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Normalized difference vegetation index (NDVI) associated with plant height and leaf area index of sugarcane (*Saccharum* spp. Hybrid)

L.M.J.R. Wijayawardhana[1*], K.D.N. Weerasinghe[2] and C.M. Navaratne[2]

[1]Sugarcane Research Institute, Udawalawe, Sri Lanka
[2]Faculty of Agriculture, University of Ruhuna, Sri Lanka

Abstract
Plant height and leaf area index are two parameters commonly used in crop growth monitoring to assess yield expectations and monitor crop health. Recording of in-situ data on plant height and leaf area index by direct methods is difficult due to cost, time consumption and skilled labor requirements. This problem is critical for large-scale sugar cane plantations. Therefore, indirect methods are introduced to alleviate this situation. Current study used free satellite data available to develop a mathematical model to simulate plant height and LAI in Sri Lankan rain-fed sugarcane plantations. Two regression medals for predicting the plant height and leaf area index of sugarcane crops were developed. Sentinel-2 Level 2A (L2A) data and crop growth data of the sugarcane plantation sites in Sevanagala, Sri Lanka for two consecutive sugarcane crop cycles during 2018 to 2020 were used for the analysis. The regression model developed for plant height simulation and leaf area index had satisfied agreement with the actual data. The index of agreement values between the actual and simulated data of plant height and LAI were 0.71 and 0.66, respectively. The two models could be recommended as rapid and low-cost method compared to direct or manual method in estimating sugarcane plant height and the leaf area index for large scale rain-fed sugarcane plantations.

Keywords: Leaf area index, NDVI, Remote sensing, Sugarcane

[*]***Corresponding Author:*** lmjrw@yahoo.com