Climate-smart agro-hydrological model for a large scale rice irrigation scheme in Malaysia

ABSTRACT

Agro-hydrological water management frameworks help to integrate expected planned management and expedite regulation of water allocation for agricultural production. Low production is not only due to the variability of available water during crop growing seasons, but also poor water management decisions. The Tanjung Karang Rice Irrigation Scheme in Malaysia has yet to model agro-hydrological systems for effective water distribution under climate change impacts. A climate-smart agro-hydrological model was developed using Excel-based Visual Basic for Applications (VBA) for adaptive irrigation and wise water resource management towards water security under new climate change realities. Daily climate variables for baseline (1976–2005) and future (2010–2099) periods were extracted from 10 global climate models (GCMs) under three Representative Concentration Pathway scenarios (RCP4.5, RCP6.0, and RCP8.5). The projected available water for supply to the scheme would noticeably decrease during the dry season. The water demand in the scheme will differ greatly during the months in future dry seasons, and the increase in effective rainfall during the wet season will compensate for the high dry season water demand. No irrigation will therefore be needed in the months of May and June. In order to improve water distribution, simulated flows from the model could be incorporated with appropriate cropping patterns.