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Measuring Leaf Area Index in Asian Rubber Plantations – A Challenge

Marc Cotter[1], Arisoa Rajaona[2], Sabine Stürz[1], Alexandra Schappert[1], Folkard Asch[1]

[1] *University of Hohenheim, Inst. of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), Germany*

[2] *Africa Rice Center (AfricaRice), Sustainable Productivity Enhancement, Madagascar*

Abstract

In order to estimate water use and water requirements of tropical plantations systems such as rubber it is adamant to have accurate information on leaf area development of the plantation as the main determinant of evapotranspiration. Literature commonly suggests a number of different methods on how to obtain leaf area index (LAI) information from rubber plantations. Methods include destructive measurements of leaf area at peak LAI, indirect methods such as gap fraction methods (i.e. Hemiview and LAI 2000) and radiation interception methods (i.e. SunScan) or litter fall traps. Published values for peak LAI in rubber plantation differ widely and show no clear trend to be explanained by management practices or the influence of local climate patterns.

This study compares four methods for determining LAI of rubber plantations of different ages in Xishuangbanna, Yunnan, PR China. We have tested indirect measurement techniques such as light absorbtion and gap fraction measurements and hemispherical image analysis against litterfall data in order to obtain insights into the reliabiliy of these measuring techniques for the use in rubber plantation systems. In addition, we have tested the applicability of available satellite based remote sensing data.

The results that we are going to present here clearly show that there is no consistent agreement between the different measurements. Site, time of the day, age of the trees and incoming radiation all had a significant effect on the results depending on the device or the method.

This renders the data published so far doubtful as to their accuracy and their usefulness in estimating evapotranspiration from rubber plantations and the induced environmental effects.

Keywords: Leaf area index, methods, rubber

Contact Address: Marc Cotter, University of Hohenheim, Inst. of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), Garbenstr. 13, 70599 Stuttgart, Germany, e-mail: Cotter@uni-hohenheim.de