

Comparison of Leaf Area Index measurements in rubber (*Hevea brasiliensis*) plantations and secondary rain forest in Xishuangbanna, China

Arisoa Rajaona*¹, Alexandra Schappert¹, Sabine Stürz¹, Kunfang Cao², Folkard Asch¹.

¹University of Hohenheim, Garbenstraße 13, 70599 Stuttgart, Germany

²Chinese Academy of Sciences, Xishuangbanna Tropical Botanical Garden / College of Forestry, Guangxi University, China

* arajaona@uni-hohenheim.de

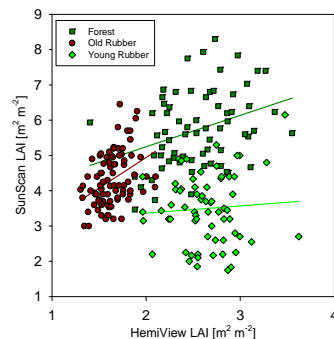
Introduction

Rubber trees (*Hevea brasiliensis*), which are considered as huge water consumers, have replaced most of the forests in Xishuangbanna, Yunnan, China. Leaf area index (LAI) is a key parameter in ecophysiology for up-scaling gas exchange from leaf to canopy level, for quantifying water loss by evapotranspiration, and for describing dynamics of the canopy and the related changes in microclimate. In order to assess the impact of the land-use change in Xishuangbanna on the local and regional water balance, precise LAI measurement in forests and rubber plantations are needed. Many methods have been developed to quantify LAI, and it is crucial to select the most appropriate technique.

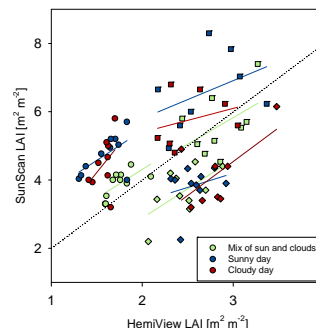
Conclusions

- HemiView generally generates lower but better spread of values than SunScan.
- Measured LAI varies between devices, stand density and weather conditions.
- Validation of the measured values using a destructive method is needed.

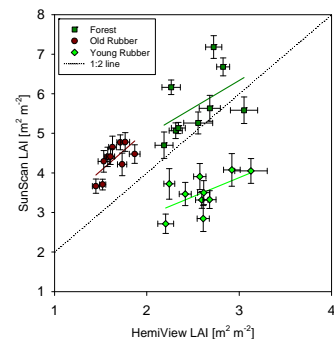
Results and Discussion



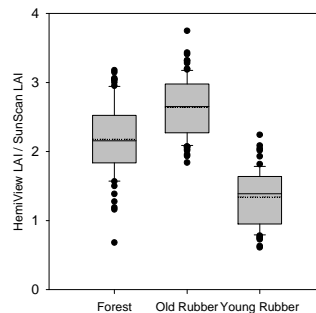
- Relationship between measurements depends on stand measured.
- HemiView generally generates lower values than SunScan.



- Within the potential ranges of measurements, HemiView sometimes provides a better spread of values.
- If there is a wide spread of SunScan values, HemiView shows a similar pattern.
- **Favourable weather condition for HemiView and SunScan, Covered sky: SunScan measurements have a larger range, Sunny day: HemiView measurements have a larger range.**



- Differences in stand density are captured by both methods in old rubber and forest, but not in young rubber stands.



- Potential correction factor between HemiView and SunScan values depends on the type of stand, the density of the foliage and the weather properties.

Materials and Methods

Location: Menglun, Xishuangbanna, Yunnan, China

Experimental period: April – July 2014

Plant material: Young (13 years old) and mature (22 years old) rubber plantations and a secondary rain forest

Measurements:

- 8 to 9 measurement days under different weather conditions
- Time of measurements: morning (09:00), mid-day (13:00) and afternoon (17:00)
- Points of measurement: 10 points across the plot (with consideration of positions across the slope)



Hemispherical photography method HemiView
Delta-T Devices Ltd, Cambridge, UK



Light absorption method SunScan
Delta-T Devices Ltd, Cambridge, UK