

# CLIMATE CHANGE IMPACT CASE STUDY: Hindu Kush Himalaya Region

## SUMMARY

Climate change (global warming) in the Hindu Kush Himalaya region will lead to glacier melting, affect water resources, wildlife, and food security, and will impact at least around 1.3 billion people across eight countries in the region. Dwindling water supplies may affect regional relations and potentially spark conflict due to scarce resources.

## BACKGROUND

- The Hindu Kush Himalaya (HKH) region is home to around 240 million people. An estimated 1.3 - 1.9 billion people in total live in the surrounding hills and river basins who rely on the HKH for water, energy and food. (GRID-Arendal, 2015 & Meola & Roberts, 2020)
- The HKH is one of the most vulnerable regions in the world to climate change
- The increasing population in the region is placing more demand on water resources, while climate change is affecting water availability in the region. (GRID-Arendal, 2015).
- The HKH region is warming at about three times faster than the global average, with most glaciers in the region retreating. (GRID-Arendal, 2015)

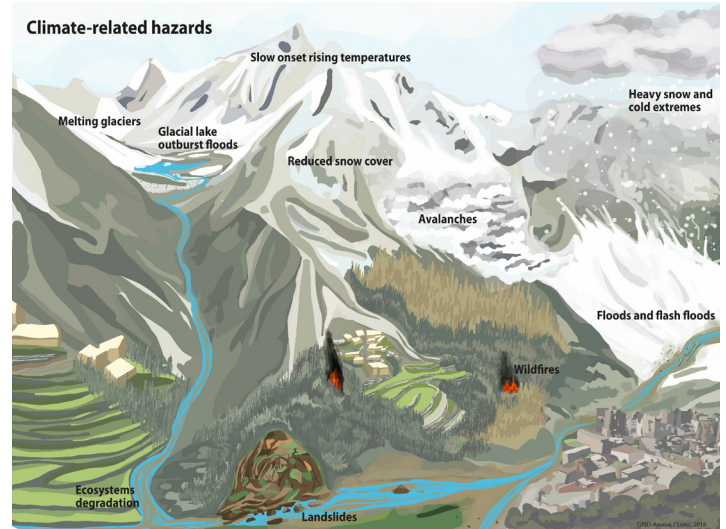
## CLIMATE CHANGE IMPACTS

- Glaciers in the region have been melting faster due to global warming
- Water resources for humans will be affected (e.g., drinking water, farming, hydroelectric power, transportation, fishing, etc.)
- Natural ecosystems will also be affected by climate change in the region
- It is expected that climate change will create more disaster events and/or exacerbate existing hazards in the mountainous regions
- There are transboundary challenges that affect the region - both upstream and downstream - that will be exacerbated by climate change
- Other wide-ranging impacts for the region will be felt, including potential conflict over water resources



The Hindu Kush Himalayan region and major river basins and rivers. Map source: Mukherji et al. 2015 (Creative Commons)

**Source:** Mayewski et al., (2021)



Mountains are hazardous places, even under conditions of natural climate variability. In the Hindu Kush Himalaya the key climate-related hazards were identified to be: Floods and flash floods; Landslides; Heavy snow and cold extremes; Avalanches; Wildfires; Glacial lake outburst floods (GLOFs); Reduced snow cover; Melting glaciers; Slow onset rising temperatures; and Ecosystems degradation.

**Source:** Nieves López Isquierdo. (2018). Climate-related Hazards. GRID-Arendal. <https://www.grida.no/resources/12778>

## KEY POINTS

- “The Hindu Kush Himalayas (HKH) are the freshwater towers of South Asia and parts of Southeast Asia. Water originating from their snow, glaciers and rainfall feed the ten largest river systems in Asia. Together these rivers support the drinking water, irrigation, energy, industry and sanitation needs of 1.3 billion people living in the mountains and downstream.” (GRID-Arendal, 2015)
- The HKH includes all of the earth’s 14 peaks above 8000 meters. The region is mostly covered by grassland, forest, shrubs and host to a great diversity of species. The HKH is also home to seventeen World Heritage Sites. (International Union for Conservation of Nature, 2021)
- The eight countries of the HKH region comprise the International Centre for Integrated Mountain Development (ICIMOD), an intergovernmental organization based out of Nepal. (ICIMOD)
- Inter-governmental regional organizations such as ICIMOD may assist with providing regional impetus to mitigating climate change impacts in the HKH
- The HKH is some 4.3 million square kilometers in size and is the source of 10 major river basins, including the Indus and Ganges-Brahmaputra. (Mayewski et al., 2021)
- The HKH region hosts the largest permanent ice cover in the world outside the polar region. Because of this, it is often referred to as the “third pole.” (IUCN, 2021)
- There are no water treaties for the region except for the Indus River Treaty of 1960, which does not address climate change
- An assessment of the region (Wester et al., 2019) reports that the HKH region will lose two-thirds of its ice fields by 2100 if global greenhouse gas emissions are not curbed. Even with global efforts to limit global warming to 1.5 degrees Celsius, glaciers in HKH will shrink by 36 percent by the end of this century, the researchers conclude. (Chugh, 2019)
- A study led by ICIMOD found that even the most ambitious Paris Agreement goal of limiting global warming to 1.5 degrees C would lead to a 2.1 degree C rise in temperature and the melting of one-third of the HKH region’s glaciers. (ICIMOD, 2019)
- Global warming will initially result in increased river flows by 2050 - 2060 because of melting glaciers. This will increase the risk of floods, landslides, Glacial Lake Outburst Floods (GLOFs), soil erosion, and crop failure. However, as water levels decrease, the pattern is predicted to then reverse, with droughts and lower energy outputs from hydropower dams, resulting in lower energy and food production for the region. (Chugh, 2019)

*“...scientists have warned that the HKH’s geological fragility combined with stressors like globalization, rapid industrialization, infrastructure development and, most importantly, rising global temperatures makes its large population extremely vulnerable to climate-induced stress. A destabilized HKH region with millions of climate refugees would have serious consequences for the whole world...”*  
(Chugh, 2019)

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