

Evaluation of Flow Alteration under Climate Change Scenarios for Disaster Risk Management in Lower Mekong Basin: A Case Study in Prek Thnot River in Cambodia

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Abstract : Climate change is one of the major global challenges inducing disaster risks and threatening livelihoods and communities through adverse impacts on food and water security, ecosystems, and services. Prek Thnot River Basin of Cambodia is one of the largest tributaries in the Lower Mekong that has been exposed to hazards and disasters, particularly floods and is said to be the effect of climate change. Therefore, the assessment of precipitation and streamflow changes under the effect of climate change was proposed in this river basin using Soil Water Assessment Tool (SWAT) model and different flow indices under baseline (1997 to 2011) and climate change scenarios (RCP2.6 and RCP8.5 with three General Circulation Models (GCMs): GFDL, GISS, and IPSL) in two time-horizons: near future (the 2030s: 2021 to 2040) and medium future (2060s: 2051 to 2070). Both intensity and frequency indices compared with the historical extreme rainfall indices significantly change in the GFDL under the RCP8.5 for both 2030s and 2060s. The average rate change of Rx1day, Rx10day, SDII, and R20mm in the 2030s and 2060s of both RCP2.6 and RCP8.5 was found to increase in GFDL and decrease in both GISS and IPSL. The mean percentage change of the flow analyzed in the IHA tool (Group1) indicated that the flow in the Prek Thnot River increased in GFDL for both RCP2.6 and RCP8.5 in both 2030s and 2060s, oppositely in GISS, the flow decreases. Moreover, the IPSL affected the flow by increasing in five months (January, February, October, November, and December), and in the other seven months, the flow decreased accordingly. This study provides water resources managers and policymakers with a wide range of precipitation and water flow projections within the Prek Thnot River Basin in the context of plausible climate change scenarios.

Keywords : IHA, climate change, disaster risk, Prek Thnot River Basin, Cambodia

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