

Development of a Methodology to Assess Hydrological Drought: A study in Kantale Irrigation Scheme, Sri Lanka

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Hydrological drought occurs when there is a significant deficit in the availability of surface or groundwater resources. In river basins or watersheds with water storage facilities, reservoir water storage can be considered as an important indicator to assess the hydrological drought since it indicates the inflow, outflow and usage characteristics. This study introduces a refined methodology for assessment of hydrological drought and a distinct approach was employed to compute the magnitude of storage status of reservoir by making use of daily *Reservoir Active Available Water Storage Percentage* (RAAWSP). An assessment was conducted for the Kantale reservoir classified under major irrigation scheme in Trincomalee District in the Dry Zone of Sri Lanka. Reservoir daily storage, outflow and the nearby rainfall data were obtained from the Department of Irrigation, while Key Person Interviews (KPI) were conducted with irrigation officials to gain insights into the prevailing water management practices. Statistical analyses were carried out in Minitab 17 to test normality and examine the seasonal variability of the data series. The magnitude of storage status of reservoir was used to identify the hydrological drought seasons as validated against outflow and irrigation command area rainfall data. The estimated probabilities of hydrological drought occurrence during *Maha* and *Yala* seasons were 0.34 and 0.37, respectively for the assessment of 1995–2024 period and identified the presence of hidden hydrological drought, characterized by the availability of water in the reservoir that remain inaccessible for utilization for the beneficiaries due to the deficit of outflow. The study offers a new lens to understand the hydrological drought using management perspectives with the reservoir water balance.

Keywords: Reservoir, rainfall, seasonal variability, surface water

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