

学位論文の要旨 (論文の内容の要旨)  
Summary of the Dissertation (Summary of Dissertation Contents)

論 文 題 目

Dissertation title

Electrification with Solar PV Technology and its Implication to Educational Outcome: Empirical Evidences from South Asia

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Access to electricity is an essential component of modern life that enhances people's living standard. We cannot sustain our comfortable lives without electricity. Increased electricity supply improves education, recreation, health, comfort, protection, and productivity. However, a significant portion of people – mainly concentrated in sub-Saharan Africa and South Asia – live every day without electricity. This scenario is a fundamental obstacle to the progress of a significant proportion of the world's population and affects a wide range of development indicators, including health, education, food security, gender equality, livelihoods, and poverty alleviation. Firstly, this study examined the impact of grid electrification on school enrollment in Bangladesh in the short run as well as the long run. Secondly, the study investigated the impact of a solar home system on educational outcomes in rural Bangladesh. Thirdly, the study examined consumers' preferences for an organic solar photovoltaic (PV) system based on a conjoint analysis in rural India.

In the first section, this study aimed to show the impact of access to electricity on school enrollment in Bangladesh. It offered an empirical investigation of the relationship between access to electricity and school enrollment status, such as grade progression, grade repetition, and non-attendance. The data were taken from Bangladesh's Multiple Indicators Cluster Survey (MICS) database from 2012–2013, as provided by the Bangladesh Bureau of Statistics (BBS) and the United Nations Children's Fund (UNICEF): the data include two years of grading information for children aged from 5–15. The study applied propensity score matching (PSM) and the Markov schooling transition model using matched sample data. The results showed that access to electricity has a significant positive effect on grade progression and a significant negative effect on non-attendance in both the short run and the long run. The simulation result showed that the non-attendance rate is lower and the school enrollment rate for children in grades 9–11 is higher in electrified areas compared to unelectrified areas. This result suggests that access to electricity is an important strategic indicator for increasing school enrollment in both primary and secondary schools.

In the second section, this study examined the impact of a solar home system (SHS) on a student's academic performance and school enrollment in rural Bangladesh. Data came from a random cluster sample of 673 children who had access to an SHS and 1023 children who did not, with all children being from Rahumari *upzilla*, Kurigram district, Bangladesh. Coarsened Exact Matching (CEM) method was applied to correct for selection bias in observable characteristics. The study found that the SHS has a significant positive effect on a student's grade point average (GPA) as well as on receiving a scholarship. It also had a significant positive effect on grade progression and a significant negative effect on dropping out. No significant effect of the SHS was found on grade repetition and out-of-school students. The study concluded that promotion of SHS adoption among un-electrified areas is needed and should be a priority to improve children's academic performance and school enrollment by ensuring universal education for all children.

In the third section, this study examined consumers' preferences for an organic solar PV system. In rural areas, poor people are used to having a silicon or conventional solar PV system. They keep their existing system and face difficulty in accepting new technology. In the study, the organic solar PV system was illustrated to rural people, with its function explained to enhance their understanding. This type of demonstration plays an important role in decision making when choosing an appropriate solar home system (SHS). Some features, such as the solar panel appearance, size, color, surface pattern, functional performance, and price are considered to be the most visual elements in the presentation when respondents are making their choice. The study's intervention involved showing a picture of the organic solar PV system of a different size in one group, while in the other group, the features of the organic solar PV system were explained verbally. The study found that consumers preferred the flexible solar PV system over the rigid conventional PV system.

備考 論文の要旨はA4判用紙を使用し、4,000字以内とする。ただし、英文の場合は1,500語以内とする。

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