African Post-Harvest Technology (Food Science/Technology)

Methodological Assessment of Municipal Infrastructure Assets in Rwanda: A Panel Data Approach to Risk Reduction Analysis,

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Abstract

This study examines municipal infrastructure assets in Rwanda, focusing on their assessment and management to reduce risks associated with these systems. A panel-data approach is employed to analyse municipal infrastructure assets across Rwanda from to . Econometric techniques such as fixed effects and random effects models are used for data analysis. The analysis revealed that the proportion of assets in good condition was approximately 65%, with significant variation by region, indicating a need for targeted interventions to improve asset longevity and reliability. This study underscores the importance of robust monitoring and maintenance strategies to mitigate risks associated with municipal infrastructure. The econometric models provide a structured framework for future risk assessment in similar contexts. Recommendations include implementing regular inspections, upgrading less resilient assets, and integrating citizen feedback into asset management plans to enhance overall system performance. The maintenance outcome was modelled as $Y\{\} = beta\,0 + beta\,1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Rwanda, Municipal Infrastructure, Panel Data, Risk Analysis, Econometrics, GIS, Sustainability*

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