

# Female Literacy and Changes in Child Sex Ratio in Bihar: A District Level Analysis

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**Abstract:** Bihar is the state, where majority of the population is illiterate and ranks lowest, among all the Indian state in terms of literacy rate (61.8 percent), where, the male and female literacy rate are 71.20 and 51.50 respectively. Sex ratio and literacy rate have always been considered as an important key for the socio - economic growth of the study of an area. Similarly female literacy rate and child sex ratio also affect the social structure and future of mankind. But it is a known fact that the literacy rate and sex ratio has an inverse relationship. In spite of the legal prohibition female foeticide is a common practice. Declining child sex ratio has been a matter of grave concern which is prevalent due to the son preference in the society, and is detrimental to the development of the nation and the state. Present paper deals with variation in female literacy rate and child sex ratio as well as their relationship and change in child sex ratio for every 1 percentage point rise in female literacy rate. The literacy rate in Bihar has been increased from 47.53 percent in 2001 to 61.80 percent in 2011, whereas the sex ratio has declined from 919 females per thousand males in 2001 to 918 in 2011. Similarly female literacy rate in Bihar has increased from 33.12 percent in 2001 to 51.50 percent in 2011, whereas the child sex ratio has declined from 942 girls per thousand boys in 2001 to 935 in 2011. The child sex ratio is normally low in those districts, where the female literacy rate is high to very high, especially in the census year 2011. Districts having low to moderate female literacy rate are having high child sex ratio. Districts like Purnea, Kishanganj, Araria and Katihar, recorded high to very high child sex ratio whereas, their female literacy rate are low in both the census years, 2001 and 2011. The change in child sex ratio for every 1 percentage point rise in female literacy rate is also high in two districts Saharsa, and Darbhanga, where the female literacy rate is low in 2001 and moderate in 2011, whereas, Arwal (1.24) with the second highest change in child sex ratio for every 1 percentage point rise in female literacy rate has moderate female literacy rate in 2001 and high in 2011. Apart from this ten other districts recorded positive change in child sex ratio below 1. Rest of the districts recorded negative change in child sex ratio for every 1 percentage point change in female literacy rate. The inverse relationship between female literacy rate and child sex ratio has been clearly indicated by the coefficient of correlation obtained by means of Karl Pearson's method of correlation, which is - 0.2823 in 2001 and - 0.4890 in 2011.

**Keyword:** Literacy Rate, Female Literacy Rate, Sex Ratio, Child Sex Ratio, Bihar, Change in Female Literacy Rate, Change in Child Sex Ratio, Coefficient of Correlation

## 1. Introduction

As per census, a person who is above seven years of age and can read and write with understanding in any language can be treated as literate in India. A person who can only read but cannot write is not literate. In the census year 1991, it was decided that all the children in age the group of 0 - 6 would be treated as illiterate and population above seven years of age would be categorized under literate or illiterate, whereas prior to 1991 census, children below 5 years of age were treated as illiterate. The literacy rate in India and a state like Bihar has always remained a matter of concern. Kerala is the only state in India which has recorded 100 percent literacy rate and is followed by Goa, Tripura, Mizoram, Himachal Pradesh and Maharashtra, whereas, the lowest literacy rate has been recorded in Bihar, according to 2011 census report. It is very important to note here that, in 2011, Bihar recorded the highest growth in literacy rate (14.8 percent) among all the states and UTs, except Dadar and Nagar Haveli (18.61 percent), whereas the average growth in literacy rate in India was recorded as 8.66 percent, which is much less than the change in Bihar. In a country like India and state like Bihar, literacy is the foundation stone for the socio - economic development. In spite of this fact so many people are not able to read and write with understanding. As far as female literacy in Bihar is concerned, it is far behind the national average female literacy rate of 65.46 percent, as compared to 51.50 percent in Bihar. Literacy has been regarded as human right and is a means of socio - economic

development and empowerment of oneself as well as whole society.

Literacy rate is one of the important parameter to analyse female progress, which indicates the status of women in the society. Literacy among women in India and especially in Bihar is a vital factor for social justice, because it accelerates the social reforms. Low literacy among women are associated with a combination of several factors, which may include demographic characteristic, social, economic and cultural characteristic. Swami Vivekananda said, "It is impossible to think about the welfare of the world unless the condition of women is improved. It is impossible for a bird to fly on only one wing.

Child sex ratio and female literacy rate are two important attributes of demographic characteristics of any region. In the recent past women's rights have been brought into centre stage of the socio - economic development of the society. In spite of this the practice of son preference in this patriarchal society has consequently led to female foeticide and infanticide, which has resulted into skewed child sex ratio and ultimate the low sex ratio, females per thousand males.

Child sex ratio has been defined as the number of females per thousand males in the age group of 0 - 6 years in a human population. The child sex ratio in India declined from 927 females per thousand males in 2001 to 919 in 2011, whereas, in Bihar it declined from 942 in 2001 to 935 in 2011. Due to spread of education among women, even in the

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rural areas, women go for sex detection technologies, which enables them to control family sex composition by practicing sex selective abortions. Due to the patriarchal society and preferring boys over girls leads parents to focus on an ideal number of son and as soon as their ideal number of sons has been achieved, fertility has been completed, irrespective of the number of girl child in their family. Various works across India have examined the relationship between education and female disadvantage in natality along with son preference in our society, and have been inconclusive. Bearing this in mind, this research paper aims to find out the correlation between the female literacy rate and gender biasness in natality, which determines the future vital events, such as marriage, labour force, age structure, migration and birth and death rate.

## 2. Objective of the Study

- To analyse the spatio - temporal variation in female literacy rate at district level.
- To analyse the spatio - temporal variation in child sex ratio at district level.
- To analyse the correlation between female literacy rate and child sex ratio at district level.
- To analyse the change in child sex ratio for every 1 percentage point rise in female literacy rate over the past decade, 2001 - 2011
- To suggest remedial measure to improve the child sex ratio.

### Database and Methodology

Present research paper is primarily based on secondary source of data. The data regarding the female literacy rate and child sex ratio of Bihar at district level have been obtained from District Census Handbook of different districts of Bihar, Office of the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India. The collected data have been computed tabulated and analyzed by means of both qualitative and quantitative methods. The relevant data have been represented by means of cartographic techniques like bar graph and scatter diagram. Apart from this choropleth maps have been drawn to analyse the spatial variation in the change in literacy rate and change in child sex ratio at district level. To find out the correlation between female literacy rate and child sex ratio, Karl Pearson's method of coefficient of correlation has been applied, which measures the linear relationship between two related variables. The numerical value obtained after calculation will be tested for their level of significance at 99% and 95% level of confidence. Apart from this, the change in sex ratio for every percentage rise in female literacy was determined from the division of the change in sex ratio by the change in female literacy between 2 successive censuses year 2001 and 2011.

### Study area

Bihar with a total area of 94163 sq. km. constitutes only 2.68 percent of the total area of the country and is located between latitude 24°20'10" N and 27°31'5" N and 83°19'50" E to 88°17'40" E longitude. Nepal is located in north of Bihar, whereas, Uttar Pradesh is located in west, Jharkhand in south and southwest and West Bengal is located on the eastern boundary of the state. There are 38

districts in Bihar, according to the census report 2011. Patna, the capital city of Bihar is the largest city and the second largest city is Gaya, which is located on the bank of Phalgu River, is of historical and mythological significance. Bihar, a part of lower middle Ganga plain has been divided into two parts by river Ganga i. e., North Bihar plain and South Bihar plain. The state of Bihar lies between Himalaya Mountain in the north and Chhotanagpur plateau in the south. Rivers have played a significant role in the formation of Bihar's physiography. Bihar located in the eastern part of India is entirely land - locked state and enjoys a continental monsoon type of climate. Distance from the sea, adjoining Himalayas and changes in the upper air circulation affect the climate of Bihar. Bihar is characterized by humid and subtropical climate, with three distinct seasons of summer, winter and rainy season. Bihar, situated in the fertile alluvial plain of Gangetic valley and is dominated by three types of soils, which includes, piedmont swamp soil in the north western part of Champaran district, Terai soil in northern part and alluvium in the plain of Bihar. Agriculture is the mainstay of economy in Bihar and the percentage of population employed in agriculture is around, 80%, which is much higher than the national average. Bihar is the eighth largest producer of fruits and fourth largest producer of vegetables in India.

According to the census report, 2011, Bihar is the third largest state in terms of population after Uttar Pradesh and Maharashtra. As per census report 2011, the total population of Bihar is 104099452, of which there are 54278157 males and 49821295 females and the total population growth rate was 25.42 percent as compared to 28.43 percent in the census year 2001, recorded a decline of 3.01 percentage point. According to 2011 census report, Bihar contributed 8.60 percent of the total population of India, and recorded a sex ratio of 918 females per thousand male, whereas, the literacy rate is 61.80 percent as against 74.04 percent in India and ranks lowest among all Indian states in terms of literacy rate.

According to 2011 census report the female literacy rate in Bihar is 51.50 percent, whereas in 2001, it was 33.12 percent, recorded an increase of 18.38 percentage point during this decade. This increase in literacy rate among women in Bihar recorded a massive jump among all the Indian state. Apart from this child sex ratio in Bihar declined from 942 girls per thousand boys in 2001 to 935 girls per thousand boys in 2011, recorded a decline of 7 percentage point.

### Spatial Variation in Female Literacy Rate

Literacy is the main foundation for socio - economic growth of any country or a region. According to 2011 census report, out of the total population of 104099452 in Bihar 52504553 are literate. Out of total 52504553 literate, 20896530 are female literate, which accounts to 51.50 percent female literacy rate. The National Statistical Office (NSO) conducted a nationwide study on "Household Social Consumption". Education in India as part of 75<sup>th</sup> round of National Sample Survey (NSS) from July 2017 to June 2018 (There are the Indian States with the lowest Female Literacy Rate, Business Insider, India, Jan 5, 2021). As per the NSS report, the lowest number of female literates are recorded in

the state of Rajasthan (57.6%). Apart from this Andhra Pradesh stands second in terms of lowest female literacy rate (59.5%) and Bihar ranks third from the bottom, scoring 60.5 percent female literacy rate.

There are several reasons which are responsible for low female literacy in Bihar, in spite of the fact that Bihar government has expressed strong commitment towards enhancing the level of education. Poverty in the single biggest cause of illiteracy in Bihar. In poor family girls are the main victims, they are denied of better opportunities, especially education. Apart from this there are several other

factors like poor school environment for girls, lack of adequate number of female teachers, caste disparities, early marriages, lack of interaction between parents and teachers due to illiterate parents, lower enrolment of girl child due to family responsibilities, larger number of illiterate mothers, dowry system, opinion of parents about women education and above all son preference are the important factors.

Table 1 reveals that, the female literacy rate has improved from 33.12 percent in 2001 to 51.50 percent in 2011 in Bihar. This improvement in the female literacy rate may

**Table 1: Female Literacy Rate and Child Sex Ratio**

S. N	DISTRICTS	Child Sex Ratio		Change in Child Sex Ratio	Female Literacy Rate (%)		Change in Female Literacy Rate	Change in Child Sex Ratio for every 1 percentage point rise in female Literacy Rate.
		2001	2011		2001	2011		
<b>SOUTH BIHAR</b>								
1	Bhagalpur	966	938	- 28	38.13	54.89	16.76	- 1.67
2	Banka	965	943	- 22	28.67	47.66	18.99	- 1.16
3	Munger	914	922	8	47.40	62.08	14.68	0.54
4	Lakhisarai	951	920	- 31	33.96	52.57	18.61	- 1.67
5	Sheikhpura	955	940	- 15	33.92	53.40	19.48	- 0.77
6	Nalanda	942	931	- 11	38.58	53.10	14.52	- 0.76
7	Patna	923	909	- 14	50.83	61.96	11.13	- 1.26
8	Bhojpur	940	918	- 22	41.80	58.03	16.23	- 1.36
9	Buxar	925	934	9	39.88	58.63	18.75	0.48
10	Kaimur	940	942	2	38.79	58.40	19.61	0.10
11	Rohtas	951	931	- 20	45.69	62.97	17.28	- 1.16
12	Aurangabad	890	858	- 32	60.06	70.08	10.02	- 3.19
13	Gaya	968	960	- 8	36.66	53.34	16.68	- 0.48
14	Nawada	978	945	- 33	32.17	48.86	16.69	- 1.98
15	Jamui	963	956	- 7	26.32	47.28	20.96	- 0.33
16	Jehanabad	915	922	7	39.82	55.01	15.19	0.46
17	Arwal	920	940	20	38.66	54.85	16.19	1.24
<b>NORTH BIHAR</b>								
18	Saran	949	926	- 23	35.82	54.42	18.6	- 1.24
19	Siwan	934	940	6	36.88	58.66	21.78	0.28
20	Gopalganj	964	954	- 10	32.16	54.81	22.65	- 0.44
21	W. Champaran	953	953	0	51.08	65.59	14.51	0.00
22	E. Champaran	937	933	- 4	24.27	45.12	20.85	- 0.19
23	Muzaffarpur	928	915	- 13	35.81	54.67	18.86	- 0.69
24	Sitamarhi	924	930	6	26.13	42.41	16.28	0.37
25	Sheohar	916	929	13	23.86	45.26	21.4	0.61
26	Vaishali	937	904	- 33	36.58	56.73	20.15	- 1.64
27	Darbhanga	915	931	16	30.78	45.24	14.46	1.11
28	Madhubani	939	936	- 3	26.25	46.16	19.91	- 0.15
29	Samastipur	938	923	- 15	31.67	51.51	19.84	- 0.76
30	Begusarai	946	919	- 27	35.64	55.21	19.57	- 1.38
31	Khagaria	932	926	- 6	29.35	49.56	20.21	- 0.30
32	Saharsa	912	933	21	25.27	41.68	16.41	1.28
33	Supaul	925	944	19	20.81	44.77	23.96	0.79
34	Madhepura	927	930	3	22.11	41.74	19.63	0.15
35	Purnea	967	954	- 13	23.42	42.34	18.92	- 0.69
36	Kishanganj	947	971	24	18.63	46.76	28.13	0.85
37	Araria	963	957	- 6	22.37	43.93	21.56	- 0.28
38	Katihar	966	961	- 5	23.80	44.39	20.59	- 0.24
	<b>BIHAR</b>	942	935	- 7	33.12	51.50	18.38	- 0.38
		Bihar			North Bihar		South Bihar	
		2001	2011		2001	2011	2001	2011
	Coefficient of Correlation	- 0.2823	- 0.4890		0.0989	- 0.1947	- 0.7845	- 0.7747
	P - value	0.0859	0.0018		0.6698	0.3978	0.00019	0.00026
	t Stat	- 1.766	- 3.363		0.4331	- 0.8651	- 4.8990	- 4.7449

Source: Census Report 2001, 2011

be attributed to the fact that government of Bihar has taken several initiatives to enhance the level of education, especially female education in Bihar. The government of Bihar has started several schemes like providing bicycle, textbooks, mid - day meal as well as scholarships, which helped a lot towards advancement in female education. According to 2001 census report the average female literacy rate in Bihar is 33.12 percent, which is much less than the average female literacy rate of India (53.7 percent). Out of 38 districts in Bihar, 18 districts are still struggling hard to catch up with the state average female literacy rate (33.12 percent) whereas, there are two district, named as Lakhisarai (33.96) and Sheikhpura (33.92) are just above the state average. The district of Aurangabad with 60.06 percent female literacy rate has the distinction of being the most literate district of the state in terms of female literacy rate. Aurangabad is followed by West Champaran (51.08 percent) and Patna (50.83 percent). Kishanganj with only 18.63 percent female literacy rate, is the least literate district in terms of female literacy rate and is located in the northeastern part of the state is a Muslim dominated district of Bihar. According to 2011 census report, out of the total population of 1690400 in Kishanganj, 1149095 are Muslims, which constitutes 67.98 percent of the total population. Being a predominantly Muslim society in Kishanganj district, people are very conservative in their belief and ideas and are reluctant to send their girl child to schools. Apart from this agriculture is the main source of livelihood and hardly there are other employment opportunities like industries. Kishanganj has witnessed large scale migration to Delhi, Punjab and Mumbai in search of good jobs. The pattern of female literacy rate shows that out of 18 districts, struggling hard to catch up with state average female literacy rate, only three districts, named as Banka (28.67), Nawada (32.17) and Jamui (26.32) are located in South Bihar, and rest of the fifteen districts are located in the North Bihar. High female literacy rate are the characteristic of the area with a high degree of exposure to educational facilities and other development. If Bihar has been divided into two parts by river Ganga, i. e., North Bihar Plain and South Bihar Plain, we find that most of the districts with low female literacy rate are located in North Bihar Plain and those with moderate and high female literacy are located in South Bihar Plain.

On the basis of 2001 census report, if we divided all the 38 districts of Bihar into Low (Less than 35 percent), Moderate (35.01 to 45 percent), High (45.01 to 55 percent) and very high (55.01 percent and above) female literacy rate we find that there are twenty districts, which can be categorized under low level of female literacy rate below 35 percent and most of these districts are located in North Bihar plain except Banka (28.67), Lakhisarai (33.96), Sheikhpura (33.92), Nawada (32.17) and Jamui (26.32), which are located in south Bihar plain. With few exception, low female literacy rate is the characteristic of those areas having low proportion of urban population. Apart from this, strong girl child prejudice and general poverty has led to the low female literacy rate in these districts of Bihar. There are thirteen districts which can be categorized under moderate level of female literacy rate between 35.01 to 45 percent. Most of these districts are located in South Bihar plain except Siwan (36.88), Muzaffarpur (35.81) and Vaishali (36.58), which

are located in North Bihar plain. Out of 38 districts only four districts can be categorized under high level of female literacy rate between 45.01 to 55 percent. The districts with high literacy rate are widely scattered and includes, Munger, Patna, Rohtas, and West Champaran. Out of these four districts, only West Champaran is located in North Bihar plain. Apart from this, there is only one district named as Aurangabad which can be categorized under very high female literacy rate above 55 percent.

While most of the people in Bihar are stilling veering towards the male child, the state recorded massive jump from 33.12 percent in 2001 to 55.50 percent in 2011 in terms of female literacy rate. As per 2011 census report, the state average female literacy rate is 51.50 percent which is 18.38 percentage point higher than the previous decade 2001. Out of 38 districts of Bihar 22 districts recorded a female literacy rate higher than the state average (51.50 percent). The district, Aurangabad with literacy rate 70.08 percent again has the distinction of being most literate in terms of female literacy rate and recorded an increase of 10.02 percentage point from the previous decade of 2001. District Aurangabad has been followed by West Champaran (65.59), Rohtas (62.97) and Munger (62.08). At the other end of the scale, Saharsa with a female literacy rate of 41.68 percent is at the lowest rank, whereas, Madhepura (41.74) ranked second lowest after Saharsa. Apart from this Kishanganj which was at the lowest rank in terms of female literacy rate in Bihar recorded a massive jump from 18.63 percent in 2001 to 46.76 percent in 2011, with an increase of 28.13 percentage points.

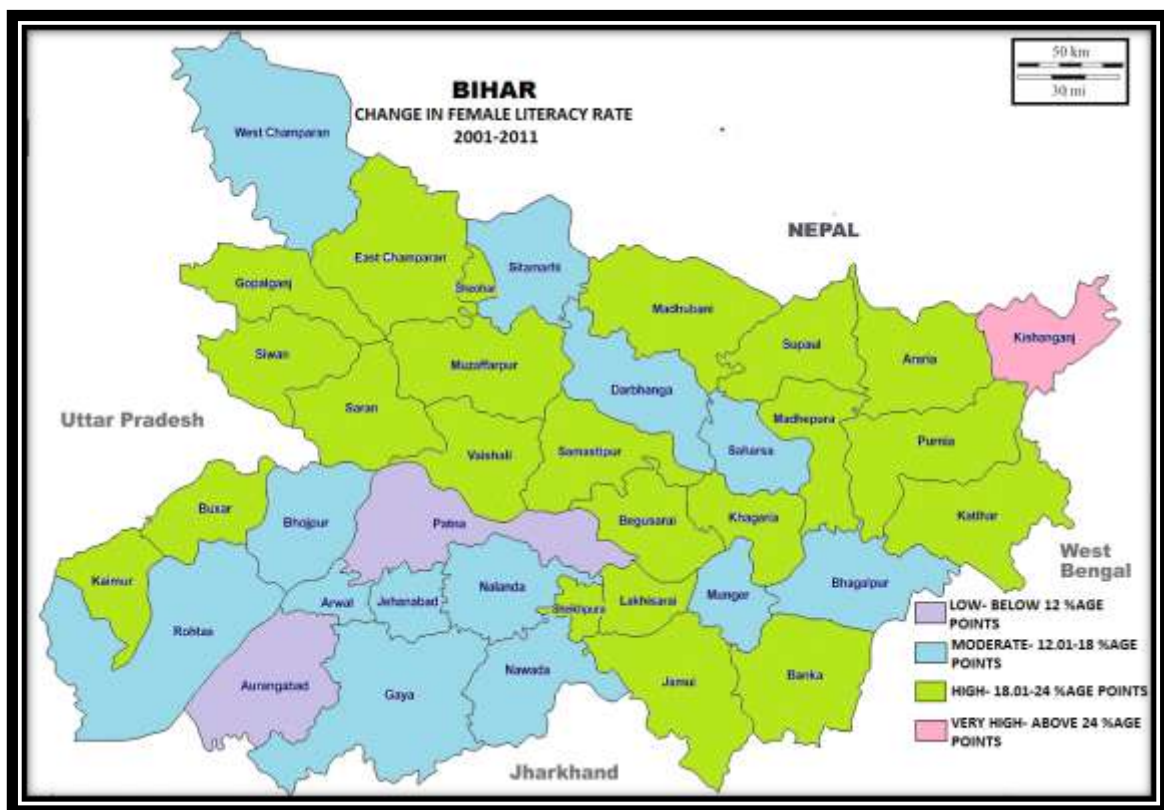
If we adopt the same method of categorization as it has been adopted in 2001 to categorize all the 38 districts of Bihar in low, moderate, high and very high female literacy rate, we find that no district can be categorized under low level of female literacy rate below 35 percent, whereas, eight districts can be categorized under moderate level of female literacy rate and all of these eight districts are located in South Bihar plain. This improvement in female literacy rate may be attributed to various types of government initiatives. Beside primary schools, even higher secondary school have been opened in all panchayat, so that girls can receive education up to class XII in their own village. Government is further going to improve the infrastructure of higher education by strengthening the degree colleges. The state government is taking all measures to give a push to women's' education (50% jump in women owning bank accounts in Bihar, Fifth NFHS data, The Times of India, Faryal Rumi, Dec.15, 2020). There are eighteen districts, which can be categorized under high level of female literacy rate between 45.01 to 55 percent. Out of these eighteen districts, 8 districts are located in North Bihar, which reflects the fact that districts lying to the north of river Ganga have made a significant improvement in female literacy rate. Apart from this rest of the twelve district recorded very high level of female literacy rate above 55 percent. It is a sign of improvement in female literacy rate that out of 12 districts categorized under very high female literacy rate, four are located in North Bihar. Whereas no district was located in North Bihar Plain, which were categorized under very high female literacy rate, according to the census report 2001.

**Table 2:** Comparison between levels of Female Literacy Rate (2001 - 2011)

Category	Range	No. of Districts 2001	No. of Districts 2011	Name of the Districts	
				2001	2011
Low	Below 35 percent	20	0	Banka, Lakhisarai, Sheikhpura, Nawada, Jamui, Gopalganj, E. Champaran, Sitamarhi, Sheohar, Darbhanga, Madhubani, Samastipur, Khagaria, Saharsa, Supaul, Madhepura, Purnea, Kishanganj Araria, Katihar	N IL
Moderate	35.01 to 45 percent	13	8	Bhagalpur, Nalanda, Bhojpur, Buxar, Kaimur, Gaya, Jehanabad, Arwal, Saran, Siwan, Muzaffarpur, Vaishali, Begusarai	Saharsa, Supaul, Madhepura, Purnea, Kishanganj, Araria, Katihar, Sitamarhi
High	45.01 to 55 percent	4	18	Munger, Patna, Rohtas, W. Champaran	Bhagalpur, Banka, Lakhisarai, Sheikhpura, Nalanda, Gaya, Nawada, Jamui, Arwal, Saran, Gopalganj, E. Champaran, Muzaffarpur, Sheohar, Darbhanga, Madhubani, Samastipur, Khagaria
Very high	Above 55 percent	1	12	Aurangabad	Munger, Patna, Bhojpur, Buxar, Kaimur, Rohtas, Aurangabad, Jehanabad, Siwan, W. Champaran Vaishali, Begusarai

There has been a perceptible change in female literacy rate during 2001 and 2011. Bihar as a whole registered an increase of 18.38 percentage points in the last census report of 2011. Out of 38 districts in Bihar twenty three districts recorded change in female literacy rate higher than the state average change of 18.38 percentage points. Kishanganj with 28.13 percentage point change in female literacy rate has the distinction of being ranked first in terms of the change in

female literacy rate. Kishanganj has been followed by Supaul (23.96 percentage points) and Gopalganj (22.65 percentage points). It is also interesting to note here that out of 23 district which have recorded change in female literacy rate higher than the state average, seventeen districts are located in North



Bihar plain. It reveals the fact that people have become aware about the importance of female literacy. Progress of any country is almost impossible without educated mother, because women are the first teacher to their children. If mothers are educated, they can shape and mould their sons

and daughter in a proper direction, which will further help in the socio - economic progress of the region. Aurangabad recorded the lowest change in female literacy rate (10.02 percentage points), whereas, Patna recorded the second lowest change in female literacy rate (11.13 percentage

points). If we categorize all the 38 districts of Bihar according to the change in female literacy rate into low (below 12 percentage points), moderate (12.01 to 18 percentage points), high (18.01 to 24 percentage points) and very high (above 24 percentage points), we find that there are only two districts, named as Aurangabad (10.02 percentage points) and Patna (11.13 percentage points), which can be categorized under low level of change in female literacy rate, whereas there are thirteen districts which can be categorized under moderate change in female literacy rate between 12.01 to 18 percentage points. Out of 38 districts twenty two districts can be categorized under high level of change in female literacy rate and most of them are located in North Bihar except few districts. Apart from this Kishanganj with 28.13 percentage points change in female literacy rate recorded very high level of change in female literacy rate above 24 percent.

### Spatial Variation in Child Sex Ratio

Imbalance in child sex ratio has always remained a matter of concern in Bihar as well as India as a whole. Child sex ratio has been defined as the number of females per thousand males in the age group of 0 - 6 years. As per census 2001, the child sex ratio in India was 927 girls per thousand boys, but it dropped to 919 girls, for every 1000 boys in 2011. Similarly child sex ratio in Bihar also dropped from 942 girls for every 1000 boys in 2001 to 935 girls per 1000 boys, registered a decline 7 points. Sex ratio always remained unfavorable for women in India, because of patriarchal society and son preference. But Bihar recorded sex ratio which remained favorable to female from 1901 to 1961, except the census year 1931. Higher sex ratio in Bihar may be attributed to the fact that religion and philosophy considered womanhood nearer to divinity and respectable position of pride has been assigned to women by our religious scriptures. The great saint Swami Vivekananda stated that the country which had no respect for womanhood could never become great. India's nationalist movement under Gandhi's leadership brought changes in providing attitude towards women in the society. Sex ratio in Bihar has become adverse to women after 1961 and has been rapidly declining decade after decade. The major cause of declining ratio is the declining child sex ratio. There has been a consistent decline in child sex ratio in India as well as Bihar, which is a matter of paramount attention. There are several causes which are responsible for declining child sex ratio in Bihar. One of the major cause is sex selective abortion due to rapid increase in sex determination practices by means of ultra sound. Apart from this poverty, social status of women, lack of women empowerment, male domination and low literacy rate among women play a major role towards the declining child sex ratio in Bihar.

According to 2001 census report there are seventeen districts in the state of Bihar, which have recorded child sex ratio higher than the state average 942 girls per thousand boys. Out of these seventeen districts, eight districts are located in north Bihar. The district of Nawada with child sex ratio 978 girls/1000 boys has been ranked as the district of highest child sex ratio. Nawada has been followed by Gaya (968) and Purnea (967). If we look at the female literacy rate of these three districts in 2001, we find that only Gaya has been categorized under moderate literacy rate, whereas rest of the

two districts, Nawada and Purnea were categorized under low literacy rate. Apart from this the lowest child sex ratio has been observed in Aurangabad with child sex ratio of 890 girls/1000 boys and was categorized under very high female literacy rate in 2001. The low child sex ratio and higher female literacy rate in Aurangabad district clearly indicates that women education has an important predictor of fertility behavior. Increase in female education can be easily linked with the lower fertility behavior. Lower child sex ratio and higher female literacy rate may be attributed to the fact that increase in women's education could influence her likelihood of engaging in sex selective abortion. In India and especially in Bihar, the society tends to be organized along strictly patriarchal lines, which explains the son preference. People prefer sons due to several factors like economic support as well as old age security to their parents. But due to exogenous nature of marriage in India, daughters lose contacts with their natal kin and drain out huge sum of money in the name of dowry to their in-laws. Although son preference has been found in almost all the districts of Bihar, irrespective of caste, creed and religion, but it is more prevalent in North Bihar.

According to the census report, 2001, we can categorize all the 38 district of Bihar into Low (below 935), Moderate (936 to 950), High (951 to 965) and Very High (Above 965) level of child sex ratio. There are fifteen districts, which can be categorized under low child sex ratio below 935 girls per 1000 boys. Out of these fifteen districts nine districts are located in the North Bihar, whereas, ten districts can be categorized under moderate sex ratio between 936 to 950 girls per 1000 boys. Eight districts can be categorized under high child sex ratio and only five districts are categorized under very high child sex ratio above 965 girls per 1000 boys. Out of these five districts categorized under very high child sex ratio, two districts are located in North Bihar region. These two districts, Purnea and Katihar, having very high child sex ratio have been categorized under low female literacy rate on the basis of the 2001 census report.

According to 2011 census report, state average child sex ratio has been reduced to 935 girls per thousand boys from 942 girls per thousand boys in 2001, registered a decline of 7 points. At district level the child sex ratio has also declined in many districts. Therefore, overall decrease in child sex ratio in most of the districts of Bihar as well as state average child sex ratio is a negative sign towards the discrimination against girl child in the study area. No doubt there has been a gradual improvement in sex ratio in Bihar from 1991 onward. In 1991 sex ratio in Bihar was 907 females per thousand males, which increased to 919 in 2001, but it declined by 1 point in 2011 and reached to 918, which is still far behind the national average sex ratio of 940 females per thousand males in 2011. As opposed to this child sex ratio has dropped by 7 point in the last census year. It reflects that families are opting for fewer children and attempts are being made to regulate the sex composition of children in favour of boys. From 2001 to 2011, several districts in Bihar have witnessed a plunge in child sex ratio. District Nawada, which recorded the highest child sex ratio in 2001, recorded a child sex ratio of 945 girls per thousand boys in 2011, dropped by 33 points. Similarly the lowest sex ratio was observed by Aurangabad in 2001, which declined to 858 in

2011, and recorded a drop of 32 points. Patna the capital city of Bihar registered a sex ratio of 923 females per thousand males in 2001, declined to 909 in 2011, recorded a drop of 14 points. Therefore, we can say that the decline in child sex ratio may be attributed to the intensification of sex selection at birth, with prior history of female infanticide and higher female mortality.

If we go through the district level child sex ratio in 2011, we find it very discouraging, because out of 38 districts 20 districts recorded child sex ratio lower than the state average child sex ratio of 935 girls per 1000 boys, and are struggling hard to reach the state average. It is also important to notice here that out of 20 districts 12 districts are located in the North Bihar. According to 2011 census report the highest child sex ratio has been observed in Kishanganj, which has recorded an increase from 947 girls per 1000 boys in 2001 to 971 girls per thousand boys in 2011, with an improvement of 24 points. Kishanganj has been followed by Katihar (961) and Gaya (960). It is also important to note here that both Katihar and Gaya recorded a drop of 5 points and 8 points respectively. Apart from this the lowest child sex ratio has been observed by Aurangabad (858) which recorded a drop of 32 points from the previous census year. Second lowest

child sex ratio has been observed by Vaishali (904), which again recorded a drop of 33 points.

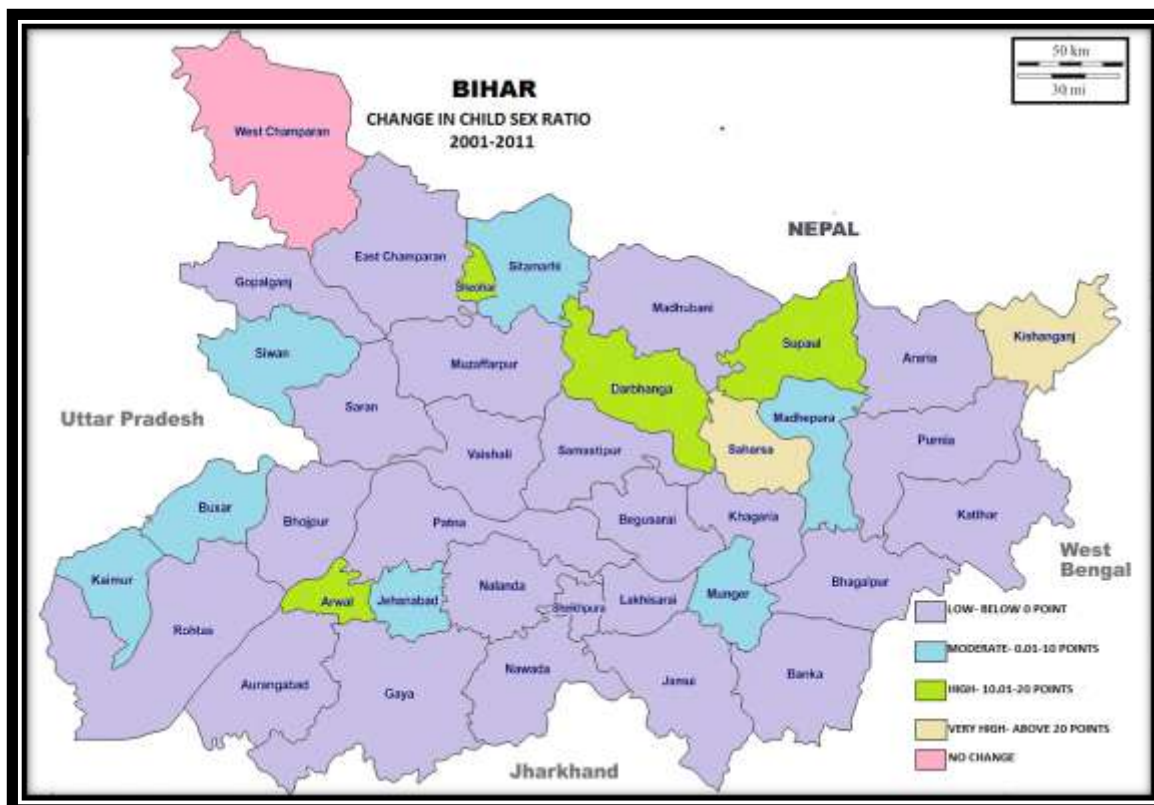
Adopting the same method of categorization as it has been adopted in 2001, we can categorize twentyone districts under low child sex ratio below 935 girls per 1000 boys, whereas nine districts are categorized under moderate child sex ratio between 936 to 950 girls per thousand boys. Out of 38 districts seven districts are categorized under high childsex ratio, whereas only one district, named as Kishanganj can be classified under very high child sex ratio above 965 girls per thousand boys. One of the striking feature is that Patna, the capital city of Bihar recorded low child sex ratio and observed a drop of 14 points. This low child sex ratio in Patna may be attributed to high literacy rate which was 62.92 percent in 2001 and 70.68 percent in 2011, whereas, the female literacy rate was 50.83 percent in 2001 and 61.96 percent in 2011. High literacy rate in Patna encouraged women to go for sex selective abortion, due to girl child prejudice and son preference. High level of literacy rate in Patna as compared to other districts also encouraged younger generation to migrate other state like Delhi, Maharashtra or may be other countries in search of better job opportunities.

**Table 3:** Comparison between Levels of Child Sex Ratio (2001 - 2011)

Category	Range	No. of Districts 2001	No. of Districts 2011	Name of the Districts	
				2001	2011
Low	Below 935	15	21	Munger, Patna, Buxar, Aurangabad, Jehanabad, Arwal, Siwan, Muzaffarpur, Sitamarhi, Sheohar, Darbhanga, Khagaria, Saharsa, Supaul Madhepura	Munger, Lakhisarai, Nalanda, Patna, Bhojpur, Buxar, Rohtas Aurangabad, Jehanabad, Saran, E. Champaran, Muzaffarpur, Sitamarhi, Sheohar, Vaishali, Darbhanga, Samastipur, Begusarai, Khagaria, Saharsa, Madhepura
Moderate	936 to 950	10	9	Nalanda, Bhojpur, Kaimur, Saran E. Champaran, Vaishali, Madhubani, Samastipur, Begusarai, Kishanganj	Bhagalpur, Banka, Sheikhpura, Kaimur, Nawada, Arwal, Siwan, Madhubani, Supaul
High	951 to 965	8	7	Banka, Lakhisarai, Sheikhpura, Rohtas, Jamui, Gopalganj, W. Champaran, Araria	Gaya, Jamui, Gopalganj W. Champaran, Purnea, Araria, Katihar
Very High	Above 965	5	1	Bhagalpur, Gaya, Nawada, Purnea, Katihar	Kishanganj

Change in child sex ratio is the difference between the child sex ratio of two consecutive census year 2001 and 2011. It has been observed that state as a whole registered a drop of 7 point during this period. Out of the 38 districts of Bihar twenty four districts recorded a decline in child - sex ratio during 2001 and 2011. This adverse child sex ratio is mainly because of high preference of sons in Indian society as a whole and especially in Bihar. In spite of the several measures adopted by government, it has been very difficult to change the child sex ratio. The strong preference for male children in Bihar has resulted into the discrimination against

girl child right from her birth. Biologically, girl child have an advantage in survival over boys during the neo - natal stage. But beyond neo - natal stage, girl child lose their biological advantage and their mortality rate is influenced by behavioral factor of the society. Decline in child sex ratio needs paramount importance in Bihar, because there are lesser females at birth due to sex selective abortion, as well as girl child die in higher proportion due to ignorant behavior of the society.



If we go through the change in sex ratio among all the 38 districts of Bihar, we find that the highest decline in child sex ratio has been observed by two districts, Nawada and Vaishali with a drop of 33 points in child sex ratio. Nawada and Vaishali, with the highest decline in child sex ratio have been followed by Aurangabad and Bhagalpur with drop of 32 points and 28 points respectively. At the other end of the scale, the lowest drop in child sex ratio has been observed in Madhubani districts with a drop of only 3 points. Apart from these 24 districts, fourteen districts recorded an improvement in child sex ratio in Bihar during 2001 and 2011. If we go through all the 38 districts of Bihar we find that highest improvement in child sex ratio has been recorded by Kishanganj with an increase of 24 points. Kishanganj has been followed by Saharsa and Arwal with an increase of 21 points and 20 points respectively, whereas the lowest improvement in sex ratio has been recorded by Kaimur with an increase of 2 points.

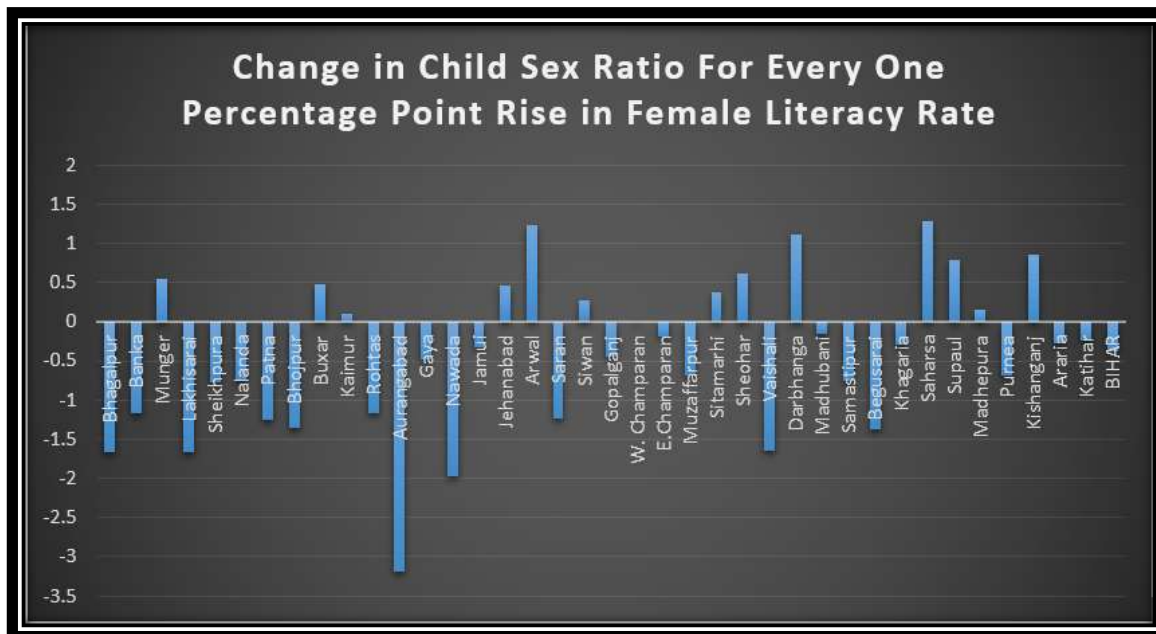
If we categorize all the 38 districts of Bihar according to change in child sex ratio into Low or negative change (below 0 point), Moderate (0.01 to 10 points), High (10.01 to 20 points) and Very High (Above 20 points), we find that there are 24 districts, which can be categorized under low or negative change in child sex ratio below 0 points whereas, there are seven districts, which can be categorized under moderate change in child sex ratio between 0.01 to 10 points. Out of 38 districts, four districts are categorized under high level of change in child sex ratio between 10.01 to 20 points and only two districts named as Kishanganj and Saharsa can be categorized under very high change in child sex ratio above 20 points.

Table 1 reveals the change in child sex ratio for every one percentage point rise in female literacy rate. Saharsa (1.28), a district from North Bihar recorded the greatest

improvement in child sex ratio for every 1 percentage point rise in female literacy rate during 2001 and 2011. Darbhanga (1.11) recorded the second highest change in child sex ratio for every one percentage point rise in female literacy rate. Apart from this lowest change in child sex ratio for every percentage rise in female literacy rate has been observed in Aurangabad (- 3.19) and West Champaran has recorded no change in child sex ratio for every 1 percentage point rise in female literacy rate, because there has been no change in child sex ratio during 2001 and 2011, and remained stagnant at 953 girls per one thousand boys. There has been a significant difference in the child sex ratio and female literacy rate in the districts located in North Bihar. Table 1 reveals that most of the districts with low literacy rate and low child sex ratio are located in North Bihar. There are several reason for this imbalance in child sex ratio and literacy rate in North Bihar. One of the most important factor is poverty which is comparatively higher in North Bihar. Poverty has resulted into undernourishment among children, especially among females. North Bihar is comparatively less literate and wider gender differential has also been observed in North Bihar. Apart from this there is low enrolment of children in school, especially girls, coupled with high dropout rate. Most of the districts in Bihar having high female literacy rate have high child sex ratio, except few of the districts, like Aurangabad which is having very high female literacy rate but there is low child sex ratio in both the census year. It has been observed that the families in North Bihar have higher proportion of sons and especially among economically and socially disadvantaged families. Parents whose first child is male stops having children faster than those parents, whose first child is female. The fertility behavior targeting to son has resulted into larger number of siblings. The number of siblings decreases or became normal child sex ratio, when the first



child is boy. Technological developments have direct impact on the sex selective abortion in the state.



### Female Literacy Rate and Child Sex Ratio

Table 1 reveals that there is a large scale disparity in the level of female literacy rate and child sex ratio among the districts of Bihar in 2001 and 2011. If we go through the female literacy rate and child sex ratio in 2001, we find that most of the districts in South Bihar, which are having low to moderate literacy rate have high or very high child sex ratio like Banka, Lakhisarai, Sheikhpura, Nawada, Jamui. These districts with low female literacy rate, below less than 35 percent, are having high child sex ratio between 951 to 965, even Nawada with low literacy rate observed very high child sex ratio above 965 girls per thousand boys. But in North Bihar most of the districts with low female literacy rate have low child sex ratio too, except few districts. Districts of North Bihar, like Gopalganj, East Champaran and Araria with low female literacy rate below 35 percent have high child sex ratio, whereas, Katihar and Purnea with low female literacy rate have very high child sex ratio. Similarly if we go through the female literacy rate and child sex ratio in 2011. We find that out of seventeen districts in South Bihar, seven districts, like Munger, Patna, Bhojpur, Buxar, Rohtas, Aurangabad and Jehanabad with very high literacy rate above 55 percent have recorded low female literacy rate. Similarly if we go through the female literacy rate and child sex ratio in North Bihar on the basis of census report 2011. We find that most of the districts with moderate female literacy rate have recorded low child sex ratio. Apart from this Katihar, Araria and Purnea with low female literacy rate have recorded high sex ratio, even Kishanganj with low female literacy rate has observed very high child sex ratio in 2011.

Above discussion clearly indicates that there is a sharp distinction between the North Bihar and South Bihar. In terms of South Bihar we can generalize that due to the increase in female literacy rate child sex ratio has declined over a decade between 2001 and 2011. But in North Bihar we can say that, in spite of the increase in literacy rate no perceptible change in child sex ratio has been observed,

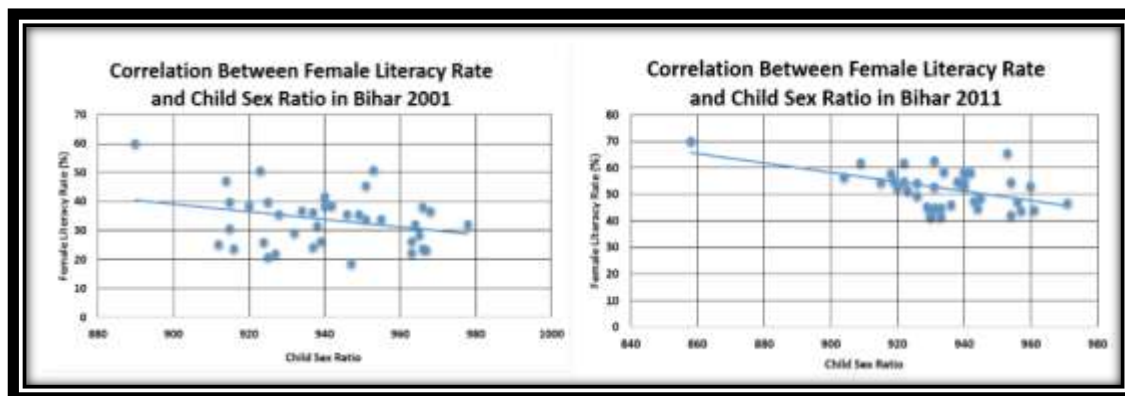
most of the district still categorized under low sex ratio, whereas most of the districts have graduated from low male literacy rate to moderate female literacy rate.

Above discussion also reveals that, increase in female literacy rate has been juxtaposed by decline in child sex ratio, whereas literacy has been supposed to eliminate the gender biasness, which now perceived as contradictory. Apart from the son preferences, there are several other reason which may be responsible for low child sex ratio, in spite of increasing female literacy rate in Bihar. The imbalance on adverse child sex ratio may be attributed to the fact that girl child have been neglected, which results into higher mortality at younger age below 6 years. Apart from this sex selective female abortion and female infanticide may also be the other reason for low child sex ratio. Due to increase in female literacy rate women have become aware of sex determination technology like ultrasound. It is a well-known fact that families go for sex determination, and as they come to know about girl child, they immediately get rid of it and go for abortion. Sex selective abortion may also be due to family pressure, to have boy. Therefore, we can say that marked increase in the female literacy rate does not seem to have any impact on the declining child sex ratio in the state of Bihar.

Declining child sex ratio as against the increase in female literacy rate indicates the girl child prejudice, sex selective abortion and traditional attitude of son preferences. Therefore, the relationship between child sex ratio and female literacy rate is of immense significance. To find out the correlation between female literacy rate and child sex ratio, Karl Pearson's method of coefficient of correlation has been used and the level of significance has been tested at 99% and 95% level of confidence. On the basis of table 1, coefficient of correlation by means of Karl Pearson's method of correlation has been calculated for two successive census year 2001 and 2011 between female literacy rate and child sex ratio. It has been observed that the coefficient of

correlation between female literacy rate and child sex ratio in 2001 is  $r = -0.2823$ , which indicates that the strength of relationship is in negative direction and is of medium level (medium level of negative correlation,  $-0.25$  to  $-0.75$ ) and not significant at 95% level of confidence. As far as the value of coefficient of correlation between female literacy

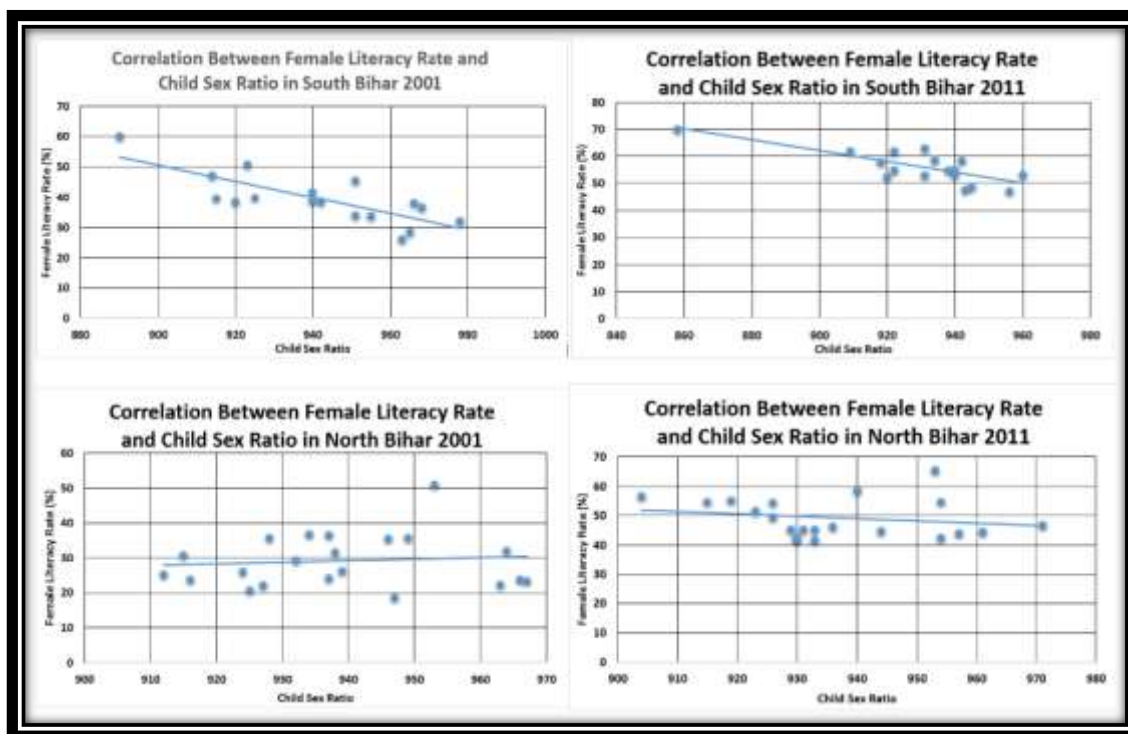
rate and child sex ratio in 2011 is concerned it  $r = -0.4890$ . The correlation value indicates that there is a medium level of negative correlation, and is significant at 99% level of confidence.



We find that there is a sharp contrast between the North and South Bihar Plain, which has been clearly observed in above discussion as well as it may be explained properly by means of the values of the coefficient of correlation, obtained through the Karl Pearson's method of correlation. As far as the coefficient of correlation between female literacy rate and child sex ratio in North Bihar is concerned it is  $+0.0989$  in 2001. The value indicates that there is no correlation because the value comes to  $+0.0$ , but it is in positive direction because the value up to four decimal point is  $+0.0989$  and is not significant. Whereas, the coefficient of correlation between female literacy rate and child sex ratio in 2011 is

$= -0.1947$  which indicates that there is a low level of negative correlation (low level of negative correlation,  $0.00$  to  $-0.25$ ) and is also not significant.

The coefficient of correlation between female literacy rate and child sex ratio in South Bihar is the census year 2001 is  $r = -0.7845$ , which indicates a high level of negative correlation (high level of negative correlation  $-0.75$  to  $-1$ ) and is significant at 99% level of confidence. Similarly the value of coefficient of correlation in 2011 is  $r = -0.7747$ , which again indicates the high level of negative correlation and is also significant at 99% level of confidence.



### 3. Conclusion

It is a known fact that literacy rate has an inverse relationship with sex ratio. Similarly with the increase of

female literacy rate, child sex ratio is also decreasing in Bihar. The declining child sex ratio has its profound impact on our society as well as it affects the future of mankind. In spite of the legal prohibition, female foeticide is a common

practice. The rapid spread of ultrasound technology has given impetus to the sex determination, which plays a vital role in female foetus induced abortion.

Declining child sex ratio is a matter of grave concern because of son preference in India as well as in a state like Bihar. A skewed child sex ratio due to shortage of girl child is detrimental to the health and welfare of the women as well as for the development of the society. It is today's reality that gender discrimination still exist in Bihar as well India as a whole. The literacy rate in Bihar has increased from 47.53 percent in 2001 to 61.80 percent in 2011, whereas the sex ratio has declined from 919 females per thousand males in 2001 to 918 in 2011. Similarly female literacy rate in Bihar has increased from 33.12 percent in 2001 to 51.50 percent in 2011, whereas the child sex ratio has declined from 942 girls per thousand boys in 2001 to 935 in 2011. According to the 2001 census report the highest female literacy rate has been found in Aurangabad district, where the child sex ratio is very low (890 girls/1000 boys). Most of the district which are having high female literacy rate are categorized under low child sex ratio, like Munger, Patna, Aurangabad, except Rohtas and West Champaran which are categorized under both high female literacy rate and high child sex ratio.

Similarly in 2011, districts with very high female literacy rate have categorized under low child sex ratio. Apart from this one of the striking feature is that there is a difference between the female literacy rate and child sex ratio in North Bihar and South Bihar. In South Bihar most of the districts with very high female literacy rate have been categorized under low child sex ratio, whereas in North Bihar plain most of the districts with low literacy rate have been categorized under low to moderate child sex ratio except Purnea, Araria and Katihar with low female literacy rate have been categorized under high and very high child sex ratio. But the scenario has changed a lot in 2011 in North Bihar plain, most of the districts with moderate literacy rate have been categorized under low child sex ratio except, Purnea, Katihar, Araria and Kishanganj with low female literacy have been categorized under high child sex ratio.

It is also interesting to note here that the change in child sex ratio for every 1 percentage point rise in female literacy is high in those districts where the female literacy rate is low in 2001 and moderate in 2011, like Darbhanga and Saharsa, whereas in Arwal female literacy rate is moderate in 2001 and high in 2011, and the change in child sex ratio for every 1 percentage point rise in female literacy rate is second highest (1.24) after Saharsa. Therefore, we can say that most of the districts with higher female literacy rate have negative change in child sex ratio, and have inverse relationship. This inverse relationship between female literacy rate and child sex ratio has been clearly indicated by the result of coefficient of correlation obtained through Karl Pearson's method of coefficient of correlation which are - 0.2823 in 2001 and - 0.4890 in 2011.

We can conclude that increasing female literacy rate has failed to change the thinking of people and female foeticide is still a problem, may be due to son preferences in our society. Declining child sex ratio should be taken into

consideration by the government as well as our society, because it is a man - made problem, not created by nature.

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