

THE IMPACT OF RURAL ELECTRIFICATION ON THE BENEFICIARIES OF GARO HILLS

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Abstract— The Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) has profoundly impacted the rural areas of Garo Hills in Meghalaya, India. The DDUGJY, initiated in 2014, aims to ensure continuous electricity supply to rural areas, enhance the sub-transmission and distribution network, and promote the socio-economic development of rural communities. Historically, Garo Hills faced significant challenges in electrification, with many villages remaining in darkness. The implementation of DDUGJY has transformed this landscape, providing electricity to previously unelectrified villages. This electrification has brought about a marked improvement in the quality of life for rural residents. The availability of electricity has facilitated the growth of local businesses and agricultural activities, creating new economic opportunities and enhancing income levels. Socially better living standards, with households now able to access electric appliances and technologies, which improves daily life. Educational institutions have benefitted from reliable power, enabling extended study hours and access to digital learning tools. Healthcare services have also seen improvements, with electrified health centres offering better medical care and reducing dependency on traditional lighting sources, which posed health risks. Despite the significant progress, challenges such as infrastructure maintenance and expanding coverage to remote areas remain. The paper concludes by discussing the future prospects for sustaining and enhancing rural electrification efforts in Garo Hills, emphasizing the need for continuous support and innovation. This review underscores the critical role of DDUGJY in fostering holistic development in Garo Hills, illustrating how access to electricity can be a catalyst for economic growth, social betterment, and improved healthcare and education.

Keywords— Infrastructure Development, Socio-Economic Development, Power Supply Reliability, Healthcare Improvement and Government initiatives.

I. INTRODUCTION

Electrically powering rural and distant communities that were previously underserved or lacked access to contemporary electrical infrastructure is known as rural electrification. Many, the scheme has led to people believe that this initiative is essential to development projects meant to raise rural areas' standard of living. Meghalaya consumes less electricity than other Indian states. Electrification starts in towns and cities before progressively spreading to rural areas. Rural electrification was initiated in India only after the establishment of the Rural Electrification corporation (REC) in July 1960. Access to electrification is a vital component of social-economic development, enabling progress in education, healthcare, communication, and the economy. Although Meghalaya has made significant progress in rural electrification, the power supply in electrified village remains extremely unreliable. Historically, Garo Hills faced significant challenges in electrification, with many villages remaining in darkness. The Garo Hills region is tucked away in the Northeastern section of the Indian state of Meghalaya, in the western part of the state. It is one of the Meghalaya's three main Hills areas, along with the

Jaintia and Khasi Hills. Primarily populated by the indigenous ethnic Garo people, the Garo Hills are renowned for its biodiversity, rich scenery, and distinctive culture. The Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) was launched, to ensure the continuous and adequate supply of electricity to agricultural and non-agricultural consumers in rural area. The Honourable Prime Minister introduced the Deen Dayal Upadhyaya Gram Jyoti Yojana with the objective of installing electrical infrastructure in rural area by improving the current setup and metering the transformer distribution and feeders. The DDUGJY, initiated in 2014, aims to ensure continuous electricity supply to rural areas, enhance the sub-transmission and distribution network, and promote the socio-economic development of rural communities.

II. REVIEW OF LITERATURE

Studies Singh (2022) discovered that the study's goal was to investigate the infrastructure development under the DDUGJY, a program designed to address rural electrification that was launched in December 2014. The primary goals of the initiative are to distinguish feeders

used for agricultural and non-agricultural uses, evaluate sub-transmission and distribution equipment, and electrify communities throughout India. The literature also discusses the DDUGJY's funding system, which allows the Indian government to provide substantial cash to support rural electrification projects. A major element of this finance strategy, which aims to promote the nation's growth and development, is improved energy access for rural families. The foundation for understanding the DDUGJY plan's significance and broader implications for the Indian economy, particularly with regard to rural development and social upliftment, is laid by this literature review.

Agoundedemba, (2023) noted that implementing electrical infrastructure presents significant obstacles due to the geographical variety of rural communities.

Palit (2017) studied a variety of policies and programs implemented over time, highlighting the fact that while infrastructure has made great progress, household access to reliable electricity has remained restricted. Because they depended more on village electricity than family access, previous success metrics exaggerated development, according to the literature. Financial considerations that prioritized industrial and urban electrification above rural accessibility are among the challenges mentioned in the literature. The 1960s and 1970s focus on irrigation pump sets did not translate into increased home electrification, although being beneficial for agricultural productivity. In 2003, the Electricity Act was adopted with the goal of enhancing service delivery and encouraging competition. Research indicates that the separation of duties has often been tenuous, nevertheless, and many nations are still having difficulty putting the act into practice.

Pauser. (2015) stated socioeconomic considerations and physical distance from current electrical networks as the main reasons why a sizable fraction of the world's population without access to electricity lives in rural areas. When discussing rural electrification and energy supply, the marginalization of the poor is a recurrent topic. Sub-Saharan Africa is emphasized in the literature as a region that desperately needs electrification, while having the lowest rates of rural electrification in the world. This focus draws attention to how vital it is to develop energy solutions suitable for the unique challenges faced by rural populations in this region.

III. OBJECTIVE

- From To examine the impact of Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) on Rural electrification in the Garo Hills of Meghalaya.
- To examine how electrification has enhanced access to education by enabling extended study hours and digital learning tools.
- To analyse the scheme's contribution to improving social-economic development and living standards in rural areas.

Research Question

Four tentative research questions are proposed for the findings and analyses of the objectives. The research questions are specific:

- i. What is the current status of rural electrification in Garo Hills Districts of Meghalaya?
- ii. How has the DDUGJY impacted the social-economic conditions of rural communities in Garo Hills districts?
- iii. What challenges have been encountered during the implementation of DDUGJY in the Garo Hills districts?

IV. RESEARCH METHODOLOGY

The purpose of this study is to evaluate how the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) has affected rural electrification in Meghalaya's Garo Hills. The larger impact of DDUGJY was examined through the analysis of government publications, census data, policy papers, and research on rural electrification.

Implementation of DDUGJY in Garo Hills

The division of feeders for agriculture and non-agriculture makes it easier to restore supplies to both groups of customers in rural regions in a prudent manner. Sub-transmission and distribution infrastructure in rural regions, including distribution transformer, feeder, and consumer metering, should be strengthened and expanded. Projects under RGGVY that have previously been approved to be finished include rural electrification, micro grid and off-grid distribution networks. The implementation of DDUGJY has transformed this landscape, providing electricity to previously unelectrified villages. This electrification has brought about a marked improvement in the quality of life for rural residents. The availability of electricity has facilitated the growth of local businesses and agricultural activities, creating new economic opportunities and enhancing income levels. The government of Meghalaya has given priority to the general development of the North Eastern Region (NER), which includes the Garo Hills region. Five of Meghalaya's eleven districts are located in the Garo Hills area. Thirteen projects are underway in the Garo hills areas to build, expand, or rebuild roads and bridges generating 133.8 kilometres in length. Every single residence in the Garo Hills and every inhabited census village has electricity. In the Garo Hills, 14 power projects are being implemented under the North Eastern Region Power System Improvement Project (NERPSIP) initiative. Under the direction of the Mop, the Rural Electrification Corporation Limited (REC) serves as the Nodal Agency for the scheme's operationalization and execution. As a fee, the Nodal Agency will receive 0.5% of the project cost that was authorized by the Monitoring Committee or the award cost, whichever is less.

Periodically notify all of the formats and instructions needed to carry out the project.

Before presenting the Detailed Projects Reports (DPRs) to the Monitoring Committee, evaluate them. Complete all tasks associated with scheduling meetings of the Monitoring Committee for approval.

V. RESULTS AND DISCUSSIONS

The number of electrified villages in the Garo Hills areas has expanded dramatically as a result of the plan. Only 625 villages had power before to DDUGJY, but 1,064 more villages gained electricity once it was put into place. Consequently, Garo Hills' overall electrification rate is 47.02%, with variances within districts. The social,

economic, and health sectors have benefited directly from the effective expansion of rural electrification in Garo Hills under the DDUGJY program. Rural development and poverty alleviation have benefited greatly from the electrification process; nonetheless, the variation in electricity rates among districts points to unequal implementation. Even though West Garo Hills has a high electrification rate (84.38%), other districts still lag behind, including East Garo Hills (30.09%) and South West Garo Hills (25.83%).

The current position of electrification in Garo Hills districts is presented Table

Table 1.

The status of implementation of DDUGJY in Garo Hills Districts of Meghalaya

Name of the Districts	Total no. of villages (2023)	No. of villages electrified before implementation of DDUGJY	No. of villages electrified after implementation of DDUGJY	Total number of villages electrified	Percentage of villages electrified
South Garo Hills	804	160	385	545	67.78
West Garo Hills	557	200	270	470	84.38
North Garo Hills	579	80	140	220	38.00
East Garo Hills	1,110	130	204	334	30.09
South West Garo Hills	542	55	85	140	25.83
District Total	3,592	625	1,064	1689	47.02

Sources:

1. <https://powermin.gov.in/>
2. <https://www.ddugjy.gov.in/>
3. <https://censusindia.gov.in/>
4. https://www.ddugjy.gov.in
5. <https://meecl.nic.in>

Finding

DDUGJY's implementation has greatly expanded the electrification of Garo Hills communities that were previously without electricity.

All communities and residences with a population now have access to electricity.

By switching from kerosene lamps to electric lights, households are lowering the health issues linked with smoke and harmful substances.

Rural communities now have better access to digital services, entertainment, and mobile communication, which has improved their quality of life.

More frequently study hours made possible by electrification have decreased dropout rates.

The availability of computers, internet connectivity, and digital learning resources in schools has improved the quality of instruction.

Reliable power is available to remote hospitals, enhancing healthcare services.

With the advent of electric refrigeration units, vaccines and medications can finally be preserved appropriately.

Including medical diagnostics and delivery at night, have greatly improved.

Insufficient road access and challenging terrain make maintaining infrastructure in isolated regions difficult.

Rural populations lack awareness and training regarding appropriate power use and upkeep.

Sustainability might be improved by connecting more rural communities to the electricity and integrating renewable energy sources like hydropower and solar.

Digital monitoring tools and smart metering can lower power theft and increase billing effectiveness.

More advancements in rural electricity and infrastructural assistance can be fueled by public-private partnerships.

Impact on Rural Beneficiaries

The Government of India's major initiative for rural electrification is the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY). The program has significantly impacted rural beneficiaries in the Garo Hills region of Meghalaya in a number of ways.

By granting access to electricity, the DDUGJY program has significantly improved rural living in the Garo Hills. The impact of the system can typically be divided into three categories: social, health, and economic.

Social Impact

- Electrical power guidance has replaced traditional kerosene lamps in households, making them safer and more pleasant.
- People in rural areas can use their mobile phones for entertainment and communication, as well as for leisure activities like watching television.
- Mobile charging stations have improved connection, enabling communities to keep in touch with the outside world.

Health Impact

- A steady power source is now available to isolated medical facilities and primary health centres (PHCs), assuring that medications and vaccinations are stored appropriately.
- At the outset illness identification and therapy have been enhanced by the availability of electric diagnostic tools.
- More Effectively maternal therapy has been made possible by health centres' 24/7 illumination, which makes overnight birthing safer.

Economic Impact

- The usage of electric irrigation pumps by farmers has boosted agricultural production and raised crop yields.
- Electrification has created jobs by promoting agro-processing industries including rice mills, mining for oil, and food preservation.
- Regarding perishable goods like fruits, vegetables, and dairy, cold storage facilities have decreased waste and increased farmers' profits.

Challenges and Limitations

To investigate the issues of rural electrification, the Indian government developed the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY). In addition to electrifying the hamlet, the plan calls for feeder separation, sub-transmission system augmentation, and distribution system strengthening. The desired outcome of the Indian government's Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) is to electrify every census village that is still without electricity nationwide. 18,452 census localities in the nation were not electrified as of April 1, 2015, according to state reports. As of April 1, 2018, just 323 census communities were still without electricity. By May 1st, 2018, the remaining census villages that are not yet electrified are to be electrified. Accessibility challenges and logistical limitations make it difficult to maintain electrical installations on a regular basis in isolated regions. Rural communities frequently lack knowledge about the advantages of electrification and proper application of electrical appliances, which results in insufficient utilization and unauthorized use. The sustainability of the electrification project could potentially be improved by initiating training programs that demonstrate to citizens how to maintain fundamental

electrical infrastructure along with promoting savings on electricity.

Future prospects

Despite the Deen dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) already significantly improving rural electrification in Meghalaya's Garo Hills, future possibilities center on electricity infrastructure development, sustainability, and predictability.

The grid will be extended to more isolated villages and communities in the Garo Hills.

Improving distribution and transmission networks to lessen the frequency of shortages. Power supply management is being transmitted electronically for consistent billing and economical power use. Putting up localized solar power plants in isolated communities where it is challenging to expand the grid. Using the rivers and streams of Meghalaya to produce hydroelectric electricity in a sustainable manner. Improving energy storage to provide a steady supply, particularly in places that frequently have power outages. With the development of technology, the incorporation of renewable energy sources, and the growth of infrastructure, the future of rural electrification in Garo Hills under DDUGJY and other government initiatives is bright. To ensure long-term advantages for rural areas, it will be essential to address issues including maintenance, price, and power dependability. A variety of approaches centered on infrastructure development, renewable energy integration, regulatory support, and community engagement is required to guarantee the long-term sustainability and growth of rural electrification in Garo Hills. expanding the electrical system to include isolated and unreachable settlements. Smart meters are being installed to decrease power theft and increase billing accuracy. To swiftly identify and fix power line problems, automated monitoring systems are being introduced. Creating internet channels to report service problems and pay power bills. To guarantee a continuous power supply in the event of a grid breakdown, battery storage systems should be included. Offering low-income rural residents subsidized and adjustable payment arrangements. Assisting in the electrification of medical facilities and schools in order to enhance instruction and healthcare. Encouraging the use of irrigation systems driven by solar energy to increase agricultural output.

VI. CONCLUSION

In the Garo Hills, rural electricity has been greatly aided by the Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), which has also improved healthcare, increased educational possibilities, and stimulated economic activity. To address issues with remote access, power dependability, and infrastructure maintenance, however, ongoing work is required. Garo Hills' rural electrification appears to have a bright future because to the use of smart grid technologies, renewable energy, and community-based projects. The accomplishments of DDUGJY in this area demonstrate how electricity may spur comprehensive development and raise living standards in rural areas.

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