



Reliability Evaluation of Field Research Stations in Tanzania: A Randomized Trial Approach

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Abstract

Field research stations play a crucial role in agricultural development, particularly in resource-limited settings such as Tanzania. The reliability of these stations is essential for ensuring accurate and consistent data collection. A randomized field trial was conducted to assess the reliability of eight selected research stations. Data were collected over two growing seasons and analysed using a mixed-effects model (lmer) to account for potential site-to-site variability. The analysis revealed significant variation in system performance across different sites, with some stations showing higher reliability than others. Specifically, Station B demonstrated an average yield increase of 15% compared to the baseline. This study provides valuable insights into the reliability of field research stations in Tanzania and highlights the need for site-specific improvements to enhance data consistency and validity. Investment should be prioritised in improving infrastructure and training at sites identified as less reliable, particularly Station B, which showed promise in increasing yield. Field Research Stations, Reliability Assessment, Mixed-Effects Model, Randomized Trial The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: African, Reliability, Methodology, Randomized, Trial, Evaluation, Station, Systems

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