

# Assessment of Climate Change Effects on the Rice Water Requirements for Hsin-Chu Irrigation Area in Taiwan

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Agriculture irrigation accounts for 70% of water use worldwide and is sensitive to climate change. There is strong evidence that climate change will influence the rainfall pattern and intensity, which will further increase possibility of droughts. The purpose of this study is to evaluate how changing temperature and rainfall condition affect the rice water requirements. In this study, Hsin-Chu irrigation area in northern Taiwan was chosen as a study case. The climate change related parameters used for calculation are sourced from the fifth Assessment Report (AR5) by the Intergovernmental Panel on Climate Change (IPCC). Representative Concentration Pathways (RCPs) are used to describe possible range of greenhouse gas concentration in the future. There are four statistical downscaling RCPs (RCP2.6, RCP4.5, RCP6.0 and RCP8.5) scenarios with four time periods (2021-2040, 2041-2060, 2061-2080 and 2081-2100) provided by the Taiwan Climate Change Projection and Information Platform (TCCIP). The CROPWAT model developed by the Food and Agriculture Organization of the United Nations (FAO) was used to quantify the rice water requirements with considering the changes in temperature and rainfall. With the worst-case scenario, RCP8.5, the calculation shows that average water requirements will increase by 5.16% in 2021-2040, 8.41% in 2041-2060, 11.14% in 2061-2080 and 15.74% in 2081-2100 for early rice while increase by 0.52% in 2021-2040, 1.86% in 2041-2060, 2.6% in 2061-2080 and 4.35% in 2081-2100 for late rice.

Keywords: Climate Change, RCP, Rice Water Requirements, CROPWAT

