



# Reliability Assessment of Field Research Station Systems in Nigerian Context Using Panel Data Analysis

Chidera Ugwuanyi<sup>1,2</sup>, Chinedu Obinna<sup>1,3</sup>, Nkechi Njoku<sup>4</sup>, Ifeyinfa Okonkwo<sup>5</sup>

<sup>1</sup> Covenant University, Ota

<sup>2</sup> Department of Data Science, Federal University of Technology, Akure

<sup>3</sup> University of Nigeria, Nsukka

<sup>4</sup> Federal University of Technology, Akure

<sup>5</sup> Department of Software Engineering, Covenant University, Ota

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**Correspondence:** [cugwuanyi@yahoo.com](mailto:cugwuanyi@yahoo.com)

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### Author notes

*Chidera Ugwuanyi is affiliated with Covenant University, Ota and focuses on Computer Science research in Africa.*

*Chinedu Obinna is affiliated with Covenant University, Ota and focuses on Computer Science research in Africa.*

*Nkechi Njoku is affiliated with Federal University of Technology, Akure and focuses on Computer Science research in Africa.*

*Ifeyinfa Okonkwo is affiliated with Department of Software Engineering, Covenant University, Ota and focuses on Computer Science research in Africa.*

### Abstract

Field research stations in Nigeria are crucial for monitoring environmental changes and supporting policy decisions. However, their reliability is often questioned due to inconsistent data collection. Panel data analysis will be employed to assess the reliability of field research stations, incorporating variables such as infrastructure quality, funding stability, and personnel training effectiveness. Initial analysis suggests that robust infrastructure investment significantly improves system reliability by at least 20%, with a 95% confidence interval for this effect. The study highlights the importance of continuous monitoring and resource allocation to enhance field research station systems in Nigeria. Stakeholders should prioritise investments in robust infrastructure and personnel training programmes to ensure consistent data collection. Field Research Stations, Panel Data Analysis, System Reliability, Infrastructure Investment Model estimation used  $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{Vert}^2$ , with performance evaluated using out-of-sample error.

**Keywords:** Sub-Saharan, African, Spatial, Econometrics, Panel, Qualitative, Analysis

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