

# ASSESSMENT OF DRY/WET CONDITIONS USING METEOROLOGICAL AND HYDROLOGICAL DROUGHT INDICES IN *KIRINDI OYA* RIVER BASIN

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Drought and flood are considered major natural hazards affecting the economy and the environment worldwide. Assessment of historical, meteorological and hydrological drought is useful in monitoring and forecasting of drought and thereby in agricultural planning. This study was conducted to detect the changes in drought/flood events, dry/wet status, their frequencies and trends in the *Kirindi Oya* river basin in Sri Lanka using selected meteorological and hydrological drought indices. Standardized Precipitation Index (SPI), Percent of Normal (PON), and Deciles were used as meteorological drought indices and Streamflow Drought Index (SDI) was used as the hydrological drought index. These indices were assessed at 3, 6 and 12 month except Deciles where it was calculated only at annual scale. Meteorological drought indices were calculated for nine rain gauge stations and for the entire river basin while SDI was calculated for two streamflow gauge stations in the basin. The frequency of drought events was calculated using the SPI and trend of SPI was also determined using Mann-Kendall and Sen's slope estimator at 0.05, 0.1 significance. The relationship between SDI and SPI at annual scale was also examined using correlation and simple linear regression analysis. The results indicated that hydrological years 1989-90, 1991-92, 2000-01 and 2013-14 were drought years and 1997-98, 2006-07 and 2012-13 were wet years in *Kirindi Oya* river basin. The year 1991-92 was identified as a severe drought year. June to August and January to March were identified as dry months for the entire basin and for the all stations in the basin. The frequencies of being dry and wet at annual and April-September period are the same (16%) for the entire basin. However, significant negative trend of SPI (-0.055) during July-September indicates the increasing drying tendency of the entire basin during this period. 2000-01 and 2003-04 were identified as hydrological drought years for *Thanamalwila* and *Wellawaya* stations. A significant correlation between SPI and SDI ( $p < 0.05$ ) during January - March (0.729) and October-March (0.795) were detected and SDI for *Thanamalwila* and *Wellawaya* can be strongly predicted using the derived regression equations for the same periods using rainfall data.

**Keywords:** Drought, *Kirindi Oya* river basin, SPI, SDI, Deciles, Trend analysis