



University of Zabol

Graduate School

Faculty of Water and Soil

Department of Water Engineering

The Thesis Submitted for PhD Degree

(In the Field of Irrigation and Drainage)

**Prioritizing the cultivation of the agricultural crops and
analyzing the adaptation solutions to climate change in
Jiroft plain**

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Abstract

The occurrence of climate change can endanger the sustainability of irrigated agriculture by changing the amount of water needed and the components of plant growth in the existing cultivation pattern in the region. Therefore, it is necessary to propose possible solutions in order to adapt to this natural phenomenon in order to reduce its risks. For this reason, in the present study, while investigating the effects of global warming on water-product parameters in the common cultivation pattern in Jiroft region from 2041 to 2070, the effect of different adaptation scenarios on the change of these components in the future climate of the selected region was investigated. For this purpose, firstly, during two cropping seasons (96-97) and (97-98), potato, corn, wheat and canola plants were treatment with full and deficit irrigation at two levels of 75 and 50% in the region the mentioned was cultivated. Meteorological data were microscaled under different RCP scenarios. In the following, for twenty GCM models used in this research in selected scenarios, the values of crop yield, water use efficiency plants were obtained using the AquaCrop model. In the following, this model was used to investigate the simulation of the effect of different irrigation managements as adaptation scenarios. With climate change, it was defined with the aim of increasing the water use efficiency for each of the selected plants in the cultivation pattern. And finally, based on the obtained results, cultivation of selected crops in Jiroft region was prioritized in the base period and the future period. In the future period, the highest water use efficiency is related to the wheat plant and in the 50% water treatment, the water requirement under both RCP2.6 and RCP8.5 scenarios is 3.12 kg/m³ and the lowest is related to the canola plant in the 50% water treatment. The water requirement under both

mentioned scenarios was obtained as 1.35 kg/m³. Therefore, based on the water use efficiency in the future period, the priority of cultivation will be wheat, corn, potato and canola plants in Jiroft region. Also, according to the results of climate change, it is recommended to irrigate plants with 75% of the water requirement, considering the lower yield reduction and the higher water use efficiency in the future climate of Jiroft.

Keywords: cropping pattern, RCP release scenarios, water use efficiency, atmospheric general circulation models, AquaCrop plant model, irrigation management.