

Abstract

Climate change causes changes in rainfall patterns, temperature and their amount, and these changes can affect the yield of crops. In this study, AquaCrop model was used to simulate grain yield and biomass of different maize genotypes and different soybean cultivars under the future climate in different irrigation treatments. For this purpose, rainfall data, minimum temperature, maximum temperature and sunshine model of the LARS-WG fine-scale model using six general circulation models (ADCM3, HadCM3, IPCM4, GFCM2, NCCCSM INCM3), for which Three scenarios The fourth report of the Climate Change Board (A1B, A2 and B1) was predicted and reviewed for the Moghan region in the years 1970-2010, 2011-2030 and 2046-2065. The results of the research showed that the HadCM3 model is the best option. AquaCrop model was calibrated and validated by field data (2015 and 2016 years), both corn and soybean plants collected in the area. Then, the grain and biomass yield values in the upcoming periods for different irrigation treatments (I1 = normal irrigation, I2 = irrigation cut off at vegetative growth stage, I3 = irrigation cut during flowering stage and I4 = irrigation cut off at the seed filling stage) Different maize hybrids (C1 = SC704, C2 = SC703 and C3 = SC705) and different cultivars of soybean (C1 = Williams, C2 = M9 and C3 = cultivar Zan) were simulated. According to the results, in the statistical period of 2011-2030 compared with the base period (1970-1999), the average monthly temperature was 1.41, 1.35, and 1.66 ° C, respectively, in the scenarios A1B, A2 and B1, the average monthly rainfall will be reduced to of 6, 11 and 15 mm, respectively, in the scenarios A1B, A2 and B1, and in the 2046-2065 period, compared to the period of 1979-2010, the monthly average of the temperature Will be increased to 2.9, 2.69 and 2.32 ° C, respectively, in scenarios A1B, A2 and B1. During this period, the amount of rain reduction was estimated at 18, 15 and 14 millimeters, respectively, in scenarios A1B, A2 and B1. The results of simulation of grain yield and total biomass of maize cultivars under the influence of irrigation administrations using AquaCrop model showed that the root mean square variables of seed and dry matter yield errors in the years 1394 and 1395 were 413 and 891 Kilograms per hectare. The root mean square mean of normalized error of seed and dry matter yield was 11 and 10%, respectively. In the case of corn using future meteorological data under different scenarios, climate change indicated that the increase in yields during the period (2011-2030) in

scenarios A2 and B1 was 6 and 11% respectively, and in the period (2046-2065) in A1B scenarios, A2 and B1 are 22, 12 and 18 percent respectively. Among the cultivars studied in this study, Hybrid SC704 corn had more growth and yield than other corn hybrids, and this figure could be recommended for future climate change in the Moghan area. The results of the evaluation of the AquaCrop model of soybean cultivars under irrigation management showed that root mean square error of seed and dry matter yields in the years 2015 and 2016 was 268 and 643 kg/ha, respectively. Root mean square root mean square error of normalized grain and dry matter yields were 13 and 11%, respectively. The results of the impact of climate change on soybean cultivars showed that the yield in the period (2011-2030) in scenarios A2 and B1 was 6% and 11%, respectively (2046-2065) in scenarios A1B, A2 and B1, respectively 22 , 12 and 18 percent increase. Among the cultivars studied in this study, Williams had more growth and yield than soybean cultivars compared to other soybean cultivars, and this figure could be used to modify the future climate in the Moghan region.

Keywords: Farm management, Grain yield, Irrigation cut, Precipitation, Sunshine



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