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Assessing the impact of climate change upon hydrology and agriculture in the Indrawati Basin, Nepal.

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Agriculture is sensitive to climate change, especially to temperature and precipitation changes. The purpose of this study was to evaluate the climate change impacts upon rain-fed crops production in the Indrawati river basin, Nepal. The Soil and Water Assessment Tool SWAT model was used to model hydrology and cropping systems in the catchment, and to predict the influence of different climate change scenarios therein. Daily weather data collected from about 13 weather stations during 4 decades were used to constrain the SWAT model, and data from two hydrometric stations used to calibrate/validate it. Then management practices (crop calendar) were applied to specific Hydrological Response Units (HRUs) for the main crops of the region, rice, corn and wheat. Manual calibration of crop production was also carried, against values of crop yield in the area from literature. The calibrated and validated model was further applied to assess the impact of three future climate change scenarios (RCPs) upon the crop productivity in the region. Three climate models (GCMs) were adopted, each with three RCPs (2.5, 4.5, 8.5). Hence, impacts of climate change were assessed considering three time windows, namely a baseline period (1995-2004), the middle of century (2045-2054) and the end of century (2085-2094). For each GCM and RCP future hydrology and yield was compared to baseline scenario. The results displayed slightly modified hydrological cycle, and somewhat small variation in crop production, variable with models and RCPs, and for crop type, the largest being for wheat.

Keywords: Climate Change, Nepal, hydrological cycle, crop yield.