

Article title	Improvement and Application of Agroecosystem Models: The DSSAT Experience
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Abstract	<p>The Decision Support System for Agrotechnology Transfer (DSSAT) originated in the 1980s as a decision support system based on a combination of common crop simulation models for cereals and legumes, including CERES-Wheat, CERES-Maize, SOYGRO, and PNUTGRO under a common shell and with a common data structure. These individual crop simulation models were later merged into the Cropping System Model (CSM) in order to allow for the simulation of the soil water, nitrogen, phosphorus, and soil organic matter using the same set of equations. In CSM, some of the crop individual modules were kept for the simulation of plant growth and development, such as CERES-Maize, CERES-Rice, CERES-Sorghum, and SUBSTOR-Potato, while the remaining models were combined into a generic module for grain legumes, referred to as CROPGRO. This module was later expanded to allow for the simulation of other crops such as cotton and tomatoes, using unique genetic data files as input. The CROPGRO module was also modified for the simulation of perennial forages. Based on the modular structure of CSM, new modules have been added, such as IXIM-Maize for maize, SAMUCA for sugarcane, and NWHEAT for wheat. In addition, new crops have been added as well, including safflower, sunflower, chia, quinoa, teff, and most recently strawberry, with other crops under development. Over time, the integration of the DSSAT crop models in different research projects has expanded at both temporal and spatial scales. This ranges from gene-based modeling with QTLs for plant breeding to global gridded modeling for climate change impact assessment and adaptation.</p>
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