



(Literature Review) Infrastructure and Enrolment of Scheduled Tribe Students in India

K. Damodaran

Central University of Tamil Nadu Thiruvarur, India

*e-mail: damodaran@cutn.ac.in

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ABSTRACT

This paper examines the school infrastructure and student enrolment among the tribal community in India. Data from the UDISE+ Reports of the Government of India for 2012-13 to 2020-21 was used for the analysis. Tribal welfare schools in the country increased between 2012-13 and 2014-15 before declining. In tribal welfare schools, water access has improved, although many schools still lack drinking water and handwash facilities. One-fifth of tribal welfare schools do not have restrooms, which infers open defecation practices. Other facilities, such as the library, playground, electricity, and computers, are unavailable to all the tribal welfare schools. However, meager school improvements, enrolment, and infrastructure have been witnessed since 2019. Given this, it is critical to stress that an increasing number of schools with good infrastructure would encourage the tribal students' enrollment. Therefore, equity and high-quality education for all citizens can aid in a country's pursuit of sustainable growth.

INTRODUCTION

With approximately 250 million students enrolled in over 1.5 million institutions, India boasts the second-largest educational system in the world. Growth of the education sector is needed as over 5000 million people are between the ages of 5 and 24 in India. Article 21 (A), added by the 86th Amendment Act of 2002, states that children have a right to education and that for those aged 6 to 14 years, primary schools are free with mandatory attendance. Additionally, National Education Policy ([NEP, 2020](#)) section 5.9 mandates that schools provide students with a suitable environment. That is a sufficient and secure infrastructure with restrooms, water for drinking, enough room for learning, a library, information technology, sports, and recreation. Children who attend school spend a significant amount of time away from home by the time they are 15 years old, which is 7538 hours on average spent on school ([OECD, 2017](#)). The family environment is ranked first, followed by the school environment, which is crucial in determining the nation's destiny. Thus, a functioning school infrastructure would allow for practical instruction and learning for students and teachers. The school's physical layout provides a secure, non-violent, inclusive, and productive learning environment for disabled students.

According to the World Bank report, a suitable physical learning environment improves students' performance in line with NEP 2020. Even after adjusting for student socioeconomic background and other pertinent factors, the analysis indicated a robust correlation between investment in school infrastructure and enhanced learning results ([Barrett et al., 2019](#)). Despite the different educational initiatives, [Bhattacharya \(2022\)](#) claims that Government schools in India perform the lowest due to

inadequate amenities and poor infrastructure. According to the Unified District Information System for Education Plus (UDISE+) report for the academic year 2019-20, more than 6000 schools exist in India without a building. The educational budgetary allocation shows that the Government's policy and action must align. Only 3.8 percent of the entire budget (2015-16), or 0.49 percent of the GDP, is set aside for educational expenses. Allocation further decreased in 2021-22 by 2.7 percent/0.42 percent of GDP, even though the spending is modest for the expanding demands of the population and education.

In India, the literacy rate increased from 64.8 percent in 2001 to 73 percent in 2011. Scheduled Tribes (STs) in India had a literacy rate of 47.1 percent in 2001 and a rate of 59 percent in 2011. STs' literacy rate differs from India's by roughly 14 percent. The tribal community in India is heavily discriminated against as they reside away from the mainstream economy. Therefore, it is essential to examine the school infrastructure of the tribal welfare department-managed schools, which is solely dedicated to the welfare of the STs in India.

LITERATURE REVIEW

Studies have analyzed the existing school infrastructure in various parts of the country. Because of inadequate educational facilities, most kids leave school before finishing their primary education ([Bhandari, 2006](#)). The infrastructure in primary schools in the Jalpaiguri district of West Bengal was evaluated in a study by [Metia \(2019\)](#). Almost 90 percent of the schools have no restrooms, 30 percent operate without electricity, and 50 percent lack playgrounds and gaming equipment. Similar statistics apply to Maharashtra, where only 27 percent of schools have access to clean water, and 40 percent lack electricity ([PWC, 2017](#)). The situation would be too significant in isolated, i.e., tribal schools, while the schools in the country's main population centers lack infrastructure.

The difficulties of tribal education in India were examined by [Naik et al. \(2020\)](#). According to the study, schools situated in tribal areas lack the instructional resources and other equipment required to entice tribal kids to attend classes and learn. Even if resources are provided, the lack of other facilities prevents the teachers from using them to their full potential, which infers the state of tribal schools in India. [TISS \(2016\)](#) analyzed the condition of tribal schools in Maharashtra and discovered that 84 percent of the institutions lack the necessary facilities, including a minimum of 2 hectares of land, classroom space, staff rooms, storage rooms, kitchens, dining rooms, sick rooms, lights, and fans.

Kerala has a high literacy rate in India, although most schools in tribal areas lack even the most basic amenities. In tribal communities, schools often have thatched roofs, deteriorating walls, and non-plastered floors. Additionally, many tribal schools do not even have blackboards or instructional resources. These restrictions compel students to leave school at the primary level, and higher education will be a pipe dream for them ([Haseena V.A and Ajims P. Mohammed, 2014](#)). Thus, less priority is given to the tribal schools, regardless of the state's progress in raising its literacy rate. According to a study by [Mog. U Sa Jen, and Jahar Debbarma \(2020\)](#), educational infrastructure is not dispersed equally among tribal and non-tribal areas in Tripura. The state's literacy rate has steadily increased over the past three decades, yet statistics show that most tribal children lack access to even the most basic educational resources. Additionally, students in the tribal region must travel a long distance to attend school due to the poor quality of education and limited accessibility of the schools.

Students in tribal schools are less motivated to learn because of the inadequate infrastructure, thereby a high dropout rate ([Vemballur, 2014](#)). Tribal female students in the Salem district of Tamil Nadu claim that inadequate educational facilities affect their education ([Emayavaramban et al., 2020](#)). In rural India, private schools ensure substantial facilities and produce higher results than government schools ([Pratham, 2019](#)). According to the Centre for Budget and Policy Studies (2017), 83% of Thane's tribal schools lacked running water and proper restrooms. However, the private schools had specific restrooms for people with disabilities. As a result, enrolment in private schools is continuously increasing, which is not affordable for poor tribes.

Infrastructure improvements in schools would improve students' academic performance. At a rural primary school in West Bengal, there is a strong correlation between enrolment and the school's physical facilities, midday meals, drinking water, and the presence of a teacher ([Karmakar, 2016](#)). Similarly, [Nepal \(2016\)](#) discovered a connection between a school's infrastructure, learning environment, and student outcomes. The state of the school's infrastructure facilities is a dependent variable that, according to 70 percent of the data, shows an excellent linear association between those

facilities and student learning outcomes. The infrastructure of the schools can also contribute 43.6 percent to the success of student learning. Thus, from the above literature, it is evident that the government schools lack infrastructure, which is even worse for the tribal community. According to the studies, school infrastructure creates productive learning outcomes among students. Given this, the present venture analyses the available infrastructure in the tribal welfare schools and its impact on students' enrolment.

METHODS

This research employed the literature review method ([Snyder, 2019](#)). Data from the secondary source is collected from the Unified District Information System for Education Plus (UDISE+) Reports, governed by the Ministry of School Education, Government of India. The data source provides information regarding the total schools, infrastructure, and enrolment of students under different management for nine years from 2012-13 to 2020-21. As the present study is specific to the tribal schools and enrolment of tribal students, the schools managed by the tribal welfare department alone are chosen for the analyses.

RESULTS AND DISCUSSION

Tribal Welfare Schools in India

India's tribal welfare department-operated schools dropped from 79,960 to 46,329 schools between 2012 and 2021. From 2012 to 2015, there were more schools overall, but after that, there were only about 46,000 (table 1). Poor enrolment of tribal students over time is the cause of the fall in the number of schools. For the period, more than 25,000 tribal welfare schools in India had to close due to student dropouts brought on by poverty, a lack of interest in and knowledge of education, and a transition to their traditional vocations. However, the statistics for the tribal schools from 2015-16 show minimal variance.

Table 1. Schools Under Tribal Welfare Department in India ([National Education Policy, 2020](#))

Year	Schools
2012-2013	76960
2013-2014	68391
2014-2015	70054
2015-2016	45980
2016-2017	46461
2017-2018	45077
2018-2019	45409
2019-2020	46279
2020-2021	46329

Provision of Drinking Water

The quality of the school's infrastructure significantly impacts students' performances. The enrolment of the school pupils would benefit from basic infrastructure, including water, handwashing stations, restrooms, electricity, a library, a playground, and a computer and internet connection. Table 2 computes the drinking water and handwashing facilities at the tribal welfare agency schools. Inferred from the findings is that more than 90 percent of the schools have access to drinking water. The extension of the drinking water facilities in the tribal welfare schools had improved significantly. However, there are some schools without a drinking water infrastructure. Only 42,867 of the 46,329 schools had access to drinking water in 2020-21. That is, pupils lack access to drinking water in 3462 schools or 8 percent of all schools. Every human has the right to access clean water, but tribal schools have failed to ensure it. In 88 percent of schools, handwashing facilities are available, and from 2012 to 2021, there is a significant change in many schools with access to these facilities. Still, 12 percent of the

schools are required to have this facility, as handwashing is closely related to health and cleanliness. As a result, the tribal welfare department has much scope to ensure that the schools have access to safe drinking water and facilities for washing hands, which are fundamental entitlements for students.

Table 2. Drinking Water Facilities in Tribal Schools of India ([National Education Policy, 2020](#))

Year	Drinking Water	Functional Drinking Water	Handwash
2012-2013	63107 (82.2)	54949 (71.40)	24213 (31.46)
2013-2014	57448 (84.1)	51960 (75.97)	22181 (32.43)
2014-2015	61648 (88.2)	54915 (78.39)	22387 (31.96)
2015-2016	43920 (95.52)	34895 (75.89)	17084 (37.16)
2016-2017	39993 (86.08)	35389 (76.17)	18432 (39.67)
2017-2018	25477 (56.52)	20024 (44.42)	18743 (41.58)
2018-2019	42521 (93.64)	40674 (89.57)	37469 (82.51)
2019-2020	43972 (95.02)	42391 (91.60)	39889 (86.19)
2020-2021	44226 (95.46)	42867 (92.53)	40773 (88.01)

Note: Figures in parentheses are percentages of the total tribal schools in the respective year

Sanitation and Hygiene

India is dedicated to achieving SDG 6 on sanitation, which guarantees equitable and appropriate access to sanitation. Household restrooms guarantee everyone's hygiene and prevent open defecation. Additionally, people would benefit from the availability of bathroom facilities in public spaces, schools, healthcare facilities, and other locations. However, it has been shown that only about 80 percent of the tribal welfare schools have restrooms. Even though this facility has been extended over time, it is depressing that the nation still falls short in delivering essential services. However, only 83.17 percent are under functional conditions (table 3). It demonstrates that schools must provide more restroom facilities, and students may utilize public locations instead. Due to this, parents may be reluctant to enroll their children in tribal schools, low-income pupils may drop out, and parents with means may send their children to private schools. Denying this fundamental right would impact the enrolment in tribal schools and the future of the tribal population. Data derived from Government sources thus demonstrates a lack of dedication from tribal welfare schools.

Table 3. Rest Room Facilities in Tribal Schools of India ([National Education Policy, 2020](#))

Year	Boy's Toilet	Functional Boy's Toilet	Girl's Toilet	Functional Girl's Toilet
2012-2013	41174 (53.50)	28765 (37.38)	63610 (82.65)	32267 (41.93)
2013-2014	52284	45541	57509	49848

Year	Boy's Toilet	Functional Boy's Toilet	Girl's Toilet	Functional Girl's Toilet
2014-2015	(76.45)	(66.59)	(84.09)	(72.89)
	49994	42814	57136	49556
2015-2016	(71.36)	(61.12)	(81.56)	(70.74)
	40793	37612	42525	39283
2016-2017	(88.72)	(81.80)	(92.49)	(85.43)
	40909	37117	42519	39188
2017-2018	(88.05)	(79.89)	(91.52)	(84.35)
	39085	35112	41159	37533
2018-2019	(86.71)	(77.89)	(91.31)	(83.26)
	38336	35960	39690	37208
2019-2020	(84.42)	(79.19)	(87.41)	(81.94)
	39511	36741	41055	38379
2020-2021	(85.38)	(79.39)	(88.71)	(82.93)
	39867	37182	41235	38532
	(86.05)	(80.26)	(89.00)	(83.17)

Note: Figures in parentheses are percentages of the total tribal schools in the respective year

Library and Games

The gateway to society for enhancing knowledge is the library. It offers the opportunity to learn about how civilization has developed regarding science, technology, politics, moral principles, and other factors. Additionally, it aids in the creation of fresh concepts that promote national progress. Good citizens for the nation would be produced if pupils were encouraged to visit libraries from a young age. Details about tribal schools with libraries, newspapers, and librarians are given in Table 4. It has been shown that, between 2014 and 2021, there was a significant increase in the number of schools having libraries, with 15 percent of tribal schools still lacking. The librarian is responsible for overseeing the books and motivating students to read. However, just 3.91 percent of the schools have a librarian, which indicates that tribal schools handle their libraries poorly. Newspapers spread up-to-date information about local, state, national, and international affairs. Newspapers are inexpensive and require reading in all schools. Only 23.97 percent of tribal schools subscribe to newspapers, and students' free time is not utilized efficiently. It raises a question of how the schools could address others' needs if they could not meet their minimal financial obligations.

Sports are crucial for a healthy life starting in childhood, so schools must promote them by providing playgrounds and sporting equipment. According to the findings, playgrounds are only in 69.62 percent of schools. There has been little progress in increasing these amenities in tribal schools between 2012 and 2021. However, 30 percent of schools still need playgrounds, which is undesirable. Beyond the classroom, students become more involved with their peers while playing, and on the other hand, participation in sports may compel students to attend school regularly. However, the absence of this facility would impact student enrolment and engagement.

Table 4. Library and Playgrounds in Tribal Schools of India (National Education Policy, 2020)

Year	Library	Librarian	Newspaper	Playground
2012-2013	49516	725	13598	44211
	(64.34)	(0.94)	(17.67)	(57.45)
2013-2014	53033	466	12686	42511
	(77.54)	(0.68)	(18.55)	(62.16)
2014-2015	61305	717	15394	46437
	(87.51)	(1.02)	(21.97)	(66.29)

Year	Library	Librarian	Newspaper	Playground
2015-2016	39401 (85.69)	1674 (3.64)	11027 (23.98)	30457 (66.24)
2016-2017	39533 (85.09)	689 (1.48)	11347 (24.42)	30935 (66.58)
2017-2018	37994 (84.29)	1137 (2.52)	10573 (23.46)	30365 (67.36)
2018-2019	38035 (83.76)	1596 (3.51)	10386 (22.87)	31448 (69.25)
2019-2020	39380 (85.09)	1575 (3.40)	11075 (23.93)	32020 (69.19)
2020-2021	39328 (84.89)	1813 (3.91)	11105 (23.97)	32252 (69.62)

Note: Figures in parentheses are percentages of the total tribal schools in the respective year

Electricity and Computers

Electricity is required to operate all modern advances; hence, humanity would unlikely to survive without it. Only electricity makes it possible to teach and learn since it powers the lighting and a variety of technological aids. Therefore, having electricity available in schools is essential for improving learning. Table 5 provides information about the tribal welfare schools with electricity. Only 62.31 percent of all the schools have access to electricity, and only 59.43 percent have it running. Even though there has been a constant improvement in ensuring electricity from 2012 to 2021, about 40 percent of schools lack electricity, which infers inadequate support for tribal education. Their education lays the foundation that pupils would build on throughout their school life. However, an electricity shortage would impact students' academic performance and might require the less fortunate to pay for their education privately. Welfare departments are specifically for the underprivileged, yet their lack of infrastructure raises concerns about their purpose.

Knowledge of information technology and computer literacy is essential for daily living. Computer use is widespread in business, institutions, and education and has merged with human needs. Students with computer knowledge can transform their skills to a greater level. However, just 14.31 percent of schools have computers, and only 6.31 percent have internet access. Regarding providing computer and internet access to tribal schools, there have been no significant advancements throughout the years. Therefore, the competency level of tribal students would be impacted by the schools' poor infrastructure. Private schools have much better infrastructure than government schools and provide significantly better academic outcomes. How can the deprived of remote tribal villages compete in modern society when they receive an inadequate education? It sets a poor example for the tribal society, demonstrating that learning will not alter them.

Table 5. Electricity and Computers in Tribal Schools of India ([National Education Policy, 2020](#))

Year	Electricity	Functional Electricity	Computer Available	Internet
2012-2013	24343 (31.63)	22143 (28.77)	7941 (10.32)	1424 (1.85)
2013-2014	21320 (31.17)	19119 (27.96)	6355 (9.29)	1060 (1.55)
2014-2015	26209 (37.41)	23229 (33.16)	7437 (10.62)	1493 (2.13)

Year	Electricity	Functional Electricity	Computer Available	Internet
2015-2016	14092 (30.65)	13387 (29.11)	5876 (12.78)	1728 (3.76)
2016-2017	15439 (33.23)	14514 (31.24)	6143 (13.22)	1773 (3.82)
2017-2018	14923 (33.11)	13910 (30.86)	5460 (12.11)	1693 (3.76)
2018-2019	21920 (48.27)	20855 (45.93)	4040 (8.90)	2354 (5.18)
2019-2020	25271 (54.61)	23851 (51.54)	5988 (12.94)	2725 (5.89)
2020-2021	28869 (62.31)	27532 (59.43)	6629 (14.31)	2925 (6.31)

Note: Figures in parentheses are percentages of the total tribal schools in the respective year

Enrolment in Tribal Welfare Schools

The above discussions highlighted the infrastructure currently in place at tribal welfare schools. It is crucial to examine how many tribal students are enrolled between 2012 and 2021. Details about the enrolment of tribal boys and girls in primary, upper elementary, secondary, and higher secondary schools are given in Table 6. Between 2012 and 2021, the number of students enrolled in tribal welfare schools decreased from 35 lakhs to 18 lakhs for boys and 19 lakhs for girls. The overall number of schools and student enrolment has drastically decreased over time. The enrollment of students at primary through higher secondary levels of education indicates a sharp fall between 2012-13 and 2020-21. In particular, the number of boys enrolled in primary school in 2012-13 was high (18,90,852) but steadily decreased to 8,58,345 in 2020-21. For the above period, the enrollment of female students has shown a similar pattern; enrollment has declined from 18,32,000 (2012-13) to 8,82,245 (2020-21). The decline in primary school enrolment affects all other educational levels, including upper primary, secondary, and higher secondary. In contrast to boys, girls enroll at higher rates throughout all educational levels, which is the only positive information obtained. It is crucial to identify why enrolment in tribal welfare schools has decreased over time to ensure the nation's inclusive growth.

Table 6. Enrolment of School Education among Tribal Students in India ([National Education Policy, 2020](#))

Year	Primary (I-V)		Upper Primary (VI-VIII)		Secondary (IX-X)		Hr. Secondary (XI-XII)		Overall	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
2012-	18908	18320	102244	109578	4365	4432	18518	16005	35350	35311
2013	52	00	1	8	82	66	3	0	58	04
2013-	16286	16089	845029	930307	1562	1919	50547	55205	26804	27864
2014	48	84			29	87			53	83
2014-	14702	14568	838892	908174	4484	4995	20102	20414	29586	30687
2015	18	78			85	11	4	5	19	08

Year	Primary (I-V)		Upper Primary (VI-VIII)		Secondary (IX-X)		Hr. Secondary (XI-XII)		Overall	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	2015-	10330	10378			3213	3557	12920	13868	20887
2016	96	86	605119	651754	79	32	2	2	96	54
2016-	99298	10060			3210	3566	12065	12944	20439	21344
2017	7	97	609269	642235	78	89	0	2	84	63
2017-	93087	95056			2947	3181	12022	13532	19049	19758
2018	2	6	559083	571844	45	04	2	4	22	38
2018-	88593	90573			2904	3044	12500	13517	18532	19106
2019	8	7	551885	565300	49	85	1	7	73	99
2019-	89628	92238			2949	3090	13380	14941	18932	19732
2020	3	5	568169	592372	61	78	3	6	16	51
2020-	85834	88224			3015	3187	13470	15362	18536	19392
2021	5	5	559084	584605	57	95	2	0	88	65

Growth Rate of Enrolment and Infrastructure

School infrastructure and student enrolment must grow parallel to attain productive educational outcomes. From 2013 to 2020, the growth rate of tribal welfare schools fluctuated (see Table 7). However, starting in 2018, the growth rate of schools has been increasing, albeit slowly. In most situations, the growth rate of all school infrastructure from 2013 to 2018 was negative; however, 2019 and 2020 may see a slight recovery. Apart from 2014 and 2019, the overall enrollment of boys' and girls' pupils is almost hostile. The year 2019 has seen an increase in enrolment across all levels of education, including primary, upper primary, secondary, and higher secondary. However, primary and upper primary school enrollment decreased in 2020, indicating that parents no longer believe in tribal welfare schools to provide their children with a quality education. There has been meager growth since 2019 regarding enrolment, infrastructure, and the number of schools. As a result, the infrastructure of schools in India substantially impacts the enrolment of tribal students.

Table 7. Growth Rate of Enrolment and Infrastructure in Tribal Schools of India ([National Education Policy, 2020](#))

Year	2013	2014	2015	2016	2017	2018	2019	2020
Schools	-11.1	2.4	-34.4	1.0	-3.0	0.7	1.9	0.1
Infrastructure								
Playground	-3.8	9.2	-34.4	1.6	-1.8	3.6	1.8	0.7
Library	7.1	15.6	-35.7	0.3	-3.9	0.1	3.5	-0.1
Newspaper	-6.7	21.3	-28.4	2.9	-6.8	-1.8	6.6	0.3
Electricity	-13.7	21.5	-42.4	8.4	-4.2	49.9	14.4	15.4
Boy's Toilet	58.3	-6.0	-12.2	-1.3	-5.4	2.4	2.2	1.2
Girl's Toilet	54.5	-0.6	-20.7	-0.2	-4.2	-0.9	3.1	0.4
Drinking Water	-5.4	5.7	-36.5	1.4	-43.4	103.1	4.2	1.1
Internet	-25.6	40.8	15.7	2.6	-4.5	39.0	15.8	7.3
Computer	-20.0	17.0	-21.0	4.5	-11.1	-26.0	48.2	10.7

Year		2013	2014	2015	2016	2017	2018	2019	2020
Enrolment									
Primary	Boys	-13.9	-9.7	-29.7	-3.9	-6.3	-4.8	1.2	-4.2
	Girls	-12.2	-9.5	-28.8	-3.1	-5.5	-4.7	1.8	-4.4
Upper Primary	Boys	-17.4	-0.7	-27.9	0.7	-8.2	-1.3	3.0	-1.6
	Girls	-15.1	-2.4	-28.2	-1.5	-11.0	-1.1	4.8	-1.3
Secondary	Boys	-64.2	187.1	-28.3	-0.1	-8.2	-1.5	1.6	2.2
	Girls	-56.7	160.2	-28.8	0.3	-10.8	-4.3	1.5	3.1
Higher Secondary	Boys	-72.7	297.7	-35.7	-6.6	-0.4	4.0	7.0	0.7
	Girls	-65.5	269.8	-32.1	-6.7	4.5	-0.1	10.5	2.8
Total	Boys	-24.2	10.4	-29.4	-2.1	-6.8	-2.7	2.2	-2.1
	Girls	-21.1	10.1	-28.8	-2.3	-7.4	-3.3	3.3	-1.7

Enrolment and Infrastructure

School infrastructure ensures enrolment at the first level and educational outcomes at the next level. Infrastructure encourages and gives the parents confidence in the education system to enroll their wards. Simultaneously, educational outcomes are better while the school infrastructure is excellent. Given this, the role of infrastructure in the enrolment of tribal students in India is analyzed by using the Multiple Linear Regression Model (MLRM). The educational attainment at primary, upper primary, high, and higher secondary levels are tested individually for boys' and girls' students.

Framework of Analysis

The primary, upper primary, high, and higher secondary educational attainments are tested individually for boys' and girls' students, which is the dependent variable. The total number of tribal welfare schools and school infrastructure are the explanatory variables. At the first level, the multi-collinearity test was applied to remove the redundant and homogenous variables in the analysis.

$$ETWS = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu$$

ETWS = Enrolment in Tribal Welfare Schools (dependent variable)

X₁ = Total Tribal Welfare Schools

School Infrastructure

X₂ = Drinking Water

X₃ = Electricity

X₄ = Boys Toilet

X₅ = Girls Toilet

X₆ = Playground

μ = random error, which is normal, independent of the mean '0' and variance 'σ²'.

In the model, the estimated coefficient (βs) provides the marginal effects of the respective explanatory variable on the enrolment of tribal students. The adjusted coefficient of multiple determinations (\bar{R}^2) Examine the contribution of explanatory factors to the endogenous factor of the school infrastructure. The suitability of the fitted Multiple Linear Regression Model is tested using the 'F' test. In addition, the influence of each explanatory factor on the endogenous factor of the school infrastructure is tested by students' t-test.

Table 8. Infrastructure and Enrolment: MLRM (National Education Policy, 2020)

Details	Estimated Marginal Effects (β Value)							
	Primary		Upper Primary		Secondary		Hr. Secondary	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Total	1.746	1.780	2.034	2.316	-0.564	-0.251	-1.552	-1.686
Tribal Schools	(6.188) **	(6.539) **	(8.191**	(4.442**	(- 0.167)	(- 0.067)	(- 0.464)	(- 0.452)

Details	Estimated Marginal Effects (β Value)							
	Primary		Upper Primary		Secondary		Hr. Secondary	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Drinking Water	0.035 (0.633) -0.103	0.023 (0.429) -0.089	0.235 (4.900) 0.311	0.301 (2.988) 0.019	1.269 (1.945) -0.055	1.408 (1.931) -0.073	1.049 (1.619) 0.015	1.006 (1.394) 0.192
Electricity	(-2.132)	(-1.913)	(5.812)	(0.217)	(-0.095)	(-0.113)	(0.025)	(0.301)
Boy's Toilet	0.242 (0.668)	0.239 (0.682)	-1.089 (-3.408)	-1.295 (-1.930)	-7.943 (-1.831)	-8.842 (-1.823)	-6.739 (-1.564)	-7.506 (-1.565)
Girl's Toilet	-0.212 (-0.468)	-0.183 (-0.421)	1.263 (3.173)	1.601 (1.917)	8.070 (1.494)	9.269 (1.535)	6.602 (1.231)	7.627 (1.277)
Playground	-0.742 (-1.681)	-0.778 (-1.834)	-1.594 (-4.117)	-2.035 (-2.504)	-2.044 (0.389)	-2.771 (0.471)	-0.532 (0.102)	0.931 (0.160)
Adjusted R ²	0.998	0.999	0.999	0.995	0.772	0.715	0.775	0.721
F- value	834.27*	896.77*	1076.88*	244.06*	5.511	4.341	5.591	4.443

Note: Figures in parentheses are t-statistic

* & ** denotes significance at 1 and 5 percent level, respectively

The result of the Multiple Linear Regression Model for the role of school infrastructure and tribal student enrolment is given in Table 8. The model results are discussed under total tribal welfare schools and five major school infrastructures such as drinking water, electricity, boys' toilets, girls' toilets, and playgrounds. From the results, the total number of tribal welfare schools has significantly influenced student enrolment at the primary and upper primary school levels, and the F value infers the same. The school infrastructure has not influenced the enrolment of the students. Since the total number of schools has dropped over the period, the number of schools has influenced enrollment only in primary and upper primary and could not in the case of secondary and higher secondary. If the total number of schools would exist over the period, it might infer the role of infrastructure in students' enrolment. Without ensuring schools, the expectation of student enrolment is not possible. Thus, there is a need for an increasing number of schools and, thereby, infrastructure for effective learning outcomes.

CONCLUSION

The number of tribal welfare schools in the country was high between 2012-13 and 2014-15 and declined afterward. It might impact tribal students' enrolment and require them to travel far to attend other institutions. Infrastructure has a significant influence in determining the student's enrolment. The availability of drinking water has increased over time in tribal welfare schools, although many still lack drinking water and handwashing facilities. The Government must provide drinking water to all the tribal welfare schools because it is a critical concern. One-fifth of the tribal welfare schools lack restrooms, which infers open defecation practices. Lack of restrooms may negatively impact the enrolment of female students and raise concerns about their educational success.

Library, playground, electricity, and computers are not available to all the tribal welfare schools in the country. While reading books at the library, students may gain more knowledge about social, economic, scientific, and technological advancements. Many schools still need to guarantee a school library or a newspaper. Playing with peers increases student enthusiasm and positively impacts attendance, health, and fitness. However, thirty percent of schools lack playgrounds. Thus, the Government must take action to remedy the situation.

Similarly, one-third of tribal schools lack electricity, negatively impacting visibility and classroom ambiance. In the digital age, offering computer education and internet access is essential. With this exposure, tribal schools lack such facilities, and bureaucrats' attention is desperately needed. The enrolment of students in tribal schools has declined continually from 2016-17 to 2012-16 at all school

levels. The negative growth rate is witnessed in the enrolment of tribal students and infrastructure over time. However, there has been little progress since 2019 in infrastructure, enrolment, and schools. Since fewer schools have been opened overall, only primary and upper primary enrollment have been impacted by the number of schools, while secondary and higher secondary enrollment was unaffected. If there were a total number of schools over the period, it could be possible to deduce how important infrastructure is to student enrolment. It is impossible to predict student enrolment in institutions without assurance. There is a need for an expanding number of schools and corresponding infrastructure to achieve successful learning outcomes. Also, it is essential to emphasize that increasing the number of schools with excellent facilities will motivate the underprivileged to enroll. It is unacceptable to develop the country while excluding the Aboriginal community. Thus, equity and quality education for everyone can help a country achieve sustainable growth.

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REFERENCES

- Bano, Nargish and Nurul Hoda. (2018). The Study of Infrastructure Management in Elementary Schools of Bihar. *International Journal of Social Relevance and Concern*, 6(1), 5-11. <https://www.academia.edu/download/55848390/2.6101-Nargish.compressed.pdf>
- Barrett, Peter, Alberto Treves, Tigran Shmis, Diego Ambasz, and Maria Ustinova. (2019). *The Impact of School Infrastructure on Learning: A Synthesis of the Evidence*. Washington DC: The World Bank. https://www.google.com/books?hl=id&lr=&id=Tf6jDwAAQBAJ&oi=fnd&pg=PP1&dq=Barrett,+Peter,+Alberto+Treves,+Tigran+Shmis,+Diego+Ambasz,+and+Maria+Ustinova.+%E2%80%9CThe+Impact+of+School+Infrastructure+on+Learning:+A+Synthesis+of+the+Evidence.%E2%80%9D++Washington+DC:++The+World+Bank,+2019.&ots=Wy-S5_pKxQ&sig=wTb1zs5dUqUmaFfHoYoFdHL9g2o
- Bhandari, L. (2006). *Social infrastructure: urban health and education*. India Infrastructure Report. https://www.academia.edu/download/73825820/Social_Infra.pdf
- Bhattacharya, D. (December 01, 2022). With Poor Infrastructure, Lack of Facilities in Government Schools Perform Worst Across India: Report. <https://www.newsclick.in/with-poor-infrastructure-lack-facilities-govt-schools-perform-worst-across-india-report>
- Centre for Budget and Policy Studies. (2017). Reviewing the Status of Education in Tribal Areas in Maharashtra: A Comprehensive Report." https://cbps.in/wp-content/uploads/CBPS_TribalReport_UNICEF_FINAL-.pdf.
- Emayavaramban, M., Kandasamy, R. K., Muthusamy, S., & Manickam, M. (2020). Barriers in the Educational Attainment of Tribal Girl students in Salem District of Tamil Nadu State, India. *International Journal of Theory and Application in Elementary and Secondary School Education*, 2(2), 121-142. <https://doi.org/10.31098/ijtaese.v2i2.247>
- Karmakar, J. (2016). Assessing the Enrollment and Primary Educational Infrastructure of Rural West Bengal, India: A District Level Analysis. *Journal of South Asian Studies*, 4(3), 101-108. <https://journals.esciencepress.net/index.php/JSAS/article/download/1530/877>
- Metia, Arindam. (2019). Assessment of Primary School Infrastructure: A Study of Rural and Urban Areas of Jalpaiguri District. *The International Journal of Analytical and Experimental Model Analysis*, 10, 501-510. <http://www.ijaema.com/gallery/5>
- Mog, U. S. J., & Debbarma, J. (2020). A case study on school enrolment and infrastructure. *The Routledge Handbook of Exclusion, Inequality and Stigma in India*, 125. <https://doi.org/10.4324/9780429295706>
- Naik, D., Gorain, R., & Mallik, P. (2020). Tribal Education: Challenges And Ongoing Measures A Critical Analysis. *Ilkogretim Online*, 19(4), 7431-7437. <https://www.ilkogretim-online.org/fulltext/218-1650468552.pdf>
- National Education Policy. (2020). *National Education Policy 2020*. Ministry of Human Resource Development. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

- Nepal, B. (2016). Relationship among school's infrastructure facilities, learning environment and student's outcome. *International Journal for Research in Social Science and Humanities Research*, 2(5), 44-57. https://www.researchgate.net/profile/Bijaya-Nepal/publication/326539338_RELATIONSHIP_AMONG_SCHOOL'S_INFRASTRUCTURE_FACILITIES_LEARNING_ENVIRONMENT_AND_STUDENT'S_OUTCOME/links/5b533c41a6fdcc8dae37fcc2/RELATIONSHIP-AMONG-SCHOOLS-INFRASTRUCTURE-FACILITIES-LEARNING-ENVIRONMENT-AND-STUDENTS-OUTCOME.pdf
- OECD. Education At a Glance 2017. (November 2022). https://www.oecd-ilibrary.org/education/education-at-a-glance-2017/d1-1-instruction-time-in-compulsory-general-education1-2017_eag-2017-table180-en
- Pratham. "Annual Status of Education Report, 2018." (December 2022). <https://img.asercentre.org/docs/ASER%202018/Release%20Material/aserreport2018.pdf>
- PWC. "Evaluation Study of Grant-in-Aid for Voluntary Agencies Running Ashram Schools in Maharashtra." (November 2022). http://ravindratalpe.com/Reports/TISS_Report.pdf
- Snyder, H. (2019). Literature Review as a Research Methodology: An Overview and Guidelines. *Journal of business research*, 104, 333-339. <https://www.sciencedirect.com/science/article/pii/S0148296319304564>
- TISS. "A Report on Status of Government and Aided Ashram Schools in Maharashtra." (December 2022). https://tiss.edu/uploads/files/Ashram_School_Report_compressed.pdf
- Vemballur, P. (2014). Scope of education and dropout among tribal students in Kerala-A study of Scheduled tribes in Attappady. *International Journal of Scientific and Research Publications*, 4(11), 423-435. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=4cfc4cef42be999477e100a84c1fc049c90560d#page=424>