



ADAPTATIVE CAPACITY &  
RESILIENCE-THE BHUTANESE  
EXPERIENCE

KARMA CHHOPHEL  
HYDROMET SERVICES

# Climate Change Related Vulnerabilities

- Landslides and Flooding,
- Deteriorating Agricultural Production, Impoverished Forests,
- Worsening Health Security,
- and Impaired Hydroelectricity Generation.



# EXPERIENCE FROM THE HIMALAYAS

The country is implementing two adaptation projects:

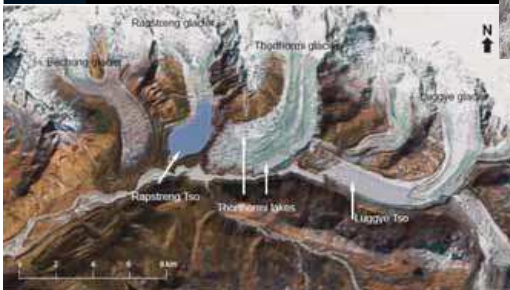
- a. Reducing Climate Change – Induced Risks and Vulnerabilities From Glacial Lake Outburst Flood in the Punakha – Wangdue and Chamkhar Valleys. (Funded by GEF/UNDP under LDCF Funding)
- a. GLOF Risk Reduction Project in the Himalayas (UNDP)

# PARTICIPANTS

| Name of the Agency                                   | Roles/Responsibilities   |
|--|--|
| Department of Geology and Mines (DGM)                | Fully responsible for planning, designing and implementation of the project on physical lowering of the water level.   |
| Disaster Management Division (DMD)                   | Assisted in logistics. Prepared and disseminated GLOF awareness programmes in the Punakha-Wangdue valley. Organized stakeholders meeting on a regular basis. |
| Department of Energy (DoE)                           | Fully responsible for setting up an Automated GLOF Early Warning System.   |
| The Dzongkhag Administrations of Punakha and Wangdue | Assisted the DGM and DMD with implementation in local communities  |
| UNDP Country Office                                  | As the overall coordinator, monitored progress, fund flow etc.   |

# COMPONENTS

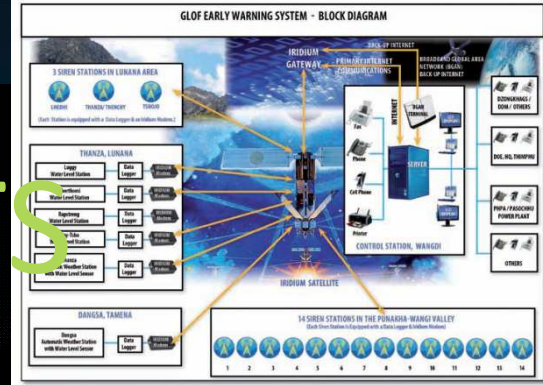
## ○ Artificial Lowering of Thorthormi Lake



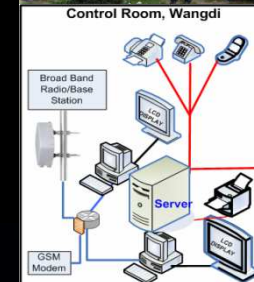
- The Department of Geology and Mines aims to lower the water level of Thorthormi lake by 5 m during a 3 year period of 4 months each (2009-2011)
- Fully manual effort – risk of destabilizing the ice masses if blasting is resorted to.
- 7 days walk from the nearest town – logistics
- Managing 300-350 workers at such high altitude (4400 m above sea level).
- Main aim-To reduce hydrostatic pressure on the moraine dam.

# COMPONENTS

- Installation of GLOF Early Warning System in the Punatsangchhu Basin



- Implemented by the Hydromet Services, Department of Energy
- Involved upgradation of of the existing system which was manual based.
- 17 siren stations and 6 water level stations have been set up across the basin. Sirens are triggered as stream thresholds are exceeded



Pic 3.2 showing the possible location of sensor and the existing gauge Station

# COMPONENTS

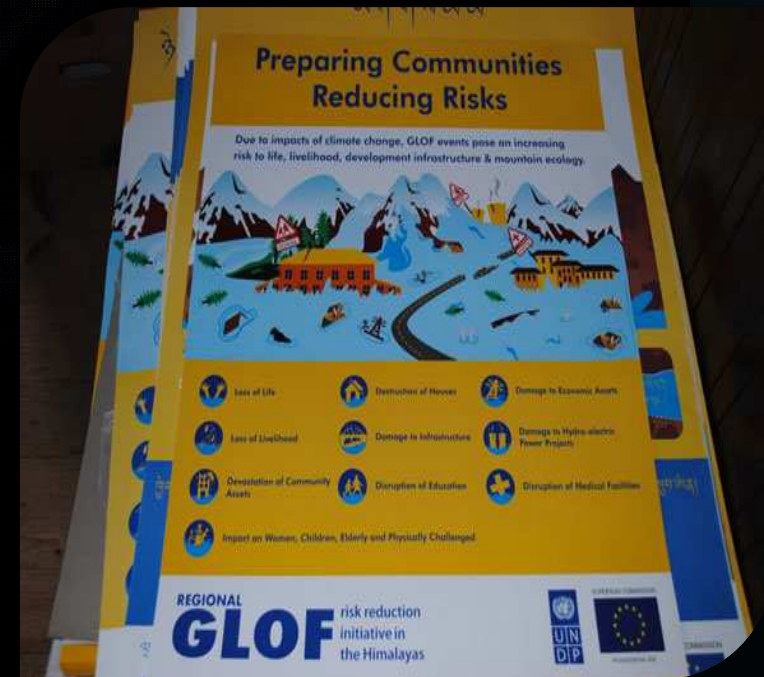
## ○ Community Awareness and Capacity Building

- A community awareness and capacity building component is being undertaken by the Department of Disaster Management in Punakha, Wangdue and Bumthang regarding GLOF risks.
- District disaster management committees have been formed and training has been given for an integrated disaster management plan which will enable communities to identify hazards and vulnerabilities. Community leaders will then ostensibly prioritize their own ranking of hazards along with recommended solutions.
- The final stage of the project will set up emergency operation centers at district administration offices to enable them to better handle crises



# Benefits of Adaptation

- The benefits of these two projects center on vulnerable communities.
- The installation of early warning system has increased the preparedness of communities and reduced risks.





# Benefits of Adaptation

## Community Resilience

- Through better understanding of the risk and hazards related to GLOF.
- The GLOF project helped in sensitizing other risks associated with floods, landslide and earthquakes.
- A response mechanism has been developed for emergencies and members of the 21 communities have been trained.

## Institutional Resilience

- Making stakeholders aware of the risks associated with GLOFs'
- Increased awareness in national institutions on the risk and coordination mechanism.
- Through formation of community based disaster management committees.

## Infrastructural Resilience

- The first structural benefit is the lowering of glacial lake water level.
- The installation of automatic water level sensors, siren towers and communication gateways is seen as another form of structural resilience.

# Challenges to Adaptation



# Challenges

- Complexity of the adaptation activity – remoteness, accessibility etc.
- The absence of a strong institutional set up- The different actors involved in adaptation have other commitments and priorities.
- There is still lack of coordination, convergence and communication among different actors .
- Lack of capacity in the participating institutions

**Thank  
You**