

Assessment of Rainfall Dynamics in the Hurulu Wewa Irrigation Scheme for Climate-Resilient Water Management

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Understanding rainfall variability is vital for managing water resources and sustaining agriculture in the dry zone of Sri Lanka, where water scarcity poses serious challenges to the farming communities. This study examines rainfall variability, its impact on water availability and agriculture within the Hurulu Wewa Irrigation Division located in the dry zone of Sri Lanka, using a 30-year dataset (1995 to 2024) of daily rainfall from three selected stations, namely Kahatagasdigiliya, Kaudulla, and Nachchaduwa. The analysis focused on spatial and temporal rainfall patterns under the hypothesis that the second half of the study period would exhibit a greater prevalence of positive rainfall anomalies compared to the first half, thereby resulting in less intense drought conditions. The study area includes the major Hurulu Wewa reservoir, several medium and minor tanks, and a key paddy-growing region. Results show that 72% of the study years recorded annual rainfall below 1,750 mm. Among the three stations, Kaudulla recorded the highest long-term average annual rainfall (1,494 mm), while Kahatagasdigiliya recorded the lowest (1,154 mm). Seasonal rainfall follows a unimodal pattern, with the dominant Maha season (September-March) and the much drier Yala season (April-August), emphasizing the critical role of storage tanks in sustaining agriculture during the dry months. The Rainfall Anomaly Index identified 38% of the study years as drier; however, the rejected null hypothesis demonstrated less intense drought conditions leading to a greater occurrence of wetter or near-normal years during the most recent 15 years. Furthermore, the analysis revealed a positive relationship between annual rainfall and the number of rainy days per year.

Keywords: Rainfall, Dry zone, Agriculture, Rainfall Anomaly Index, Dry and wet days

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