

Does Electrification Improve Quality of Rural Life? ADB's Assistance for Rural Electrification in Bhutan

This study evaluates the impact of two ADB-funded rural electrification projects in Bhutan: The study aims to (i) evaluate the performance of the two projects based on relevance, effectiveness, efficiency, impact, and likely sustainability; and (ii) conduct a rigorous quantitative evaluation of the projects impact, focusing on three broad areas influencing quality of life (economic, social, and environmental) and their sustainability. It also identifies key lessons and offers recommendations for ADB management in enhancing development effectiveness of rural electrification in Bhutan.

Strategy 2020 of the Asian Development Bank (ADB) identifies energy as a key component of the infrastructure core area of operations. It states that ADB will continue to invest in rural infrastructure, covering irrigation and water management, rural roads, and rural electrification (RE) - services that particularly benefit women. In addition, ADB's Energy Policy recognizes that Millennium Development Goal targets cannot be met without modern energy services, and that access to energy is essential to reducing poverty.

The development effectiveness of RE assistance is important from both quality of life and socioeconomic development perspectives to justify continued investment in this subsector. However, there are only a few cases where the impact of RE intervention has been evaluated and systematically quantified by other agencies. Knowledge in this area is still evolving. ADB has funded 28 RE projects in 11 countries from 1995 to 2009, but their development effectiveness has not been quantified. This study attempts to quantify both intended and unintended RE impacts on household welfare using household survey data from Bhutan. In addition, results are expected to benefit future ADB RE assistance to its developing member countries. Finally, this study also contributes new knowledge to the global body of literature on the impact of RE in the Asia Pacific region.

Key Findings

- The overall performance of the two rural electrification projects in Bhutan is *successful* based on relevance of design, effectiveness in implementation and achievement of outputs, efficiency of operations, and likely sustainability of project benefits.
- Impacts from electrification are quantifiable, visible, and positive. However, most impacts are modest in magnitude due to low household consumption of electricity, which is largely limited to lighting, rice cooking, and water boiling.
- Economic benefits from electrification are emerging slowly and will take time to translate into substantial impacts. Uptake of electricity use for income generation will depend on other enabling environments. At present, this is limited to weaving in central and western Bhutan and poultry production in southern Bhutan.
- In comparison to unelectrified households, electrified households (i) derive proportionately more income, (ii) encounter less smoke-induced health ailments, (iii) experience fewer number of missed workdays due to illness,



Residents of electrified households enjoy a better quality of life in terms of economic, environmental and social outcomes compared to those in the unelectrified households.

QUICK LINKS

Asian Development Bank's Assistance for Rural Electrification in Bhutan -Does Electrification Improve Quality of Rural Life?

www.adb.org/Documents/IES/BHU/IES-BHU-2010-27.asp

ADB Management Response

www.adb.org/Documents/Evaluation/Management-Response/IES/mr-ies-bhu-rural-elec.pdf

Chair's Summary of the Development Effectiveness Committee (DEC)

www.adb.org/BOD/dec/DEC-Chair-Sum-19Oct2010.pdf

(iv) provide better education environment for children, (v) reduce time spent in collecting fuelwood, and (vi) enjoy better access to information.

- Gender benefits from electrification are emerging and women in electrified households are playing more significant roles in household decisions, particularly for children's education and health of household members, compared to those in unelectrified ones.
- Project impacts are likely to be sustainable, subject to continued subsidy for RE from electricity export revenues. It is envisaged that the fundamentals of cross-subsidization will not change in the near future as Bhutan has committed to increasing power generation for the export market. Domestic demand for electricity is likely to grow with modernization and urbanization.

Lessons

- Rigorous impact evaluation informs policymakers about attribution of outcomes and impacts more systematically.
- Country ownership is crucial to project success, reflected by government's mandate, development prioritization, vision for harnessing potential natural resources in a sustainable manner, and an effective coordination mechanism with development partners.
- In addition to expanding coverage, extra efforts are needed to boost domestic demand for electricity to facilitate income generating activities and enhance safety and efficiency in electricity use. The use of electricity for income-generating activities has been limited, but the potential to increase household income is high. Electricity can also be used to improve agricultural and cottage industry productivity.
- The existing regulatory framework needs to be strengthened to ensure that energy-efficient appliances and equipment are used by households and businesses, thereby ensuring affordability and other benefits.
- When rural people directly realize benefits from rural electrification, they are willing to pay more.
- Fuelwood consumption is unlikely to decline without an enabling environment and disincentive to felling trees. Viable alternatives to fuelwood for cooking and heating need to be explored.
- Baseline data are crucial for properly evaluating the impact of any development intervention, including RE. With proper advance planning and systematic recording, much richer databases could have been created and used for impact evaluation using a double-difference method.

Feedback

The study was completed in August 2010. ADB Management's Response commended the in-depth analysis of the study and agrees with the overall assessment and recommendations made. Management noted the quantifiable, visible, and positive outcomes of rural electrification, and recognized the spreading of benefits over time from programmatic interventions in other sectors such as rural roads, financial and social services.

The Chair's Summary of the Development Effectiveness Committee (DEC) welcomed the study, which was the first study to present a rigorous quantification of the economic, environmental and social impact of rural electrification in ADB-financed projects. The study confirmed that access to electricity for rural households contributed to increased household income; reduced expenditure on traditional energy sources such as kerosene; improved in-door air quality, thereby contributing to better health; and enabled children to use better lighting for their studies. DEC members hoped that through time, the impact of rural electrification on the connected households will become even stronger. DEC members also highlighted the importance of monitoring and linking RE with income generating activities for poverty reduction.

Recommendations

- *Stimulate and manage household and community demand for electricity. ADB could assist government in implementing and developing action plans and linking electricity with income-generating activities.*
- *Ensure the sustainability of project benefits. ADB could assist the government in (a) conducting a detailed electricity demand study and determining a sound and efficient basis for setting electricity tariffs and fees for felling trees, and (b) testing viability of alternate energy sources for cooking and other household use in remote areas, thereby reducing dependency on fuelwood.*
- *Encourage monitoring of project outcome and impacts over time. ADB could assist the government in monitoring progress in economic, environmental, and social impacts of rural electrification over time using these indicators as baseline or benchmark.*

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