

Beyond Access: Understanding Productive Use of Electricity in Rural Nigerian Communities

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Abstract

Rural electrification programs across Sub-Saharan Africa focus on expanding access. Limited evidence exists on how households use electricity for productive purposes. This study examines household-level patterns of productive electricity use in rural Nigeria, surveying 249 households across two communities: Gbamu-Gbamu (with a recently defunct solar mini-grid) and Ila-Orangun (grid-connected).

Despite an 86.7% electrification rate, only 31.5% of electrified households engage in productive electricity use, revealing an access–utilization gap. Productive users generally have higher education levels, higher incomes, and better infrastructure. Unreliable supply emerges as the primary barrier (62% of non-adopters), followed by cost and equipment affordability.

Households engaged in multiple productive activities report better economic outcomes than those engaged in single activity, suggesting that the depth of engagement matters more than simple adoption rates. In Gbamu-Gbamu, where the mini-grid collapsed, 97% of households adapted to alternative energy sources, however productive use fell to 15%, less than half the rate observed in the grid-connected community. This underscores that decentralized alternatives *cannot* fully substitute for a reliable centralized supply. Findings from this study highlight the need for rural electrification programs to move beyond access metrics and prioritize reliability, affordability, and maintenance systems that enable sustained productive use and equitable economic participation.