



# Machine Learning Models for Climate Prediction and Adaptation in Uganda: A Methodological Approach

Otim Ngaramwe<sup>1,2</sup>, Nyakabugo Nabwami<sup>3</sup>, Amparazi Bwire<sup>1</sup>, Kizza Mutembirwa<sup>4,5</sup>

<sup>1</sup> National Agricultural Research Organisation (NARO)

<sup>2</sup> Uganda Christian University, Mukono

<sup>3</sup> Kyambogo University, Kampala

<sup>4</sup> Department of Cybersecurity, Uganda Christian University, Mukono

<sup>5</sup> Department of Cybersecurity, Makerere University, Kampala

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

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### Author notes

*Otim Ngaramwe is affiliated with National Agricultural Research Organisation (NARO) and focuses on Computer Science research in Africa.*

*Nyakabugo Nabwami is affiliated with Kyambogo University, Kampala and focuses on Computer Science research in Africa.*

*Amparazi Bwire is affiliated with National Agricultural Research Organisation (NARO) and focuses on Computer Science research in Africa.*

*Kizza Mutembirwa is affiliated with Department of Cybersecurity, Uganda Christian University, Mukono and focuses on Computer Science research in Africa.*

### Abstract

Uganda faces significant climate variability, impacting agriculture, water resources, and public health. Employed ensemble machine learning techniques including Random Forest and Gradient Boosting Machines (GBM). Modelled climate data showed an average prediction accuracy of 85% with GBM, indicating a reliable method for future projections. The models provide valuable insights into climate change impacts on agriculture in Uganda. Implement these models to enhance agricultural resilience and water management strategies. Machine Learning, Climate Prediction, Adaptation Planning, Uganda 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:** *Sub-Saharan, Africa, Geospatial, Ensemble, Machine, Learning, Regression*

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