal (2011-12)

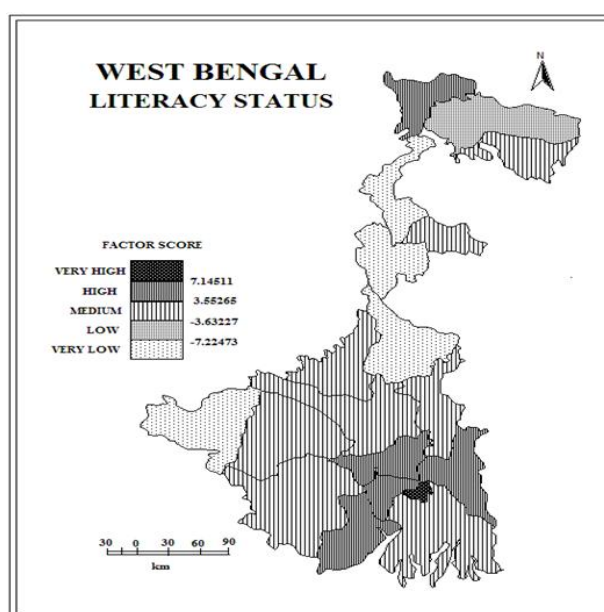


Fig 4

Thus from the above discussion, it is clear that there exists large regional disparities in the level of education in West Bengal. This is due to a variety of factors. It may be the historical, socio-cultural, socio-economical, in efficient government policies etc. The most dominant is socio-economical factor.

It observed during the visit of some rural and urban areas that the drop-outs particularly in girls is common that may be because of socio-cultural reasons that is indicated in factor analysis also. The educational backwardness of weaker sections indicates that even when education is subsidized at all levels, a combination of factors both social and economic keep the weaker sections away from education or we can say that poverty is the main hindrance in education.

IV. Conclusion

It is evident from the above study that there exists a large regional variation in the level of education of West Bengal. A very high level of education is seen in southern region of study area. Whereas whole of northern region is characterised with medium level of education while low and very level of education is found in middle and western region. The above mentioned pattern of educational level of West Bengal could be associated with the nature of economic activity in which they are engaged. There may be two reasons for the prevailing nature of economic activity; one is the fertility of the soil and second is nearness to Kolkata. As most of the people of northern and middle part of the region are engaged in primary and secondary activities so they give less weightage to education particularly to higher education while southern region is having much industries and other sector of engagement so the people are largely engaged in economic activities in one form or the other, giving more preference to education to get employment elsewhere.

For bridging the gap in educational level among different regions of the study area, awareness programme should be made by involving local people of the areas as well as by the government agencies, focussing the importance of education in our life and society, discouraging child labour.

Suggestions

- ✓ There is a need for detail survey, particularly of backward districts to find out gap in facilities at micro-level for better planning.
- ✓ Emphasis should be on regional approach to education rather than sectoral.
- ✓ Integrated development of an area in terms of economic and social well beings is required to encourage rural poor towards education and for the creation of job opportunities in rural areas.
- ✓ People awareness need to be developed through motivation programme with regards to education.
- ✓ Special programme should be launched for the upliftment of the weaker section and backward classes of the society in remote areas of the Western Uttar Pradesh.
- ✓ Periodical awareness programme should be launched to attract more and more people, particularly girls to school in rural areas, focusing down trodden societies.
- ✓ To assess the reliability of secondary data, it is imperative to cross check with the help of NGOs or through primary surveys to find out ground reality.

Nevertheless, a planned educational policy and financial assistance for every section of society should be taken up by the government for uplifting the educational attainment of the region.

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