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A large photograph of a landslide in Nepal, showing a steep, rocky slope with a large area of exposed, light-colored soil and rock. The foreground shows terraced fields and some trees. The image is split diagonally, with the top left portion being a solid blue color containing the logos and text, and the bottom right portion being a light gray color containing the title.

# LOSS AND DAMAGE FROM A CATASTROPHIC LANDSLIDE IN NEPAL

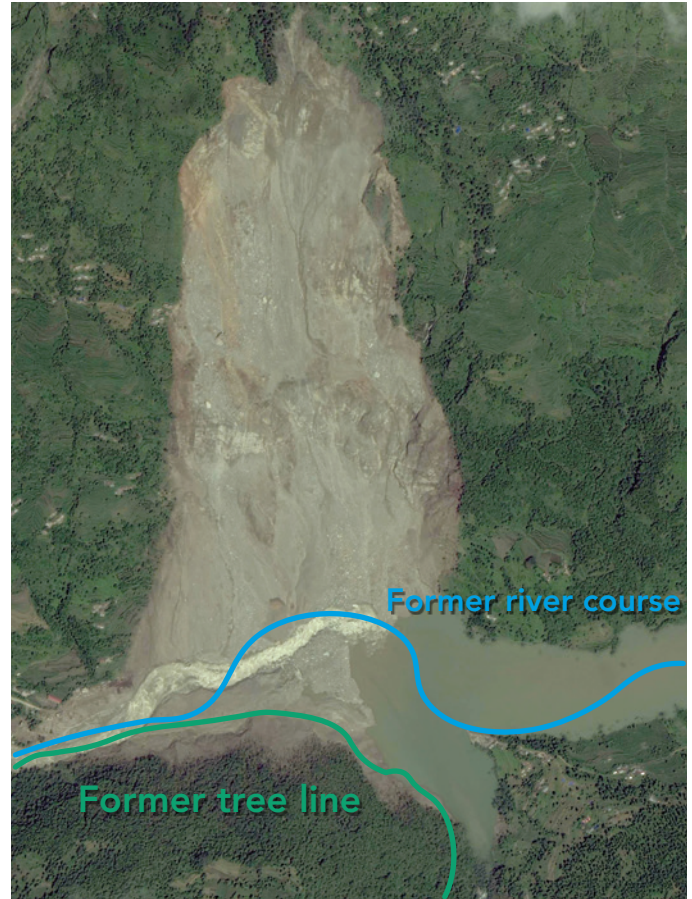


# WHAT HAPPENED?

On 2 August 2014, a major landslide struck in a densely populated area 80 km northeast of Nepal's capital Kathmandu in Jure, Sindhupalchok District. With a death toll of 156, it was one of the deadliest landslides in Nepal's history. The landslide had a length of 1.26 km and was 0.81 km wide at the bottom. It destroyed all land, houses, properties and infrastructure in its path and created a 55m-high dam in the Sunkoshi River. Behind the debris dam, a 3 km long lake inundated houses, farms and a hydropower plant. The Araniko Highway, Nepal's only road connection to China, was severely damaged, leading to nation-wide impacts.



Landslide area 25 October 2012  
Source: Google Earth



Landslide area 10 August 2014  
Source: Google Earth

## RESEARCH QUESTION:

What losses and damages did the 2014 landslide in the Sindhupalchok District cause to households in the area; how effective were their preventive and coping measures; and what were the major constraints?

## ATTRIBUTION TO CLIMATE CHANGE?

Landslides are often triggered by extreme rainfall events, but the existence of a causal relationship with climate change is uncertain. While climate change alters the conditions that underlie the region's weather, the Jure landslide was also caused by factors such as unsustainable land use, the absence of effective water-channeling mechanisms, a weak geology and steep slopes. Thus, although anthropogenic causes may have increased the likelihood of a landslide to occur, it cannot be pinpointed as its definitive cause.

## WHAT IS LOSS AND DAMAGE:

Adverse effects of climate-related stressors that have not been or cannot be avoided through mitigation and adaptation efforts.

# FINDINGS

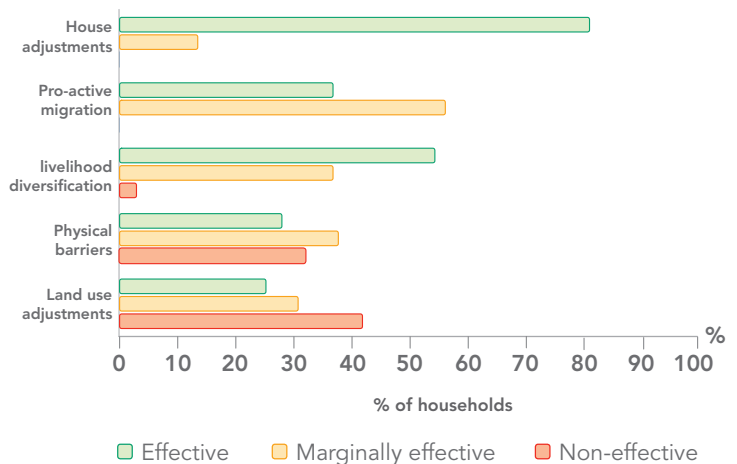
The findings are based on questionnaire interviews with 234 households in the Sindhupalchok District

## HOUSEHOLD PROFILE

- Gender of household head: 81.5% male.
- Livelihood: 94.4% have at least three sources; 98.7% are farmers.
- Median land ownership: 3,200 m<sup>2</sup> (0.32 ha).
- Poverty: 76.8% live below a poverty line of \$1.25/capita/day. Median: \$0.6/capita/day.
- Education: 28.2% of respondents have never been to school.

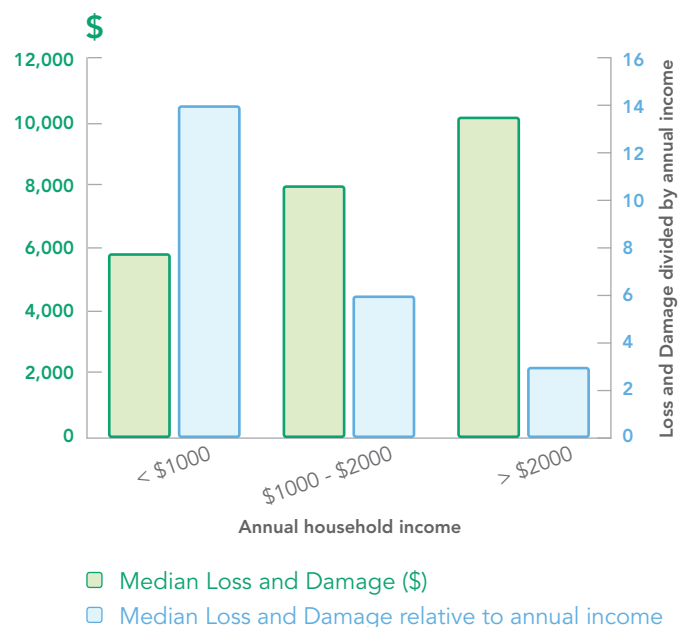
## Preventive measures

- Uptake: 65.3% adopted measures; most common measures were livelihood diversification (41.6%) and placing physical barriers (37.6%).
  - Most successful: House adjustments and pro-active migration.
  - Least successful: Physical barriers and land-use adjustments.
- Nobody expected a landslide of this scale, and therefore, preventive measures by households and organizations were limited.



## Impact

- Most common impact types: Loss of crops (79.9%), land (79.1%) and mental stress (68.4%).
  - Most costly impact type: Loss of land. For 67% of the respondent households, the value of land losses was more than \$1000.
- Households in the lowest income group were the most severely affected. They lost a median of 14 times their annual earnings. They may never return to the level of assets, livelihood security and well-being they had prior to the landslide.
- Households in the highest income group had higher absolute losses (median: \$10,300), but the value of losses was much less in relative terms (three times the annual earnings). Still, it will take them years to recover from the landslide impacts.



# Landslide impact map

### Impact types

Icons appear when > 50% reported experiencing the impact

#### LIVELIHOOD

Crops

Livestock

Soil/Land

Trees

#### ASSETS

Housing

Drinking water

Properties

#### NON-ECONOMIC

Health

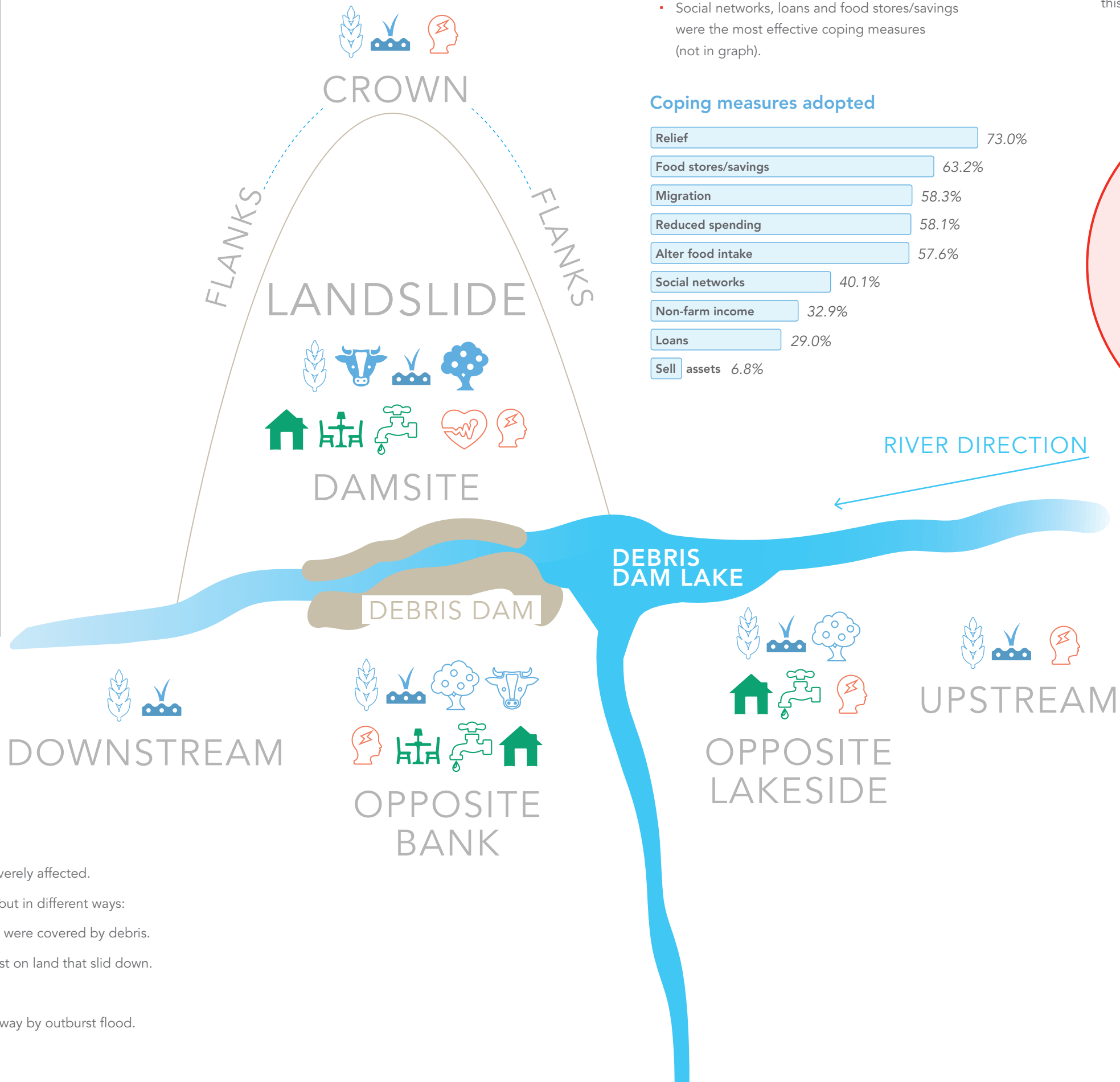
Mental stress

The difference between colour icons and white icons is based on the average impact costs.

- Solid: More than \$1000
- White: Less than \$1000

## Map Summary

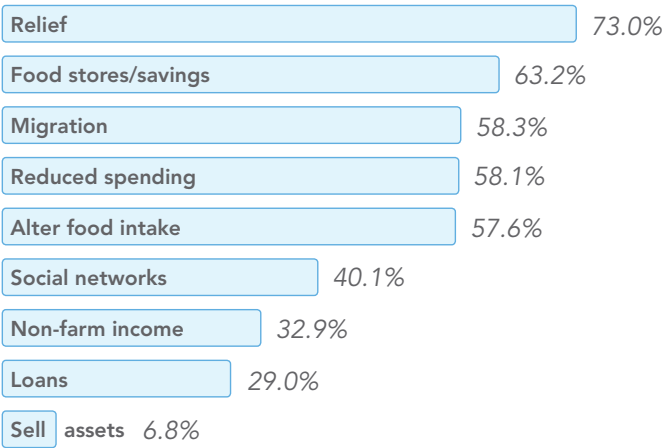
- Area around debris dam was most severely affected.
- Crops were affected in all study sites but in different ways:
  - Damsite and opposite bank:** Crops were covered by debris.
  - Crown and flanks:** All crops were lost on land that slid down.
  - Upstream:** Crops were inundated.
  - Downstream:** Crops were washed away by outburst flood.



# Coping

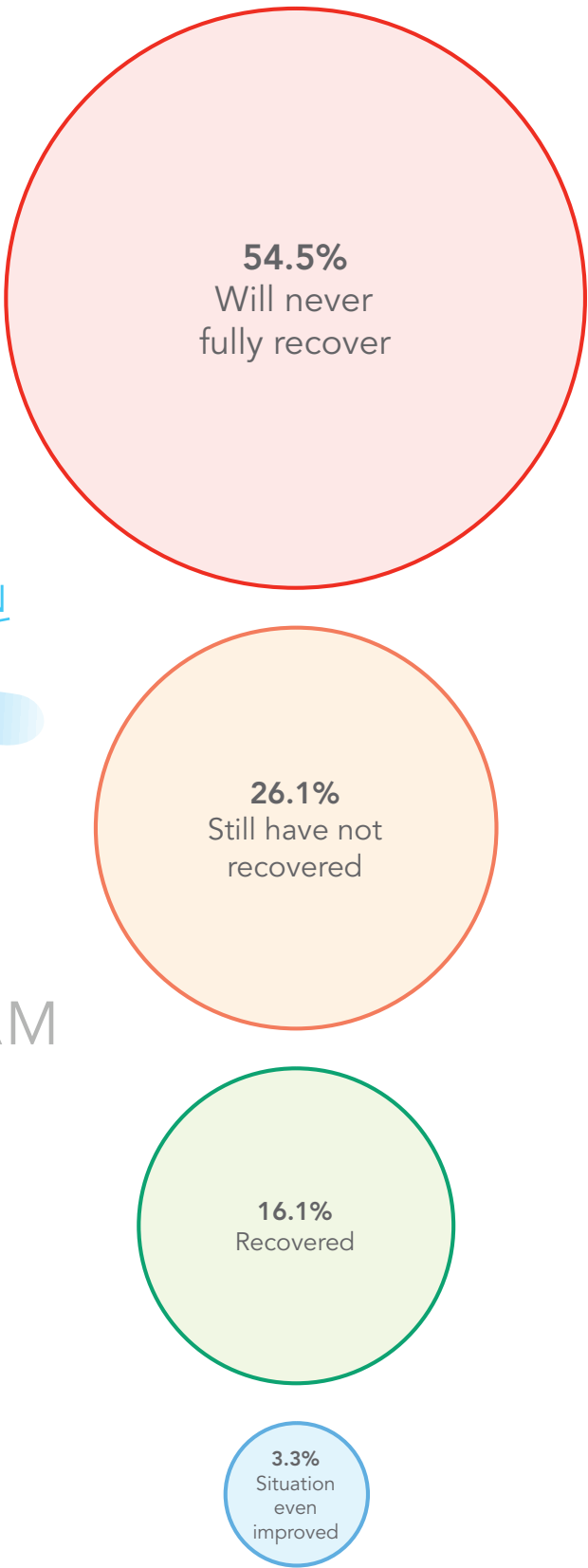
- 78% adopted three or more measures to cope with landslide impacts.
- Social networks, loans and food stores/savings were the most effective coping measures (not in graph).

## Coping measures adopted



# Recovery

- Over half of the households think they will never recover from the impacts of this landslide.



# Conclusion

- While prevention is better than cure, as is too often the case with disasters, little was done to prevent landslide impacts. Much more resources went into post-disaster relief.
- Besides loss of life, houses and land, people in the area suffered a wide range of impacts from the landslide, particularly on their livelihoods. This challenges the narrow definition of 'affected households' that the government and aid organizations used to distribute relief.
- For discussions on loss and damage valuation and compensation, the household impact analysis demonstrates an important lesson learned: The people who are in most dire need of support for survival and recovery end up receiving the least because their losses are lower in monetary terms.
- For the first time, this study assessed both what people did to prevent and cope with disasters and how effective the individual measures were.
- The new methods toolbox used for this case study was a valuable resource for understanding not just **what** is lost in disasters, but also **how** and **why**.

# Policy implications

To address loss and damage:

AVOID LANDSLIDES	MINIMIZE IMPACTS	TACKLE RESIDUAL IMPACTS
<ul style="list-style-type: none"> <li>• Place barriers against land erosion.</li> <li>• Plant trees.</li> <li>• Raise people's awareness locally of landslide risks and the importance of sustainable land use.</li> <li>• Scientific research: Identify high-risk areas, e.g. using the Landslide Susceptibility Index (LSI.)</li> </ul>	<ul style="list-style-type: none"> <li>• Resettlement: Away from high-risk areas.</li> <li>• Assisted migration.</li> <li>• Early Warning Systems (EWS).</li> <li>• Design escape routes.</li> <li>• Fortify river embankments to minimize impacts of debris lake outburst floods.</li> <li>• Promotion and support of more resilient building methods.</li> <li>• Conduct risk-assessments for infrastructure.</li> <li>• Sanitary facilities/equipment after disasters to limit spread of disease.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide compensation to affected households.</li> <li>• Provide affordable loans to facilitate recovery.</li> <li>• Support and promote non-farm income opportunities to people who lost their land.</li> <li>• Provide subsidized and affordable insurance against impacts of landslides and other disasters.</li> </ul>

## CONTEXT: METHODS TOOLBOX FOR ASSESSING LOSS & DAMAGE IN VULNERABLE COMMUNITIES

The Nepal case study was conducted to test a new methods toolbox for assessing Loss & Damage in vulnerable communities. Besides the Nepal case study, the method toolbox has been tested in India (cyclone) and Pakistan (drought and floods). The toolbox is unique in that its methodology is people-centered and combines qualitative and quantitative research tools that go beyond a simple stocktaking of disaster losses. The toolbox can play a significant role in enhancing the understanding of loss and damage, which is a key objective of the Warsaw International Mechanism

The toolbox was designed at the United Nations University Institute for Environment and Human Security (UNU-EHS), with financial support from the Asia-Pacific Network for Global Change Research (APN). LEAD-Pakistan was the project consortium lead and the field work in Nepal was organized by the Integrated Development Society Nepal (IDS-Nepal).

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