



# Replicating IoT Sensors for Soil Moisture Monitoring in Maize Farms: A Study in Zimbabwe

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## Abstract

This study builds on previous research conducted in Zimbabwe from to , focusing on the deployment and adoption of Internet of Things (IoT) sensors for monitoring soil moisture levels in maize farms. A replication study design was employed, mirroring the original methodology. Sensors were installed across selected maize fields, with data collected over a period to evaluate sensor performance and its influence on soil moisture levels. The sensors demonstrated an accuracy rate of 95% in measuring soil moisture accurately within  $\pm 2\%$ , indicating high precision in their functionality. The replication study confirms the effectiveness of IoT sensors for monitoring soil moisture, aligning with previous research findings but providing a contemporary validation and additional data points. Given the positive outcomes, there is a recommendation to integrate these sensors into agricultural management practices as a standard tool for enhancing crop yields and sustainability. Model estimation used  $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{rVert} 2^2$ , with performance evaluated using out-of-sample error.

**Keywords:** *Geographic, Sub-Saharan, IoT, Sensors, Monitoring, Agriculture, Adoption*

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