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IMPACT OF PMGSY ON RURAL CONNECTIVITY AND ECONOMIC DEVELOPMENT IN INDIA: A STATE-WISE ANALYSIS

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ABSTRACT----------
Launched in 2000, the Pradhan Mantri Gram Sadak Yojana (PMGSY) aims to provide all-weather road connectivity to previously unconnected villages across rural India. This study explores the program's impact on rural connectivity and its broader implications for economic development across different Indian states. By conducting a state-wise analysis, the research assesses how rural road infrastructure has improved access to markets, boosted agricultural productivity, enhanced healthcare and educational access, and generated employment opportunities in rural areas. The study relies on secondary data, including government statistics, survey findings, and case studies, to evaluate the socioeconomic benefits of improved connectivity. Results indicate that states with higher implementation efficiency under PMGSY have experienced notable gains in rural livelihoods, market integration, and economic growth. However, persistent challenges such as inadequate road maintenance, difficult terrain, and funding constraints continue to hinder uniform progress. The study concludes with policy recommendations aimed at strengthening the sustainability of rural road networks and maximizing their long-term economic and social impact.
KEYWORDS: *PMGSY, Rural Connectivity, Economic Development, Road Infrastructure, Market Integration and Rural Livelihoods----------*

INTRODUCTION

Rural connectivity plays a crucial role in fostering economic and social development, particularly in developing countries like India, where a significant portion of the population resides in rural areas. The Pradhan Mantri Gram Sadak Yojana (PMGSY), launched in 2000, was designed to provide all-weather road connectivity to unconnected villages and improve rural infrastructure (Ministry of Rural Development, 2023). The program aims to bridge the infrastructure gap in rural India, enhance market access, improve agricultural productivity, and facilitate better access to education, healthcare, and employment opportunities.

Road connectivity is widely recognized as a key driver of rural development. According to Bhattacharya and Rao (2019), improved road infrastructure reduces transportation costs, enhances mobility, and increases rural participation in economic activities. Rural roads also play a pivotal role in improving agricultural productivity by enabling farmers to access markets, acquire quality inputs, and reduce post-harvest losses (Suresh & Patel, 2020). Additionally, better connectivity facilitates access to healthcare and educational institutions, thereby improving overall human development indicators (Mehta & Gupta, 2019).

Despite the significant progress under PMGSY, the program's impact has varied across states due to differences in geographic conditions, state-level implementation capacity, and governance structures. While states like Uttar Pradesh and Madhya Pradesh have made substantial progress in rural road connectivity, hilly and remote regions such as Nagaland and Himachal Pradesh continue to face challenges due to difficult terrain and maintenance issues (Das et al., 2020). Bhattacharya et al. (2019) emphasize that poor road maintenance and funding constraints remain critical issues in sustaining the benefits of PMGSY.

This study aims to evaluate the state-wise impact of PMGSY on rural connectivity and economic development in India. It seeks to analyze how improved rural road infrastructure has influenced agricultural productivity, rural employment, market access, and access to social services. The findings are expected to provide valuable insights for policymakers to strengthen rural infrastructure programs and enhance their long-term effectiveness.

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REVIEW OF LITERATURE

The Pradhan Mantri Gram Sadak Yojana (PMGSY) was introduced in 2000 as a flagship rural development program to provide all-weather road connectivity to unconnected villages in India. The program aims to improve rural infrastructure, facilitate market access, enhance agricultural productivity, and improve access to education and healthcare services. Over the years, several studies have explored the impact of PMGSY on rural connectivity and economic development, highlighting both its successes and challenges.

Studies have shown that rural road connectivity under PMGSY has significantly enhanced access to markets and increased the participation of rural communities in economic activities. According to Singh and Sharma (2021), improved rural roads have facilitated better transportation of agricultural produce, reduced transaction costs, and enabled farmers to access a wider range of markets. Similarly, Bhattacharya and Rao (2019) found that PMGSY-connected villages witnessed a 15% increase in agricultural productivity due to improved access to market centers and input supply chains. Improved road infrastructure also encourages rural entrepreneurship by reducing logistical barriers and promoting mobility.

Road connectivity plays a crucial role in improving agricultural productivity and rural livelihoods. Suresh and Patel (2020) emphasized that rural roads have enabled farmers to adopt modern farming techniques, access better quality seeds and fertilizers, and reduce post-harvest losses through faster transportation. A study by Mehta et al. (2018) reported that villages with PMGSY roads experienced a 20% increase in crop yield and higher market prices due to improved access to market facilities and extension services.

PMGSY has also contributed to improving social infrastructure by enhancing access to education and healthcare services. Singh and Choudhary (2020) noted that better road connectivity led to higher school enrollment rates and reduced dropout rates, as students could travel to schools more easily. Similarly, road connectivity has facilitated the delivery of healthcare services, including maternal and child healthcare. Mehta and Gupta (2019) observed that rural health centers in PMGSY-connected villages reported a 30% increase in patient visits due to improved transportation infrastructure.

Improved rural road infrastructure has been linked to poverty reduction and increased employment opportunities. According to Kumar and Das (2021), PMGSY has created employment opportunities through construction and maintenance activities while also enhancing access to non-farm employment in nearby towns and cities. Bhattacharya et al. (2019) found that rural households in PMGSY-connected villages reported a 12% increase in income levels and a 10% reduction in poverty rates within five years of road construction.

Despite its positive impact, PMGSY faces several challenges related to maintenance, funding, and geographic barriers. Singh and Sharma (2021) highlighted that poor maintenance of rural roads reduces their longevity and diminishes the benefits of improved connectivity. Moreover, Das et al. (2020) pointed out that hilly and remote areas face logistical challenges in road construction, resulting in slower progress and higher costs. There is also a need for increased investment in road maintenance and better coordination between central and state governments to ensure the sustainability of PMGSY.

The literature indicates that PMGSY has played a transformative role in enhancing rural connectivity and fostering economic development in India. Improved road infrastructure has facilitated market access, increased agricultural productivity, improved access to social services, and created employment opportunities. However, challenges related to maintenance, funding, and geographic constraints need to be addressed to sustain the long-term benefits of rural road connectivity. Future research should focus on evaluating the long-term socioeconomic impacts of PMGSY and developing policy frameworks to enhance the effectiveness of rural infrastructure programs.

OBJECTIVES OF THE STUDY

To analyze the impact of the Pradhan Mantri Gram Sadak Yojana (PMGSY) on rural connectivity and economic development in India through a state-wise assessment, focusing on how improved road infrastructure influences access to markets, employment, and overall rural growth.

RESEARCH METHODOLOGY

This study follows a review-based research design aimed at evaluating the impact of the Pradhan Mantri Gram Sadak Yojana (PMGSY) on rural connectivity and economic development in India. A review paper methodology involves the systematic collection, evaluation, and synthesis of existing research and secondary data to identify patterns, trends, and gaps in the literature. This approach helps develop a comprehensive understanding of the state-wise impact of PMGSY and provides insights into its implementation, successes, and challenges. The study will rely on secondary data sources, including PMGSY Annual Reports from the Ministry of Rural Development,

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Government of India; state-level reports on rural development and road infrastructure; and NITI Aayog reports and evaluations on rural connectivity and economic development. Additionally, data from the Economic Survey of India, RBI reports on rural growth indicators, PMGSY progress reports, and Census of India data on population, literacy rates, and employment levels will be analyzed. Statistical data from the National Sample Survey Office (NSSO) and state-level reports from rural development departments and road transport agencies will also be used to assess the program's economic and social impact across different states.

RESULT AND DISCUSSION

The analysis reveals that PMGSY has significantly improved rural connectivity across most Indian states, enhancing access to markets, healthcare, and education. States with better implementation strategies experienced higher economic growth, increased rural employment, and improved income levels. However, challenges such as uneven fund allocation, project delays, and geographic constraints have limited the program's overall impact.

Table – 1 State-Wise Road Constructed Under PMGSY*

State/Union Territory	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Andaman & Nicobar Islands	0	0	0	0	0	0	0	31	45	74	234
Andhra Pradesh	11,481	12,022	12,995	13,728	13,882	14,219	14,520	15,051	16,292	17,365	35,397
Arunachal Pradesh	3,818	3,825	4,131	5,492	6,624	7,942	9,673	11,468	11,962	13,259	27,038
Assam	12,910	14,187	15,177	16,106	17,725	22,020	25,667	28,349	30,489	31,131	63,386
Bihar	28,490	32,565	36,010	42,608	47,829	51,136	51,855	54,110	56,020	57,885	1,20,096
Chhattisgarh	20,962	23,788	25,829	26,849	28,750	31,863	33,815	38,501	41,538	42,204	84,792
Goa	155	155	155	155	155	155	155	155	155	155	311
Gujarat	8,763	11,597	12,291	12,503	12,552	12,567	12,567	12,769	13,773	14,598	30,196
Haryana	4,565	4,926	5,475	5,538	5,576	5,581	5,581	5,805	7,178	7,601	15,879
Himachal Pradesh	9,096	9,803	10,462	11,891	13,664	14,998	16,085	18,000	19,606	20,747	42,070
Jammu & Kashmir	3,134	3,949	4,656	6,392	8,152	9,711	10,886	14,053	17,108	17,792	37,299
Jharkhand	8,686	10,498	11,779	14,899	19,418	22,989	24,397	26,406	27,243	28,386	59,082
Karnataka	16,137	16,607	17,607	18,515	18,563	18,569	18,575	19,141	21,664	23,172	47,419
Kerala	1,848	2,114	2,508	2,823	3,196	3,510	3,636	3,713	3,779	3,903	8,291
Ladakh	260	304	387	437	481	544	695	781	890	1,030	2,140
Madhya Pradesh	50,771	55,619	60,600	65,681	70,900	75,420	77,293	80,248	84,669	88,366	1,78,435
Maharashtra	22,063	22,592	23,483	25,483	26,053	26,320	26,441	26,621	26,794	27,878	58,798
Manipur	3,365	3,667	4,032	5,517	6,249	7,101	7,855	8,748	9,417	10,764	21,625
Meghalaya	995	1,026	1,177	1,546	1,696	1,907	2,181	2,910	3,734	4,201	8,980
Mizoram	2,170	2,207	2,324	2,622	2,859	3,126	3,470	3,717	4,048	4,255	8,644
Nagaland	2,716	2,914	3,008	3,403	3,488	3,697	3,886	3,921	4,120	4,189	8,463
Odisha	25,924	30,106	34,000	39,779	46,919	55,049	60,347	62,192	65,018	67,638	1,40,139
Puducherry	0	0	0	0	0	0	0	0	0	38	125
Punjab	5,244	5,800	6,528	7,115	7,966	8,213	8,242	8,243	8,436	8,940	19,717
Rajasthan	52,648	56,060	58,235	61,339	64,589	67,117	67,220	69,076	72,314	72,848	1,48,550
Sikkim	2,384	2,549	2,940	3,188	3,607	3,959	4,027	4,184	4,323	4,607	9,333
Tamil Nadu	10,684	12,314	12,903	13,787	15,398	17,565	18,631	19,502	21,521	22,342	46,599
Telengana	8,817	9,017	9,415	9,823	10,126	10,507	10,713	11,034	11,581	12,133	25,221
Tripura	2,855	3,094	3,452	3,857	4,170	4,340	4,425	4,534	4,700	4,827	9,821
Uttar Pradesh	40,720	43,706	47,113	50,208	54,315	56,003	56,379	57,090	60,063	65,134	1,43,295
Uttarakhand	4,036	4,514	5,540	7,529	9,368	11,124	13,161	16,525	18,546	19,415	39,774
West Bengal	15,615	17,830	20,296	23,121	26,335	31,446	33,626	35,805	36,326	36,453	73,287

*: Pradhan Mantri Gram Sadak Yojana. PMGSY includes PMGSY-I, PMGSY-II, PMGSY-III, and Road Connectivity Project for Left Wing Extremism Affected Areas (RCPLWEA).

Source: National Rural Infrastructure Development Agency, Ministry of Rural Development, Government of India.

The data in Table 1 provides a comprehensive overview of state-wise road construction under the Pradhan Mantri Gram Sadak Yojana (PMGSY) from 2013-14 to 2023-24, showcasing the government's sustained efforts to enhance rural connectivity across India. Over this 11-year period, there has been a significant increase in the length of rural roads constructed, reflecting a focused push towards improving rural infrastructure, economic integration, and accessibility.

Among the top-performing states, Madhya Pradesh stands out prominently, registering the highest cumulative road length of 1,78,435 km by 2023-24. It is followed by Rajasthan (1,48,550 km), Uttar Pradesh (1,43,295 km), Odisha (1,40,139 km), and Bihar (1,20,096 km). These states, which have vast rural populations and large geographical areas, have demonstrated consistent year-on-year growth in road construction, indicating effective

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implementation and prioritization of the PMGSY scheme. The consistent progress in these states has likely contributed to improved mobility, rural livelihoods, and access to essential services like health care and education. The data also highlights the strides made by northeastern and hilly states, traditionally known for difficult terrains and connectivity challenges. States like Arunachal Pradesh, Himachal Pradesh, Manipur, and Jammu & Kashmir have shown a commendable upward trend in road development. For instance, Arunachal Pradesh increased its constructed road length from 3,818 km in 2013-14 to 27,038 km in 2023-24, while Jammu & Kashmir grew from 3,134 km to 37,299 km over the same period. These improvements point to the government's focused efforts on inclusivity and regional development, especially in remote and strategically significant areas.

On the other hand, Union Territories such as Andaman & Nicobar Islands and Puducherry displayed minimal progress in the initial years, with activity picking up only after 2020-21. Ladakh, after its separation from Jammu & Kashmir, has also seen steady development, with road construction reaching 2,140 km in 2023-24, reflecting growing infrastructural emphasis in newly formed administrative regions.

Interestingly, the year 2023-24 marks a major leap in road construction figures for almost all states and UTs, often doubling or more compared to the previous year. This sudden spike may be attributed to several factors including enhanced budgetary allocations, accelerated implementation of PMGSY-III, and renewed focus on rural infrastructure post-pandemic to boost economic recovery. Additionally, integration of data from sub-schemes like RCPLWEA (Road Connectivity Project for Left Wing Extremism Affected Areas) might have contributed to the sharp rise.

However, some states like Goa, Kerala, and Punjab recorded relatively lower totals over the decade. Goa remained static at 155 km until 2022-23 and only reached 311 km in 2023-24, possibly due to its small size or already well-developed road network. Similarly, Kerala and Punjab may have shown modest growth due to geographic constraints or focus on maintenance rather than new construction.

In the data underscores a clear upward trajectory in rural road construction under PMGSY, with considerable variation across states due to factors such as geography, administrative capacity, funding, and pre-existing infrastructure. The substantial rise in 2023-24 reflects a strategic intensification of rural development efforts, aligning with national goals of inclusive growth, last-mile connectivity, and infrastructure-led development.

The Role of Road Infrastructure in Accelerating Rural Development

Road infrastructure plays a crucial role in accelerating rural development by improving connectivity, reducing isolation, and linking villages to markets, services, and employment opportunities. Better roads lower transportation costs, enhance access to healthcare and education, and stimulate local businesses and industries. They facilitate labor mobility, attract investments, and promote social inclusion, ultimately contributing to economic growth and improved quality of life in rural areas.

1. Improved Access to Markets

Improved road infrastructure plays a crucial role in enhancing access to markets, particularly for rural communities engaged in agriculture and small-scale production. One of the most immediate benefits is the reduction in transportation costs. When roads are in good condition, it becomes faster and cheaper to transport goods to marketplaces, making it more profitable for farmers and rural producers to sell their products. This increases their income and reduces dependence on middlemen.

Better roads also lead to stronger market linkages, connecting remote villages with nearby towns, cities, and regional trade hubs. This expanded connectivity allows rural producers to access a wider and more diverse customer base, including both wholesale and retail markets. As a result, they can sell in bulk, command better prices, and engage in long-term contracts or partnerships with buyers and retailers.

In the agricultural sector, reduced wastage is another significant benefit. Perishable products like fruits, vegetables, and dairy can be transported more quickly, minimizing spoilage and preserving product quality. This leads to higher returns for farmers and encourages the production of high-value crops.

Furthermore, road infrastructure improves input accessibility. Farmers and rural enterprises can more easily procure essential agricultural inputs such as quality seeds, fertilizers, pesticides, tools, and machinery. Timely access to these resources boosts productivity and efficiency, leading to better yields and improved livelihoods.

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2. Enhanced Employment Opportunities

Improved road infrastructure significantly boosts employment opportunities in rural areas by supporting both farm and non-farm sectors. One of the most notable impacts is the growth of non-farm employment. With better connectivity, small businesses, cottage industries, retail shops, and service-based enterprises (like mechanics, tailoring, and transport services) begin to thrive, providing alternative income sources beyond agriculture. This diversification is especially important in reducing underemployment and seasonal job dependency.

Better roads also enhance labor mobility. Rural workers gain the ability to commute to nearby towns, cities, and industrial zones for employment. This increases access to a wider range of job opportunities and enables rural populations to tap into urban labor markets without having to permanently migrate. It also allows women and youth to participate more actively in the workforce by improving the safety and reliability of travel.

In addition to enabling mobility and entrepreneurship, the construction and maintenance of roads themselves create direct employment. Programs such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) offer wage-based employment to rural households, particularly for unskilled labor. Road-building projects under such schemes contribute to both infrastructure development and immediate livelihood support.

3. Stimulating Overall Rural Growth

Improved road infrastructure plays a vital role in stimulating holistic rural development by enhancing access to essential services and fostering inclusive growth. One of the most significant impacts is on healthcare and education access. With better roads, people can reach hospitals, health centers, and schools more easily and quickly. This improves health outcomes through timely medical care and increases school attendance, especially among girls and children from remote areas, thereby contributing to long-term human capital development.

Road connectivity also promotes financial inclusion by facilitating the expansion of banking services, ATMs, and digital infrastructure into rural areas. It enables mobile banking, digital payments, and government welfare transfers to reach beneficiaries more efficiently, reducing dependency on informal credit and promoting economic empowerment.

Furthermore, improved roads attract investment and support industrial growth in rural regions. They enable the establishment of small-scale industries, agro-processing units, and storage facilities, which add value to local resources and generate employment. Better connectivity lowers logistical barriers and makes rural areas more appealing for private and public sector investments.

Lastly, enhanced road infrastructure leads to social development by improving mobility, information exchange, and participation in civic and political life. It allows marginalized communities, including women and tribal populations, to engage more actively with mainstream society. Access to information, government services, and markets helps reduce social isolation and fosters a more equitable and inclusive rural economy.

State-wise Variations and Challenges in PMGSY Implementation

The Pradhan Mantri Gram Sadak Yojana (PMGSY), launched in 2000, aims to provide all-weather road connectivity to unconnected rural habitations across India. However, the program's implementation has shown considerable variation across states, influenced by factors such as geography, administrative efficiency, funding, and socio-political conditions.

States like Punjab, Haryana, Gujarat, and Maharashtra have demonstrated strong implementation due to flat terrain, robust administrative frameworks, and better financial management. These states have nearly achieved universal connectivity and are now focusing on upgrading roads under PMGSY-II and III. However, maintaining older roads and integrating infrastructure with other development schemes remain challenges. Andhra Pradesh and Telangana have also performed well, leveraging technology like GIS for monitoring and ensuring timely fund use, although land acquisition issues in tribal and forest areas persist.

States with moderate progress, such as Rajasthan, Uttar Pradesh, and Bihar, have undertaken substantial construction, particularly in the Ganga plains and semi-arid regions. Yet, poor contractor performance, weak road maintenance, and land disputes hinder further development. Similarly, Madhya Pradesh and Chhattisgarh have built significant road lengths, especially in tribal belts, but face hurdles due to difficult terrain and Naxal-related security concerns.

Lagging states include those in the Northeast such as Nagaland, Arunachal Pradesh, Manipur, Meghalaya, and Mizoram where mountainous terrain, frequent natural disruptions, forest clearance delays, and short working

seasons pose serious constraints. The hill and border states Jammu & Kashmir, Ladakh, Himachal Pradesh, and Uttarakhand struggle with harsh climatic conditions, snowbound periods, and security-related delays that slow implementation.

Across the country, some common challenges persist. These include gaps in road maintenance post-construction, delays in fund disbursement from both central and state governments, a shortage of skilled labour in remote areas, underperforming contractors, and inconsistent use of digital monitoring tools.

While PMGSY has significantly improved rural connectivity, its success varies by region. Addressing location-specific barriers, ensuring timely funding, enhancing contractor accountability, and investing in sustainable maintenance are essential to achieving equitable and long-lasting rural road infrastructure across India.

CONCLUSION

The Pradhan Mantri Gram Sadak Yojana (PMGSY) has played a transformative role in improving rural connectivity across India, contributing significantly to economic development and social inclusion. The state-wise analysis reveals that while the program has led to enhanced access to markets, better healthcare and education services, increased employment opportunities, and improved agricultural productivity, the extent of these benefits varies widely among states. Factors such as administrative efficiency, geographical conditions, fund management, and security concerns have influenced the pace and quality of implementation.

States with strong administrative capacity and favorable terrain have reaped substantial socioeconomic gains, while others particularly in hilly, remote, and conflict-prone regions continue to face persistent implementation challenges. Common issues such as inadequate road maintenance, contractor inefficiencies, and funding delays further affect long-term outcomes.

To fully realize the developmental potential of rural road infrastructure, there is a need for sustained policy support, targeted interventions in lagging regions, and robust maintenance mechanisms. Strengthening institutional capacity, promoting technology-based monitoring, and ensuring community involvement will be key to maximizing the long-term impact of PMGSY and achieving inclusive rural growth across all Indian states.

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