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Past, Present and Future Climate Trends Under Varied Representative Concentration Pathways for a Sub-Humid Region in Uganda

by Anthony Egeru ^{1,*}, Bernard Barasa ², Josephine Nampijja ³, Aggrey Siya ⁴, Moses Tenywa Makooma ⁵ and Mwanjalolo Gilbert Jackson Majaliwa ³

¹ Department of Environmental Management, Makerere University, P.O. Box 7062 Kampala, Uganda

² Department of Geography and Social Studies, Kyambogo University, P.O. Box 1 Kyambogo, Kampala, Uganda

³ Department of Geography, Geoinformatics and Climatic Sciences, Makerere University, P.O. Box 7062 Kampala, Uganda

⁴ Department of Biosecurity, Ecosystems and Veterinary Public Health, Makerere University, P.O. Box 7062 Kampala, Uganda

⁵ Department of Agricultural Production, Makerere University, P.O. Box 7062 Kampala, Uganda

* Author to whom correspondence should be addressed.

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Abstract

Long-term trend analysis at local scale for rainfall and temperature is critical for detecting climate change patterns. This study analysed historical (1980–2009), near future (2010–2039), mid- (1940–2069) and end-century (2070–2099) rainfall and temperature over Karamoja sub-region. The Modern Era-Retrospective Analysis for Research and Applications (MERRA) daily climate data provided by the Agricultural Model Inter-comparison and Improvement Project (AgMIP) was used. The AgMIP delta method analysis protocol was used for an ensemble of 20 models under two representative concentration pathways (RCPs 4.5 and 8.5). Historical mean rainfall was 920.1 ± 118.9 mm and minimum, maximum and mean temperature were 16.8 ± 0.5 °C, 30.6 ± 0.4 °C and 32.0 ± 0.7 °C, respectively. Minimum temperature over the historical period significantly rose between 2000 and 2008. Near future rainfall varied by scenario with 1012.9 ± 146.3 mm and 997.5 ± 144.7 mm for RCP4.5 and RCP8.5 respectively; with a sharp rise predicted in 2017. In the mid-century, mean annual rainfall will be 1084.7 ± 137.4 mm and 1205.5 ± 164.9 mm under RCP4.5 and RCP8.5 respectively. The districts of Kaabong and Kotido are projected to experience low rainfall total under RCP4.5 (mid-century) and RCP8.5 (end-century). The minimum temperature is projected to increase by 1.8 °C (RCP4.5) and 2.1 °C (RCP8.5) in mid-century, and by 2.2 °C (RCP4.5) and 4.0 °C (RCP8.5) in end-century. [View Full-Text](#)

Keywords: climate change; trends analysis; temperature and precipitations; variability

