



**First workshop on addressing loss and damage in the context of
decisions 2/CP.27 and 2/CMA.4
29-30 April 2023**

Session 2 – Addressing slow onset events
Melting Glaciers and Changing Snow Cover
Bhutan and Nepal Case Study

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The HKH is an integral part of the identity and economy of Bhutan and Nepal

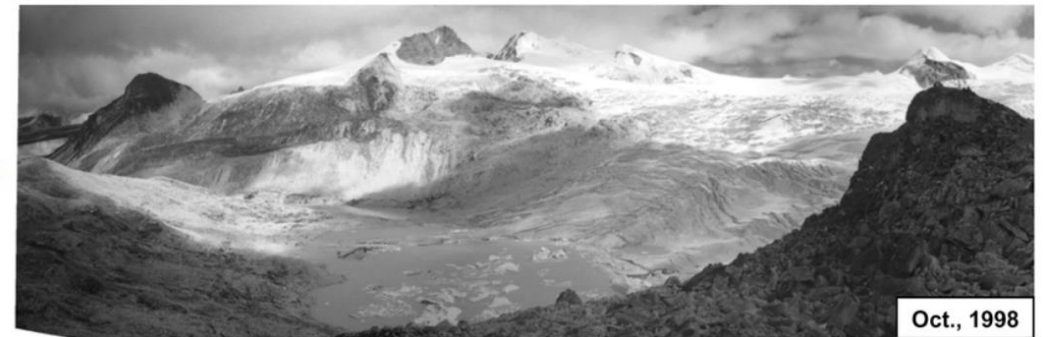
Hindu Kush Himalaya (HKH) Region:

- Home to 4 global biodiversity hotspots
- Origin of 10 major river basins in Asia
- Home to 240 million people living in the mountains and hills, and 1.9 bn people living in the river basins downstream
- Provides essential ecosystem services including freshwater resources and fertile soil for agriculture
- Population and economy highly dependent on the services provided by the mountains – drinking water, agriculture, pastoral farming, hydropower, tourism



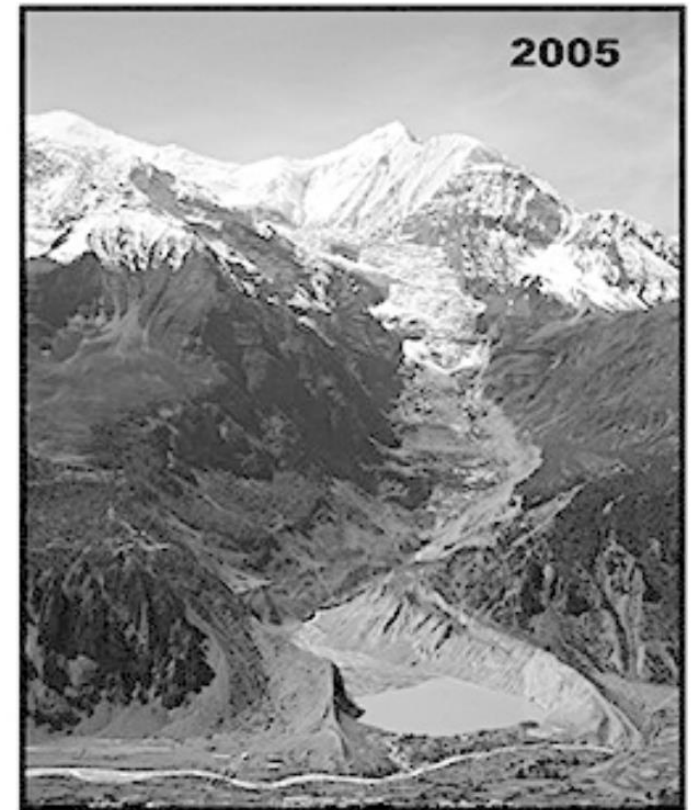
HKH warmed at an average rate of 0.2°C per decade in the last 50 years

- HKH warming much higher than the average global rate of warming - 0.18°C per decade since 1981
- At 1.5°C, warming is expected to be at least 0.3°C higher in the HKH.
- Increase glacier melt, change in snow cover and permafrost, precipitation extremes have been observed over the years.
- HKH lost about a fourth of glacier area within 30 years. Between 1980 and 2010, Bhutan lost around 23% of its glaciers and Nepal lost 25%.
- Over 50 GLOF events have been recorded in the HKH, including in Nepal and Bhutan.
- 47 lakes identified as potentially dangerous in Nepal and 24 identified as potentially dangerous in Bhutan
- HKH could lose up to 60% of their glacier volume if emissions do not go down and will still lose 33% of their volume at 1.5°C



Photos of the glacier at Gangrinchemzoe La in Lunana Village in Bhutan

Source: Naito et al. (2006)



Retreat of Gangapurna glacier, Manang Valley, Nepal. Left (1850): reconstruction on basis of terminal glacier; middle (1952): reconstruction after photo by Toni Hagen; right: picture from 2005

A global assessment on GLOF's societal impact found that Nepal and Bhutan had the greatest economic consequences from GLOFs

- Between 1985-2014, economic losses in mountain regions was highest in HKH region 45 billion USD, followed by European Alps at 7 billion and Andes at 3 billion.
- *Dudhi Koshi* sub-basin in Nepal and *Pho chu* sub-basin in Bhutan are among the global hotspot of glacial activities, recording several destructive GLOF event over the years.
- Recorded deaths, destroyed crucial infrastructures such as hydropower plants, roads, bridges, river protection walls, cultural monuments, houses, etc.
- Impacted freshwater availability, loss of soil moisture, drying up of water sources, biodiversity, etc.
- Impacted lives and livelihoods, hydropower production, agriculture productions, etc.
- Reduced snow cover has also exacerbated impacts on agriculture by reducing soil moisture, drying up of water sources.
- Impacts on agriculture productivity has caused mountain communities to adopt costly farming practices, relocation of settlements.



image: Flood in Lingbi river in Bhutan
Credit: The Bhutanese Newspaper

Best Practices

- Addressing these impacts mostly focus on adaptation and early recovery activities
 - For eg., water resource management, climate resilient agriculture and food security, disaster risk reduction, etc are mainstreamed in the NAPs, NAPAs, national policies, plans and programmes with significant national budget allocation
- In 2008, Bhutan implemented a project with GEF-LDCF and UNDP to reduce risk from GLOF from *Thorthomi* lake through artificial lowering of the lake and establishment of GLOF EWS, evacuation centers, among others
- In 2013, Nepal implemented project with GEF-LDCF and UNDP at high mountains and low-lying flatlands to reduce risk from GLOF and floods through construction of open channel, installed sensors, automated EWS, bioengineering, drainage system and built evacuation centers.
- The project was co-financed by the government of Bhutan and Nepal.



Image: Workers from the United Nations Development Programme in Bhutan are trying to reduce the risk of floods around Thorthormi lake United Nations Development Programme

Lessons Learned

- Most of these projects focused mostly on ex-ante adaptation measures that reduce risk.
- Support for ongoing and ex-post activities, crucial elements for holistic response, not available under the current UNFCCC financial mechanism.
- International support for immediate response, relief, intermediate recovery and long-term reconstruction comes in the form of disaster, humanitarian, development aid and is voluntary.
- Climate change induced loss and damage in the HKH is difficult to quantify as they are cross-sectoral, spatially and temporally extensive.
 - Quantifying non-economic losses such as loss of life, biodiversity, social and cultural disruption is also complex and challenging.
 - Assessment of loss and damage and associated costs will require significant resources from the new Fund.

Lessons Learned

- Both countries have invested significant resources to meet the cost of climate change induced loss and damage, diverting national resources from development. As such both countries economies are setback and cannot afford to go into further debt to meet the costs of loss and damage.
 - funding to address loss and damage should be grant based.
- For both countries accessing funding from existing fund is challenging due to complex funding criteria including extensive data requirements. Further, the scale of funding is not commensurate with the scale of challenges.
 - the new fund should be designed to improve accessibility, scale and predictability.
- Triggers that activate funding flows as soon as a country is hit with an extreme events should be a key features of the new fund.
- Need to ensure that both, early response and recovery is covered, with recovery costs often far exceeding response costs

A scenic mountain landscape with snow-capped peaks, rocky terrain, and colorful prayer flags strung across a stream. The text "Thank you" is overlaid in the center.

Thank you