

Parameterization and evaluation of the GRAMI model for simulation of soybean

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GRAMI is a simple crop model that uses remote sensing (RS) information and few crop growth specific parameters to simulate growth and yield of potential grain crops. This study aimed to extend GRAMI in simulating soybean (*Glycine max*) yield by determining crop parameters required for modeling. Field trials were conducted to calibrate and validate the model in Chonnam National University (CNU), Gwangju, South Korea in 2017-2018 under irrigated and rain-fed condition. Validation data was obtained from another field at CNU. The estimated parameters of radiation use efficiency (RUE), light extinction coefficient (k), and specific leaf area (SLA) were 1.65 g MJ⁻¹, 0.71, and 0.017 m² g⁻¹, respectively. The

GRAMI-soybean model was evaluated for its capability at simulating leaf area index (LAI), above-ground dry mass (AGDM), and yield based on integrating RS data. Simulated LAI and AGDM values agreed with the corresponding measured values with agreeable statistical accuracies and reasonable model efficiencies in both calibration and validation. The model combined with RS data simulated yields in agreement with the measured yields without significant differences in calibration ($p = 0.54$) or validation ($p = 0.92$). The study results demonstrate that the GRAMI-soybean model can reproduce soybean growth and yield using a simple input requirement and RS data.