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Infrastructure Challenges in Rural Schools: A Case Study

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Abstract: ***During last few decades a number of investment plans for strengthening the rural infrastructure have been designed and implemented. Quality health and education can boost the growth of rural economy. Most of the poor lives in rural areas. Rural areas face number of problems in the process of development. Educational infrastructure is one of the most important among them. Education has the ability to transform the socio-economic condition of a country. Education infrastructure is a crucial component for a country's development as it increases the skill and knowledge. NEP, 2020 also emphasizes on educational infrastructure and technology integration, as a key, for achieving quality, equitable and inclusive education for all especially in rural areas. In this study, we have tried to explain the importance of infrastructure and status of infrastructural facilities available in rural schools of Bengal. For this purpose, primary data have been collected from different type of school. The secondary data is taken from different research papers, journals, and websites. The result shows that maximum schools have basic minimum facilities; still, there is room for improvement in other. Governments are responsible for provisioning most of the infrastructure needs and formulating policies that safeguard the interest of the poor in rural areas.***

Keywords: Educational infrastructure, rural infrastructure, NEP 2020, inclusive education, learning environment

1.Introduction

Education is one of the most important social institutions and can be seen as vital component for development. Education is essential for a satisfying and rewarding life. It also involves the transmission of knowledge, culture and values from present generation to future generation. It provides individuals with skills and knowledge for better employment, fosters innovation and helps to reduce poverty. As a social infrastructure, education also contributes to a more cohesive society by creating shared values and providing opportunities for all. In recent decades literacy and other basic education have extended to a majority of people in many countries of the world. Developing and low-income countries face great challenge as they try to improve education of their people. The rate of return to investment in primary schooling is higher for poor countries than the developed countries. According to SDGs Report 2025 − education is vital for sustainable development, yet progress remains off track. While enrolment and completion rates have improved since 2015, with girls outperforming boys in most regions, progress is slowing. Meanwhile, 272 million children and youth remained out of school in 2023. Learning quality remains a major concern. Globally, the minimum proficiency of primary students stands at just 58 percent in reading and 44 percent in mathematics in 2019. Learning outcomes are declining in many countries.

India has made remarkable strides in recent years in attaining near-universal enrolment in elementary education through initiatives such as the Sarva Shiksha Abhiyan (now the Samagra Shiksha) and the Right to Education Act. However, the data indicates some serious issues in retaining children in the schooling system. The GER for Grades 6-8 was 90.9%, while for Grades 9-10 and 11-12 it was only 79.3% and 56.5%, respectively − indicating that a significant proportion of enrolled students drop out after Grade 5 and especially after Grade 8. As per the 75th round household survey by NSSO in 2017-18, the number of out of school children in the age group of 6 to 17 years is 3.22 crore. It should be a top priority of the government to prevent further students from dropping out, with a goal to achieve 100% Gross Enrolment Ratio in preschool to secondary level by 2030. According to NEP 2020, the global education development agenda reflected in the Goal 4 (SDG4) of the 2030 Agenda for Sustainable Development, adopted by India in 2015 − seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030. Such a goal will require the entire education system to be reconfigured to support and foster learning, so that all of the critical targets and goals (SDGs) of the 2030 Agenda for Sustainable Development can be achieved.

It is clearly mentioned in NEP 2020 that effective and sufficient infrastructure is necessary for the quality education and quality ensures the retention of students. According to **The Sustainable Development Goals Report 2025 – "**basic school infrastructure improves globally while it lags in LDCs. Adequate school infrastructure is essential for safe and effective learning. Between 2015 and 2023, electricity access in primary schools increased globally by over 10 percentage points, mainly driven by rapid expansion in Central and Southern Asia. Internet access within schools has increased notably since the COVID-19 pandemic and provision of drinking water in the primary schools of sub-Saharan Africa has improved by 10 percentage points since 2016. Despite this progress, significant gaps remain". Globally, over 20 percent of primary schools lack access to electricity, drinking water or sanitation. Fewer than half have computers, internet or disability-adapted facilities. The situation is worse in LDCs, where over a third of primary schools lack basic sanitation, more than half lack electricity and over two thirds lack digital tools; only one in five offer disability-friendly infrastructure.

2.Objectives of the Study

Educational infrastructure in rural areas is crucial for improving education quality. Addressing the challenges is the need of the hour for achieving equitable and inclusive education as envisioned by NEP 2020. The objectives of the present study are as follows:

1) To show the importance of infrastructure in school learning.
2) To know the status of infrastructure facilities available in schools surveyed.

3.Methodology Used and Source of Data

The research involves collection of primary data through structured questionnaires from selected 25 school administrators in the year 2023-24. Our present study includes analysis of primary data collected from a sample of 25 randomly selected schools of Patashpur I CD Block, Purba Medinipur District in West Bengal. Selected 25 schools include 11 primary schools, 4 junior high schools (middle schools), 6 high schools and 4 higher secondary schools. The collected data has been divided into broad categories for better analysis according to the objectives of the study.

The secondary data obtained from various sources such as journal articles and reports from government and various organizations have been accounted for the present study.

4.Importance of Education Infrastructure

Education is a vital social infrastructure that develops human capital, drives economic growth, promotes social equity and builds a stronger society. It provides individuals with skills and knowledge for better employment and helps reduce poverty. Education is the most vital multidimensional component for achieving most of the SDGs related to poverty, hunger, nutrition, health for all, income equality, gender equality, decent employment and climate change. Education infrastructure contributes to a society by creating values and providing opportunities for all. Adequate water, sanitation and hygiene (WASH) facilities in schools 'improve access to education and learning outcomes, particularly for girls, by providing a safe, inclusive and equitable learning environment for all' (UNICEF and WHO, 2018:8). Many studies have found that − design of school infrastructure can have positive impact on the students' progress through factors like: naturalness (light, sound, temperature, AQ, and links to nature.), stimulation (visual complexity and colour) and individualization (ownership, flexibility and connection). Education infrastructure is vital element for learning environment in schools. A good and quality infrastructure facilitates better instruction, student outcomes and reduces dropout rates, among other benefits. Parents consider the available infrastructure in schools as one of the important factors for admission of their children.

NEP 2020 also recognizes the fact that improved and modern education infrastructure are necessary for quality learning. It emphasizes on safe, inclusive and digital resource centres. In order to make education more attractive, accessible and student friendly tools like ICT, Online Learning Platforms and well-equipped laboratories, libraries must be established. These things encourage curiosity, make education more interactive, gives hands on training and therefore makes the education more interactive, effective and qualitative.

Developed educational infrastructure motivates students to attend classes regularly and participate in other activities in the school. Buildings, classrooms, laboratories and equipment are crucial elements of learning environment in schools. Provisions such as proper classrooms, adequate & functional toilets, drinking water facility, ramps etc. are necessary part of any school building and need to be provided mandatorily. All school buildings that will be constructed must have provision of rainwater harvesting and solar panel. Rainwater harvesting provides alternative source of water supply for various purposes especially in rural areas where reliable water source is not available. Solar panels also provide a reliable source of energy. These facilities inspire students to learn about water harvesting and renewable source of energy and help to make responsible citizens.

Educational infrastructure in rural areas empowers individuals from disadvantaged backgrounds, enabling them to participate more meaningfully in society. The gap between the qualities of learning in urban-rural education must be bridge by infrastructure overhauling that brings the highest quality, equity and integrity in the schools. Investment in rural infrastructure ensures students access to the same quality of education as their counterparts in urban areas. Schools with best facilities motivate the students to attend the class regularly which helps reduce dropout rates in rural areas. Infrastructures like playgrounds, sports related facilities and play−based education are important for rural areas or students with disabilities for quality learning.

5.Results of the Study

Educational infrastructure facilities differ significantly in 4 types of different schools. The data were collected mainly on the basic facilities that a school provides to the student. The average number of students in primary school is 97 and that in the higher secondary school is 328 (Table-1). Trained teachers and non-teaching staffs are fundamental for any school to perform well in all aspects of teaching-learning process.

Table 1: Average Number of Students

Sl. No.	Type of School	Average no. of Students		
		Boys	Girls	Total
1.	Primary	47.91	49.09	97.00
2.	Jr. High	40.00	45.25	85.25
3.	Secondary	71.00	114.50	185.50
4.	H. S.	202.00	126.00	328.00

Source: Primary data from field survey

Table 2 shows that the average number of teachers in primary school is 3.45 and it is respectively 2.75, 5.67 and 16.50 in Jr. High, Secondary and H.S school. The number of non-teaching staffs is very poor in all categories of schools. Primary and Jr. High School don't have any non-teaching staff. Whereas, it is only (average staff) 4.75 for Secondary and 1.50 Higher Secondary Schools. The number of average classrooms is highest 3.64 in Primary School than in the Jr. School which stood at 2.75 (Table 3). The same is 16.75 for Higher Secondary School. The pupil-teacher ratio can be calculated which is highest for Secondary School at 34.45 and lowest 18.66 for Higher Secondary School.

Table 2: Teaching and Non-Teaching Staff

Sl. No.	Type of School	No. of Schools	Average no. of Teachers	Average no. of Casual/ Guest / PTTs	Average no. of Non-teaching Staff	Vacant Teaching Post per school
1.	Primary	11	3.45	0.09	0.00	0.73
2.	Jr. High	4	2.75	4.50	0.00	1.5
3.	Secondary	6	5.67	2.17	1.50	3.67
4.	H. S.	4	16.50	7.00	4.75	6.75

Source Primary data from field survey

The data in Table 3 highlights the available basic physical infrastructures in different categories of schools. In this paper we are considering only the basic facilities like drinking water, toilets, library, playgrounds, electricity and waste management system. Most of the schools surveyed have all basic facilities with limited access to library and waste management system. Drinking water facilities are there in 84% of all schools with 100% for Higher Secondary Schools and 82%for Primary and 75% each for Jr. High School and Secondary Schools. A drinking water facility ensures clean water which is important for preventing water borne diseases and overall performance of the students. 76% of all schools have playgrounds. Notably, all the schools surveyed have access to playground with 73.73 percent for Primary School, 50%, 83% and 100% respectively for Jr. High School, Secondary and Higher Secondary School indicating a strong foundation for sports related activities. Library is part of learning environment that provide information and knowledge. In our survey we have found that only 75% of H.S. Schools have library with only 25% librarians. Only 25% of Junior High Schools have library with no librarians.

Table 3: Physical Facilities

Serial Number	Type of School	No. of Schools	Average no. of class Rooms	Schools with a Library (%)	Schools with a Librarian (%)	School has Drinking Water Facilities (%)	School has Play Ground	No. of Toilet per School	Separate toilet for girls (%)	Electricity facility	Schools with waste management system (%)
1	Primary	11	3.64	73.00	00	82.00	73.73	1.91	73	100	55
2	Jr. High	4	2.75	25.00	00	75.00	50.00	2.50	75	100	67
3	Secondary	6	7.50	83.00	00	100.00	83.00	2.17	100	100	00
4	H. S.	4	16.75	75.00	25	75.00	100.00	4.75	100	100	50
5	All Schools	25	7.66	68.00	25	84.00	76.00	2.88	80.00	100	48

Source: Primary data from field survey

Sanitation facilities with separate toilets for girls and boys are essential for students' health and well-being. The average number of toilets per school is 2.88 across all schools, with H.S schools having the highest of 4.75 toilets. Separate toilets for girls are available in 80% of schools with Secondary and H.S Schools achieving 100% coverage (Table 3). Waste management system is another important physical infrastructure that is required in schools. Proper waste management system must be available in schools for safe disposal of hazardous and other waste. Table 3 shows that only 48% of all schools have such system. Secondary Schools perform better at 67%. Electrical systems which are safe and with reliable source of power are important for supporting administrative work of the school, running projectors, computers and other technologies that assists students in learning process. It is also required for security system creating a safer environment in the school premises. Electricity is available in all schools with 100 percent connection.

6.Limitations of the study

The study conducted with data collected from 25 schools of Patashpur - I CD Blocks of Purba Medinipur District in West Bengal. A sample of only 25 schools was not adequate to represent the total population of the schools of Patashpur Block. There is scope of further study with large sample that may reflect better results. Nevertheless, an attempt has been made hereby to have a baseline data for future studies.

7.Conclusion

One of the most important factors that act as a barrier to quality education is lack of educational infrastructure. The gap is more when we make a comparison between rural and urban areas. The marginalised and disadvantage students are the worst affected in pursuance of good education. Facilities like Drinking water, toilets and waste management system are necessary for good health of a student. A healthy student can learn effectively and helps them to become more competitive. NEP 2020 and SDGs report 2025 rightly consider infrastructural bottleneck as the key hindrance to quality and inclusive education for all groups of people. Good education has the ability to transform not only an individual but also a whole community. Education must be humanistic in nature. It must also be effective and equitable. Educational infrastructure helps to bridge the gap between have and have-nots and in turn helps in the removal of poverty and inequality. The issues related with gender inequality in schools can be deal with educational infrastructure in place. Without required infrastructure students can't avail the benefits of modern technology in their learning process.

The study reveals that while most schools have all basic facilities like drinking water, playgrounds, electricity, toilets etc. there is variability in waste management services, libraries in different types of schools which show room for improvement. Hence, education policies must be formulated and implemented in such a way that it gives importance for creation of infrastructure needed for quality education. Rural areas must receive attention in this respect as they can play a vital role in the development of a country.

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