

## **Theme 11: Climate change and natural disasters**

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### **IMPACT OF CLIMATE CHANGE ON HIMALAYAN GLACIERS: AN INDIAN PERSPECTIVE**

Abhaya K. Singh

Associate Professor, Dept. of Defence & Strategic Studies, K. S. Saket Post Graduate College, Dr. R.M.L. Awadh University,  
Ayodhya, Faizabad-224001- India

The greater Himalayan region -“the roof of the world”- contains the most extensive and rugged high altitude areas on Earth, and the largest areas covered by glaciers and permafrost outside the Polar Regions. Seventy percent of the freshwater of the world is frozen in glaciers. Glacier melt buffers other ecosystems against climate variability. Very often it provides the only source of water for humans and biodiversity during dry seasons. Freshwater is already a limited resource for much of the planet, and in the next three decades, the population growth is likely to far exceed any potential increase in available water. The Himalayas have the largest concentration of glaciers which is world’s third largest freshwater stores after the Antarctic and Arctic, outside the polar caps. With glacier coverage of 33,000 km<sup>2</sup>, the region is aptly called the “Water Tower of Asia” as it provides around 8.6 X 10<sup>6</sup> m<sup>3</sup> of water annually. These Himalayan glaciers feed seven of Asia’s great rivers: the Ganga, Indus, Brahmaputra, Salween, Mekong, Yangtze and Huang Ho. It ensures a year round water supply to more than 1.3 billion people. The region and its water resources play an important role in global atmospheric circulation, biodiversity, rainfed and irrigated agriculture, and hydropower, as well as in the production of commodities exported to markets worldwide. The water resources of this region are currently facing threats from a multitude of driving forces. Global warming is having a severe impact on the amount of snow and ice, which has serious implications for downstream water availability in both short and long term as up to 50% of the average annual flows in the rivers are contributed by snow and glacial melting. The warming in the greater Himalayas has been much greater than the global average: for example, 0.6 degrees Celsius per decade in Nepal compared with a global average of 0.74 degrees Celsius over the last 100 years. Since the ecology of the region is so finely balanced, with glacier runoff providing a regular pattern of melt water into the region’s largest rivers and acting as a backup supply of water in the event of monsoon failure. Even minor climate changes can have a devastating environmental effect on the life blood of more than 25% (1.3 billion People) of the world’s population. This source is not inexhaustible and with accelerated

melting of Himalayan glaciers the water shortages in the long run would be the cause interstate and intrastate conflicts as millions of lives would be at stake in the region. Sea levels threaten to rise higher than previously anticipated. And water supplies are increasingly at risk from both melting glaciers and extreme climate events, such as droughts and floods. These changes threaten not only the climate, but also regional security and stability. The melting of Himalayan glacier due to climate change also poses a complex security challenge in the form of forced migration and resource based conflicts.

Therefore, it is necessary to understand how India and its neighbors view the climate change and its impact. What is the impact of climate change on water resources and livelihood in the greater Himalayas due to rising temperature? Does climate change and melting of glaciers create security problems for India? Will it become a critical driver in our relations with the neighboring countries? The Paper tries to analyze and answer these questions.