Climate Change Induced Water Disaster:

'case of 2021 Melamchi River flooding Sindhupalchok'

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PRESENTATION OUTLINE

- ❑ Background
- ❑ Case of Melmachi River Flooding
- ❑ Study Objectives
- ❑ Study Methods
- ❑ Findings
- ❑ Mitigation and Coping Action

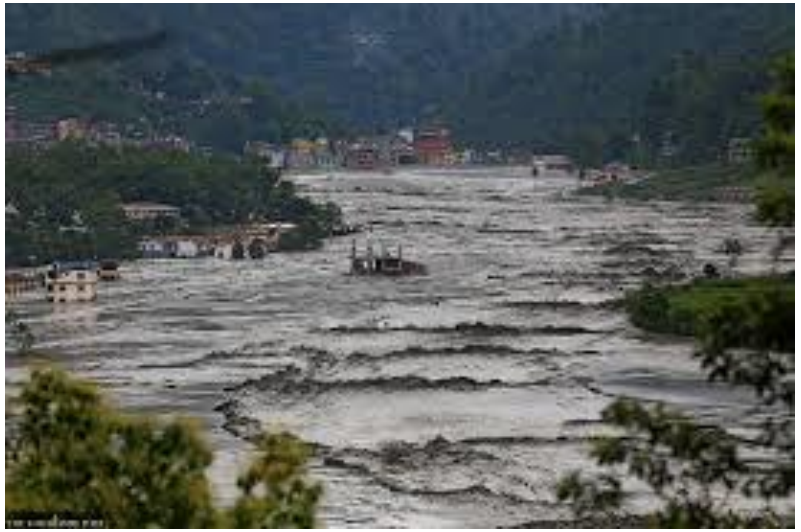
BACKGROUND

- Climate change: water crisis in different parts of the world, arises intense floods, long droughts and many more.
- Most severe impacts of climate crisis already have realized and its water disasters.
- As stated by Intergovernmental Panel on Climate Change (IPC) - disasters which are mostly water-related rising across the world.
- Poorest countries: who have contributed very little to greenhouse gas emissions, are hardest hit.
- There is a real risk that low-income countries are pushed into a vicious cycle of worsening poverty.

Source: Kathmandu Post

CASE MELAMCHI RIVER FLOODING SINDHUPALCHOK

- Nepal - experience the negative effect of climate change; variability in temperature and precipitation, overbank flooding from snow-fed rivers etc.
- Geographically, hills of country are in-between snow clad Himalayas and downfallen roaring rivers, that passes through the down deep valley.
- In June and July 2021 there was big flood in Melamchi river (as heard such flooding was not occurred in 100 years).
- There was no rain in the upstream.
- River flooding with large amount of sediments (debris).



STUDY OBJECTIVES (WHY SUCH INCIDENT HAPPENED)

Main Objective of the study is to find the cause of climate change induced water disaster: 'case of 2021 Melamchi River flooding Sindhupalchok:

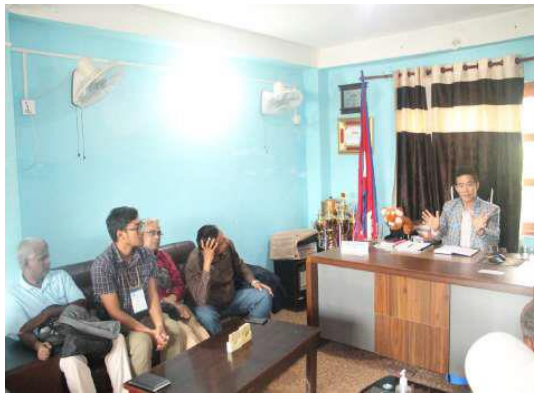
Specific Objectives were:

- To find the actual cause of sudden flooding
- Suggest the adaptation and mitigation measures

STUDY METHODS

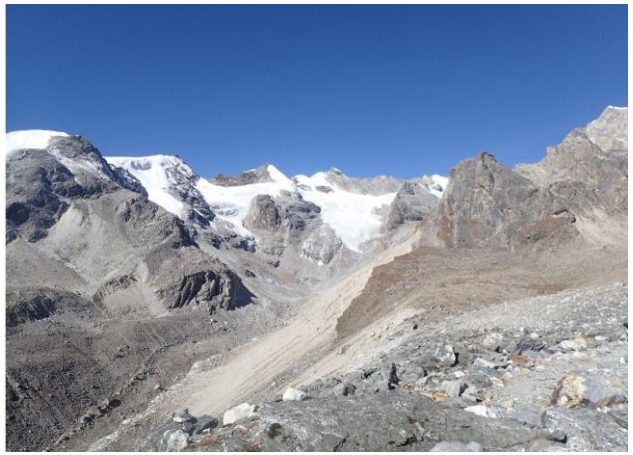
Research method has been separated into two distinct areas:

- ❖ Scientistic committee gathered and discussed.
- ❖ Visited of Melamchi and Helambu Disaster Area.
- ❖ Interaction with local government officials (Melamchi and Helambu Municipalities) and get first hand information; and recovery and reconstruction after 2021 flooding.
- ❖ Interaction with disaster-affected community members of
- ❖ Observation and vivid understandings.



FINDINGS

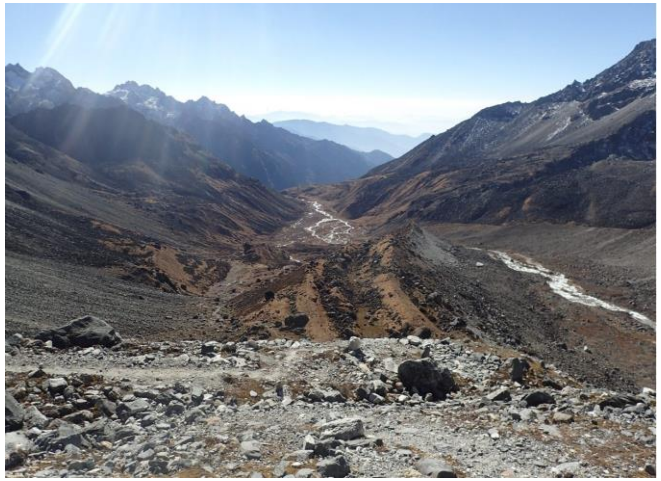
- Temperature rise: summary day
- Ice lake-brust at Bhremathang of Helambu RM-1, Sindhupalchok.
- Flood damage and impacted different population groups at downstream, with many families displaced from their homes.
- 20 people swept away and lost huge property.
- Farming-based families permanent loss of highly valuable agriculture and farm land - impacted their livelihoods and subsequent well-being.
- To seek alternative livelihoods: away from home: out-migration for labour or permanent settlement elsewhere.



FINDINGS (Contd.)

Climate change impact Observing since some years in high Himalayan region:

- The glacier lake outburst is the cause of failure of dam the containing a glacier.
- Water body contained by a glacier melts of overflows the glacier.
- Glacier ice in dam or lake - failure can happen due to erosion and buildup water pressure an avalanche of rock or heavy fall of snow.
- In Himalayas, geologies are more active - outburst floods from glacier-dammed lakes typically entrain, transport, and deposit large amounts of sediments (debris).



FINDINGS (contd.)

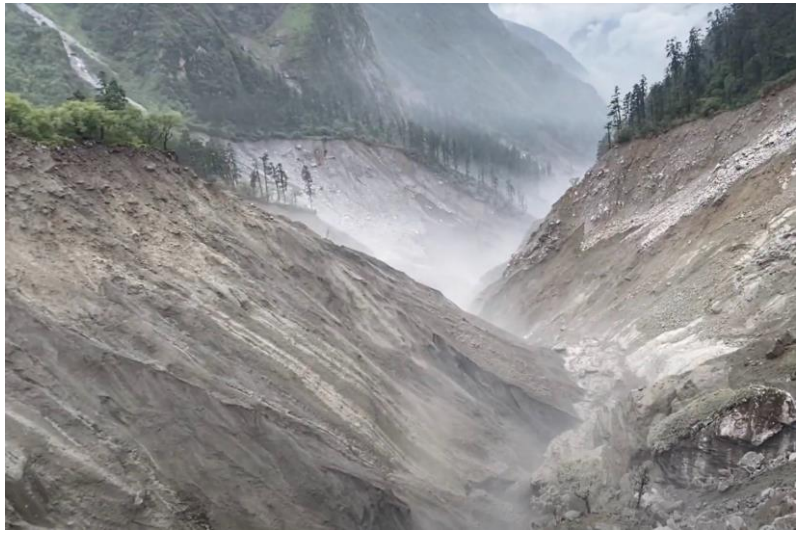
The Melamchi flooding was a result of multiple factors: and processes that occurred at various locations along the Melamchi river.

- local weather conditions
- processes in the high altitude glacial environment
- processes at the Bremthang old landslide site
- formation of a new landslide at Melamchi gaon
- river damming and outburst flood, and
- riverbank erosion and debris deposition.
- earthquake 2015: cause of heavy debris.

FINDINGS (SIMILAR FLOODINGS)

Nepal continues such disasters, suffered the same:

- August 2023, Kagbeni village of Mustang district.
- August 2024, Thame village, Solukhumbu (Everest region).
- There are several such glacier lakes lies upstream of northern Himalayan region.
- Those glacier outburst is triggered by temperature rise combined with continuous rainfall during monsoon.
- As of severe climate change effects those upstream lakes are in threat that has warned floods and landslides, projected increasing the days to come.



1. Precedent snow cover
Heavy rain
Snowmelt

2. Glacial lake drainage
glacial deposit erosion

3. Old landslide
Congestion of flow, overtopping,
erosion dam toe
cutting & collapse

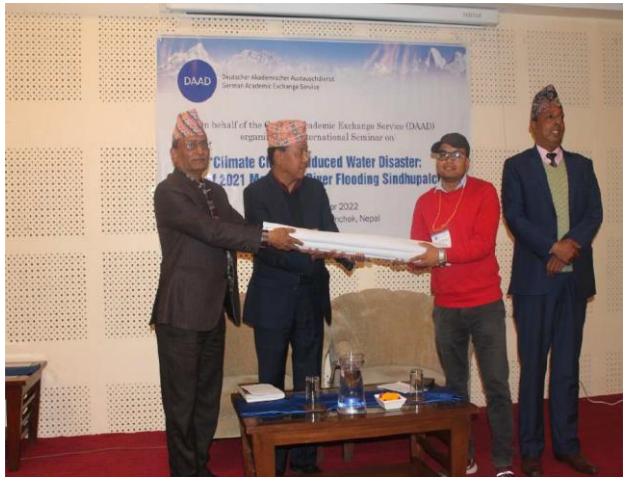
4. New landslide
Damming, overtopping, erosion
dam toe
cutting & collapse

5. River bank erosion and deposition
on river channel
Sediment deposition and filling up
of Melamchi water supply intake

6. Debris deposition and
inundation

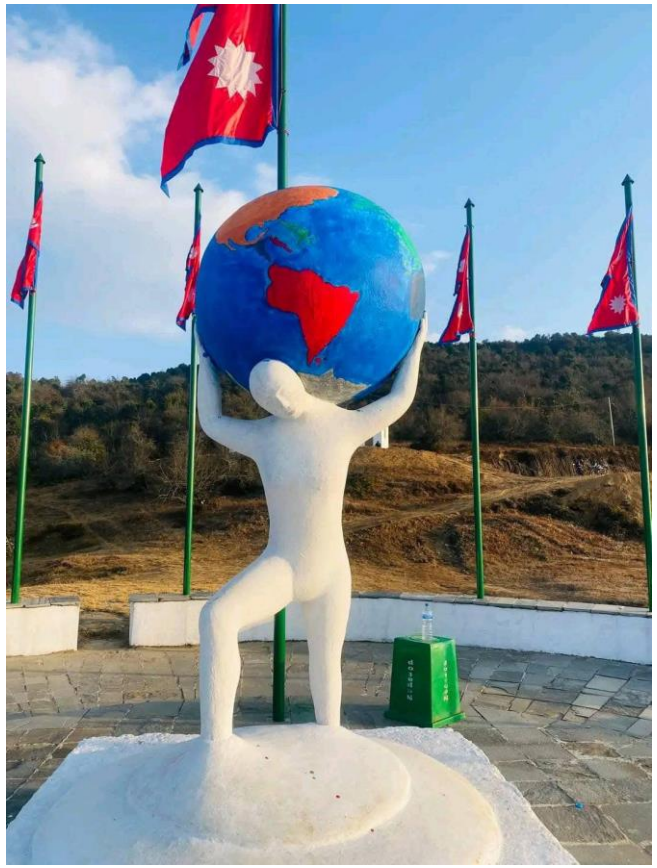
MITIGATION AND COPING ACTION

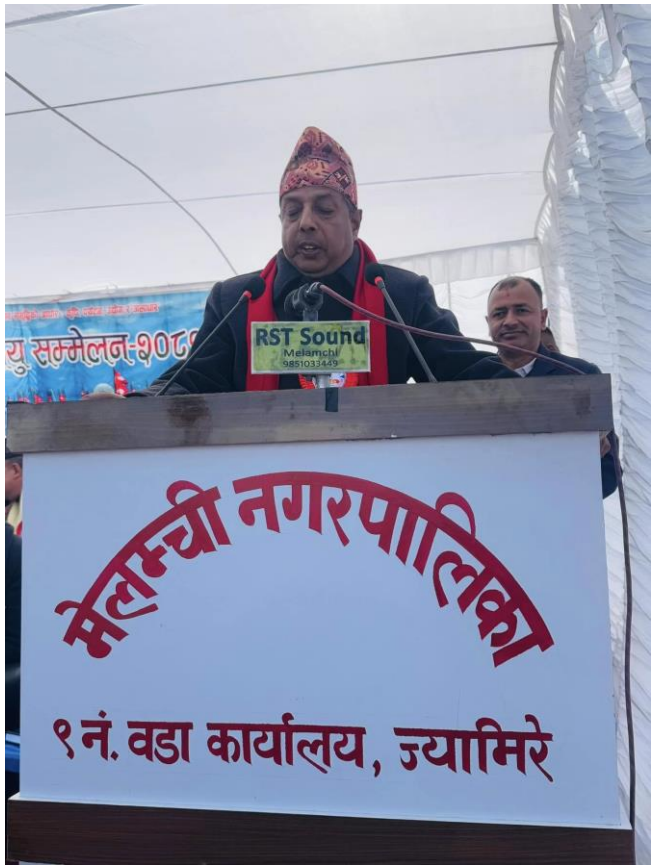
- Climate change induced water disasters: made human casualties and lost of property in the downstream.
- Preparedness of sudden flooding and provide the necessary precautive measures and action plan to the respective disaster affected municipalities to mitigate such event in future.
- Flood - early warning system should in place.
- Adaptation and mitigation is a process of adjusting and to minimize negative impacts of climate change.
- Protecting Himalayan ecosystems may become more difficult as a result of temperature rise.

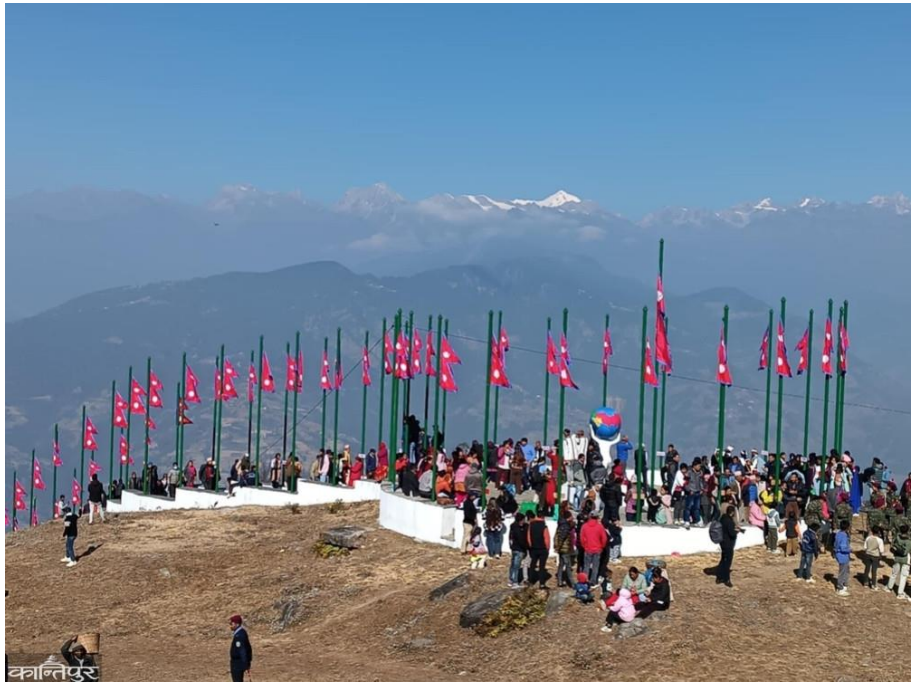


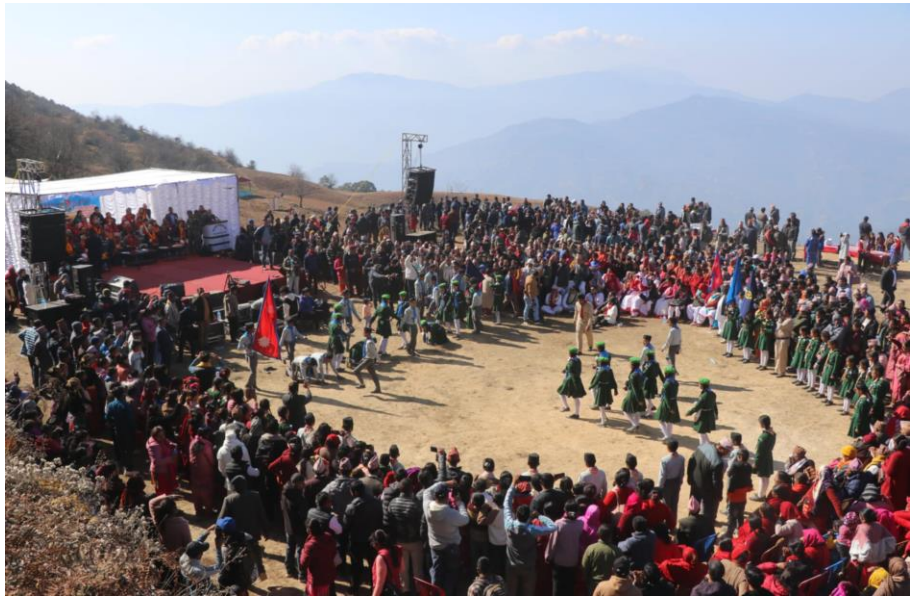
MITIGATION MEASURES: AWARENESS

Climate Change Conference at Top of Hill (1 January Every year)









Question and Answer (Q&A)

Thank You

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