



Health Impact of Renewable Energy Use in Home Cooking on Rural Ethiopian Communities Over Time

Yared Ayana¹, Fasil Teklehaimanot², Mekdes Woldemariam³, Kassaye Assefa^{3,4}

¹ Department of Public Health, Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa

² Department of Epidemiology, Ethiopian Public Health Institute (EPHI)

³ Ethiopian Institute of Agricultural Research (EIAR)

⁴ Debre Markos University

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Correspondence: yayana@yahoo.com

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Author notes

Yared Ayana is affiliated with Department of Public Health, Africa Centers for Disease Control and Prevention (Africa CDC), Addis Ababa and focuses on Medicine research in Africa.

Fasil Teklehaimanot is affiliated with Department of Epidemiology, Ethiopian Public Health Institute (EPHI) and focuses on Medicine research in Africa.

Mekdes Woldemariam is affiliated with Ethiopian Institute of Agricultural Research (EIAR) and focuses on Medicine research in Africa.

Kassaye Assefa is affiliated with Debre Markos University and focuses on Medicine research in Africa.

Abstract

Rural Ethiopian communities predominantly rely on traditional biomass fuels for home cooking, leading to poor air quality and associated health issues. A longitudinal study employing a mixed-methods approach including baseline surveys, follow-up interviews, and air quality measurements over five years. Intervention groups receive solar cookers, control groups continue with traditional cooking methods. Solar cooker use was associated with a significant reduction in household particulate matter (PM_{2.5}) levels by up to 40% compared to baseline conditions, leading to an estimated 10% decrease in respiratory symptoms among intervention households over the study period. The transition from traditional biomass fuels to solar cookers demonstrated substantial health benefits and environmental improvements in rural Ethiopian communities. Policy makers should incentivize renewable energy adoption in rural areas, particularly focusing on improved access to solar technology for sustainable development goals. Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geography, Africa, Biomass, Fuel, Sustainability, LifeCycle, Ethiopia*

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