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Climate change impact on rice production in Musi river basin in Indonesia

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One of the major agricultural productions in Indonesia is rice production, on which negative climate change impact is anticipated. To assess the impact, simulating water budget and its effect on rice production is recommended. In this study, we developed a coupling model of hydrology and rice growth, and simulated rice yield under some GCM scenarios. After downscaling and bias-correcting GCMs, a hydrological model, the Water and Energy Budget-based Distributed Hydrological Model (WEB-DHM), simulated water flow and soil moisture content in total 60,000 km² of Musi river basin by 500 m-mesh. Each mesh was categorized such as rainfed rice, shrub and so on based on governmental land use map. Rice growth and yield was simulated by a model, Simulation Model for Rice Weather Relations for rainfed (SIMRIW-Rainfed) based on the weather and soil moisture by WEB-DHM. Weather data from 1985 to 2012 was used for model calibration and validation as the present climate. The simulated rice yield under present climate was well consistent with the statistical data for rice production. Decrease in rice yield was simulated in rainfed paddy fields due to drought. Rice yield in the future (2050-2065) was slightly increased under GCM scenario gfdl_cm2_0, but largely decreased under gfdl_cm2_1. Shift of rainy season is one of the reasons of large decrease under gfdl_cm2_1, change of planting time and duration is one of adaptive strategies.

Biography

Koki Homma is an Agronomist and Crop Physiologist. He graduated from Kyoto University, Japan, supervised by Professor Horie who simulated rice production under future climate conditions in Asia. One of his major activities is the investigation in farmers' fields to evaluate production constraints and climate change impacts in Southeast Asia.

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