

Impact Assessment of Climate Change on Water Resources in the Kabul River Basin

Authors : Tayib Bromand, Keisuke Sato

Abstract : This paper presents the introduction to current water balance and climate change assessment in the Kabul river basin. The historical and future impacts of climate change on different components of water resources and hydrology in the Kabul river basin. The eastern part of Afghanistan, the Kabul river basin was chosen due to rapid population growth and land degradation to quantify the potential influence of Global Climate Change on its hydrodynamic characteristics. Lack of observed meteorological data was the main limitation of present research, few existed precipitation stations in the plain area of Kabul basin selected to compare with TRMM precipitation records, the result has been evaluated satisfactory based on regression and normal ratio methods. So the TRMM daily precipitation and NCEP temperature data set applied in the SWAT model to evaluate water balance for 2008 to 2012. Middle of the twenty - first century (2064) selected as the target period to assess impacts of climate change on hydrology aspects in the Kabul river basin. For this purpose three emission scenarios, A2, A1B and B1 and four GCMs, such as MIROC 3.2 (Med), CGCM 3.1 (T47), GFDL-CM2.0 and CNRM-CM3 have been selected, to estimate the future initial conditions of the proposed model. The outputs of the model compared and calibrated based on (R2) satisfactory. The assessed hydrodynamic characteristics and precipitation pattern. The results show that there will be significant impacts on precipitation pattern such as decreasing of snowfall in the mountainous area of the basin in the Winter season due to increasing of 2.9°C mean annual temperature and land degradation due to deforestation.

Keywords : climate change, emission scenarios, hydrological components, Kabul river basin, SWAT model

Conference Title : ICWRRED 2015 : International Conference on Water Resources and Renewable Energy Development

Conference Location : Osaka, Japan

Conference Dates : October 08-09, 2015