



"Rural Infrastructure Development for Inclusive and Sustainable Rural Transformation"

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Abstract: A Nation's economic growth is highly dependent on its infrastructure, but the supply of efficient infrastructure continues to be a serious challenge. Many rural communities in developing countries are vulnerable and lack resilience. Developing effective approaches to promote inclusive rural transformation in developing countries is critical for attaining the SDGs. In order to achieve a socially inclusive and environmentally sustainable rural transformation in any nation, non-agricultural/pastoral employment, livelihood diversification, and skill development must be created, as well as rural governance that efficiently addresses issues like poverty alleviation, access to resources, and social inclusion. This research paper highlights the existing patterns of rural transformation in many nations using a variety of methodologies and techniques, as well as the social and economic implications. Rural Transformation is a dynamic and constructive process of evolution and development of rural areas that entails a shift in people's outlook on life. Therefore, it sets forth a vision of how development efforts can promote the inclusive transformation of rural areas in a sustainable way.

Keywords: Rural Transformation, environmentally sustainable, SDGs (sustainable development goals), pastoral employment, livelihood diversification, skill development, poverty alleviation, social inclusion.

quantity and quality of rural infrastructure might greatly benefit economic development and human well-being. Upgrading basic infrastructure such as roads, transportation, energy, telecommunications, housing, health, water, and sanitation is critical for rural growth and well-being. Rural infrastructure development could promote economic growth, raise people's living standards, and reduce poverty by creating farm and non-farm employment and earning opportunities, increasing productivity, providing access to basic goods and services, and improving people's health and physical condition. It embodies a shift in people's perspectives on life and is a proactive, constructive process of change and development of rural communities.

Inclusive rural development is about improving the quality of life of all members of rural society. More specifically, inclusive rural development covers three different but interrelated dimensions: Economic dimension, social dimension and Political dimension.

Introduction

Any country's infrastructure is its backbone. It is extremely significant in promoting a country's economic prosperity. In a developing country such as India, the importance of infrastructure for economic growth and development in rural areas cannot be overemphasised. Even a minor improvement in the

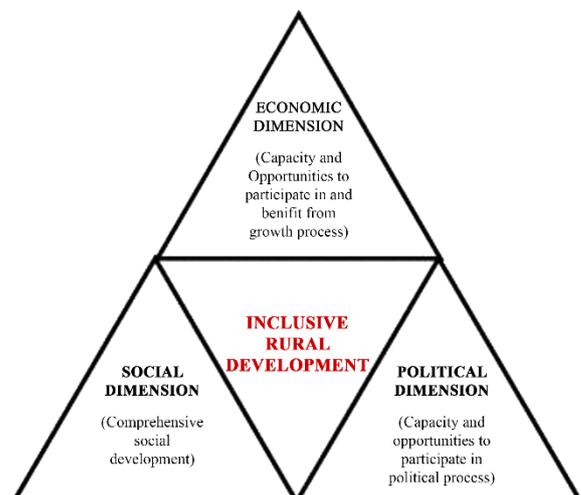


Figure 1: Three dimensions of Inclusive rural development

Rural transformation is impacted by a wide range of elements, including market and ecosystem dynamics, national politics, and local capacity for action. Different trajectories and patterns characterise such movements towards multidimensional change within diverse countries and geo-ecological locations.

The present study highlights the existing patterns of rural change in many nations using a variety of methodologies and techniques, as well as the social and economic implications.

The findings, which indicate the relative significance of various infrastructures, recommend that the government should prioritise extra expenditures in electricity, roads, irrigation, housing, health and telecommunications in order to improve general well-being.

Inclusive Rural Transformation comprises a sustainable and comprehensive level of transformation in rural regions that is social, economic, and environmental. The following themes shed further insight on the concept:

- **Agricultural Development:**

Agricultural development aims to improve the economic and social well-being of farmers, herders, and agricultural workers. It focuses on land-intensive natural resources such as agriculture, cattle, forestry, and fisheries. Improving agricultural services, agricultural incentives and technology, and agricultural resources such as land, irrigation, human capital, and rural infrastructure are all part of the process.

- **Rural Development:**

Rural development is the process of enhancing the prospects and well-being of rural people. It is a transformation in the features of rural societies. It includes human development, social and environmental goals, as well as economic goals. As a result, rural development includes health care, education, and other social services. It also promotes agriculture, mineral extraction, tourism, recreation, and specialty manufacturing through a multi-sector strategy.

- **Rural Transformation:**

Rising agricultural productivity, increased commercialization and marketable surpluses, and diversification of production patterns and lifestyles are all part of rural transformation. It also entails more off-farm employment and entrepreneurial prospects, improved rural coverage and access to services and infrastructure, and increased access to and influence over important governmental processes.

- **Inclusive Rural Transformation:**

Everyone, without exception, may exercise their economic, social, and political rights, develop their capacities, and take use of the opportunities available in their surroundings through inclusive rural transformation. This significantly improves the economic status and quality of life of small farmers, landless and landless labourers, women and youth, marginalised ethnic and racial groups, and disaster and war victims.

- **Structural Transformation:**

Structural transformation is both a cause and a consequence of economic growth. It entails rising agricultural and urban productivity, a shift in the economy's composition from agriculture to industry and services, increased participation in international trade, increased rural-urban migration and urbanisation, and

the realisation of a demographic transition from high to low birth rates. It causes severe political, cultural, social, and environmental strains that must be handled for long-term viability.

Link Between Rural Infrastructure And The Economy

Infrastructure is essentially the foundation upon which economic progress is constructed. It includes those auxiliary services that aid in the expansion of directly productive enterprises such as agriculture and manufacturing. These services vary from the provision of health care and education to the provision of necessities such as power, irrigation, transportation, and communication.

Any planned infrastructure project, whether in a rural or metropolitan location, has an influence on the region's entire economy. It creates jobs for neighbouring residents and aids in the appropriate movement of cash in the marketplace by impacting all economic stakeholders. The government must prioritise projects since they have a direct influence on rural development. Rural infrastructure must be constructed at the same rate as impetuous expansion.

The first, forward linkages between infrastructure and economic growth are caused by the following factors:

- Infrastructure sector outputs such as power, water, transportation, and so on are utilised as inputs for production in directly productive sectors such as agriculture, industry, and so on. As a result of low availability of the former, assets in the latter are used inefficiently.
- Infrastructure improvement, such as transportation, has a huge impact on productivity. In almost every

industry, infrastructure is the cornerstone to modern technology.

- Several studies have found a tight relationship between infrastructure and Economic development. According to these studies, a 1% increase in infrastructure stock is correlated with a 1% increase in per capita GDP.
- According to studies, infrastructure services in low-income nations provide around 6.5 percent of total value added. This proportion rises to 9% in middle-income nations and 11% in high-income countries.

Given the aforementioned form of relationship, infrastructure development is critical not just for economic growth (through globalisation and technical innovation in manufacturing), but also for poverty alleviation.

The second, backward linkages between infrastructure and economic growth are caused by the following factors:

- Growth, in turn, places demand on infrastructure.

This may be demonstrated using the following relationship between GDP growth and infrastructure demand:

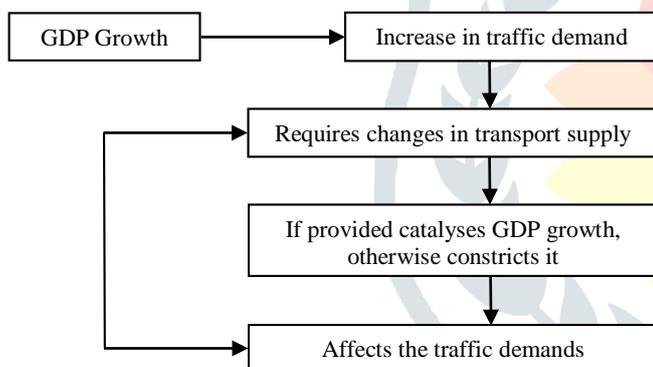


Figure 2: Relationship b/t GDP growth & Infrastructure demand

- As a result, the composition of infrastructure varies as income levels rise.
- Basic infrastructure, such as water and irrigation, is particularly crucial in low-income nations.
- Demand for transportation is increasing rapidly in middle-income countries.
- Power and telecommunications are more important in high-income countries. Because of these connections between infrastructure and the rest of the economy, the status of development in the infrastructure sector influences the economy's efficiency, competitiveness, and growth.

Why Rural Growth is so Important

Three key economic challenges are addressed by rural infrastructure. We frequently hear that the city's

foundations are eroding and that cities like Delhi and Mumbai are unable to withstand the fast-expanding population strain. They are not designed to accommodate such a large population. And the answer to where this population is coming from is in rural regions. Therefore, when we provide critical rural infrastructure, whether it is education, agriculture, or healthcare, we are actually rescuing our cities. Improving rural infrastructure will slow population migration to cities. Rural infrastructure has the ability to drastically lower the country's farmer suicide rate. Farmers in the country have no other source of income. Hence, by developing rural infrastructure, we are providing new alternatives for them. Farmers' loan burdens might be reduced with additional revenue. This can also help to reduce the number of suicides.

Objectives Of Rural Infrastructure Development

- To encourage rural economic growth by providing enough access to food, housing, clothes, education, and jobs. Those living in rural locations will be able to acquire a level playing field for income alternatives if they have access to opportunities that are proportional to those in metropolitan areas. (Incham Manggat, 2018)
- To promote rural economic growth by ensuring enough access to food, shelter, clothing, education, and employment. People who live in rural regions will be able to compete on a level playing field for economic possibilities if they have access to opportunities that are proportionate to those in urban areas.
- The goal of rural development is to maximise economic advantage for residents by using natural resources within a region. This involves significant land reform efforts to increase agricultural output and productivity for all those engaged.

Challenges In Inclusive Rural Transformation

Enhancing rural livelihoods necessitates a rural transformation. Yet, fostering such change remains challenging in underdeveloped areas. Rural transformation is a long-term change process in basic aspects of how people in rural regions live and behave economically, taking into account how they are entrenched in social and global dynamics. It is a total cultural shift in which rural economies diversify and become less reliant on agriculture. Such change necessitates increased agricultural production, i.e., a green revolution. Additionally, increasing revenue from

these initiatives can inspire additional investment through greater aggregate demand and agglomeration effects, propelling rural transformation even further. The obstacles that diverse groups have in accessing inputs, money, natural resources, and ecosystems must be addressed in an integrated and methodical manner. The basic physical evolution mentioned is considered important as it serves as an indicator to the progress and developmental process of a particular nation. Absence of essential infrastructure indicates that the country or region is underdeveloped and is falling behind in terms of growth and modernization. It is necessary to build a network of basic facilities in rural regions in order to bridge the gap between the communities in rural and urban areas. Additionally, closing this gap is crucial in order to preserve overall quality of life.

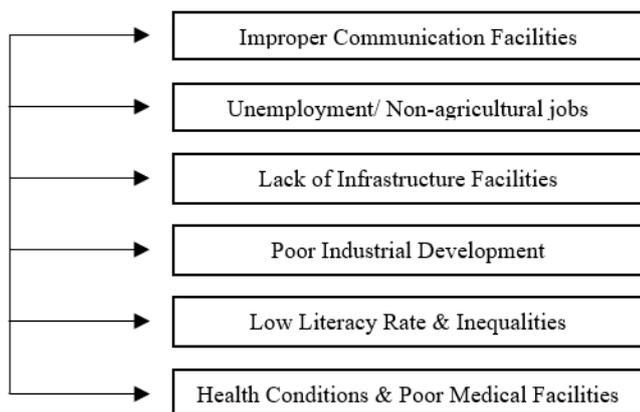


Figure 2: Problems of Rural Development

Infrastructure For Agriculture and Rural Development

Agriculture-focused development models emphasise the importance of infrastructure in agricultural growth in particular. The expansion of agricultural technology is significantly dependent on both physical and institutional infrastructure. It is also suggested that infrastructure plays a crucial role in generating substantial multiplier effects in the economy when agricultural expansion occurs. Rural infrastructure promotes agricultural expansion by boosting yields, farmers' access to markets, and institutional funding availability. The type of infrastructure put in place also impacts whether expansion accomplishes everything possible to alleviate poverty. The majority of the poor live in rural regions, and the expansion of agricultural production and non-farm rural employment is intimately related to infrastructure supply. Three-quarters of the world's poor live in rural regions, and farming is their primary source of income. Improving agricultural output is so critical to alleviating poverty.

When rural infrastructure deteriorates or fails, the cost of marketing agricultural goods can be prohibitively

expensive for impoverished farmers. Inadequate rural infrastructure also restricts traders' capacity to travel to and interact with remote farming communities, reducing market access and removing competition for their goods. Development of rural roads nearly always results in increased agricultural production and productivity by bringing in additional land for cultivation or increasing current land usage to capitalise on enlarged market prospects.

Enhanced infrastructure also contributes to market expansion, economies of scale, and improved factor market operations. The development of rural infrastructure contributes to the expansion of markets by providing better access to production factors.

Impact Of Investments In Rural Infrastructure

- Investment in rural infrastructure can have an indirect impact on farmer income by modifying land efficiency and land use structure.
- Infrastructure investment has a nonlinear influence on farmer income.
- Increased productivity and transportation infrastructure investment will help to accelerate rural economic change.

Infrastructure investment is critical for increasing farmers' access to input and output markets, stimulating the rural non-farm economy and revitalising rural towns, increasing consumer demand in rural areas, and facilitating the integration of underserved rural areas into national and international economies. Infrastructure expenditures often have the greatest impact on economically integrated and intermediate rural communities. Any investment in infrastructure raises real income in both agriculture and non-agriculture sectors, resulting in a decrease in poverty.

Rural Development Strategy Approach

Traditional strategy approach:

- Using tax exemptions and other concessions, attract traditional export-based industries.
- Increase the retail and service industries to attract employees and customers from neighbouring towns.
- Commuters to larger cities should have access to decent schools and residential facilities.
- Provide visitors, seasonal migrants, and retirees with requested public services.
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Non-Traditional strategy approach:

- Small company owners should be given training, financing, tax breaks, and technical support; entrepreneurial development mechanisms should be used to foster an entrepreneurial culture.
- Train, lend, and provide technical help to networks of similar businesses.
- Encourage local firms to make better use of their educational and technical resources.
- Attract well-educated or creative individuals with goods and services they want, offer amenities desired by well-educated or artistic people, and help them start or expand local enterprises.

chains and build new ones, as well as to give chances for households to re-allocate labour in accordance with their comparative advantage. In the Philippines, user-managed irrigation schemes—a typical feature of small-scale irrigation projects in the country—can promote trust, social cohesion, and mutual support, as well as providing chances for families to become more involved in communal activities in their community. In both nations, when livelihood choices expand through the aforementioned channels, livelihood susceptibility to climate stresses can be minimised through income diversification. Among the beneficiaries of both initiatives, better rural infrastructure is intended to contribute to women's empowerment by lowering economic and social obstacles.

CASE STUDIES 1:

Rural infrastructure for inclusive rural transformation on roads, markets and irrigation in Bangladesh and the Philippines

For a variety of reasons, the two projects provide good case studies for gaining rich and broadly applicable insights for development practise. Secondly, both projects are in South Asia, a region that is seeing rapid economic growth while still experiencing significant economic and social disparity and high poverty rates. Because the majority of the region's countries face similar economic and structural challenges—including widespread inequality, unbalanced growth, poor connectivity, and increasingly frequent and severe climatic shocks—insights from the two case study projects can be used to inform a more inclusive growth agenda across the region. Using these insights, ongoing investments aimed at stimulating inclusive rural development as a method of contributing to the SDGs may be made more successful, equitable, and efficient.

Along with most nations in South Asia, Bangladesh and the Philippines, have made significant headway in structural and rural development during the last two decades. Both projects aim to achieve their goals primarily through lowering obstacles to and improving conditions for smallholder agricultural output.

Climate resilient road and market infrastructure is expected to help improve and modernise smallholder production in Bangladesh by lowering transaction costs for accessing inputs, while **better irrigation systems** are expected to accelerate crop growth and avoid disruption caused by unreliable rainfall in the Philippines.

Improved market access in Bangladesh is also intended to assist connect smallholder producers to existing value

Other Projects on Rural infrastructure for inclusive rural transformation in Bangladesh and the Philippines:

The Sustainable Rural Infrastructure Improvement Project in Bangladesh: It will improve rural people's access to social services like as health and education, as well as economic possibilities. Increased access to markets and livelihood activities will result in higher wages for the rural poor, particularly poor women.

Lighting Up Bangladesh's Rural Communities: The Second Rural Electrification and Renewable Energy Development Initiative encourages the use of renewable energy, such as solar household systems, in remote rural regions where grid power is not yet economically viable. Solar mini-grids in distant locations, solar irrigation pumps, and upgraded cookstoves that utilise half the amount of firewood required by traditional stoves and biogas digesters are also supported by the initiative.

Infrastructure for rural productivity enhancement sector project (InfRES) in Philippines, which aims to increase agricultural productivity by investing in rural infrastructure. InfRES supports three types of infrastructure:

- **Rural roads:** The InfRES initiative would fund the improvement and restoration of rural roads that connected to agriculturally productive regions. This involves converting trails or pathways to all-weather rural roads, as well as building landing facilities, footbridges, cableways, and other transportation infrastructure that would connect manufacturing regions to markets and helped enhance output.
- **Small-scale Irrigation:** Small irrigation system construction and repair had the ability to boost productivity and revenue by providing farmers with one more crop each year.

- **Rural water supplies:** InfRES would fund the renovation and building of intake boxes at springs, building of reservoirs and broke pressure tanks, installation of tapped stands, and drilling of tube-wells and provision of handed pumped when groundwater of appropriate quality for cost-effective extraction was present.

The optimistic future for nations dominated by smallholder farms envisions individuals living in rural areas having much enhanced access to social and economic, governmental and private services. It is distinguished by long-term agricultural development and diversification, improved access to markets and basic services, and increasing non-farm employment.

CASE STUDIES 2:

Rural infrastructure for inclusive rural transformation in India

Rural infrastructure is crucial for promoting the rural economy and achieving the United Nations' Sustainable Development Goals (SDGs) by 2030. Nowadays, 65% of India's population lives in rural regions. As a result, rural infrastructure must be constructed to offer basic amenities to the rural people, such as municipal services and housing. This will improve their overall quality of life. There is no denying the urgent need to revitalise India's rural economy, encompassing the agricultural and non-farm sectors. This is necessary due to the rural sector's importance, since 68.84 percent of the population resides in rural areas (according to the 2011 Census), and more than half of the workforce is employed in agriculture. In these conditions, the importance of rural infrastructure in increasing agricultural output, farm and non-farm employment, reducing rural poverty, and raising rural living standards cannot be overstated. Keeping all the above factors in mind, the government of India had initiated critical schemes for the upliftment of rural infrastructure. Such as:

- **Rural Infrastructure Development Fund (RIDF):** The RIDF, which was established at the national bank for agricultural and rural development (nabard) in 1995-96, now encompasses 36 activities divided into three basic categories: agriculture and allied sectors, rural connection, and the social sector.
- **Pradhan Mantri Awas Yojana (Pmay - Gramin):** Providing housing for all by 2022. Pmay-g aims to provided pucca (permanent) houses and other basic civic amenities such as piped drinking watered, power supply and liquefied petroleum gas (lpg) connection in convergence.

- **Pradhan Mantri Gram Sadak Yojana (PMGSY):** Improving rural connectivity, by providing all-weather roads to connected eligible habitations in rural areas.
- **Jal Jeevan Mission (JJM):** providing functional household tapped connection (fhtc) to every rural household i. e. , Har Ghar Nal Se Jal by 2024.

Some Rural transformation cases in India:

Guiding a Rural Transformation: The Example of Punsari Village, Punsari village in western India has evolved from an undeveloped and impoverished environment to a "smart village" today. Punsari has achieved excellent achievements in healthcare, education, employment, and contemporary amenities

via good planning and utilisation of central and state government expenditures. Punsari was not always a picture-perfect hamlet. It lacked decent roads, as do many villages in India. A severe shortage of safe drinking water existed. Electricity was only accessible on rare occasions. There were no street lights. The sewage treatment system was inefficient. The sanitation was deplorable. To make matters worse, the gram panchayat lacked the finances to make small modifications.

A Modern Village's Appearance and Feel, The village's various sites are now linked by clean, well-maintained concrete roadways. Solar energy powers streetlights. Punsari now enjoys 24-hour power supply from a 66 KV power sub-station located in the village.

- **Healthcare:** Punsari features a primary healthcare centre (PHC) that is open 24 hours a day, seven days a week. Punsari has eight well-equipped anganwadi (child care) centres. All of these facilities have well-kept infrastructure. Punsari residents make the greatest use of these facilities. The services offered by these centres have reduced child malnutrition and disease to near-zero levels.
- **Drinking Water:** Punsari has worked to improve the village's access to safe drinking water by installing five bore wells, four hand pumps, and house-to-house piped connections for chlorinated water.
- **Sanitation & Waste Management:** The village has implemented a cleaning campaign in which residents are encouraged to keep their surroundings tidy. Every home has a bathroom, which leads to cleaner surroundings. Solid waste management is handled in a separate landfill.
- **Skill Development and Employability:** Punsari aims to become a self-sustained village and with this goal in mind, fostering employability among the village youth is a priority. More employment-

oriented skill development courses are likely to start in near future.

- There are some more initiatives was implemented towards achieving the United Nations' Sustainable Development Goals: Women's Empowerment, Education, Internet facilities, etc.

This instance demonstrates that rural India has a fixed pattern of thought and conduct that has evolved over time and is sacred to the people. As a result, the process of social development requires a reorientation of leadership to address the issues unique to the Indian rural milieu. Decentralized democratic leadership is essential. Rural infrastructure is crucial for promoting the rural economy and achieving the United Nations' Sustainable Development Goals (SDGs) by 2030.

Conclusion

In the face of poor rural infrastructure, lack of basic amenities, poverty, hunger and lack of non-agricultural jobs, People migrate to cities, due to which population of cities are increasing and problems are also increasing day by day, So to control this migration and for achieving SDGs it is very important to develop rural areas. Enhancing rural infrastructure has the ability to influence the transformation process in a variety of ways, including increased agricultural output, off-farm activity, asset accumulation, resilience, food security & nutrition, social capital, and educational investments.

Initiatives taken for the development of rural infrastructure in countries like Bangladesh, Philippines and India have yielded good results and it should be implemented in other rural areas as well. Rural transformation involves more than just building basic facilities and infrastructure. It has a human development dimension that can impact the sustainability of any transformation. These findings suggest that the government prioritise further expenditures in energy, roads, irrigation, housing, and telecommunications in order to increase agricultural output, improve rural literacy and life expectancy, and reduce rural poverty and infant mortality.

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