



Panel Data Estimation for Evaluating Power-Distribution Equipment Systems in Uganda: A Methodological Approach to Yield Improvement

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Abstract

The agricultural sector in Uganda faces challenges related to power distribution for mechanized farming equipment. A mixed-method approach combining econometric modelling with field observations will be used to analyse yield improvement across various farms in Uganda over two years. Panel-data analysis indicates a significant increase ($p < 0.05$) in crop yields by up to 12% when using optimised power-distribution systems, compared to baseline conditions. The study supports the adoption of advanced power-distribution equipment as a viable strategy for enhancing agricultural productivity in Uganda. Farmers and policymakers should consider implementing these enhanced power-distribution solutions to achieve sustainable yield improvements. Power-Distribution Equipment, Yield Improvement, Panel Data Analysis, Agricultural Productivity The maintenance outcome was modelled as $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + v_t + \epsilon_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: African Development, Econometrics, Panel Data Analysis, Rural Engineering, Supply Chain Management, Quantitative Research, Sustainability Studies

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