

# Loss & Damage

## Repairing shattered lives

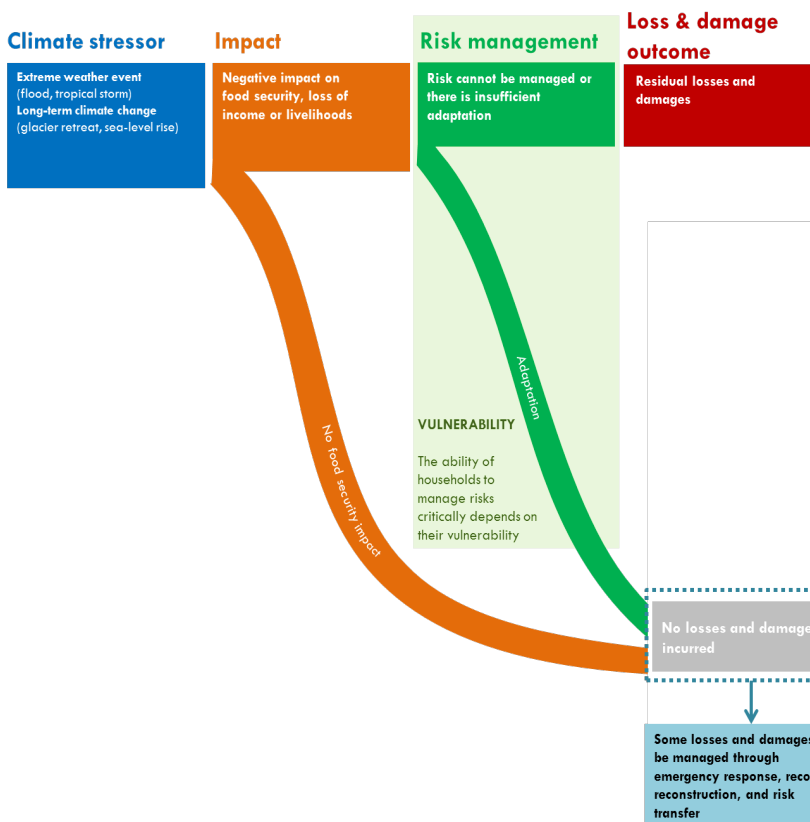
**Loss and Damage (L&D)** refers to the unavoidable consequences of climate change resulting from either **climate-related extreme events** (such as floods, storms, and droughts) or **through longer-term climate variability** (such as sea-level rise and glacier retreat). L&D can have significant implications for food security, and as such are a serious concern for developing countries and the World Food Programme. The key question in the L&D discourse is how to appropriately manage unavoidable impacts of climate change.



# 1

## unavoidable climate impact

This black & white paper examines how the United Nations Framework Convention on Climate Change work plan on Loss & Damage relates to food security and livelihoods, and proposes recommendations for managing loss and damage based on evidence from Asian countries.



### Schematic representation of loss and damage in the context of food security.

The diagram highlights a framework for identifying loss and damages related to food security, whereby:

1. A **climate-related stressor** affects a region or population;
2. The climate stressor may or may not have an **impact on food security and/or livelihoods** (if there is no impact, no losses and damages are incurred);
3. If there is a negative impact on food security and livelihoods, vulnerable populations may or may not be able to effectively **manage the impact** (if the risk is managed through adaptation, there are no losses and damages);
4. If adaptation is not possible or sufficient, then there are **losses and damages**.
5. Some **loss and damage can be managed** through emergency response, recovery, reconstruction, and risk transfer.

Loss and damage are the residual effects of climate change that are not managed through adaptation efforts – either because:

- measures to adapt are *insufficient* to avoid loss and damage,
- measures to adapt are *too costly* and do not yield immediate benefits to vulnerable populations,

- Maladaptation measures to adapt *degrade community assets* making people more vulnerable, or
- *no measures* can be adopted due to lack of capacity, knowledge of potential impacts, or financing.

### KEY DEFINITIONS

**Climate change:** A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

**Loss and damage:** Residual impacts of climate change on communities that are not managed through adaptation efforts.

# 2

## implications for food security

Unavoidable loss and damage resulting from climate change will affect food security in several complex ways. The table below provides examples to illustrate how loss and damage could affect the different dimensions of food security.

<b>FOOD SECURITY DIMENSION</b>	<b>EXAMPLES OF LOSS AND DAMAGE</b>
<b>Availability</b> <i>(sufficient quantity of food for consumption)</i>	<ul style="list-style-type: none"><li>✓ Extreme weather events such as storms, floods, or droughts could result in crop losses and damage to agricultural land</li><li>✓ Gradual changes in climatic conditions – such as changes in rainfall trends, increasing glacier retreat, sea-level rise – could render certain regions unproductive, thereby resulting in loss of productive agricultural land</li></ul>
<b>Access</b> <i>(ability to obtain food regularly through own production or purchase)</i>	<ul style="list-style-type: none"><li>✓ Lower yields due to climate stressors could result in income losses</li><li>✓ Extreme weather events could result in significant crop losses and drive food prices upward in global markets</li><li>✓ Gradual changes in climate conditions could result in loss of livelihood opportunities as certain activities become unfeasible in certain areas</li></ul>
<b>Utilisation</b> <i>(quality and safety of food, including nutrition aspects)</i>	<ul style="list-style-type: none"><li>✓ Changes in rainfall patterns can affect the quality of food, resulting in nutritional losses</li><li>✓ Changes in climatic conditions can affect the timing of disease patterns, with significant effects on health and malnutrition</li><li>✓ Droughts and floods have been linked to long-term detrimental effects on nutrition</li></ul>
<b>Stability</b> <i>(risk of losing access to resources required to consume food)</i>	<ul style="list-style-type: none"><li>✓ Increasing intensity of extreme weather events will likely result in losses or damage to food supplies</li><li>✓ Increasingly erratic weather patterns will result in losses of income from rainfed agriculture and other climate-sensitive livelihoods</li></ul>

One of the most quantifiable effects of residual L&D in the context of food security is the effect of climate change on agricultural production. Evidence from several Asian countries suggests that increases in temperature, erratic rainfall patterns, changes in seasonality, and climate extremes all affect agricultural production.

For instance, crop and climate models suggest that, for every degree Centigrade increase in temperature, between 4 and 5 million tonnes of wheat are lost in South Asia. This is especially the case if increases in temperature coincide with key stages of crop development. In 2004, temperatures in the Indo-Gangetic Plains were higher by an average of 3-6 degrees Centigrade during the cropping season. This trend caused wheat to mature between 10 and 20 days earlier resulting in decreases in production of up to 4 million tonnes in the region.

Gradual changes in climatic conditions, too, could render certain regions unfit for agricultural production. As glaciers retreat and eventually become entirely depleted, areas that depend on glacier melt for their water in the Indo-Gangetic Plains may be unable to produce key crops with important implications for food security at the regional and global levels.

L&D can also occur through longer-term impact on livelihoods. Climate risks may damage key natural resources such as land and water, as well as important assets. Where loss and damage has been severe, traditional livelihoods may no longer be possible.

To illustrate, typhoon Haiyan hit the Philippines in November 2013. The typhoon – one of the strongest ever recorded – destroyed over 130, 000 hectares of farmland, resulting in losses of 145, 779 metric tonnes of rice, and financial losses of almost US\$200 million. Coconut farmers, in particular, are especially affected as coconut trees take up to ten years to become productive.

In Nepal's Far Western Himalayan and hill regions, evidence suggests that the intensity of winter drought has increased, while the monsoon rains have become increasingly erratic. Together, these two trends have negative implications for food security. Of particular concern is the increasing intensity of the winter drought – during the winter

months, communities in the Far Western regions depend increasingly on markets for their food as production for own consumption is not feasible. As the winter drought becomes longer and more intense, communities will continue to depend critically on their limited savings to access food. This concern will be exacerbated by unprecedented glacier melt. Communities in the Far Western mountain regions of Nepal depend on glacier melt for agricultural production. Glacier retreat will have significant implications for the availability of water in the longer-run.

Climate change may also result in loss and damage related to nutrition. Directly, changing climate patterns could result in crop and livestock failure and therefore affect calorie consumption, diet quantity, and diet diversity. Climate-related shocks impact dietary diversity and reduce overall food consumption with overall long-term detrimental effects on stunting. Indirectly, climate change could exacerbate health problems through changing disease patterns, as well as inadequate care practices due to livelihood pressures on mothers.

Evidence from South Asia suggests that climate-related hazards have negative impacts on stunting rates. For instance, in eastern India exposure to recurrent floods has been linked to increased malnutrition. Households affected by floods have up to 60 per cent higher stunting rates, and up to 86%

higher prevalence of underweight, compared to non-flooded households within the same community.

Similarly, droughts can result in loss of certain types of nutritious food and impact on malnutrition. As higher malnutrition increases the risk of acquiring an infectious disease, there may be additional health-related losses and damages, such as increased mortality. In Bangladesh, droughts have resulted in lack of food which is associated with an increased risk of mortality from diarrhoeal disease.

# 3

## assessment challenges

Assessment of loss and damage is extremely complicated – especially for future food security due to several inter-related factors:

*It is difficult to isolate the impacts of climate change.* Food security depends on a number of factors, not all of which are affected by climate. In such cases, negative food security outcomes may be incorrectly interpreted as being affected by climate. Where climate change does act as a hunger risk multiplier, exacerbating key food insecurity drivers such as resource scarcity, magnitude of disasters, and unpredictability of weather conditions, it may be difficult to separate food security impact of pre-existing vulnerability from impact due to climate change.

*It is impossible to model societal responses to climate change.* Loss and damage in the long-term is especially difficult to quantify as populations adapt to climate change, either at the community level (through changes in livelihood activities) or at the regional or global levels (through increased trade relations or migration).

*Uncertainties in climate science exist.* Global and regional climate models are continually improving. However, uncertainties remain – particularly for key issues such as the effect of climate change on cyclone intensity in the Pacific, glacier retreat in the Himalayan mountain range, and the expected rate of sea-level rise in coastal megacities in Asia. Another key challenge in climate models relates to the timeframes used for analysis. Most of the model outputs generate information for the long-term (2050 and beyond). Shorter-term decadal outputs are still largely under-developed.

*Certain losses and damages are unquantifiable* and are therefore harder to assess. Some losses and damages, for example, to ecosystem function or to indigenous knowledge may have significant impacts on livelihoods but are difficult to quantify. It is therefore difficult to establish a baseline against which to measure loss and damage.

To date, quantitative assessments of loss and damage are primarily based on historical events. Assessments of future loss and damage, for example through gradual changes in seasons and sea-level rise, remain qualitative. Where possible, analogous historical events are used to identify potential effects in the future – but these remain speculative. This is an area that needs to be developed further considering the uncertainties involved.

# 4

## emerging approach for WFP

For WFP, loss and damage resulting from climate change means additional humanitarian and food security challenges for the most vulnerable communities. Concretely, loss and damage could result in a wide range of impacts – ranging from land degradation, loss of assets, loss of key natural resources such as land and water, and loss of livelihood options, all of which can lead to destitution, displacement, and humanitarian crises.

WFP will remain engaged on discussions on L&D to provide its expertise and experience in preparing for and responding to L&D events. WFP's expertise on this topic was recognized at COP-19 in the background papers prepared by the UNFCCC Secretariat, some Parties and civil society, with mentions of WFP's work in building climate resilience, and in its R4 Rural Resilience Initiative. WFP is also planning to develop tools and services to provide governments with a better evidence base for understanding loss and damage implications for food security.

WFP is working with a number of key government partners and scientific institutions to better understand the potential loss and damage. The focus is only on impacts related to food and nutrition security, and livelihoods.

This type of collaboration will be based on an experimental analytical framework that (1) analyses climate impacts on food & nutrition security and livelihoods based on historical trends, (2) develops climate scenarios, (3) identifies potential loss and damage to vulnerable populations based on these scenarios, and (4) identifies priority interventions to better manage loss and damage to enhance food security. The approach provides an overview of loss and damage over time, including impact of rapid-onset and slow-onset disasters.

**1. Climate risk and food security analysis.** WFP currently works with national governments, national meteorological services, and international climate research institutes to assess historical and future climate trends, as well as their impact on food security and livelihoods.

**2. Climate scenarios.** As a next step, WFP will work in close collaboration with meteorological services and climate research centres to interpret climate change projections and trends in terms of food security impact.

**3. Estimate loss and damage.** Climate scenarios will be integrated into WFP's shock model to provide an estimate of the loss and damage implications for food security.

**4. Identify priority interventions.** WFP will work with governments and partners to identify priority food security interventions using innovative tools and services such as sets of maps highlighting where loss and damage has been *incurred* and where it can be *anticipated*.

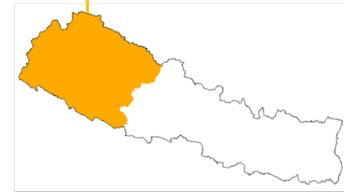
WFP will work closely with governments to integrate the analysis into relevant national policies, plans, and mechanisms. This process will examine options for (i) reducing climate risk to avoid loss and damage, (ii) options for strengthening national preparedness and response capacities (this will include looking at strengthening the interface between national capacities and the international humanitarian system), and (iii) planning options for addressing the risks posed to food security and nutrition by slow on-set events. In Asia, this approach will first be piloted in Nepal.

## INCURRED LOSS & DAMAGE

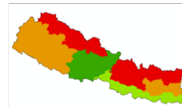


### Drought

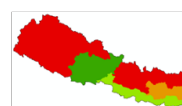
The 2008/2009 winter drought - one of the worst in the country's history - destroyed crops across Nepal, with wheat and barley production reduced by almost 15 percent. Crop yields in Mid- and Far-Western Nepal - which received less than 50 percent of average rainfall during the winter - dropped by more than half. Over 2 million people were affected. This type of drought will likely become more frequent under a climate change scenario.



Current food security status

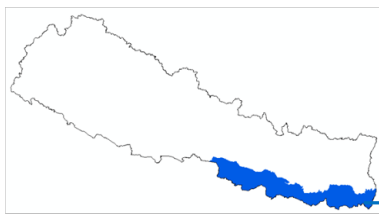


Food security L&D scenario



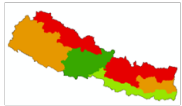
**Food security implication:** deterioration of food security in the Mid- and Far Western regions

## ANTICIPATED LOSS & DAMAGE

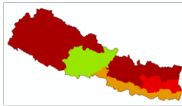


Increased flood risk due to more extreme monsoons in the eastern Terai threatens to result in significant losses to rice production. As the majority of rice is produced in the Terai, permanent loss of land could have devastating impact on food security for the whole country.

Current food security status

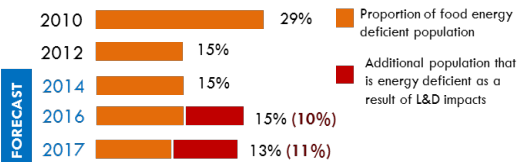


Food security L&D scenario

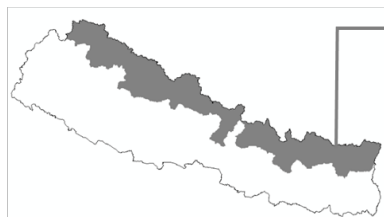


**Food security implication:** deterioration of food security across the entire country

Modelled shock impact on food security in Eastern Terai (Siraha District)



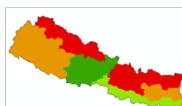
According to historical data, floods occur every 4 or 5 years with significant losses in crop production. A shock in 2016 would have a detrimental effect on those households that depend critically on their own production for their food needs and would almost double the proportion of households that are food energy deficient.



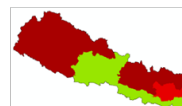
### Glacier melt

Over 3,000 Himalayan glaciers provide water for agriculture in the mountainous regions of Nepal (where rainwater is scarce), and also contribute to 70% of the Ganges' river flow during the spring and autumn seasons. By mid-century, all glaciers in Nepal are expected to melt or shrink significantly. This trend would substantially result in loss of water for agricultural use, loss of mountain crops, and could exacerbate drought risk.

Current food security status

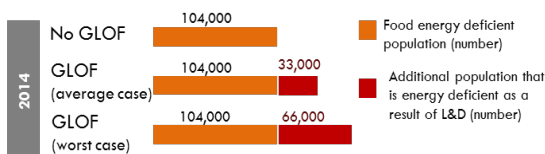


Food security L&D scenario



**Food security implication:** deterioration of food security across regions of the country that depend on glacier melt water. Deterioration of food security downstream in India and Bangladesh as key river basins are not replenished.

Modelled GLOF impact on food security in Baitadi District (Far Western)



Glacier lake outburst floods have direct effects on crop production and indirect effects on food prices and other incomes. Without a GLOF, the current proportion of food deficient population would stand at 40% (104,000 people). With a major GLOF destroying between 30 and 80 percent of cereal production, the food security situation of mountain and hill communities would deteriorate substantially. In Baitadi District, between 53%, i.e. 33,000 additional persons (average case, where 30% of crops are destroyed), and 64%, i.e. 66,000 additional persons (in the worst case, where 80% of crops are lost) would experience food insecurity in these scenarios.



## **ABOUT THE BLACK&WHITE PAPER SERIES**

This document is produced as part of the WFP Black & White Paper Series. Produced by the WFP Regional Bureau for Asia, the series provides a brief overview of emerging topics from a food security perspective. These white papers are meant to be papers for discussion, debate, and information.



## **ABOUT C-ADAPT**

The production of this white paper has been made possible through the generous contribution of the Government of Sweden through C-ADAPT. C-ADAPT is a strategic global initiative that aims to strengthen the capacity of WFP and partners to deliver climate services to the most vulnerable and food insecure communities and build resilience to climate-related risks through effective climate risk analysis, adaptation planning, and risk management. C-ADAPT is funded by the Government of Sweden's fast-track climate finance.

## **FURTHER READING**

- ✓ The UNFCCC website on the loss and damage work stream includes updates on the UNFCCC negotiations related to L&D as well as outputs from workshops and meetings.
- ✓ The Loss and Damage in Vulnerable Countries Initiative, initiated by the Government of Bangladesh, aims to move forward the debate on L&D as it relates to the least developed countries.