

Community based Spatial Variance of Rural Female Literacy status of West Bengal

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Abstract : The working definition of literacy in the Indian census since 1991 is the total percentage of the population of an area at a particular time aged seven years or above who can read and write with understanding. The low female literacy rate has had a dramatically negative impact on family planning and population stabilization efforts. Literacy rate in West Bengal is seen upward trend and is 76.26 percent as per 2011 population census. Out of that, male literacy stands at 81.69 percent while female literacy is at 70.54 percent (Indian Census 2011). According to Indian census 2011, the female literacy rates of villages of West Bengal are comparatively low. In this situation most of the villages are belonging to the districts of minority and backward class community. Rural female literacy rates also vary in respect of a village female population. There are differences found between percentage of share of female population and literate female population in majority of village. Gender disparities in Literacy rate are also found in different ranges in rural areas.

Keywords – Gender disparity in Literacy, Inequality of Literacy, Rural female Literacy, Variance of Literacy rate,

Date of Submission: 15-12-2017

Date of acceptance: 28-12-2017

I. INTRODUCTION

Improving girls' educational levels have been demonstrated to show clear impacts on the health and economic future of young women, which in turn improves the prospects of their entire community. Improving female education, and thus women's earning potential, improves the standard of living for their own children, as women invest more of their income in their families than men do. Yet, many barriers to education for girls remain. Girls are unlikely to attend school for such basic reasons as a lack of private latrine facilities for girls. Education increases a woman's and her partner and the family's level of health and health awareness. Furthering women's levels of education and advanced training also tends to lead to later ages of initiation of sexual activity and first intercourse, later age at first marriage, and later age at first childbirth, as well as an increased likelihood to remain single, having no children, or having no engaged in formal marriage and alternatively, leads to increasing levels of long-term partnerships. It can lead to higher rates of barrier and chemical contraceptive use and a lower level of sexually transmitted infections among women and their partners and children, and can increase the level of resources available to women who divorce or regrets domestic violence. It has been shown, in addition, to increase women's communication with their partners and their employers, and to improve rates of civic participation such as voting or the holding of office.[1]

II. OBJECTIVE

The specific objective to the study would be –

- 1) Investigate the literacy status of the women in rural West Bengal.
- 2) Identification variance of rural female literacy in different spatial association?
- 3) Investigate the source of low female literacy in rural Bengal
- 4) Find out the relationship among rural female population, rural female literacy rate and number of village.
- 5) Identify the inequality of literacy in respect to total population.
- 6) Investigate the rural based gender disparity in literacy.

III. METHODOLOGY

The investigator has selected rural areas of west Bengal as the geographical area for the data. A detail work is carried out with rural female literacy at village level. Total census population is considering as population for the study. Major concentrating population is above seven years rural literate female population of

West Bengal on the basis District, Community development Block and village. National Population Census 2011 of Indian data from District Census Hand Books was used for this research. Calculations of data by researcher are:

- A. Literacy rate (Lr)= $L_p/T_p \times 100$
Where, L_p = Literate Population above seven years, T_p = Total Population
- B. Coefficient of Variation=($\sigma/x \times 100$)
Where, σ = Standard Deviation, x = Mean
- C. Gini Coefficient (G)= $1 - \sum_{k=1}^n (X_k - X_{k+1})(Y_k + Y_{k+1})$
Where, X= Percentage of literate, Y= Percentage of Population
- D. Kundu and Rao's modified disparity index formula, as follows:
 $D_s = \log(x_2/x_1) + \log\{(200 - x_1) / (200 - x_2)\}$
Where, X_1 = Female literacy Rate, X_2 = Male Literacy Rate[2]

IV. CONTEMPORARY RURAL WOMEN LITERACY OF WEST BENGAL

There is a wide gender disparity in the literacy rate in India. Effective literacy rates between age 7 and above in 2011 were 82.14% for men and 65.46% for women. The low female literacy rate has a dramatically negative impact on family planning and population stabilisation efforts in India. Studies have indicated that female literacy is a strong predictor of the use of contraception among married Indian couples, even when

women do not otherwise have economic independence. The census provided a positive indication that growth in female literacy rates (11.8%) was substantially faster than in male literacy rates (6.9%) in the 2001–2011 decadal period, which means the gender gap appears to be narrowing. Literacy rate in West Bengal has seen upward trend and is 76.26 percent as per 2011 population census. Of that, male literacy stands at 81.69 percent while female literacy is at 70.54 percent (Indian Census 2011). [3]

Naturally, West Bengal has unequal distribution of rural female literacy. Multifactor are responsible for unequal distribution of rural female literacy in west Bengal. Darjeeling is a land of missionary schools and colleges in west Bengal. Darjeeling and Kalimpong, both of them are known for residential missionary institution. For that rural female literacy of Darjeeling Himalaya are influenced by this. In south Bengal has been a biggest educational and cultural hub since the colonial time.

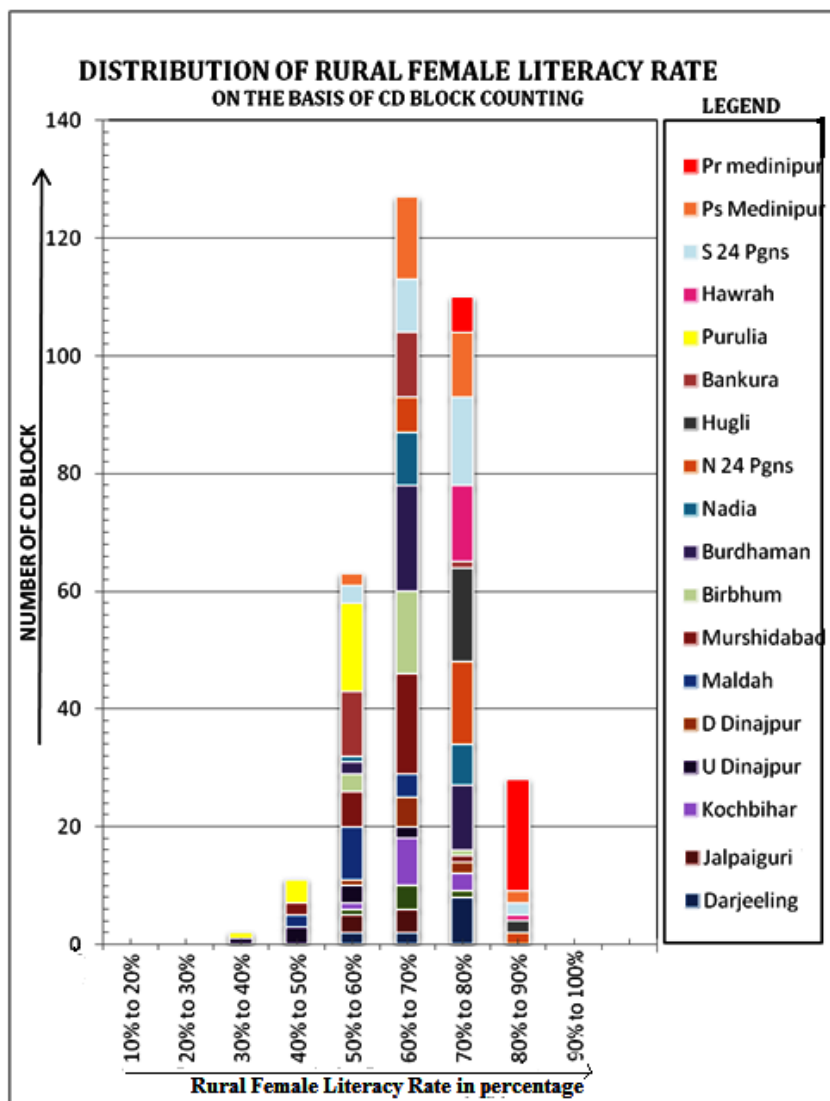


Fig-1: Data Source: Diagram on the basis of calculating data of 2011 Indian Census [7]

Note: Jalpaiguri District was bifurcated in 2014

Darjeeling, Bardhaman and Paschim Medinipur districts were bifurcated in 2017

Kolkata is playing this role as a capital of west Bengal or education. Surrounding Districts are influenced and reach to high rural female literacy. Purba Medinipur is in top of list. [4][5][6][7]

Eastern part and Himalayan foothill are dominated by tribal community. Their introvert mentally keeps them in distance from modern formal education. For that female literacy in rural area is relatively low. Other side Muslim dominated areas are also low rural female literacy. Maldah, Uttar Dinajpur, Murshidabad etc. are the evidences. They could not get proper infrastructure, employment, Education and social awareness facilities. Sachar Committee proved this on their report.[4][5][6][7]

In Fig-1, Out of 341 Community Development Blocks, 127 CD Blocks were under 60% to 70% rural female literacy rate. Only 2 CD Blocks, one from Purulia which is tribal dominated and another from Uttar Dinajpur which is muslim dominated, had rural female literacy rate between 40% to 50%. There was no CD block that had below 30% and above 90% rural female literacy.

V. VILLAGE LEVEL RURAL FEMALE LITERACY OF WEST BENGAL

Table-1 : Rural Female Literacy Rate and Number of habitted Villages in Different Female Populated Villages of West Bengal

Female Population of Villages	Below 51		51 to 100		101 to 500		501 to 1000		1001 to 2000		2000 to 4000		4000 above		Total	
	H.V	L.R	H.V	L.R	H.V	L.R	H.V	L.R	H.V	L.R	H.V	L.R	H.V	L.R	H.V	L.R
Darjeeling-Kalimpong	29	61.45	34	63.70	196	61.84	162	64.10	134	67.98	51	67.06	10	66.01	616	66.59
Jalpaiguri-Alipurduar	13	60.24	5	57.87	72	57.40	114	61.50	282	62.24	188	60.25	44	60.94	718	61.82
Koochbihar	30	59.58	44	64.93	386	64.11	265	65.20	253	65.52	114	66.18	40	68.02	1132	66.47
Uttar Dinajpur	27	49.16	32	52.04	554	50.36	451	49.51	291	48.58	92	47.64	27	45.29	1474	48.72
Dakshin Dinajpur	54	60.23	107	61.08	947	62.80	350	63.29	106	64.76	16	59.96	2	69.44	1582	63.79
Malda	36	50.61	66	45.39	665	51.42	346	55.43	274	56.92	154	54.61	71	54.60	1612	54.29
Murshidabad	40	62.82	44	60.74	492	63.94	462	65.38	449	63.89	257	63.51	142	55.45	1886	62.03
Birbhum	77	53.71	115	55.43	1060	54.50	558	54.35	331	54.56	85	53.31	18	51.67	2244	54.11
East-West Bardhaman	36	50.80	33	64.29	778	65.89	777	66.33	571	65.06	179	65.62	32	64.85	2406	65.86
Nadia	22	61.74	19	55.87	222	66.41	308	65.98	368	66.25	206	66.27	71	66.77	1216	66.69
North 24 Parganas	10	66.33	13	63.48	229	72.82	438	72.61	549	72.54	232	72.27	48	70.41	1519	72.61
Hooghli	19	66.99	24	67.82	600	71.05	639	71.74	406	73.18	133	74.05	21	73.41	1842	72.09
Bankura	204	52.01	258	53.27	2034	57.02	759	58.12	272	60.39	45	63.57	3	46.97	3575	58.31
Purulia	107	41.26	163	44.91	1301	48.60	592	47.96	252	48.37	40	46.87	2	58.88	2457	48.06
Haoarah	2	80.41	1	63.41	76	72.72	188	75.35	257	74.32	111	73.82	9	73.67	644	74.69
South 24 Parganas	18	72.60	18	67.76	388	70.77	534	70.27	573	69.64	356	69.50	109	65.17	1996	68.90
Paschim Medinipur-Jhargram	832	63.18	982	64.17	4381	67.13	962	69.15	358	70.88	74	71.93	8	75.48	7597	68.94
Purba Medinipur	99	79.12	113	80.06	1254	80.88	796	82.11	484	81.49	156	80.32	29	79.91	2931	81.03

Source: From 2011 Indian Census Data Calculated [3] [7]

All the villages of West Bengal are not same in perspective of population. Different factors are responsible for that. Sometimes, some villages are large populated due to concentrated rural market, centre connecting number of roads, administrative facilities, proximity to urban or semi urban areas, social facilities, employment ect. All the facilities create awareness of infrastructural development of literacy especially for women. Same thing is happened also in West Bengal. Researcher found that largely female populated villages

have not at least one girl's school. Surrounding small villages are also depending on these large populated villages for good educational facility. Sometimes these large villages have some rural collages which motivate small villages' girls to literacy and education. [6]

In West Bengal, generally very low female populated and very high female populated villages are less in number than moderately female populated villages. Researcher categorized the villages on the basis of female population of villages. There are seven categories of female populated villages. Out of 37447 habited villages, 15635 villages female population is in 101 to 500 female populated. With increase of village female population, rural female literacy is simultaneously increased. It is hypothetically normal trend for any developing nation. Most of the districts of West Bengal are followed this. Centralised infrastructure of development always attracts number of people of sounding area. For that higher facility attracts population and sometime these facilities are creating positive impact on literacy, especially female literacy. Sometimes low population of a village shows backwardness of community that is not good for positive development of rural female literacy. It is necessary to give them proper facility for education but sometime it is not to be cost effective for any organization. Researcher found that above 4000 female populated villages literacy is slightly low than below populated village. Causes of this type of situation are problem proper family planning and mixed cultural community development.

VI. VILLAGE LEVEL VARIANCE OF RURAL FEMALE LITERACY OF WEST BENGAL

Table-2: Coefficient of Variation of Rural Female Literacy of Different type of Female Populated Villages

FEMALE POPULATION	Below 51	51 to 100	101 to 500	501 to 1000	1001 to 2000	2000 to 4000	4000 above
DISTRICTS	CV	CV	CV	CV	CV	CV	CV
Darjeeling Kalimpong	0.39732	0.28612	0.25925	0.20348	0.16706	0.18697	0.19540
Jalpaiguri Alipurduar	0.49188	0.13904	0.19831	0.15591	0.13377	0.17202	0.12710
Kochbihar	0.42467	0.14557	0.18225	0.13370	0.12097	0.12341	0.10425
Uttar Dinajpur	0.39786	0.36956	0.31069	0.27334	0.28899	0.31221	0.26869
Dakshin Dinajpur	0.37484	0.26583	0.21602	0.18092	0.16604	0.16831	0.07187
Malda	0.60328	0.39996	0.32342	0.24025	0.21195	0.18502	0.19566
Murshidabad	0.31960	0.26424	0.22764	0.16080	0.16894	0.14936	0.18851
Birbhum	0.48266	0.35185	0.22850	0.17332	0.16284	0.16161	0.15788
Bardhaman East & West	0.43358	0.29334	0.20134	0.14491	0.13093	0.12002	0.09543
Nadia	0.44211	0.37755	0.18645	0.16632	0.15968	0.13219	0.12864
North 24 Parganas	0.27525	0.37498	0.16559	0.11619	0.11756	0.11045	0.11983
Hugli	0.32630	0.29517	0.15712	0.12212	0.11136	0.09184	0.07203
Bankura	0.45006	0.46265	0.50017	0.51119	0.53387	0.56567	0.39975
Purulia	0.66294	0.38779	0.27091	0.21836	0.23228	0.26149	0.18385
Haora	0.01860	0.00000	0.16806	0.12341	0.10955	0.09198	0.08790
South 24 Parganas	0.25209	0.20532	0.18656	0.16037	0.14910	0.14727	0.15649
W Medinipur Jhargram	0.39804	0.28137	0.23527	0.16330	0.15414	0.13717	0.06249
Purba Medinipur	0.25443	0.13404	0.11646	0.09449	0.08074	0.07717	0.05822

Source: Calculating data from 2011 Indian Census [3] [7]

Note: Blue colour is deeper with decreasing of C.V

Researcher want to find out, whether there is any variance of rural female literacy on accordance with spatial organization. In our West Bengal, all villages are not same on the basis of economically, culturally, socially, educationally, Caste, Religious, Believes, ect. All the things prove that multi culture structures create different dimension of rural female literacy. To find out variance of literacy, we also find out frequency of villages in different populated classes and literacy rate classes. Variance of rural female literacy is measured on the basis of rural female population and rural female literacy rate. [8]

Co-efficient of variance of rural female literacy rates were relatively high for below 51 female populated villages. If we go above 4000 female populated villages, researcher found that variation of rural female literacy is relatively low. Both of things were exceptional for Bankura district which we found. High variation of rural female literacy was found in all type of villages, that was Uttar Dinajpur district. Relatively low variation of rural female literacy was found in Haorah district. In comparison to North Bengal, south

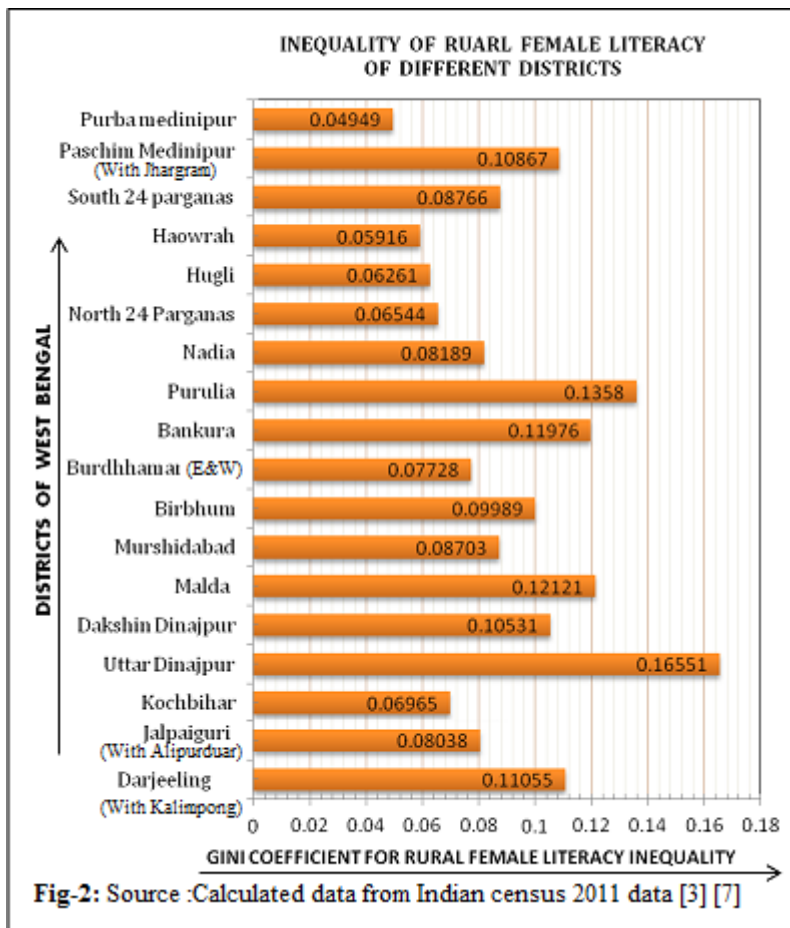
Bengal had low variation of rural female literacy rate. It is only happened due to urbanization and its impact. Researcher found some specific common characteristics. Majority of district's maximum villages were within 50% to 70% rural female literacy rate. Central tendency of under develop districts were concentrated in low rural female literacy i.e. Purulia, Uttar Dinajpur, Malda etc. Developed district like Purba Medinipur, Hawrah, Hugli etc. districts whose central tendency toward high rural female literacy rate.

VII. INEQUALITY OF RURAL FEMALE LITERACY OF VILLAGE LEVEL FEMALE POPULATION OF WEST BENGAL

Inequality of rural female literacy in our research was percentage share of literate population of individual villages from total rural literate population. It was no necessary that every village taking equal number of literate population. So researcher check inequality with individual female population percentage shares of total rural female population. In this perspective Lorenz Curve and Gini coefficient or Gini Index show the inequality of female literacy. When numbers of villages have got this type inequality it forms large inequality in district level. It is not significant for the rural female literacy. Same thing researcher found in his research but not in large quantity of deviation. Line of Equality and Lorenz cure shows it clearly. Gini Coefficient value is always 0 to 1. [2][8]

$$\text{Gini Coefficient (G)} = 1 - \sum_{k=1}^n (X_k - X_{k+1})(Y_k + Y_{k+1})$$

Where, X= Percentage of literate
Y= Percentage of Population



Variance of inaccessibility of educational institute due to maintaining area is a major cause for high inequality in rural female literacy in Darjeeling and Kalimpong Districts. Himalayan foothill districts Jalpaiguri and Alipurduar had low inequality of rural female literacy rate. It was not due to high equally distributed rural female literacy, but it was happened for low female literacy equally distributed, i.e. majority of villages were low female literacy rate. Uttar Dinajpur was having large number of Muslim community which denoted relatively high inequality with compare to other north Bengal districts and all over West Bengal. Muslim community faced some educational problem which impact also notified on these districts. Relatively low female populated villages had high female literacy but high populated villages had low female literacy. Malda and Murshidabad districts faced same thing in perspective of rural female literacy. Malda was comparatively high in inequality of rural female literacy than Murshidabad.

West Bardhaman district is educationally backward due to tribal and under developed people. Bankura District is also one of the educationally under developed district. There is number of tribal community which creates inequality in rural female literacy rate. Purulia is totally tribal dominated district and they also educationally backward. It proved that where tribal community dominated villages are in a large number; their female literacy is relatively low due to regional under development.

North 24 parganas is relatively educationally high achieving district in West Bengal. Proper developments of all different aspect are done and its impact shows on literacy sector. Northern part was equally distributed in rural female literacy, but southern part slightly different. Hugli was a colonial influenced district

for long time, and its impact is also shown in literacy structure. Rural female literacy equally distributed throughout the district. South 24 Parganas is extreme southern district of West Bengal and majority of area covered by Sunderban Mangrove forest land on Gangatic delta. So including education all development could not reach all people due to island feature. It was happened due to highly populated villages in north of the district and low populated relatively inaccessible villages in south of the district. Purba Medinipur district was relatively high rural female literacy and inequality in rural female literacy was relatively low. Over all development in education create modernization in education and its impact also noticed in rural female literacy rate.

VIII. RURAL MALE-FEMALE DISPARITY IN LITERACY OF WEST BENGAL

There are 23 districts in West Bengal, no one achieved higher literacy of female than male. According to census 2011 data, in west Bengal male literacy is 81.69% and female literacy is 70.54%. Difference between them is 11.15%. 14 District out of 23 districts are above this state disparity point where Kolkata is included. If we consider state data in rural west Bengal male and female literacy goes down to respectively 68.81 and 57.24 where disparity of literacy is 11.37%. In rural situation, 12 districts out of 22 districts are above the state rural disparity of literacy where Kolkata is not included. 4.10% disparity of literacy found in Kolkata which is totally urban based. Murshidabad is only one district where total male female disparity in literacy is higher than rural situation. Both are respectively 7.14% and 5.60%, but illiteracies of different section are near about equally very low. Lowest rural male female disparity of literacy among the districts is also Murshidabad district. Over all literacy situation is poor for both gender, so disparity is low. Rural male female disparity is highest in Purulia district that is 24.62%.

Only gender difference is not enough for complete analysis. To find out the specific disparity of literacy researcher use statistical formula. The present research aims to analysis the disparity of literacy of the rural male female of the districts of West Bengal according to the secondary data collect from District Census Hand Book. Literacy rate has been computed for the population above 6 years of age. For the measurement of male-female disparity in literacy, Sopher’s Disparity Index (1974) modified by Kundu and Rao (1983) has been employed –

$$Ds = \log (x2/x1) + \log \{(100 - x1) / (100 - x2)\} \text{ (I)}$$

Kundu and Rao’s modified disparity index formula, as follows:

$$Ds = \log (x2/x1) + \log \{(200 - x1) / (200 - x2)\} \text{ (II)}$$

x2 is considered for male and x1 is considered for female literacy rate.

This method of calculating disparities has been developed by David V. Sopher. In case of perfect equality that is no disparity at all, the value of Ds will be zero. If gender disparity index in literacy is below zero that means female literacy is higher than male literacy.[2][9] Polarized high gender disparity in rural literacy was found in western part of West Bengal which is dominated by tribal community. Purulia, Bankura, West Burdhaman, Uttar Dinajpur and Northern Jalpaiguri are belonging to high gender disparity in rural literacy. Centralized low gender disparity in rural literacy was found in south east part of West

Table-3: Rural Gender Disparity Index in Literacy of Different Districts of West Bengal

Districts	Disparity Index	Remark
Darjeeling (With Kalimpong)	0.11446	Moderate
Jalpaiguri (With Alipurduar)	0.11782	Moderate
Kochbihar	0.10029	Moderate
Uttar Dinajpur	0.15374	High
Dakshin Dinajpur	0.09833	Slightly Low
Malda	0.11291	Moderate
Murshidabad	0.06951	Low
Birbhum	0.11424	Moderate
Bardhaman (East & West)	0.10414	Moderate
Nadia	0.07177	Low
North 24 Parganas	0.07063	Low
Hugli	0.09164	Slightly Low
Bankura	0.16791	Very High
Purulia	0.23176	Exceptionally High
Haora	0.07374	Low
South 24 Parganas	0.09539	Slightly Low
Paschim Medinipur (With Jhargram)	0.12358	Slightly High
Purba Medinipur	0.07577	Low

Data Source: Calculated from Indian Census 2011 Data [3] [7]

Bengal. Lowest rural gender disparity in rural literacy found in Murshidabad and another part was Purba Medinipur, Haora, North 24 Parganas and Nadia. In northern West Bengal upper part of Darjeeling, Alipurduar sadar, Kochbihar Sadar and Dakshin Dinajpur relatively low rural gender disparity in rural literacy is found. In this study researcher found that where male rural literacy relatively very high, their gender disparity in rural literacy were relatively low. If male rural literacy is low, it was vice versa. . There is disparity of rural female literacy rate from rural male literacy rate of different districts of West Bengal. Muslim dominated north Bengal district Uttar Dinajpur and tribal dominated districts Purulia and Bankura had relatively high gender disparity in rural literacy. Muslim dominated district Murshidabad was low gender disparity because of low rural literacy rate of male and female. Paschim Medinipur had received same tribal impact on rural gender disparity in literacy. North Bengal other district was Moderate in this case. Kolkata oriented district were low in this situation because of impact of touch of urban culture.

RURAL GENDER DISPARITY IN LITERACY MAP WEST BENGAL

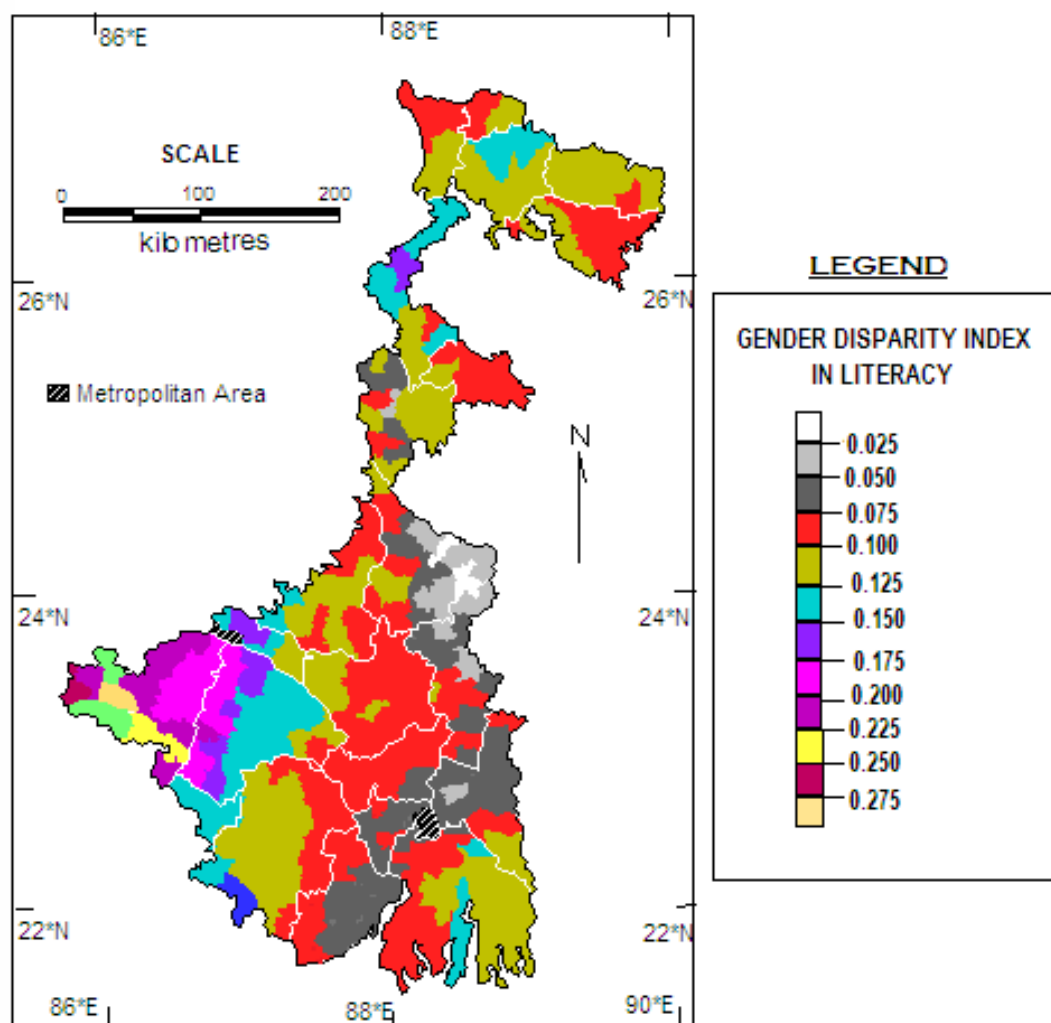


Fig-3: Data Source: Calculated from Indian Census 2011 Data [3] [7]

IX. FINDINGS OF THE STUDY

First Findings, Uttar Dinajpur district had slightly high variance in rural female literacy which is Muslim dominated. In same respect Purulia and Bankura district which are tribal dominated had medium variance in rural female literacy. Urban oriented south Bengal districts had concentrated relatively low variance in rural female literacy

Second Findings, with increase of individual village female population, variance of rural female literacy rate was decrease which was applicable for all districts of west Bengal. Relatively high variance was found in 'below 51 female population' villages and vice versa for 'above 4000 female population' villages.

Third Findings, Individual village's difference between percentage share of female literate and percentage share of female total population was created inequality of rural female literacy. In this perspective all districts were relatively low inequality in rural female literacy.

Fourth Findings, Inequality of rural female literacy in comparison to percentage of rural female literacy was created negative correlation with rural female literacy rate. That means inequality of rural female literacy was increase with decrease of rural female literacy rate. It is negative relationship.

Fifth Findings, Muslim dominated north Bengal district Uttar Dinajpur and tribal dominated districts Purulia and Bankura had relatively high gender disparity in rural literacy. Muslim dominated district Murshidabad was low gender disparity because of low rural literacy rate of male and female. Paschim Medinipur had received same tribal impact on rural gender disparity in literacy. North Bengal other district was Moderate in this case. Kolkata oriented district were low in this situation because of impact of touch of urban culture. Sixth Findings, Male rural literacy rate was positively correlated with female rural literacy rate. That means male and female rural literacy increased with each other.

X. CONCLUSION

On the study, researcher recommended that planning should be taken in micro level spatial organization that means village level planning. Female literacy of Ruppur gram panchayet is 67.59% and there are 256 villages. But there 200 villages female literacy is 37.87%. So there have been no values for State level, district level and panchayet level planning of literacy. Village to village female literacy problem are changed due to different socio economic condition. Government should reduce the distance between home and school for girls. Number of Girls school is not enough for enrichment of rural female literacy. Government should take important role to build residential schools for girls. Where male literacy high, female literacy is relatively lower than male but gap is also low. It is seen most of the Purba Medinipur district villages. In other case where male literacy was low, female literacy was very but gap was very high. Most of villages of Purulia district are the example of this type of scenario. Researcher could not say that only female literacy is increased, with introduction of education for all. In all sectors of societies if literate then it's the impact shown on female literacy. That means Awareness is important for the literacy. People could not know the importance of female literacy for society and in family if people are not literate and educated. Globalization and Modernization is the proper concept where rural area major needs for their broad thought. Urban areas are having the facility of landscape in globalization and Modernization. If rural people get to frequent contact with urbanization, then it will be no longer time when rural areas are modernized in thoughts and logic. Its benefit will also help to gain rural female literacy. In 2006, number of rural female student are increased approximately by 25% in graduate and post graduate section of urban areas of west Bengal (Census 2011). So, smoothness of accessibility of rural area with nearest urban area will help in achieving higher rate of literacy in female population.

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IOSR Journal Of Humanities And Social Science (IOSR-JHSS) is UGC approved Journal with Sl. No. 5070, Journal no. 49323.

Parijat Keshar Saha "Community based Spatial Variance of Rural Female Literacy status of West Bengal." IOSR Journal Of Humanities And Social Science (IOSR-JHSS). vol. 22 no. 12, 2017, pp. 01-09.