A Study on Performance of Pradhan Mantri Gram Sadak Yojana (PMGSY) in Kalyana Karnataka Region

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ABSTRACT: Rural roads in Karnataka are low volume roads comprising both village roads (VRs) and other district roads (ODRs). Pradhana Manthri Gram Sadak Yojana (PMGSY) was launched to provide rural connectivity by way of all-weather roads to eligible habitations with a population of 500 and above. The main objective of the official is to Know the Concepts of Pradhan Mantri Gram Sadak Yojana. to know the trends and patterns and to find out the Overall Progress and performances of Pradhan Mantri Gram Sadak Yojana in the Kalyana Karnataka Region in the study area. This paper is analytical, descriptive, and prepared based mainly on secondary data. The periods of study were taken from 2000-2001 to 2022-23. The finding of the Bidar Koppal Raichur and Yadagiri, except for all district road sensation and habitation, was positively upgraded. there's an increase in both sanctioned and completed road lengths across all districts, with varying degrees of completion. The sanctioned and completed road lengths stationary R-squared is approximately 0.536, indicating that around 53.6% of the variance in completed road length is explained by the predictors in the model. The sanctioned and completed road length data shows that there is an increase in road length and a complete but small gap here. Yadagiri districts are slowly upgrading compared to other districts. The "Total Cost" and "Total Expenditure" for each district. On average, "Total Cost" appears slightly higher than "Total Expenditure" across all years. Finally, the researcher suggests that the govt to take over the more advanced technology and adopt the other notion billed the road construction methods, and made by the concrete road, because the biggest benefit of concrete road construction is the longevity. Lasting 20-40 years on average.

KEY WORDS: Rural Roads, Rural Connectivity, PMGSY, Road Transport, Habitation.

INTRODUCTION

Pradhan Mantri Gram Sadak Yojana (PMGSY) is a key program of the Government of India (GoI) to provide road connectivity in rural India. It was launched on December 25, 2000, under the Ministry of Rural Development (MoRD). It was funded by the central government through the Central Road Fund. It sought to provide all-weather road access for all Habitations of population of more than 1000 by 2003 and greater than 500 in plains and greater than 250 persons in desert, hilly and tribal areas and 250 persons and above in hill States. The State of Karnataka has been allocated target length of 5,612.50 Km under PMGSY-III, out of which State has already been sanctioned 5,377.63 km and 234.87 Km remains to be sanctioned. The State has proposed 38 roadworks of 258.84 Km in the current proposal, which is 23.97 Km more than the allocated target.

Pradhana Manthri Gram Sadak Yojana (PMGSY) was launched with an objective of providing rural connectivity by way of all-weather roads to eligible habitations having a population of 500 and above. Under this programme Rs 790.00 crore has been allocated, of which Rs. 206.86 crore has been spent towards 233.33 kms of road works. For the maintenance of roads Rs. 100.00 crore has been allocated, of which Rs. 18.84 crore has been spent for maintaining of 2361.32 kms of road length up to the end of December 2023. Percentage of targeted habitations connected by all-weather roads under Pradhan Mantri Gram Sadak Yojana (PMGSY) 100.

The Rural Roads total length of rural roads as on 31.03.2023 in Karnataka is 197331.61 kms (Bituminous Surface-60721.05 Kms, Metal Surface 25968.83Kms and Earthen / Gravel Surface- Kms 110641.73). Improvement of Rural roads and their maintenance is being taken up under Pradhan Manthri Gram Sadak Yojana (PMGSY), Namma Grama Namma Raste Yojane(NGNRY), Mukhya Manthri Grameena Rasthe Abhivruddhi Yojane (CMGSY) & RIDF schemes. . Progress on PMGSY I and II: PMGSY I, launched in 2000 and PMGSY II, launched in 2013 was scheduled to be completed by September 2022. As of

January 2023, 96% of the target was achieved for PMGSY I and 97% for PMGSY II. The PMGSY Timeline for completion of PMGSY-III is till March 2025.During 2023-24, under this programme Rs 790.00 crore has been allocated towards road works, of which Rs. 182.16 crore has been spent towards 214.17 kms of road length and for the maintenance Rs. 100.00 crore has been allocated, of which Rs.14.60 crore has been spent to maintain 1471.47 kms of road length up to the end of November 2023.

REVIEW OF LITERATURE

1. **Dr. Shivraj Meena, (2017).** Rural Road Connectivity with PMGSY and its Impact: A Case Study: The primary goal of PMGSY was to provide all eligible habitations with basic access via all-weather roads. Assessing the effects of rural road connections in Sawaimadhopur District's Gangapur City Block in Rajasthan is the main objective of the study. The study's findings are helpful for the rural advancement of the Gangapur city block. Of course, certain adjustments to government programs and efforts still need to be made in order to achieve the aim.

2. **Appa M. Kale and Dr. S. S. Pimplikar, (2017).** Pradhan Mantri Gram Sadak Yojana: Past, Present, & Future, Appa the Pradhan Mantri Gram Sadak Yojana is the project's foundation. The initiative investigates the past, present, and future of India's PMGSY program. Finally, the study claims that it will also aid in understanding how the PMGSY system benefits rural people from an economic, health, and educational standpoint. The goal of this project is to better both the present and the future.

3. **Dr. Yuvaraja U. and Dr. B. Jayarama Bhat (2016).** Karnataka's Rural Road Connectivity in Different Regions: An Analysis. Analysis of the regional imbalances in rural road connections in Karnataka is the main goal of the current study. The current investigation was carried out using secondary data. Finding Programs (PMGSY, CMGSY, and so on) for rural road construction in the state should be implemented by the federal and state governments with better cooperation, especially in underdeveloped districts, talukas, and rural areas.

4. **Dr. Mahesha M. and Lokesha M. N. (2017).** Benefits to the Economy from Road Infrastructure on Rural Road Infrastructure Development Programs in India and Karnataka. The two primary objectives are to examine how road infrastructure affects agricultural development and how road infrastructure development initiatives contribute to it. The study discovered that these programs not only promote agriculture and the social advancement of the rural poor, but also give the rural agricultural sector better infrastructure.

5. **Rentu Biswas and A K M Anwaruzzaman (2018).** A Case Study of the Effect of PMGSY on Socio-Economic Development on the Murshidabad District's Chandpur-Kushabaria Road. This paper's main goal is to evaluate the socio-economic effects on rural residents' lives who benefit from improved rural connectivity made possible by the Chandpur-Kushabaria PMGSY Road. It is primarily based on primary and secondary data. Important Findings: Motorized vehicles offer significantly faster and more effective transportation services than traditional means of transportation. The influence of the Chandpur-Kushabaria PMGSY route on the socioeconomic development of its neighbouring villages is highlighted in the current research as a case study of how PMGSY has affected social and economic transformation.

6. **Prakash C. Antahal and Bushan Kumar (2021).** Evidence from the J&K district of Udhampur regarding the effects of PMGSY roads on the rural economy. The major goals of the current research are to evaluate how much PMGSY has done to raise the bar for healthcare, education, and market access in the study area. The primary and secondary data used to write this essay are both. The study also shows how the rural farmers/people could grow their farming system and boost their income generation by improving access to fundamental amenities like improved education, health care, etc.

7. **Dr. S. Ramasamy, D (2015).** The Pradhan Mantri Gram Sadak Yojana (PMGSY) in India: What Will Happen? a worldwide examination. The main objective of PMGSY is to construct all-weather roads that are equipped with the necessary culverts and cross-drainage structures to link all isolated habitations in rural regions. The average number of kilometers of road built in states like Madhya Pradesh (MP), Uttar Pradesh (UP), and Rajasthan was finally found to be much greater than in other states in India's roads built under the PMGSY Scheme.

8. **Dr. S. Abash Parida. (2014).** the PMGSY's role in improving quality of life in Odisha's rural areas. This research focuses. to evaluate and quantify the socioeconomic effects of PMGSY roads on rural residents' quality of life in particular settlements/villages. To describe the events and tales connected to the influence. Finally, the study found that less accessible locations had weaker economic and social development than those with better access to roads, with the greatest social and economic advancement taking place in communities with long-established paved roads.

Research Gap

To identify the previous research there is no one studying this Area, and there are many studies done by the other states and districts but not study in this Kalyana Karnataka Region. Specially researcher find out the Kalyana Karnataka Region Districts Proper or continuous road construction is possible or not, why the researcher taking this topic and the study conducted up to 2000 to 2023.

Statement of the problem

However, most of the roads do not have proper construction in the Kalyana Karnataka region so that's why. The construction of roads is currently not finished by the Karnataka Road Authority. Due to the poor quality of road construction and the necessity for routine repairs or expansions of roadways every two to three years, construction projects are also becoming more prevalent today. This study looks at how much road growth or construction took place in Kalyana Karnataka Region between 2000 and 2023 in addition to looking at costs and spending overall. The investigation is being done by the researcher because of this. Right now, all countries, including India, which improves road construction every year, place a high priority on improving road development but not in rural and urban area, specially, the Kalyana Karnataka region or Karnataka govt spent more money on road development but do not development of the all-weather road in rural and urban areas. The study conducted the how much of the road connection every year and how length of road complected for every year research to take the study.

Objectives

1. To Know the Concepts of Pradhan Mantri Gram Sadak Yojana in the Kalyana Karnataka Region.
2. To know the trends and patterns of Pradhan Mantri Gram Sadak Yojana in the Kalyana Karnataka Region.
3. To find out the Overall Progress and performances of Pradhan Mantri Gram Sadak Yojana in the Kalyana Karnataka Region.

Hypotheses of the study

1. H0: There is a significant difference in the number of sanctioned and habitations across the years for Kalyana Karnataka Region.
2. H1: There is no significant difference in the number of sanctioned and habitations across the years for a particular district (except Bidar).
3. H0: There is a significant difference in the number of Sanctioned Road Length (km) & Completed Road Lengths (km) across the years for Kalyana Karnataka Region.
4. H1: There is no significant difference in the number of Sanctioned Road Length (km) & Completed Road Length (km)across Kalyana Karnataka Region.
5. H0: There is a significant difference in the number of Total Cost and Total Expenditure Rs. Cr across the years for Kalyana Karnataka Region.
6. H1: There is no significant difference in the number of Total Cost and Total Expenditure Rs. Cr across Kalyana Karnataka Region.

Scope of the study

The study has identified the Pradhan Mantri Gram Sadak Yojana overall road development in the Kalyana Karnataka Region, but not including Karnataka. The study has been conducted on the Sanction of habitation, Sanction of road length and completion of the road length, and total cost and total expenditure of the PMGSY in Kalyana Karnataka region.

Methodology

This paper is analytical and descriptive and prepared based on mainly secondary data. The data has been collected from PMGSY, Omms.nic.in., e-utthaan.gov.in, and the Karnataka Economics survey. And different books, journals, websites etc. to fulfil the set objectives. The detailed information on the Kalyana Karnataka region road is taken from 2000-2001 to 2022-23.

Tools using

A few statistical tools and cartographic techniques have been used to fulfill set objectives of the present study. like Descriptive Statistics, Time series Analysis, Related Samples Fridman's Analysis of variances by ranks, ARIMA Model and Sequence Charts specification was done.

Limitation of the Study

The sample periods considered for this analysis are too small and it will not be justified to generalize the performance of PMGSY in the Kalyana Karnataka region since data availability is for the periods of comparison between 2000-2001 to 2022-23.

DISCUSSION AND ANALYSIS

Evolution of the PMGSY into different Verticals and their Goals in Kalyana Karnataka Region

The Pradhan Mantri Gram Sadak Yojana (PMGSY) was launched in December 2000 to provide unrestricted all-weather road connectivity to unconnected villages of India.

- It is a centrally sponsored scheme and is part of the poverty reduction strategies of the government.
- Eligibility for the Scheme: Rural areas with a population of 500 and above in plain areas; and hill states including NE, desert states, tribal areas, and other backward areas with a population of 250 and above.
- Apart from building new roads, the scheme also has provisions for the upgrade of existing roads in these areas, although the primary focus is to provide connectivity to unconnected habitations.
- All-weather roads imply roads that can be used throughout the year in all seasons. To provide all-weather roads, the scheme envisages providing for the draining of roads by adequate cross-drainage structures such as culverts, minor bridges, and causeways.
- The scheme does not cover repairs to black-topped or cement roads, even if the surface condition is bad.
- The share of the central government's funding is 60% of the cost with the share increasing to 90% for northeastern and hill states.
- Currently, the scheme is in its third phase – **PMGSY – III**.
- The roads developed under this scheme are maintained by the Panchayati Raj institutions.
- The nodal ministry for the scheme is the Ministry of Rural Development.
- In 2012, an agreement was signed between the National Rural Roads Development Agency (NRRDA), the Ministry of Rural Development, and the ILO to enable the international organization to help with the implementation of the project.

Sanction and Habitation of Road Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

Financial Year	Ballari Sanctioned Habitations	Ballari Connected Habitations	Bidar Sanctioned Habitations	Bidar Connected Habitations	Kalburgi Sanctioned Habitations	Kalburgi Connected Habitations	Koppal Sanctioned Habitations	Koppal Connected Habitations	Raichur Sanctioned Habitations	Raichur Connected Habitations	Yadagiri Sanctioned Habitations	Yadagiri Connected Habitations
2000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2001	0.00	0.00	11.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	3.00	0.00
2002	0.00	0.00	11.00	6.00	0.00	0.00	1.00	0.00	0.00	0.00	3.00	0.00
2003	0.00	0.00	11.00	8.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2004	0.00	0.00	11.00	8.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2005	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2006	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2007	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2008	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2009	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2010	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2011	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2012	0.00	0.00	11.00	11.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	3.00
2013	0.00	0.00	11.00	11.00	0.00	0.00	3.00	1.00	5.00	0.00	3.00	3.00
2014	0.00	0.00	11.00	11.00	0.00	0.00	3.00	1.00	5.00	2.00	3.00	3.00

2015	0.00	0.00	11.00	11.00	0.00	0.00	3.00	1.00	5.00	4.00	3.00	3.00
2016	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2017	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2018	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2019	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2020	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2021	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2022	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
2023	0.00	0.00	11.00	11.00	0.00	0.00	3.00	3.00	5.00	5.00	3.00	3.00
Total	0	0	253	231	0	0	45	37	55	46	69	63

Sources: - https://sansad.in/getFile/annex/259/AU1713.pdf?source=pqars

This table summarizes data on sanctioned and connected habitations in various districts of Karnataka across multiple financial years (2000-2023). It appears no sanctioned habitations have been reported for any district throughout the period (all values in "Sanctioned Habitations" are 0). Bidar has the highest number of connected habitations on average, followed by Yadagiri. There seems to be no significant change in the number of connected habitations over the years.

Sanction and Habitation of Road Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region descriptive analysis.

	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Minimum	Maximum	Sum
Ballari Sanctioned Habitations	0.00	0.000	0.00	0	0.000	0	0	0
Ballari Connected Habitations	0.00	0.000	0.00	0	0.000	0	0	0
Bidar Sanctioned Habitations	10.54	.458	11.00	11	2.245	0	11	253
Bidar Connected Habitations	9.63	.659	11.00	11	3.228	0	11	231
Kalburgi Sanctioned Habitations	0.00	0.000	0.00	0	0.000	0	0	0
Kalburgi Connected Habitations	0.00	0.000	0.00	0	0.000	0	0	0
Koppal Sanctioned Habitations	1.88	.220	1.00	1	1.076	0	3	45
Koppal Connected Habitations	1.54	.225	1.00	1	1.103	0	3	37
Raichur Sanctioned Habitations	2.29	.519	0.00	0	2.545	0	5	55
Raichur Connected Habitations	1.92	.489	0.00	0	2.394	0	5	46
Yadagiri Sanctioned Habitations	2.88	.125	3.00	3	.612	0	3	69
Yadagiri Connected Habitations	2.63	.207	3.00	3	1.013	0	3	63

This table provides a statistical summary of the data on connected habitations across different districts in Karnataka. The most frequent value of connected habitations across all districts and years. Bidar has the highest average number of connected habitations (10.54), followed by Yadagiri (2.88).

Hypothesis Test Summary

|	Null Hypothesis	Test	Sig.	Decision
1	The distributions of Ballari Sanctioned Habitations, Ballari Connected Habitations, Bidar Sanctioned Habitations, Bidar Connected Habitations, Karburgi Sanctioned Habitations, Karburgi Connected Habitations, Koppal Sanctioned Habitations, Koppal Connected Habitations, Raichur Sanctioned Habitations, Raichur Connected Habitations, Yadagiri Sanctioned Habitations and Yadagiri Connected Habitations are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The above graph shows that the test conducts Sanction and Connected Habitation, the related Samples Fridman's two-way Analysis of variances by rank. The test clearly said that reject the Null hypothesis the test significances 0.000. Finally, there is no significant difference in the number of S Sanction and Connected Habitation across Kalyana Karnataka Region.

Arima Model Sanction and Habitation of Road Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

ARIMA Model Statistics						
		Model Fit statistics	Ljung-Box Q (18)			
Model	Number of Predictors	Stationary R-squared	Statistics	DF	Sig.	Number of Outliers
Ballari Connected Habitations-Model_1	0			0		0
Bidar Connected Habitations-Model_2	0	.702	8.143	16	.945	0
Kalburgi Connected Habitations-Model_3	0			0		0
Koppal Connected Habitations-Model_4	1	.789	9.502	18	.947	0
Raichur Connected Habitations-Model_5	0	-1.524E-05	7.207	17	.981	0
Yadagiri Connected Habitations-Model_6	0	-.045	.665	17	1.000	0

These statistics help in evaluating the performance and reliability of each predictive model in estimating the number of connected habitations in each district. The ARIMA model with the parameters (0,0,0), and (0,1,0), basic time series parameter. For Ballari, Kalburgi, Raichur, and Yadagiri, the stationary R-squared value is not provided. This could indicate that these models may not have a good fit to the data. For Bidar and Koppal, the stationary R-squared values are provided. In Bidar, the stationary R-squared value is 0.702, indicating that approximately 70.2% of the variance in the number of connected habitations is explained by the model. In Koppal, the stationary R-squared value is 0.789, indicating that approximately 78.9% of the variance in the number of connected habitations is explained by the model. Negative stationary R-squared values (such as for Raichur) suggest that the model performs worse than a model with no predictors. In all cases here, the number of outliers is zero, suggesting that there are no significant unusual observations in the data according to the model. A significant level greater than 0.05 (5%) indicates that there is no significant lack of fit in the model.
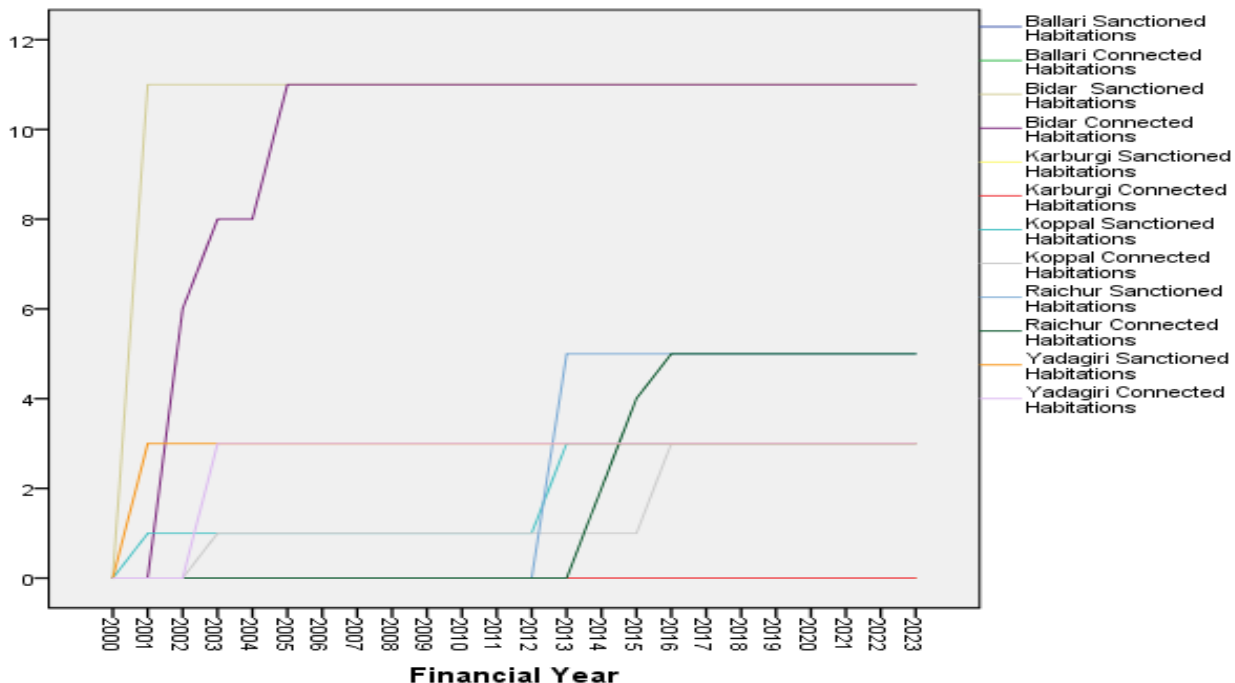
Above the graph it shows that Sanctions of road length in Kalyana Karnataka Region. Bidar Koppal Raichur and Yadagiri except all district's road sensation and habitation positively upgrade, but Ballari and Kalburgi districts low level compared to other districts. Highest sanction of the road Bidar and Koppal districts.

Sanction of Road length and Completed of Road length in Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

Finan cial Year	Ballari Sancti oned Road Length km	Ballari Compl eted Road Length km	Bidar Sancti oned Road Length km	Bidar Compl eted Road Length km	Kalbur gi Sancti oned Road Length km	Kalbur gi Compl eted Road Length km	Koppal Sancti oned Road Length km	Koppal Compl eted Road Length km	Raichu r Sancti oned Road Length km	Raichu r Compl eted Road Length km	Yadagi ri Sancti oned Road Length km	Yadagi ri Compl eted Road Length km
2000	59.41	0.00	55.30	0.00	69.80	0.00	34.04	0.00	61.70	0.00	27.60	0.00
2001	163.87	0.00	122.65	0.00	174.80	0.00	105.09	0.00	136.13	0.00	70.60	0.00
2002	163.87	47.11	122.65	48.25	174.80	49.10	105.09	40.79	136.13	43.26	70.60	8.00
2003	202.82	142.97	151.52	71.55	233.78	147.90	129.39	95.09	168.38	127.93	87.30	36.90
2004	202.82	163.87	151.52	111.85	233.78	174.80	129.39	105.09	168.38	136.13	87.30	70.60
2005	231.32	178.47	175.93	122.65	278.33	209.88	166.66	129.39	216.28	145.13	97.24	70.60
2006	252.82	196.32	279.42	143.72	511.38	233.78	265.50	129.39	474.42	168.38	129.59	81.90
2007	252.82	245.22	279.42	151.52	511.38	309.93	273.90	223.38	475.82	228.52	129.59	101.81
2008	418.75	252.82	400.57	208.55	580.62	457.35	423.60	288.21	631.11	386.81	209.96	129.59
2009	596.32	334.60	496.18	327.07	746.16	580.62	528.35	365.66	754.83	433.69	230.65	209.96
2010	596.32	519.08	496.18	478.00	746.16	605.64	528.35	398.87	754.83	494.33	230.65	209.96
2011	613.73	596.32	496.18	496.18	746.16	746.16	528.35	455.33	754.83	681.36	230.65	230.65
2012	613.73	613.73	507.76	496.18	746.16	746.16	528.35	528.35	754.83	729.45	240.49	230.65

International Journal of Current Science Research and Review

ISSN: 2581-8341

Volume 07 Issue 09 September 2024

DOI: 10.47191/ijcsrr/V7-i9-23, Impact Factor: 7.943

IJCSRR @ 2024

www.ijcsrr.org

2013	683.75	613.73	577.78	496.18	837.09	746.16	605.65	528.35	831.65	738.29	278.94	240.49
2014	683.75	613.73	577.78	505.38	837.09	746.16	605.65	553.02	831.65	757.13	278.94	240.49
2015	683.75	637.57	577.78	523.65	837.09	795.32	605.65	564.42	831.65	801.52	278.94	267.14
2016	683.75	682.04	577.78	577.24	837.09	835.78	605.65	605.64	831.65	829.80	278.94	278.22
2017	683.75	682.04	577.78	577.24	837.09	835.78	605.65	605.64	831.65	829.80	278.94	278.22
2018	683.75	682.04	577.78	577.24	837.09	835.78	605.65	605.64	831.65	829.80	278.94	278.22
2019	689.29	682.04	577.78	577.24	1007.36	835.78	642.05	605.64	873.84	829.80	334.18	278.22
2020	884.96	686.54	761.84	577.24	1098.03	856.02	724.82	608.64	989.06	829.80	403.94	279.02
2021	884.96	745.17	761.84	589.98	1098.03	966.81	724.82	670.48	989.06	866.20	403.94	355.28
2022	897.77	845.38	766.84	711.74	1098.03	1055.30	744.28	697.62	1009.60	907.24	409.91	389.88
2023	897.77	864.60	766.84	741.34	1098.03	1083.56	744.28	713.48	1009.60	972.32	409.91	399.86
Total	12725.85	11025.39	10837.1	9109.99	16175.33	13853.77	10960.21	9518.12	15348.73	12766.69	5477.74	4665.66

Each row corresponds to a specific year, and each column represents the sanctioned and completed road lengths for different districts. In the year 2000, the Ballari district had a sanctioned road length of 59.41 km, but none of it was completed. Similar records are provided for other districts. In 2003, Ballari had a sanctioned road length of 202.82 km, out of which 142.97 km was completed. By 2023, there's an increase in both sanctioned and completed road lengths across all districts, with varying degrees of completion. For instance, in Ballari, the sanctioned road length reached 897.77 km, and 864.60 km of it had been completed.

Descriptive of Statistics Sanction of Road length and Completed of Road length in Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Minimum	Maximum	Sum
Ballari Sanctioned Road Length km	530.2438	55.02670	613.7300	683.75	269.57468	59.41	897.77	12725.85
Ballari Completed Road Length km	459.3913	57.13586	605.0250	682.04	279.90739	0.00	864.60	11025.39
Bidar Sanctioned Road Length km	451.5458	46.68876	501.9700	577.78	228.72727	55.30	766.84	10837.10
Bidar Completed Road Length km	379.5829	49.23394	496.1800	577.24	241.19605	0.00	741.34	9109.99
Kalburgi Sanctioned Road Length km	673.9721	67.02752	746.1600	837.09	328.36646	69.80	1098.03	16175.33
Kalburgi Completed Road Length km	577.2404	70.89809	746.1600	746.16[a]	347.32831	0.00	1083.56	13853.77
Koppal Sanctioned Road Length km	456.6754	48.38972	528.3500	605.65	237.06023	34.04	744.28	10960.21
Koppal Completed Road Length km	396.5883	49.98501	491.8400	605.64	244.87555	0.00	713.48	9518.12

International Journal of Current Science Research and Review

ISSN: 2581-8341

Volume 07 Issue 09 September 2024

DOI: 10.47191/ijcsrr/V7-i9-23, Impact Factor: 7.943

IJCSRR @ 2024

www.ijcsrr.org

Raichur Sanctioned Road Length km	639.5304	65.46563	754.8300	831.65	320.71477	61.70	1009.60	15348.73
Raichur Completed Road Length km	531.9454	69.26148	705.4050	829.80	339.31055	0.00	972.32	12766.69
Yadagiri Sanctioned Road Length km	228.2392	24.12253	235.5700	278.94	118.17577	27.60	409.91	5477.74
Yadagiri Completed Road Length km	194.4025	25.01596	230.6500	278.22	122.55268	0.00	399.86	4665.66

This table provides statistics related to sanctioned and completed road lengths (in kilometers) for different regions. Ballari Sanctioned Road Length km: The average sanctioned road length in Ballari is 530.2438 km, with a standard deviation of 269.57468 km. The longest sanctioned road is 897.77 km, and the shortest is 59.41 km. The total length of all sanctioned roads in Ballari is 12725.85 km.


The above graph shows that the test conducts Sanction of Road Length and completed Road Length, the related Samples Fridman's two-way Analysis of variances by rank. The test clearly said that reject the Null hypothesis the test significances 0.000. Finally, there is no significant difference in the number of Sanctioned Road Length (km) & Completed Road Length (km)across Kalyana Karnataka Region.

ARIMA Model Descriptive Statistics Sanction of Road length and Completed of Road length in Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

ARIMA Model Statistics						
Model	**Number of Predictors**	**Model Fit statistics** Stationary R-squared	**Ljung-Box Q (18)** Statistics	DF	Sig.	**Number of Outliers**
Ballari Completed Road Lengthkm-Model_1	4	.536	15.084	18	.656	0
Bidar Completed Road Length Km-Model_2	3	.790	14.405	18	.702	0
Kalburgi Completed Road Length Km-Model_3	1	.752	14.829	18	.674	0
Koppal Completed Road Length Km-Model_4	1	.259	19.323	18	.372	0
Raichur Completed Road Length Km -Model_5	2	.779	26.949	18	.080	0
Yadagiri Completed Road Length Km -Model_6	1	.223	7.151	18	.989	0

These statistics provide insights into the performance and reliability of each predictive model in estimating the completed road length for their respective districts. all models are of the ARIMA (Auto Regressive Integrated Moving Average) type with parameters (0,1,0). Represents the goodness-of-fit statistics of each model. For each district, a stationary R-squared value is provided. For Ballari, the stationary R-squared is approximately 0.536, indicating that around 53.6% of the variance in completed road length is explained by the predictors in the model. Similarly, for Bidar, Kalburgi, Koppal, Raichur, and Yadagiri, the stationary R-squared values are provided. This column presents the Ljung-Box Q statistics with 18 degrees of freedom. Higher values of this statistic indicate a lack of independence in the residuals, which means the model might not be capturing all the information in the data. A significant level greater than 0.05 (5%) indicates that there is no significant lack of fit in the model. Higher R-squared values indicate better fit.
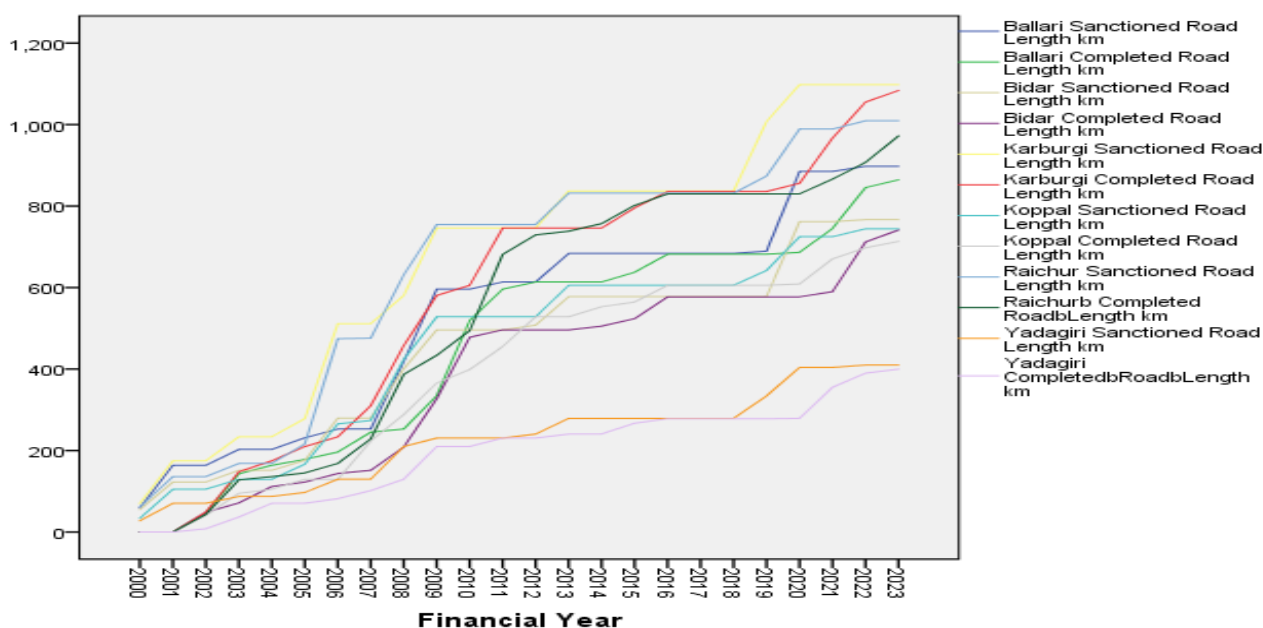
Above the graph shows sanction of road length and completed road length in Kalyana Karnataka region in the year of 2000 to 2023. The data shows that there is an increase in road length and a complete but small gap here. But Ballari, Kalburgi, and bidar districts are heights sanction and completed road length. But not Yadagiri districts slowly upgradation of the compare other districts.

Total Cost and Total Expenditure in Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

Financial Year	Total Cost Ballari	Total Expenditure Rs. Cr Ballari	Total Cost Bidar	Total Expenditure Rs. Cr Bidar	Total Cost Kalburgi	Total Expenditure Rs. Cr Kalburgi	Total Cost Koppal	Total Expenditure Rs. Cr Koppal	Total Cost Raichur	Total Expenditure Rs. Cr Raichur	Total Cost Yadagiri	Total Expenditure Rs. Cr Yadagiri
2000	4.21	0.00	3.65	0.00	4.89	0.00	2.56	0.00	3.20	0.00	2.14	0.00
2001	13.92	0.00	9.95	0.00	14.58	0.00	8.80	0.00	9.03	0.00	6.23	0.00
2002	13.92	0.00	9.95	0.00	14.58	0.00	8.80	0.00	9.03	0.00	6.23	0.00
2003	17.98	0.00	13.55	0.00	20.42	0.00	11.01	0.00	12.25	0.00	8.06	0.00
2004	17.98	0.00	13.55	0.00	20.42	0.00	11.01	0.00	12.25	0.00	8.06	0.00
2005	22.92	17.12	18.18	11.80	28.86	19.37	17.89	10.50	19.44	11.62	9.54	7.04
2006	26.81	20.96	37.82	15.53	70.84	29.82	38.33	20.51	61.94	19.80	14.88	9.36
2007	26.81	27.28	37.82	26.37	70.84	60.04	40.05	34.19	62.28	39.53	14.88	14.09

2008	67.27	35.52	70.95	45.01	88.93	80.10	82.42	46.24	104.36	53.95	36.52	26.85
2009	109.40	56.44	97.90	66.91	141.51	102.45	111.69	71.38	142.34	75.94	43.41	35.89
2010	109.40	91.07	97.90	96.16	141.51	132.92	111.69	90.09	142.34	106.60	43.41	43.33
2011	113.92	118.32	97.90	111.30	141.51	149.96	111.69	106.24	142.34	137.09	43.41	47.66
2012	113.92	121.61	102.69	112.03	141.51	152.25	111.69	113.04	142.34	148.74	47.33	48.38
2013	149.17	121.61	136.72	113.46	189.36	152.25	136.53	114.03	182.36	150.25	66.47	51.91
2014	149.17	130.05	136.72	127.54	189.36	176.07	136.53	120.79	182.36	163.68	66.47	61.75
2015	149.17	137.66	136.72	135.49	189.36	188.49	136.53	125.08	182.36	172.26	66.47	68.59
2016	149.17	154.46	136.72	149.93	189.36	197.98	136.53	135.30	182.36	186.47	66.47	70.07
2017	149.17	155.00	136.72	151.30	189.36	198.39	136.53	135.91	182.36	188.63	66.47	70.15
2018	149.17	155.24	136.72	151.75	189.36	198.59	136.53	134.61	182.36	190.40	66.47	70.28
2019	152.60	155.24	136.72	151.75	301.02	198.59	158.39	134.61	213.61	190.56	104.88	70.28
2020	275.62	158.05	236.70	151.75	374.52	237.77	206.39	140.91	282.42	193.19	147.55	91.88
2021	275.62	215.51	236.70	186.92	374.52	318.49	206.39	168.91	282.42	232.98	147.55	134.29
2022	281.87	252.12	239.40	215.87	374.52	348.71	218.85	189.76	302.08	255.28	150.51	143.05
2023	281.87	268.39	239.40	232.54	374.52	359.38	218.85	206.06	302.08	278.77	150.51	147.55
Total	2821.06	2391.65	2521.05	2253.41	3835.66	3301.62	2495.68	2098.16	3339.91	2795.74	1383.92	1212.4

This table provides financial data on "Total Cost" and "Total Expenditure Rs. Cr" for six districts (Ballari, Bidar, etc.) across 24 financial years (2000-2023). Cost vs. Expenditure: There seems to be a consistent difference between "Total Cost" and "Total Expenditure" for each district. On average, "Total Cost" appears slightly higher than "Total Expenditure" across all years. both cost and expenditure seem to be increasing over the years for all districts. A significant jump in "Total Cost" is observed for Kalburgi in 2019 (301.02 Cr). The Ballari Expenditure seems to be consistently lower than cost, with some years showing zero expenditure from 2000 to 2004. There might be specific reasons for these discrepancies.

Descriptive of Statistics Total Cost and Total Expenditure in Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Minimum	Maximum	Sum
Ballari Total Cost	117.5442	18.72107	113.9200	149.17	91.71414	4.21	281.87	2821.06
Ballari Total Expenditure Rs Cr	99.6521	16.94136	119.9650	0.00	82.99537	0.00	268.39	2391.65
Bidar Total Cost	105.0438	15.97136	100.2950	136.72	78.24337	3.65	239.40	2521.05
Bidar Total Expenditure Rs Cr	93.8921	15.21300	111.6650	0.00	74.52816	0.00	232.54	2253.41
Kalburgi Total Cost	159.8192	25.32279	141.5100	189.36	124.05585	4.89	374.52	3835.66
Kalburgi Total Expenditure Rs Cr	137.5675	22.79335	151.1050	0.00	111.66416	0.00	359.38	3301.62
Koppal Total Cost	103.9867	14.67558	111.6900	136.53	71.89536	2.56	218.85	2495.68
Koppal Total Expenditure Rs Cr	87.4233	13.51310	109.6400	0.00	66.20040	0.00	206.06	2098.16
Raichur Total Cost	139.1629	20.09470	142.3400	182.36	98.44350	3.20	302.08	3339.91
Raichur Total Expenditure Rs Cr	116.4892	18.73802	142.9150	0.00	91.79716	0.00	278.77	2795.74
Yadagiri Total Cost	57.6633	10.11971	45.3700	66.47	49.57627	2.14	150.51	1383.92
Yadagiri Total Expenditure Rs Cr	50.5167	9.24893	48.0200	0.00	45.31034	0.00	147.55	1212.40

This table summarizes various descriptive statistics for "Total Cost" and "Total Expenditure Rs. Cr" across different districts (Ballari, Bidar, etc.). Ballari: Both "Total Cost" and "Total Expenditure" have similar means (Total Cost 2821.06) 281.87, and (Total Expenditure 2391.65) 268.39 RS cr. in the year of 2023. but the cost seems slightly more spread out (higher SD 91.71414) compared to expenditure. The minimum expenditure is 0, suggesting there might be a specific reason for some periods. Bidar & Koppal: Similar patterns to Ballari, with expenditure having a slightly lower SD than cost. Kalburgi: "Total Cost (374.52 in the year of 2023) " has a higher mean 374.52 and SD (124.05585) compared to other districts. The presence of a high mode might suggest a frequent cost value. Raichur: Similar trends to Kalburgi but with slightly lower values. Yadagiri: Both cost 1383.92 and expenditure 1212.40 have the lowest means 0.00 and SD total cost 49.57627 among all districts. The minimum cost is also very low compared to others.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distributions of BallariTotal Cost , Ballari Total Expenditure Rs Cr , Bidar Total Cost , Bidar Total Expenditure Rs Cr , Karburgi Total Cost , Karburgi Total Expenditure Rs Cr , Koppal Total Cost, Koppal Total Expenditure Rs Cr , Raichur Total Cost, Raichur Total Expenditure Rs Cr , Yadagiri Total Cost and Yadagiri Total Expenditure Rs Cr are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The above graph shows that the test conducts Total cost and Total Expenditure, the related Samples Fridman's two-way Analysis of variances by rank. The test clearly said that reject the Null hypothesis the test significances 0.000. finally, there is no significant difference in the number of Sanctioned Road Length (km) & Completed Road Length (km)across Kalyana Karnataka Region.

ARIMA Model Description Total Cost and Total Expenditure in Pradhana Mantri Grama Sadak yojana Districts wise in Kalyana Karnataka Region

ARIAM Model Statistics						
Model (ARIMA (0,1,0))	Number of Predictors	Model Fit statistics Stationary R-squared	Ljung-Box Q (18) Statistics	DF	Sig.	Number of Outliers
Total Expenditure Rs. Cr Ballari-Model_1	6	.311	17.000	18	.523	0
Total Expenditure Rs. Cr Bidar-Model_2	6	.218	21.110	18	.274	0
Total Expenditure Rs. Cr Karburgi-Model_3	6	.476	27.466	18	.071	0
Total Expenditure Rs. Cr Koppal-Model_4	6	.198	47.101	18	.000	0
Total Expenditure Rs. Cr Raichur-Model_5	6	.242	30.040	18	.037	0
Total Expenditure Rs. Cr Yadagiri-Model_6	6	.664	22.038	18	.230	0

The table you provided appears to be the result of fitting an ARIMA (0,1,0) model to multiple time series, likely one for each district (Ballari, Bidar, etc.). Here's a breakdown of the analysis for each district and some overall observations. The model explains the variance of the stationary component of the time series data. It ranges from 0 to 1, with higher values indicating a better fit. Yadagiri-Model_6 has the highest R-squared (0.664), while Koppal-Model_4 has the lowest (0.198). Ljung-Box Q (18) the presence of autocorrelation (lack of independence) in the model residuals. A high p-value (>.05) suggests no autocorrelation.
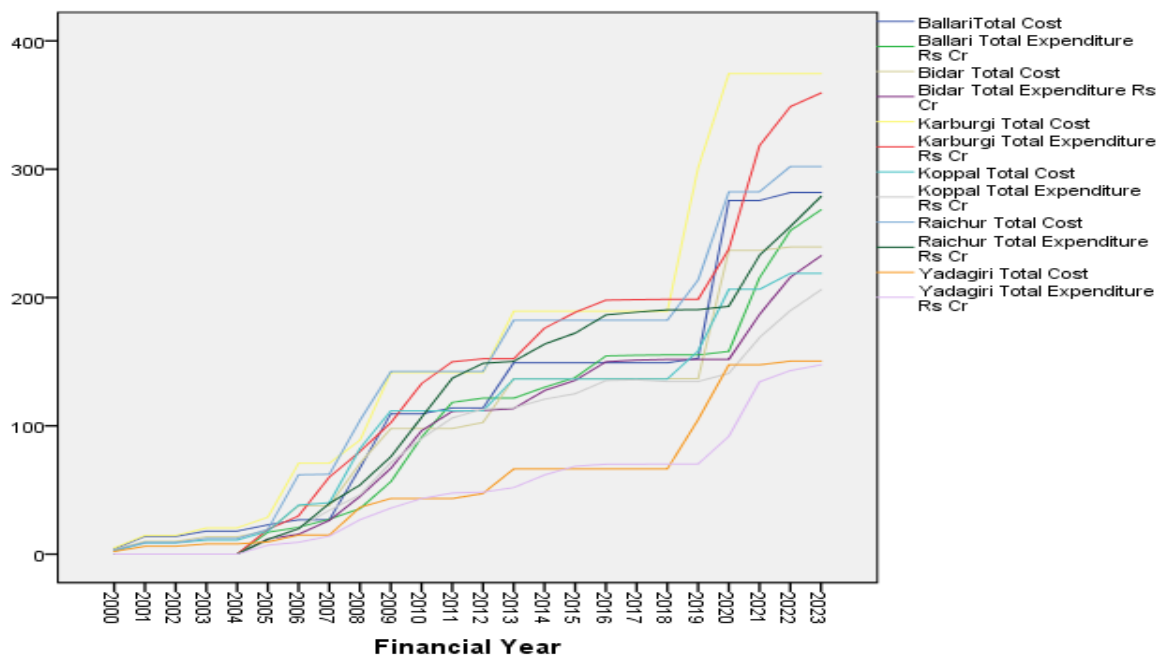
Above the graph shows sanction of road length and completed road length in Kalyana Karnataka region in the year of 2000 to 2023. The data shows that there is an increase in total cost and total expenditure but a small gap here. Means, Ballari, Kalburgi, and bidar districts are heights sanction and completed road length. But not Yadagiri districts slowly upgradation of the compare

other districts. That means the government should focus on Yadagiri Districts. Because of every country Development depends on the transport system directly.

Pradhan Mantri Gram Sadak Yojana progress districts wise up to of 2000 to 2023.

Financial Year	Total Sanctioned Habitation	Total Connected Habitation	Total Sanctioned Road	Total Completed Road	Total cost (Rs Cr.)	Total Expenditure (Rs Cr)	Total
Ballari	0	0	12725.85	11025.39	2821.06	2391.65	28963.95
Bidar	253	231	10837.1	9109.99	2521.05	2253.41	25205.55
Kalburgi	0	0	16175.33	13853.77	3835.66	3301.62	37166.38
Koppal	45	37	10960.21	9518.12	2495.68	2098.16	25154.17
Raichur	55	46	15348.73	12766.69	3339.91	2795.74	34352.07
Yadagiri	69	63	5477.74	4665.66	1383.92	1212.4	12871.72
Total	422	377	71524.96	60939.62	16397.28	14052.98	-

This table provides an overview of the infrastructure development projects in these districts, including habitation and road construction, along with their costs and expenditures. Ballari District no habitation projects have been sanctioned or completed. However, road construction has been significant, with 11,025.39 km completed out of 12,725.85 km sanctioned. The total cost of projects is 2821.06 crore rupees, with an expenditure of 2391.65 crore rupees. And the Bidar district 253 habitation projects have been sanctioned, out of which 231 have been completed. In terms of road construction, 9109.99 km out of 10837.1 km have been completed. The total cost is 2521.05 crore rupees, with an expenditure of 2253.41 crore rupees. The Kalburgi district Like Ballari, no habitation projects have been completed. However, in road construction, 13853.77 km out of 16175.33 km have been completed. The total cost is 3835.66 crore rupees, with an expenditure of 3301.62 crore rupees. The Koppal district 45 habitation projects have been sanctioned, out of which 37 have been completed. In road construction, 9518.12 km out of 10960.21 km have been completed. The total cost is 2495.68 crore rupees, with an expenditure of 2098.16 crore rupees. Raichur: 55 habitation projects have been sanctioned, out of which 46 have been completed. In road construction, 12766.69 km out of 15348.73 km have been completed. The total cost is 3339.91 crore rupees, with an expenditure of 2795.74 crore rupees. Yadagiri district 69 habitation projects have been sanctioned, out of which 63 have been completed. In road construction, 4665.66 km out of 5477.74 km have been completed. The total cost is 1383.92 crore rupees, with an expenditure of 1212.4 crore rupees.
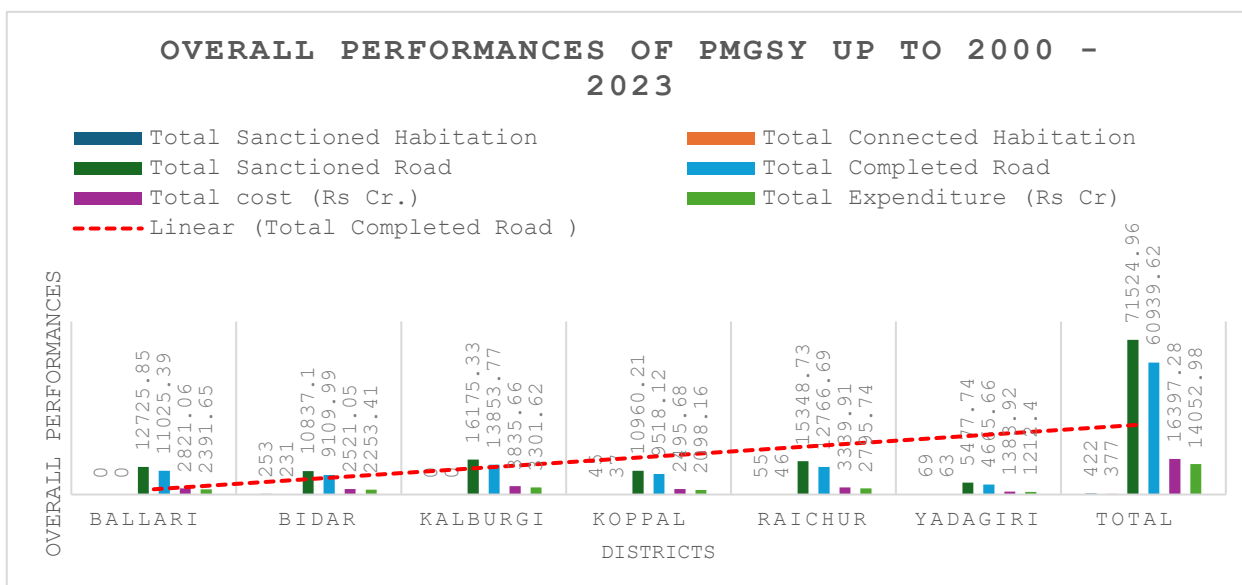
FINDINGS

- ✓ The Bidar has the highest average number of connected habitations (10.54), followed by Yadagiri (2.88). The Kalburgi Like Ballari, no habitation projects have been completed.
- ✓ The Koppal district, the stationary R-squared value is 0.789, indicating that approximately 78.9% of the variance in the number of connected habitations. And Bidar Koppal Raichur and Yadagiri except all district's road sensation and habitation positively upgrade.
- ✓ The Ballari district the longest sanctioned road is 897.77 km, and the shortest is 59.41 km. there's an increase in both sanctioned and completed road lengths across all districts, with varying degrees of completion. The sanctioned and completed road lengths stationary R-squared is approximately 0.536, indicating that around 53.6% of the variance in completed road length is explained by the predictors in the model.
- ✓ The sanctioned and completed road lengths data shows that there is an increase in road length and a complete but small gap here. Yadagiri districts slowly upgradation of the compare other districts.
- ✓ The "Total Cost" and "Total Expenditure" for each district. On average, "Total Cost" appears slightly higher than "Total Expenditure" across all years.
- ✓ The Ballari, Kalburgi, and bidar districts are heights sanction and completed road length. But not Yadagiri districts slowly upgradation of the compare other districts. That means the government should focus on Yadagiri Districts. Because of every country Development depends on the transport system directly.

SUGGESTIONS

1. Improved Infrastructure specially the road, and invest in better road infrastructure, including wider roads, well-maintained highways, and pedestrian-friendly amenities.
2. The govt to tack over the more advances technology and adopt the other notion billed the road construction methods and made by the concrete road, because the biggest benefit of concrete road construction is the longevity. Lasting 20-40 years on average.

CONCLUSION

Rural roads in Karnataka are low volume roads comprising both village roads (VRs) and other district roads (ODRs). The Government of India is financing rural road construction to improve rural connectivity through the Pradhan Mantri Gram Sadak Yojana (PMGSY), with the target of connecting every rural habitation. The central and state governments have launched many projects to improve roads in all six districts and in all weather conditions, based on the current study's findings. The study looks at road construction in Karnataka at the district level. Since the economy is still expanding, it is advantageous and essential. Using data spanning from 2000 to 2023, this research shows that road construction in the Kalyana Karnataka Region increased and declined annually. Compared to other divisions, the Kalyana Karnataka division is still expanding, mostly because of the road system.

The Pradhan Mantri Gram Sadak Yojana (PMGSY) initiative is currently building roads—one of the best schemes. Thanks to PMGSY, connections between states and divisions are now simple. The finding of the Bidar Koppal Raichur and Yadagiri except all district's road sensation and habitation positively upgrade. there's an increase in both sanctioned and completed road lengths across all districts, with varying degrees of completion. The "Total Cost" and "Total Expenditure" for each district. On average, "Total Cost" appears slightly higher than "Total Expenditure" across all years. Finally, the Researcher suggest that the govt to tack over the more advances technology and adopt the other notion billed the road construction methods, and made by the concrete road, because the biggest benefit of concrete road construction is the longevity. Lasting 20-40 years on average.

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