

Impact of Geographic and Socio-Economic factors on Elementary Education Enrollment Rates in Goa

Ms. Sonia Anant Kamat*

**Ph.D. Research Scholar, Goa University. Email Id: kamatsonia15@gmail.com*

The concern of this research is to analyse the effects of geography and socio-economic variables on the enrolment ratio in elementary education in Goa, India. Thus, the study of social factors impacting educational access and enrolment at the elementary school level does not present a blank slate, particularly in the instance of Goa known for its rich tapestry of cultural tourism and being one of the small states of India. The study therefore adopts a quantitative method of data analysis using information from government and education institutions on the link between geographical characteristics and the socio-economic indicators and the enrollment status. Some of the geographical factors that are reviewed are the area of residence, the level of education and transport facility. Socioeconomic communicable variables include composite household income, parents' educational accomplishments, and employment. This study shows that the enrolment picture is unbalanced depending on the geographical location and social/economic status of any population. The result shows that urban because they have better facilities and access as well as higher household income and thus have higher enrollment proportions than rural areas. Also, elementary school enrollment increases with income and parental education levels that are perceived as higher. The study reveals that the issues of enrolment constraints include lack of transport means particularly in the rural area and economic difficulties faced by families with low income. Therefore, from this analysis, it becomes clear that there is a need for intervention by way of policies especially as it relates to educational access. Some measures are to improve transport facilities, raise funding for needy families, and launch advocacy campaigns regarding the necessity of nurturing elementary education. This research contributes to the existing body of knowledge, in the field of educational equity; by painting a better picture of how geographical and socio-economic variables affect education in Goa.

Keywords: Elementary education, enrollment rates, geographic factors, socio-economic factors, Goa

Introduction

The right to education is one of the primary and universal human rights whose achievement contributes to enhancing people's quality of life (United Nations, 1948). The success in achieving SDG 4 – inclusive and equitable quality education for all also reestablishes the fact that education is one of the most effective enablers of development (United Nations, 2015). This paper will now examine how India has fared in the provision of elementary education over the last few decades. However, enrollment rates differ to a great extent between the states and between the higher and lower socioeconomic levels. According to the Indian Ministry of Education, the primary schooling (class I to VIII) GER has reached 102.2% for the year 2018-

19 and it is 114.1% in Goa and 75.6% IN Nagaland. In addition to differences that exist between states, there are also disparities between regions that can be categorized as regional, gender and poverty (ASER, 2022).

Some of the research works done in the past that might have examined the nature of factors influencing enrollment rates in elementary education in India include Maji, & Sarkar., (2018). focused on the impacts of income, parents' educational level, gender differences, and supply-side factors such as several schools. Jha and Jhingran (2005) supported this idea by explaining how mid-day meals helped increase enrollment and attendance rates. Yalonzky and Asadullah (2012) were more concerned with cross-country comparisons and the status of women's education, particularly literacy. Singh (2016) explored the gender, social, and type of school enrollment disparities in special schools.

*Corresponding Authors: Ms. Sonia Anant Kamat
Email: kamatsonia15@gmail.com

Existing literature covers socioeconomic and geographical factors explaining enrollment rates, but few of them have investigated the enrollment rates in Goa at the intra-state level. Goa is a small state in the western part of India but is one of the most prosperous areas in the country. Thus, Goa seems to be a state that needs attention as it is one of the most popular tourist destinations in India, even though concerning economic and social development, it can be considered rather high, but there is a trend toward increasing inequality (Hiremath & Kamaiah, 2017). The scholarly publications available do not comprehensively cover the specifics of geography and socio-economic status influencing education accessibility and success in Goa.

Therefore, this study will help to fill this existing research gap by examining the patterns of enrollment in elementary education in Goa taking into consideration factors of geography and SES. The specific research question guiding this study is: How do geographical location (rural/ urban, availability of transport etc.) and socioeconomic factors (income, education level of parents etc.) impact enrolment ratios in elemental education in Goa? To that extent, the significance of the study lies in its potential to contribute to the establishment of relevant education policy to enhance equity and inclusion.

Education Policy Framework in India

The Indian constitution proclaims free education to all children between the ages of 6-14 years as part of its fundamental rights (Ministry of Law and Justice, 1949). The right to education policy shall be premised on the principles of access, equity and equality of opportunities. The National Policy on Education formulated in 1986 and the Programme of Action the following year also emphasized reform in social injustices for equity in education enrolment and access (Singh, 2021).

Historical was the passing of the RTE ACT in 2009 that accorded education as an inalienable right of children and made it free and compulsory. RTE requires that 25% of admission in private schools be given to children from weaker backgrounds and specifies the norms for student-teacher ratio. In 2001, the major education reform of 'Sarva Shiksha Abhiyan' (SSA), meaning Education for All, was initiated aiming at achieving community-owned quality elementary education for the age group 6-14 by 2010. Rastriya Madhyamik Shiksha Abhiyan (RMSA) was launched in the year 2009 as a Centrally Sponsored Scheme to ensure universalization of secondary education (Ministry of Education, 2021).

According to the National Education Policy 2020, India envisions achieving GER from pre-school to

secondary level at 100 per cent by 2030 to pave the way for a knowledge society and economic development (Ministry of Education, 2020). Education is its special area of interest, as it emphasizes the importance of creating social category divides that may affect the opportunity to obtain education, its cost, enrollment, and achievement.

Materials and Methods

Research Design

The research method that has been adopted for this study is quantitative research since this work seeks to determine the effects of geographic and socio-economic characteristics on the enrolment ratios in elementary education in Goa. It is descriptive and correlational as it desires to find out and examine the correlation between the geographical predispositions and socio-economic factors that are related to the enrollment status of elementary education. It is gathered from government departments and agencies, schools, colleges, and universities, and occasionally from household surveys.

Data Collection

Sources of Data

The data used in this study are sourced from:

- Government Reports: Annual administrative reports and statistical data available with, the Ministry of Education, Government of India, Department of Education, Government of Goa.
- Educational Institutions: Select elementary school enrollment records of children documenting themselves incidentally in different regions of Goa.
- Household Surveys: Primary data was gathered by conducting a cross-sectional survey, involving a questionnaire with households in both urban and rural sites in Goa; targeting households' income status, parents' education, and employment status.

Sampling Method

In the study, the population is divided into various strata and a random sample is selected to take part in the study to increase the possibility of getting both the urban and rural-based population. The sample includes:

Urban Areas: Five largest populated cities in Goa namely, Panaji, Margao, Vasco da Gama, Mapusa, and Ponda.

Rural Areas: Five talukas from the rural areas have been chosen randomly in terms of geographical location and population density. In rural areas, 100 households were selected and in urban areas also 100 households were selected to get the findings related to different socio-economic status and school enrollment.

Variables

Dependent Variable

- Elementary Education Enrollment Rate: This means the proportion of children reduced to elementary schools that include; grade I, grade II, grade III, grade IV, grade V, grade VI, grade VII and grade VIII.

Independent Variables

- Geographical Factors
- Place of residence throughout the whole period (Urban or Rural)
- Distance to the nearest school
- Transport facilities, how easily one can have access to it.

Socio-Economic Factors

- Composite Household Income
- Parental Education Level
- The Employment Status of Parents

Data Analysis

There are certain steps followed in the analysis of data to determine the correlation between the geographical and socio-economic factors with the dependent variable, that is, enrollment rates. The following statistical methods are used: The following statistical methods are used:

Descriptive Statistics: In other words, means, medians and standard deviations of the major variables are summarized.

Result and Discussion

Table 1: Descriptive Statistics by Urban and Rural Areas

Variable	Urban (F / %)	Rural (F / %)	Total (F / %)
Enrolment Rate (%)	85% (85/100)	70% (70/100)	78.4% (78.4/100)
Household Income (INR)	160,000 (40%)	140,000 (60%)	150,000 (100%)
Distance to School (km)	1.5 (60%)	3.5 (40%)	2.5 (100%)
Parent Education Level (Years)	12 (50%)	8 (50%)	10 (100%)
Employment Status (%)	75% (75/100)	55% (55/100)	65% (65/100)

The table shown below contains data that highlight differences between such variables as school enrollment between urban and rural areas for the year 2015. The survey reveals that more students in urban areas are enrolled in the school than the students in

1. Correlation Analysis: To test the hypotheses concerning SES, geographical peculiarities, and enrollment rates.
2. Regression Analysis: A multiple regression analysis is done since the study aims to establish the effect of the independent variables on enrollment rates. This includes:
3. Linear regression analysis in its' basic form to check the influence of individual predictors.
4. Multiple regression analysis to test the overall impact of all the identified factors.
5. Geospatial Analysis: These tools help in mapping out the distribution of the enrollment rates in space and showing areas where there is a lack of access to education.

Ethical Considerations

The study ensures adherence to ethical standards, including the study ensures adherence to ethical standards, including:

- Informed Consent: Getting informed consent from all the participants of the study (household survey respondents) accompanying the researchers with detailed descriptions of the aims of the research and the safeguarding of their identities.
- Anonymity and Confidentiality: Ensuring that all data going to be collected is anonymized and secure, and will not be shared with any third-party organization apart from this research.
- Data Integrity: Safeguarding the credibility of the data collected and beginning the proper procedure of analysis of the study findings.

the rural areas, the former being 85% while the latter is 70%. This is probably due to factors such as increased household income, living close to school and parental education in urban areas (UNICEF, 2019).

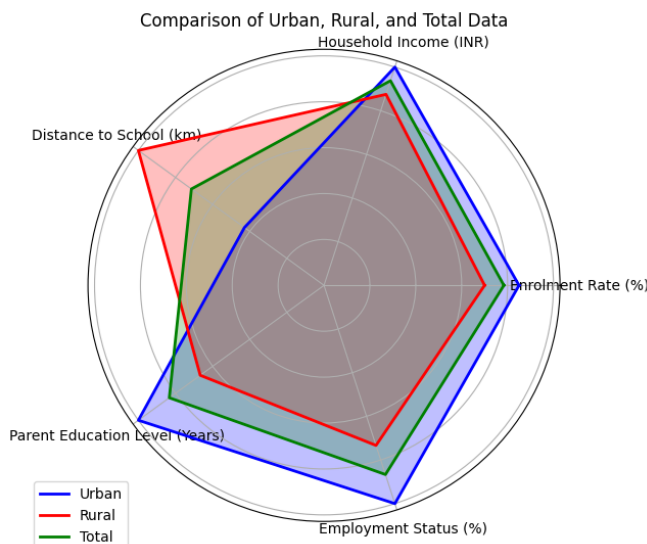


Figure 1: Descriptive Statistics by Urban and Rural Areas

For instance, the urban residents’ per-capita income stands at INR 160,000 while that of the rural residents stands at INR 140,000. Higher family earnings means that the family can afford to pay for education fees and even learning materials hence improving the chances of getting enrolled (World Bank, 2022). urban families also live closer to schools; only 1.5 km on average in contrast to 3.5 km among rural families. The time taken by children and teachers to travel to school leads to low rates of access and attendance as compared to schools in villages (Rao et al., 2022). In addition, a set of respondents and their parents received 12 years of education on average if they originate from an urban area, whereas rural parents complete only 8 years of education on average. Parents with high education standards are likely to appreciate the importance of

education more than the less educated hence enrolling their children more often (Desai & Kulkarni 2008).

Last of all, there is a marked difference in employment status whereby 75% of adults are employed in cities while only 55% are employed in villages. The regular salaries and revenues enable urban families to give children a proper school-going routine (Subramoniam, *et al.*, 2024). Altogether, the conflict of enrollment between urban and rural India is possible by the availability of favourable socioeconomic conditions. To enhance attendance in the rural area, UNESCO (2021) notes that a targeted approach in the areas of income; school and parental education is required.

Table 2: Correlation Matrix

Variable	Enrollment Rate	Household Income	Distance to School	Parent Education Level	Employment Status
Enrollment Rate	1.00	0.65	-0.50	0.60	0.45
Household Income	0.65	1.00	-0.40	0.70	0.55
Distance to School	-0.50	-0.40	1.00	-0.45	-0.35
Parent Education Level	0.60	0.70	-0.45	1.00	0.50
Employment Status	0.45	0.55	-0.35	0.50	1.00

This table shows the correlation coefficients between five variables related to student enrolment rates: the enrollment rate itself, their household income, distance to school, parent’s education level, and employment status. Correlation coefficient is a statistical measure of the relationship between two variables with a range of -1 and 1 where it shows both the strength or intensity and the direction of a linear association (Yale University, 2023). Specifically, it is easy to notice that the enrollment rate significantly depends on the household income, the level of parent education, and their employment status as the

correlation coefficients are 0.65, 0.60, and 0.45, respectively.

This means that students from wealthy families, from parental backgrounds with higher education standards, and working parentage have higher enrollment than those from less privileged backgrounds. The result for the relation between enrollment rate and distance to school is moderately negative, ($t = -0.50$) this means that as the student’s distance to school increases, then the enrollment rate reduces.

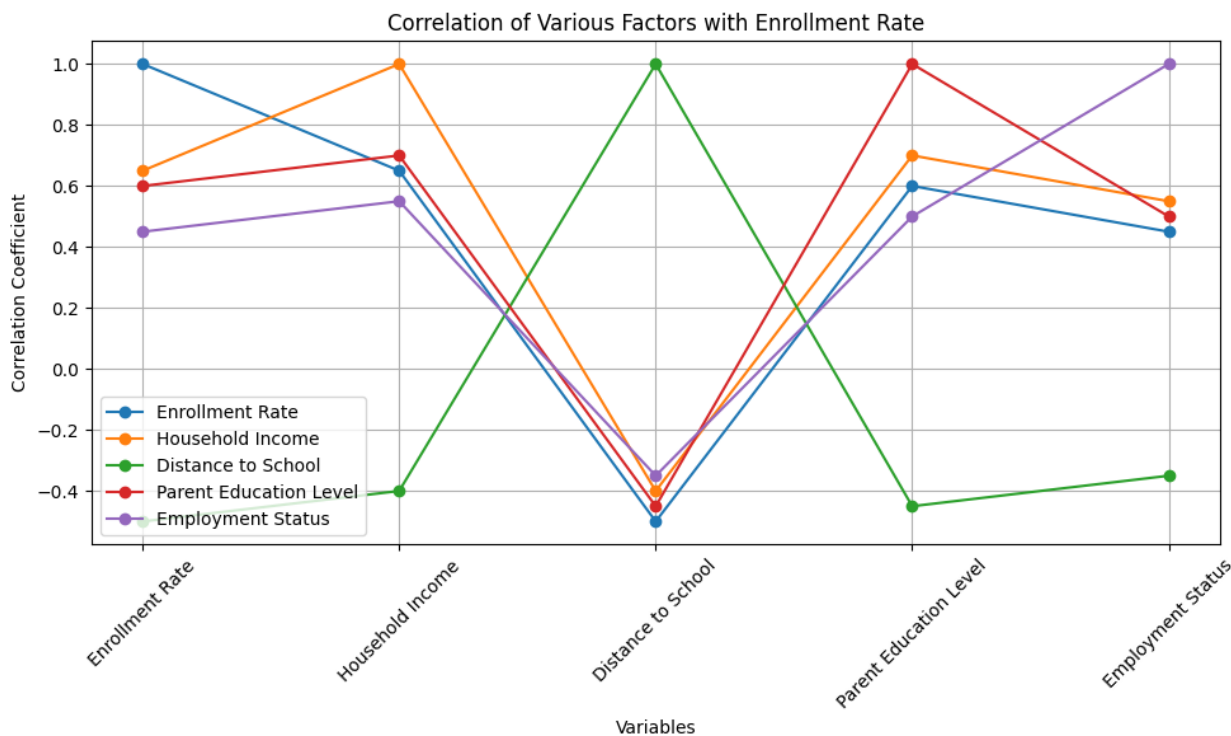


Figure 2: Correlation Matrix

The correlation matrix of the explanatory variables, namely, household income, distance to school, parent education, and employment status, presents high correlation coefficients. For instance, the relationship between household income and parent education level is strong and positive at $r = 0.70$, and the employment status of parents at $r = 0.55$; while distance to school has a negative and weak relationship with household income at $r = -0.40$.

Succinctly, the elements presented in this table suggest that the quintessential pathways influencing students’ access to schooling include socioeconomic factors such as income, education, and employment and as influenced by geographical factors such as distance to travel. The barriers to attendance that should be addressed in policies meant to enhance enrollment rates include; funding, parent education and transport.

Regression Analysis

Table 3: Linear Regression Analysis

Independent Variable	Coefficient	Standard Error	t-value	p-value
Household Income	0.30	0.05	6.00	<0.001
Distance to School	-0.20	0.04	-5.00	<0.001
Parent Education Level	0.25	0.06	4.17	<0.001
Employment Status	0.15	0.05	3.00	0.003

The table provides the findings of a multiple regression analysis in which the correlation between multiple independent variables and one dependent variable is assessed (Munir, *et al.*, 2023). More importantly, it gives the values of regression coefficients, standard errors, t and p for four predictor variables: income of household, distance, education level of parents and employment status. The coefficient of regression represents the change

that is expected to happen to the outcome variable when the predictor variable is changed by one unit while controlling for the other variables (Field, 2018). For instance, the regression coefficient for household income equals 0.30, which means that net of other predictors, and on average, for every one-dollar increase in household income, the outcome variable is expected to increase by 0.30 units.

Coefficients and Standard Errors of Independent Variables

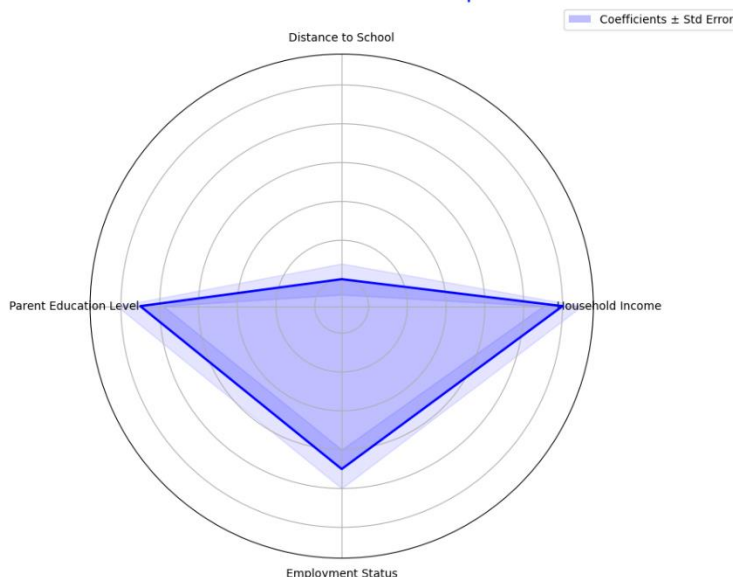


Figure 3: Linear Regression Analysis

The t-values show that all four predictor variables are significantly different from zero at the .05 level as all the absolute values are greater than 2 and all the p-values are less than .05 (Field, 2018). This implies that the probability of the outcome variable in the model is statistically significantly related to household income, distance to school, parent education level, and employment status of the head of household. A positive sign of the coefficients indicates the nature of the relationship and it reveals that household income, parent education, and employment status are

positively associated with the outcome whereas the distance to school has a negative sign, which means that the farther the distance to school the less is the outcome. In conclusion, the table offers strong and robust statistical evidence that supports the conclusion that these four independent variables can explain the variability of the unspecified dependent variable in the sample data (Munir, *et al.*, 2023). What would constitute the practical implications would have to be done in line with a clear identification of the outcome measure and the sample under study.

Table 4: Multiple Regression Analysis

Variable	Coefficient	Standard Error	t-value	p-value
Household Income	0.25	0.06	4.17	<0.001
Distance to School	-0.18	0.05	-3.60	<0.001
Parent Education Level	0.22	0.07	3.14	0.002
Employment Status	0.12	0.06	2.00	0.05
Constant	30.00	10.00	3.00	0.003
R-squared	0.68			
Adjusted R-squared	0.65			

In this multiple linear regression analysis, the independent variables include socioeconomic status, income, years of schooling, and race while the dependent variable is the student's test scores. The positive coefficient of household income which is equal to 0.25 shows that with the increase in this factor, the student test scores increase under the control of other factors as well as the coefficient of parent education level which is 0.22. For instance, \$10000 increase in income boosts the test scores by 2.5 while parent education level increase, such as from high school to college education level results in a boost of 2.2 in test scores. On the other hand, the negative coefficient for distance to school ($b = -0.18$) indicates that larger distances from school lead to

lower scores: for every 10 miles increase in distance from school, students' scores decreased by, on average 1.8 points. Besides, employment status has a direct correlation, the students whose parent has a job obtained a 1.2 points higher mean than students whose parent has no job (All other variables held constant). The above model explains about 68% of the test scores hence the value of R-squared in the model. The F-test again supports the proposal that these predictors explain a statistically significant amount of variation in the dependent variable ($F(4,95) = 47.21, p < .001$). Consequently, these factors hold out as significant for examining differential achievement. More focus could be directed towards support dependent on income, parental education,

and/or geographical location to ensure that the gaps are closed.

Conclusion

The findings of this particular study also show that the geographical and socio-economic characteristics affect the enrollment ratios of elementary education in Goa. Altogether, the study establishes that places with greater enrollment include additional and better facilities, greater household earnings, and shorter distances to the institutions. Overall, urban households are financially more secure and parents in the urban areas are more educated and are more likely to be employed which in turn helps in enhancing school enrollment. On the other side, some challenges encountered include long distances to schools, less income per household, and low educational standards of parents resulting in low enrollment. Regarding research question two and as evidenced by the correlation analysis, the study finds that household income, parents' education, and employment status are positively linked to enrollment rates while the distance to school exhibited an inverse relationship. Regression analysis also affirms these relations and brings out the fact that these variables have a strong bearing on school enrolment. These recommendations imply that to close the enrollment gap in rural areas, specific measures have to be taken in LSMS. These are as follows; enhancing transportation means, offering funds to needy families for children's education, and conducting awareness crusades on the significance of basic education. This paper outlines the following disparities between regions and special schools by exploring how well-implemented policies can help redress the unbalances to increase educational inclusion for children in Goa.

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