

Impacts of electrification under the perspective of the Multi-Tier-Framework in Southern Tanzania

Annika Groth
Interdisciplinary Institute for Environmental-, Social- and Human Studies
Department Energy and Environmental Management
Europa Universität Flensburg, Germany
e-mail: annika.groth@uni-flensburg.de

ABSTRACT

Off-grid areas in many African countries do not necessarily lack access to electricity. In the last decade, energy technologies based on solar power achieved higher penetration rates, also in rural areas of Sub-Saharan Africa. This “pre-grid-electrification status” needs to be reflected in research on rural electrification and its impacts on socio-economic conditions. Nevertheless, many studies in the field still focus on the effects of having or not having access to grid-electricity. Taking into account the Multi-Tier-Framework (MTF) by the World Bank electricity access is no longer a binary metric. This study strives to fill this gap and compares households in villages that are electrified by a hydro power based and main grid-connected mini-grid system with households in villages having no connection to grid-electricity but access to solar powered electricity in the Southern Tanzanian Region.

In the focus of this paper are mean lighting and lumen hours per day consumed per household in grid-electrified and not yet grid-electrified areas. Lighting is one of the most important intermediary outcomes of electricity through which households can benefit in many fields. In contrast to absolute hours of lighting consumed per day, lumen hours can be seen as an indicator of quality of lighting, one of the criteria in the Multi-Tier Approach.

Propensity Score Matching Method is applied to identify treatment and control group. As has been expected, lighting and lumen hours consumed by households in grid-connected areas are significantly higher. However, the analysis underlines the importance of interconnected systems supporting the reliability of electricity access, which is also acknowledged in the MTF and crucial for productive uses. Additionally, fertile ground for further research is identified.

KEYWORDS

Interconnected energy systems; Electricity access; Multi-tier framework; Propensity score matching; Sub-Saharan Africa