African Computer Engineering

Enhanced Water Harvesting Systems Adoption and Yield Analysis in Southwest Nigeria: A Replication Study

Oluwaseyi Adebayo[1], **Biyi Olayinka**[2]

[1] Department of Data Science, Babcock University

[2] Department of Software Engineering, University of Nigeria, Nsukka

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Correspondence: oadebayo@yahoo.com

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Author notes

Oluwaseyi Adebayo is affiliated with Department of Data Science, Babcock University and focuses on Computer Science research in Africa.

Biyi Olayinka is affiliated with Department of Software Engineering, University of Nigeria, Nsukka and focuses on Computer Science research in Africa.

Abstract

{ "background": "Enhanced water harvesting systems (EWS) are increasingly recognised as a critical component in ensuring food security, particularly in arid and semi-arid regions of sub-Saharan Africa. In Southwest Nigeria, where rainfall variability is high, EWS have shown promise in mitigating water scarcity issues faced by smallholder farmers.", "purposeandobjectives": "The purpose of this replication study is to replicate the findings from an earlier study on EWS adoption rates and their impact on crop yields among smallholder farmers in Southwest Nigeria. The objectives are to validate previous results, explore potential variations in outcomes across different geographical regions, and provide a robust analysis framework for future research.", "methodology": "The methodology employed in this replication study is consistent with the original study, utilising survey data collected from EWS beneficiaries in two local government areas of Southwest Nigeria. The sample size includes 300 farmers who have adopted at least one form of EWS technology over a five-year period. Data analysis was conducted using logistic regression and linear mixed models to estimate adoption rates and yield changes respectively.", "findings": "A notable finding from this replication study is that the adjusted odds ratio for adopting EWS technologies among surveyed farmers (0.85, CI: 0.73-0.99) suggests a slight reduction in adoption compared to the original study, indicating potential variations in regional acceptance rates. In terms of yield increases, an average linear mixed model revealed a significant increase in crop yields by 12% with EWS application, but with substantial variability across different crops and seasons.", "conclusion": "This replication study confirms the efficacy of enhanced water harvesting systems in improving agricultural productivity among smallholder farmers in Southwest Nigeria. The findings emphasise the importance of contextualizing EWS adoption rates to understand regional variations better.", "recommendations": "Future research should consider additional factors such as socio-economic conditions, climate variability, and technological advancements that might influence EWS adoption and yield outcomes. Policy makers could benefit from these insights to design more effective interventions aimed at Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

Keywords: *African, GIS, Methodology, Quantitative, Sustainability, Water Management, Yield Analysis*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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