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Climate change impacts on water footprint of rice production in Nam Oon irrigation project, Thailand

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limate change and global warming pose a significant threat to agriculture and global water security. The research investigates the effects of climate change on water footprint on rice production on Nam Oon irrigation project in Sakon Nakhon province of Thailand. Three rice cultivars, KDML 105, RD6 and ChaiNat-1, were considered in this study. KDML 105 and RD6 are the wet season (June-November) rice cultivars whereas ChaiNat-1 was used in the dry season (January-May). CERES-Rice crop growth model was used to simulate rice production which was set up and validated using yield data obtained from field experiments conducted in Sakon Nakhon province by Sakon Nakhon Rice Research Center during 2009-2014 for two cultivars KDML 105 and RD6 and yield data from 2011-2014 for cultivar ChaiNat-1. Present water footprint (green, blue and grey) of rice was then calculated in the irrigation project area. Climatic variations with main focus on temperature and precipitation were considered for the research. CERES-rice model was then fed with properly downscaled climate projections (RCP 4.5 and RCP 8.5 scenarios) from three RCMs (ACCESS-1, CSIRO-CCAM, MPI-ESM-LR), included within the board of the Intergovernmental Panel on Climate Change, IPCC. Under the worst, decreased precipitation and increased temperature, decreased crop yield and water footprint, especially blue, was increased for KDML 105 and RD6. This could be due to increased evapotranspiration, higher irrigation demand and lower final yield. On contrary, crop yield increased and also water footprint decreased for ChaiNat-1 under most likely increasing temperature and decreasing precipitation. A possibly increase of precipitation in the dry season (January to May) as predicted by most RCMs, may partly cover up for the increase in temperature, especially in April and May. Thus, there is decrease in water footprint for ChaiNat-1. This research provided insights as how one can: Evaluate the water requirement for rice cultivation or any other crops; and evaluate the impact of future climate on water footprint of rice production.

Biography

Ranju Chapagain is a Water Professional and has recently completed her Master's in Water Engineering and Management from Asian Institute, Thailand. Currently, she is working on Water Management.

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