

Agricultural drought assessment using MODIS satellite data in Kurunegala District

B.G.N.N. Gamanayake, H.K. Kadupitiya and V.P.A. Weerasinghe*

Department of Zoology and Environmental Management, University of Kelaniya, Sri Lanka

*Corresponding author: primali@kln.ac.lk

Abstract

Drought is a climatic anomaly characterized by long spell scarcity of water. Agricultural drought is usually defined by less availability of soil water to maintain crop and forage growth by the deficiency of normal precipitation over an identified period of time. Since drought is a creeping phenomenon which appears slowly and resulting web of impacts not only to agriculture but also for all other aspects, monitoring, forecasting, evaluating impact and proposing solutions to drought hit areas are challenging than other disasters. Distinct to point observations of ground data, remote sensing provides direct spatial information on vegetation stress that occur due to drought conditions. This facilitates the utilization of time series Vegetation Indices derived using time series satellite data for continuous monitoring of vegetation conditions and tracking drought occurrences.

MOD13Q1 (250m, 16-day) satellite images, which contain NDVI (Normalized Difference Vegetation Index), were used in this study and Vegetation Condition Index (VCI) was calculated using ENVI 4.5 Remote Sensing software for agricultural drought monitoring in Kurunegala District during the year 2000-2015. Spatial variability of drought frequencies was evaluated and mapped using ILWIS 3.4 free software. Map accuracy was assessed using actual drought data available for Kurunegala district in the database of Disaster Management Center. According to the results, North and North-West parts of Kurunegala District were identified as severe agricultural drought prone areas. In order to enhance the accuracy, water mask was recommended.

Keywords: Agricultural drought, MODIS, NDVI, VCI, Kurunegala District