# ABSTRACT

Climate change has brought about changes in rainfall pattern around the globe including India. Changes in rainfall patterns alongside changes in land use have brought about significant variation in the runoff and soil erosion rates. Erosion rate has a direct impact on sediment yield. Estimation of change in sediment yield rates brought about due to impact of climate change is important for re-assessing the useful life of reservoir.

The present study aims to assess the impact of climate change on surface runoff and estimation of soil erosion in the catchment of Bisalpur Dam, Rajasthan. The study primarily involves 3 steps:

(1) Estimation of future rainfall in the catchment: This was done using four climate models namely (a) Australian Community Climate and Earth System Simulator (ACCESS) – Coupled Model (CM) – 2; (b) Beijing Climate Center (BCC)-Climate System Model (CSM)-2; (c) Institute for Numerical Mathematics(INM), Russia – CM4-8 & ; (d) Max Planck Institute (MPI), Germany – Earth System Model (ESM)1-2. Rainfall projections using 4 emission scenarios namely Shared Socioeconomic Pathways (SSP)1-2.6, (SSP)2-4.5, (SSP) 3-7.0 & (SSP) 5-8.5 were calculated for each of the 4 models in the study area.

Validation of historical rainfall series generated by these models with the actual observed historical rainfall data revealed that the past rainfall projections generated by BCC-CSM2 model under Scenario SSP2-4.5 closely resembles the actual rainfall occurring in the area of study in the past and thus future rainfall projections generated by this model has been used for the purpose of study.

(2) Estimation of surface runoff from the catchment: Natural Resources Conservation Services (NRCS) - Curve Number (CN), method which is based on water balance Equation has been used for estimation of surface runoff.

(3) Estimation of soil erosion from the catchment: Revised Universal Soil Loss Equation (RUSLE) developed by the United States Department of Agriculture (USDA) has been used to predict long-term annual averages for soil loss in the catchment of Bisalpur Dam.