

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

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A study was conducted to detect the changes in dry/wet status, and their trends in *Kelani* riverbasin in Sri Lanka using Standardized Precipitation Index (SPI), Deciles, Consecutive dry days (CDD) and Consecutive wet days (CWD) as meteorological drought indices and Streamflow Drought Index (SDI) as a hydrological drought index. SPI and Deciles were calculated for rainfall at 16 rain gauge stations and for the entire river basin while SDI was calculated for streamflow at six streamflow gauge stations. Further CDD and CWD were calculated for rainfall at five rain gauge stations. The temporal trends of all these indices were determined using Mann - Kendall and Sen's slope estimator. The relationship between SDI and SPI was determined using correlation and regression analysis. The results of SPI and Deciles indicated that the hydrological years 1982-1983, 2000-2001, 2001-2002 and 2011-2012 were drought years and 1997-1998, 2005-2006, 2007-2008, 2009-2010 and 2012-2013 were wet years in *Kelani* river basin. According to the CDD and CWD for the entire basin the months December, January and February were identified as dry months while April to June and September to November were identified as wet months. Trends of CWD were not significant for any month at five rainfall stations. However, significant negative CDD trend at *Deraniyagala* station (-0.453) implies the wetting trend in December. Significant positive trend of SPI (+0.140) during October to September indicates the increasing wetness of *Kelani* river basin during that period. The year 2011-2012 was identified as a hydrological drought year for *Deraniyagala*, *Glencourse* and *Norwood* stations. Significant ($p < 0.05$) negative trend of SDI identified in three, six nine and twelve months' scales at *Deraniyagala*, *Glencourse* and *Hanwella* streamflow stations showed a drying tendency of streamflow of the basin. A significant correlation between SPI and SDI ($p < 0.05$) was observed only at *Kithulgala* station (0.277) during October to September. Significant positive trends of meteorological drought indices and negative trend of hydrological drought index (SDI) infer that there is an increasing extraction of water from streams of *Kelani* river basin. The results of this study may help for sustainable water management planning of *Kelani* river basin.

Keywords: Deciles, Drought, *Kelani* river basin, Standardized Precipitation Index, Streamflow Drought Index, Trend analysis