Abstract

Global warming is a one of the most important natural hazard in the current world which could affect crop yields through affecting plant physiology, soil water balance and blue and green water requirement. Under such circumstances, achieving water and food security through an optimal usage of water resources and maintaining crop yield level requires measures for adapting with this major environmental challenge in the future periods. Since wheat, barley and their produces has the most important share in peoples' food diet, the climate change effect on wheat and barley's cropping calendar and their water requirement in Sistan and Baluchestan province was investigated in this research. Also, the influence of managing sowing date on diminishing the negative effects of this global event was assessed. After calibrating and validating LARS-WG, the climatic variables in six synoptic stations of Zabol, Zahedan, Iranshahr, Saravan, Khash and Chabahar were downscaled under three scenarios of A1B, A2 and B1 of HADCAM3 model up to 2100. Crop water requirement was calculated by determining suitable crop cultivation periods based on cardinal temperature and determining the length of initial, developing, mid-season and late-season stages based of growth degree day coefficient. Based on root mean squire error and model efficiency coefficient, LARS-WG was capable enough for simulating minimum and maximum temperature and precipitation. Climate change decrease the length of different growth stages by 1-20 days due to significant temperature increase which led to 0.03-42.7 percentage decrease in crop water requirement. Although delaying wheat and barley cultivation will intensify the climate change effects and shorten the growing period by 12-25 days, water requirement will increase by 1.27-778 M^3 ha^{-1}. Based on the results, the management of wheat and barley cultivation calendar can be effective way to achieve sustainable agriculture under future climate condition of the Sistan and Baluchestan province.

Keywords: Cultivation management, Global warming, HADCM3, LARS-WG model, Sustainable agriculture,

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