

Good Infrastructure Can Reduce Rural Poverty

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Abstract

This article tries to answer the question whether good infrastructure can reduce rural poverty by exploring the connection between rural infrastructure development and rural poverty through an analytical framework. This article also presents the current rural infrastructure development in India through an index. By analyzing the economic studies, it can be very well understood that rural infrastructure development has a significant impact on poverty reduction worldwide. Despite having a large infrastructure gap historically, India is showing progress on the scale of physical infrastructure in rural areas. Seeing this connection, government's role becomes very much important in rural infrastructure development. Thus, current government policies have also been explored in this article.

1 Introduction

Infrastructure is a buzzword in India right now resonating through policy discussions, development agendas, rural revitalization plans and others. There is no doubt that good infrastructure is one of the many factors which is crucial for India to achieve its aspirations of Vision 2047. Making India poverty free is one of them. According to NITI Aayog's National Multidimensional Poverty Index (MPI), India's population living in multidimensional poverty was 14.96% in 2019-21. However, it is mainly concentrated in rural area (19.28% in rural area VS 5.27% in urban area). So, one question arises - is there any significance of good infrastructure in poverty reduction?

The significance of infrastructure is widely acknowledged in the worldwide debate on poverty reduction as a critical factor influencing socio-economic development, especially in rural areas. Infrastructure includes all of the essential structures and processes required for a society to run smoothly, such as energy and transportation grids, communication networks, and the provision of basic public services. Robust infrastructure may greatly reduce economic inequities and promote sustainable development in the context of rural poverty, where access to basic necessities is frequently restricted or insufficient.

Broadly, infrastructure can be categorised in two categories - social infrastructure and physical infrastructure. Former includes basic utility services like education, health, water and sanitation related infrastructure whereas latter includes road, irrigation, electricity, telecommunication related infrastructure. Here, one important question arises - how infrastructure plays its role in reducing rural poverty?

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As per NCAER 2007 [nca], building rural infrastructure¹ could raise people's standards of living, encourage economic growth, and lessen the prevalence of poverty by producing employment and income opportunities on and off farms, boosting production, facilitating access to necessities, and enhancing people's physical and mental well-being. Empirical studies also suggest a strong relationship between infrastructure, economic growth, and poverty reduction.

Despite the fact that infrastructure is vital, there are still serious shortcomings in rural areas of all Indian states. As of 2011-12, only 55.3% of households had access to electricity. Still, India has not achieved 100% electrified villages status. Compared to urban regions, rural areas have far less infrastructural facilities, both in terms of quantity and quality. The development of basic infrastructure amenities in rural areas is thought to be hampered by a low household income, a low population density, and the lack of scale economies.

In this write up, we will first look the analytical framework supporting the connection of infrastructure reducing poverty then we will review recent literature and current status of rural infrastructure in India and then we will focus on what are some policies in India which are along the lines. Lastly, we will explore the possible recommendations focusing on which can reduce poverty significantly.

2 Analytical Framework

As per Amartya sen and latest literature, poverty is a multidimensional concept which includes educational, health, income and other essential aspects². Social infrastructure helps in boosting majority of aspects. It's importance has been widely recognized over the time as it creates positive externality developing human capital and increasing productivity of a human being. However, physical infrastructure has an important role in income growth of a rural individual. For this write up, roads, electricity and irrigation have been taken into account for physical infrastructure.

Typically, there are two kinds of income activities in rural areas - farm and non-farm activities. Within farm activities, there are some farmers (small and marginal) who are net buyers of the food and others (large farmers) net sellers of food. When prices of agriculture food rises, the real income of former drops and latter's rise. Implicitly, the terms of trade between agriculture and nonagriculture is also an important determinant of poverty incidence.

This simple analytical framework where the main determinants of rural poverty include agricultural productivity, nonagricultural employment, and nonagricultural productivity has been suggested by Asian Development Bank [IA03].

As explained, these three areas (roads, irrigation and electricity) influence three areas broadly as shown in figure 1. Their impact can be channelized through direct or indirect channel where direct channel influences the wage and employment of the poor and indirect channel through rural economic growth which further affects supply and price of the basic goods. Both of these channels brings impact upon real income or the consumption of the poor which ultimately results in poverty reduction.

This can be understood by an example of a village which is not connected to nearby urban area market through a proper road. Because of lack of road connectivity, a labourer is unable to explore the possible employment opportunities outside

¹As per NABARD [nab21], Rural infrastructure comprises all activities and facilities which help to sustain the growth in production and income generation.

²For more information, please refer UNDP Multidimensional Poverty Index Report [Pro23]

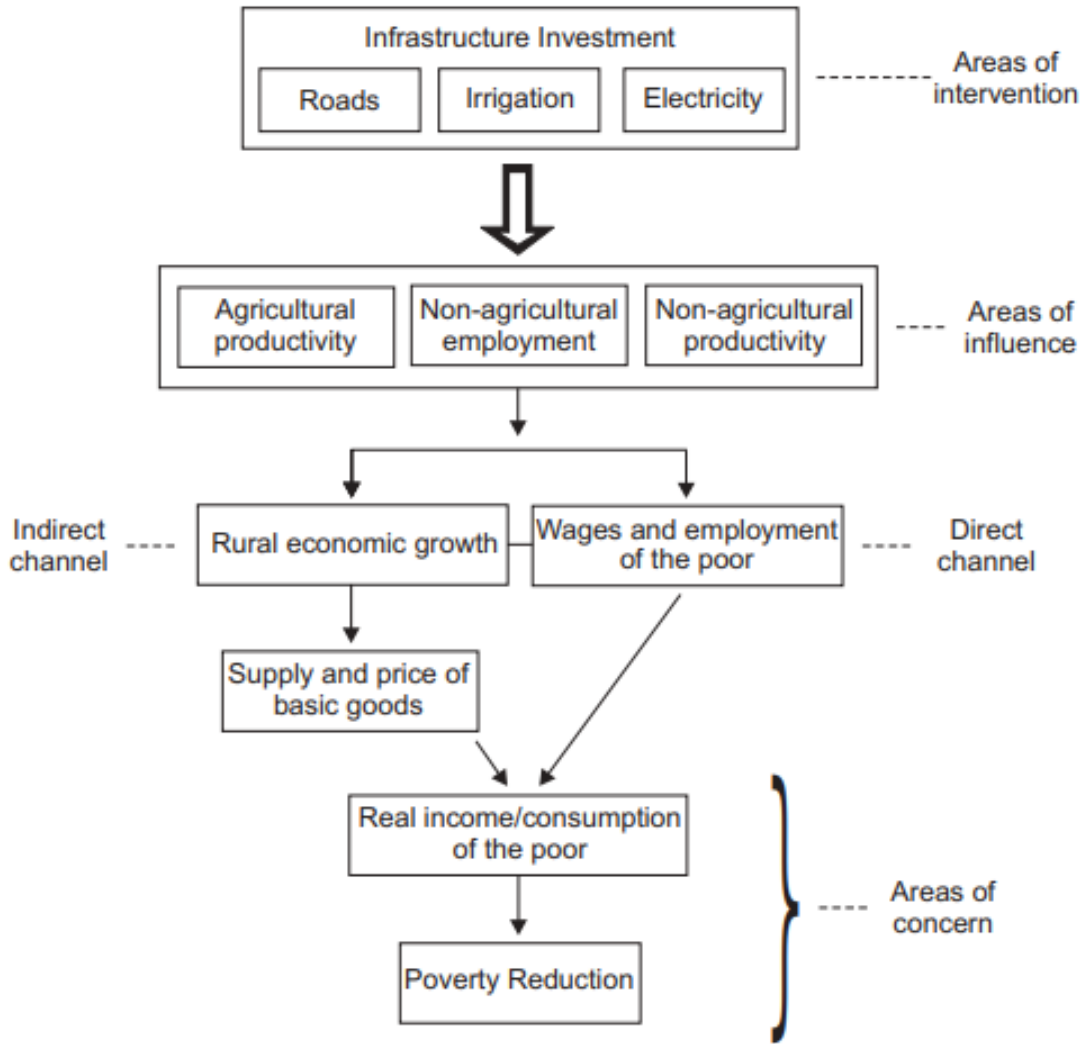


Figure 1: Simple Analytical Framework Depicting the Links between Infrastructure and Poverty Reduction (Reference [IA03]).

village and this ends up getting subsistence wage as farm labour. Also, due to disconnectivity, there is lack of market in this village. Now, if this village is connected to a nearby urban market through a good quality road where public transport is also availed then it will result in reduction in transaction cost. Also, the local labour has an additional option to explore the employment opportunity in nearby urban market. It is the direct channel of impact. Further, this road will result in expansion of market in rural area which will increase the supply and reduce the price of basic goods locally. Non-farm activities including livestock and retail market, will also get net positive impact on their income. This is the indirect channel of impact on poverty just because of availability and accessibility of a good infrastructure (Road in this example).

3 Empirical Evidence

Economic studies available describing connection between rural poverty and rural infrastructure generally do not trace the link between these two described above. Here, the studies on Asian countries mainly have been taken into consideration. It

should be noted that these studies differ in their methodologies, data sources and Econometric techniques. Nonetheless, these studies provide helpful insights over the connection between good infrastructure and rural poverty. The framework described in section 2 can be used to study the connection between rural poverty and rural infrastructure for India.

Kwon (2000) [Kwo00], analyzing Indonesian data, estimates a growth elasticity with respect to poverty incidence of 0.33 for good-road provinces and -0.09 for bad-road provinces. As per Fan et al. (2002) [FZ02], 10000 Yuan investment in rural roads by the government can bring 3.2 poor people out of poverty on average.

Bhattarai et al. (2002) [BH02] finds that in India, Philipines and Vietnam, an irrigated rural area was found to have lower poverty incidence compared to irrigated one. In people republic of China, Fan, Zhang and Zhang (2002) [FZ02] estimated the irrigation elasticity of poverty reduction to be 1.13.

According to a review of World Bank-funded rural electrification projects in Asia, rural electrification increases irrigation use in Bangladesh and India, greatly lowering the prevalence of poverty (Songco 2002 [Son02]). However, this report also found negative or insignificant impact of rural electrification on poverty reduction in a number of countries mainly because of low credit access, undefined use rights, higher transaction costs and others.

For India, Madhusudan Ghosh (2017) [Gho17] unambiguously found the importance of the physical and social infrastructure indices and the livelihood opportunity index in rural development. The coefficients of the indices were in the expected sign and turned out to be statistically significant in majority of the cases.

Thus, it can be concluded that there are significant number of empirical evidences supporting the connection between good infrastructure and poverty reduction. Now, it becomes important to evaluate the current status of rural infrastructure in India.

4 Evaluating Rural Infrastructure in India

The data of rural infrastructure is not readily available for the recent years. So, the author relied on the Physical Infrastructure Development Index (PIDI) used in Madhusudan Ghosh et al. (2013) [Gho17] which scores the infrastructure development of a specific state or country on the scale of 0 to 1 where 0 implies unavailability of any physical infrastructure and 1 implies fully available infrastructure in that state³. This index covers the state of rural infrastructure very well in a way such that different states' progress on infrastructure development in rural areas can be compared.

Here, it can be observed that PIDI index for India was on rising trend. Also, every state has contributed in this as similar trend was observed in every state as shown in figure 2. However, there is still a long path to cover on physical infrastructure.

Throughout all the years, Odisha had the lowest PIDI level and Punjab the highest. In 1981, HP was one of the lowest five states. However, in 1991, it made

³Physical Infrastructure Development Index (PIDI) was constructed by combining: the proportion of households with access to electricity, safe drinking water and toilets (EWT); the proportion of households with pucca houses (HPH); and the index of road connectivity (IRC) estimated as a product of (a) the proportion of surfaced roads to total roads, and (b) the increase in road coverage per 100 sq. km relative to the national average. The PIDI is given by:

$$PIDI = (Exp[0.4ln(EWT) + 0.3ln(HPH) + 0.3ln(IRC)])/100$$

<i>State</i>	<i>Physical Infrastructure Development Index (PIDI)</i>			
	<i>1981</i>	<i>1991</i>	<i>2001</i>	<i>2011</i>
AP	0.071	0.141	0.299	0.442
Assam	0.048	0.070	0.111	0.189
Bihar	0.077	0.089	0.120	0.186
Gujarat	0.185	0.286	0.454	0.470
Haryana	0.112	0.220	0.428	0.658
HP	0.057	0.194	0.403	0.666
Karnataka	0.087	0.159	0.286	0.409
Kerala	0.075	0.136	0.230	0.427
MP	0.067	0.111	0.172	0.224
Maharashtra	0.095	0.181	0.302	0.475
Odisha	0.025	0.041	0.093	0.144
Punjab	0.225	0.363	0.600	0.772
Rajasthan	0.116	0.193	0.279	0.391
Tamil Nadu	0.115	0.187	0.260	0.396
UP	0.082	0.137	0.234	0.321
WB	0.093	0.125	0.228	0.341
India	0.092	0.154	0.255	0.363
CV (%)	51.9	48.7	48.5	44.2
L/H	0.111	0.113	0.155	0.187

Figure 2: PIDI for states (Reference [Mal14]).

significant progress and into the top five, where it remained for the rest of the time. From the middle-level category in 1981 and 1991 to the top-five category in 2001, Maharashtra advanced and maintained its place in 2011. The top five states in PIDI are those with low rates of rural poverty and high levels of agricultural per capita income. However, out of the bottom five states in 1981, AP and HP both made great progress and were able to move up to a higher category: AP to the middle-level category and HP to the top-level one. States with high rates of rural poverty and low levels of agricultural per capita income are those that fall into the bottom five.

It should be noted that the data is available only till 2011. Given that strong push of central government in last decade⁴, this PIDI might have increased further.

5 Current Government policies

Infrastructure plans and investment are carried out by private and public players both. However, in rural areas it is mainly government who invests significantly to build rural infrastructure. Currently, there are a number of policies by central and state government supporting the rural infrastructure development.

Rural Infrastructure Development Fund (RIDF) by NABARD is one of the most important providing the funds for rural infrastructure development. RIDF was operationalised during 1995-96 as an endeavour to bridge the infrastructure gap. At All India level, as on 31 March 2019 an amount of .2,68,220 crore was disbursed for

⁴he 'Effective Capital Expenditure' of the Centre was accordingly budgeted at 13.7 lakh crore (4.5 per cent of GDP) for 2023-24 Source: PIB

projects under various tranches (RIDF I to XXIV). The RIDF assistance to various State Governments is estimated to have created/ restored an irrigation potential of 330.44 lakh ha and 4.68 lakh km of rural roads, 44.45 lakh meters of bridges creating non- recurring employment of 2772.05 crore mandays.

MNREGA is another central government schemes which ensures guaranteed wage employment focusing on livelihood assurance through creating physical assets by unskilled manual labour. This scheme focuses on developing physical assets like well, ponds, irrigation canals, roads etc which not only helps in infrastructure development but also in assuring livelihood. More than 50% of registered workers are woman so it helps in inclusive development as well. In FY24 budget, central government allocated 60000 crore rupees for the scheme.

Pradhan Mantri Gram Sadak Yojna is the centrally sponsored scheme which helps in developing all weather road connectivity to unconnected rural areas. It was initiated back in 2000. Till now, three phases have been launched. Third phase PMGSY-III is during 2019-20 to 2024-25. It is proposed that 1, 25,000 km of road in the States be integrated under the PMGSY-III Plan.

Pradhan Mantri Krishi Sinchai Yojana is the scheme which helps in enhancing agriculture productivity by ensuring efficient irrigation with a focus on watershed management, micro irrigation and water conservation. This scheme was extended till 2026 with an outlay of rs 93,068 crore. Till FY23, total 22 Lakh farmers (out of which 2.5 lakh are SC and 2 lakh are ST farmers) were benefitted out of it.

Rural Electrification Scheme - Deen Dayal Upadhyay Gram Jyoti Yojana has the objective to ensure reliable and affordable electricity supply in rural areas by strengthening of sub-transmission and distribution networks and separating agricultural and non-agriculture feeders.

Apart from schemes mentioned above, other schemes along the lines are Bharat-Net, PM Awas Yojana - Gramin, Swacch Bharat Mission etc.

6 Conclusion

In this article, the connection between rural infrastructure and poverty reduction was explained and evaluated. Now, it can be concluded that there exists conclusive evidence worldwide that good, readily available and accessible infrastructure can significantly reduce the rural poverty. All the states have made progress on rural infrastructure development since 1981. However, there exists significant interstate variation in availability of good rural infrastructure. Also, despite the progress made since 1981, still there is large amount of gap exists in a number of states on the front of rural infrastructure development. However, there is scope for more data intensive analysis and research on this topic especially for India. Recent data availability and a quantitative analysis could have established this connection very strongly which couldn't be done in this article.

As explained in section 5, a number of policies exist to support and establish rural infrastructure development. However, these policies need to be complemented with good governance and a decentralized approach. Government should try to make and prepare Gram Sabha Development Plan (GPDP) mandatorily at the level of Gram Panchayat. These local government should be equipped with a adequate basket of tax rights locally and finance commission aid. Along these lines, Aziznagar village in Rangareddy district of Telangana state presents a very good example. Here, they earn good amount of tax revenue and finance commission aids which they wisely use for rural infrastructure development on the basis of needs. It should

be noted that this Gram Panchayat has a GPDP and good governance structure. Here, they support more than 120 SHG groups majority of which are headed by women. Further, state government should effectively look for strengthening the local government through a strategy of shifting from controlling and directing them to supervising and regulating local government after distributing the powers to them. States can also look for regular and effective social and internal audit of these Gram Panchayat which will be proved as regulatory measures.

Nonetheless, state and central government should continue developing the basic infrastructure including electricity, irrigation and roads which will help in reduction of poverty and thus achieving vision 2047.

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