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# A Spatio-Temporal Analysis of Gender Related Educational Development Index of Kota Division of Rajasthan

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**ABSTRACT:** India has a significant gender gap in literacy. According to the Census of 2011, 74.04% of Indians are literate overall, compared to 82.14% of men and 65.46% of women. Kerala ranks first among all states, while Bihar is at the bottom. Additionally, the northern states, particularly Haryana, Punjab, and Rajasthan, once considered BIMARU paint a startling image of the literacy gap between men and women. In Rajasthan, the literacy rates for men and women are, respectively, 79.11% and 52.12%. The gender gap in literacy persists in Indian society despite numerous national and state-level initiatives. The goal of the current study is to identify gender differences in literacy at the tehsil level of Kota Division of Rajasthan. However, due to various socio economic and cultural factors such as poverty, ignorance, social custom, conservative attitude of family etc incidence of gender disparity can still be found in many parts of the Division.

**KEYWORDS:** Literacy rate, Spatio-temporal analysis, Gender gap, Gender Disparity Index

## I. INTRODUCTION

Literacy is a concept that changes from time to time and place to place. While some nations define it as the capacity for spoken communication, others define it according to the number of years spent in school. Literacy defined by UNESCO as the "ability to identify, understand, interpret, create, compute and written material associate with varying contracts. Literacy is described as "the capacity to read and write with understanding in any language" by the Census of India in India. Because it is regarded as one of the primary indicators of socioeconomic change and cultural growth of a place, literacy is a crucial qualitative feature of human resource. Literacy lays the groundwork for the development of economic skill and is crucial in reducing resistance to change. As a result, to a large extent, the literacy rate reflects the calibre of the current and future labour force. Both the cause and the effect of development are literacy rates (Mohapatra, 1993). As a result, it is now recognised as the socioeconomic transformation's trigger. The degree of female literacy and the resulting gender difference between men and women must be highlighted in this context. Women are treated differently than men in the family and in society since they belong to a physiologically weaker segment of the population, particularly in patriarchal and patrilineal societies. The degree of education and literacy in a country or region is a good indicator of that country or region's progress. One of the key factors in a community's socioeconomic development has been seen to be education, especially among women (Manjunatha. N.K, 2017). The development of women as individuals, as well as that of their families and communities, is significantly impacted by education as a deliberate investment in human resources (Jangra & Kaushik, 2016). The potential for socio-economic progress to be hampered by the underachievement of women in general and literacy is a major source of concern. If a given group in society is ignored, real economic growth cannot be attained. Thus, one of the key factors for a population geographer is the analysis of literacy levels, trends, and patterns.

## II. OBJECTIVES

The main objectives of the present paper are as follows:

- i. To highlight the gender gap in the literacy rate in tehsils of Kota division of Rajasthan
- ii. To suggest some suitable measures to reduce gender gap in literacy rate in the study area.

### III. DATA AND METHODOLOGY

The technique is mostly based on the UNDP-HDR framework; however, it has been modified as needed, depending on the data's availability. The GEDI, or gender-related educational development index, evaluates a region's level of education. The harmonic mean of male and female accomplishments is the foundation for the GEDI estimates. GEDI value "1" denotes the highest level of achievement with perfect gender equality, while "0" denotes the lowest level of achievement (Joshi, 2003). The following methodology is used to calculate GEDI:

$$\text{GEDI} = 1/(\text{FP}/\text{FL} + \text{MP}/\text{ML})$$

Where,

FP- Female Proportion                      MP- Male Proportion

FL- Female Literacy Index              ML- Male Literacy Index

Here,

Female Proportion = Total Female / Total Population

Male Proportion = Total Male / Total Population

Female Literacy Index = Total Female Literate / (Total Female Population (excluding 0-6 age group))

Male Literacy Index = Total Male Literate / (Total Male Population (excluding 0-6 age group))

Data on male and female literacy rates as well as the overall population were computed using census data from 2001 and 2011. Calculations and mapping have been done using MS-EXCEL and Arc GIS, respectively. The unit of study is tehsil. Spatial pattern of disparity for each census year is represented on a map.

### IV. REVIEW OF LITERATURE

On gender literacy, a variety of academicians, researchers, and scholars have worked. Here are some of the studies.

Joshi's two influential publications (Joshi 2001, 2003), which were based on census data, are worth mentioning. Her work offers some conceptual and methodological insights into gender difference from a spatial and temporal viewpoint. She has created a quantitative and cartographic term called ISOGEDI (lines joining places of equal GEDI) to account for the distribution of the GEDI value on the map. However, this empirical methodological underpinning has not yet gained traction in India's modern research practises, particularly in the discipline of geography. Additionally, Kumari (2007) completed another study named "Gender-Related Development Index of Bihar (1991-2001)" in which she concluded that male-female imbalance and poor literacy rates exist in Bihar.

A thorough investigation of the gender differences in Indian school completion rates was done by Husain in 2010. Although North India has bigger disparities in school completion rates (apart from in metropolitan areas), he came to the conclusion that Eastern states may constantly experience higher degrees of prejudice. Given the prominence of matrilineal structures and the presence of missionaries in the North-eastern states, this is quite unexpected. In the Mathura District of Uttar Pradesh, Ashok Kumar Kaushik and Kapil Kaushik (2012) conducted a spatial analysis of the gender difference in literacy rates. According to this study, there is unquestionably a big gap between the literacy rates of men and women in the Mathura area. In their 2013 study, Swati Pathak and Arti Gupta focused on the gender gap in literacy rates in India while also examining the status of women in India. This study brought attention to the issue of the gender gap in literacy. Som and Mishra, (2014) carried out a study on gender disparities in literacy in West Bengal. They concluded that there are significant differences in literacy rates between men and women, urban and rural, rural, and urban, male, and female, and male and female. Contrary to popular belief, their data reveals a weak to moderate association between school accessibility and literacy rates. However, it has a greater impact on female literacy than on male literacy.

Important research has been done on "Gender discrepancy in Education: A study of Poonch District in J & K" by Sameena & Jameel Ahmad (2015). To understand the nature, pattern, and current state of the gender gap in literacy

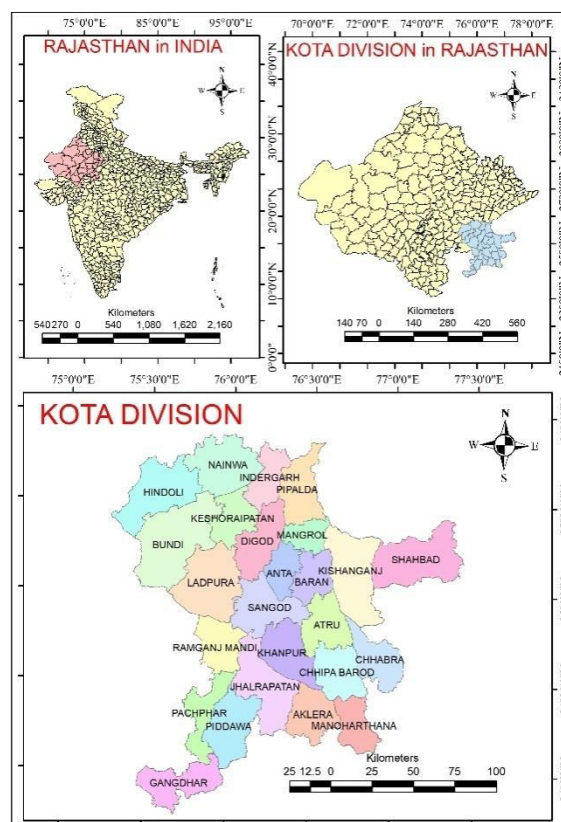
and to ascertain the relationship between gender disparity and literacy rate, De, J. (2015) undertook a macro level spatio-temporal analysis of gender disparity in literacy in India. He discovered that the BIMARU states in central India have a significantly worse condition. Many times, people are unable to take their children to school due to poverty. Poor individuals choose to include their children in wage work to secure a supper. Lack of schooling throughout generations has an impact on the total literacy rate. The worst victims of this predicament are women. The gender discrepancies in Punjabi districts have been discussed by Vimal Vidushy (2015). He concluded that while gender inequality is greater in some districts, it has gradually decreased in some Punjabi developed areas when compared to Rajasthan, Bihar, and Uttar Pradesh. A study of inter-district literacy discrepancies in Haryana by Ritu Singh Meena (2015) provides an explanation of the gender differences in literacy. In their 2016 study, R.C. Ahire and S.R. Chaudhari examined the literacy disparities among the scheduled tribes in the Nandurbar district.

Given Kolkata Municipal Corporation's high literacy rate, Das and Mookherjee's (2015) research demonstrates that gender inequalities in education are extremely rare. Here, the GEDI value is almost ideal. The level of literacy in the Awadh region is still relatively low, according to Bano (2017) in her article titled "Spatio Temporal Variation of Male- Female Disparity in Literacy: A Geographical Analysis of Awadh Region, U.P, INDIA." Yadav, Jetwal and Khan (2018) examined the spatial patterns of literacy differentials in the Hadauti region of Rajasthan. Pal and Singh (2020) studied the spatio-temporal analysis of gender related educational development index of Uttar Pradesh covering 75 districts of the state.

## V.STUDY AREA

The Kota division comprises of four districts of Kota, Bundi, Baran and Jhalawar. The area lies between 230461N to 250501N and 750151E to 770251E covering an area of 24687 sq.kms. The northern and southwestern boundaries are formed by Sawai Madhopur, Tonk, Bhilwara and Chittorgarh districts of Rajasthan. The region consists of 25 administrative units that are tehsils and according to the 2011 census, it has a population of 5695804 persons out of which 33.06% is urban and 66.94% is rural.

Kota district is most populous district of the division and is smallest in area among the four districts of the division. A fundamental determinant of its socioeconomic, cultural, and political activity is the geographic environment. This area is a typical physical unit due to its remarkable surface, physiography, and soil composition characteristics. Low hills and sparsely spaced plateaus with shallow plains make up the bulk of the region. The region has a wide variety of natural variations and shows an odd and perplexing admixture of lowland and upland topography. The Chambal River and its tributaries cut through its centre portion, which is flanked by hills.



**VI.RESULTS AND DISCUSSION**

The tehsils of Kota division show a wider variation in the GEDI value.

**Table 1: GEDI Value in Districts of Kota Division**

S.No.	TEHSIL	GED12001	GED12021	Change in %
1	Aklara	0.417	0.482	15.833
2	Anta	0.619	0.684	10.518
3	Atru	0.573	0.667	16.441
4	Baran	0.664	0.734	10.492
5	Bundi	0.544	0.61	12.267
6	Chhabra	0.506	0.594	17.445
7	Chhipa barod	0.441	0.565	28.173
8	Digod	0.659	0.69	4.69
9	Gangdhar	0.409	0.504	23.391
10	Hindoli	0.395	0.496	25.598
11	Indergarh	0.564	0.619	9.842
12	Jhalrapatan	0.565	0.642	13.546
13	Keshoraipatan	0.544	0.651	19.78
14	Khanpur	0.603	0.667	10.606
15	Kishanganj	0.468	0.563	20.336
16	Ladpura	0.765	0.804	5.124
17	Mangrol	0.579	0.672	16.091
18	Manoharthana	0.387	0.457	18.08
19	Nainwa	0.451	0.53	17.561
20	Pachphar	0.544	0.61	12.152
21	Piddawa	0.57	0.598	4.839
22	Pipalda	0.618	0.642	3.82
23	Ramganj mandi	0.673	0.676	0.415
24	Sangod	0.66	0.68	3.119
25	Shahbad	0.455	0.591	29.959

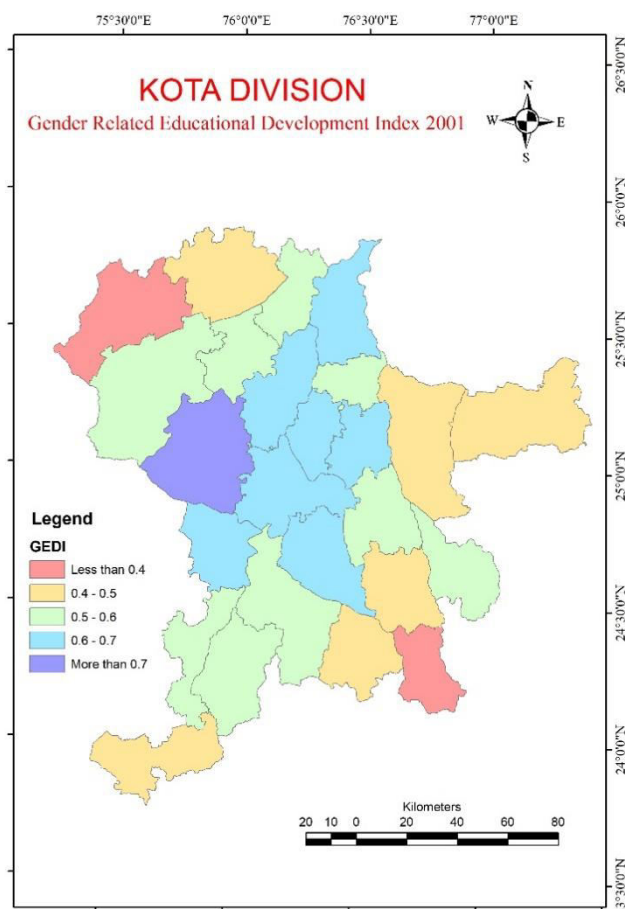
Source: Computed by the Authors based on Census Data of 2001-2011

A sex-based analysis of the population's male-female literacy levels revealed significant gender differences. The literacy rate of women was significantly lower than that of men. Male culture predominates in Indian society, and women are not only treated with deference but also denied the right to education. Wide sex disparities were seen despite population literacy variations. A low disparity index suggests that the population's level of female literacy is improving, and vice versa.

**Table 2: Levels of Disparity based on GEDI Value**

S.No.	GED1 Values	Levels of Disparity
1	< 0.4	Very High
2	0.4 – 0.5	High
3	0.5 – 0.6	Medium
4	0.6 – 0.7	Low
5	> 0.7	Very Low

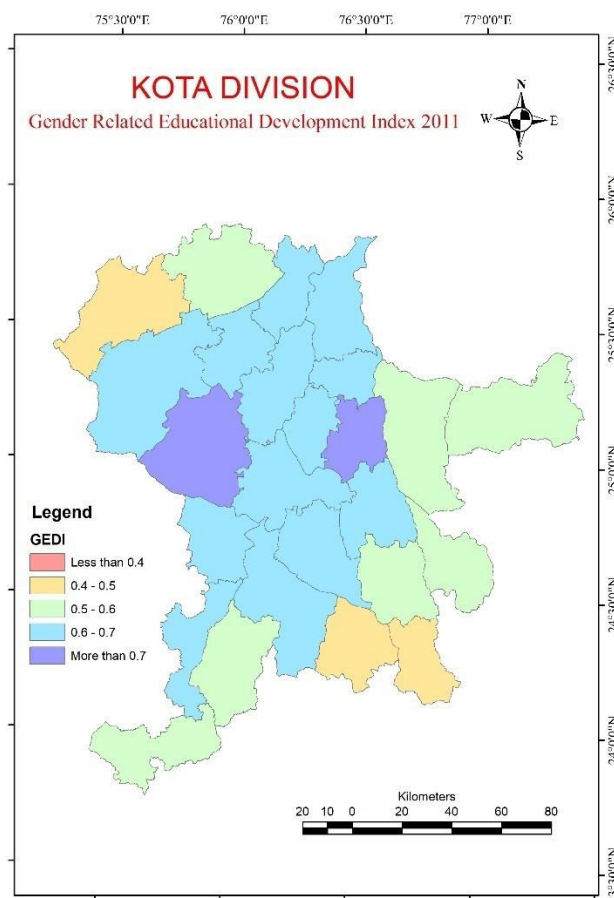
Source: Computed by the Authors



The map for 2001 show that Ladpura was the only tehsil with a gender related development index (GEDI) value greater than 0.70 while, Pipalda, Digod, Anta, Baran, Sangod, Ramganj mandi and Khanpur had GEDI values in the range of 0.6 to 0.7. This is the central part of Kota division. It is interesting to note that Pipalda and Digod are two tehsils devoid of urbanisation and have comparatively low male-female disparity. Lowest value of GEDI was seen in Manohar thana (0.387) and Hindoli (0.395) which indicate a very high disparity in the male-female literacy levels in these tehsils. Low values of 0.4 to 0.5 were largely spread in Shahbad, Kishanganj, Nainwa, Chhipa barod, Gangdhar and Aklera tehsils of the division. Their low GEDI score may be a result of the traditional lifestyle they lead, where primary industries like agriculture and others are the main source of employment. The involvement of girls in childcare, domestic tasks, etc., may be another issue. In addition to this lack of understanding of the value of a girl's education, there is also a lack of educational infrastructure, including adequate separate lavatories for boys and girls as well as, playgrounds, and libraries. All of these contribute significantly to the discrepancy between male and female literacy levels by resulting in a lack of educational options.

Besides, Bundi, Keshorai patan, Indargarh, Mangrol, Atru, Chhabra, Jhalrapatan, Pachpahar and Piddawa tehsils fall in the range of 0.5 to 0.6 that is moderate disparity in 2001. Here some of the tehsils are primarily agrarian but Bundi and Jhalrapatan which are district headquarters and ancient royal centers having good educational facilities falling in this category is unsatisfactory.

The map for 2011 show that there is no tehsil falling in the category of GEDI values of less than 0.4 which is very high disparity. Three tehsils that is Hindoli, Aklera and Manohar thana have the GEDI values in a high disparity of 0.4 to 0.5. Although their values have increased from the preceding ten years, the progress is unimpressive in the term of progress. In the tehsils of Nainwa, Shahbad, Kishanganj, Chhabra, Chhipa barod, Piddawa and Gangdhar, a GEDI with medium disparity between 0.500-0.600 was recorded.

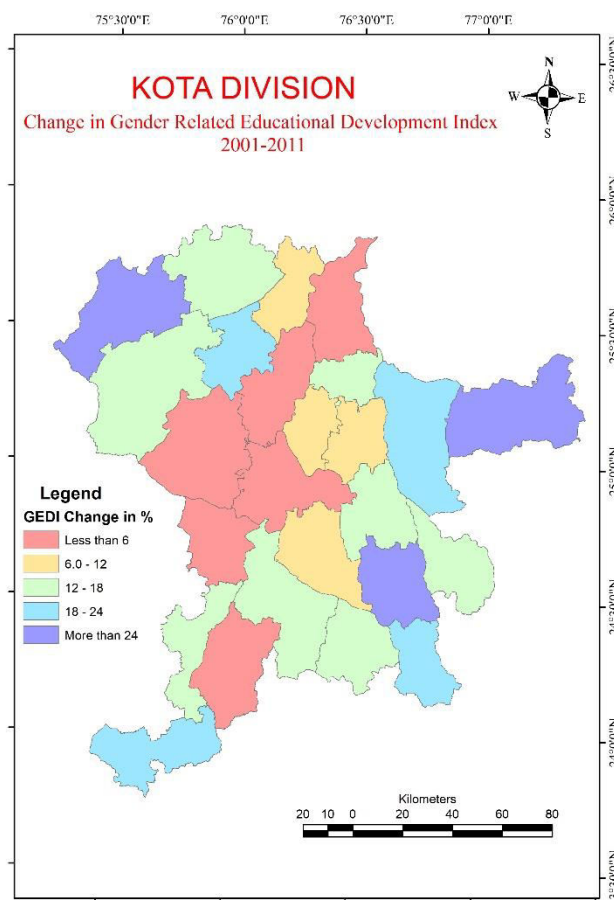


The maximum number of tehsils (blue colour on map) of the division were in the range of low disparity that is GEDI value between 0.6 and 0.7. These are Bundi, Keshoraipatan, Indargarh, Pipalda, Digod, Mangrol, Anta, Sangod, Ramganj mandi, Pach pahar, Jhalrapatan, Khanpur and Atru. The increase in this category may be attributed to government programmes, increase in urbanisation with better educational opportunities and endeavours of local people. Ladpura and Baran tehsils which are both district headquarters and high rate of urbanisation fall in the GEDI values above 0.7 which is very low disparity in male-female literacy.

### Changing Trend

Table 1 shows change in GEDI value from 2001 to 2011. The same is also represented on the map. A minimum change of 0.415 was recorded in Ramganj mandi tehsil of the division. This may be because the people of the tehsil are engaged in primary activities like agriculture and mining for their livelihood. Besides this Ladpura, Piddawa, Sangod, Pipalda and Digod fall under the category of less than 6 percent change in GEDI values from 2001 to 2011. Four tehsils of Indargarh, Anta, Baran and Khanpur have recorded a change in the range of 6 to 12 percent. This is because these tehsils had moderate to high GEDI value in 2001. Eight tehsils of the division that are Nainwa, Bundi, Pachpahar, Jhalrapatan, Aklera Chhabra, Atru and Mangrol have a change of 12 to 18 percent in their GEDI values. Gangdhar, Keshorai patan, Kishanganj and Manoharthana saw a change of 18 to 24 percent because of government programmes, creation of new accessibility routes and provision of new educational opportunities.

Hindoli, Shahbad and Chhipa barod tehsils recorded a change of over 24 percent highest in Shahbad tehsil that is 29.9 percent. It is predominantly a tribal tehsil inhabited by Sahriya tribe. People here were backward, but government programmes and participation of NGOs have shown results as enrolment in educational institutions is on the rise. People in rural areas may not have access to decent educational institutions, therefore villagers may hire their kids to help with a variety of tasks like grazing cattle and working on farms. Therefore, it is important to focus on establishing facilities, educating people about improved education, and addressing the gender gap.



## VII.CONCLUSIONS

On the basis of data analysed and detail study, it is concluded that there is wide gap in gender literacy in the study region. It is very low in Manohar thana (0.457) and very high in Ladpura (0.804) tehsil. In contrast, Manohar Thana and Hindoli tehsils, have a very significant literacy gap because of its difficult geography, lack of transportation options, and lack of understanding of the value of education. The main causes of the extremely large gender literacy gap in these tehsils include the custom of early marriage, the absence of parental impetus for education, poor economic conditions, domestic work for girls, low standards of life, and the backwardness of the region.

Given the degree of gender disparity in literacy and educational attainment, it is advised that the government create educational policies that are more inclusive of women and women's issues, educate households about the advantages of women's education, and create special schools for girls with qualified teachers. So, the government ought to promote women's education. Finally, nothing will change unless we adopt a different attitude toward girls. Our way of thinking has the power to change things.

Every literate person must also adopt the aspiration of eradicating illiteracy. Participation from every literate individual is necessary to eliminate the threat. Building substantial and dependable economic and social infrastructure in rural areas is crucial if the government is to improve the economic situation of rural residents and, as a result, lessen the literacy rate gap between rural and urban areas. This will avoid spending extensively in urban areas while neglecting rural areas. As a result, there must be a strong effort to investigate and address the literacy gap between men and women. Finally, there is an urgent need to raise awareness of female education. As a result, literacy campaigns must be run to educate women about the value of education for both them and their children.

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