Evaluating Waste Management Practices within the Circular Economy Paradigm in South African Municipalities: A Methodological Approach

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Abstract

The circular economy aims to minimise waste by promoting reuse, recycling, and reducing resource consumption. In South Africa, municipal waste management is crucial but often inefficient. A combination of quantitative surveys and qualitative interviews will be employed to assess recycling rates and public engagement with circular economy initiatives. Statistical analysis will include logistic regression models for predicting recycling behaviour based on demographic factors. Recycling rates varied significantly across municipalities, ranging from 15% to 40%, with urban areas generally showing higher participation than rural ones. Interviews revealed mixed perceptions of circular economy benefits among the public. The study highlights disparities in waste management performance and identifies a need for targeted educational campaigns to enhance recycling rates. Municipalities should implement tailored strategies based on local data, including community engagement programmes and improved infrastructure for recycling facilities. The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sustainability, Geographical Indicators, Geographic Information Systems, Waste Streams Analysis, Life Cycle Assessment, Resource Productivity, Participatory Planning*

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