



# A Multilevel Regression Framework for Methodological Evaluation of Manufacturing Plants Efficiency in Nigerian Agribusiness Systems

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## Abstract

In Nigeria, agribusiness systems often face challenges in optimising manufacturing plant efficiency due to varying operational conditions and resource availability. The proposed framework will utilise multilevel regression analysis to account for both within- and level variations in plant productivity data. The model incorporates fixed effects at various hierarchical levels (e.g., individual plants, farms, regional markets) to capture nuanced relationships. The proposed framework offers a structured approach for methodological evaluation of manufacturing plants in Nigerian agribusiness systems, providing insights into the key drivers of efficiency and facilitating targeted policy interventions. Future research should validate this model using empirical data from diverse agribusiness settings to enhance its applicability and robustness. Policymakers could leverage these findings to design more effective support programmes for manufacturing plants in Nigeria. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *African, agribusiness, multilevel, regression, productivity, efficiency, constraints*

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