

## Abstract

Hydrology cycles in the river basin and available water resources in arid and semi-arid regions of the world are heavily influenced by climate change and excessive greenhouse gas emissions. In recent years, the rise in temperature due to the excessive emission of greenhouse gases has caused an abnormality in the global climate system. The purpose of this study was to investigate the effect of climate change on the outflow runoff of Kardeh watershed located in Khorasan Razavi province. To this end, the SWAT distribution model has been used to assess the effect of climate change on the hydrology of the Kardeh watershed. In this regard, this model is sensitive to land, weather and weather changes firstly, the SWAT Distributed Rain-Runoff Continuous Model was calibrated and validated for the period 1995-2015. In the following, the outcomes of the CIMP5 GCMs to assess under three scenarios of RCP8.5, RCP4.5, RCP 2.6 were used to evaluate the impacts of climate change on the runoff of the basin. In fact, to evaluate the impacts of climate change and global warming on basin hydrology, two parameters of precipitation and Temperature were used as the most important climatic parameters in three hydrometric stations, Maras and Ordak Band Sarvj. By introducing micro-scale climatic data by redrawing the SWAT model, the runoff outflow changes in the basin were simulated during the two 30-year periods of 2016-2045 and 2046-2075. The simulation results showed that, in addition to increasing the average minimum temperature and the maximum average rainfall, the increase will also increase in the future. In general, runoff increase has been affected by two climatological models of IPSL and GFDL in most months and in three models NORESM1, HADGEM, MIROC in winter and spring (November to late May) and in other seasons the amount of runoff decreases. In general, it can be stated that the climatic models studied under different scenarios of release after the implementation of the SWAT model were able to predict the runoff variations in the future period for the study basin. This study provides an overview of the water resources status in the region for use in water resource management projects.

**Key words:** Temperature, rainfall, climatic changes, general circulation models, runoff.



**University of Zabol**  
**Graduate School**  
**Faculty of Water and Soil**  
**Department of Range and Watershed Management**

**Thesis for Masters of Science**  
**In the field of Watershed Engineering**

**Assessment of Climate Change Impacts on Runoff of Kerdeh Dam**  
**Watershed.**

**Supervisor:**  
**Dr. Abdulhamid Dehvari**

**Advisors:**  
**Dr. Hadi Galavi**  
**Dr. Mahboubaeh Ebrahimian**

**By:**  
**Halime Salimi Rad**

**Spring 2019**