Abstract
Climate change is a significant change in mean temperature, precipitation, radiation and other parameters that continues for a decade or more. In the last 19th century we faced reduction of water resources and increasing consecutive dry years due to the changes in weather conditions. Since agricultural production play an important role in human life and 27% of water consumption in Moghan is related to the agricultural sector, So in this study, climate change effects on net irrigation requirements of potato, maize, wheat and cotton in Moghan plain is investigated. For this purpose, Parsabad meteorological data during the 1984-2009 were used. First, climate change detection for the study area was done by using statistical tests such as cumulative deviation, Mann-Kendall and Sen's slope estimator. Then available GCM models were reviewed. HadCM3-B2 and CGCM3-B2 were selected as suitable models for predicting temperature and precipitation in the 2014-2039, 2044-2069 and 2074-2099 periods for the study area. Global atmospheric general climate models have low spatial resolution and their outputs were downscaled at local level using two downscaling models named K-NN and SDSM. Trend test results showed annual rainfall had decreasing trend that is not significant in the calculated levels (90%, 95% and 99%). Annual maximum temperature at 99% significant level and annual minimum temperature at 95% significant level has shown an increasing trend. Potential evapotranspiration results showed that K-NN outputs are more similar to reality than SDSM in the warm months. After the calculation of net irrigation requirements with regard to the both downscaling methods in climate change and past conditions, continuous increasing of net irrigation requirements from 1984 until 2100 at initial and end planting stages was observed. Most increase in the net irrigation requirement of potato using K-NN and SDSM outputs has been observed in initial and end stages to the value of 22/3 and 53/8 mm by 2100. In the SDSM model, the net irrigation requirements of potato has been decreased at all stages of planting period in 2014-2039 compared to observed period. Increasing of net irrigation requirement in the future was observed at each period rather than past period. Similar results for other studied plants were obtained. According to research results, limitation of high consumed plants cultivation such as cotton and maize in this area is suggested. It is suggested that these plants remove gradually from the pattern of cultivation.

Keywords: Climate change, General circulation model, Moqan, Net irrigation requirement, Potato

University of Zabol
Graduate school
Faculty of Agriculture
Department of irrigation

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Supervisors:
Dr. Masoumeh Delbari
Dr. Shahab Araghinejad

Advisors:
Dr. Parviz Haghighatju

By:
Azadeh Ezani

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