



Increasing Patterns of Literacy Rate and Sex Ratio in Jalpaiguri District of West Bengal: A Spatio-Temporal Assessment with Special Emphasis on Correlation between Literacy Rate and Sex Ratio

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Abstract

Literacy and sex ratio are two vital components of any society which give an overview about status of female in respect to male as well as socio-cultural well being. An analysis on spatio-temporal patterns of literacy and sex ratio of Jalpaiguri district and correlation between literacy and sex ratio has been made an attempt in this work, which is the prime aim and objective of this study as well. As of 2011 census of India, a continuous increasing patterns of literacy and sex ratio has been recorded in Jalpaiguri from 1951. But undoubtedly there is a vast extent of imbalance in terms of literacy and sex ratio among the community development blocks of the study region. Literacy rate and sex ratio of the district is 73.40% and 956 respectively. Educational status of people i.e. literacy plays crucial role for optimum sex composition in a society. So correlation between literacy and sex ratio is enormously significant, which is examined here by using Spearman's Rank Order method. Consequently the correlation between them is $\rho = -0.88$, which is rather high and negative correlation.

Keywords:

Literacy Rate;

Sex Ratio;

Correlation;

Spatio-temporal Assessment;

Spearman's Rank Order

Correlation.

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1. Introduction

A society with high literacy rate helps to overcome different social obstacles which expedites individual as well as community well-being. It improves the overall development in terms of socio-cultural dimension of every strata of a society. Sex ratio is also a pivotal demographic component which denotes the status of female in respect to male in a society. Sex ratio is one of the important indices to comprehend women's health and position in any society (Barakade, 2012).^[1] At a given point of time the number of females per thousand of males is conceptually defined as sex ratio. So to understand the situation of female in a society, it is very much necessary to acquire knowledge about sex ratio fast. Equal participation in the context of gender in every socio-cultural aspect usually refers to an optimum demographic profile of a society, in where better educational status plays crucial role for such parity. Various dimensions of socio-cultural change in any society can be understood in light of the level of literacy and education (Som & Mishra, 2015).^[2] Literacy affects on the fertility rate, mortality rate, human migration as well as sex ratio. A less sex ratio is powerfully indicative of avoid of girl children, sex selective abortions and traditional thoughts of the society (Shinde & Lingade, 2017).^[3] Knowledge of sex ratio is essential for the assessment status of women in society. The less female population of the total population strongly indicates the neglect of the girl child, abortion and the traditional view of society (Bansode, 2017).^[4] There is a significant relation between literacy and sex ratio. Literacy rate of Jalpaiguri district is 73.40%, which is below both the state and national average of 76.3% and 74.0% respectively, while sex ratio is 956 which is quite above both the state and national average of 950 and 940 respectively as per report of census of India, 2011. But undoubtedly there is vast range of disparity in terms of both literacy and sex ratio among the blocks of the study region.

2. Literature Review

Sule & Barkade (2012) stated that literacy affects on demographic components like fertility, mortality, human migration as well as sex ratio. It observed that correlation between literacy rate and sex ratio is moderate and positive.^[5]

Aktar (2013) explained the spatial pattern of literacy and sex ratio at district level. Availability of educational facilities, high number of educational institutions, development of transportation and communication, high level of urbanization etc are the responsible for high literacy, while for low sex ratio the reasonable facts are neglected of girl child, high maternal mortality, sex selective, female infanticide. Correlation between literacy and sex ratio observed as rather low and negative.^[6]

Ghosh & Manna (2013) analysed the trends of declining child sex ratio in West Bengal and its variation among the districts of the state. Such trend has been recording since 1991 and mainly son preference, female foeticide and gender inequality and male dominant social structure are the causes behind the declination. They also discussed that developed states are recorded even steeper falls.^[7]



Godase, Lingade & Pawar (2014) examined correlation between literacy and sex ratio and their spatial distribution. Literacy plays vital role for the betterment of sex ratio. Finally they found a low and negative correlation between literacy and sex ratio.^[8]

Chaudhari & Ahire (2015) discussed about regional patterns of literacy and sex ratio and correlation between them. The resulted correlation is mainly low and positive correlation.^[9]

3. Research Objectives

The present study has the following objectives-

- a) To examine and highlight the increasing trend of literacy rate and sex ratio from 1951 to 2011 in Jalpaiguri compare with the state and national average.
- b) To analyse the inter-block spatial pattern of literacy rate and sex ratio in study region.
- c) To find out the correlation between literacy rate and sex ratio in the district.

4. Study Area

Jalpaiguri district is located in the northern part of Indian state West Bengal. The latitudinal and longitudinal extension of the district is 26°15'47" N to 26° 59' 34" N and 88°23'02" E to 89°07'30" E. It shares district boundary with Darjeeling in north-west, Alipurduar in east, Cooch Behar in south-east; and international boundary with Bhutan in north-east and Bangladesh in south-west part of the district. Earlier the district was comprised of three sub-divisions namely Sadar, Mal and Alipurduar. But in 2014 Alipurduar separated from Jalpaiguri and formed as 20th district of West Bengal. Hence here the study conducted on present form of Jalpaiguri(excluding parts of Alipurduar district), which consists of Sadar and Mal sub-divisions having seven administrative blocks namely Rajganj, Mal, Matiali, Nagrakata, Dhupguri, Maynaguri and Jalpaiguri. The total population of the study region is 2381596 persons having sex ratio and literacy rate of 956 and 73.40% respectively.

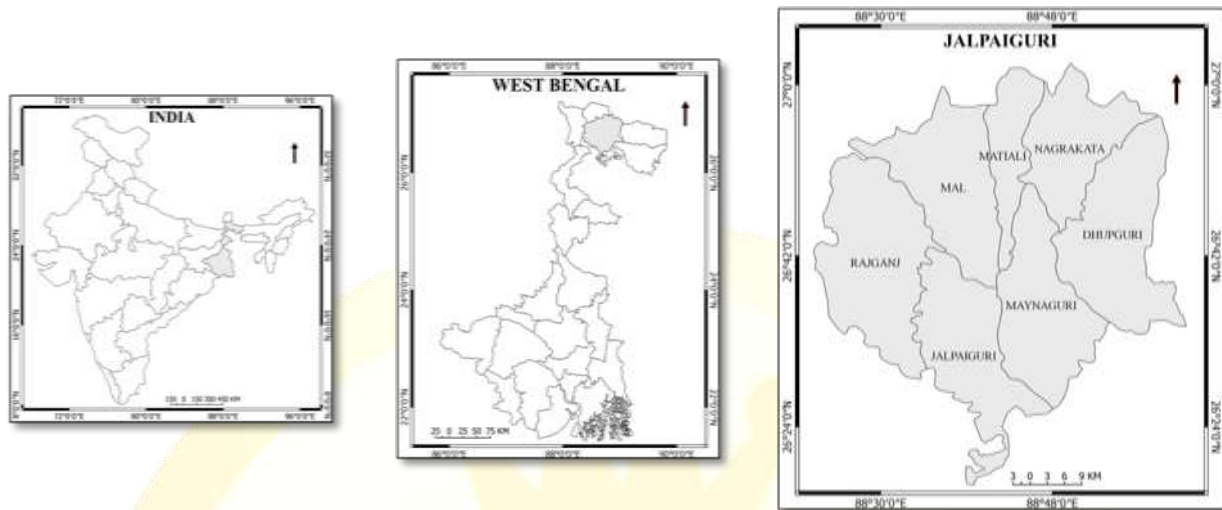


Figure 1. Location and Administrative Blocks of Jalpaiguri District

5. Research Materials and Methods

The entire work is based on secondary sources of data. Data for analytical purpose have been obtained from District Census Handbook of Jalpaiguri, 2011(Directorate of Census Operations, West Bengal, 2011).^[10] Then whole district is grouped into three categories namely low, moderate and high in terms of spatial pattern of literacy rate and sex ratio of the blocks on the basis of simple statistical technique. For preparing graph and map MS Excel and QGIS have been utilized respectively to present the results. Spearman's Rank Order(ρ) method is applied to find out and analyze the correlation between literacy rate and sex ratio. Following is the formula of ρ :

$$\rho = 1 - \frac{6 \sum d^2}{n^3 - n}$$

The value of ρ ranges from '-1' to '+1'. The value towards positive and '+1' indicates positive and perfect positive correlation; and towards negative and '-1' means negative and perfect negative correlation respectively(Mahmood, 2017).^[11]



6. Results and Discussion

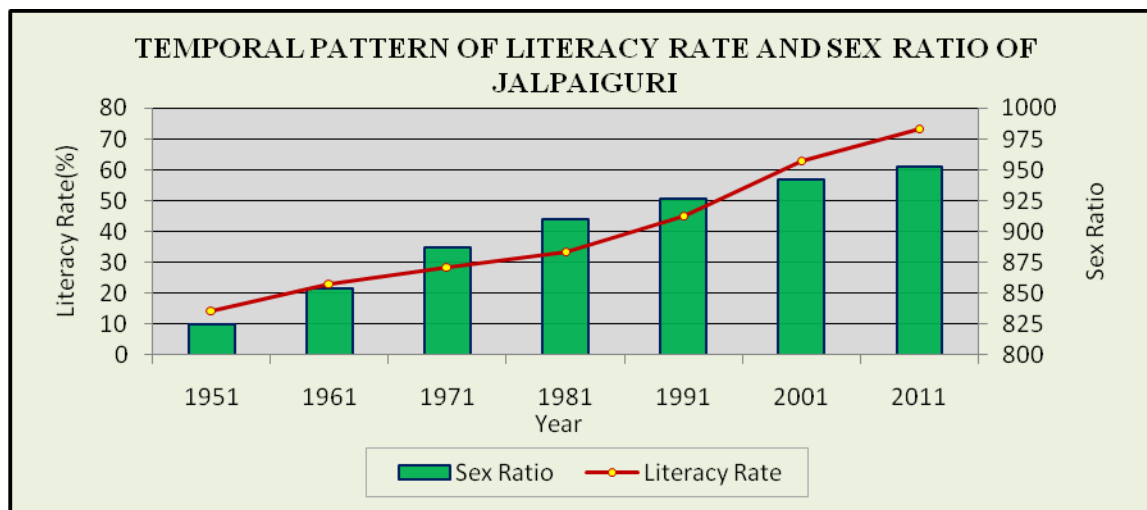
Table 1. Comparative Pattern of Literacy Rate and Sex Ratio of Jalpaiguri with Stae and National average

Particular	Region	Year						
		1951	1961	1971	1981	1991	2001	2011
Literacy Rate(%)	Jalpaiguri	14.3	23.2	28.6	33.4	45.1	62.9	73.3
	West Bengal	25.0	34.5	38.9	46.3	57.7	68.6	76.3
	India	18.3	28.3	34.5	43.6	52.2	64.8	74.0
Sex Ratio	Jalpaiguri	825	854	887	910	927	942	953
	West Bengal	865	878	891	911	917	934	950
	India	946	941	930	934	927	933	940

Source: Compiled by Author; Data from District Census Handbook of Jalpaiguri, 2011(including Alipurduar)

6.1. Temporal Pattern of Literacy Rate and Sex Ratio:

Literacy rate of Jalpaiguri district is 73.3%, which is quite below the state and national average of 76.3% and 74.0% in the last census(Table 1). It is found that there is a continuous increasing trend of literacy from 1951 to 2011 in Jalpaiguri. Highest rate of decadal change of literacy has been recorded from 1991 to 2001 and the increasing rate is 17.8%. But in the last census decadal period(2001-2011) the rate was 10.4%, which is higher than the state average of 7.7%. There is also an unremitting increasing trend of sex ratio in Jalpaiguri. The continuation has been recorded from 1951 to 2011. According to last census the sex ratio in Jalpaiguri is 953, which is simultaneously higher than the state and national average of 950 and 940 respectively. Highest decadal increasing rate has been found in between 1961 to 1971 and the value is 33 females. In last census decadal period(2001-2011) the changing rate is 11 female per 1000 males, which is lower than the state and higher than the national average of 16 and 7 females per 1000 males respectively.



Graph 1. Temporal Pattern of Literacy Rate and Sex Ratio of Jalpaiguri, 2011

Table 2. Spatial Pattern of Literacy Rate and Different Types of Sex Ratio in Jalpaiguri, 2011

Blocks	Literacy Rate(%)	Sex Ratio	Child Sex Ratio	Rural Sex Ratio	Urban Sex Ratio	SC Sex Ratio	ST Sex Ratio
Rajganj	72.08	935	950	923	947	941	960
Mal	66.31	973	969	973	977	939	1001
Matiali	66.98	955	975	952	981	986	1015
Nagrakata	61.27	986	970	986	-	962	1013
Dhupguri	69.57	970	962	969	987	947	1027
Maynaguri	75.63	935	939	931	970	929	952
Jalpaiguri	73.81	948	959	946	957	948	1015

-No Urban Population recorded as per 2011 Census of India

Source: Compiled by Author; Data from District Census Handbook of Jalpaiguri, 2011

6.2. Spatial Pattern of Literacy Rate:

Literacy rate of Jalpaiguri district(excluding parts of Alipurduar district) is 73.40% as per census of India, 2011. But block level disparity in literacy rate ranges from 61.27% to 75.63%. In this regard entire district has been categorised into three groups as following:



Low Literacy Rate(<66.06%): The blocks which have literacy rate below 66.06% are included in low category. Only Nagrakata is under this category and lowest literacy rate among all blocks of the district is recorded in it(61.27%). The scenario of literacy rate in Nagrakata is said to be worse. Zero level of urbanization(% of rural population to total population is 100%) and almost half of total population of this block is scheduled tribe(49.17% ST to total population) are basic reasonable factors for lowest level of literacy rate of Nagrakata. In India the rural and tribal dominant regions are experience low level of literacy as well as higher gender gap in literacy rate(Barman, 2020).^[12] Besides, poverty, low per capita income, lack of educational facilities as well as socio-cultural and economic backwardness are also reasons behind such kind of insignificant literacy rate in this block.

Moderate Literacy Rate(66.06%- 70.84%): Mal, Matiali and Dhupguri are enlisted their names in moderate category, which literacy rate ranges from 66.06% to 70.84%. In Mal and Matiali, moderate level of literacy examined due to low number of schools, high pupil teacher ratio, low per capita income(majority of total population is engaged in tea garden or tea factory), poverty, high rate of drinking habit(among rural ST population) etc. and in Dhupguri due to its agrarian society and socio-cultural backwardness.

High Literacy Rate(>70.84%): Rajganj, Maynaguri and Jalpaiguri belong to high category with literacy rate of 72.08%, 73.81% and 75.63% respectively. Highest level of literacy rate is observed in Maynaguri due to its educational development, good economic condition, optimum socio-cultural profile etc. High levels of urbanization, proper educational facilities, high per capita income etc are the reasons for high literacy in Rajganj and Jalpaiguri. In Jalpaiguri block, the district headquarter of the district, Jalpaiguri is situated, which is also a favourable indicator for its high level of literacy rate.

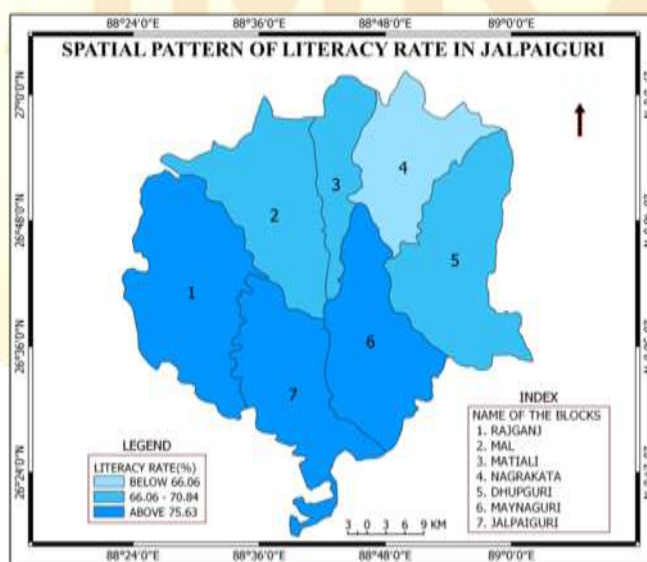


Figure 2. Spatial Pattern of Literacy Rate among the Blocks of Jalpaiguri District, 2011



6.3. Spatial Pattern of Sex Ratio:

Sex ratio of Jalpaiguri district(excluding parts of Alipurduar district) is 956 i.e. 956 females per thousand of males as per census of India, 2011. But there is a vast range of variation in terms of inter-block sex ratio, which varies from 935 to 986. Then entire district has been categorised into three groups as following:

Low Sex Ratio(<952): Rajganj, Maynaguri and Jalpaiguri belong to low category with sex ratio of 935, 935 and 948 respectively. Lowest sex ratio among all the blocks of study region is recorded in Rajganj and Maynaguri. Due to female infanticide, low preference on girl child, fertility choice, immigration etc are the facts behind low sex ratio in these three blocks. As the level of urbanization is maximum in Rajganj and Jalpaiguri, there is an opportunity of works, which creates rural-urban migration(specially male migrant) i.e. immigration in urban points. Consequently it reduces sex ratio. Pattern of migration highly influences the sex ratio(Banerjee, 1977).^[13]

Moderate Sex Ratio(952- 969): Moderate sex ratio is found only in Matiali block with sex ratio of 955. The percentage of ST population to total population of this block is 46.61% as per census of India, 2011. Generally tribal people are not familiar to sex selection or fertility choice, female infanticide etc and maternal mortality is take place due to remote location of Matiali, which denotes lack of proper transportation, medical facilities as well as knowledge. So these are the factors for its moderate sex ratio in the district.

High Sex Ratio(>969): Dhupguri, Mal and Nagrakata are under high category with sex ratio of 970, 973 and 986 respectively. Highest sex ratio among all blocks of the district is examined in Nagrakata. Reasons of high sex ratio of Mal and Nagrakata are almost related to the reasons of Matiali. For Nagrakata an additional reason is its zero level of urbanization, which creates emigration and people(specially male migrant) moves to nearest urban centres for opportunity of works. Low maternal mortality, relatively low immigration(specially male migrant), good health structure and health services(and nearness of proper health services) and moderate educational development etc are basic reasonable factors for high sex ratio in Dhupguri.

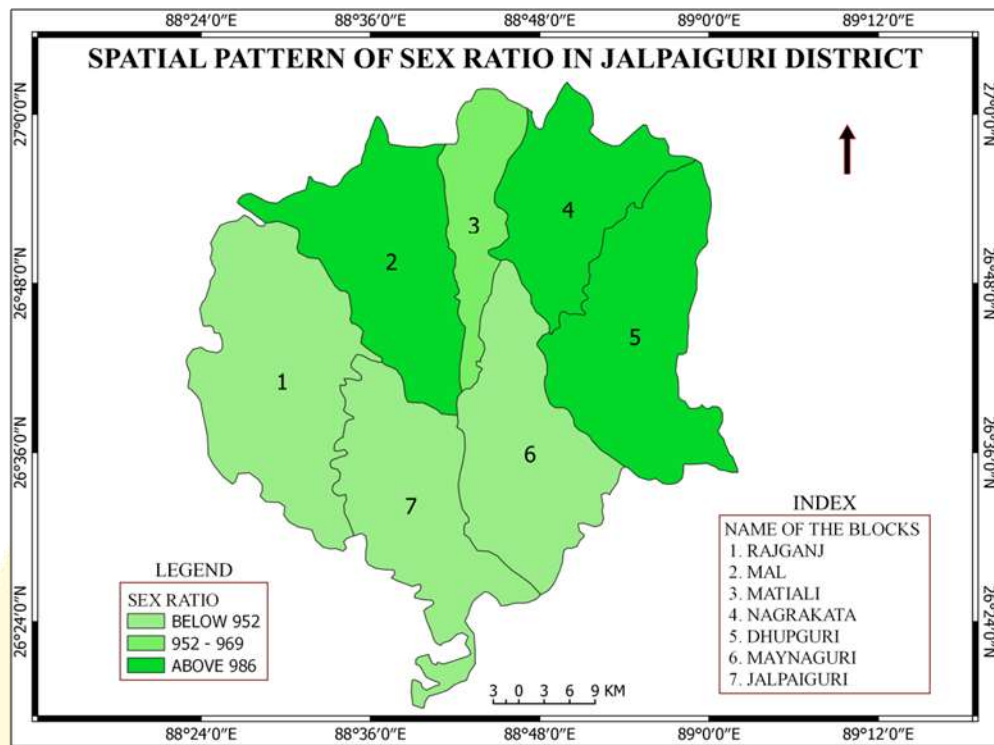


Figure 3. Spatial Pattern of Sex Ratio among the Blocks of Jalpaiguri District, 2011

6.4. Correlation between Literacy and Sex Ratio:

Columns_ Spearman's Rank Order method is applied to examine the correlation between literacy rate and sex ratio in Jalpaiguri district. The analysis is depicted that there is rather high and negative correlation i.e. $\rho = -0.88$ between literacy rate and sex ratio. This indicates that the blocks which are in high category in terms of literacy rate, have low sex ratio.



Table 3. Correlation Matrix

	Literacy Rate(%)	Sex Ratio	Child Sex Ratio	Rural Sex Ratio	Urban Sex Ratio	SC Sex Ratio	ST Sex Ratio
Literacy Rate(%)	1						
Sex Ratio	-0.88	1					
Child Sex Ratio	-0.82	0.75	1				
Rural Sex Ratio	-0.84	0.99	0.74	1			
Urban Sex Ratio	-0.57	0.74	0.51	0.78	1		
SC Sex Ratio	-0.57	0.33	0.77	0.32	0.33	1	
ST Sex Ratio	-0.55	0.73	0.82	0.75	0.57	0.59	1

Source: Compiled by Author; Data from District Census Handbook of Jalpaiguri, 2011

7. Conclusion:

There is a significant variation in literacy rate and sex ratio among the blocks of Jalpaiguri. The scenario of literacy rate among northern most parts of the district mainly tribal dominant areas is said to be worse situation compare to the southern parts. Levels of educational development, transportation system, health, economic background etc are responsible factors for such disparity in literacy; while female infanticide, low preference on girl child, maternal death, fertility choice, migration etc play pivotal role for imbalances in the context of sex ratio among the blocks of the study area. But the correlation between literacy rate and sex ratio is observed strongly negative, for instance literacy rate of Maynaguri(75.63%) is highest among the blocks of the district as opposed to sex ratio is lowest in it(935) simultaneously.



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