Hyperspectral Vegetation Indices for Predicting Leaf Area Index (LAI) of Rice : Modeling and Validation

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Abstract:

Monitoring the distribution and changes Leaf Area Index (LAI) is important for assessing growth and vigour vegetation. Direct measurement of LAI is labor intensive, impractical at large scales. Using hyperspectral remote sensing LAI can assess efficiency for large scale. Estimation Leaf Area Index of rice using hyperspectral data need special algorithm for the great accuracy. Our objective of this research was developed spectral in situ and LAI in situ to make model of LAI for remote sensing hyperspesctral. Spectral in situ is measured using field spectrometer and LAI in situ is measured using LAI-Li Cor 2000.

In this paper, a set of vegetation indices such as Renormalized difference vegetation index (RDVI), modified simple ratio (MSR) index , modified soil Adjusted Vegetation Index (MSAVI) and   Modified forms of Triangle Vegetation index (MTVI 1 and MTVI 2) were tested using regression model at different growth stage of rice. Then the most appropriate model were validated using airborne hyperspectral remote sensing.

The result showed that RDVI and MTVI 1 are most appropriate for estimation LAI of rice with high correlation coefficient R^2 of 0.90 with RMSE 0.63 and 0.89 with RMSE 0.68. The validation using airborne hyperspectral data with HyMap sensor given result correlation coefficient R^2 of 0.76 for RDVI and 0.75 for MTVI 1.

Key words: *LAI , Rice, Hyperspectral,*