



Solar Panels and Water Supply in Rural Uganda: Economic and Health Impacts

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Abstract

Solar panels have been increasingly adopted in rural areas as a sustainable energy solution. In Uganda, where access to clean water and reliable electricity is limited, integrating solar power with water supply systems presents an opportunity for improving both economic and health outcomes. A mixed-method approach combining quantitative data on financial and usage patterns with qualitative feedback from villagers was employed. Data collection involved surveys, interviews, and direct observations over a year. Solar panel systems provided an average of 80% reduction in operational costs for water supply compared to traditional diesel generators. Users reported a preference for solar panels due to their reliability and minimal maintenance needs (92%). The deployment of solar panels for water supply significantly reduced financial burdens and enhanced user satisfaction, demonstrating potential as an innovative solution in rural Ugandan settings. Further research should be conducted to assess scalability and cost-effectiveness across different socio-economic contexts. Policy recommendations include incentives for adopting renewable energy technologies in water supply systems. Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Uganda, Geographic Information Systems (GIS), Remote Sensing, Sustainable Development, Community Health Assessment, Photovoltaic Systems, Water Quality Analysis*

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