

Opinion

## **Climate change in Nepal : Policies on impact adaptation needed**

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For adaptation planning, it is essential to understand how the climate might change in the future and how the change might impact the hydrological regime. Climate modeling has been an important tool to understand how the climate might evolve in the future while hydrological modeling can provide insights on how the projected climate might impact the hydrological system of the river basins

Nepal is exposed to several hazards due to the variable geo-climatic conditions, young and fragile geology, haphazard and unplanned settlements, deforestation, environmental degradation and increasing population. Nowadays, climate change has also become one of the key elements of the hazards. Hence, the intensity and incidences of disasters in Nepal are increasing due to quick changes in the global climate. Thus, Nepal has been a hot spot for several disasters.

The monsoon climate is predominant in Nepal, where 80-85 percent of the total precipitation of overall average of around 1,700 mm per annum occurs from June to September and is drained through its 6,000 rivers, including four main Himalayan river systems. Torrential rains during the monsoon render the country highly susceptible to water-induced natural disasters, such as floods, landslides, flash floods, debris flows, slope failures and inundation. Although rainy days are decreasing, high-intensity rainfall events are increasing, resulting in the increase in magnitude and frequency of water-induced disasters. On the other hand, the potential threat of Glacier Lake Outburst Floods (GLOFs) in Nepal is also growing. There are 2,315 glacial lakes in Nepal, and 26 of them are potentially dangerous for GLOFs.

Nepal has a wide variety of plant and animal species. A study has found that 2.4 per cent of biodiversity may be lost with climate change. Obviously, climate change will affect agriculture. The majority of the people of Nepal depend on agricultural crops like rice, maize and wheat. Higher temperatures, increased evapotranspiration and decreased winter precipitation may result in droughts. It should be considered as an early warning for food security. Geo-scientists have found that due to global warming, the number and volume of glacier-lake outburst flood hazards are on the rise in Nepal and beyond. Some of these floods have produced discharge rates up to 30,000 m<sup>3</sup>/sec and can run for distances of 200 km. Considering the average vertical lapse rate of 6.5°C per kilometer, it was found that almost 20 per cent of the present glaciated area above 5,000 meters altitude is likely to be snow and glacier free area with an increase of air temperature by 1°C. Similarly, 3°C and 4°C rise in temperature could result in the loss of 58 per cent and 70 per cent of snow and glaciated areas respectively. Such changes are likely to contribute to the faster development of glacier lakes, leading consequently to the increase in the potential of glacier-lake outburst flood hazards. Also, an increase in precipitation by more than 20 per

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cent is likely to cause a significant increase in sediment delivery, and more than a 20 per cent increase in annual sediment deposit could be expected in the scenario of a 50per cent increase in annual precipitation. According to a study carried out by Martin Vargic, a full-time student in Slovakia, there is enough ice in the Earth's polar caps to cause about 250-300 feet (80-100 m) rise in the sea level. The result of such an event would be catastrophic to human civilization and the earth's biosphere. More than 75% of the world's population lives below 300 feet above sea level, including the vast majority of all large metropolitan areas. If current trends continue, 80per cent of the Himalayan glaciers – the water source for a sixth of the world's population – could disappear if the current rate of emissions is not reduced (IPCC). The Himalaya will have no ice by the year 2300 or even sooner. The lives of 2 billion people are at stake, according to WWF Nepal.

The above figures and situation warn us of the effect of global warming and climate change in the GLOFs. The outburst of huge GLOFs may cause enormous loss not only in Nepal but North India and Bangladesh as well. Increased glacier-lake outburst flood hazards, increased variability of river runoff, increased sediments, increased evaporation from reservoirs and impacts on watersheds are the major impacts of climate change in the context of Nepal. As a result, glacier melt and precipitation patterns would occur.

Climate change is a growing challenge that has made changes in the amount, intensity, frequency and form of precipitation. Consequently, it is causing frequent disasters. Therefore, it is imperative for the government to have good climate change policies with a strong focus on impact adaptation. It is necessary to plan adaptation measures in order to avoid the negative impacts of climate change on the socio-economy of the country. For adaptation planning, it is essential to understand how the climate might change in the future and how the change might impact the hydrological regime. Climate modeling has been an important tool to understand how the climate might evolve in the future while hydrological modeling can provide insights on how the projected climate might impact the hydrological system of the river basins. Stopping deforestation and building a healthy environment should be the key issues in the climate change policy of the government. Then it will provide a way for millions of poor people in the country to benefit directly. In the same way, such policy will help to reduce deforestation, maintain ecological balance, and allow the country to sell credits for successful programmes combating carbon dioxide. On the other hand, developed countries that pollute more than the allowed limits under the existing Kyoto protocol would be able to buy the carbon credits to increase their emission levels and help to fund forest protection plans and programmes of countries like Nepal.

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