conferenceseries.com

Global Summit on ENVIRONMENTAL HEALTH

October 10-11, 2022 | Webinar

Evaluation of Future Streamflow in the Upper Part of the Nilwala River Basin (Sri Lanka) under Climate Change

Imiya Chathuranika

Sri Lanka Institute of Information Technology, China

Climate change is a serious and complex crisis that impacts humankind in different ways. It affects the availability of water resources, especially in the tropical regions of South Asia to a greater extent. However, the impact of climate change on water resources in Sri Lanka has been the least explored. Noteworthy, this is the first study in Sri Lanka that attempts to evaluate the impact of climate change in streamflow in a watershed located in the southern coastal belt of the island. The objective of this paper is to evaluate the climate change impact on streamflow of the Upper Nilwala River Basin (UNRB), Sri Lanka. In this study, the bias-corrected rainfall data from three Regional Climate Models (RCMs) under two Representative Concentration Pathways (RCPs): RCP4.5 and RCP8.5 were fed into the Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS) model to obtain future streamflow. Bias correction of future rainfall data in the Nilwala River Basin (NRB) was conducted using the Linear Scaling Method (LSM). Future precipitation was projected under three timelines: 2020s (2021–2047), 2050s (2048–2073), and 2080s (2074–2099) and was compared against the baseline period from 1980 to 2020. The ensemble mean annual precipitation in the NRB is expected to rise by 3.63%, 16.49%, and 12.82% under the RCP 4.5 emission scenario during the 2020s, 2050s, and 2080s, and 4.26%, 8.94%, and 18.04% under RCP 8.5 emission scenario during 2020s, 2050s and 2080s, respectively. The future annual streamflow of the UNRB is projected to increase by 59.30% and 65.79% under the ensemble RCP4.5 and RCP8.5 climate scenarios, respectively, when compared to the baseline scenario. In addition, the seasonal flows are also expected to increase for both RCPs for all seasons with an exception during the southwest monsoon season in the 2015–2042 period under the RCP4.5 emission scenario. In general, the results of the present study demonstrate that climate and streamflow of the NRB are expected to experience changes when compared to current climatic conditions. The results of the present study will be of major importance for river basin planners and government agencies to develop sustainable water management strategies and adaptation options to offset the negative impacts of future changes in climate.