

Radiative transfer model inversion for measuring maize leaf area index (directly related to crop productivity)

Project Title: P1074 - Detection of maize foliar disease with airborne multi-spectral, hyper spectral and thermal sensors

Description of the innovation: This study compares maize leaf area index (LAI) retrieval methods based on radiative transfer models and machine learning techniques. Ground LAI was measured from the study field at different growth stages, where aerial hyperspectral images were acquired at the same stages.

New Innovation: Yes

Stage of innovation: Stage 2: successful piloting (PIL - end of piloting phase)

Innovation type: Biophysical Research

Geographic Scope: Global

Number of individual improved lines/varieties: <Not Applicable>

Description of Stage reached: Results showed that the PROSAIL-based model provided the highest R2 value between ground and estimated LAI followed by the RF and SVM where R2 values were 0.65, 0.59 and 0.35 respectively.

Name of lead organization/entity to take innovation to this stage: CIMMYT - Centro Internacional de Mejoramiento de Maíz y Trigo / International Maize and Wheat Improvement Center

Names of top five contributing organizations/entities to this stage:

- WCDI - Wageningen Center for Development Innovation

Milestones:

- Innovative tools, methods and multimedia extension materials to enhance soil quality, nutrient and water use efficiency

Sub-IDs:

- 45 - Increased capacity for innovations in partner research organizations
- 46 - Increased capacity for innovation in partner development organizations and in poor and vulnerable communities

Contributing Centers/PPA partners:

- CIMMYT - Centro Internacional de Mejoramiento de Maíz y Trigo / International Maize and Wheat Improvement Center

Evidence link:

- https://www.wageningenacademic.com/doi/10.3920/978-90-8686-916-9_41

Deliverables associated:

- D28084 - Radiative transfer model inversion using hyperspectral airborne imagery over maize farmers' fields (<https://tinyurl.com/2mxyaycw>)

Contributing CRPs/Platforms:

- Maize - Maize