PC-043

Assessment of Water Availability in the Ganges Basin inside Bangladesh using CORDEX Climate Projection

Md. Sazzad Hossain1,G M Tarekul Islam2 , AKM Saiful Islam2,Md.Mizanur Rahman3, Bijon Kumer Mitra4

1Sub-Divisional Engineer, Bangladesh Water Development Board, Dhaka, Bangladesh 2Professor, Institute of Water and Flood Management, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh 3Superintending Engineer, Bangladesh Water Development Board, Dhaka, Bangladesh 4Researcher, Institute for Global Environmental Strategies (IGES), Kanagawa, Japan

The southwest region of Bangladesh depends on the flow of the river Ganges and is facing various environmental problems like decrease in fresh water flow, saline water intrusion etc. due to decrease of the flow in the dry season. This study has assessed the future water availability and water demand in the Ganges basin inside Bangladesh under climate change scenarios using CORDEX Downscale Climate Projection data.

Assessment of climate induced long-term water availability in the Ganges basin inside Bangladesh have been computed using the Soil Water Assessment Tool (SWAT). Digital Elevation Model (DEM) of Shuttle Radar Topography Mission (SRTM), soil data of Food and Agriculture Organization (FAO), global land cover data from European Space Agency (ESA) have been used to set up the hydrological model. The Tropical Rainfall Measuring Mission (TRMM) rainfall product version 3B42V7 with spatial resolution 0.250 and temperature data from ERA interim by the European Center for Medium range Weather Forecasts have been used for calibration and validation of hydrological model. Relevant hydrological data like water level, discharge has been collected from Bangladesh Water Development Board. Regional Climate Downscale Data from CORDEX-South Asia has been used to assess the future water availability based on climate projection.

The model is calibrated and validated for periods of 1998 to 2008 and 2009 to 2014 respectively. The model performance is evaluated using several statistical parameters like Nash-Sutcliffe Efficiency (NSE), Coefficient of Determination (R2), percent bias, RMSE-observations standard deviation ratio (RSR). During the calibration period the NSE value is 0.93 and coefficient of determination is R2 0.97 whereas in validation period NSE value is 0.75 and coefficient of determination is R2 0.96. This calibrated and validated model has been simulated for the period of 2014-2040, 2041-2070 and 2071-2099 with one RCM (CCAM) output of CNRM-CM5 GCM model for scenarios RCP 4.5 and RCP 8.5. The model results show that the flow is likely to be increased for the months of April, May, June, and July for both the scenarios. On the other hand, model results show that the flow is likely to be deceased for the months of August, September and October for the second half of the century. At present, the model has been simulated with single RCM output, and model simulation is under process with other RCM results derived from GCM of ACCESS, CCSM, GFDL and MPI.