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Policy and practice relevant climate change impact assessments: Case study, Western Nepal

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Most existing climate impact assessments in Nepal only consider a limited number of generic climate indices such as means. Few studies have explored climate extremes and their sectoral implications, which in turn are key for informing policy and practice. This study evaluates future scenarios of extreme climate indices from the list of the Expert Team on Sector-specific Climate Indices (ET-SCI) and their sectoral implications in the Karnali Basin in western Nepal. First, future projections of 26 climate indices relevant to six climate-sensitive sectors in Karnali are made for the near (2021–2045), mid (2046–2070), and far (2071–2095) future for low- and high-emission scenarios (RCP4.5 and RCP8.5, respectively) using bias-corrected ensembles of 19 regional climate models from the COordinated Regional Downscaling EXperiment for South Asia (CORDEX-SA). Second, a qualitative analysis based on expert interviews and a literature review on the impact of the projected climate extremes on the climate-sensitive sectors is undertaken. We also used widely available global data sets such as DesInventar and national census data and disaster-specific mixed-effects regression models to assess the impact of precipitation extremes on landslide and flood mortality. Both the temperature and precipitation patterns are projected to deviate significantly from the historical reference already from the near future with increased occurrences of extreme events. Results show winter in the highlands is expected to become warmer and dryer. The hot and wet tropical summer in the lowlands will become hotter with longer warm spells and fewer cold days. Low-intensity precipitation events will decline, but the magnitude and frequency of extreme precipitation events will increase. Furthermore, an increase in one standardized unit in maximum one-day precipitation increases flood mortality by 33%, and heavy rain days increase landslide mortality by 45%.