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ISSN : 2454 – 308X | Volume : 03 , Issue : 09 | October – December 2017

Rural Road Connectivity through PMGSY and its Impact: A case Study

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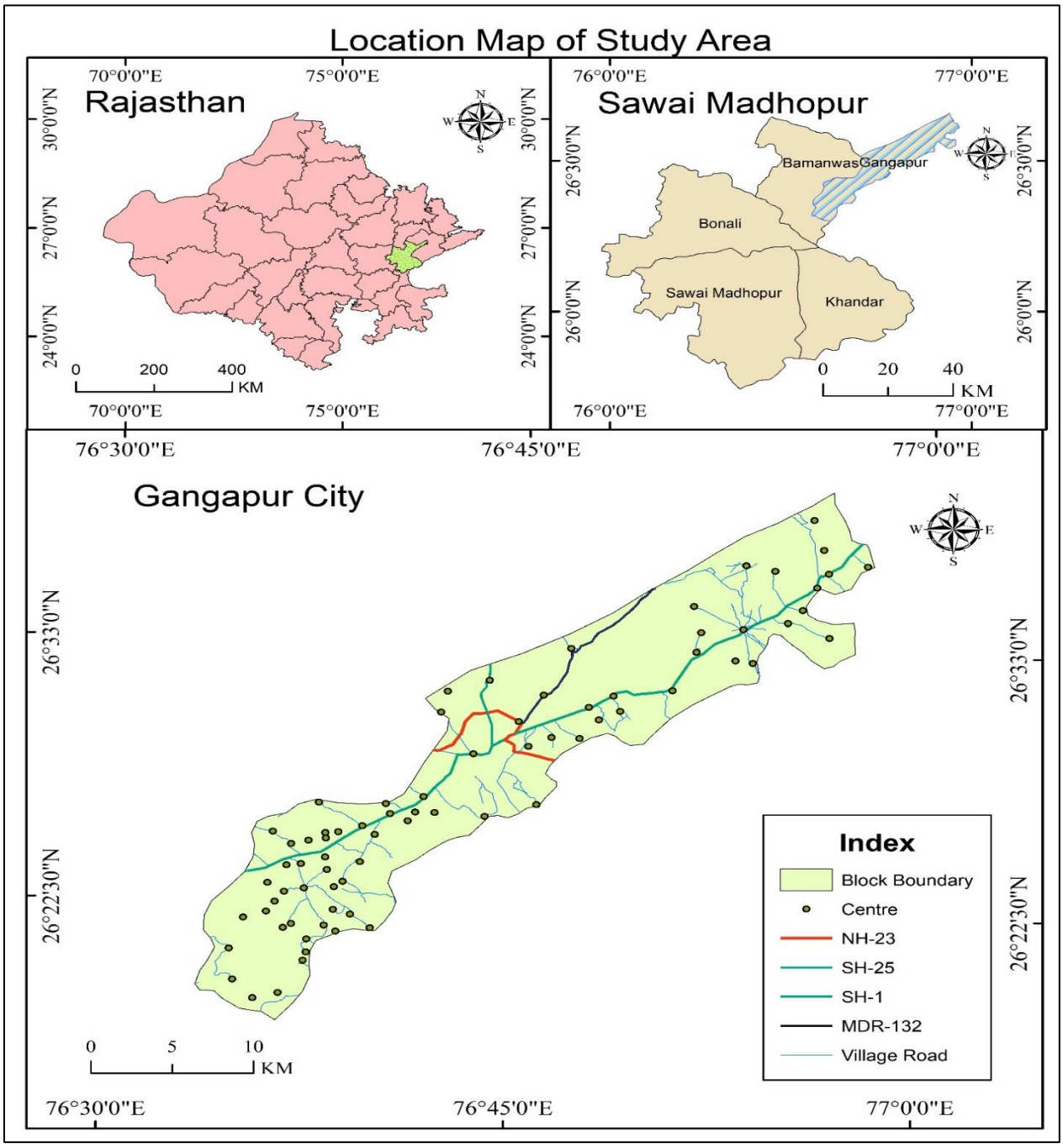
Abstract

Inclusive growth is the most talked about issue in India. Rural road connectivity is a very important component of inclusive growth and plays an important role in promoting access to social, physical and financial services. In this context The Government of India had launched the PMGSY on 25 December, 2000. It is a nationwide programme under the Ministry of Rural Development, Govt. of India. The object of PMGSY was to provide basic access to all the eligible habitations by way of all-weather roads. The purpose of this study is to analyses the impact of rural road connectivity in Gangapur city block of Sawaimadhopur District (Rajasthan). In this block, 127.74 km. of road-work and bridge construction were completed during the period of 2000-01 to 2012-13. For this road-work, total expenditure of ₹ 248.675 million, which is 75.42 % of the total sanctioned amount, was made. Now the time has come to develop a new approach called "upgradation planning of rural roads" in order to connect all the villages to fulfill the basic needs. Global Positioning System (GPS) and Geographical Information System (GIS) are very useful in development of efficient planning of roads in rural areas. It has a positive impact on rural development in Gangapur city block. Of course, certain changes are still required in government plans and programmes to fulfill the objective.

Keywords: - Rural Road, PMGSY, Road connectivity, Impacts.

Introduction

India has one of the largest and densest road networks in the world. Rural roads are the tertiary road system in total road network which provides accessibility for the rural habitations to market and other facility centres. In India, rural roads are being planned and programmed in the context of overall rural development, and tried to provide all-weather connectivity with some level of achievement. However, a large part of the 2.7 million km rural road network was in poor condition and, until the year 2000, 30 percent of the country's population lacked access to all-weather roads. The Government of India had launched the Pradhan Mantri Gram Sadak Yojana (PMGSY) on 25th December, 2000. It is a nationwide programme under the Ministry of Rural Development to substantially expand rural road connectivity in a systematic manner. PMGSY is a fully-funded centrally sponsored scheme to provide all-weather road connectivity in rural areas of the country. The programme envisages connecting all habitations with a population of "500 (or above) in the plain areas" and "250(or above) in the hilly states, the tribal and the desert areas." In February 2005, 'Bharat Nirman' goal to provide connectivity to all habitations with a population of "500 or above in hilly and tribal areas" and "1000+ for the rest habitation" with an all-weather road. The PMGSY shall cover only the rural roads. Rural roads provide the access to basic amenities and means of transporting agricultural products to nearby market centers.



Study Area

The study area for this paper is Gangapur city block (District Sawai Madhopur, Rajasthan). This block geographically lies between 26°29´ N to 26°65´ N latitude and 76°56´ E to 76°97´ E longitude. Area of Gangapur city block is 644.22 sq. km and population are 3, 46,614 (2011), out of which 62.47 % population is rural.

Objects

- To find the socio- economic impact of PMGSY roads in Gangapur city.
- To find out drawbacks and problems in implementing PMGSY in rural areas of Gangapur city.

Collection of Data& Methodology

This study is mainly based on secondary data collected from the PMGSY website but to know the socio- economic impact of PMGSY roads, the primary information is also needed through personal investigation and observation techniques. Gamma index of road network analysis graph theory is used to assess the economic development and road connectivity in this study area. Secondary data are collected through:

- Government agencies like NRRDA, RRRDA.
- Annual report of PMGSY.
- Magazines and Journals related to rural road connectivity and rural development.
- Websites like ommas.nic.in, for mapping bhuvan-panchayat. nrsc. gov. in etc.

Use of GIS for Planning of Rural Roads

PMGSY programme is monitored, planned using online monitoring system called as Online Management, Monitoring and Accounting System (OMMAS). The use of Global Positioning System (GPS) for preparing a Geographical Information System (GIS) database for monitoring, management and building transparency in programme implemented in all districts of Rajasthan. To implement use of GIS for development of rural roads and creation of GIS data base, Rajasthan is chosen as pilot state.

An important part of the PMGSY is the preparation of detailed District Rural Road Plans (DRRP) and the Core Network Plans. The DRRP clearly identifies the proposed roads for providing connectivity to unconnected habitation in an economical and efficient way, in termsof cost and their utility. The core network of all roadsis necessary to provide basic access to all the habitations.

Implementation of PMGSY by NRRDA was difficult to manage, update this giant scheme using traditional and manual methods of project management as these methods are not only tedious and time consuming but also difficult to retrieve the desired information. A GIS database is quite suitable for planning, constructing and monitoring of rural roads since all the relevant data in this case is geographically referenced and the GIS makes it very easy to store, retrieve, analyse and displaying data which are spatially referenced to the Earth for solving complex planning and management problems. GIS is a useful mapping tool that links information found in database to geographic locations found on colourful map displayed in order to make analysis.

GIS also depends on the information content input in computer but this information system requires special processing. Presentation of rode network locations along with road width, pavement type, no. of road line, remoteness and distance between two centers can be made by GIS.

Road Network Analysis

Density, accessibility of road network and its structure related analysis can be a good aspect to measure the economic development of any region. Graph theory can be used to analyse the road network of an area. In graph theory, road network is displayed as path, circuit and graph in topological form. For this study area, gamma index (γ) is used to know the connectivity. Since there is a direct relation between the value of gamma index and level of economic development.

Gamma Index (γ) $= \frac{e}{3(v-2)}$

Here:

γ *is value of Gamma Index*

e *is no. of edges or linkages* &

v *is no. of nodes*

In Gangapur city block no. of road linkages are 47 and no. of nodes (connected habitation) are 78. So, the value of gamma index is;

Gamma Index (γ) = $\frac{47}{3(78-2)}$

(γ) = 0.2061

For economically developed area, the value of gamma index is approx. 1 and for developing or undeveloped area it varies between 0 and 1. In Gangapur city block, on the basis of gamma index value is 0.20 and percent of rural road connectivity is 20.61. So, this area is ranked as undeveloped.

Financial and Physical Progress of PMGSY in Gangapur city Block

The Rajasthan Rural Road Development Agency (RRRDA) has been entrusted with the task of implementing this programme in Rajasthan. RRRDA is a nodal department and executing agency for this programme. Under the PMGSY in Gangapur city Block, during the period of 2000-01 to 2012-13 total ₹ 329.68 million have been sanctioned for new connectivity and upgradation of rural roads through PMGSY, out of which 75.42% of total sanctioned amount was spent.

The net habitation of Gangapur city block is 484 out of which 136 habitations have been found eligible for PMGSY. Till 2012-13, 78 (out of 136) habitations have been linked through 37 new connectivity roads and 10 upgradation road work. As per 2001 census, total population of 64,877 resides in 78 habitations. Out ofthe proposed 156.98 km. road length, 127.74 km. of roadwork and bridge construction were completed during the period of 2000-01 to 2012-13. For this road work total sanctioned amount of ₹ 329.68 million, out of this sanctioned amount, ₹ 248.67 million has been spent. Work for the phase 2012-13 is still going on.

Table No. 1 Financial and Physical Progress of PMGSY in Gangapur city Block (2000-01 to 2012-13)

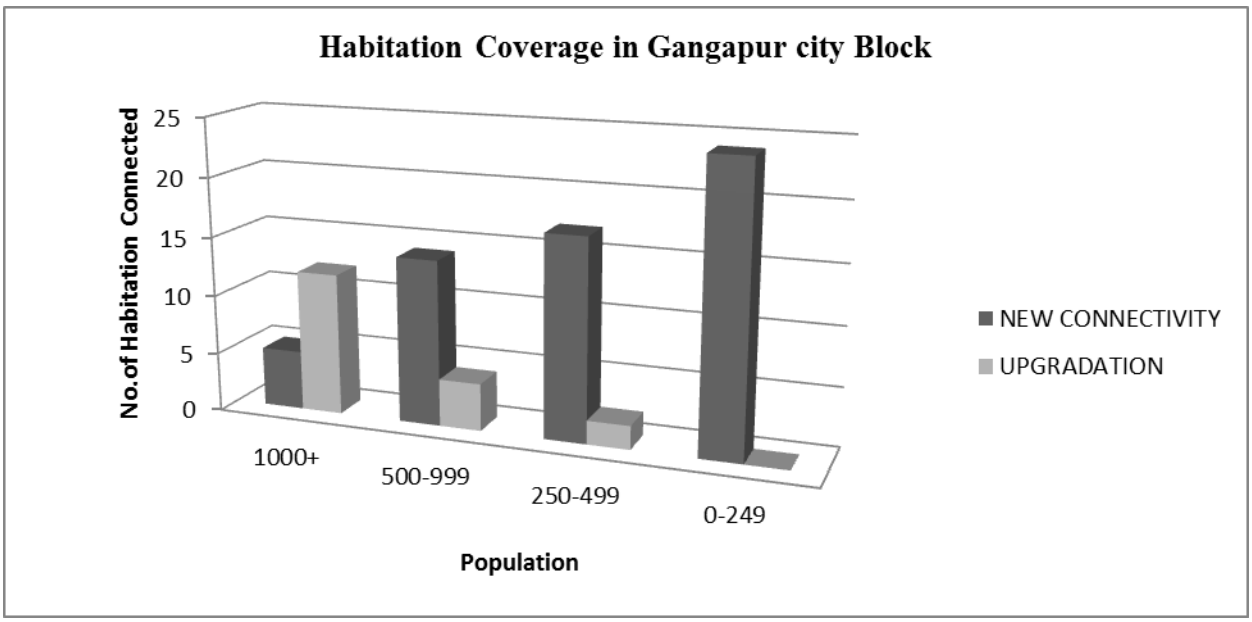
Year Phase	No. of Road Work		Road Length (in KM.)		Sanctioned Cost (₹ in Lacks)	Expenditure Cost (₹ in Lacks)	Habitation being Connected	
	New connectivity	Upgradation	sanction Road	Completed Road			Total Habitations	Population
2000-01	1	3	10.200	10.200	93.39	78.91	8	12890
2001-02	2	0	4.850	4.600	77.38	57.90	2	2988
2002-03	0	0	0	0	0	0	0	0
2003-04	4	0	10.660	9.855	164.83	141.02	4	3052
2004-05	3	0	13.850	13.850	190.39	181.17	5	2958
2005-06	6	0	14.250	14.250	289.12	238.36	6	3691
2006-07	10	0	21.770	19.780	417.91	318.68	10	3980
2007-08	0	5	40.300	38.250	931.06	894.67	10	25573
2008-09	0	2	15.20	15.160	455.49	448.31	1	2539
2009-10	0	0	0	0	0	0	0	0
2010-11	0	0	0	0	0	0	0	0
2011-12	1	0	1.800	1.800	49.52	42.49	1	1000
2012-13	10	0	24.100	0	627.77	85.24	31	6146
Total	**37**	**10**	**156.98**	**127.745**	**3296.86**	**2486.75**	**78**	**64877**

Source: -PMGSY Reports

Habitation coverage in Gangapur city Block

Population wise habitation coverage in Gangapur city block under PMGSY has been shown by the below graph. According to graph, till December 2013Out of the 78 habitations covered under the study 60 habitations were connected by new connectivity and upgradation work was done for 18 habitations by constructing rural roads.

Graph No. 1



Source: - PMGSY Reports

Impact of PMGSY

The objective of this study was to find out and quantify the possible impact of rural roads on socio-economic development in rural areas. Rural road construction and upgradation is the key component for rural development. At the outset one particular point needs to be clarified that economic benefits such as increase in agriculture production, employment, marketing, education, banking, hospitality, E-Mitra service and such other variables depend on a number of factors other than roads. Poverty reduction is the main object in rural roads construction under the PMGSY.

Connectivity of roads in rural areas helps to open up remote regions and also links the backward regions with advanced developed areas which help for better and full utilization of available resources. Broadly speaking, the impact of rural roads can be summarized as follows-

- Improvement in market access and transportation services.
- Availability of public services and public functionaries in the rural areas.
- Improve access to school, banking, and hospitality.
- Improve basic health level and income etc.

Impact on Agriculture

- Because of PMGSY road connectivity, all-weather transportation has developed, as a result, access of farmers to agri product markets, chemical fertilizers and seed-centers has become easy.
- Thus, the agriculture products produced by farmers can easily reach the market and farmers can get the actual return-price for their products.
- Crop pattern has also changed due to road connectivity and now farmers have started giving more attention to cash-crops instead of food crops. In 2005-06 the total cultivated

aera of Rabi crops is 39,664 Hectares. But in 2012-13 it 18,417. And The Kharif crops area in 2005-06 is 20947 and in 2012-13 it is 14646.

- It was found that in 2001 the population of agriculture labourers was 3151 after PMGSY road construction it increased to 8000 in Gangapur city block.

Impact on Employment Generation

- As a result of construction of PMGSY roads, employment opportunity outside the villages has increased. And creation of additional man-days in farming activities due to additional crops being cultivated has risen.
- It was found that in 2001 the no. of households was 43,343 after the road construction it increased to 63,010 (31.21%) in this block.

Table No. 2

Workers Population in Gangapur city Block

No.	Workers	Census 2001	Census 2011
1	Main workers	75072	91985
2	Marginal workers	23543	42600
3	Total workers	98615(34.64%)	134585(38.82%)

Source: - Census of India

Impact on Poverty Alleviation and Income

- Because of construction of rural roads under PMGSY, poverty rate has declined in rural areas.
- Rural roads are the important enabling conditions for livelihood development of people in rural areas. The poor and very poor primarily benefit through the indirect impact of road improvements, of better access to state services and improved provision of services to the villages, and opportunities in alternative livelihood income stream.

Impact on Health Aspect

- The access of rural population to urban health centers has become easy and now doctors have started visiting rural areas because of road connectivity.
- There has been an overall improvement in access to the health facilities like PHCs, sub-centres and district hospitals in the Gangapur city block. Positive impact was observed on accessibility to preventive and curative health care facilities; better management of infectious diseases and attending to emergencies and increase in frequency of visits by health workers.
- In Gangapur city block the percentage of Public Health Centres is 14.2%.

Impact on Education

- Because of road connectivity done under PMGSY, schools have witnessed a greater presence of students and enrollments in urban colleges have also increased.

- Apart from increase in presence of girl students, even presence of teachers in schools has also increased. As a consequence, literacy rate in rural areas has witnessed a sharp rise.

Table No. 3: Block Schools No. and Enrollments in Gangapur City Block

Year		No. of Schools in Block (Class 1 to 8)	No. of Enrollments in Block (Class1 to8)
2009-2010	Total	240	11686
	Rural	220	10871
	Urban	20	1815
2014-15	Total	247	26159
	Rural	224	22251
	Urban	23	3908

Source: Office of Block Primary Education Officer, Gangapur city Block

- It was found that in 2001 total literates' population was 1, 45,003 after PMGSY road construction literates population increased to 2, 09,381 in Gangapur city block.

Impact on Other Aspects

- Ruralites have got greater access to Government services like- Aanganwari centers, E-Mitra, Banking and Primary health centres.
- Increase in road connectivity has led to a decline in transportation cost and travel time.
- Rural areas have started witnessing urbanization to some extent.

Problems

- Suspension in road construction work because of lack of competent contractors and Engineers.
- Shortage of skilled and local workers and the problem of Child Labour.
- Use of sub-standard raw material and increase in the cost of raw material.
- Delay in payment to workers by contractors.
- Problem of land procurement in construction of the rural roads.
- Lack of monitoring by administrator due to other work load.
- Complex proportional separation of percent of human labour and machine according to labour act.
- Monsoon and geographical problems.
- Regional and political problems.

Suggestions

- Solve the problem of ineligible contractors and engineers by using the Electronic bid system (tender).

- Low-cost marginal and industrial waste materials may be promoted for rural road construction; necessary design and specifications should be developed.
- The District may use the resources from Employment Programmes and other available sources from the District for providing connectivity to the lower order settlements.
- It is proposed that the State Executing Agencies of rural roads shall make it possible to take at least 5% of the road works under Research and Development using cost-effective new materials, adoption of new technology and new process which are likely to ensure R&D culture to the field engineers.
- A plan for tree plantation should be formulated at the time of finalizing the detailed project report for construction/upgrading of rural roads.
- To create a green belt and avenues for meeting aesthetic recreational needs and thereby providing shade to pedestrians and reduce the ambient temperature
- To reduce the surface run-off discharge and checking erosion in the downhill side especially in hilly regions.
- Monitoring should be regular and transparent.
- District magistrate should be authorized for land procurement for rural road construction.
- Road route should be finally approved by Panchayat.
- Contractors should be penalized for delay in work.
- Eco-friendly raw material should be used for road construction.

Conclusion

Rural roads are back bone of whole economic system of rural development. It provides connectivity in rural areas. A well-developed rural road serve the socio-economic development in particular regions.After the construction of the PMGSY roads, there has been an improvement in the education, health, employment, hospitality, banking, man-days, rural income etc. Social interaction and integrations have increased due to implementation of PMGSY.

Assimilation of GIS into planning, implementation and monitoring process of PMGSY is changing the whole concept of execution of rural road plan. PMGSY has achieved a great success in the field of rural road construction in our country.

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