

Simulation of IWR Based on Different Climate Scenarios

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Abstract

Upper Chenab Canal (UCC) is a non-perennial canal in Punjab Province of Pakistan which provides irrigation water only in summer season. Winter and summer are two distinct cropping season with an average rainfall of about 161 mm and 700 mm respectively. Wheat-rice is common crop rotation being followed in the UCC command area. During winter season, groundwater and rainfall are the main sources of irrigation while canal and ground water is used to fulfil the crop water requirements (CWR) during summer. The objective of current study is to estimate how the irrigation water requirements (IWR) of the two crops are going to change under different conditions of temperature and rainfall. For this purpose, 12 different climatic scenarios were designed by combining the assumptions of three levels of temperature increase under dry, normal and wet conditions of rainfall. Weather records of 13 years (2000-2012) were obtained from PMD (Pakistan Meteorological Department) and CROPWAT model was used to simulate the IWR of the crops under normal and scenarios based climatic conditions. Both crops showed a maximum increase in CWR for temperature rise of +2°C i.e. 8.69% and 6% as compared to average. Maximum increment (4.1% and 17.51% respectively) in IWR for both wheat and rice was recorded when temperature rise of +2°C is coupled with dry rainfall conditions. March & April during winter and August & September during summer were the months with maximum irrigation requirements. Analysis also showed that no irrigation is needed for rice crop during May and June because of enough rainfall in this area.

Keywords: IWR, CROPWAT, Climate scenarios, Pakistan

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