



Solar-Powered Water Supply Systems in Ethiopian Rural Villages: Energy Access and Livelihood Impacts

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Abstract

Solar-powered water supply systems (SWSSs) have emerged as a critical solution for rural communities in Ethiopia, addressing both energy access and livelihood challenges. A comprehensive search strategy was employed across multiple databases, including Scopus and Web of Science, focusing on articles published between and . Studies were included if they reported data from Ethiopia and analysed SWSSs' effects on energy access or livelihood outcomes using quantitative methods. SWSSs in rural Ethiopian villages have led to a significant increase of at least 40% in household electricity generation compared to pre-SWSS levels, with notable improvements in lighting and basic electrical appliances use. The review underscores the transformative potential of SWSSs for enhancing energy access and fostering economic development in Ethiopia's rural areas. Policy makers should prioritise investment in SWSS infrastructure and support community initiatives to maximise benefits from these systems. The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sudanic, Renewable Energy, Sustainability, Photovoltaics, Rural Development, Access Studies, Livelihood Analysis*

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