



Bhutan's experience and lessons learned from undertaking the Climate-Induced Loss and Damage Assessment 2025

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Ministry of Energy and Natural Resources
Royal Government of Bhutan
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OUTLINE

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2. Bhutan's engagement in L&D
3. Assessment Methodology
4. Key Findings
5. Lessons Learned
6. Conclusion

1. Background



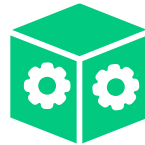
Constitutional
mandate to
maintain **60%**
forest cover.



Commitment
to remain
carbon
neutral



Minimal
contribution
to global
greenhouse
gas
emissions.

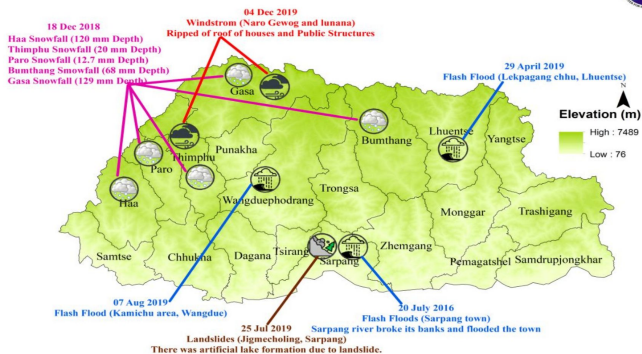


Acts as a
net global
carbon
sink.



Extreme Events

Weather Events in Bhutan (2016-2019)



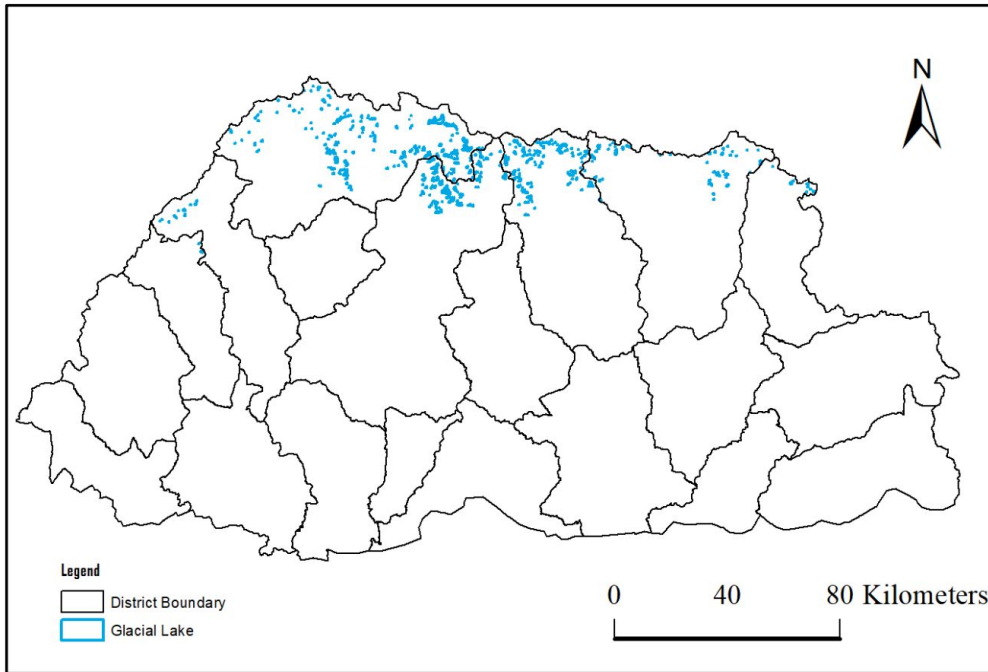
Source: NCHM, 2020. [Records of Extreme Weather Events in Bhutan](#)



Year	Date/Month	Flood Event	River/ Basin	Dzongkhag
2017	April 25	Flash Flood	Punatshang Chhu	Gasa
2017	May 5	Flash Flood	Manas	Trashigang
2017	June 26	Nakpola and Kukturgang caused flash flood	Kholong Chu, Manas	Trashi Yangtse
2017	July 18	Flash Flood	Mangdichhu, Manas	Trongsa
2017	July 17	Swollen stream caused flood	Khomachhu, Manas	Lhuentse
2017	July 22	Heavy rain caused flash flood	Phuntsharge, Sankosh	Wangdue
2017	July 28	Heavy rain caused flash flood	Manas	Lhuentse
2017	August 30	Flash Flood	Aichhu	Gelephu
2017	August 8	Flash Flood	Dhaura River, Manas	Gelephu
2017	August 10	Heavy rain caused flood	Mao River, Aichhu	Gelephu
2017	September 4	Heavy rain caused flood	Dhaura River	Sarpang
2017	August 13	Small Flash Flood	Cherichhu, Wangchhu	Thimphu
2017	October 12	Flood	Manas	Mongar
2017	August 9-11	Flood	Punatsang chhu	Punakha
2018	June 13	Flash flood	Manas	Lhuentse
2018	July 22	Flash Flood	Mithimdrang stream, Manas	Trashigang
2018	August 1	Flash Flood	Buna Stream, Manas	Trashigang
2019	June 24	Heavy Rain	Aichhu (stream beneath the bridge)	Gelephu
2019	April 29	Flash Flood	Lekpagangchhu stream, Manas	Lhuentse
2019	July 25	Flash Flood	Manas	Lhuentse
2019	July 26	Flash Flood	Wangchhu	Chukha
2019	August 6	Flood	Punatsangchhu	Punakha
2020	July 20	Flood	Mao River	Gelephu
2020	October 1	Flash Flood	Chamdey Gangchu Stream, Manas	Trongsa
2020	October 4	Flash flood	Puntsangchhu	Wangdue Phodrang
2021	June 15	Flash Flood	Khenbachhu	Trongsa
2021	June 16	Flash flood and landslide	Punatsangchhu	Gasa
2021	August 8	Flash flood	Serkang stream, Manas	Trashiyangtse
2021	August 26	Flash flood	Punatsangchhu	Gasa
2021	August 25	Flood	Maochhu	Sarpang

Source: NCHM, [Climate & Hydrological Extremes events\(2017-2021\)](#)

❑ Total of 567 Glacial lakes (17 PDGL)



Source: NCHM, BGLI, 2021. Distribution of Glacial Lakes

2. Bhutan's engagement in L&D

1. Bhutan was member for the “Transitional Committee” -FRLD
2. Institutional Arrangements:
 1. L&D Negotiation: DECC-Lead L&D Negotiation during SB/COPs.
 2. National Liaisons from Bhutan to Santiago Network: DECC
 3. FRLD Focal points: DECC & MoF
 4. L&D TaskForce-Technical Team
 5. L&D Knowledge Product: National level L&D Assessment 2025

Work in progress:

1. SNLD-TA requested(Framework/Capacity/Data)
2. FRLD proposal-Work on progress



3. Assessment Methodology



- Country-led participatory approach
- Consultations across sectors & districts
- Field visits & data review
- Stakeholder workshops & inputs
- Review of existing L&D knowledge products & Technical Guides-ExCom/SNLD/FRLD



4. Key Findings:

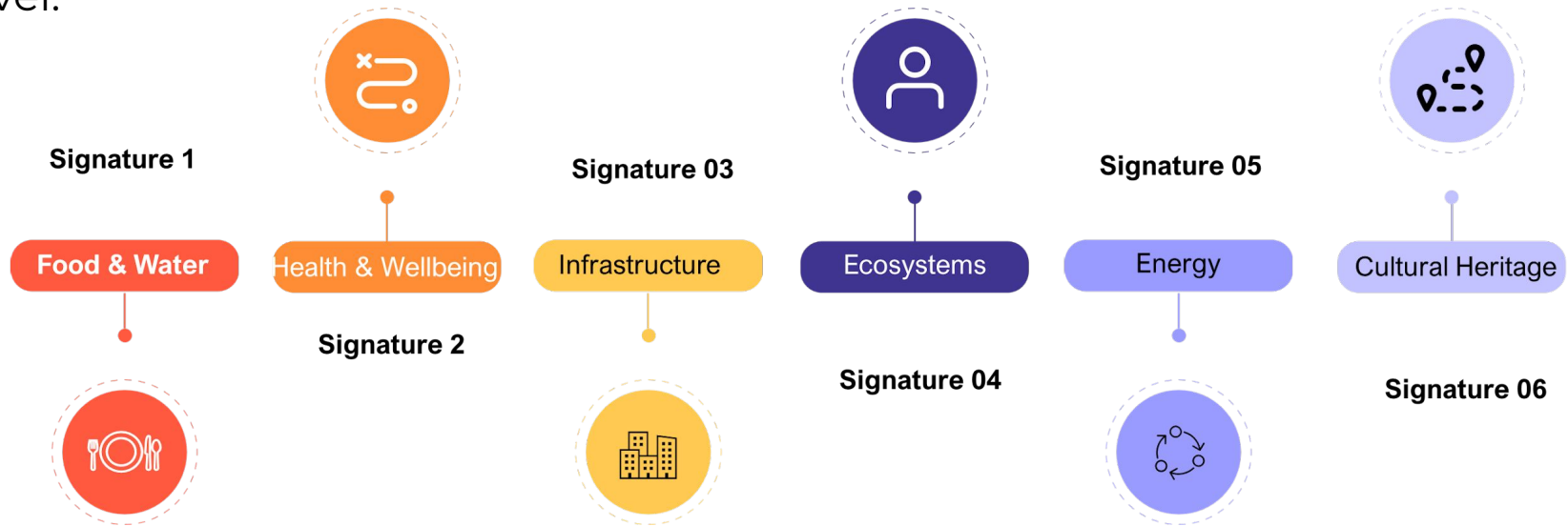
Bhutan's definition of Loss and Damage:

Loss and Damage refers to the adverse impacts of climate change on Bhutan's people, culture, environment, and economy, arising from extreme weather events including but not limited to floods, Glacial Lake Outburst Floods (GLOFs), landslides, forest fires, heatwaves, windstorms, and erratic precipitation patterns and slow-onset events such as glacial retreat, droughts, monsoon breaks, and changing temperatures. It encompasses both economic and non-economic losses, including harm to lives and livelihoods, health, natural resources, cultural heritage, infrastructure and erosion of traditional knowledge. These losses are particularly severe due to Bhutan's mountainous and fragile ecosystems and disproportionately affect the vulnerable groups and communities. They occur despite Bhutan's significant efforts to remain carbon neutral and climate-resilient, undermining its pursuit of Gross National Happiness.



Six Signature Solutions

The six Loss and Damage signatures represent Bhutan's most significant and recurring climate-related impacts across sectors. They provide a structured way to identify, monitor, and address climate-induced economic and non-economic losses at the national level.





Complementary to this definition, Bhutan identifies six **L&D signatures**:

1. Food and water insecurity due to changes in temperatures, erratic precipitation, windstorms, droughts, and land degradation
2. Impacts on human health and wellbeing due to heatwaves, forest fires, landslides, and floods
3. Infrastructure and property damage due to floods, GLOFs, windstorms and landslides
4. Impacts on terrestrial and freshwater ecosystems due to changes in temperatures, glacier melt, and forest fires
5. Energy insecurity due to glacier melt, changes in precipitation, and GLOFs
6. Impacts on cultural heritage due to glacier melt, floods, and forest fires

Case studies of loss and damage in Bhutan

Case study 1: Landslides and flash flood in Dechencholing-Capital City

Cause: Intense thunderstorm → heavy rainfall → landslides & flash floods.

Hydrological factors: Overflowing rivers and landslide debris creating temporary dams.

Economic losses: Damage to homes, shops, roads, water & electricity infrastructure; ~40 vehicles lost; Nu 10 million (~USD 117,647) in relief & debris clearance.

Non-economic losses: 84 families displaced, 2 schools temporarily closed, psychological stress, disrupted daily life, blocked access to community sites.

Recovery & impact: 12-day initial restoration; long-term recovery ongoing, straining local and national resources.

Significance: Illustrates both economic and non-economic L&D, highlighting need for sustained financial & technical support.





Case study 2: Flash flood in Punakha district

Cause: Intense monsoon rainfall → riverbank collapse and slope instability.

Infrastructure & economic losses: Highway & farm roads destroyed; bridge affected 42 households; reconstruction cost ~Nu 46.3M (USD 545,091).

Non-economic losses: Reduced mobility, limited access to food, health services, and education; disrupted school-exams and healthcare.

Community-led response: 50 households contributed labour; local government provided partial support; restoration took ~2 weeks.

Significance: Illustrates complex climate-induced L&D and need for targeted financial and technical support for vulnerable communities.



Case study 3: Growing threat of Glacial Lake Outburst Floods



Floods – A case of severe projected loss and damage

Growing threat: Accelerated glacial melting increases risk of GLOFs; 17 high-risk lakes require monitoring.

Economic & infrastructure impacts: Threatens hydropower dams, settlements, agriculture; flooding and debris can disrupt electricity generation and require costly repairs.

Non-economic/cultural losses: Historic sites like Punakha Dzong face irreversible damage; cultural and spiritual losses are significant.

Early Warning Systems (EWS) gaps: partially inactive sirens; limited real-time data and poor integration across basins.

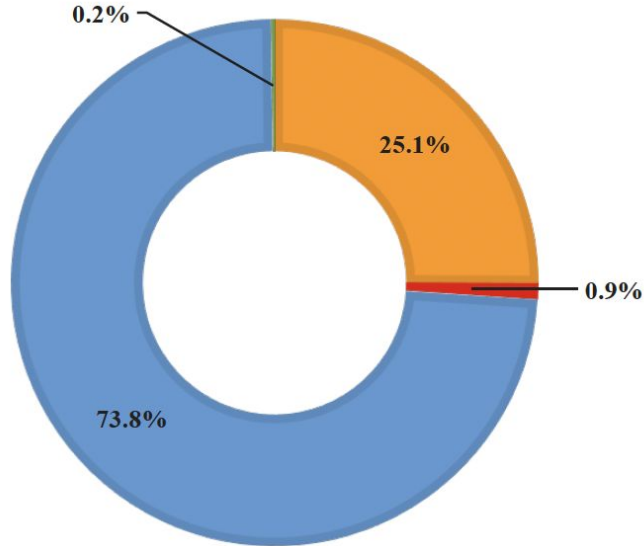
Required actions: Upgrade and unify EWS with modern sensors, real-time monitoring, and better national-local coordination.

Status of Water Sources in Bhutan

- Assessment and mapping of water sources in Bhutan in 2021 : 7,399 water sources.



- Drying
- Dried Up
- No Change
- Others



5. Lesson Learned



1. Valuation Gaps

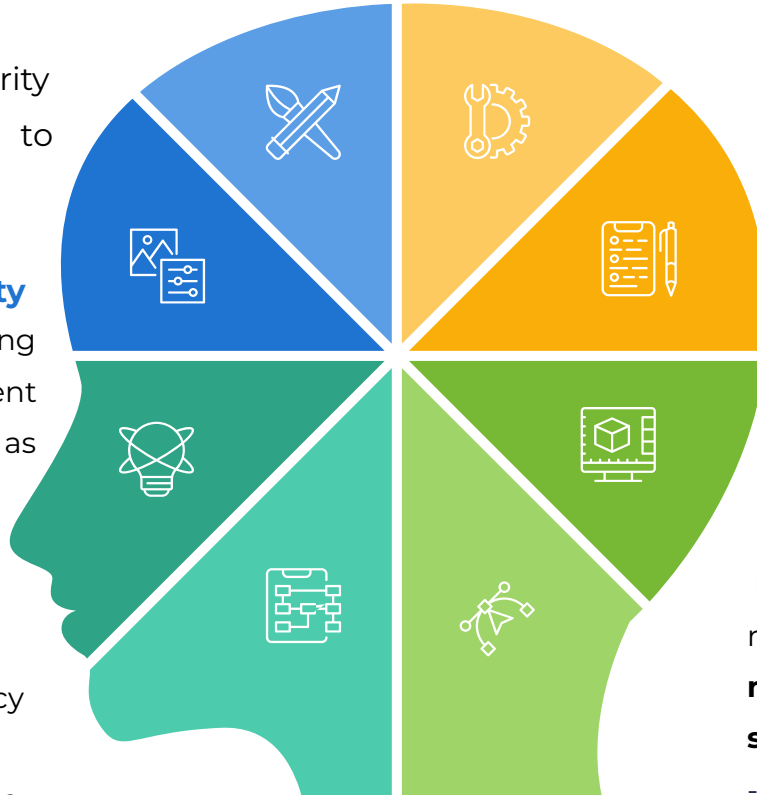
Health, mobility, and food security losses are underreported due to **lack of standardized reporting**.

2. Infrastructure Vulnerability

Critical infrastructure and housing remain at risk. Climate-resilient structures **may still be insufficient** as extreme events intensify.

3. Coordination and Communication

Clear mandates, inter-agency protocols, and **efficient communication**- reduce response delays and support communities



4. Community Engagement

Local communities play a key role in **early response and recovery**. Support with **financial and institutional resources** is essential to avoid disproportionate burdens.

5. Budgetary Support

Funding is crucial for disaster risk reduction, response, and **modernizing early warning systems and hazard mapping**.

-Engagement with FRLD and ExCom-SNLD

6. Conclusion



1. Data Systems

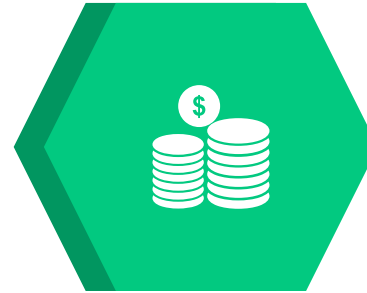
Map data systems, indicators, and ownership roles across all sectors.

Identify gaps and disparities in data availability and measurements for Loss & Damage (L&D).



2. Build an Integrated Indicator System

Ensure consistent data collection and reporting. Capture both projected vs. observed L&D and small-scale, localised events often overlooked.



3. Strengthen Institutions: Coordination & Policy Alignment

Adopt a collaborative, participatory approach in designing the L&D framework. Integrate L&D considerations into national climate policies.



SEEKING SUPPORT FROM THE INTERNATIONAL COMMUNITY

L&D Projects support and collaboration with ExCom-SNLD/FRLD / international Partners

THANK YOU