

**Parallel Session C:
Climate Change Impacts**

C2: High mountain environments

POSTER PRESENTATIONS

Parallel Session C: Climate Change Impacts

C2: High mountain environments

C2-P-01

Application of CORDEX South Asia climate product to assess the impacts of climate change on water availability in Karnali River Basin of Nepal Himalaya.

***Piyush Dahal**, The Small Earth Nepal, Nepal*

***Piyush Dahal, Jeeban Panthi, Madan Lall Shrestha**, The Small Earth Nepal/Nepal Academy of Science and Technology, Nepal*

The Himalayas are water towers for Asia and water source to major rivers which provide water for about 1.3 billion people inhabiting the mountain and downstream. Basin-level water availability assessment in the context of climate change is now a major concern for many regional planners and decision makers in this area. The main objective of this research is to evaluate the projected impacts of climate change on water availability in Karnali River Basin of Nepal Himalaya. We applied the Soil and Water Assessment Tool (SWAT), a basin-level hydrological model to determine future water availability based on climate scenarios. We used an ensemble product of CORDEX South Asia future climate data for 2040-2069 and 2070-2099 for 2 emission scenarios – RCP4.5 and RCP8.5. Results indicate that the average annual temperature could rise by at least 1.4°C by the mid-21st century (2040-2069) and can exceed by 3.4°C by the late 21st century (2070-2099) under a high-emissions scenario compared to the baseline 1971-2000. The warming trend is projected to be stronger in northern highland than lowland. Our analysis shows that precipitation will increase during the monsoon but decrease during the winter, indicating increasing extreme events. Annual precipitation could increase by 12% and 30% under RCP4.5 RCP8.5 scenarios respectively. This change in precipitation has been reflected in streamflow change. An increase in streamflow is expected for both the mid- and late-century compared to the baseline period in pre-monsoon (March-May) and monsoon (June-September) seasons and that flooding will become more extreme and projected to decrease streamflow during the early winter.

Keywords: Climate Change, Water Resource, Hydrological Model, Himalaya

Parallel Session C: Climate Change Impacts

C2: High mountain environments

C2-P-02

Climate change vulnerability in different parts of the Nepal Himalaya

***Subodh Dhakal**, Tribhuvan University, Tri-Chandra Multiple Campus, Nepal*

***Subodh Dhakal**, Tribhuvan University, Tri-Chandra Multiple Campus, Nepal; **Muna Neupane**, Central Department of Environmental Science, Tribhuvan University, Nepal*

Due to the great variation of topography, the climatic variability and its impact are not homogeneous in Nepal. This paper identifies the vulnerabilities associated with the climate change in the High Mountains to the plain areas of Nepal focusing on glacial retreat in the high mountains, water resources in the Middle Mountain and crop production in the plain area. The primary data were collected from the direct field study and social survey. The secondary data were collected from the satellite images and the relevant agencies of the Nepal government. The climatic and crop yield trends were determined using Mann–Kendall tests and quantified using Sen's slope method.

When comparing the aerial extent of the glaciers in the Langtang Valley, the total loss of glacial coverage area within the past 30 years is 24%. The horizontal and vertical retreat of glaciers in this watershed is found to be 40 m/year and 3 m/year respectively. As a consequence, the vulnerability of debris flow, shortage of water resources and adverse impact in agriculture were reported. Study in the middle mountain of Salyantar area for last 30 years revealed that maximum temperature was increasing at the rate of 0.039 degree Celsius/year and annual precipitation was decreasing at the rate of 22.99 mm/year with statistically significant trend. Number of local ponds has been reduced and the soil moisture has been decreased continuously. Water coverage has been decreased from 28.93% to 6.47% within the same period. Study in plain areas of Nepal in Rautahat district revealed that the annual average rainfall is decreasing at the rate of 10.21 mm/year and the annual mean temperature is increasing at a rate of 0.020 degree Celsius/year over the last 30 years. Despite this trend, the yield of major crops showed increasing trend which is statistically significant. This is attributed to the adaptation measures like enhanced irrigation systems, hybrid seeds and increased access to fertilizers and pesticides.

Keywords: Climate change, Vulnerability, Glacial retreat, Crop production

Parallel Session C: Climate Change Impacts C2: High mountain environments

C2-P-03

Impacts of climate change on the mountainous indigenous communities of Nepal

***Madhav Giri**, Tribhuvan University, Nepal, Nepal*

Climate change is fast pushing the communities, particularly the most poor and marginalized in the developing countries. Erratic rainfall patterns and changing seasons are upsetting agricultural cycles and drought events are leaving many to struggle to feed their families. This study was undertaken to assess adaptation practices by Surel and Thami mountain indigenous and marginalized communities of Nepal.

The study was conducted based on the data gathered from both the primary and secondary sources. The primary data were collected using questionnaire survey of 104 households of marginal communities in Lapilang and Surel village of Dolakha, mountain district of Nepal along with key informant interviews in May – June 2018. Meteorological data were collected from Department of Hydrology and Meteorology.

There was increment of mean annual temperature by 0.02040C per year. Similarly, data confirmed an increment trend of annual rainfall at the rate of 7.574mm per year. There was increased in Maize production and increased Mosquito problem due to increased in temperature. Both the communities are facing emergence of diseases and pests in their farmland and livestock.

It was found that the farmers are practicing some adaptation options such as shifting from large animals to smaller ones, introduction of new varieties of commercial vegetables, crop rotation, surface channels for irrigation, artificial ponds and water tank for the storage of water. However, strong institutional supports are required to build resilience of poor and marginalized community to strengthen the adaptive strategies and practices.

Keywords: Climate change, Impact, Adaptation, Mountain, Indigenous