

# The Impacts of Energy Insecurity on Household Welfare in Cambodia: Empirical Evidence and Policy Implications

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## **Abstract**

This study investigates the impacts of energy insecurity on household welfare in Cambodia. The notion of energy insecurity is not well understood in the literature as well as in local contexts. This study defines household energy insecurity as the status quo derived from the interplay of inadequate and insufficient energy consumption that prevents households from meeting basic energy needs. The notion of energy insecurity can only be well understood by investigation in the local context as it varies from place to place. Households facing insufficient energy consumption may forgo many other opportunities. Once energy security has been defined in the Cambodian context, the study employs multiple regression models using the Cambodia Socio-Economic Survey Data (2015) to investigate the impacts of household energy insecurity. The study confirmed that energy insecurity has enormous negative impact on welfare of the households, with a further negative impact on the human capital formation of the children. The findings will lead to policy implications to improve household energy security, and thus impact economic, social, and environmental development.

**Keywords:** energy insecurity, schooling and welfare

**JEL Classification:** Q48, C39, I39

## **Overview**

The concept of energy security defined in this study strongly links energy security with fundamental human rights as reflected in the 65<sup>th</sup> UN General Assembly's resolution declaring 2012 as international year for 'sustainable energy for all' (UN, 2011). This resolution highlighted the importance of energy services that have a profound effect on productivity, health, education, climate change, food and water security, and communication services. It further said the lack of access to clean, affordable, and reliable energy hinders human, social, and economic development and is a major impediment to achieving the Millennium Development Goals. Politicians' and decision-makers' lack of understanding of energy insecurity in terms of inadequate and insufficient household and individual energy consumption could delay energy access to all. Thus, this study defined household energy security as the amount of energy needed to meet the basic needs of daily life of the individual and household in terms of cooking, lighting, washing/cleaning, warming/cooling the house.

The fundamental research questions of this study are (i) Who are the households facing energy insecurity in Cambodia? (ii) Does energy consumption insufficiently and inadequately of the household affect their welfare? (iii) Does empirical evidence using Cambodia data support the

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existing literatures? What should be the policy implications from the findings of this research? Thus, this study investigates the above research questions by using the 2015 Cambodia Socio-Economic Survey (CSES), and by defining household energy insecurity and determining how it impacts welfare of the households. The results will help formulate policy implications to strengthen the energy security of the households.

## Methods

The hypothesis is that household of energy insecurity is believed to substantially impact a households' welfare including food consumption, education, and health of the individual in the household. To investigate energy insecurity on households' welfare, two structural equations will be constructed. The right-hand side of the equation in the first structural equation uses the independent variable 'Energy Insecurity' explicitly as it will affect households' welfare. The second structural equation, the right-hand side variable 'Share of energy expenditure to total expenditure', is used to investigate the magnitude of impact. Thus, the model specification can be written as:

$$Welfare_i = \alpha_0 + \beta_1 Energy\ Insecurity_i + \beta_2 X_i + \beta_3 Rural_i + U_{i1} \quad Eq. (1)$$

$$Welfare_i = \alpha_0 + \beta_1 Share\ of\ Energy\ Expenditure_i + \beta_2 X_i + \beta_3 Rural_i + U_{i1} \quad Eq. (2)$$

The variable  $X_i$  is the set of exogenous variables representing the household's characteristics such as household's income, electricity access, electricity consumption per capita, education, and access to clean water. The variable  $Rural_i$  is the community characteristic if the household is residing in the rural or otherwise.

## Results

The results will confirm on (1) the impact of energy insecurity on welfare such as food consumption and education expenditure for the children; (2) The impact of a household's income on welfare such as food consumption and education expenditure for children; (3) The impact of household head's education on welfare such as food consumption and education's expenditure for children; (4) The impact of other household and community characteristics on welfare such as food consumption and education's expenditure for children:

## Conclusions

The findings could lead to confirm that energy insecurity has enormous negative impact on households and the human capital formation of the children. The above findings imply for policy implications and reform on policy towards welfare impacts due to energy insecurity of the households.