Climate Trends, Variability, and Impacts of El Niño-Southern Oscillation on Rainfall Amount in Ethiopia

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Abstract : In Ethiopia, agricultural production is predominantly rainfed. The El Niño Southern Oscillation (ENSO) is the driver of climate variability, which affects the agricultural production system in the country. This paper aims to study trends, variability of rainfall, and impacts of El Niño Southern Oscillation (ENSO) on rainfall amount. The study was carried out in Ethiopia's Western Amhara National Regional State, which features a variety of seasons that characterize the nation. Monthly rainfall data were collected from fifteen meteorological stations of Western Amhara. Selected El Niño and La Niña years were also extracted from National Oceanic and Atmospheric Administration (NOAA) from 1986 to 2015. Once the data quality was checked and inspected, the monthly rainfall data of the selected stations were arranged in Microsoft Excel Spreadsheet and analyzed using XLSTAT software. The coefficient of variation and the Mann-Kendall non-parametric statistical test was employed to analyze trends and variability of rainfall and temperature. The long-term recorded annual rainfall data indicated that there was an increasing trend from 1986 to 2015 insignificantly. The rainfall variability was less (Coefficient of Variation, CV = 8.6%); also, the mean monthly rainfall of Western Amhara decreased during El Niño years and increased during La Niña years, especially in the rainy season (IJAS) over 30 years. This finding will be useful to suggest possible adaptation strategies and efficient use of resources during planning and implementation.

Keywords : rainfall, Mann-Kendall test, El Niño, La Niña, Western Amhara, Ethiopia

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1

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