



Environment for Development

RESEARCH BRIEF

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Household electricity consumption inefficiency and poverty: Evidence from Ghana

Based on EfD Project MS-956: “Electricity consumption inefficiency and poverty: Evidence from Ghana” by Daniel Kwabena Twerefou, Jacob Opantu Abeney, Michael Toman, Priscilla Twumasi Baffour and Festus Ebo Turkson.

How inefficient are households in electricity consumption in Ghana, and how does inefficient electricity consumption affect poverty? Do risk preference, education, and sex significantly affect poverty among households in Ghana?

Key Messages

Improvements in household electricity consumption resulting from efficiency improvements have the potential to reduce household electricity expenditure, and consequently the level of poverty among households. However, little is known about the extent to which improvement in electricity consumption efficiency can reduce poverty. Our study finds that:

- A one percent improvement in electricity consumption efficiency by households reduces multidimensional poverty by about 9 percent.
- A one percent increase in household electricity consumption efficiency reduces consumption poverty by about 10 percent.
- In Ghana, male-headed households are more likely to be multi-dimensionally poor than female-headed households.
- Households that are willing to take risks to buy new electrical appliances are more able to reduce poverty than those who are not willing.
- In Ghana, education significantly reduces the probability of being poor.

We recommend that government strengthens policy choices to improve household electricity consumption efficiency through appliance star ratings and appliance rebate systems. Policy should also focus on increasing the level of education and awareness on energy efficiency to aid poverty reduction

Background and Methodology

In many Sub-Saharan African (SSA) countries, electricity demand among households has increased and is bound to increase with time because of population growth and continuous increase in rural electrification (IEA, 2022)¹. Governments of many of these countries, including Ghana, are implementing the Sustainable Energy for All initiative and Sustainable Development Goal Seven which seek to promote cost-effective means of sustainable energy supply. Poverty remains the main challenge to development in most African countries, making it difficult for communities to have a sustainable future. Until recently, the increase in electricity demand was met mainly through an increase in thermal generation, which pollutes the environment. Even with recent improvements, the share of renewable energy in the energy mix of African countries is very low (IEA, 2022). One way of meeting household energy demand and ensuring sustainability is to improve consumption efficiency. Efficient consumption of electricity has the potential to reduce poverty among households. Unfortunately, little attention has been paid to the extent to which efficiency improvements can aid poverty alleviation.

We conducted a household survey in three regions of Ghana: Greater Accra,

Ashanti, and Northern regions to represent the coastal, forest, and savannah zones, respectively. Following the sampling technique by the Ghana Statistical Service for the Ghana Living Standards Survey, we selected 81 enumeration areas consisting of 55 urban and 26 rural areas. A total of 1,580 households were surveyed, of which 1,109 fully completed responses were used in the estimation.

We estimated the level of consumption efficiency using energy demand frontier and employed Ordinary Least Squares (OLS) and probit models to estimate the impacts of electricity consumption efficiency on multidimensional and consumption poverty.

Results

Findings from the study indicate that a one percent increase in energy efficiency reduces multidimensional poverty by approximately 9 percentage points, while lower and upper consumption poverty, reduces by approximately 10 percent and 14 percent, respectively. Male-headed households are more likely to be multidimensionally poor than female-headed households. If households are willing to take risks to buy new electrical appliances, they may reduce their level of poverty. Increasing the level of education of the household head can aid in poverty alleviation.

¹ <https://www.iea.org/reports/africa-energy-outlook-2022/key-findings>

Policy Implications

We recommend that government enact policies that promote household electricity consumption efficiency. These may include appliance star ratings and appliance rebate systems. Additionally, government should increase the level of education and improve awareness of

energy efficiency as a way of alleviating poverty. Policymakers should also develop the appliance market to ensure that only quality and standardized products are made available. This will encourage households to patronize new appliances than second-hand ones, without fear of risk.

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