

## Correlation between female literacy and sex ratio in Rajasthan: a geographical analysis

### Correlación entre la alfabetización femenina y la proporción de sexos en Rajastán: un análisis geográfico

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#### ABSTRACT

Education changes the awareness of the society, so literacy responsible for the changing pattern of sex composition of any region. The study triumphs that Literacy has vital effects on the sex ratio. Therefore, the present paper is aimed to analyze the Correlation between female Literacy and Sex Ratio in Rajasthan using data collected by the 2011 census. Spearman's Rank Difference method is used to analyze the correlation between literacy and sex ratio. The study reveals that the correlation between female literacy and sex ratio is  $r = -0.295$ . It is a moderate negative correlation. The female literacy and sex ratio have moved the opposite direction in Rajasthan. The sex ratio has been found higher in districts, which have low female literacy. Kota district has registered the highest female literacy of (65.9%) but it has a very low sex ratio of 911.

Key Words: sex-ratio, female Literacy, correlation.

#### RESUMEN

La educación cambia la conciencia de la sociedad, por lo que la alfabetización es responsable del cambio en la composición del sexo de cualquier región. Este estudio resulta exitoso al demostrar que la alfabetización tiene efectos vitales en la proporción de sexos. De modo que, el presente artículo tiene como objetivo analizar la correlación entre la alfabetización femenina y la proporción de sexos en Rajastán mediante el uso de información recabada por el censo de 2011 en la India. También, se emplea el método de coeficiente de correlación de rangos de Spearman para analizar la correlación entre la alfabetización y la proporción de sexos. El estudio revela que la correlación anteriormente mencionada es de  $r = -0.295$ , la cual es una correlación negativa moderada. Como resultado, la alfabetización femenina y la proporción de sexos han girado a la dirección opuesta en Rajastán. Además, la proporción de sexos ha sido mayor en los distritos que tienen una baja alfabetización femenina. En relación con lo anterior, el distrito de Kota ha registrado la alfabetización femenina más alta con un 65,9%, sin embargo, el distrito tiene una proporción de sexos muy baja de 911.

Palabras clave: proporción de sexos, alfabetización femenina, correlación.

## INTRODUCTION

Female literacy and child sex ratio are two significant demographic characteristics of the population. Literacy means the ability to read and write. Literacy is the capability to identify, understand, interpret, create, communicate, and compute using printed and written materials associated with varying contexts (UNESCO, 1917). A person aged seven years or more than seven years who can read and write with understanding in any language is called a literate person (census of India, 2011). Sex ratio is used to designate the number of females per 1000 of males which is a valuable source for finding the population of women in India. It is a vital social indicator to measure the extent of prevailing inequality between males and females in society. (Visaria, 1972). The sex ratio of the human population is helpful in meaningful demographic analysis. Sex Ratio defines the present situation concerning the status of the girl child, gender discrimination, infanticides, and feticides (Chandana, 2008). Gupta and Bhat (1995) have explicated that educated mothers have lower fertility, which tends to be accompanied by higher gender bias. The proportion of childless women or the couples with only one child increases with higher levels of education and access to technology; such couples would likely prefer to ensure that the one-child they have is male (Patel, 2002). Higher literacy is necessary but not sufficient for improving the declining sex ratio over the past four decades (Chakraborty and Sinha, 2006). The female literacy rate has no significant consequence on the sex ratio in the district panel estimate in India (Bhattacharya 2009; Bhattacharya and Saxena 2015). The relationship between maternal education and gender bias in child survival is positive in general, but it varies between Northern and Southern states in India (Bourne and Walker 1991). There is no simple relationship between maternal education and gender bias (Chen *et al.* 1981, Sen and Sengupta 1983, Caldwell *et al.* 1989). Echavarri and Ezcurra (2010) have systematically reviewed the debate of the relationship between parental education and sex ratio at birth. Using the district-level data of India for the year 1991, they have observed that the relationship between the sex ratio at birth and education in India follows an inverted U shape. Using the district-level data of India they confirm the results that the relationship between the sex ratio at birth and education follows an inverted U-shape. This article investigates the possible existence of a nonlinear link between female disadvantage in natality and education. Kumar, Monu (2013) revealed that Female literacy and child sex ratio are two important demographic characteristics of population. Female literacy plays a very important role in upliftment of the sex ratio.

In the present paper, an attempt has been made to bring out the correlation of Female Literacy and Sex Ratio in Rajasthan state (2011). The study is based on primary and secondary data.

### Selection of the study area

Rajasthan, the largest state of the country, located in the north-western part of the country, covers an area of 3,42,239 sq km, which is 10.40% of the geographical area of the country. The geographical extent of the State is 23°4'N to 30°11'N latitude and 69°29'E to 78°17' E longitude on Globe. The State has 4 different regions i.e., the Western Desert with Barren Hills(Thar desert), Sandy Plains, the Aravalli Hills, and South-Eastern Plateau. The climate of the State varies from semi-arid to arid and hot. The western part of the State, including Thar Desert (also known as The Great Indian Desert), is relatively dry and infertile whereas, in the south-western part, the land is wetter, hilly, and more fertile. The average annual temperature ranges between 0°C to 49°C and the average annual rainfall is in the range of 500 mm to about 750 mm. The rainfall is very low, highly indefinite, and variable. The State is drained by several rivers that include Chambal, Banas, Mahi, and Luni. The State has 33 districts and has a population of 68.55 million accounting for 5.66 percent of India's population out of which 35550997 males and 32997440 females as per the 2011 Census. The sex ratio recorded 928 females per thousand males which is than the national average of 933. Rajasthan has a 66.11% literacy rate with a disparity of 79.19% male literacy and 52.12% female literacy. (ISFR-2019-vol-ii-rajasthan).



Source: Self- Composed

Figure 1 : Location Map of Sikar District, Rajasthan (India)

#### OBJECTIVES OF THE STUDY

The objectives of the present paper are as follows:

1. To study the spatial pattern of female literacy rate in Rajasthan state.
2. To study the spatial pattern of sex ratio in Rajasthan state.
3. To analyze the correlation between the spatial pattern of female literacy and sex ratio in the study area.

#### DATABASE AND METHODOLOGY

The present study is based on secondary data collected from the census of India, 2011, and various govt. departments. Spearman's Rank Difference method is used to analyze the correlation between female literacy and sex ratio in the study. The districts of Rajasthan are grouped into five categories i.e. very high, high, moderate, low, and very low based on the simple statistical method. With the help of which the data is analyzed and obtained results are spatially represented in the form of maps with the help of Arc GIS software. Spearman's rank correlation coefficient is a technique that can be used to summarize the strength and direction (negative or positive) of a relationship between two variables- female literacy rate and sex ratio.

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

Where d is the difference between the ranks of two variables, n is the total number of observations. Spearman's correlation coefficient is a statistical measure of the strength of a monotonic relationship between paired data. The result will always be between 1 and minus 1 i.e.  $-1 < \rho < 1$ . The degree of intensity of the relationship between two variables is measured with the coefficient of correlation. They are as follows:

- $\pm .00-.19$  - "very Low Positive/Negative Correlation"
- $\pm .20-.39$  - "Low Positive/Negative Correlation"
- $\pm .40-.59$  - "moderate Positive/Negative Correlation"
- $\pm .60-.79$  - "high Positive/Negative Correlation"
- $\pm .80-1.0$  - "very high Positive/Negative Correlation"

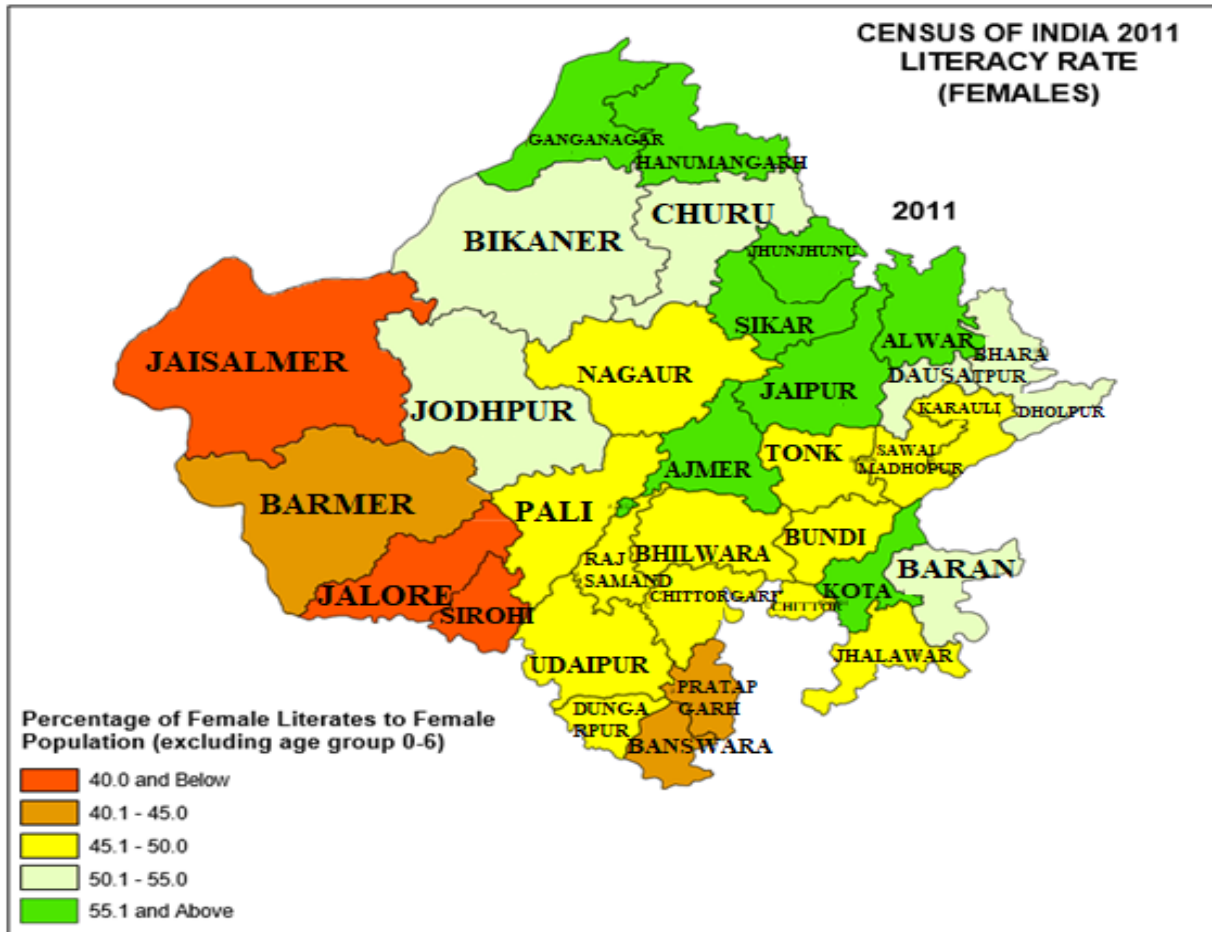
#### ANALYSIS AND DISCUSSION

##### Spatial Pattern of female Literacy Rate in Rajasthan

Rajasthan as a whole has a 52.11% female literacy rate in 2011. The spatial distribution of female literacy is uneven through the state.

1. Very high female literacy rate - Very high female literacy rate 55.1 percent and above were recorded in the districts namely Kota, Jaipur, Jhunjhunun, Sikar, Ajmer, Alwar, Ganganagar and Hanumangarh districts Due to the high number of educational facilities, high urbanization, development of transport and communication and so on.
2. High female literacy rate - The districts which have literacy rate lies between 50.1 to 55 percent are included in this category. High literacy was recorded in the districts of Churu, Bikaner, Jodhpur, Baran, Bharatpur, Dholpur and Dausa.
3. Moderate female literacy rate - The districts which have literacy rate between 45.1 to 50 percent is low female literacy region. Moderate literacy was recorded in the districts of Pali, Rajasmand, Nagaur, Bhilwara, Tonk, Bundi, Jhalawar, Dungarpur, Chittaurgarh, Udaipur, Swaimadhpor and Karoli.
4. Low female literacy rate - The districts which have the female literacy range 40.1 to 45 percent are included in the low category. Low literacy was recorded in the districts of Barmer, Partapgarhand Banswara.

5. Very low female literacy rate - Very Low literacy (40% and below) was recorded in the districts of Jaisalmer, Jalore and Sirohi.



Source: Self- Composed

Figure 2 : Spatial pattern of female literacy rate in Rajasthan

#### Spatial Pattern of Sex Ratio

Rajasthan as a whole has 928 number of females per thousands of males' population in 2011. But the district level sex ratio varies from district to district ranges from 846 to 994. All the districts are categorized as follows:

1. Very High sex ratio - The districts which have a sex ratio 976 and above are included in the very high category. Very High sex ratio was recorded in the districts of Banswara, Dungarpur, Pratapgarh, Pali, Rajasmand.
2. High sex ratio - The districts which have the sex ratio ranges 951 to 975 are included in the high category. High sex ratio was recorded in the districts of Jalore, Chittorgarh, Udaipur, Ajmer, Tonk and Bhilwara districts.
3. Moderate sex ratio - The districts which have a sex ratio range from 926 to 950 are included in the moderate category. Moderate Sex Ratio has been recorded in the districts of Sirohi, Sikar, Nagaur, Jhunjhun, Churu, Jhalawar and Baran districts.
4. Low sex ratio - The districts which have the sex ratio ranges 901 to 925 are included in the low category. low sex ratio was recorded in the districts Bundi, Hanumangarh, Bikaner, Jodhpur, Barmer and Kota and Dausa districts.



Table 1: District-wise correlation between female literacy and sex ratio

Districts	Female literacy rate(x)	Sex ratio(y)	Rank(d <sub>x</sub> )	Rank (d <sub>y</sub> )	D=(d <sub>x</sub> -d <sub>y</sub> )	Σd <sup>2</sup>
Ganganager	59.7	887	4	29	25	625
Hanumangarh	55.8	906	6	23	17	289
Bikaner	53.2	905	13	24.5	11	121
Churu	54.0	940	9	16.5	7.5	56.25
Jhunjhunnun	61.0	950	3	12.5	9.5	90.25
Alwar	56.3	895	8	27	19	361
Bharatpur	54.2	880	10	30	20	400
Dhaulpur	54.7	846	11	33	22	484
Karauli	48.6	861	19	31	12	144
Swai madhopur	47.5	897	21	28	7	49
Dausa	51.9	905	14	24.5	10.5	110.25
Jaipur	64.0	910	2	22	20	400
Sikar	58.2	947	5	15	10	100
Nagaur	47.8	950	18	12.5	5.5	30.25
Jodhpur	51.8	916	15	20	5	25
Jaisalmer	39.7	852	33	31	2	4
Barmer	40.6	902	31	26	5	25
Jalor	38.5	952	32	9.5	22.5	506.25
Sirohi	39.7	940	30	16.5	13.5	182.25
Pali	48.0	987	16	3	13	169
Ajmer	55.7	951	7	11	4	16
Tonk	45.4	952	26	9.5	16.5	272.25
Bundi	46.6	925	24	19	5	25
Bhilwara	47.2	973	23	6	17	289
Rajasmand	48.0	990	17	2	15	225
Dungarpur	46.2	994	27	1	26	676
Banswara	43.1	980	28	5	23	529
Chittaurgarh	46.5	972	22	7	15	225
Kota	65.9	911	1	21	20	400
Baran	52.0	929	12	18	6	36
Jhalawar	46.5	946	25	14	11	121
Udaipur	48.4	958	20	8	12	144
Partapgarh	42.4	983	29	4	25	625
Rajasthan	52.1	928	-	-	-	Σd <sup>2</sup> = 7754.75

Now, using the formula (with n = 33 here)

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

$$\rho = -0.295$$

#### CONCLUSION

It is observed that there is a low and negative correlation i.e.  $\rho = -0.295$  between the female literacy and sex ratio in Rajasthan state using the spearman's rank difference method. The female literacy and sex ratio have moved the opposite direction in Rajasthan state. The sex ratio has been found higher in districts, which have low

female literacy. Kota district has registered the highest female literacy of (65.9%) but it has a very low sex ratio of 911. Jaipur district has the second-highest female literacy (64%) rate registered the very low sex ratio of 910. Jalore district, the most backward district of the state has registered very low female literacy of 38.5 %. However, it has a very high sex ratio of 952. It requires urgent action from the state authorities and mass awareness to change the mindset and equal order of the patriarchal society. Without gender equality, society will not be able to achieve the Millennium Development Goals and their full development potential.

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