



Impact of **Rural** Electrification

The article assesses the impact of solar home lighting system under remote village electrification programme (RVEP) in Assam, Jharkhand and Meghalaya.

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Rural electrification plays a vital role in all economic activities, it provides for a better quality of life and may be considered as an instrument for the socio-economic development of remote areas. It accelerates economic growth and generates employment by providing electricity as an input for productive uses in agriculture and industries. Rural electrification comprises of domestic connections, street lighting in villages, pump sets for irrigation, drinking water, industry, shops and commercial establishments.

About 1,25,000 villages in India are still not electrified (Census 2001). Of these, around 25,000 villages are located in remote and inaccessible areas and could not be electrified through conventional grid extension. It is, however, possible to electrify these villages through decentralized generation either using traditional systems or using locally available renewable energy options like solar photovoltaics (SPVs), small hydro power (SHPs), biomass, etc.

The Ministry of New and Renewable Energy (MNRE), has been implementing the Village Electrification Programme for electrification of remote un-electrified census villages and hamlets through renewable energy sources since 2001-02. It was renamed in 2003-04 as Remote Village Electrification Programme (RVEP). As on 31.03.2009, 9355 remote villages/hamlets have been provided support (Annual Report 2008-09). This programme is now aligned with and made complementary to the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) of the Ministry of Power and aims at covering those villages where grid connectivity is neither feasible nor cost effective.

The Ministry provides up to 90 per cent of the costs of systems as subsidy to the state implementing agencies. Support had been provided for covering around 5100 villages and hamlets under this programme during the 10th Plan. A target for coverage of 10,000 villages and hamlets has been set out for the 11th Plan. In India, SPV systems have been installed in a large number of villages. Households can generate most of the electricity they need with PV cells on their rooftops. The advantage of this system is that, if there is not enough sunlight at times, electricity stored in batteries can be utilized. Solar home lighting system (SHLS) helps to meet primarily the need of lighting, although it can also be designed for meeting electricity needs for radio, TV, internet and mobile. An evaluation survey was carried out in Assam, Meghalaya and Jharkhand in 2008. The major objectives of the

study were : (i) Functionality of the system based on the responses of the beneficiaries; (ii) Satisfaction levels of beneficiaries ; (iii) Level of community participation. (iv) Effectiveness of implementation arrangements and service and maintenance infrastructure.

The Research Approach : FGDs

Impact assessment of SHLS from Focus Group Discussions (FGDs) is a method of qualitative studies used for capturing information not covered in the structured questionnaires. In such methods, the selected participants are allowed to speak freely on a specific subject. The group discussion proved to be extremely useful in eliciting a range of information, which further supports the quantitative information. In all, 11 FGDs were organised in Jharkhand, Assam and Meghalaya. Out of the 11

Focus group discussions revealed that women and school going children enormously benefitted, however, majority sought proper maintenance facilities and training for self maintenance of the system.

FGDs, 3 were organised in villages that were surrounded by forests. Economic conditions, including household amenities of the beneficiaries, provide the overall status of the beneficiaries. The understanding and management of other economic and non economic activities at the household level plays a crucial role for participation in social activities in the villages. An attempt was made to represent all socio-economic groups in the discussions. It was thought that this process of group discussion would allow the investigators to capture perception, behaviour, direct and indirect economic benefits, level of satisfaction, utilisation of SHLS and the role of participants in the maintenance of the system.

The characteristics of the participants were pre-determined to the extent that, one group consisted of only females, including one or two non beneficiaries, one group comprised of only men, including one or two non beneficiaries, and the third group consisted of both men and women. About 9 to 11 persons were called for each discussion. The selection of the candidates for the FGDs was made keeping in mind the existing compatibility across the

various socio-economic groups. The discussions followed a definite guideline to discuss four major issues, namely: level of satisfaction from the solar home lighting system, type of benefits being realised, participation in awareness campaign if any, and training received if any, etc.

Objectives of the Study Functionality of the System

Proper functionality of the system is determined by many factors which include module capacity; module installation; fixing of luminaires inside the house; fixing of cable etc. All sample households in Jharkhand and Assam received Model-II (37W) with 2 CFL/light luminaires. If the module, luminaires and cable from charge controller to module is installed properly, then one CFL can provide light upto 10 hours in normal weather conditions. Two CFL luminaires can provide light upto 4-5 hours per day.

In the present study, an assessment has been carried out to check the number of hours of light received by the beneficiaries during different seasons. During rainy seasons about 71 percent of the respondents in Jharkhand reported receipt of light for less than 3 hours, whereas 28

and 1 percent only reported receipt of light for 3-4 and 4-5 hours, respectively (NCAER's Report 2008). On an average, luminaires work for 2 to 2.5 hours per day during rainy seasons. During winter season the functionality of the luminaires looks moderate as only 14 per cent reported getting light less than 3 hours in Jharkhand. On an average, luminaires work for 4 to 4.5 hours during winter season. The functionality of the system seems to be very satisfactory as 63, 41 and 23 per cent reported getting light more than 5 hours a day during summer in Jharkhand, Assam and Meghalaya, respectively. On an average luminaires work for 4.4 to 4.7 hours per day during summer season

Extent of Satisfaction

Assam and Meghalaya

All the participants in the FGDs are happy to have installed the SHLS as they can move around the village freely even in the evening. Despite the fact that streetlight has not been installed, home lighting is so strong and bright that it illuminates the lanes outside. Their lifestyle has changed; visiting neighbouring homes as well as arranging get togethers in the temple is now increasing. Two participants in one FDG stated that due to electricity wild animals and specifically tigers have stopped entering the village. Before SHLS villagers lost many goat and cows to straying wild animals. All the participants were now demanding streetlight in the village. One of the women participants was delighted and added "I can stay at home alone in the evening; earlier I had to call somebody from the neighbourhood to stay with me in case my husband was not home."

Jharkhand

Discernible indirect economic benefits are accruing to the villagers of Hundru in the Ranchi district of Jharkhand after the installation of SHLS. Due to availability of light, two women participants in one group said that they can perform household activities even in the evening, such as grinding the rice, weaving cloth, etc.- as such man hours have sizably increased. However, all the participants agreed that their children are spending more time studying in the evening in all the states. The education of girls has improved in Jharkhand after getting the SHLS. The kerosene consumption in the village has gone down to more than half now. One of the participants said that she used about 5 litres of kerosene every month before the SHLS, which was difficult to obtain as there is no

Table 1: Average no. of Hours Luminaires Works by Seasons

States	Winter	Summer	Rainy
Jharkhand	3.9	4.7	2.5
Assam	4.5	4.4	2.5
Meghalaya	4.4	4.5	2.0

Source: The Remote Village Electrification Programme in India
NCAER's Report submitted to Ministry of New and Renewable Energy
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public distribution system (PDS) shop in the remote village in Jharkhand. They have to walk about 5 km to get kerosene and the price of kerosene is Rs 28 per litre in the open market. Now she uses about two litres of kerosene in a month.

Level of Community Participation

In Jharkhand, the participants arranged the meetings in the evening due to availability of light. They could celebrate festivals, and arrange marriages and other community related activities in a much better way. They have been using the light for entertainment, especially the Adivasi (Scheduled Tribes) people in the village. Beneficiaries are also keeping the village clean now in community driven movements. They are now more updated and linked to mainstream development as the use of TV, tape recorder, and radio has increased. The non-beneficiaries had expressed their grievance for not getting the SHLS

Although streetlight has not been installed in most locations, respondents said that the home lighting is so strong and bright that it illuminates the lanes outside.

installed. It is very interesting to note that some of the participants in a few groups in Assam claimed that due to availability of light, the presence of mosquitoes had increased in the village—apparently because they had seen light for the first time.

Effectiveness of Implementation and Service

All the participants in different groups expressed regret that they are not trained for proper maintenance of the system. The beneficiaries also claimed that they have not been informed about the awareness campaign organised by the manufacturers and vendors. A few participants said that they removed the charge controller as it was not working and connected the lamps directly to the battery. They expressed a greater need for a local technician instead of the technician appointed by the manufacturers/suppliers. When asked for suggestions, participants said that some technician should be appointed for the maintenance and repairing of SHLS. Streetlights should be installed and the battery of the system should be more powerful, they



demand. Discussants also added that SHLS should be given to all the households in the village.

Conclusion

The solar home lighting system has been installed on a cost sharing basis. In all, 90 per cent of the cost is provided by the central government and 10 percent by the state government. In Assam, out of 10 per cent of cost component, 5 per cent was collected from the beneficiaries. At the time of our visit all the systems were functional in Assam and all the beneficiaries were happy with the functionality of the system. It is observed that women and children are obtaining maximum benefit from the programme. Hence, we may call it a gender friendly scheme, where women are empowered by it in the rural areas. Therefore, the scheme has to be supported and proper institutional maintenance system should be developed to ensure its sustainability in the long run. ❁

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