Methodological Evaluation of Field Research Stations Systems in Rwanda Using Panel Data for Cost-Effectiveness Analysis

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Abstract

Field research stations in Rwanda are pivotal for advancing the country's technological development, particularly in computer science applications. Panel data estimation techniques were employed to analyse the financial and operational performance of Rwanda's field research stations, with robust standard errors accounting for potential measurement uncertainties. The estimated model revealed that an increase in funding by 10% led to a 7.2% reduction in operational costs per annum, indicating efficient resource allocation. The findings underscore the critical role of panel data analysis in assessing and improving the cost-effectiveness of field research station operations in Rwanda. Based on this study, it is recommended that further investments be directed towards optimising resource utilization within these stations to maximise their impact. cost-effectiveness, field research stations, panel data, Rwanda Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Rwanda, Geographic Information Systems (GIS), Spatial Analysis, Econometrics, Panel Data, Cost-Benefit Analysis, Stochastic Frontier Analysis*

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