



Study on the Impact of the Nationwide Rural Road Connectivity Programme in India (PMGSY) on the Socio-Economic Status of the Rural People under Wozhuro Rural Development Block, Wokha District, Nagaland, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Rural road connectivity plays a significant role in the socio-economic growth and development of rural people by providing them access to basic amenities for a better livelihood. A study was conducted under the Wozhuro R.D. Block in Wokha district to find out the socio-economic impact of PMGSY road connectivity on rural livelihoods. A purposive random sampling design was used for

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the selection of respondents. A total of 100 respondents from three villages comprised the sample for the study. A structured interview schedule was developed, and data was collected through the personal interview technique. Statistical tools such as frequency, percentage, and the correlation coefficient were used for analysing the data obtained. The findings showed that rural roads had a great impact on both farm and non-farm sectors. The dependent variable, income generation, was found to have a positive and significant relationship with the independent variables, family size ($r=0.20^{**}$) and land holding ($r=0.27^{**}$). Also, farm benefits were found to have a positive and significant relationship with land holding ($r=0.39^{**}$) and annual income ($r=0.66^{**}$), and non-farm benefits (health $r=0.44^{**}$ and education $r=0.70^{**}$) with annual income, respectively.

Keywords: All-weather roads; PMGSY; rural connectivity; rural roads; socio-economic impact.

1. INTRODUCTION

Roads serve as the arteries of a country, traversing its length and width and connecting every nook and cranny. With 63.32 lakh kilometres of road, India has the second-largest road network in the world [1]. Out of the total road network in India, rural roads account for 70 percent of the total share of roads. Rural connectivity not only serves as a lifeline for socio-economic growth and development but also plays a significant role in increasing agricultural production, generating employment opportunities, and serving as a strategic tool for poverty alleviation. A vast majority of the population in India lives in rural areas, which form the majority of the workforce in the agriculture sector. Agriculture is considered the backbone of the Indian economy, and almost two-thirds of the population is dependent on it. According to recent World Bank data, the rural population in India accounts for 65 percent of the total population, which shows a declining trend. The declining trend of rural populations is a big concern for agricultural growth and development. The absence of well-knit road connectivity in rural areas is to blame, which has deprived the rural people of basic facilities needed for growth and development, leading to large-scale migration of rural people to towns and cities in search of a better livelihood opportunity. To prevent this situation, the government of India has embarked on several rural development and poverty alleviation programmes in the rural areas of the country. On the 15th of August 2000, the Prime Minister announced a centrally sponsored scheme called the Pradhan Mantri Gram Sadak Yojana as a fully funded, centrally sponsored scheme to provide all-weather road connectivity in rural areas of the country, on the recommendations of the National Rural Roads Development Committee. The scheme was launched on December 25, 2000, and has been

formulated as an anti-poverty programme, focusing on providing connectivity to unconnected rural habitations to enable access to economic and other essential services. A total road length of 734,992 kilometres has been completed so far under the PMGSY scheme in India [2]. Barwell [3] stated that rural connectivity is the only means for a country's rural people to achieve all-round development, which includes better education, access to medical and banking facilities, better transportation, and working facilities. Pant [4] mentioned that the country has yet to overcome the problems of poverty. Today, an estimated 350 million out of one billion people fall below the poverty line. More than 60 percent of the population is still dependent on agriculture for livelihood and employment. The PEO [5] study concluded that PMGSY has succeeded in providing connectivity to some of the most deserving habitations. PMGSY roads provide connectivity to important places such as schools, colleges, market centres, block offices, etc. Althaf [6] found in his study that the PMGSY roads connected the habitations with district headquarters, block headquarters, the main banks, the nearest hospitals, markets for household assets, markets for provisions, fertiliser and pesticide shops, a veterinary hospital, and bus stops with all-weather roads. Mukherjee [7] concluded in his study that better road connectivity had a positive impact on school enrollments across different age cohorts and social backgrounds. A study conducted by Jain [8] revealed that the construction of PMGSY roads has led to many employment opportunities and the active involvement of housewives in small-scale industries like pickle making, etc., which has significantly contributed to a decreased rate of poverty. Mamun and Paul [9], in their study on the impact of the rural transport system on the agricultural development of Jalangi block as a case study, concluded that the improvement of the rural road

system leads to increased agricultural productivity.

A major part of the area under Nagaland is hilly and undulating, which makes it impossible for other transportation means such as railways to connect all the areas in a cost-effective way. Thus, roads serve as the major infrastructure for transportation in the state, providing basic inputs for all-round socio-economic development and also serving as the backbone for the agricultural sector in rural areas. Various road development projects have been undertaken in the state, keeping in mind the importance of road connectivity for the socio-economic upliftment of rural areas. Under the PMGSY scheme, a total of 4893 km of road length has been sanctioned to be constructed in Nagaland, out of which 4189 km (85.59%) of road length have been completed so far (PMGSY, Online Management, Monitoring, and Accounting System). An effort has been made to study the socio-economic impact of PMGSY on the rural people of the Wozhuro rural development block under Wokha district, Nagaland.

2. RESEARCH METHODOLOGY

The study was conducted in the Wokha district of Nagaland State. Out of the seven rural development blocks in the district, the Wozhuro rural development block was purposively selected for the study as the PMGSY scheme was found to be implemented in the block. A purposive cum random sampling technique was used to select the respondents for the study. A total of 100 respondents were selected from three neighbouring villages to form the sample size for the study. A structured interview schedule was developed for the collection of data, which was pre-tested on a small non-sample population before final data collection. The variables for the study were selected keeping in mind the objective of the study and in consultation with various available literature and sources. The study is based on primary data collected from the sampled respondents through personal interview techniques. Statistical tools such as frequency, percentage, and the correlation coefficient were used to analyse the data.

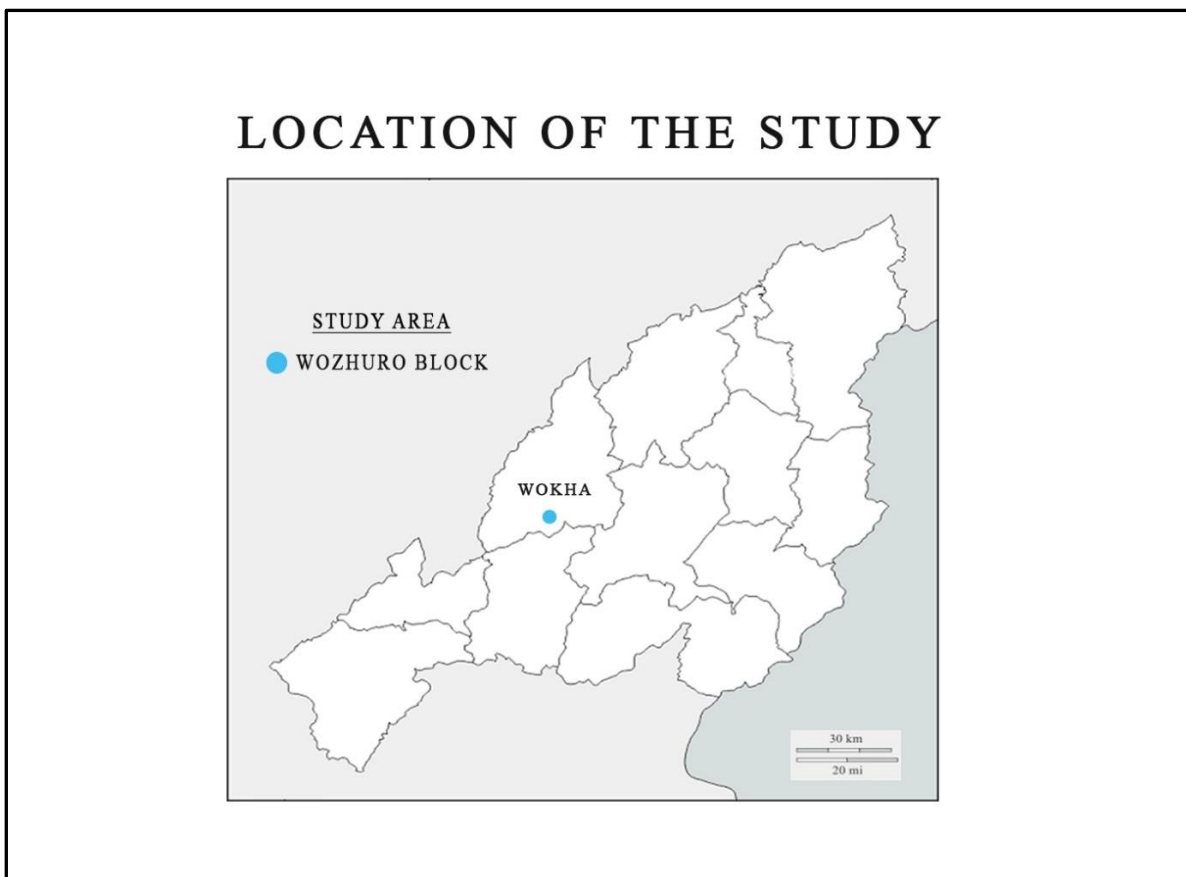


Fig. 1. Map of Nagaland indicating the study area



Fig. 2. Sign board indicating the implementation of PMGSY in the block and details of road pavement

3. FINDINGS AND DISCUSSION

3.1 Socio-Economic Variables of the Respondents

3.1.1 Age

The respondents were divided into three categories based on age. The majority, i.e., 48% of the respondents, were found to be within the age group of 31–50 years, followed by 40% (up to 30 years) and 12% (51 years and above). It can be inferred from the findings on age that persons with physical vigour and accountability towards the family form the largest age group category. Manual work was mostly done by respondents belonging to the 30–50 age categories because of their physical and mental abilities.

3.1.2 Gender

Table 2 shows that the male population formed a larger part of the selected respondents, comprising 77% to 23% of the female population. The larger number of male respondents may be due to the fact that they were more exposed to different activities, including attending training programmes, seminars, campaigns, etc., which made them more interactive in acquiring reliable information regarding the concerned subject. The women, on the other hand, were more engaged in household activities, which deprived them of many activities.

3.1.3 Education

Table 3 revealed that the maximum number of respondents have attained a primary level of

education (49%), followed by illiterate (40%), secondary level (7%), and secondary and above level (4%). Respondents with a primary education level formed the largest category. The findings on education showed that the literacy rate of the respondents was not satisfactory, as the majority of them were illiterate and a majority had attended only the primary level of education. This justified their confinement with employment within the villages on the one hand and poor socio-economic status to avail themselves of better education on the other.

3.1.4 Marital status

As evident from Table 4, the majority (77%) of the respondents belonged to the married category, while 23% belonged to the unmarried category. It was observed that the majority of the respondents were married. This explains the reason for seeking employment, most probably to provide sustenance for their respective families.

3.1.5 Family size

To determine the size of the family, the total number of persons in each family was recorded, and depending on the number of persons in the family, they were categorised into two categories, namely small size and large size. Table 5 revealed that the majority (56%) of the respondents were from large families, with the small families having the least (44%).

3.1.6 Land holding

The total land holding under agriculture was obtained during the data collection from the

respondents and categorised into landless, marginal, small, and medium. Table 6 revealed that the majority (41%) of the respondents belonged to the small farmer's category, whereas 34% of the respondents fell under the marginal farmer category, followed by medium farmers (16%) and landless (9%). It was found that the land holding patterns of the respondents were mostly ancestral for both agricultural and non-agricultural land.

3.1.7 Annual income

It was observed from Table 7 that the majority, i.e., 45% of the respondents, had an annual income in the (21,000–40,000) category, followed by 30% in the (below 20,000) category, 15% in the (41,000–60,000) category, and 10% in the (61,000 and above) category, respectively. Those respondents receiving high annual income were farmers who were engaged in different agricultural activities and enterprises compared to the other categories, who were least engaged or not engaged.

3.2 Impact of PMGSY on the Socio-Economic Status of the Rural People in the Study Area

3.2.1 Employment generation

Table 8 shows the number of working days generated under PMGSY as hired labour during road construction. It was observed that the majority (65%) of the respondent received employment days under the 33 days and below category, followed by 25% in the 34-66 days category, and 10% in the 66 days and above category. Under the PMGSY scheme, there is no fixed number of working days as in other employment-generating programmes; however, findings revealed that the majority of the respondents were employed for 33 days or fewer and expressed satisfaction with the daily wage that was provided to them under the scheme. Biswas and Anwaruzzaman [10] indicated a positive relationship between PMGSY road construction and employment generation.

Table 1. Distribution of the respondents based on their age

Sl. No.	Category	Frequency	Percentage
1.	Up to 30 years	40	40%
2.	31-50 years	48	48%
3.	51 and above	12	12%
	Total	100	

Table 2. Distribution of the respondents based on sex

Sl. No.	Category	Frequency	Percentage
1.	Male	77	77%
2.	Female	23	33%
	Total	100	

Table 3. Distribution of the respondents based on their education

Sl. No.	Levels of education	Frequency	Percentage
1.	Illiterate	40	40%
2.	Primary level	49	49%
3.	Secondary	7	7%
4.	Secondary and above	4	4%
	Total	100	

Table 4. Distribution of the respondents based on marital status

Sl. No.	Category	Frequency	Percentage
1.	Unmarried	23	23%
2.	Married	77	77%
	Total	100	

Table 5. Distribution of the respondents based on their family size

Sl. No.	Category	Frequency	Percentage
1.	Small (up to 5 member)	44	44%
2.	Large (more than 5)	56	56%
	Total	100	

Table 6. Distribution of the respondents based on land holding size

Sl. No.	Size of land holding	Frequency	Percentage
1.	Landless	9	9%
2.	Marginal (below 1 ha)	34	34%
3.	Small (1-2 ha)	41	41%
4.	Medium (4-10 ha)	16	16%
	Total	100	

Table 7. Distribution of the respondents based on their total annual income

Sl. No.	Category	Frequency	Percentage
1.	Below 20,000	10	10%
2.	21,000-40,000	13	13%
3.	41,000-60,000	40	40%
4.	61,000 and above	37	37%
	Total	100	

Table 8. Distribution of the respondents based on employment generation

Sl. No.	Category	Frequency	Percentage
1.	33 days and below	65	65%
2.	34-66 days	25	25%
3.	67 days and above	10	10%
	Total	100	

3.2.2 Income generation

Table 9 shows that the majority (24%) of the respondents are dependent on agriculture and livestock, followed by 21% solely in agriculture and 11% in livestock, 9% in business, and 8% in other categories. 12% of respondents earn money from livestock and business, 6% from agriculture and others, and 5% from business and others. It was observed that the majority of the respondents were engaged in an agricultural occupation, where agricultural products such as rice, mustard, potato, and orange were the major crops cultivated, whereas livestock included poultry, pigs, etc. Income from businesses and others includes running grocery shops and pan shops, a log business, a fish business, handicrafts, weaving, etc. PEO [5] concluded in a study that PMGSY roads have improved the accessibility of beneficiary villages and resulted in higher income in the form of a better price for agricultural produce, new employment avenues, etc.

3.2.3 Farm benefits: Agriculture and livestock

Table 10 shows that 65% of the respondents benefited from a reduction in spoilage of produce, 72% from an improvement in marketing of produce, 56% from a shift in cropping pattern, 37% from an increase in animal and poultry production, 37% from improved meat quality and the sale of meat products, 60% from good-quality farm manure, and 58% from having more access to forage crops. Thus, there was a positive impact on the agriculture and livestock sectors. Nair and Kumar [11], in a study, indicated that the rural road benefited the farm sector in terms of reduction of transport costs, reduction of spoilage of produce, price gains from timely marketing, and income gains from a shift in cropping pattern.

3.2.4 Non-farm Benefits

3.2.4.1 Health

Table 11 revealed that 65% of the respondents had easy access to maximum medical facilities,

79% had access to emergency medical care (emergency doctors, ambulances, etc.), and 43% felt that there was improved medical care for the elderly and the disabled. The results thus showed that there has been a great impact on the health facilities where the rural people have easy access to the maximum medical facilities and infrastructure. The findings are similar to those of Biswas and Anwaruzzaman [10] and Balamurugan [12].

3.2.4.2 Education

Table 12 showed that 78% of the respondents had easy access to various schools and institutions (transportation), 58% could manage to shift their children from government to private schools or colleges, 12% could afford outdoor exposure like a field trip, study tour, etc., 16% of the respondents could afford additional private tuition, and 3% of the respondents could send their children outside the state for higher studies. NRDA (2004) found that with the construction of PMGSY roads, there has been an improvement in the accessibility of educational facilities.

3.2.4.3 Community welfare

Table 13 showed that 76% of the respondent felt that transportation and marketing facilities were improved, 38% felt that better road coverage creates or opens employment chances through projects from other agencies other than PMGSY,

cent percent recorded that some new projects were being implemented recently from state departments, and 68% recorded that there were frequent trainings conducted in the village by various state departments, organisations, etc. In a similar finding, NRDA (2004) observed that the construction of the PMGSY road has led to an increase in the frequency of visits by government officials.

3.2.4.4 Others

Table 14 revealed that there was a positive impact on the standards of living of the people after the implementation of the programme as they could afford some of the new technologies like telecommunications, etc., and built up new business establishments, to name a few. A similar finding by Althaf (2010) found that farmers and shopkeepers had increased economic activity after road construction; there was an introduction of new shops in the villages.

3.2.5 Social participation

Table 15 explains the distribution of the respondents based on their social participation. By social participation, the researcher means the extent to which an individual participates in a broad range of social roles and relationships. It was observed that the respondents were socially active and had contact with the village council, government officials, banks, and various NGOs.

Table 9. Distribution of the respondents based on income generation

Sl.No.	Particulars	Frequency	Percentage
1.	Agriculture	21	21%
2.	Livestock	11	11%
3.	Business	9	9%
4.	Others	8	8%
5.	Agriculture & livestock	24	24%
6.	Livestock & business	12	12%
7.	Business & others	5	5%
8.	Agriculture & others	6	6%
9.	All of them	4	4%
Total		100	

Table 10. Distribution of the respondents based on farm benefits

Sl. No.	Particulars	Frequency	Percentage
1.	Reduction in spoilage of produce	65	65%
2.	Improvement in marketing of produce	72	72%
3.	Shift in cropping pattern	56	56%
4.	Increase in animal & poultry production	37	37%
5.	Improved meat quality and sale of meat products	37	37%
6.	Good quality farm manure	58	58%
7.	More access of forage crops	36	36%

Table 11. Distribution of the respondents based on health

Sl. No.	Particulars	Frequency	Percentage
1.	Easy access to maximum medical facilities	65	65%
2.	Access to emergency medical care (emergency doctors/ ambulance etc)	79	79%
3.	Improved medical care for the old and the disabled	43	43%

Table 12. Distribution of the respondents based on education

Sl. No.	Particulars	Frequency	Percentage
1.	Easy accessibility to various schools & institutions (transport)	78	78%
2.	Shift from Govt. to private schools/colleges	58	58%
3.	Outdoor exposure like field trip, study tour etc.	12	12%
4.	Additional private tuitions	16	16%
5.	Any children studying outside the State	3	3%

Table 13. Distribution of the respondents based on community welfare

Sl. No.	Particulars	Frequency	Percentage
1.	Transportation and marketing facilities improved	76	76%
2.	Better road coverage creates/opened employment chances through projects from other agencies other than PMGSY	38	38%
3.	Any new projects being implemented recently from State departments	100	100%
4.	Frequent trainings been conducted in the village by various State Departments/organizations etc.	68	68%

Table 14. Distribution of the respondents based on others

Sl. No.	Particulars	After PMGSY	
		Frequency	Percentage
1.	Television	10	10%
2.	Radio	8	8%
3.	Telecommunication (Mobile/landline/internet)	22	22%
4.	Access to other new technological innovations. Example-solar lamps, rice mill, water pump etc	36	36%
5.	No. of business establishments (any) being set up	7	7%

Table 15. Distribution of the respondents based on social participation

Sl. No.	Particulars	Frequency	Percentage
1.	Contact with VDB/ Village council	75	75%
2.	Contact with Govt. Officials (Agriculture/Veterinary/Others)	76	76%
3.	Contact with Bank officials (NABARD/SBI/RRB/Others)	38	38%
4.	Contact with NGOs	33	33%
5.	Member of any organization	29	29%
6.	Any other	8	8%

3.3 Correlation between Independent Variables with Dependent Variables

Table 16 shows that the variables family size and land holding have a positive and significant relationship with income generation. A large family size results in a larger workforce to perform income-generating activities. Also, operational land holdings form the basic

unit of production for generating profit and income through agriculture and allied activities. Through the implementation of PMGSY, respondents were able to avail themselves of income-generating activities, and the agriculture sector saw growth as roads provided easy access to various farm inputs for the farmers and linkage to market facilities to sell their produce.

Table 16. Correlation between independent variables with income generation

Sl. No	Variables	Correlation coefficient 'r'
1.	Age	0.02
2.	Gender	-0.05
3.	Education	-0.06
4.	Marital status	0.12
5.	Family size	0.20**
6.	Land holding	0.27**
7.	Annual income	-0.10

**=Significant @ 1% α

Table 17. Correlation between independent variables with farm benefits and non-farm benefits

Sl. No.	Variables	Correlation coefficient 'r'		
		Farm benefits	Non-farm benefits	
			Health	Education
1.	Age	0.04	0.12	0.03
2.	Gender	0.08	-0.07	0.03
3.	Education	-0.02	0.18	0.13
4.	Marital status	0.06	0.07	0.00
5.	Family size	0.14	0.06	-0.02
6.	Land holding	0.39**	-0.03	0.12
7.	Annual income	0.66**	0.44**	0.70**

**=Significant @ 1% α

Table 17 shows that land holding and annual income had a positive and significant relationship with farm benefits, while there was a positive and significant relationship between annual income and non-farm benefits. A farmer with ample operational land holdings is able to cultivate more, achieve more gains, and have better scope to upscale their farm production with the profit made. A good source of income means better living conditions through easier access to various resources and facilities. Better road connectivity has benefitted the rural people in terms of better access to farm inputs and marketing channels, leading to better farm output and price, and has also given them better access to health care, education, and better livelihood opportunities. Ghosh [13] stated that access to quality roads significantly contributes to agricultural productivity, poverty reduction, and improvements in health and education [14].

4. CONCLUSION

The study found that the scheme had a significant impact on raising the standard of living for rural people. There has been a positive impact on employment generation, an increase in annual income, the farm sector (such as agricultural, livestock, and marketing), as well as the non-farm sector (viz., health, education, community welfare, household assets, etc.).

Here, the researcher concludes that since rural connectivity under PMGSY had a positive impact on the socio-economic status of the rural people under the study area, more emphasis should be given to the proper implementation of the scheme as rural connectivity is essential for the overall development of the rural areas as there is a close link between rural connectivity and socio-economic aspects, such as agricultural growth, employment, education, and health care etc.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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