

## Assessment of Historical and Future Climatic Trends in Seti-Gandaki Basin of Nepal. A study based on CMIP6 Projections

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### Abstract

Climate change is a complex phenomenon having its impact on diverse sectors. Temperature and precipitation are two of the most fundamental variables used to characterize climate, and changes in these variables can have significant impacts on ecosystems, agriculture, and human societies. This study evaluated the historical (1981–2010) and future (2011–2100) climatic trends in the Seti-Gandaki basin of Nepal based on 5 km resolution Multi Model Ensemble (MME) of 18 Global Climate Models (GCMs) from the Coupled Model Intercomparison Project Phase 6 (CMIP6) for SSP1-2.6, SSP2-4.5 and SSP5-85 scenarios. For this study, ERA5 reanalysis dataset is used for historical reference dataset instead of observation dataset due to a lack of good observation data in the study area. Results show that the basin has experienced continuous warming and an increased precipitation pattern in the historical period, and this rising trend is projected to be more prominent in the future.

The Seti basin hosts 13 operational hydropower projects of different sizes, with 10 more planned by the government. Consequently, the findings of this study could be leveraged to design adaptation measures for existing hydropower schemes and provide a framework for policymakers to formulate climate change policies in the region. Furthermore, the methodology employed in this research could be replicated in other parts of the country to generate precise climate projections and offer guidance to policymakers in devising sustainable development plans for sectors like irrigation and hydropower.

**Keywords :** Climate Change, CMIP6, MME, SSPs, Seti-Gandaki Basin, Nepal

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