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PMGSY in Karnataka: A Performance Evaluation of Rural Road Connectivity

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Abstract : Launched in 2000, the Pradhan Mantri Gram Sadak Yojana (PMGSY) stands as one of India's most ambitious rural infrastructure programmes, aiming to provide all-weather road connectivity to unconnected habitations. Karnataka, with its diverse topography and socio-economic conditions, presents a unique case to evaluate the implementation of the programme over two decades. This study undertakes a performance evaluation of PMGSY in Karnataka from its inception to the present, using both quantitative and qualitative parameters. Drawing upon district-level data, government reports, and field observations, the paper analyses trends in rural connectivity, project completion rates, and socio-economic impacts such as access to markets, education, and health services. The study reveals a mixed performance: while several districts witnessed significant infrastructure upgrades, others lagged due to administrative delays, terrain challenges, and capacity constraints. The paper concludes with policy recommendations to enhance the programme's effectiveness in the next phase, emphasizing integrated planning, maintenance strategies, and community involvement for sustainable rural road development.
Keywords: *PMGSY (Pradhan Mantri Gram Sadak Yojana), Rural Connectivity, Rural Infrastructure Development, Karnataka Road Network, Rural Development.*

1.0 INTRODUCTION

Rural infrastructures, particularly road connectivities, play a crucial role in bridging the development gap between urban and rural areas. Among the most transformative initiatives launched by the Government of India in this regard is the Pradhan Mantri Gram Sadak Yojana (PMGSY), introduced in December 2000 with the primary objective of providing all-weather road connectivity to unconnected rural habitations with a population of 500 and above (250+ in hilly/tribal areas) (Ministry of Rural Development, 2023). PMGSY represents a strategic shift from welfare-oriented infrastructure to outcome-based rural development, facilitating access to markets, health services, education, and employment opportunities for millions in India's villages.

Karnataka, with its varied physiographic regions of coastal plains, hilly Malnad areas, and interior dry zones, presents a dynamic terrain for the implementation of the PMGSY. Over the last two decades, Karnataka has been among the top-performing states in terms of sanctioned road length, yet it also faces challenges in project execution, particularly in ecologically sensitive or backward regions (NABARD, 2022). While states like Uttar Pradesh, Madhya Pradesh, and Rajasthan dominate in scale, Karnataka stands out for its quality standards, decentralized implementation via Zilla Panchayats, and integration with digital monitoring systems like (Online Management, Monitoring and Accounting System (OMMAS).

Despite the visible achievements, questions remain regarding the actual development outcomes of PMGSY in the state. How far has rural connectivity is translated into inclusive development? Are all districts performing equally well? What factors hinder or facilitate successful implementation? - are the issues pertinent.

Existing literature on the programme largely emphasizes national-level achievements, focusing on length constructed or habitations connected. However, micro-level analyses exploring district-wise performance, quality of roads, maintenance issues, and impact on rural livelihoods remain limited especially in Karnataka. This study attempts to fill that gap at least to some extent.

1.1 OBJECTIVES OF THE STUDY

The objectives of the present studies are:

1. To assess the performance of the PMGSY in Karnataka over the last two decades in terms of road length, habitation coverage, and financial utilization in selected districts.

2. To identify regional disparities in implementation across the selected districts.

3. To evaluate the development outcomes associated with improved rural connectivity, including access to health, education, and markets.
4. To suggest policy interventions for enhancing the efficiency, equity, and sustainability of the programme in the future phases.

2. Review of Literature

A review of earlier studies helps in identifying the conceptual frameworks and methodological approaches relevant to the present study. While numerous studies have been conducted on transportation and rural road connectivity at the national and regional levels, the present review is confined to some works that closely relate to the performance and development outcomes of the PMGSY in Karnataka, in view of the scope and focus of this article.

A paper entitled **Returns to Public Investment in Rural India** by **Fan and Hazell (2001)** carried out an econometric analysis of rural infrastructure interventions. It found that rural roads contributed significantly to poverty reduction and agricultural productivity, yielding higher returns than other public expenditures, thereby strengthening the rationale for schemes like PMGSY[1].

In a paper titled **Rural Roads and Regional Development in India, Ghosh (2003)** argued that road connectivity alone does not guarantee rural development unless integrated with effective local governance and planning. He emphasized the importance of community participation and maintenance mechanisms to ensure infrastructure sustainability[2].

In his study on **PMGSY and Rural Infrastructure Development**, **Lokhande (2008)** critically evaluated the implementation of PMGSY in Maharashtra. While acknowledging improvements in access to health and education, the study highlighted challenges such as corruption, land disputes, and poor contractor accountability[3].

A district level study titled **Impact of Rural Roads on Agricultural Marketing in Karnataka** by **Murthy and Raghavendra (2010)** analysed road development under PMGSY in Tumakuru and Chitradurga. The authors found that improved connectivity reduced post-harvest losses and enhanced access to markets, but also noted the lack of supporting rural transport services[4].

An official evaluation report by **the Ministry of Rural Development (2016)** identified Karnataka as a top-performing state in terms of project execution, use of Online Management Monitoring and Accounting System (OMMAS) digital monitoring, and cost efficiency. However, the report also noted concerns regarding post-project maintenance and unequal district-level outcomes[5].

In their study titled **Educational Outcomes and PMGSY in Backward Taluks of Karnataka, Channabasappa and Raju (2018)** investigated how PMGSY roads influenced access to education. Their findings revealed improved attendance and lower dropout rates, particularly for girls, but called for parallel improvements in educational quality[6].

In a paper titled **GIS-Based Performance Mapping of PMGSY Roads, Sharma and Kumar (2020)** used spatial analysis to study road connectivity in Karnataka. They discovered that coastal and southern districts performed better, while backward regions with higher SC/ST populations remained underserved[7].

Suresha and Arun (2021), in their recent study on **PMGSY delays in Karnataka Delay in rural road construction: evidence from PMGSY in Shimoga district**, ***Karnataka***, examined implementation in Shimoga district. They found that 95% of rural road projects were delayed, attributing the delays to inefficient contractor systems and monitoring gaps[8].

A case study by **Khuvung and Odyuo (2023) titled** , **Study on the impact of PMGSY on socio-economic status: Wokha district, Nagaland** examined the socio-economic impact of PMGSY in Wokha district, Nagaland. The study concluded that PMGSY roads enhanced farm and non-farm incomes, increased access to healthcare and education, and reduced travel time and costs significantly[9].

A paper by **Kumar and Shobana (2025)** conducted a state-wise evaluation of PMGSY and found that states with efficient implementation had better rural employment, market integration, and service access. However, issues like terrain challenges and delayed maintenance funding persisted[10].

3. Research Methodology

3.1 Area of the Study

The study is focused on the state of Karnataka, one of the prominent states in South India with diverse geographical, socio-economic, and demographic characteristics. Karnataka consists of 31 districts, which represent three broad regional zones—Coastal Karnataka, Malnad (hilly) Region, and the Inland plateau. The study includes a district-wise performance review,

with specific attention to Udupi, Tumakuru, Kalaburagi, Chitradurga, and Belagavi, to represent different zones and outcomes under PMGSY.

3.2 Data Sources

The study relies on secondary data drawn from multiple reliable government and institutional sources:

- PMGSY official dashboard and online Online Management, Monitoring and Accounting System (OMMAS) portal
- Annual Reports of the Ministry of Rural Development (MoRD), Government of India
- Karnataka Rural Road Development Agency (KRRDA) progress reports
- State-level Economic Surveys (Government of Karnataka)
- NABARD Rural Infrastructure Development Fund (RIDF) reports
- GIS-based rural road coverage maps and satellite images (where applicable)
- Published literature and case studies from academic journals

3.3 Period of the Study

The performance analysis covers the period from 2000 (inception of PMGSY) to 2024, divided into three major phases:

- **Phase I (2000–2012)** – initial expansion and connection of core habitations
- **Phase II (2013–2018)** – strengthening and upgradation of existing roads
- **Phase III (2019–2024)** – consolidation and quality improvement with maintenance thrust

3.4 Tools and Techniques of Analysis

To ensure a robust and insightful evaluation, the study adopts a mixed-methods approach:

1. **Descriptive Statistical Analysis**
    - District-wise comparison of road length sanctioned and completed
    - Percentage of habitations connected
    - Fund allocation vs. utilization
    - Year-wise performance indicators
2. **Comparative Regional Analysis**
    - Grouping districts by region (coastal, Malnad, plains) to evaluate disparities
    - Identification of top-performing and low-performing districts
    - Use of indicators like Road Connectivity Ratio (RCR) and Execution Efficiency Rate (EER)
3. **Qualitative Assessment**
    - Review of implementation challenges, bottlenecks, and policy gaps from official reports
    - Inclusion of case-based observations (e.g., from Udupi and Kalaburagi districts)

3.5 Limitations of the Study

- The study is primarily based on secondary data, and field validation is limited to documented cases.
- Inconsistencies in reporting formats across different agencies (e.g., MoRD vs. state agencies) posed some comparability issues.
- GIS analysis is restricted to open-source maps due to limited access to high-resolution official spatial data.

4. PMGSY in Karnataka – Progress and Performance Analysis

The implementation of the PMGSY in Karnataka has evolved over more than two decades, reflecting both the strengths and structural challenges of rural road development in a geographically diverse state. This section presents a detailed evaluation of the programme's performance in Karnataka across three key dimensions: physical progress, financial utilization, and regional disparities.

4.1 Historical Progress Overview

Since the launch of PMGSY in 2000, Karnataka has been a front-runner in leveraging the programme to bridge the rural-urban divide. The Karnataka Rural Road Development Agency (KRRDA) has been the nodal agency overseeing the implementation of the PMGSY, supported by the Zilla Panchayats at the district level.

As of **March 2024**, Karnataka has:

- Completed over 52,000 km of rural roads
- Connected more than 18,500 habitations with All-Weather Road access
- Maintained a completion rate above 90% in sanctioned works (MoRD, 2024)

4.2 Phase-Wise Implementation Summary

Using secondary data published by the Ministry of Rural Development (MoRD, 2024), Karnataka PMGSY Dashboard, and KRRDA Annual Reports, the phase-wise implementation status of PMGSY in Karnataka has been compiled and presented in Table 01. This Table outlines the progress made in different phases in terms of road length completed and habitations covered.

Table-01

Phase-Wise Implementation

Phase	Period	Objective	Completed Road Length (km)	Habitations Covered
Phase I	2000–2012	Connect unconnected habitations (core network)	31,500 km	13,000+
Phase II	2013–2018	Strengthen and upgrade existing roads	10,200 km	3,200+
Phase III	2019–2024	Consolidation, quality enhancement, and maintenance focus	10,500 km (ongoing)	2,300+ (in progress)

***Source**: Ministry of Rural Development (2024), Karnataka PMGSY Dashboard; Karnataka Rural Road Development Agency (KRRDA). Annual Progress Reports 2023–24. Retrieved from https://omms.nic.in and* https://krrda.karnataka.gov.in

4.3 Financial Performance

Karnataka has shown relatively high fund absorption capacity under the PMGSY, as reflected in the year-wise data presented in Table-02.

Table-02

Year-wise Fund Sanction and Utilization under PMGSY in Karnataka

Year	Funds Sanctioned (₹ Crores)	Funds Utilized (₹ Crores)	Utilization %
2020-21	745.23	702.54	94.28
2021-22	812.10	775.84	95.54
2022-23	895.66	857.91	95.77
2023-24	910.00 (est.)	821.23 (till Jan 2024)	~90.30

***Source**: Ministry of Rural Development, Government of India; Karnataka State Finance Accounts*

From the data presented above, it could be viewed that effective financial utilization reflects administrative efficiency and proactive use of the OMMAS portal for monitoring the programme in the state of Karnataka, a matter of appreciation indeed.

4.4 District-Wise Performance

In order to understand regional disparities and variations in implementation outcomes across the state, a district-level analysis is presented in Table-03, highlighting differences in road length completed and habitation coverage under the PMGSY. The data indicate that while districts like Udupi and Tumakuru have performed exceptionally well, others such as Kalaburagi and Chamarajanagar face challenges due to terrain and administrative hurdles.

Table-03

District-wise PMGSY Performance in Karnataka (as of June 2024)

District	Road Length Completed (km)	Habitation Coverage (%)	Observations
Udupi	586	99	High performance; coastal terrain managed well
Tumakuru	1,386	99	Major gains in dry zones
Kalaburagi	1,025	89	Some delays due to terrain and land issues
Chamarajanagar	1,102	90	Forest clearance delays impacted timelines
Vijayapura	1,310	91	Arid zone; moderate initiation delays

Source:

- *Annexure I & II, Rajya Sabha, Ministry of Rural Development Responses (as of June 10, 2024)* sansad.in
- *OMMS State Abstract Report – Karnataka, District Briefs (June 2024)* sansad.in

The data presented in Table–03 indicates significant progress in rural road construction across Karnataka under the PMGSY scheme as of June 2024. Districts like Tumakuru and Udupi have demonstrated near-complete implementation, achieving over 99% habitation coverage, reflecting efficient project execution even in challenging terrains. In contrast, Kalaburagi and Chamarajanagar faced moderate implementation delays, primarily due to issues related to land acquisition and forest clearances. Vijayapura, being part of the arid northern zone, showed steady progress despite slower project initiation. These inter-district disparities highlight the role of geographical, administrative, and logistical factors in shaping the performance outcomes of PMGSY in Karnataka.

4.5 Achievements

The implementation of PMGSY in Karnataka has led to several notable achievements over the years. One of the most significant outcomes has been the reduction in the number of unconnected habitations, particularly in the underserved regions of northern Karnataka. The programme has also resulted in an average 40% reduction in travel time to essential services such as markets, health centres, and schools, thereby improving rural mobility and access. Additionally, the scheme has played a vital role in enhancing rural employment opportunities, both directly through road construction and indirectly through allied services. Institutional improvements have also been noteworthy, including the adoption of e-tendering systems for transparency and the integration of quality control mechanisms such as State Quality Monitors (SQM) and National Quality Monitors (NQM) to ensure accountability and performance across project stages.

4.6 Challenges

Despite the notable achievements of PMGSY in Karnataka, several challenges continue to hinder its full potential. Land acquisition delays and forest clearance bottlenecks, particularly in districts like Chamarajanagar and Kodagu, have led to project postponements and incomplete stretches. Another persistent issue is the poor maintenance of roads after the mandatory five-year contractor maintenance period ends. This is especially problematic in Malnad and interior regions, where climatic conditions and terrain demand continuous upkeep. Additionally, the lack of integration between PMGSY roads and local development plans has resulted in instances where roads terminate abruptly without connecting to key functional centres such as markets, health institutions, or schools. In more remote areas, PMGSY roads remain underutilized due to the absence of complementary infrastructure like public transport systems and economic hubs, limiting their impact on rural development and mobility.

5. Impact Analysis of PMGSY in Karnataka

The PMGSY has played a pivotal role in shaping the economic and social landscape of rural Karnataka. This section analyses the multi-dimensional impact of the PMGSY on **agriculture**, **education**, **health**, and **livelihood opportunities**, based on available data, field reports, and region-specific observations.

5.1 Impact on Agriculture

One of the most visible impacts of the PMGSY roads in Karnataka has been on agricultural productivity and market access.

- Improved Transportation of Farm Produce: In districts like Belagavi and Tumakuru, farmers now reach markets faster, reducing post-harvest losses by nearly 20% (MoRD, 2022).
- Increased Cropping Intensity: Reliable All-Weather Roads have encouraged double cropping in irrigated areas of Mandya and Raichur.
- Input Access: Fertilizers, seeds, and extension services are now more accessible, particularly in dryland zones like Vijayapura and Bagalkot.

Further, more importantly in Chikkaballapur district, the PMGSY roads led to a 15% rise in the area under floriculture due to easier access to flower markets in Bengaluru,the state capital.

5.2 Impact on Education

The expansion of rural road connectivity under the PMGSY had a measurable positive impact on educational access in Karnataka. In districts such as Koppal and Yadgir, the construction of all-weather roads led to a 10–15% decline in dropout rates, particularly among children from remote villages where schools had previously been difficult to reach (MoRD, 2021) [11]. In addition, improved infrastructure contributed to higher school attendance, especially among female students in Hassan and Shivamogga, by reducing travel time and enhancing perceptions of safety during commutes (KRRDA, 2023)[12]. Enhanced connectivity has also opened pathways to higher secondary and degree-level education for students in hilly and isolated areas like Kodagu, where difficult terrain previously limited access.

In Kalaburagi district, government high schools located in villages connected by PMGSY roads reported a 12% increase in enrolment between 2018 and 2022, with a notable rise in attendance among girls and SC/ST students (KRRDA, 2023) [12].

5.3 Impact on Health

The PMGSY roads have significantly improved healthcare access for rural populations in Karnataka. In Ballari and Gadag, road development enabled faster transportation to Primary Health Centres (PHCs) and taluk hospitals, reducing emergency response times by over 50% (MoRD, 2021) [11]. The enhanced accessibility has been especially crucial for maternal and neonatal health services, with institutional deliveries increasing by 25% in districts like Dharwad and Chitradurga, as reported by NRHM (2022) [13]. Furthermore, medical staff now conduct regular immunization camps and outreach services in villages that were previously underserved due to poor road conditions.

In Hebri Taluk (Udupi district), villagers earlier walked nearly 5–7 km to access basic healthcare facilities. After the construction of PMGSY roads, average travel time dropped from 90 minutes to just 20 minutes, resulting in a significant rise in outpatient visits and maternal check-ups (KRRDA, 2023) [14].

5.4 Impact on Livelihoods and Social Inclusion

The livelihood impact of the PMGSY roads in Karnataka has been multifaceted, especially in terms of employment generation, market access, and social inclusion. According to MoRD data, road construction activities under PMGSY created over 14 lakh person-days of employment in the state between 2020 and 2023 (MoRD, 2024) [15]. The enhanced road network also enabled rural youth to engage in non-farm employment such as petty trade, transport services, and small-scale enterprises. In districts like Davangere and Udupi, the mobility of women Self-Help Group (SHG) members improved significantly, allowing them to participate in training programmes, attend banking facilities, and sell goods at local markets (KSRLM & KRRDA, 2023) [16].

In Vijayanagara district, the completion of PMGSY roads led to over 30% of women in connected villages joining SHGs and accessing microfinance loans for income-generating activities like tailoring, dairy production, and petty trading (KSRLM & KRRDA, 2023) [16].

5.5 Overall Social Transformation

- **Reduced Migration:** Seasonal migration has reduced in many PMGSY-covered villages due to improved local opportunities.
- **Access to Government Services:** Delivery of pensions, voter registration, and awareness campaigns has become more effective.
- **Emergency Response:** Road access has enabled faster disaster response in flood- or drought-prone areas, such as **Kodagu and Gadag**.

6. Key Findings and Policy Suggestions

Based on the detailed performance and impact analysis, this section summarises the major findings of the study and proposes policy-level recommendations to strengthen the effectiveness of the PMGSY in Karnataka.

6.1 Key Findings

The study found the following key findings:

The study reveals several critical insights regarding the implementation of the PMGSY in Karnataka. Firstly, the state has shown high physical and financial performance, with more than 52,000 kilometers of rural roads constructed and over 18,000 habitations connected across Phases I to III. This reflects Karnataka's consistent success in project execution and fund utilization under the PMGSY. However, the performance has not been uniform across all regions. While coastal and southern districts such as Udupi

and Tumakuru have exhibited strong implementation outcomes, northern and interior districts like Kalaburagi and Vijayapura continue to face significant challenges stemming from land acquisition hurdles, administrative delays, and difficult terrain. Furthermore, the PMGSY has led to multi-sectoral development gains, notably enhancing agricultural productivity, access to education and healthcare, and promoting livelihood diversification, particularly benefiting women and rural youth.

Despite these positive outcomes, the sustainability of benefits remains inconsistent, largely due to weak post-project maintenance mechanisms. After the five-year mandatory maintenance period managed by contractors, Gram Panchayats often lack the financial and institutional capacity to ensure continued road upkeep, thereby threatening the long-term durability of the infrastructure. Another key finding is the limited integration of the PMGSY with other rural development plans, such as the Gram Panchayat Development Plans (GPDPs). This disjointed approach has frequently resulted in last-mile connectivity gaps, reducing the scheme's effectiveness in ensuring equitable access to essential services.

6.2 Policy Suggestions

1. **Strengthen Maintenance Mechanisms**
   - Allocate dedicated funds for Post-5-Year Maintenance through State Rural Road Funds.
   - Build capacity at the Panchayat level for decentralized upkeep and use of mobile inspection teams for monitoring.
2. **Reduce Regional Imbalances**
   - Prioritise backward and SC/ST-dominated habitations in Phase III and beyond.
   - Provide flexibility in project timelines for terrain-challenged districts (e.g., Kodagu, Chamarajanagar).
3. **Enhance Convergence with Other Schemes**
   - Link PMGSY roads with MGNREGA, NRLM, and PMAY-G to multiply benefits.
   - Use roads to improve access to existing education and health assets under schemes like Samagra Shiksha and Ayushman Bharat.
4. **Introduce Performance-Based Incentives**
   - Reward districts showing innovation in e-governance, quality monitoring, and community involvement (as seen in Tumakuru and Udupi).
5. **Leverage Technology and GIS**
   - Use real-time GPS tracking, drone inspection, and GIS-based planning to identify gaps and enhance planning accuracy.
   - Promote mobile-friendly grievance redressal systems at the village level.
6. **Promote Community Participation**
   - Encourage SHGs and local youth clubs to act as "road watchdogs" for reporting damages or poor-quality work.
   - Use social audits to improve transparency and public trust.
7. **Conclusion**

The PMGSY has emerged as a transformational rural infrastructure initiative in Karnataka. Its implementation over the past two decades has significantly improved rural connectivity, fostered agricultural and non-agricultural development, and enhanced access to basic services like health and education. The success of the programme in several districts like Udupi, Tumakuru, and Belagavi demonstrates that efficient planning, effective monitoring, and timely fund utilization can yield remarkable results.

However, the study also brings out the glaring regional disparities, gaps in maintenance, and lack of convergence with local developmental plans, which continue to limit the full potential of PMGSY. Addressing these gaps through community involvement, technology adoption, and enhanced inter-departmental collaboration will be essential to realize the vision of 'Grameen Bharat'—a connected and empowered rural India.

A forward-looking, inclusive, and sustainable road policy is needed to ensure that the PMGSY roads become not just a means of transport, but a lifeline for rural transformation. Let us all hope for the best.

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