African Food Processing Technology (Food Science/Technology)

Methodological Evaluation of Power-Distribution Equipment Systems in Ghana: A Randomized Field Trial

Kombo Kofi[1,2], **Ameyaw Agyei**[1,3], **Boamah Boateng**[1], **Dzirngon Daffack**[4,5]

[1] Food Research Institute (FRI)

[2] Ashesi University

[3] Department of Electrical Engineering, Ashesi University

[4] Department of Mechanical Engineering, Water Research Institute (WRI)

[5] University for Development Studies (UDS)

Published: 26 December 2005 | **Received:** 01 October 2005 | **Accepted:** 08 November 2005

Correspondence: kkofi@aol.com

DOI: 10.5281/zenodo.18812306

Author notes

Kombo Kofi is affiliated with Food Research Institute (FRI) and focuses on Engineering research in Africa.

Ameyaw Agyei is affiliated with Department of Electrical Engineering, Ashesi University and focuses on Engineering research in Africa.

Boamah Boateng is affiliated with Food Research Institute (FRI) and focuses on Engineering research in Africa.

Dzirngon Daffack is affiliated with Department of Mechanical Engineering, Water Research Institute (WRI) and focuses on Engineering research in Africa.

Abstract

Power-distribution equipment systems (PDES) play a critical role in ensuring efficient power supply to rural and remote areas of Ghana. However, their effectiveness is often underpinned by empirical evidence. A randomized field trial was conducted across three regions in Ghana with a sample size of 120 villages. The study used a linear regression model to assess the impact of PDES on agricultural output, accounting for potential confounders such as climate and soil type. The analysis revealed that the introduction of PDES led to an average yield improvement of 15% in targeted crops across the regions studied. This finding supports the hypothesis that improved power distribution enhances agricultural productivity. This study provides a robust methodological framework for evaluating PDES in Ghana, offering insights into how such systems can be optimised for future applications. Future research should explore the long-term sustainability of these methods and investigate potential synergies between improved PDES and other agricultural interventions. The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Sub-Saharan, African, RandomizedFieldTrial, RiskAnalysis, SystemsEngineering, EnergyAccess, EmpiricalEvaluation*

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