

Project Dissertation Report on

EDUCATION AND INDIA: A STATE LEVEL ANALYSIS

Submitted by

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CERTIFICATE

This is to certify that the work titled '**Education and India: A State-level Analysis**' as part of the final year Major Research Project submitted by Samyak Jain in the 4th Semester of M.B.A., Delhi School of Management, Delhi Technological University during January-May 2021 is his original work and has not been submitted anywhere else for the award of any credits/ degree whatsoever.

The project is submitted to Delhi School of Management, Delhi Technological University, in partial fulfillment of the requirement for the award of the degree of Master of Business Administration.

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DECLARATION

I hereby declare that the work titled 'Education and India: A State-Level Analysis' as part of the final year Major Research Project submitted by me in the 4th Semester of M.B.A., Delhi School of Management, Delhi Technological University, during January-May 2021 under the guidance of Prof. P.K. Suri is my original work and has not been submitted anywhere else.

The report has been written by me in my own words and not copied from elsewhere. Anything that appears in this report which is not my original work has been duly and appropriately referred/ cited/ acknowledged.

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I have put all my efforts into ensuring that the project is completed in the best possible manner and also ensured that the project is error-free.

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ABSTRACT:

This paper provides an overview of the education level in states and union territories of India. This research puts forth a methodology to provide an explanation for the change in literacy rate with respect to the variables that we have taken. In the context of states and union territories of India, we have done so by integrating the literature on education levels, papers/research material related to education level. Studies on factors affecting education leveled: modern computational techniques and the prerequisite knowledge of econometric models. The firstly paper examines the literacy rate of different states and union territories on the basis of gender disparity on the basis of Child Sex ratio and Sex ratio, population density, excess to schools in terms of gross enrolment ratios and number of schools, quality of education in terms of the pupil to teacher ratio, Education development Index and schools with computers, etc. When it is done, the interpretation of this analysis yields few certain and other abstract relationships between literacy rate and the variables. And thus, we obtained that the literacy rate is directly related to expenditure share of education in states budget, child sex ratio, Education Development Index, and per capita G.D.P. On the contrary this, the literacy rate is directly related to the pupil-teacher ratio of the state. Also, we came across a few anomalies while comparing states on the basis of factors; we observed some interesting trends, we observed a positive trend between literacy level and unemployment rate, and a negative trend between the number of schools and education level.

TABLE OF CONTENTS

Certificate	2
Declaration	3
Acknowledgement	4
Abstract	5
Introduction	7
Literature review	9
Objective	12
Research methodology	13
Data Interpretation	16
Data testing	32
Conclusion	37
Limitations and suggestion	39

INTRODUCTION

India holds an important place in the global education industry. Being a country majorly dependent on agriculture, India Inc. saw a boom in the education sector nearly four decades ago when the government made policies for land distribution and education.

India has since seen major growth in the education industry and is poised to witness even more. The numbers that we stumbled upon during the research of this paper were startling. First, the country has more than 1.5 million schools consisting of over 260 million students, over 700 universities, and more than 36000 colleges. India has one of the largest higher education systems in the world. Yet, there is still a lot of potential untapped for the development of the system.

However, it all starts from the nascent stage, primary education. The primary education market in India has both crest and trough. India boasts the world's 2nd largest population in number, yet a massive 46% of the population is under the broad umbrella of illiteracy. There has been mixed success in India's educational pursuits. On the upside, where investments to the tune of U.S. \$11.945 billion have been injected into the education sector for the financial year 2017-18, on the downside, as per the Annual Status of Education Report (ASER) 2015-16 report, only 25.43% of children from IV standard could solve two-digit mathematical problems.

LITERATURE REVIEW

Elementary education in India

The provision of universal elementary education has been a salient feature of Indian national policy since Independence. Free and compulsory education till the age of 14 became a fundamental right in 2002. The government of India took various steps to achieve the goal of the universalization of education. It is important to keep track of the impact of such steps, whether they are working or not, to which extent they are helping, and what other actions are needed to be taken. (BMK Raju, 2011) Quantification of educational development is important as it enables the states to formulate policies and plans of action needed to further the development process.

Educational development is a multidimensional process. Hence, its impact cannot be tracked by any single indicator; it is important to study the statistical impact of statistical development in different spheres. (BMK Raju, 2011) These factors, when studied individually, fail to provide a clear picture of reality, and hence this paper tries to build a composite index for education development based on various indicators.

The 7th All India School Education Survey (7th AISES) data conducted by NCERT with a reference date of 30th September 2002 has been used in this study. This paper builds an Index based on component factors such as access to a school within walking distance, enrolment ratio, equity in educational opportunities, which, i.e., social equity or gender equity, infrastructure available at school, quality education inputs such as pupil-teacher ratio or percentage of trained teachers, etc., the efficiency of the school system. (Mehrotra, 2006) These factors are chosen as they are somewhat independent of each other and have a huge impact on educational development. The achievement level is taken as an outcome indicator to judge the performance of these factors. This index is then used to compare various states and U.T., and conclusions are drawn based on that. This create Country Analytical Review (C.A.R.) in India performed a huge task of combining works of a couple of analysts working on India's distinct factors related to elementary education. Each has realized autonomous papers.

Educational Infrastructure of India

This Review Paper is an undertaking to fuse the recognitions ascending out of all these papers. It is an attempt to think about the issues that include access to elementary education in India. (Govinda & Bandyopadhyay, 2008) The measure of the issues is enormous. Furthermore, the diversity is inescapable over a population of more than 200 million primary-age children who are facing difficulty learning.

Three factors seem to have an unmistakable impact on the improvement of elementary education in the country. The first factor is the extended direct relationship of the central government in fortifying infrastructure and conveyance of elementary education. (Vaidyanathan & Nair, 2001) The second factor is the appropriation of the district level as the base for arranging advancement contributions for elementary education. The third factor that has begun to reshape India's elementary education scene is the enormous social mobilization drive. (S, 2006; Mehrotra, 2006) This has been encouraged over the last 10-15 years inside the elementary education portion, under the help of the National Literacy Mission.

The paper has been divided into sections. The first and second sections of the paper show a short study of elementary education in India with a particular focus on regional disparities. The third section plots zones of denial, including the nature and size of access, transition, and equity issues. The fourth section gets the profiles of the varying groups of children and addresses the question: 'who is banished from schooling?' and 'why are they banished?'. In the last section, the paper makes a push to perceive gaps in our understanding, (Kingdon, 2007) which points to the need for further research and recognizes strategies that have had some achievement in addressing the issues of access to elementary education in India. Intervention by N.G.O.s and government using policies such as Sarva Siksha Abhiyan, mid-day meal, studies along with vocational skills (MSME), para-teacher interaction, 2% educational cess, no-fail policy, etcetera are going to be the supplementary factors for gaining momentum to achieve higher literacy rate in India.

Progress in Indian schools over years

This paper provides an overview of the factors that affect the literacy rate in India the most. India stands 168 out of 234 countries in terms of literacy rate, which falls behind more than 70% of the countries in the world. The paper examines the most prominent factors that affect students' enrollment and retention in primary and secondary level schools (Kingdon, 2007).

All of this has been done using state-wise data of India. Quantitative factors, such as per capita income, proximity to schools et cetera are considered rather than qualitative factors such as student's motivation, parental pressure since such factors are difficult to collect and quantify. (Sahni, 2015) According to the research paper, government and Private players' intervention in the prominent factors (according to the research paper) are expected to soar the literacy rate in India. Intervention by N.G.O.s and government using policies such as Sarva Siksha Abhiyan, mid-day meal, studies along with vocational skills (MSME), para-teacher interaction, 2% educational cess, no-fail policy, etcetera are going to be the supplementary factors for gaining momentum to achieve higher literacy rate in India.

The story of India's achievements in education is sort of a mixture. On the downside, we have 22% of the world's population and lack behind 70% of the world in literacy. In contrast, on the upside, India has made significant improvements in the literacy rate since Independence. (Praveen jha, 2014) Even though the educational system is in the doldrums, it is expected to take off at a significant pace with the introduction of I.T. and Technological advancements and the creation of skilled jobs, which will make both males and females participate in the learning process through schools and colleges. This paper studies gender disparity in literacy in India. Society is made up of the people who live in it; that is why the human resource is a very important aspect of any society. It is crucial for the overall development of society. Education plays a very important role as it has the potential to increase human capital. It helps remove inequalities from society and helps in the increase of employment, thus helping in improving the G.N.P. of the country. Literacy is the basic building block and an essential element in the development of education in society.

Gender disparity in education

According to the Indian Human Development report of 2011, gender is an important factor in determining an individual's education level, especially when Indian society is taken into context. Even though women constitute approximately half of the total population of India, that is 48.46 percent, there exist large disparities in the level of education of both men and women when their literacy level is examined. (Katiyar, 2016) There is a large male-female gap in literacy in India. According to the 2011 Census of India, it is about 16 percent between the two reference groups. This problem has become a huge concern worldwide as it affects the development in India and affects the development efforts made all around the globe (Mohammad, 2018).

OBJECTIVE OF THE STUDY

In this report, I attempt to determine the various factors that determine the outcomes of the government's education policies. The questions that bud in mind is, "Why, despite large investments, primary education still seems to be going through a rough patch?", "What are the reasons behind the disparity in the literacy rates of various states" and many more. The report focuses on factors that affect the literacy rate. Based on those factors, the comparison is drawn among various states of India.

Structure

The study starts with a brief introduction followed by a review of existing studies on the subject matter. We study the biases in the education scenario of India and how government initiatives are helping educational developments. Further, we discuss the methodology of research used for this project. This project takes on an empirical analysis of the factors affecting the educational development of India using principal component analysis and regression analysis of data from all states of India. Results and Conclusions derived from the regression are then discussed. Furthermore, we have discussed the limitations and the scope of further research that stems from this study.

RESEARCH METHODOLOGY

The following independent factors were considered for the regression purpose, with the dependent factor being Literacy Rate (L.R.):-

- Child Sex Ratio
- Education Development Index
- Percentage Budget to Education
- Gross State Domestic Product
- Pupil to Teacher Ratio
- Working Children
- State Population
- Female Literacy Rate
- Population Density
- Rural Population
- School with Computers
- Sex Ratio
- Total Schools in the State
- Unemployment
- Net Enrolment to Primary School
- Percentage of S.C. and S.T. Population

When we checked our factors for multicollinearity, the V.I.F. value of factors ranged from 6 to 58 for some factors, hence to combat the presence of this multicollinearity and to generate any meaningful result, we need to make dimension reduction for which we used Principal Component Analysis and the following Prominent Factors are extracted which explain 80% of the Variance in the data:-

Education Development Index (E.D.I.)

Child Sex Ratio (C.S.R.)

Percentage Budget to Education (B.E.)

Gross Domestic Product (G.D.P.)

Pupil to Teacher Ratio (PTR)

The model undertaken for the study is as follows:

$$- LR = f(\text{EDI, CSR, BE, GDP, PTR}) + \text{error}$$

To study the factors affecting Literacy Rate across the states, the econometric model considered here is:-

$$LR = \beta_0 + \beta_1 \text{ EDI} + \beta_2 \text{ CSR} + \beta_3 \text{ BE} + \beta_4 \text{ GSDP} + \beta_5 \text{ PTR} + \text{error}$$

ESTIMATORS/REGRESSION COEFFICIENTS

β s defined here are the regression coefficient of our model. They capture the effect of change in the respective independent variable on the dependent variable in the regression analysis. The regression coefficient can be negative, which signifies that if the independent variable rises, then the dependent variable falls, and if the independent variable rises, the dependent variable will decline.

Similarly, when it is positive, it means that when the independent variable increases, the dependent variable also increases and vice-versa.

In our regression model, each variable is studied in linear form. This is so because the variables undertaken here are ratios or in percentage form. So the interpretation of the variables will be in percentage.

B (Regression Coefficient)	Interpretation
B1	1 unit change in E.D.I. will lead to a B1 unit change in literacy rate
B2	1 unit change in child sex ratio leads to B2 unit change in literacy rate
B3	1 unit change in share of education expenditure on G.D.P. will lead to B3 unit change in literacy rate
B4	1 unit change in per capita G.D.P. will lead to a B4 unit change in literacy rate
B5	1 unit change in the pupil-teacher ratio will lead to a B5 unit change in literacy rate

ERROR

Error is the disturbance term or noise. This variable captures all other factors which influence the dependent variable other than the repressors. The relationship between the error term and the repressors, for example, whether they are correlated, is a crucial step in formulating a linear regression model. It will determine the method to use for estimation.

Hypothesis testing:

To check whether all the variables have a significant effect on sex ratio, we define the null hypothesis on R square that all variables together do not have any effect on the literacy rate, against the alternative that at least one variable affects literacy

H0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ and the alternate hypothesis is

H1: At least one of the β s is not equal to 0

For our regression result, we want to reject the null hypothesis at the assumed level of significance. If null is rejected, we may conclude that at least one of the independent variables will significantly affect the dependent variable, i.e., literacy rate.

DATA ANALYSIS AND INTERPRETATION:

Variable scores across states and union territories:

Literacy Rate

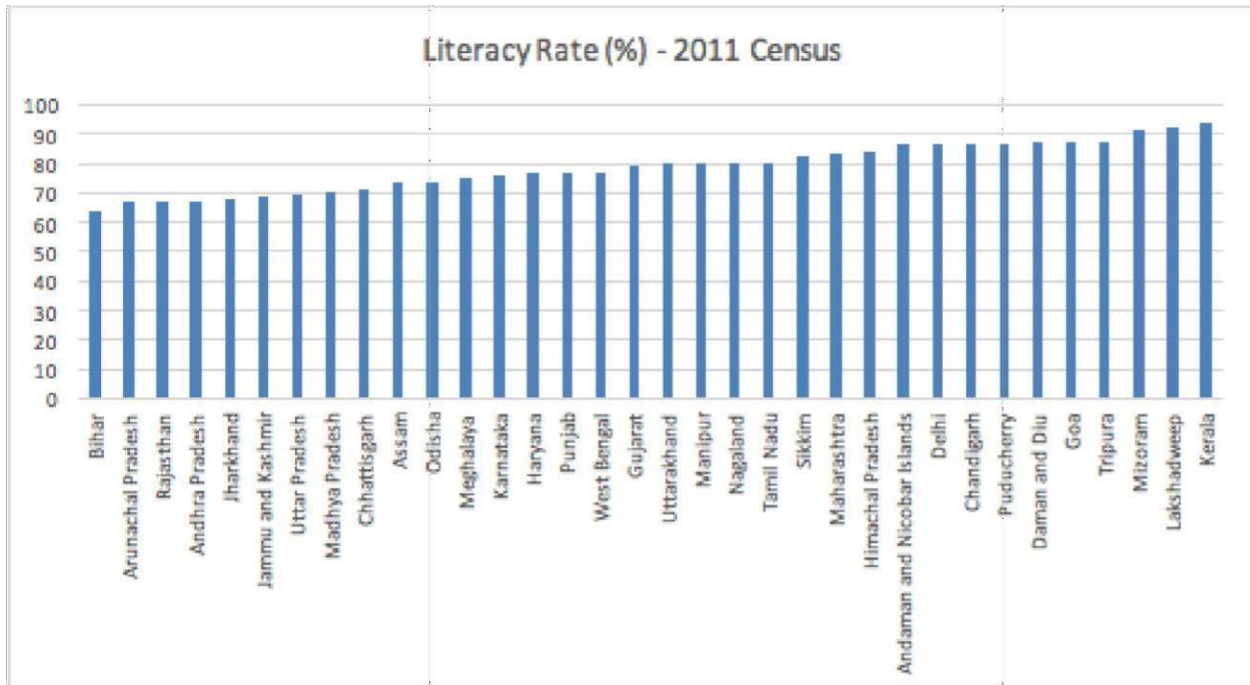


Fig. 1 source: https://en.wikipedia.org/wiki/Indian_states_ranking_by_literacy_rate

First, We Arranged States and Union Territories on the basis of Ascending order of literacy Rate. From the analysis done above, we can infer that Kerala leads the chart with a 93.4 % literacy rate, which is a great achievement compared to India's 74.4 % literacy rate. Bihar, with only a 62% literacy rate, has the lowest literacy among all the states.

Child Sex ratio

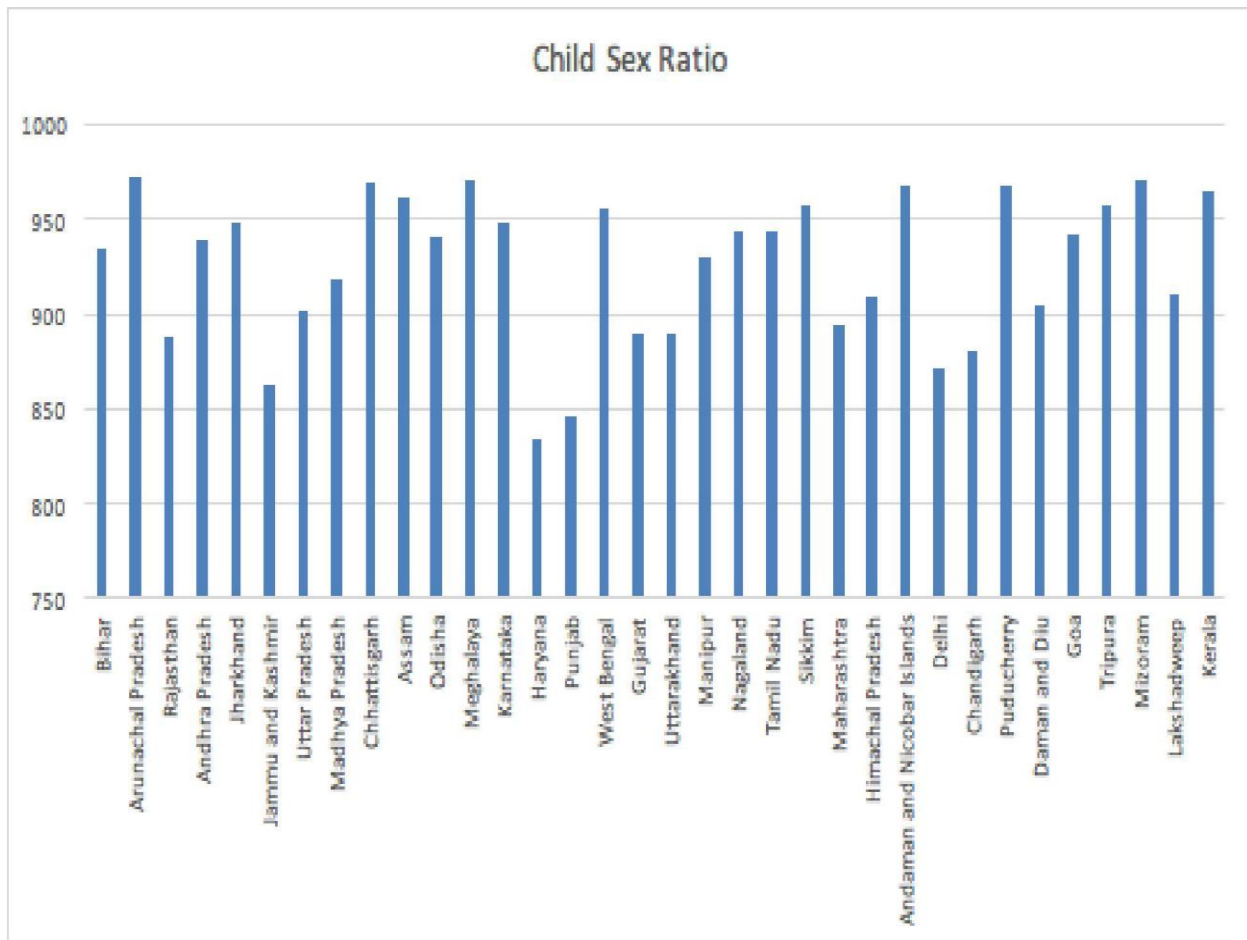


Fig. 2:

source: www.education.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

Arunachal Pradesh leads the way in child sex ratio with 972 female children for 1000 Male Children followed closely by Chhattisgarh with C.S.R. of 969, surprisingly Kerala, one of the most progressive states of India could only manage to get 3rd position with 964 CSR, but we can't say the same about Haryana sits on the bottom of the table with C.S.R. of 834, just below Punjab with C.S.R. of 846.

Sex Ratio

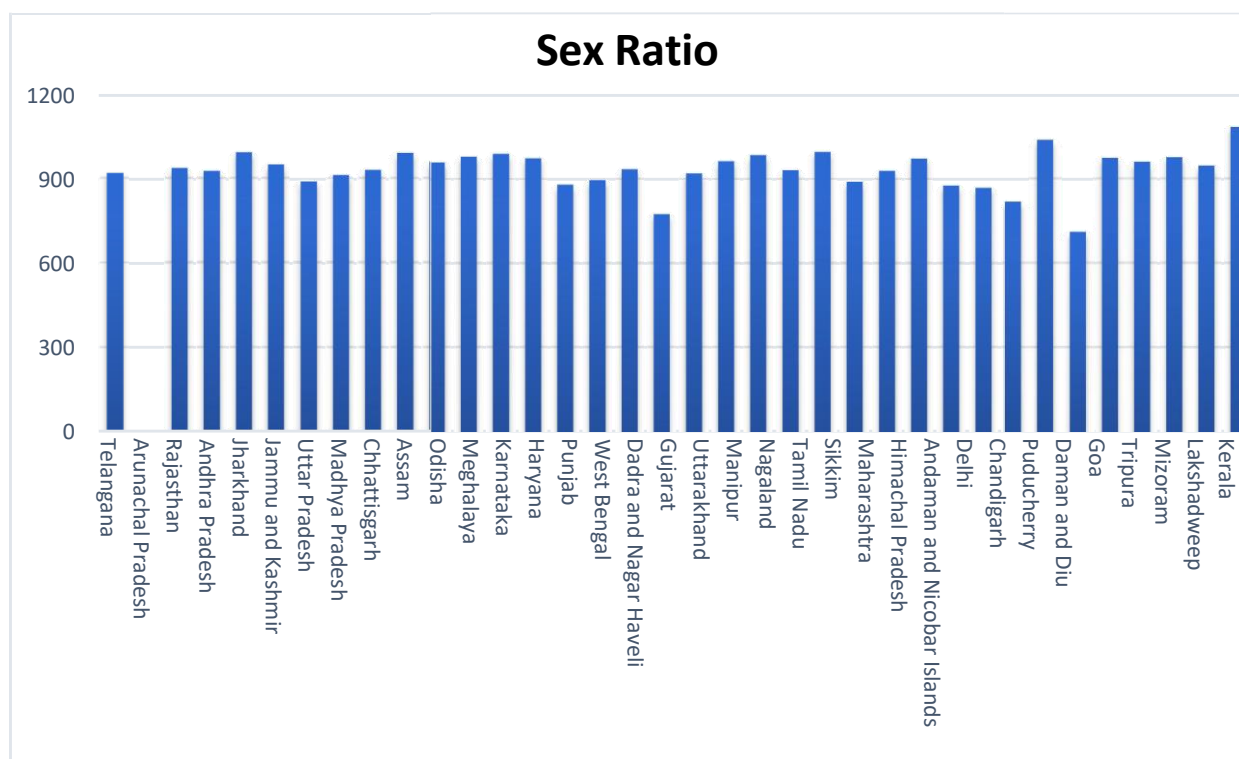


Fig. 3 source: https://en.wikipedia.org/wiki/Indian_states_and_territories_ranking_by_sex_ratio

Topping the charts for long, Kerala boasts the highest sex ratio among all the states with 1084 females per 1000 males, closely followed by Puducherry with 1037 and Tamil Nadu with 996. States like Madhya Pradesh, Andhra Pradesh, and Chattisgarh are also not very behind in numbers as far as the sex ratio is concerned. Simultaneously, Daman and Diu find themselves at the least spot with only 710 females for every 1000 males. A major increase in the recent decade is the one in states like Haryana and Bihar, both of which stand above the 900 marks.

Female literacy rate

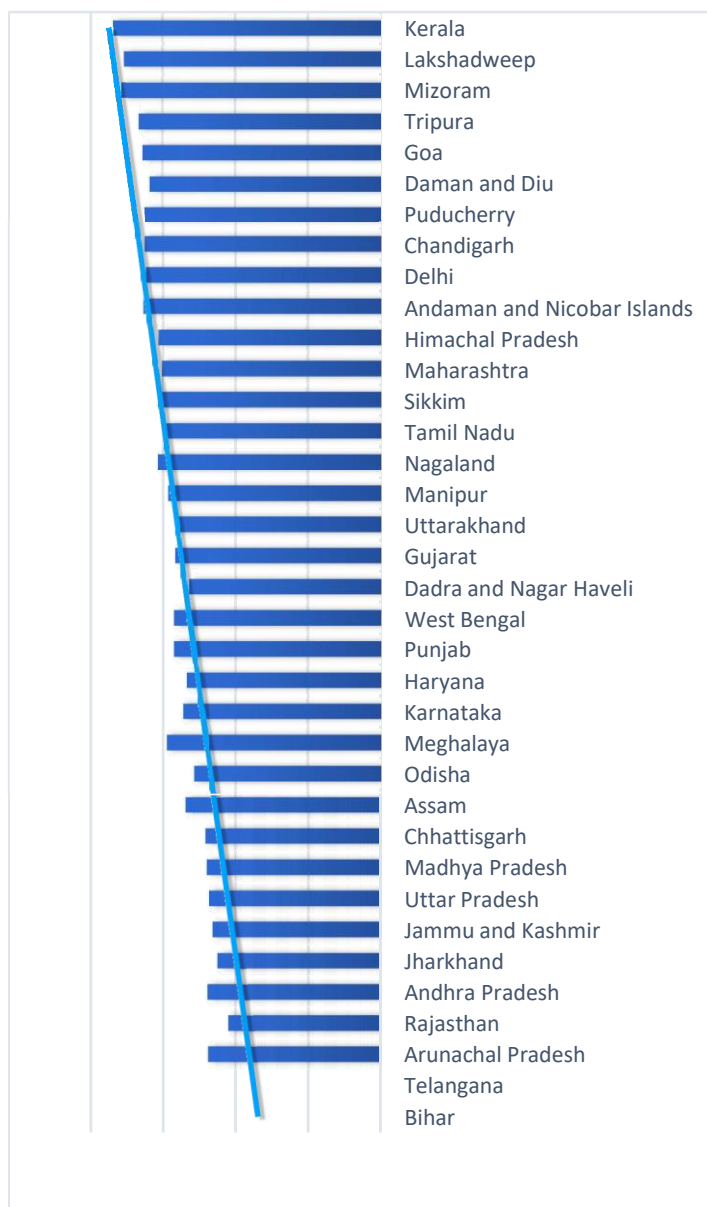


Fig. 4 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

It is visible that the states with high overall literacy rates and high sex ratios follow the same trend when it comes to female literacy rates. Here too, Kerala stands beats all the other states with a flourishing 91.8% female literacy rate. Other states closely follow are Mizoram with 89.4% and Tripura with an 83.14% female literacy rate, while Delhi, Chandigarh, and Puducherry are at close shaves with an average of 81%.

Rural population in percentage

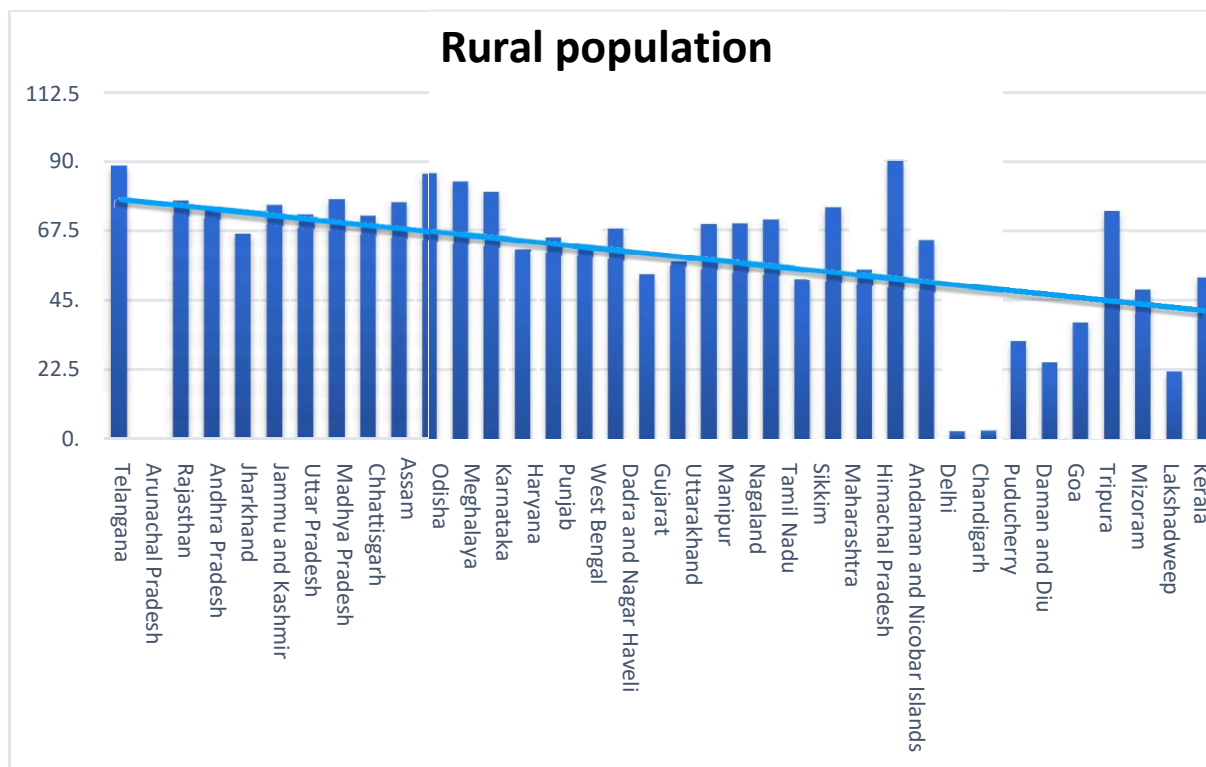


Fig. 5 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

The literacy rate among the rural population is a crucial milestone. We can see that Himachal Pradesh tops the chart with 89.96% rural population in the state, closely followed by Bihar with 88.7%. On the other hand, there are states like Delhi and Chandigarh too, where the rural population accounts for 2.5 and 2.75% of the entire state population. It is not a surprise that states with more rural populations have low literacy.

Percentage of schools with computer

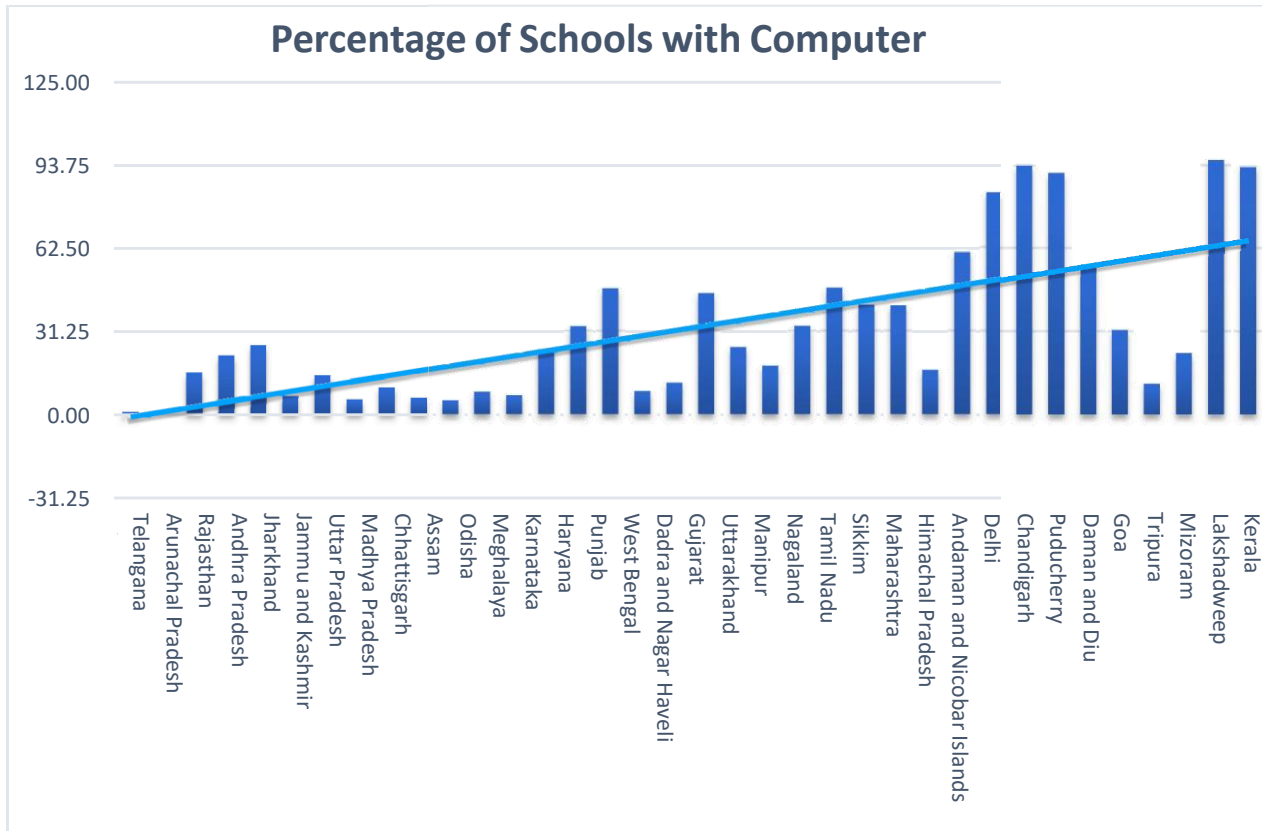


Fig. 6 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

Lakshadweep and Kerala are the two leading states closely followed by Puducherry and Chandigarh regarding the number of schools equipped with and providing basic computer education to the pupils. It should not be surprising that states with high literacy have more schools equipped with the prerequisite technology. Lakshadweep has 95.56% of schools are equipped with a computer, while Kerala follows with 93.01%.

As the literacy rate increases, the number of schools equipped with basic computer technology and education also increases.

Total Schools

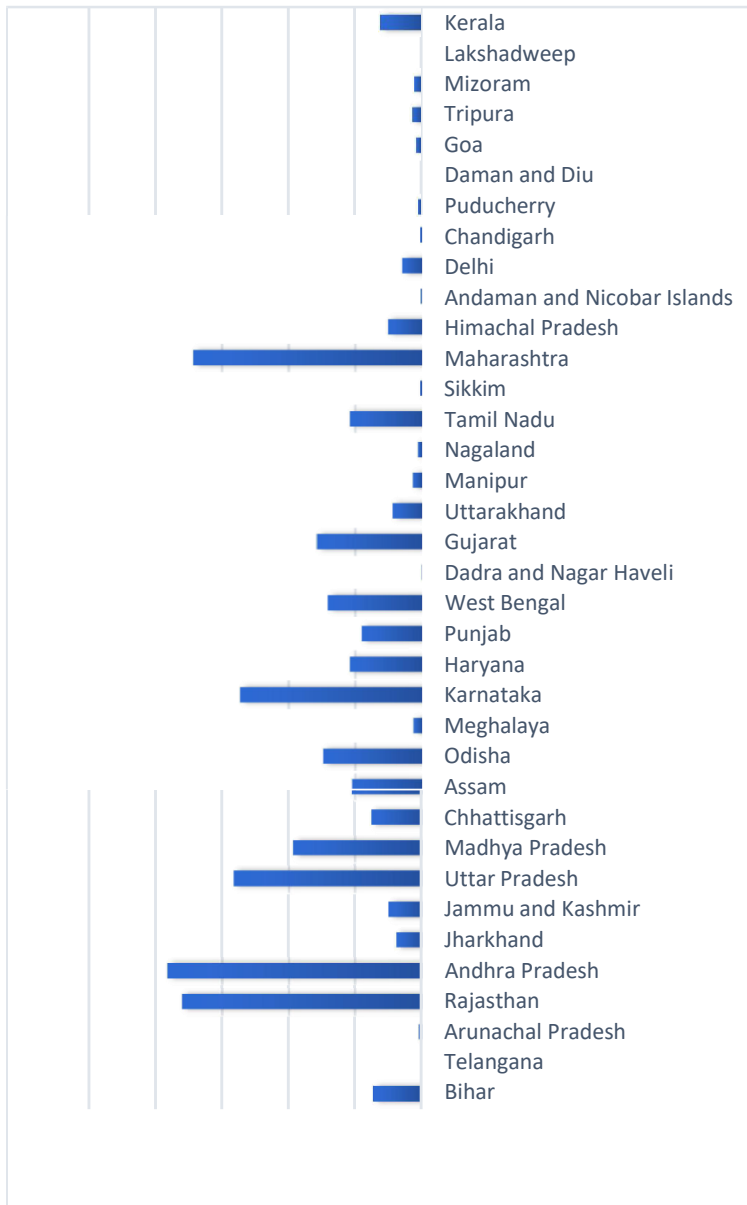


Fig. 7 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

A peculiar chart, if to be called. While Kerala boasts the highest literacy rate and high sex ratio, the number of schools in Kerala compared to many other states is very low. It almost finds itself among the bottom ten states in the count of several schools. On the other hand, Andhra Pradesh leads the chart with 47,838 schools which Rajasthan and Maharashtra follow.

Percentage expenditure on education

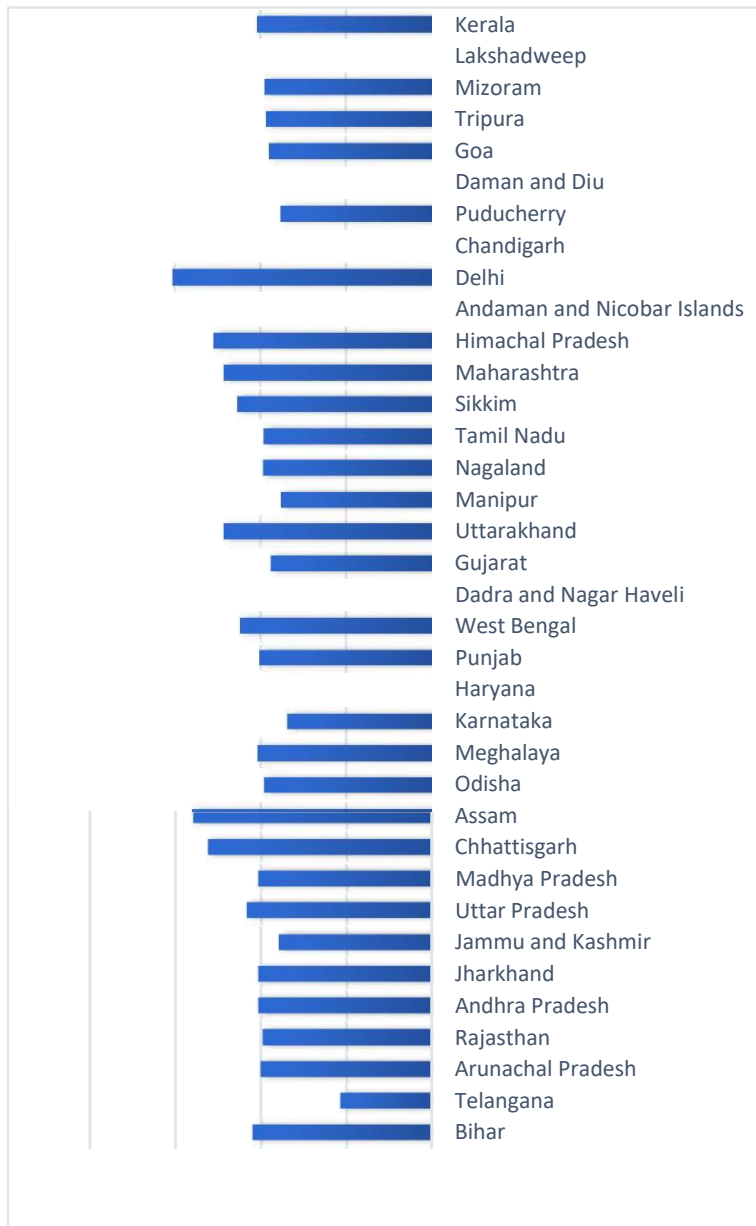


Fig. 8

source: http://empcom.gov.in/content/27_1_StateWiseBudget.aspx

Delhi tops the list of cities with the highest allocation of budget resources to education. Of its annual budget, Delhi allocates a huge 22.5% to education. Closely following Delhi, Assam allocates 21% of its annual budget to education, whereas Telangana stands last with only 8% of its budget.

Unemployment Rate

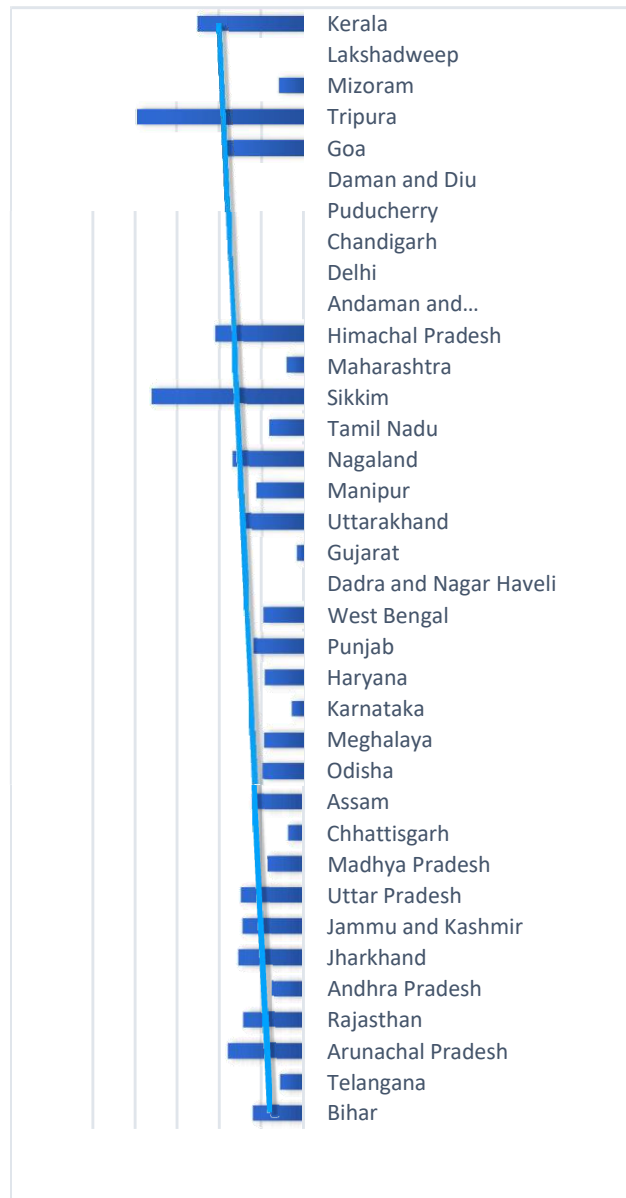


Fig. 9 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

Unemployment is the quagmire pulling the population into plunges, where Tripura ranks at the top in terms of unemployment, immediately followed by Sikkim. On the contrary, Gujarat, Karnataka, and Chattisgarh rank at the lowest positions.

The proportion of working children

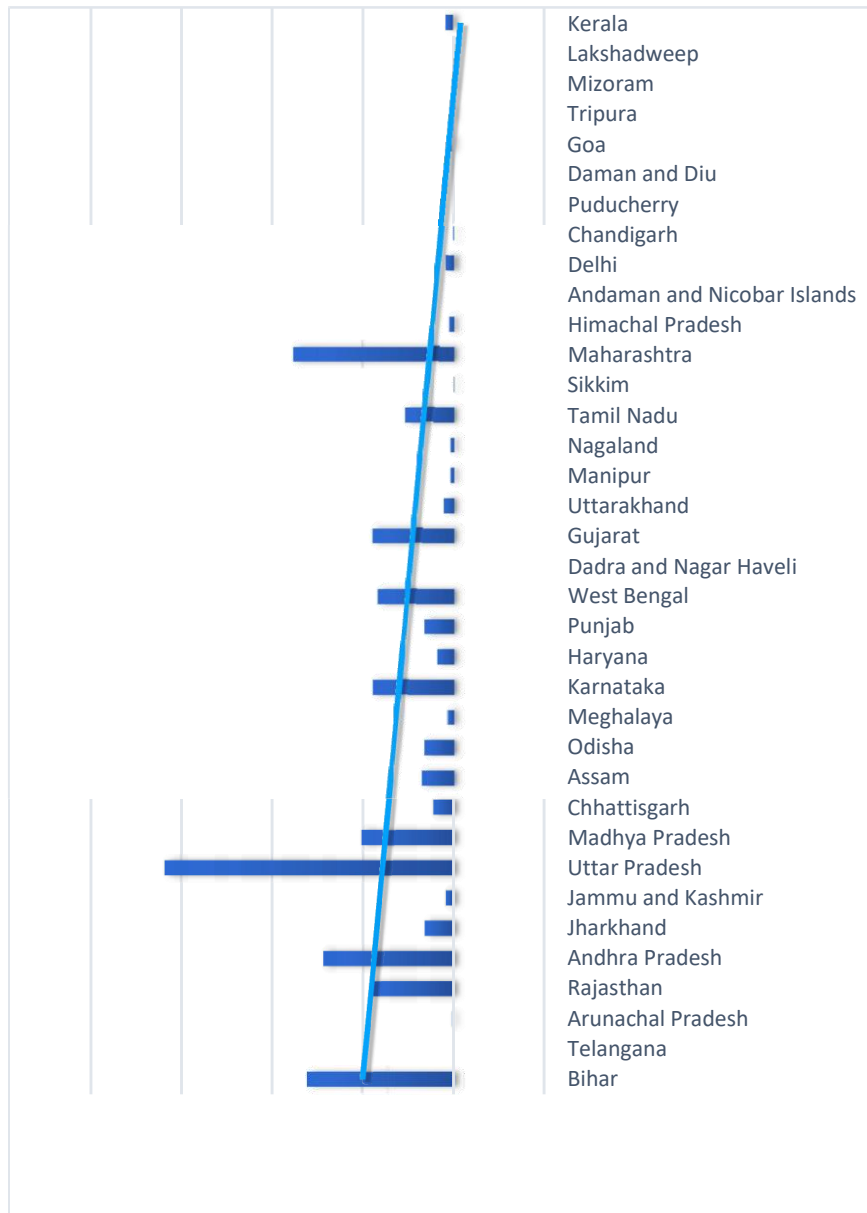


Fig. 10

source: <http://labour.nic.in/sites/default/files/Census-2001&2011.pdf>

As it could be easily predicted, the chart shows the number of child labor population in the Indian states. Not to our surprise, cities like Delhi, Kerala, Puducherry, and Goa, which boast a high literacy rate, stand at the bottom carpet of the list, whereas cities like Bihar, Uttar Pradesh, and Maharashtra bag the top positions on the list.

Pupil-teacher ratio

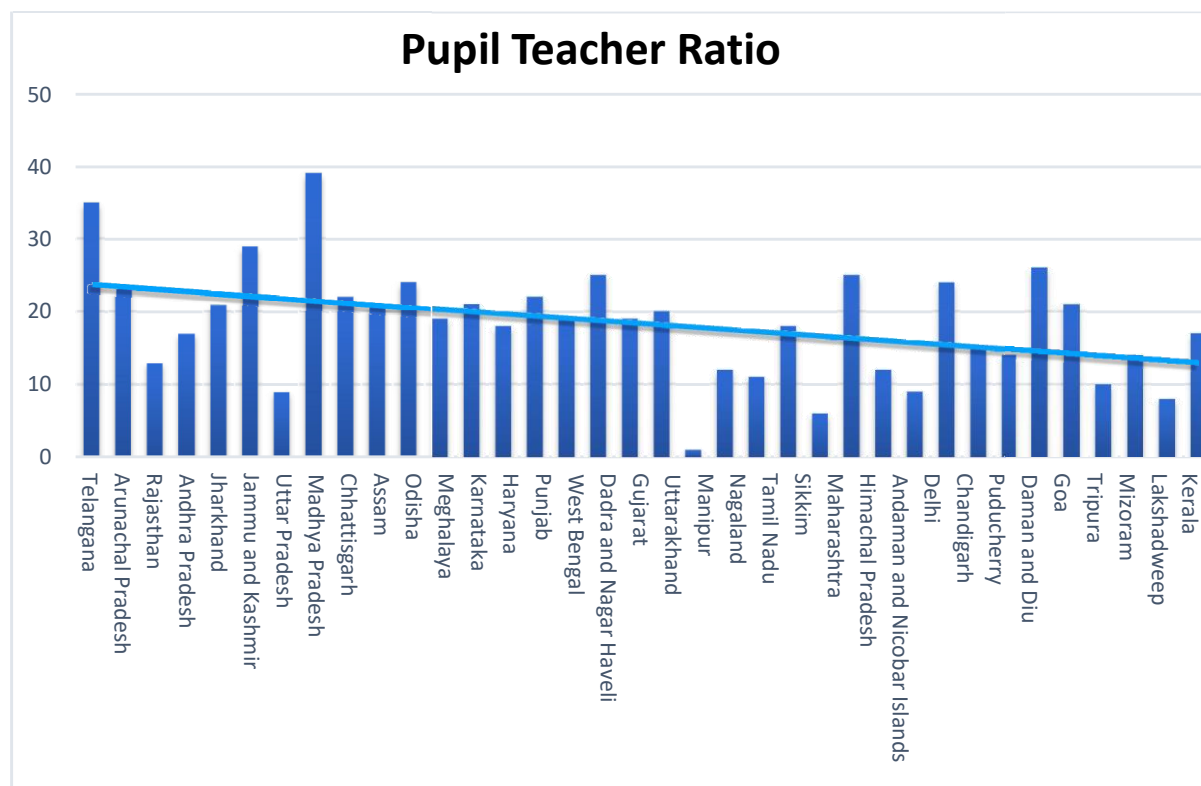


Fig. 11 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

In terms of pupil-to-teacher ratio in the states and union territories, Uttarakhand tops the list with Sikkim following it to the second position while states and union territories like Lakshadweep and Tripura, Puducherry, and Delhi rank on the following positions below Sikkim. Uttar Pradesh and Bihar recorded the most harrowing figures, which rank the last in terms of the pupil-to-teacher ratio. This shows the extent to which the students are coping with the scarcity of teachers in schools.

The trend shows that as the literacy rate increases, the pupil-to-teacher ratio declines. Following the trend, Kerala and Lakshadweep have it on the power side while Uttarakhand tops the list.

1. Percentage of S.C. enrollment

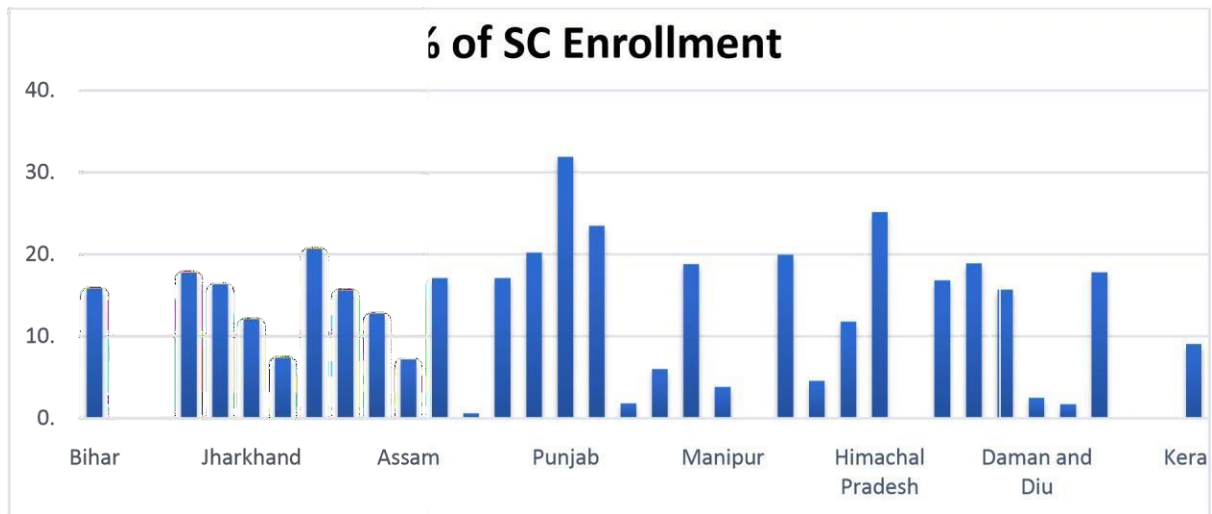


Fig. 12 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

Punjab tops the list when it comes to the enrolment of the population of scheduled castes in schools. It posts a heavy 32.01% on the charts, which Himachal Pradesh follows with S.C. enrolment to the tune of 25%. Simultaneously, the lowest numbers are recorded from states like Meghalaya, Goa, Sikkim, and Manipur, with Lakshadweep at the bottom-most position.

Percentage of S.T.s and S.C.s in Population

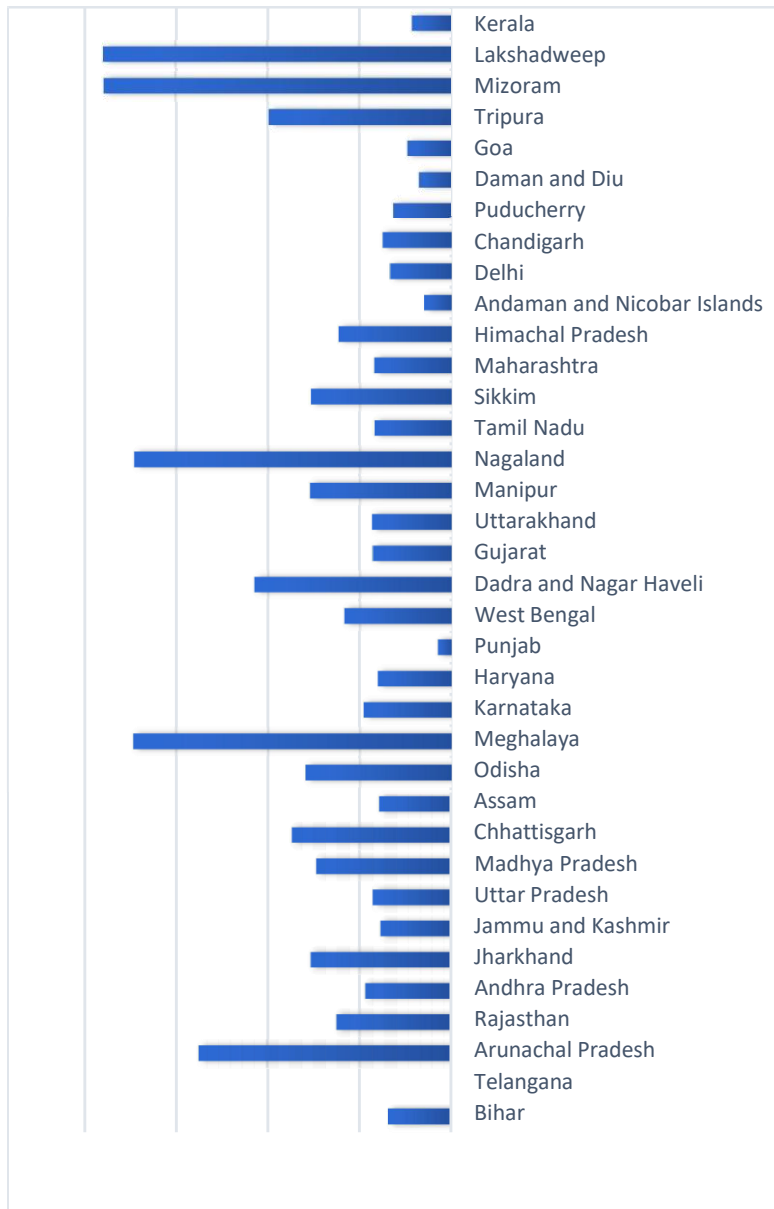


Fig. 13 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

Mizoram and Lakshadweep are in close competition while posting the numbers representing the total percentage of S.C. and S.T. population in the respective states. While Mizoram and Lakshadweep sit at the topmost position, they are immediately followed by Nagaland, Meghalaya, and Arunachal Pradesh. On the other end, Punjab posts the least percentage of total S.C. and S.T. Population in the state.

Population Density

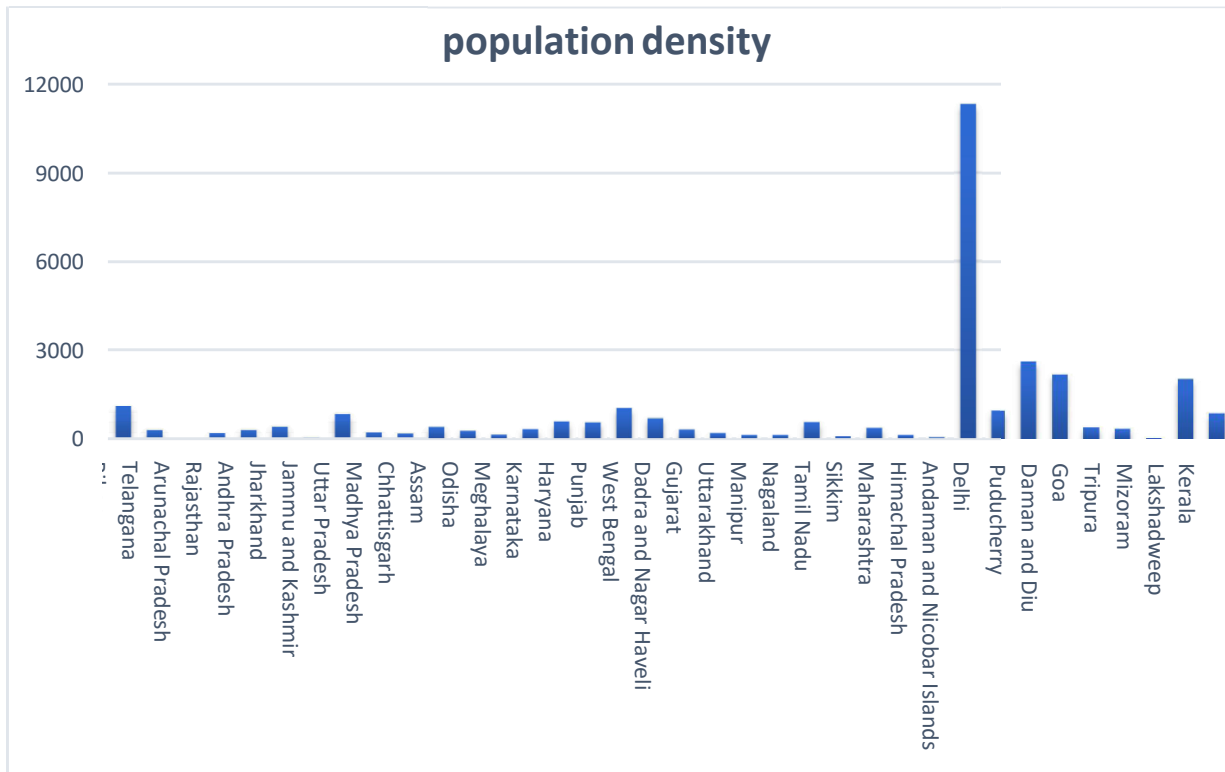


Fig. 14 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

In terms of population, no other city even comes close to Delhi, which posts whopping figures on the chart. Delhi accommodates a massive 11000 people per sq. kilometers, which is increasing at an ever alarming rate in the wake of transition from other non-metro cities. Compared to Delhi, the lowest population density is recorded in Arunachal Pradesh which accommodates a meager 17 people per sq. kilometer. Other states, including Himachal Pradesh, Meghalaya, Rajasthan, and more closely follow Arunachal Pradesh.

Educational development index

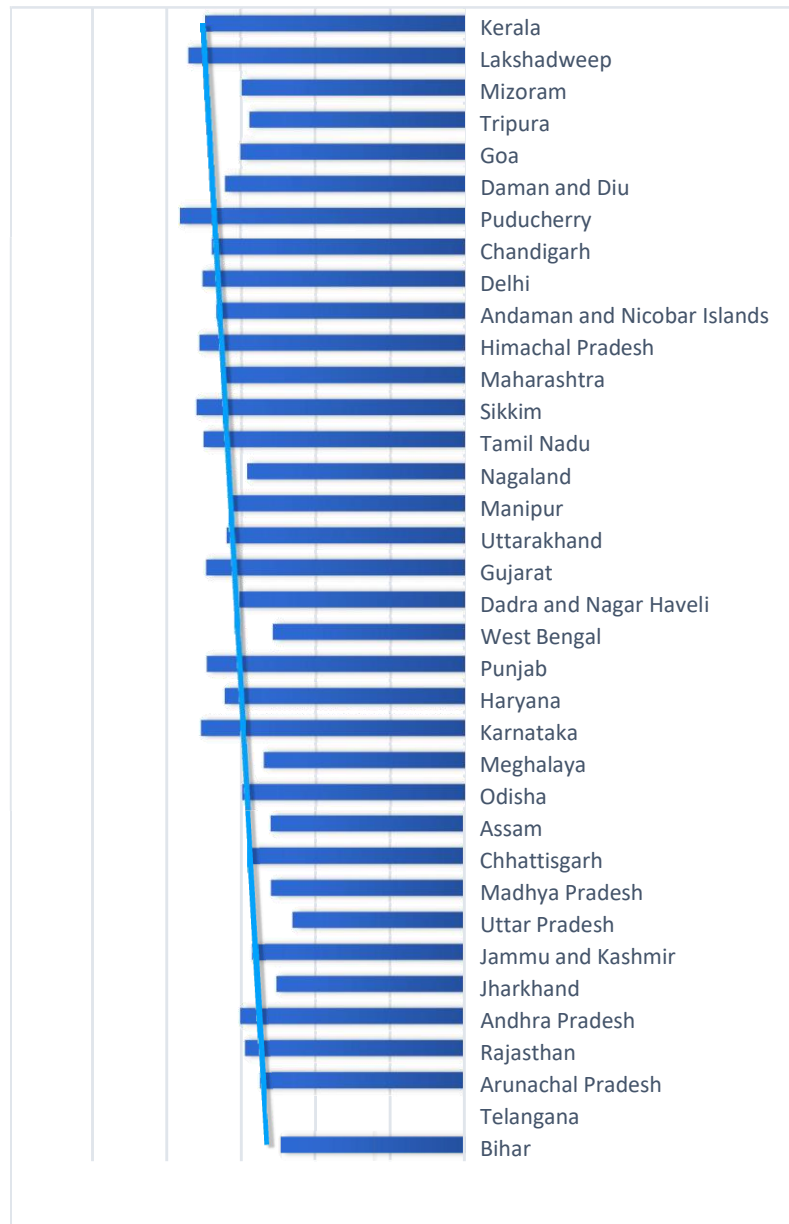


Fig. 15 source: http://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/ESG2016_0.pdf

Puducherry and Lakshadweep post the highest numbers on the chart regarding the educational Development Index, followed by Kerala, Karnataka, Gujarat, Sikkim, and Tamil Nadu. On the other extreme, Bihar posts the lowest numbers. This shows the trend that as the literacy rate increases, the educational development index also increases.

TEST FOR MULTICOLLINEARITY:

Factor	VIF
Child Sex Ratio	7.264
Educational Development Index	10.645
% Budget of Education	1.689
GDP per capita(Rupees)	15.010
Pupil Teacher Ratio	6.326
children working	48.709
Number of Schools	58.677
Female Literacy Rate	17.222
population density	15.634
Rural%	12.586
All Schools with Computer	12.258
Sex Ratio	4.993
Total Schools	6.813
unemployment	6.035
Net enrollment ratio in primary schools	4.574
% of S.T. and SC population	22.609

Table 1

The value of the Variance Inflation Factor for all the independent variables is much more than the acceptable level of 5. We can say our model suffers from multicollinearity, which is not a surprise since these factors are somewhat interdependent.

EXTRACTING PRINCIPAL COMPONENTS:

To combat multicollinearity, we use principal components analysis to reduce the sixteen dimensions of Educational development. By using the P.C.A., we can extract much information in all the indicator at the same time avoiding the problem of multicollinearity

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings				
	Total	% of Variance	Cumulative %	Total	% Variance	Cum relative %
1	4.745	29.655	29.655	4.745	29.655	29.655
2	3.084	19.275	48.930	3.084	19.275	48.930
3	2.572	16.075	65.006	2.572	16.075	65.006
4	1.400	8.747	73.753	1.400	8.747	73.753
5	1.041	6.504	80.257	1.041	6.504	80.257
6	0.877	5.480	85.737			
7	0.684	4.276	90.012			
8	0.599	3.742	93.755			
9	0.372	2.323	96.078			
10	0.210	1.310	97.388			
11	0.167	1.043	98.431			
12	0.107	0.667	99.098			
13	0.092	0.577	99.675			
14	0.027	0.170	99.845			
15	0.016	0.099	99.943			
16	0.009	0.057	100.000			

Table 2

The eigenvalues of components indicate how many variances the component can explain. Five components out of 16 have eigenvalues of more than 1. These factors are the principal components and explain 80.257 percent of Variance in the data.

Factors extracted are:

- 1. Child sex ratio**
- 2. Educational Development index**
- 3. Share of education expenditure in GDP**
- 4. GDP per Capita**
- 5. Pupil-teacher ratio**

Regression:

Our final regression equation is:

$$LR = -3.53 + .252CSR + .381EDI + 0.069BE + .331GDP - 0.153PTR$$

Where,

1. Education Development Index (**EDI**)
2. Child Sex Ratio (**CSR**)
3. Percentage Budget to Education (**BE**)
4. Gross Domestic Product (**GDP**)
5. Pupil to Teacher Ratio (**PTR**)
6. Literacy rate (LR)

Factor	Relationship with a literacy rate
EDI	POSITIVE
CSR	POSITIVE
BE	POSITIVE
GDP	POSITIVE
PTR	NEGATIVE

Table 3

Negative relationships mean an increase in factor leads to falling in literacy rate, and positive relationships indicate that an increase in factor leads to an increase in literacy rate.

R Square:

We obtain the following results from regression of literacy rate on factors extracted in principal component analysis.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.716 ^a	.513	.407	6.21759

Fig .16

The sample Multiple Correlation Coefficient measures the strength of the association, R. R can be any value from 0 to +1.

- The closer R is to one, the stronger the linear association is. If R equals zero, then there is no linear association between the dependent and independent variables.
- R-value of 0.716 indicates a moderately strong linear association between the dependent variable and the independent variables.

An R square value of 0.513 shows that the independent variables taken in the model can explain 51.3 % of the variability independent variable, i.e., literacy rate, and the remaining variability is left as residual variability.

The standard error here refers to the estimated standard deviation of the error term u . The standard error is 6.21759, which tells us that the average distance of the data points from the fitted line is about 6.2 units of literacy rate. The standard error of the regression may be considered to measure the overall amount of "noise" in the data.

F-TEST:

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	937.060	5	187.412	4.848	.004 ^b
	Residual	889.145	23	38.658		
	Total	1826.205	28			

a. Dependent Variable: Literacy Rate (%) - 2011 Census

b. Predictors: (Constant), Pupil Teacher Ratio, Child Sex Ratio, GDP per capita(Rupees), % Budget of Eductaion, Educational Development Index

Fig. 17

- It can be inferred from the above table that calculated F, which is 4.848, is greater than critical F, 2.69.
- Therefore, going by the theory of the F-test, we can reject the null hypothesis and conclude that least one of the β statistics is not equal to 0. Also, it can be concluded that the R square value which we obtained previously is significant. Therefore, it was correct to infer that the independent variables explain 51.3% of the variability in literacy rate.

CONCLUSION

Our study starts with 17 variables affecting the literacy rate of a county, which we reduce to 5 to combat multicollinearity, and on these factors, we based our model. Factors extracted were child sex ratio, educational development index, G.D.P. per capita, pupil-teacher ratio, and state's expenditure on education. The percentage share of education expenditure in the state's budget enables the education department to improve conditions of available education facilities and introduce new facilities, which positively affects many social indicators. Hence, increasing the education budget has far-reaching benefits. Secondly, we study the effect of per capita G.D.P. It is not surprising that states that are financially sufficient and where wealth is distributed more evenly than other states are also highly literate. With financial security, people can afford a good education, and hence increase in Per capita G.D.P. also helps increase the literacy rate. Next, we study the child sex ratio. We can observe a positive correlation between child sex ratio and literacy rate; an increase in C.S.R. is a sign of decreasing gender disparity in a male-dominated society like India. Government should take steps to help C.S.R. get close to its saturation point, which will directly affect the education level in the state. Another factor is the Educational development index which is a sign of the educational health of a state, and naturally, as E.D.I. rises literacy rate also rises. Decision-making. These factors work to improve the educational health of the state and hence, increase the literacy rate. We also studied the effects of the Pupil-teacher ratio, which, as expected, shares a negative relation with the literacy rate. As if there are fewer teachers available than there are students, it will surely be a burden for teachers, and the quality of teaching will go down. Government should look into this and ensure teachers are not overworked and make sure there are enough teachers according to the strength of students. It is a big problem in states with huge Populations like Uttar Pradesh and Bihar.

Let's move to factors that were not extracted during P.C.A. analysis, but a substantial amount of literature is available for those variables and their effect on literacy rate. Thus, we cannot deny their importance. We observed a relationship between gender disparity and education level in states based on factors such as female literacy rate and sex ratio. Less gender disparity showed a positive trend with the literacy rate. It is not a surprise that states with more gender disparity are also those with lower literacy rates. It is also observed that states with a higher percentage of the

rural population have a low literacy rate. It can be safely inferred that this is because of the lack of access to quality education in rural areas compared to urban areas. Child labor is also a big problem in India; we noticed an interesting trend that no children currently share a negative trend with the literacy rate. The government implemented schemes such as mid-day meals for these reasons only, but these schemes are not usually enough to get kids who are forced to work to take care of their family to join schools. The government needs to launch more schemes and take appropriate steps to curb child labor. One interesting yet ironic trend we noticed is that a higher number of schools have low literacy rates. This could be due to differences in quality of educational facilities or population level. Another ironic trend we can observe was the positive relationship between the literacy rate and the unemployment rate. This can be due to a shift in labor from agriculture to industries and the inability of industries to create more jobs. The government needs to look into this and take appropriate steps to create jobs.

To conclude, to make a fully literate society is a daunting, almost impossible task, the educational health of any state in a country depends on thousands of factors. Most of these factors, in turn, depend on education health itself. The analysis of literacy rate across different states and union territories and the state-level factors studied here shows that states such as Bihar and Uttar Pradesh follow the footsteps of progressive states such as Kerala and try to keep these factors in check they too can better their literacy rate and improve their education health.

LIMITATIONS AND SUGGESTIONS

- The data for the newly formed state Telangana was not available since the data used was extracted from Census 2011 when Telangana was not formed. Thus Telangana is kept outside the scope during the construction of the model.
- The data is not consistent with the present scenario of 2017 since the data is from Census 2011.
- Since the data is collected from a third party, there might be inconsistency and systematic error in the data and the findings.
- Since we have taken 35 states and union territories in our study and give the diversity in culture in India, there are a lot of variations on account of differences in economic, political, demographic, and socio-cultural conditions within and across the states and union territories. As a result of these differences, not all the variation in the sex ratio could be explained by the independent variables considered in the study. Even though we included the most significant and numerous explanatory variables in our study, there still might be some more of such variables that could have explained the variations in literacy rates, which were, however, not accounted for.
- Literacy rate is not a perfect factor to judge the educational health of a state, but due to lack of any good substitute, we went ahead with literacy rate. Furthermore, we failed to add any qualitative factors that affect the literacy rate of a state. The study can be improved in the future on this ground.

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ANNEXURE

State	Sex Ratio	Child Sex Ratio	GDP per capita(Rupees)	Literacy Rate (%) - 2011 Census	Female Literacy Rate
Bihar	918	935	63200	63.82	--
Telangana	--	--	182333	66.5	--
Arunachal Pradesh	938	972	139228	66.95	59.57
Rajasthan	928	888	101353	67.06	52.66
Andhra Pradesh	993	939	137000	67.4	59.74
Jharkhand	948	948	73031	67.63	56.21
Jammu and Kashmir	889	862	116535	68.74	58.01
Uttar Pradesh	912	902	72300	69.72	59.26
Madhya Pradesh	931	918	102083	70.63	60.02
Chhattisgarh	991	969	111538	71.04	60.59
Assam	958	962	80325	73.18	67.27
Odisha	979	941	98095	73.45	64.36
Meghalaya	989	970	98559	75.48	73.78
Karnataka	973	948	206451	75.6	68.13
Haryana	879	834	214509	76.64	66.77
Punjab	895	846	151624	76.68	71.34
West Bengal	934	956	100000	77.08	71.16
Dadra and Nagar Haveli	774	926	--	77.65	65.93
Gujarat	919	890	214285	79.31	70.73
Uttarakhand	963	890	180520	79.63	70.7
Manipur	985	930	58442	79.85	73.17
Nagaland	931	943	89607	80.11	76.89
Tamil Nadu	996	943	184210	80.33	73.86
Sikkim	890	957	277282	82.2	76.43

Maharashtra	929	894	225892	82.91	75.48
Himachal Pradesh	972	909	182359	83.78	76.6
Andaman and Nicobar Islands	876	968	138858	86.27	81.84
Delhi	868	871	365882	86.34	80.93
Chandigarh	818	880	275454	86.43	81.38
Puducherry	1037	967	236450	86.55	81.22
Daman and Diu	710	904	--	87.07	79.59
Goa	973	942	466632	87.4	81.84
Tripura	960	957	77351	87.75	83.15
Mizoram	976	970	159645	91.58	89.4
Lakshadweep	946	911	--	92.28	88.25
Kerala	1084	964	196842	93.91	91.98

State	Population	Rural population %	percentage Schools with Computer	% expenditure on education	Total Schools
Bihar	10,38,04,637	88.7	1.21	15.8	9006
Telangana	--	--	--	8.1	--
Arunachal Pradesh	13,82,611	77.33	15.58	15.1	618
Rajasthan	6,86,21,012	75.11	21.73	14.9	45122
Andhra Pradesh	8,46,65,533	66.51	25.58	15.3	47838
Jharkhand	3,29,66,238	75.95	7.15	15.3	4946
Jammu and Kashmir	1,25,48,926	72.79	14.69	13.5	6210
Uttar Pradesh	19,95,81,477	77.72	5.45	16.3	35288
Madhya Pradesh	7,25,97,565	72.37	10.12	15.3	24242
Chhattisgarh	2,55,40,196	76.76	6.04	19.7	9656
Assam	3,11,69,272	85.92	5.12	21	13126
Odisha	4,19,47,358	83.32	8.47	14.7	18534
Meghalaya	29,64,007	79.92	7.10	15.3	1602
Karnataka	6,11,30,704	61.43	24.37	12.7	34182
Haryana	2,53,53,081	65.21	32.92		13542
Punjab	2,77,04,236	62.51	47.12	15.1	11314
West Bengal	9,13,47,736	68.11	8.72	16.8	17590
Dadra and Nagar Haveli	3,42,853	53.38	11.78	--	64
Gujarat	6,03,83,628	57.42	45.37	14.1	19688
Uttarakhand	1,01,16,752	69.45	25.14	18.2	5552
Manipur	27,21,756	69.79	18.18	13.2	1768
Nagaland	19,80,602	71.03	33.12	14.8	812
Tamil Nadu	7,21,38,958	51.55	47.43	14.7	13544
Sikkim	6,07,688	75.03	40.97	17	370

Maharashtra	11,23,72,972	54.77	40.80	18.2	42948
Himachal Pradesh	68,56,509	89.96	16.55	19.1	6386
Andaman and Nicobar Islands	3,79,944	64.33	60.84		198
Delhi	1,67,53,235	2.5	83.17	22.7	3744
Chandigarh	10,54,686	2.75	93.48	--	266
Puducherry	12,44,464	31.69	90.69	13.2	602
Daman and Diu	2,42,911	24.84	55.45	--	58
Goa	14,57,723	37.83	31.92	14.2	920
Tripura	36,71,032	73.82	11.65	14.5	1680
Mizoram	10,91,014	48.49	23.04	14.6	1272
Lakshadweep	64,429	21.92	95.65	--	30
Kerala	3,33,87,677	52.28	93.01	15.3	7650

State	children working	% of SC in Census	% of ST In Census	Net enrollment ration in primary schools
Bihar	451590	15.9	1.3	93.77
Telangana				82.55
Arunachal Pradesh	5766	0	68.8	
Rajasthan	252338	17.8	13.5	77.76
Andhra Pradesh	404851	16.4	7	72.17
Jharkhand	90996	12.1	26.2	96.02
Jammu and Kashmir	25528	7.4	11.9	72.7
Uttar Pradesh	896301	20.7	0.6	85.6
Madhya Pradesh	286310	15.6	21.1	85.31
Chhattisgarh	63884	12.8	30.6	93.37

Assam	99512	7.2	12.4	
Odisha	92087	17.1	22.8	91.07
Meghalaya	18839	0.6	86.1	97.13
Karnataka	249432	17.1	7	96.44
Haryana	53492	20.2	0	77.82
Punjab	90353	3.9	0	85.74
West Bengal	234275	23.5	5.8	90.96
Dadra and Nagar Haveli	1054	1.8	52	76.65
Gujarat	250318	6.7	14.8	83.29
Uttarakhand	28098	18.8	2.9	85.4
Manipur	11805	3.6	35.1	
Nagaland	11062	0	86.5	85.59
Tamil Nadu	151437	20	1.1	88.41
Sikkim	2704	4.6	33.8	79.75
Maharashtra	496916	11.8	9.4	85.7
Himachal Pradesh	15001	25.2	5.7	82.92
Andaman and Nicobar Islands		0	7.5	78.85
Delhi	26473	16.8	0	93.16
Chandigarh	3135	18.9	0	74.93
Puducherry	1421	15.7	0	72.54
Daman and Diu	774	2.5	6.3	75.14
Goa	6920	1.7	10.2	96.97
Tripura	4998	17.8	31.8	
Mizoram	2793	0.1	94.4	95.45
Lakshadweep	28	0	94.8	76.03
Kerala	21757	9.1	1.5	84.62

State	% of ST and SC population	population density	Pupil Teacher Ratio	% of SC Enrollment
Bihar	17.2	1102	35	15.9
Telangana	0	307	23	--
Arunachal Pradesh	68.8	17	13	0
Rajasthan	31.3	201	17	17.8
Andhra Pradesh	23.4	303	21	16.4
Jharkhand	38.3	414	29	12.1
Jammu and Kashmir	19.3	57	9	7.4
Uttar Pradesh	21.3	828	39	20.7
Madhya Pradesh	36.7	236	22	15.6
Chhattisgarh	43.4	189	21	12.8
Assam	19.6	397	24	7.2
Odisha	39.9	269	19	17.1
Meghalaya	86.7	132	21	0.6
Karnataka	24.1	319	18	17.1
Haryana	20.2	573	22	20.2
Punjab	3.9	550	19	31.9
West Bengal	29.3	1029	25	23.5
Dadra and Nagar Haveli	53.8	698	19	1.8
Gujarat	21.5	308	20	6
Uttarakhand	21.7	189	1	18.8
Manipur	38.7	122	12	3.8
Nagaland	86.5	119	11	0
Tamil Nadu	21.1	555	18	20
Sikkim	38.4	86	6	4.6
Maharashtra	21.2	365	25	11.8
Himachal Pradesh	30.9	123	12	25.2
Andaman and Nicobar Islands	7.5	46	9	0
Delhi	16.8	11297	24	16.8

Chandigarh	18.9	952	15	18.9
Puducherry	15.7	2598	14	15.7
Daman and Diu	8.8	2169	26	2.5
Goa	11.9	394	21	1.7
Tripura	49.6	350	10	17.8
Mizoram	94.5	52	14	0.1
Lakshadweep	94.8	2013	8	0
Kerala	10.6	859	17	9.1

State	Educational Development Index	unemployment rate
Bihar	0.491	60
Telangana		28
Arunachal Pradesh	0.548	89
Rajasthan	0.592	71
Andhra Pradesh	0.603	39
Jharkhand	0.505	77
Jammu and Kashmir	0.57	72
Uttar Pradesh	0.462	74

Madhya Pradesh	0.519	43
Chhattisgarh	0.571	19
Assam	0.52	61
Odisha	0.599	50
Meghalaya	0.541	48
Karnataka	0.71	15
Haryana	0.646	57
Punjab	0.694	60
West Bengal	0.515	49
Dadra and Nagar Haveli	0.606	
Gujarat	0.696	9
Uttarakhand	0.639	70
Manipur	0.628	57
Nagaland	0.586	85
Tamil Nadu	0.701	42
Sikkim	0.722	181
Maharashtra	0.65	21
Himachal Pradesh	0.714	106
Andaman and Nicobar Islands	0.668	
Delhi	0.705	
Chandigarh	0.68	
Puducherry	0.762	
Daman and Diu	0.642	
Goa	0.601	96
Tripura	0.577	197
Mizoram	0.597	40
Lakshadweep	0.741	
Kerala	0.696	125