

Category	: International Rice Research Conference
Select Theme	: Climate change and environmental sustainability
Endorsement email	:
Keyword 1	: Mitigation of climate change
Keyword 2	: Carbon and nitrogen cycles
Keyword 3	: Integrated risk assessment/management
Title of Entry	: Do existing crop models simulate soil processes adequately for soil health and climate change mitigation applications?
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Select only one type of presentation	: 15 minute oral presentation
Abstract	<p>: Crop modeling has become an indispensable tool in agricultural research and applications. However, like any other tools, if the users of the models are unaware of or ignore the limitations, then their applications may be questionable. Over the years at least 300 publications cite the various applications of the CERES-Rice model. In some cases, the model has been used for extreme temperature and drought stress simulations. The model predictions under these extreme conditions had not been verified with actual data until recently. Under AgMIP collaboration, the CERES-Rice and twelve other rice models have been calibrated and evaluated for extreme ranges of temperatures and water and nitrogen management from multi-location trials. The model ensemble comparisons have led to significant improvements in the capability of most models to predict crop development and growth processes. These improvements in the CERES-Rice model will be highlighted. However, the improvement in modeling soil processes has been lagging. With increasing interest in modeling, particularly among researchers in developing countries, the need to improve soil processes is critical. Application of models for sequestering carbon, predicting soil health parameters, and greenhouse gas mitigations are all dependent on the model's capability to reliably simulate soil processes that capture the effect of microbial functions on carbon and nitrogen cycles. Likewise, the effects of management on soil ecosystem functions are key issues affecting agriculture in vulnerable environments (degraded soils and climatic uncertainties). The progress on simulating C and N dynamics, including emissions of nitrous oxide and methane by the CERES-Rice model, is presented. Attempts to improve the model evaluation process by predicting readily accessible soil outputs, such as the Solvita test as a soil health index output, will be discussed.</p>

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