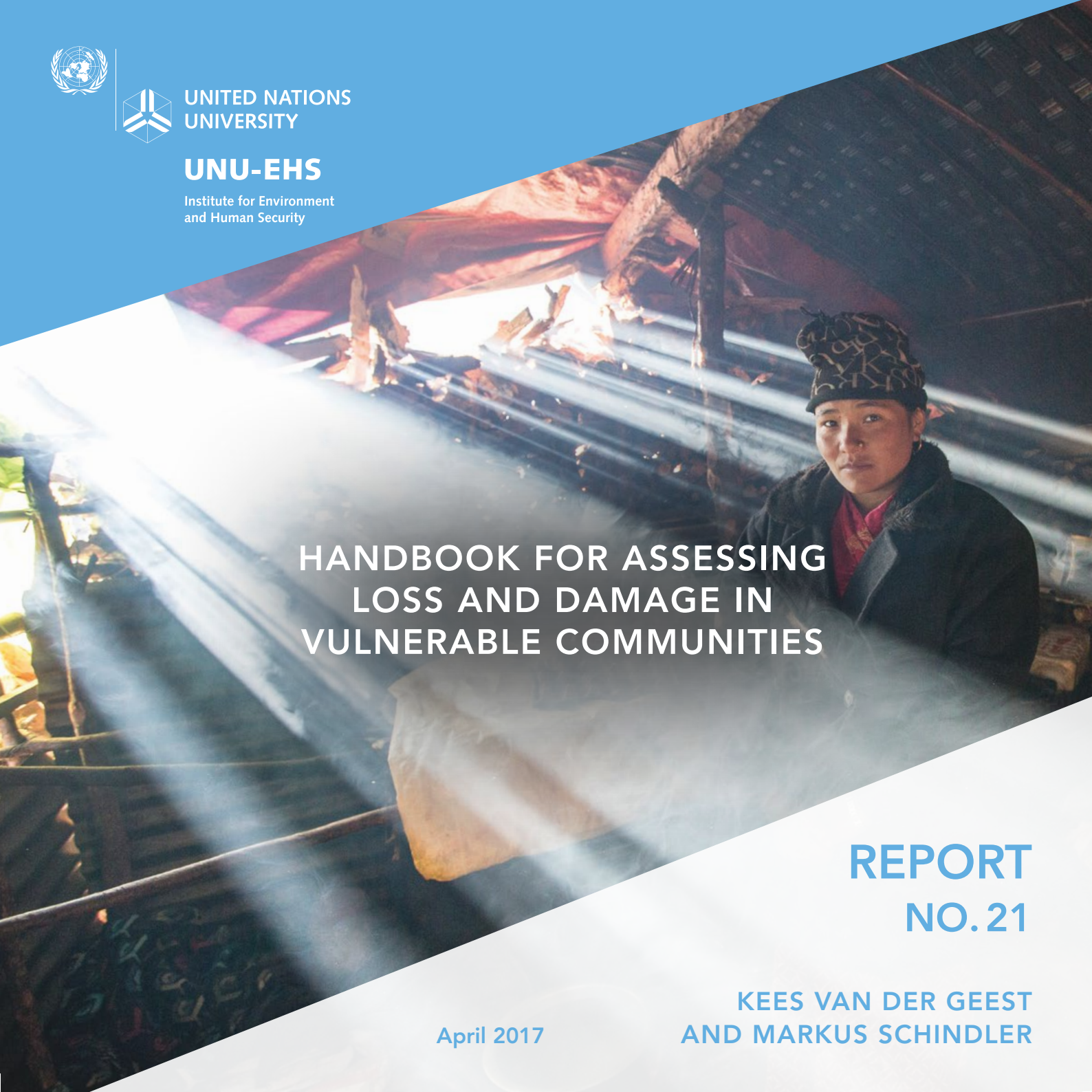

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HANDBOOK FOR ASSESSING LOSS AND DAMAGE IN VULNERABLE COMMUNITIES

REPORT NO. 21

KEES VAN DER GEEST AND MARKUS SCHINDLER

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Authors: Kees van der Geest and Markus Schindler

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List of abbreviations and acronyms

ACPC	African Climate Policy Centre
AIDMI	All India Disaster Mitigation Institute
APN	Asia-Pacific Network for Global Change Research
AR5	Fifth Assessment Report
CDKN	Climate and Development Knowledge Network
CCA	Climate Change Adaptation
CIESIN	Center for International Earth Science Information Network
DRR	Disaster Risk Reduction
ECLAC	Economic Commission for Latin America and the Caribbean
EI	Expert Interview
FGD	Focus Group Discussion
GHG	Greenhouse Gas
GPS	Global Positioning System
IDS	Integrated Development Society
IL	Institutional Landscaping
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Country
MDVI	Multi-Dimensional Vulnerability Index
MDVIs	Multi-Dimensional Vulnerability Indicators
NA	Needs Assessment
NGO	Non-Governmental Organization
PEPA	Participatory Evaluation of Planned Adaptation
PI	Principal Investigator
PRA	Participatory Rural Appraisal
SBI	Subsidiary Body for Implementation
SIDS	Small Island Developing States
SPSS	Statistical Package for the Social Sciences
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy or Disaster Reduction
UNU-EHS	United Nations University Institute for Environment and Human Security
VDC	Village Development Committee (administrative unit in Nepal)
WG2	Working Group 2

Image 1: Lalmati and Bhagatey Tamang, both over eighty years of age, *outside their destroyed house in Gairimudi village, Dolakha.*

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Executive Summary

'Loss and damage' is an emerging topic in climate change negotiations, research and policy as well as in the implementation of climate change action. It also connects the fields of climate change adaptation and disaster risk reduction. Loss and damage results from inadequate efforts to reduce greenhouse gas emissions and insufficient capacity to adapt to climatic changes, to reduce the risks associated with climatic stressors and to cope with the impacts of climatic events. An assessment of loss and damage, as proposed in this handbook, includes measuring what is measurable and qualifying what is not measurable. A key principle of this book is that *understanding* loss and damage, with the aim of eventually minimizing it, is more important than just measuring it.

This publication is primarily concerned with assessing loss and damage in poor, rural areas that are vulnerable to the effects of climate change, but alternative applications of the handbook are outlined in section 7. The title of this publication – "Handbook for assessing loss and damage in vulnerable communities" – conveys three important messages. First, it indicates the scale of the assessment, which is at community-level. The methods can be scaled up for regional or national assessments, but the primary purpose of this handbook is to guide researchers and practitioners to conduct *local* assessments of loss and damage. Second, the term 'vulnerable' indicates that it makes most sense to conduct the assessments in places that are exposed to climatic stressors and have limited capacity to cope and adapt. Third, the notion of 'communities' points to a people-centred approach. The methods proposed in this handbook are rooted in the social sciences, such as human geography, anthropology and development studies. When we talk about 'communities' we do not assume communities are uniform or harmonious in any way. In reality, vast differences in levels and causes of vulnerability exist between households and individuals within communities. The methods proposed in this handbook primarily assess loss and damage at household level to understand these differences within communities.

This handbook is not just about assessing loss and damage, but also about assessing adaptation limits and constraints. We conceptualize loss and damage as adverse effects of climate-related stressors that occur despite mitigation and adaptation. Hence, assessing loss and damage is not just about measuring and evaluating *what* is lost or damaged, but also about understanding *how* and *why* actors incur loss and damage. If loss and damage involves impacts beyond, despite or associated with adaptation, assessing it also involves understanding adaptation costs, limits and constraints.

As loss and damage is a new field in climate change research, no well-developed assessment methods are available to countries and organizations. After the establishment of the *Warsaw International Mechanism for Loss and Damage Associated with Climate Change Impacts* in 2013, a steady increase in empirical work on loss and damage is discernible. This methodological handbook builds on experiences from the first-ever multi-country assessment of loss and damage in vulnerable communities that the United Nations University Institute for Environment and Human Security (UNU-EHS) coordinated in 2012 and 2013. It integrates ongoing thinking about the topic with the aim of sharing lessons learned and advancing methodologies for assessing loss and damage. An early version of this handbook and its research tools have been tested in Nepal, Pakistan and India in 2015. The current version has been refined and enriched with examples from this last round of fieldwork.

This handbook's central idea is that to reduce loss and damage, its causes and consequences need to be better understood. Studying the causes of loss and damage goes beyond climate science as loss and damage results from the combination of biophysical stressors and social vulnerability, including exposure to stressors and lack of coping and adaptive capacity to deal with the stressors. This handbook aspires to become a key instrument and reference for future studies and action on loss and damage.

This methodological handbook aims to provide researchers and practitioners on the ground with a set of tools to conduct high-quality studies on loss and damage as well as adaptation limits and constraints. To achieve this, the handbook divides the assessment of loss and damage in vulnerable communities into seven research domains:

1. **Climatic stressors and perceptions of climatic change;**
2. **Livelihood vulnerability;**
3. **Preventive risk reduction measures;**
4. **Loss and damage related to the impacts of climatic events and changes that actors have not been able to avoid through preventive risk reduction measures;**
5. **Adaptation to climatic changes and their impacts;**
6. **Coping with impacts of climate-related events;**
7. **Loss and damage related to the costs and adverse side effects of coping and adaptation measures adopted in response to climatic stressors.**

This handbook presents different research tools and instruments to study these seven research domains. The household questionnaire, which is the principal tool used in the loss and damage assessment, covers all seven of these. The other tools discussed in this handbook focus on specific domains and have different perspectives and levels of detail. The participatory evaluation of planned adaptation exercise, for example, looks specifically at the effectiveness of planned adaptation and relief interventions. The personal stories of loss and damage are based on in-depth open interviews with individuals who experienced climate-related disasters.

The handbook begins with a short review of the literature about the emergence of loss and damage in the climate change negotiations and a description of the objectives of this handbook. It then goes on to provide definitions for core concepts and outlines the conceptual framework. The section that follows details how to conduct a loss and damage assessment, specifically concerning scale, the seven research domains, site selection and fieldwork timing.

Next, different research tools are described and explained. **Desk study** is conducted prior to the fieldwork to gain knowledge of the study area, the prevalent climatic stressors and livelihoods, and the specific adverse event or disaster that occurred. This is done through the study of prior research, grey literature, such as government reports, and online data. **Participatory Rural Appraisal (PRA) methods**, such as focus group discussions (FGDs), serve to enhance the researchers' understanding of the dynamics between key research concepts at the onset of the research. The **household questionnaire survey** is the principal research instrument in the assessment and the tool that requires most human and financial resources.

It is relevant to all seven research domains, it combines closed questions and open-ended questions, and plays a central role in reporting. **Expert Interviews (EIs)** make it possible to gain information that is otherwise difficult to obtain, or to cross-check the results of other research tools. EIs can also improve the team's understanding of planned adaptation interventions and their effectiveness. **Stories of loss and damage** are the most qualitative and in-depth way of assessing the impacts of a disaster and how people deal with the consequences. They result from in-depth interviews with selected respondents and aim to give a face to the statistical data we gather through the questionnaire. Finally, **Participatory Evaluation of Planned Adaptation (PEPA)** evaluates current and past interventions in a participatory way through FGDs: Were they successful, what were the constraints, what makes some interventions successful and others not, do they reach the most vulnerable, what is not yet done, what is most needed? This research tool is designed to facilitate an in-depth understanding of interventions by governmental and non-governmental organizations, as well as their effectiveness at minimizing loss and damage.

Following the section on research tools is a section on data entry, analysis and reporting, with examples from the Nepal case study. Then, the handbook goes on to describe the resources needed to successfully conduct fieldwork, with sub-sections on financial resources (budget), human resources (team composition), as well as concrete materials to bring to the field. The last section of this handbook discusses alternative applications of the research tools. While the methods have been designed primarily for use on a local level in rural areas of vulnerable countries, there are possibilities of scaling up to regional or national level through smart sampling techniques. The section also discusses how to apply the methods in urban areas and high income communities.

Image 2: A shepard stands in front of his herd in drought stricken Tharparkar, Pakistan.

Frequently Asked Questions about loss and damage

To assess loss and damage in vulnerable communities, one must first have a basic grasp of what loss and damage is. This section of frequently asked questions provides a brief overview and attempts to convey the fundamental elements of loss and damage research and policy.

What is loss and damage?

'Loss and damage' is an emerging topic in climate change negotiations, research, policy and implementation of climate change action, connecting the fields of climate change adaptation and disaster risk reduction. In this handbook, loss and damage is defined as adverse effects of climatic stressors resulting from inadequate efforts to reduce greenhouse gas emissions and insufficient capacity to reduce the risks associated with climatic stressors, to cope with impacts of climatic events and to adapt to climatic changes.

Can loss and damage be avoided?

Often yes, via adaptive or preventive measures. However, there are also unavoidable losses and damages because of locked-in emissions and adaptation limits. In these cases, loss and damage can be minimized, but not fully avoided. Besides avoidable and unavoidable loss and damage, there is *unavoided* loss and damage, which can be addressed by supporting communities with alternative solutions, such as assisted migration and resettlement with compensation, risk transfer tools (e.g. micro-insurance) and risk retention measures (e.g. social safety nets and contingency funds).

How can loss and damage be reduced?

More ambitious reduction of GHG emissions, more effective climate change adaptation and better disaster risk management tend to minimize loss and damage. Countries and companies that contributed disproportionately to global warming have a moral obligation to transfer financial resources for adaptation and disaster management to vulnerable countries. Receiving-country governments should step up efforts to remove or minimize institutional constraints to adaptation so that financial inputs from polluting countries and companies can be used effectively to protect their populations against impacts of dangerous climate change.

What is the difference between climate change impacts and loss and damage?

The concept of loss and damage expands on the concept of climate change impacts by emphasizing that currently, many avoidable impacts are not being avoided and that some impacts cannot be avoided even with large improvements in mitigation and adaptation policy.

What causes loss and damage?

A combination of climatic stresses and social vulnerability, which in turn is comprised of exposure to climatic stress and limited capacity to cope and adapt. Sudden-onset extreme weather events as well as slow-onset climate-related processes can cause loss and damage.

Should assessments of loss and damage focus purely on climate change or also on climate variability and extremes?

That depends on whether an assessment aims to prepare a compensation claim in the international arena, or to protect lives and livelihoods against climatic disturbances.

If the study aims to prepare a compensation claim in the international arena, then the focus should be exclusively on losses and damages that are attributable to anthropologically enhanced climate change. However, this seems unrealistic at this stage because the science of attribution is still in its infancy, and there is reasonable doubt about whether following the legal path of liability and compensation is the right way forward for protecting the rights of vulnerable communities. We should not wait for progress in climate science to advance our understanding of the processes on the ground that determine how climatic stressors lead to loss and damage among vulnerable people.

If the objective is to protect lives and livelihoods against climatic disturbances, the question of to what extent an extreme weather event can be attributed to greenhouse gas emissions is less relevant. Hence, in most cases, assessments of loss and damage should not be limited to impacts of climate change, but also include climate variability and extreme weather events. For similar reasons, understanding loss and damage is more crucial than measuring it.

Who incurs loss and damage?

This methodological handbook focuses primarily on people, and the units of analysis for the questionnaire are households. However, other actors can also incur loss and damage. For example, companies can lose properties and profits, states can incur damage to infrastructure, and communities can lose social cohesion as well as other aspects of their livelihood that may not be quantifiable in monetary terms. The emergence of loss and damage in the climate change negotiations was pushed by vulnerable countries, particularly the small island development states (SIDS) and the least developed countries (LDCs), which are more exposed and lack adaptive capacity. However, high income countries also incur loss and damage from climate change and extremes. When expressed in monetary terms, losses and damages are often higher in high income countries, although they tend to be more severe in LDCs when viewed relative to coping capacity.

Are all losses and damages measurable?

No. To measure means "to find the size, length or amount of something by comparing to a standard unit". While some losses and damages, such as crop losses and damages to houses and properties can be expressed in monetary terms, others, such as loss of identity and social cohesion, are not measurable. Yet other losses and damages, such as loss of life, can be counted (number of casualties), but valuation in

monetary terms is complex and comes with ethical dilemmas.[1] The emerging literature on loss and damage usually speaks of economic versus non-economic loss and damage (UNFCCC, 2013). The main difference between the two categories is whether the lost items are commonly traded in markets.[2]

What is the importance of assessing loss and damage?

Loss and damage is important on multiple levels. First, methods of assessing loss and damage provide a means to ascertain the severity of a disaster for a natural environment or an affected population. In this, loss and damage assessments should aim to go beyond simple stocktaking of impacts, and aim for a more differentiated, comprehensive and people-centred result. Hence, loss and damage assessments adequately reflect a post-disaster situation, which gives recognition of their plight to an affected population and provides a strong basis for policies to avert, minimize and address loss and damage in the future. In doing so, it also provides significant input for adaptation efforts to climate change.

Second, loss and damage research seeks to ascertain the degree to which the effects of climate events are anthropogenic. This also plays a major role in policymaking, as it can be argued that climate events that can be identified as having anthropogenic causes may require anthropogenic remedies.

Third, loss and damage research is relevant for compensation and relief. As the methods employed by loss and damage research aim to evaluate the 'true' effects that a natural disaster has had on an affected population, they are a valuable tool to measure the amount of compensation an affected household may claim from a climate insurance plan, or the amount and type of relief it requires to smooth the post-disaster period and facilitate recovery.

1 In theory, it is possible to express loss of life in monetary terms, for example by making use of life insurance data or amounts paid in case of airline-related accidents. However, this has huge ethical implications (ECLAC, 2003: 11-12).

2 According to a recent UNFCCC Technical Paper (UNFCCC, 2013: 3), "economic losses can be understood as the loss of resources, goods and services that are commonly traded in markets. Market prices can be used to value economic losses." Non-economic losses are all other losses that are not commonly traded in markets.

Image 3: Maya Gurung and her daughter Ritu Gurung, whose home was one of 600 destroyed in the 2015 Nepal earthquake.

Image 4: The interior of a house that was damaged and abandoned after the Jure landslide in Sandhupalchok District, Nepal.

1. Introduction

'Loss and damage' is an emerging topic in climate change negotiations, research and policy as well as in the implementation of climate change action. It connects the fields of climate change adaptation and disaster risk reduction. Loss and damage results from inadequate efforts to reduce greenhouse gas emissions and insufficient capacity to adapt to climatic changes, to reduce the risks associated with climatic stressors and to cope with impacts of climatic events. An assessment of loss and damage, as proposed in this handbook, includes measuring what is measurable and qualifying what is not measurable. A key principle of this book is that understanding loss and damage, with the aim of eventually minimizing it, is more important than just measuring it.

In November 2013, on the sidelines of the 19th Conference of the Parties, the World Bank launched a report with findings on economic losses from natural disasters (The World Bank, 2013). The report estimates that US$4 trillion was lost from disasters over the past 30 years, and that annual losses increased from around US$ 50 billion in 1980 to US$200 billion in 2012. Natural disasters further claimed 2.5 million lives over the past three decades. Although the science surrounding attribution of these losses to greenhouse gas emissions and global warming is still in its infancy, the report cites climatological evidence that global warming increases the frequency and intensity of weather-related disasters. The World Bank Group joined other organizations in calling for investment in the prevention of dangerous climate change. Economic models show that every dollar spent on prevention saves US$ 3-4 in rebuilding, and for Early Warning Systems the savings can even be up to US$ 35 (The World Bank, 2013). However, prevention is not enough to

address loss and damage. There are already losses and damages that have become unavoidable due to locked-in emissions and adaptation limits (Huq et al., 2013) – meaning that even though people expect extreme weather events, they are unable to address them.

Loss and damage results from inadequate efforts to reduce greenhouse gas emissions and insufficient capacity to adapt to climatic changes, to reduce the risks associated with climatic stressors and to cope with impacts of climatic events.

As loss and damage is a new field in climate change research, no well-developed methods of assessing loss and damage are available to countries and organizations. After the establishment of the *Warsaw International Mechanism for Loss and Damage Associated with Climate Change Impacts* in 2013, a steady increase in empirical work on loss and damage is discernible. This methodological handbook builds on experiences from the first-ever multi-country assessment of loss and damage in vulnerable communities (conducted in 2012) and integrates ongoing thinking about the topic with the aim of sharing lessons learned and advancing methodologies for assessing loss and damage. The handbook and its research tools have been tested in Nepal, Pakistan and India in 2015.

The methods discussed in this handbook are primarily tailored to be applied in rural areas that are vulnerable to the effects of climate change. The handbook's central idea is that to reduce loss and damage, its causes and consequences need to be better understood. Studying the causes of loss and damage goes beyond climate science as loss and damage results from the combination of biophysical stressors and social vulnerability, including exposure to stressors and lack of coping and adaptive capacity to deal with the stressors. The handbook aspires to become a key instrument and reference for future studies and action on loss and damage.

To reduce loss and damage, its causes and consequences need to be better understood.

The second objective of this handbook is linked to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR5), which includes, for the first time, a chapter on adaptation opportunities, limits and constraints (Chapter 16). This IPCC chapter is an important input to the loss and damage debate, as it focuses on situations in which mitigation and adaption efforts are not enough to avoid residual impacts from climate change. The chapter documents existing evidence on factors that make it harder to plan and implement adaptation ('adaptation constraints') and points at which actors' objectives cannot be secured from intolerable risks through adaptive actions ('adaptation limits'). When actors face 'hard limits', such adaptive actions are simply not possible. While in the case of 'soft limits', options are currently not available (IPCC, 2014). Chapter 16 of IPCC WG2 AR5 provides an excellent conceptual framework for understanding adaptation limits and constraints, and situations in which actors incur loss and damage. However, the chapter lacked empirical work to reference to.[3] This methodological handbook aims to contribute to this emerging and much-needed body of knowledge by providing researchers and practitioners on the ground with a set of efficient tools to conduct high-quality assessments of loss and damage as well as of adaptation limits and constraints.

3 Personal communication with IPCC WG2 AR5 Chapter 16 authors Prof. Frans Berkhout and Dr. Kirstin Dow

1.1 About the title

The title of this book is "Handbook for assessing loss and damage in vulnerable communities". It is important to dedicate a few lines to the question: what do we mean by 'assessing loss and damage'? A dictionary meaning of the verb 'to assess' is: "To estimate the nature, quality or value of something" (Oxford Learners Dictionary, 5th edition). Though the terms are sometimes used interchangeably and may overlap, *to assess* has a different meaning than *to measure* something ("to find the size, length or amount of something by comparing to a standard unit", Oxford Learner's Dictionary, 5th edition). An assessment of loss and damage, as proposed in this handbook, includes measuring the measurable and qualifying the unmeasurable. A key principle of this book is that understanding loss and damage, with the aim of eventually minimizing it, is more important than just measuring it.

An assessment of loss and damage, as proposed in this handbook, includes measuring the measurable and qualifying the nature of the unmeasurable.

The words "in vulnerable communities" in the title convey three important messages. First, they indicate the scale of the assessment. Though, in principle, the methods can be scaled up for regional or national assessments, the primary purpose of this handbook is to guide researchers and practitioners to conduct *local* assessments of loss and damage. Second, the word 'vulnerable' indicates that it is most sensible to conduct the assessments in places that are exposed to climatic stressors and have limited capacity to cope and adapt. Third, the word 'communities' in the title points to a people-centred approach. When we talk about 'communities' we do not assume communities are uniform or harmonious in any way (Cannon, 2008). In reality, vast differences in levels and causes of vulnerability exist between households and individuals within communities (Ribot, 1995: 121; Mohan and Stocke, 2000; Dodman and Mitlin, 2013). The methods proposed in this handbook primarily assess loss and damage at household level to understand these differences within communities.

Though it is not explicitly mentioned in the title, this handbook is not just about assessing loss and damage, but also about assessing adaptation limits and constraints. This is implicit in our definition of loss and damage: adverse effects of climate-related stressors that occur despite mitigation and adaptation. Assessing loss and damage is not just about measuring and evaluating it, but also about understanding how and why actors incur loss and damage. If loss and damage involves impacts beyond, despite or associated with adaptation, assessing it also involves understanding adaptation limits and constraints.

1.2 Progressive insights and lessons learned

This methodological handbook builds on the experiences from the first generation of loss and damage case studies in vulnerable communities in 2012.[4] Researchers from Bangladesh, Bhutan, Micronesia, Kenya, The Gambia, Burkina Faso, Ethiopia and Mozambique conducted fieldwork with methods designed at the United Nations University Institute for Environment and Human Security (UNU-EHS). The methods used in these nine case studies and the results they yielded were evaluated critically in 2013 and 2014. The lessons learned were documented, recognizing weaknesses and building on

4 These case studies were conducted in the context of the Loss and Damage in Vulnerable Countries Initiative, funded by the Climate and Development Knowledge Network (CDKN) and with additional funding from the Africa Climate Policy Centre (ACPC). See www.lossanddamage.net/empirical-research. All case studies were published as journal articles in a special issue of the International Journal of Global Warming (Bauer, 2013; Brida et al., 2013; Haile et al., 2013; Kusters and Wangdi, 2013; Monnereau and Abraham, 2013; Opondo, 2013; Rabbani et al., 2013; Traore et al., 2013; Yaffa, 2013)

ITEM	FIRST GENERATION OF CASE STUDIES (CDKN, 2012-2013)	SECOND GENERATION OF CASE STUDIES (APN, 2014-2016)
L&D Pathways	Identification of pathways.	Systematic assessment of pathways.
Type of adaptation measures	Focused on what people and communities did themselves (autonomous adaptation).	Added: Planned adaptation and post-disaster interventions by governments and NGOs.
Quantifying	No attempt to quantify losses. Focused on an explorative approach with more open survey questions.	Added: Attempt to quantify losses and damages.
Conceptual framework	Two streams: 1) L&D despite coping with climatic events; 2) L&D despite adaptation to climatic changes.	Added: More prominent role for preventive measures (risk reduction). L&D are impacts despite risk management, adaptation and coping.

Table 1: Some major differences between the first and second generation of loss and damage case studies

Source: Authors' own

strengths. In the meantime, more publications about loss and damage – most of them still conceptual, very few empirical – started to appear, the Warsaw International Mechanism was established, and more clarity about what loss and damage is and what it is not started to surface.[5] The lessons learned from the first generation of loss and damage case studies and the growing interest in the topic were also a strong impetus to prepare this methodological handbook, and to return to the field to test it. This resulted in a second generation of case studies, conducted in Pakistan, Nepal and India. Table 1 (p. 22) outlines the main differences between the first and second generation of case studies.

Based on empirical findings from the first generation of case studies, Warner and van der Geest (2013) identified four loss and damage pathways. Households incur loss and damage when:

→ 1. Measures to prevent, cope or adapt are **not enough** to avoid loss and damage;

→ 2. Measures have **costs** (economic, social, cultural, health, etc.) that are not regained;[6]

→ 3. Despite short-term merits, measures undermine future livelihood security (erosive coping, maladaptation);

→ 4. **No measures** are adopted at all, due to:

→ a. **Lack of awareness** or capacity to respond to climate threat (constraints);

→ b. Coping/adaptation **not possible** (limits).

In the first generation of case studies (2012-2013), these pathways were identified, but not yet assessed systematically. By contrast, the new methods, outlined in this handbook, assess these.

In the first generation of case studies (2012-2013), these pathways were identified, but not yet assessed systematically. By contrast, the new methods, outlined in this handbook, assess these pathways more systematically, aiming to disentangle the nature of loss and damage and its causes and consequences. In addition, the aim of the second generation of case studies is to quantify losses and damages (where possible) more systematically than the first-generation studies, while at the same time emphasizing the idea that understanding loss and damage may be more important than measuring it.

While the first generation of case studies was primarily people-centred and looked at what people did to cope with and adapt to climatic stressors, the new methods pay much more attention to the planned adaptation interventions by governments and NGOs, and the constraints and effectiveness of these measures.

Finally, the second generation involves a more prominent role for preventive measures that aims to reduce the risks of future impacts of climatic events and changes. Preventive measures can be traditional 'ways of doing things', such as building houses on elevated land and diversifying food and income sources, or newly-introduced, such as building concrete sea walls and high-tech early warning systems. On the other hand, the first generation of case studies focused more on curative measures such as post-event coping strategies and reactive adaptation.

5 A good example of ambiguity about what loss and damage is and what it is not, comes from a blog by Saleemul Huq (2014). He wrote: "Several journalists covering the climate change negotiations have told me that their editors back home routinely change the words "loss and damage" to "liability and compensation" because they feel that is what it is really about."

6 Sometimes expenditures on adaptation measures are like investments that yield returns. For example, in a Bhutanese case study, some wealthier farmers adapted to changing monsoon patterns that resulted in increased water scarcity for irrigation by buying diesel pumps. Though the initial costs were high, most were able to regain the costs through higher crop yields and by renting out their equipment to other farmers (Kusters and Wangdi, 2013).

1.3 Objectives

The main objective of this handbook is to contribute to emerging knowledge about the limitations of human systems to adjust sufficiently to climate change and its impacts – as recently documented in Chapter 16 of the IPCC WG2 AR5 – to avoid losses and damages, and the consequences for vulnerable populations. The establishment of the Warsaw International Mechanism for Loss and Damage Associated with Impacts of Climate Change in 2013 has sparked a wide range of new studies and policy initiatives (Warner, 2013). Policy-makers, particularly in the most vulnerable countries, grapple with the question of how to address current and future climate-related losses and damages. Urgent action is needed to prevent adverse effects on sustainable development pathways. To address loss and damage adequately, and make the appropriate evidence-based policy decisions, accurate and rigorous assessments of loss and damage are needed first. In other words, to *address* loss and damage, we need to know how to *assess* loss and damage.

As loss and damage is a new field in climate change research, no well-developed methods of assessing loss and damage are available to countries and organizations. This methodological handbook aspires to become a key instrument and reference for future studies of loss and damage.

> To address loss and damage, we need to know how to assess loss and damage.

Image 5: Street vendor in Sindhupalchok District, Nepal.

Image 6: A view of heavy flooding caused by monsoon rains in Punjab Province, near the city of Multan, Pakistan.

2. Concepts and framework

This section gives an overview of key terms used in relation to loss and damage from climate change, and joins these in a conceptual framework for assessing loss and damage. The aim of this section is twofold. First, we want to establish a common language among the small but growing community of researchers and practitioners who work on this complex topic. Loss and damage is at the centre of and borrows extensively from other thematic areas in global change research, particularly disaster risk reduction and climate change adaptation. The work on loss and damage has the potential to link these fields, but to do so effectively, it is important to create conceptual clarity. The second aim of this section is to position the terms discussed in a conceptual framework that summarizes our thinking on loss and damage, and that informs the methods used to assess it.

2.1 Definitions

The key terms and definitions discussed here are clustered in groups that resemble the 'research domains' discussed in the next section: climatic stressors, vulnerability, adaptation and loss and damage.

CLUSTER I: *CLIMATIC STRESSORS*

- *HAZARD:* The potential occurrence of an anthropogenic or non-anthropogenic physical event that may cause loss of life, injury, or other health impacts, as well as damage to and loss of property, infrastructure, livelihoods, service provision and environmental resources (IPCC, 2012).

- *RISK:* The potential for consequences where something of human value (including humans themselves) is at stake and where the outcome is uncertain. Quantitatively, risk is often represented as probability of occurrence of a hazardous event(s) multiplied by the consequences if the event(s) occurs (IPCC, 2014).

- *DISASTER:* Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery (IPCC, 2012).

- *SUDDEN-ONSET EVENTS:* These take place over short time frames (typically hours, days or weeks). Climate-related sudden-onset events include floods, cyclones, tornadoes, landslides, sudden collapses of riverbanks, extreme rainfall events, heat waves and wild fires.

- *SLOW-ONSET PROCESSES OR CHANGES:*[7] These take place over longer time frames (typically years to decades). Climate-related examples are sea level rise, coastal erosion, salinization, ocean acidification, temperature rise, desertification and changing rainfall patterns. Droughts are usually categorized as slow-onset phenomena, but in terms of the consequences and the coping strategies adopted in response, a drought is often similar to sudden-onset events.

- *MITIGATION:* This can have two different meanings: Firstly, mitigation of climate change involves human interventions to reduce the sources or enhance the sinks of greenhouse gases (IPCC WG2 AR5 Glossary). Secondly, mitigation of disaster risk is the lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure and vulnerability (IPCC, 2012).

7 Slow-onset processes or changes are often called slow-onset events. In our view, this is erroneous as the word 'event' suggests a discrete occurrence of a phenomenon that can be clearly identified in time.

CLUSTER II: *VULNERABILITY AND RESILIENCE*

- *IPCC DEFINITION OF VULNERABILITY*: "The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt." (IPCC 2014: 1775).

- *EXTERNAL AND INTERNAL VULNERABILITY:* The distinction made by Robert Chambers in his landmark 1989 article describes the external side of vulnerability as *exposure* and the internal side as a lack of *coping capacity* (Chambers, 1989). Current thinking and studies about vulnerability still use this distinction, or add a third element: sensitivity (Füssel and Klein, 2006).

- *SENSITIVITY:* "The degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct (e.g. a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise)" (IPCC, 2007).

- *COLLECTIVE AND INDIVIDUAL/HOUSEHOLD VULNERABILITY:* Collective vulnerability results from area-level variables that are the same for all households in a given community, region or country. By contrast, the level of individual or household vulnerability differs between households in a community (Adger, 1999; McLeman, 2010).

- *RESILIENCE:* In its Glossary, IPCC WG2 AR5 defines resilience as: "The ability of a social, ecological, or socio-ecological system and its components to anticipate, reduce, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner." The definition is more inclusive than earlier definitions of resilience where the emphasis was on 'recovery'; bouncing back after a shock/disturbance.

- *LIVELIHOOD RESILIENCE:* People's capacity to sustain and improve their livelihood opportunities and well-being despite environmental, economic, social and political disturbances (Tanner et al., 2015).

CLUSTER III: *ADAPTATION AND OTHER RESPONSES TO CLIMATIC STRESSORS*

- *ADAPTATION*: "Adaptation involves changes in social-ecological systems in response to actual and expected impacts of climate change in the context of interacting non-climatic changes. Adaptation strategies and actions can range from short-term coping[8] to longer-term, deeper transformations, aim to meet more than climate change goals alone, and may or may not succeed in moderating harm or exploiting beneficial opportunities" (Moser and Ekstrom, 2010: 22026). Several types of adaptation measures can be distinguished:

- *AUTONOMOUS AND PLANNED ADAPTATION:* Planned adaptation involves actions and deliberate policies by public bodies (e.g. governments, NGOs) to protect citizens against climate change and its impact (Smit et al., 2001). By contrast, autonomous adaptations are natural or spontaneous adjustments to climatic changes by individual actors, such as households, small enterprises or communities (Carter et al., 1994, in Fankhauser et al., 1999: 69).[9] The IPCC WG2 AR5 glossary adds that such adjustments do not necessarily focus on addressing climate change. In reality the boundaries between planned and autonomous adaptation are fuzzy (Adger et al., 2003). For example, autonomous adaptation options that are open to individual actors often depend on planned adaptation action policies by their governments (Monnereau and Abraham, 2013).

- *PRO-ACTIVE AND REACTIVE ADAPTATION:* Pro-active or anticipatory adaptation measures are adopted in response to future expected climate, and before impacts have occurred. Reactive adaptation measures are adopted in response to climatic changes or events that have already had adverse effects or caused damage (Füssel, 2007). Their boundaries overlap, as adaptation decision-making often occurs in response to experiences of the past as well as expectations of the future.

- *INCREMENTAL AND TRANSFORMATIONAL ADAPTATION:* In the case of incremental adaptation the aim is to maintain the essence and integrity of a system while transformational adaptation changes the fundamental attributes of a system in response to actual or expected climate and its effects (IPCC WG2 AR5 glossary). In more popular language, for Kates et al. (2012: 7156) incremental adaptation is "doing slightly more of what is already being done to deal with natural variation in climate and with extreme events". They distinguish three types of transformational adaptations: "those that are adopted at a much larger scale or intensity, those that are truly new to a particular region or resource system, and those that transform places and shift locations" (Kates et al., 2012: 7156).

8 This handbook refers to such short-term responses to impacts of climatic stressors as 'coping strategies'.

9 The term autonomous adaptation is also used for spontaneous adjustments in ecosystems (see e.g. IPCC WG2 AR5, chapter 4).

- *MALADAPTATION:* "Action taken ostensibly to avoid or reduce vulnerability to climate change that impacts adversely on, or increases the vulnerability of other systems, sectors or social groups" (Barnett and O'Neill, 2010: 211). "Actions that may lead to increased risk of adverse climate-related outcomes or increased vulnerability to climate change, now or in the future" (IPCC WG2 AR5 glossary).

Some key terms in the emerging literature on loss and damage are closely related to adaptation:

- *ADAPTATION CONSTRAINTS:* Factors that make it harder to plan and implement adaptation actions or that restrict options (IPCC). The terms 'adaptation barrier' and 'adaptation obstacle' are synonyms.

- *ADAPTATION LIMIT:* The point at which an actor's objectives (or system needs) cannot be secured from intolerable risks through adaptive actions (IPCC). This is the case when "no option exists, or [when] an unacceptable measure of adaptive effort is required" (IPCC, 2014: Ch. 16, p.8).

  → Soft limit: Options are currently not available to avoid intolerable risks through adaptive action (IPCC).

  → Hard limit: No adaptive actions are possible to avoid intolerable risks (IPCC).

In addition to adaptation measures, there are other types of responses to deal with climatic changes and the impacts of climatic events.

- *COPING STRATEGIES:* Defined by the IPCC (2012) as "The use of available skills, resources, and opportunities to address, manage, and overcome adverse conditions, with the aim of achieving basic functioning of people, institutions, organizations, and systems in the short to medium term."[10] Literally, to cope means 'to deal successfully with something difficult' (Oxford Learner's Dictionary, 5th edition). In livelihood research and development studies, the term is reserved for the things people do in the aftermath of adverse events (such as a flood or drought-induced crop failure) to survive or 'get back to normal'. Examples are: selling assets, migration, reliance on alternative sources of food and income when the main source of livelihood fails (e.g. food aid, wild foods, petty trade, labour), taking loans, etc.

- *EROSIVE COPING:* Coping strategies are erosive when they undermine future livelihood security (van der Geest and Dietz, 2004; Opondo, 2013). Examples of this include eating seed stocks, selling productive assets, taking a child out of school to beg or work in the informal sector, taking up a corrosive loan, and migrating, which can lead to the absence of productive members of farm households when the fields need to be prepared for the next harvest.

10 This glossary entry builds on the definition used in UNISDR (2009) and IPCC (2012a).

- *PREVENTIVE MEASURES/EX-ANTE RISK MANAGEMENT:* Besides reactive adaptation and ex-post coping strategies, households can also take measures to prevent or minimize future impacts of adverse events. Classic risk management theory distinguishes four ways of dealing with risk that are usually adopted as a function of the probability and severity of events (see the risk matrix in Figure 1 (p. 33); also, Bekefi et al., 2008):

  → **Risk avoidance:** Refrain from certain activities or avoid certain places or situations because the probability of severe impacts is too high.

  → **Risk reduction:** Actions taken to lessen the probability and/or negative consequence associated with a risk.

  → **Risk transfer:** Sharing the burden of a loss with others, including insurance solutions and community-based systems related to social capital.

  → **Risk retention:** Accepting a risk because of low probability and non-severe impacts that make it possible for adverse effects to be absorbed.

- *LIVELIHOOD:* "A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Carney, 1998: p.4; Scoones, 1998, p.5).

Figure 1: Risk matrix

Source: Authors' own

CLUSTER IV: *IMPACTS AND LOSS AND DAMAGE*

Though there is much overlap between impacts of climate change and loss and damage from climate change, the two terms are not exactly the same (Roberts et al., 2014; Zommers et al., 2016). The concept of loss and damage emphasizes that avoidable impacts have not been avoided and that some impacts cannot be avoided even with large improvements in mitigation and adaptation policy.

- *IMPACTS:* "Effects on natural and human systems of physical events, of disasters, and of climate change" (IPCC WG2 AR5 glossary);

The IPCC WG2 AR5 glossary does not define loss and damage (van der Geest and Warner, 2015b). A rapid appraisal of how recent reports on loss and damage frame the issue shows two strands. The difference lies in the question of whether we should talk about 'residual impacts' (i.e. impacts despite or beyond mitigation and adaptation) or make loss and damage synonymous with 'impacts'. These two definitions exemplify the difference:

- *LOSS AND DAMAGE – DEFINITION 1:* Loss and damage refers to effects that would not have happened in a world without climate change, which have not been mitigated, and which cannot be (or have not been) adapted to (ActionAid, 2010: page 6);

- *LOSS AND DAMAGE – DEFINITION 2:* Loss and damage refers to the actual and/or potential manifestation of climate impacts that negatively affect human and natural systems (UNFCCC SBI, 2012: page 3).[11]

This methodological handbook follows the first strand and defines loss and damage as "adverse effects of climatic stressors that occur despite mitigation and adaptation".

Losses and damages are "adverse effects of climatic stressors that occur despite mitigation and adaptation".

A longer definition would be: adverse effects of climatic stressors resulting from inadequate efforts to reduce greenhouse gas emissions and insufficient capacity to reduce the risks associated with climatic stressors, to cope with impacts of climatic events and to adapt to climatic changes. We treat loss and damage as a single concept while at the same time recognizing that distinguishing loss (complete and irrecoverable) and damage (repairable) can be useful at times.[12] Several types of loss and damage can be distinguished, for example:

11 The way UNFCCC defines loss and damage is very important as the concept comes from the negotiation process. However, this quote from a UNFCCC document does not mean that the organization formally adopted this definition.

12 A recent World Bank report distinguishes loss from damage in a different way: It states: "[…] in economic terms, damage refers to disaster impacts on physical stocks and assets, while loss refers to impacts on economic flows." (The World Bank, 2013: p.2).

NATURE OF LOSS AND DAMAGE	WAYS TO ADDRESS LOSS AND DAMAGE
Avoidable Impacts due to inadequate mitigation, adaptation or risk-management	• Reduce GHG emissions • Remove constraints to adaptation • Improve effectiveness of adaptation • Enhance disaster risk reduction (preparedness) • Increase resilience and coping capacity
Unavoidable Mitigation, adaptation or risk-management are ineffective, for example due to locked-in emissions	• Social protection and safety nets • Resettlement • Assisted migration • Insurance solutions • Compensation

Table 2: Avoidable and unavoidable loss and damage

Source: Authors' own

- *ECONOMIC AND NON-ECONOMIC LOSS AND DAMAGE:* The main distinction between the two categories is whether the lost items are commonly traded in markets (Fankhauser et al., 2014). In reality, it is more complex (Serdezny et al., 2016). For example, loss and damage to livelihoods and ecosystem services are usually categorized under 'non-economic' loss and damage while elements of livelihoods and ecosystem services are traded in markets (Zommers et al., 2016).

- *AVOIDED, UNAVOIDED AND UNAVOIDABLE LOSS AND DAMAGE:* According to Verheyen (2012) there are three types of loss and damage: avoided, unavoided and unavoidable. Avoided loss and damage is used to characterize the impacts of climate change that are avoided by mitigation and adaptation. Unavoided loss and damage could have been avoided, but has not been because of inadequate mitigation and adaptation efforts. Lastly, there is some loss and damage that is unavoidable no matter how ambitious mitigation and adaptation efforts are. Those impacts that are either unavoided or unavoidable – or residual loss and damage – will need to be addressed by a range of other approaches, such as risk transfer tools (e.g. insurance) and risk retention measures (e.g. social safety nets and contingency funds). Ultimately, the more successful mitigation and adaptation efforts are, the less loss and damage will be incurred.

  Based on the distinction of loss and damage into avoided, unavoided and unavoidable outcomes, it becomes clear that the topic of loss and damage goes beyond questions of compensation and liability. Instead, it is also strongly concerned with adaptation limits and constraints, as well as recognizing when loss and damage is unavoidable. However, much loss and damage does not occur because it is unavoidable, but due to a lack of funds or measures to adapt and cope (van der Geest and Warner, 2015a). Table 2 (above) gives suggestions for responses to different types of loss and damage.

2.2 Conceptual framework

The framework discussed in this section connects loss and damage from climate-related stressors to vulnerability, risk management, impacts, coping strategies, adaptation and limits and constraints of adaptation (fig. 2, p. 37). The framework results from progressive insights from working on loss and damage in vulnerable communities in the past two years (Warner et al., 2012, 2013; Warner and van der Geest, 2013), and previous work on impacts of and adaptation to climate change in dryland West Africa (van der Geest 2004, 2011, van der Geest and Dietz, 2004). This work, in turn, builds on a longer tradition of studying livelihoods in risk-prone environments that emerged in the 1990s (Chambers, 1989; Davies, 1996; Blaikie et al., 1994; Scoones, 1998; Ellis, 1998).

The blue box in the upper part of Figure 2 (p. 37) shows the vulnerability context of households and communities that shapes households' livelihood strategies and the measures they put in place to reduce the risk of being adversely affected by climatic and other stressors. The framework distinguishes collective vulnerability – resulting from area-level variables that are the same for all households in a given community – and individual or household vulnerability (Adger, 1999; McLeman, 2010). When a region experiences slow-onset changes or when sudden-onset extreme weather events hit, some households will experience impacts (such as a crop failure or damage to properties) while others may not. This depends on their vulnerability profile – particularly their exposure – and the measures the household has adopted to reduce risk prior to the event. When the household experiences no impact, there is also no loss and damage (hence the green colour of the 'no-impact-box'). When the household is affected by the climatic stressor, it may incur or avoid residual loss and damage depending on whether effective measures are adopted to adjust (hence the red-green colour of the impact and coping/adaptation boxes).

In the case of sudden-onset events, household responses to deal with impacts are 'coping strategies'. If there are no impacts, there is also no need to cope. This is different in the case of slow-onset changes. Households can adapt in response to *actual* or *expected* impacts (Moser and Ekstrom, 2010: 22026). Reactive adaptation is in response to actual impacts and pro-active adaptation is in response to expected impacts.

If there is nothing the household can do to cope or adapt, it will incur loss and damage (hence the red colour of the no-adaptation and no-coping boxes). If coping or adaptation measures are adopted, these may or may not be effective in avoiding residual loss and damage, depending on the household's adaptive capacity and the magnitude of the climatic stressor (or in other words: adaptation constraints and limits).[13] If measures are insufficient, costly or 'erosive' in the longer-term, households incur loss and damage (Warner and van der Geest, 2013). Lastly, there is a feedback loop connecting loss and damage back to the household's vulnerability profile. This is because the losses and damages incurred render the household more vulnerable in the face of ongoing climatic changes and future extreme events.

The framework distinguishes two types of household responses to climate-related stressors: 'coping' and 'adaptation'. Many studies use these terms synonymously (Birkmann, 2011). This is problematic because they involve different types of responses to different types of stresses (van der Geest and Dietz, 2004). Coping strategies are short-term responses to the impacts of sudden or unusual events. By contrast, adaptation refers to longer-term adjustments to more permanent changes in the climate.[14] Besides coping and adaptation, a third type of

13 IPCC's Fifth Assessment Report defines adaptation constraints as "factors that make it harder to plan and implement adaptation actions" and it defines an adaptation limit as "the point at which an actor's objectives […] cannot be secure from intolerable risks through adaptive actions" (See also Dow et al., 2013).

14 For the more elaborate definition of adaptation that was used in the case studies, see Moser and Ekstrom (2010). Their definition recognizes that adaptation measures are often adopted in response to a mix of climatic and non-climatic changes and aim to meet more than climate goals alone.

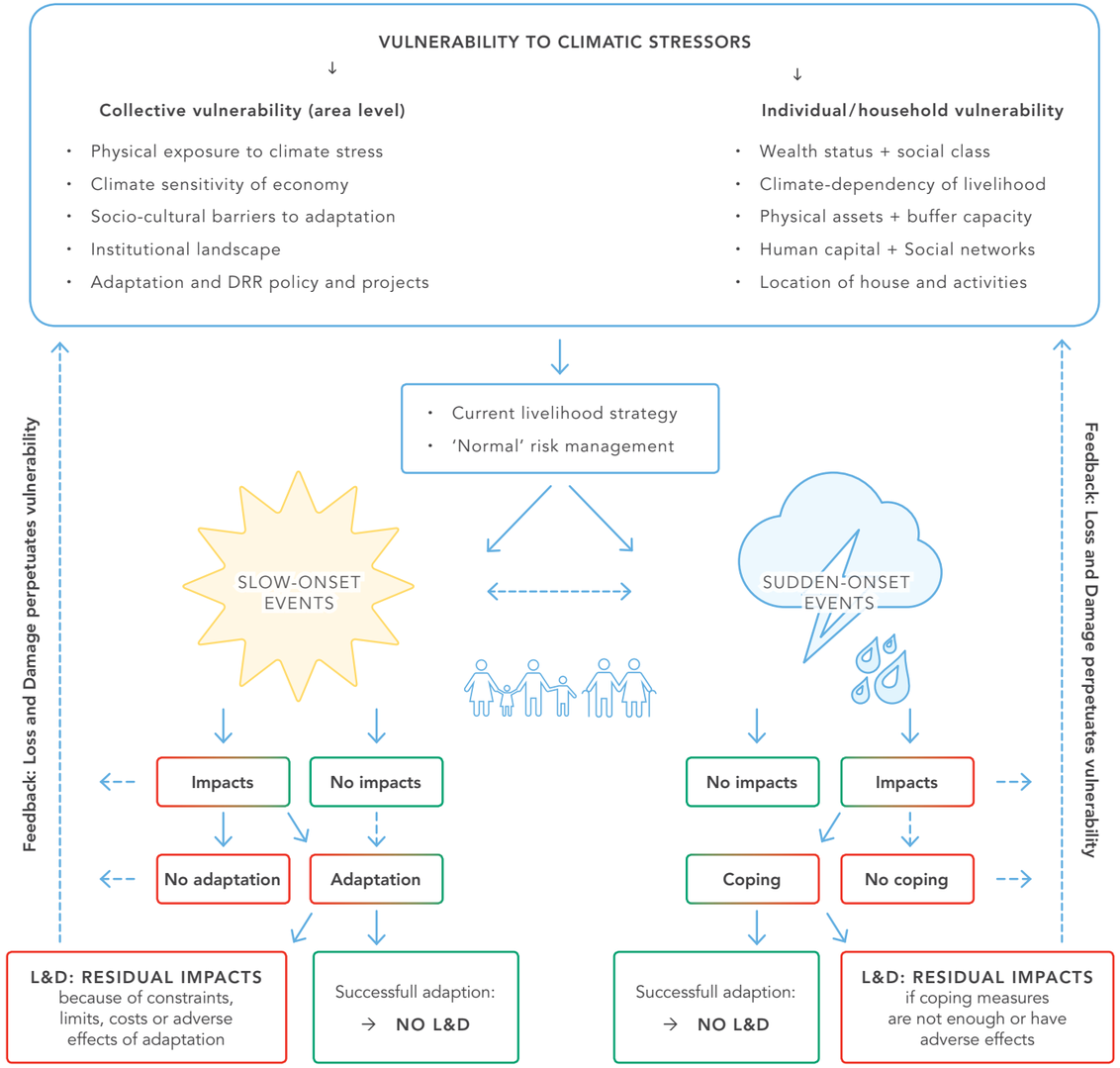


Figure 2: Conceptual framework: Linking loss and damage to vulnerability, risk management and adaptation

Source: van der Geest and Warner, 2015a

CLIMATIC STRESSOR	HOUSEHOLD RESPONSE
Climate variability (risks, hazards) • Regular uncertainties • Regular risk of extreme weather events	**Preventive measures (disaster risk reduction)** • Physical protection • Risk spreading • Creating buffers • Build safety nets • ...
Climate-related events (disasters) • Floods • Droughts • Cyclones/storms • Landslides • …	**Coping strategies** • Rely on social networks • Food aid and other relief • Alternative income • Selling assets • ...
Climatic changes • Changes in 'average' conditions • Changes in risk (frequency and severity) of extreme weather events	**Adaptation** • Agricultural change • Livelihood diversification • Migration • Changes in 'normal' risk management, including preventive measures and coping strategies • ...

Table 3: Different climatic stressors require different household responses (examples)

Source: Authors' own

response involves the preventive measures (risk reduction) that households adopt in response to normal characteristics (including variability) of the climate and environment and in *anticipation* of unusual events.[15]

The three groups of climatic stressors and household responses are shown in Table 3 (above), with some non-exclusive examples. There are multiple linkages between different types of household responses to climatic stressors. First, the success of ex-ante preventive measures determines the need for and success of ex-post coping strategies. Second, short-term coping measures can evolve into more permanent livelihood adaptations when they become recurrent. Third, when households change their preventive measures in response to changes in perceived risk, they are adapting.[16]

15 The relationship between preventive strategies, coping and adaptation is described in detail in van der Geest (2004: 20-29).

16 For an overview of linkages between prevention, coping and adapting, see van der Geest and Dietz (2004). The framework is inspired by the early work of Susana Davies (1996) on 'adaptable livelihoods' in Mali.

Image 7: Family that lost their house in the Jure landslide; in front of their temporary shelter in Sindhupalchok District, Nepal.

Image 8: A view of the devastation caused by the October earthquake, en route to Thori Camp in Muzaffarabad, Pakistan.

3. Research design

3.1 Scale

This methodological handbook has been prepared for assessments of loss and damage in local, community-based case studies. However, with sufficient human and financial resources and smart sampling techniques, there is potential for scaling up to regional and even national level. For the APN-funded research in Pakistan, Nepal and India, the methods were tested in one district (or similar administrative unit) per country. In each district, a select number of villages were surveyed. The budget for fieldwork was approximately US$20,000 per test country, which limited the scale of the case studies. Each team consisted of a principal investigator, five enumerators, a note taker and a logistics manager, and the proposed duration of the fieldwork was 24 days for each case study. The teams conducted approximately 200 household questionnaires, five focus group discussions (FGDs), and five-to-ten expert interviews (EIs).

3.2 Research domains

To assess climate-related losses and damages in vulnerable communities, the research teams needed to gather data in seven research domains. The household questionnaire covered all seven domains at household level. Additional research tools – desk study, FGDs, EIs and the institutional landscaping/participatory evaluation covered the domains at a higher level of scale. These are the seven research domains:

1. *CLIMATIC STRESSORS, INCLUDING SUDDEN-ONSET EVENTS AND SLOW-ONSET PROCESSES*

   a. Perceptions
   b. Meteorological data

2. *LIVELIHOOD (SYSTEM) VULNERABILITY TO IMPACTS OF THESE STRESSORS*

   a. At household level
   b. At area level

3. *PREVENTIVE MEASURES TO DEAL WITH EXISTING CLIMATIC RISKS AND VARIABILITY*

   a. By households (e.g. mixed cropping)
   b. By organizations (e.g. early warning systems)

4. *LOSS AND DAMAGE FROM DIRECT IMPACTS OF CLIMATIC EVENTS AND CHANGES DESPITE PREVENTIVE MEASURES*

   a. At household level (e.g. harvest failure)
   b. At area level (e.g. damage to infrastructure)

5. *ADAPTATION TO CLIMATIC CHANGES AND IMPACTS*

   a. By households (e.g. livelihood diversification)
   b. By organizations (e.g. construction of sea walls)

6. *COPING WITH IMPACTS OF CLIMATE-RELATED EVENTS*

   a. By households (e.g. sale of livestock to buy food)
   b. By organizations (e.g. emergency relief or food aid)

7. *LOSS AND DAMAGE RELATED TO THE COSTS AND ADVERSE SIDE-EFFECTS OF PREVENTIVE, COPING AND ADAPTATION MEASURES*

   a. To households (e.g. livelihood collapse or displacement)
   b. At area level (e.g. social cohesion)

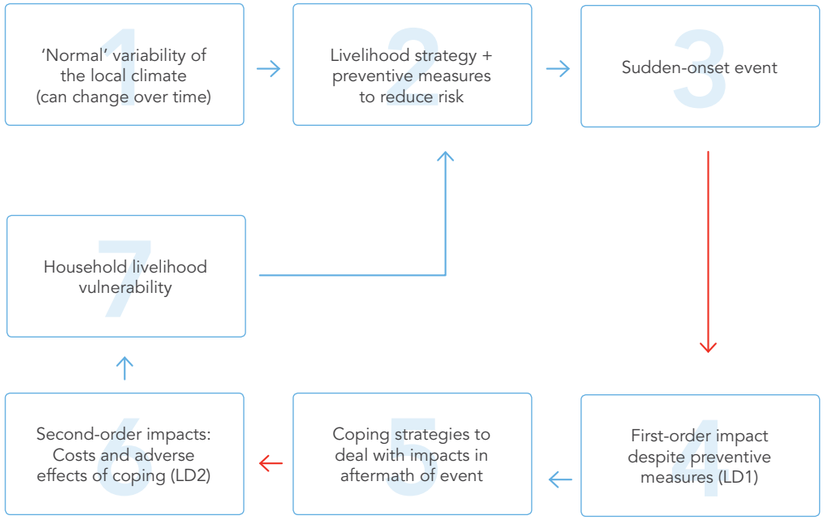


Figure 3: Connection between research domains in the case of sudden-onset events

Source: Authors' own
Notes: Households are the units of analysis. The arrows do not represent causal relations, but chronological order: before, during and after an adverse climatic event.

In terms of research design, a significant difference exists between assessment of loss and damage from slow-onset processes and loss and damage from sudden-onset events. Figures 3 (above) and 4 (p. 44) show this schematically. Both figures contain elements of the conceptual framework in Figure 2 (p. 37), but separate flows are shown for sudden-onset events (fig. 3, above) and slow-onset changes (fig. 4, p. 44). To reduce loss and damage from sudden-onset events actors can engage in preventive, ex-ante risk reduction measures and curative, ex-post coping measures. To reduce loss and damage from slow-onset changes, adaptation measures are required in addition.

Figure 3 (above) shows the connections between the research domains in the case of sudden-onset events. The starting point for the process is the variability of the local climate as perceived by those living in the area (box 1). To deal with 'normal' climatic conditions, including the usual probability/risk of climate-related events (floods, cyclones, droughts, etc), local populations develop livelihood strategies and risk reduction measures that aim at minimizing impacts of such events when they occur (box 2). For example, farmers in Africa might use drought-resistant crops to prevent harvest losses when rainfall is insufficient. Once a sudden-onset climatic event happens (box 3), it will depend on the effectiveness of the regular livelihood strategies and preventive measures from box 2 to determine whether people experience impacts. We call these first order impacts or first order losses and damages that occur despite the preventive measures taken (box 4). To deal with the unavoided impacts of the event, people usually adopt

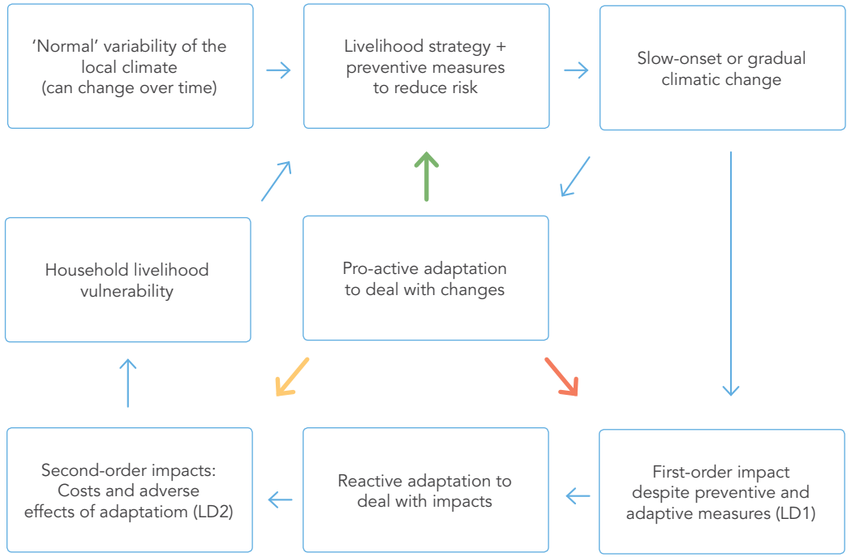


Figure 4: Connection between research domains in the case of slow-onset changes

Source: Authors' own
Notes: Households are the units of analysis. The arrows do not represent causal relations, but chronological order: before, during and after climatic changes.

coping measures for survival. (box 5). The farmer who lost part of his harvest in a drought, for example, could sell a cow to buy grain for his family. However, coping measures often have costs – which can be monetary as well as non-monetary – and they can have adverse effects in the longer-term (erosive coping). We call these second-order impacts or second-order losses and damages (box 6). The losses and damages that people incur in the face of such adverse events further increase their livelihood vulnerability (box 7) at the start of a new cycle.

While Figure 3 (p. 43) depicts the cycle for sudden-onset events, Figure 4 (above) does the same for slow-onset processes. The difference between Figure 3 and Figure 4 is the central box showing 'Pro-active adaptation'. If a household experiences slow-onset processes (e.g. desertification) or gradual climatic changes (e.g. changing monsoon patterns) (fig. 4, box 3), it can adopt pro-active adaptation measures in anticipation of the possible impacts of these processes or changes. If such measures are adopted, they can:

1) Fail – **red arrow**
2) Be successful without costs or negative side effects – **green arrow**
3) Be successful in preventing impacts, but still incur costs or adverse effects – **yellow arrow**

If pro-active adaptation fails (red arrow), the cycle continues as depicted in Figure 3 (p. 43), with first order impacts and possibly second-order impacts. If pro-active adaptation is successful and comes with no adverse effects (green arrow), it means that people's new, adapted livelihood strategies and preventive measures can absorb slow-onset events and gradual changes without making them more vulnerable. If pro-active adaptation is successful but comes with additional costs or adverse effects (yellow arrow), the first-order impacts are avoided and reactive adaptation measures would not be necessary, but second-order impacts (box 6) will still be experienced with implications for the household's livelihood vulnerability in a new cycle.

A key lesson from Figure 3 (p. 43) and 4 (p. 44) is that households can incur loss and damage in two ways. First, due to impacts of climatic stressors despite the risk reduction measures (in the case of sudden-onset events, see fig. 3) and pro-active adaptation measures (in the case of slow-onset processes, see fig. 4) they adopted to avoid such impacts. These are called first-order loss and damages. The second way in which actors incur loss and damage is when the coping strategies and adaptive measures have costs or negative side-effects that affect livelihood sustainability in the longer term (erosive coping and maladaptation). These are called second-order losses and damages.

Finally, the distinct loss and damage cycles for sudden- and slow-onset stressors (fig. 3 and 4) are to some extent theoretical. This is because in practice, slow-onset processes such as sea level rise, usually cause loss and damage in combination with sudden-onset events, such as a cyclone. This is elaborated below and in Figure 5 (p. 47) with an example from Bangladesh.

In the rest of this section we elaborate on the research design for the specific domains.

RESEARCH DOMAIN 1: CLIMATIC STRESSORS

To cover this research domain, the household questionnaire inquired about respondents' perception of changes in the frequency and severity of climate-related stressors. Prior to the fieldwork, the researcher would try to access and analyse existing data on the stressors the assessment focuses on. These could come from local meteorological or hydrological stations or from global databases.

Slightly different approaches are needed for assessing loss and damage from climate-related disasters (sudden-onset events), such as floods, cyclones, landslides and sudden collapse of riverbanks, as well as more gradual climate-related changes (slow-onset processes), such as sea level rise, salinization, coastal erosion, changing rainfall patterns and desertification.

In reality, there is a continuum between sudden-onset and slow-onset stressors (e.g. droughts are in between the two extremes) and complex interactions exist between the two. First, slow-onset processes can have sudden peaks. Riverbank erosion, for example, is a gradual process, but becomes a sudden-onset disaster when a big chunk of land breaks off (riverbank collapse). Second, slow-onset processes can influence the frequency and intensity of sudden onset events. Examples for this include gradual, long-term changes in rainfall patterns, such as the onset and duration of the rainy season, and the total amount of annual rainfall. The frequency of dry spells and extreme rainfall days also involve changes in the extremes, which can become sudden-onset disasters. Third, a slow-onset process, such as sea level rise, can adversely affect the intensity with which sudden-onset events, such as a cyclone or a tidal flood, impact communities. Fourth, sudden-onset events can act as triggers that push slower-onset changes over tipping points. For example, a severe drought can trigger desertification and a severe flood can accelerate salinization of soil and water.

An illustration of the complex interaction between slow- and sudden-onset stressors is provided in Figure 5 (p. 47), based on a loss and damage case study in coastal Bangladesh (Rabbani et al., 2013). Sea level rise (slow-onset process) and cyclones (sudden-onset event) both contribute to coastal erosion. Without sea level rise, cyclone-induced floods would be less devastating, and without cyclones and other extreme events it would be much easier to adapt to sea level rise and avoid salinity intrusion.

RESEARCH DOMAIN 2: VULNERABILITY

Understanding people's vulnerability to climate-related stressors is key to minimizing loss and damage. If one discovers, for example, that households with low levels of education tend to be more affected by a natural hazard than households with higher education levels, then it might be worth investing resources in understanding why that is the case and recommend policy options to address this.

To assess household vulnerability, we used an index that builds on the Alkire Foster method for measuring the multiple dimensions of poverty (Alkire and Foster, 2011). Based on the experience from past case studies, 10 vulnerability indicators were defined. These are education level, land and livestock ownership, livelihood diversity, total income, dependency ratio, house quality and exposure, food security and level of preparedness. These indicators represent the three dimensions of vulnerability: Exposure, sensitivity and (lack of) adaptive capacity.[17] The choice of indicators is not fixed and can be adjusted to different geographical contexts and climate-related stressors. Also, the number of indicators can be increased, for example to include a health dimension of vulnerability.

For each indicator, four thresholds were chosen, dividing the sample population into five groups. For example, for education the groups are "no formal education", "attended literacy classes", "primary school", "lower secondary school" and "higher secondary or tertiary education". For quantitative indicators (e.g. land size, livestock ownership and total income), the sample population is divided into quintiles, and household scores are assigned accordingly. Each household in the sample has a score of 1 to 5 on each indicator. The Multi-Dimensional Vulnerability Index (MDVI) is calculated as the average of the scores on the ten indicators. A higher score on the index indicates higher vulnerability to the natural disaster at hand.

To assess household vulnerability to impacts of climatic stressors, the questionnaire should include questions that yield data for a MDVI. The ten MDVI dimensions used in earlier case studies (van der Geest and Warner, 2015a; van der Geest and Schindler, 2016b) are outlined in Table 4 (p. 48).

In the first generation of loss and damage case studies, a data limitation for the MDVI was that we did not systematically gather information about the location of houses and farmland in most study sites. However, the case studies yielded some qualitative findings on vulnerability that show that location is a crucial variable, especially in the case studies focused on flooding (Bhutan, Kenya, Nepal), salinity intrusion (Bangladesh) and coastal erosion (Micronesia). The maps that were made for the case study on the island of Kosrae in the Federated States of Micronesia – where GPS coordinates of households were gathered – illustrate the importance of location (fig. 6, p. 49). The maps show that impacts of storm surges were much more severe among coastal households living in areas without mangroves. A lesson learned from this example is that gathering geo-information about household location is crucial in the case of some stressor types.

17 The three dimensions of vulnerability originate from the IPCC definition of vulnerability that was used in the Third and Fourth Assessment Report. Füssel and Klein (2006) discuss this definition in more detail. Other indices, such as the one used in the World Risk Report (Garschagen et al., 2016) also build on these three dimensions, but at national level instead of household level.

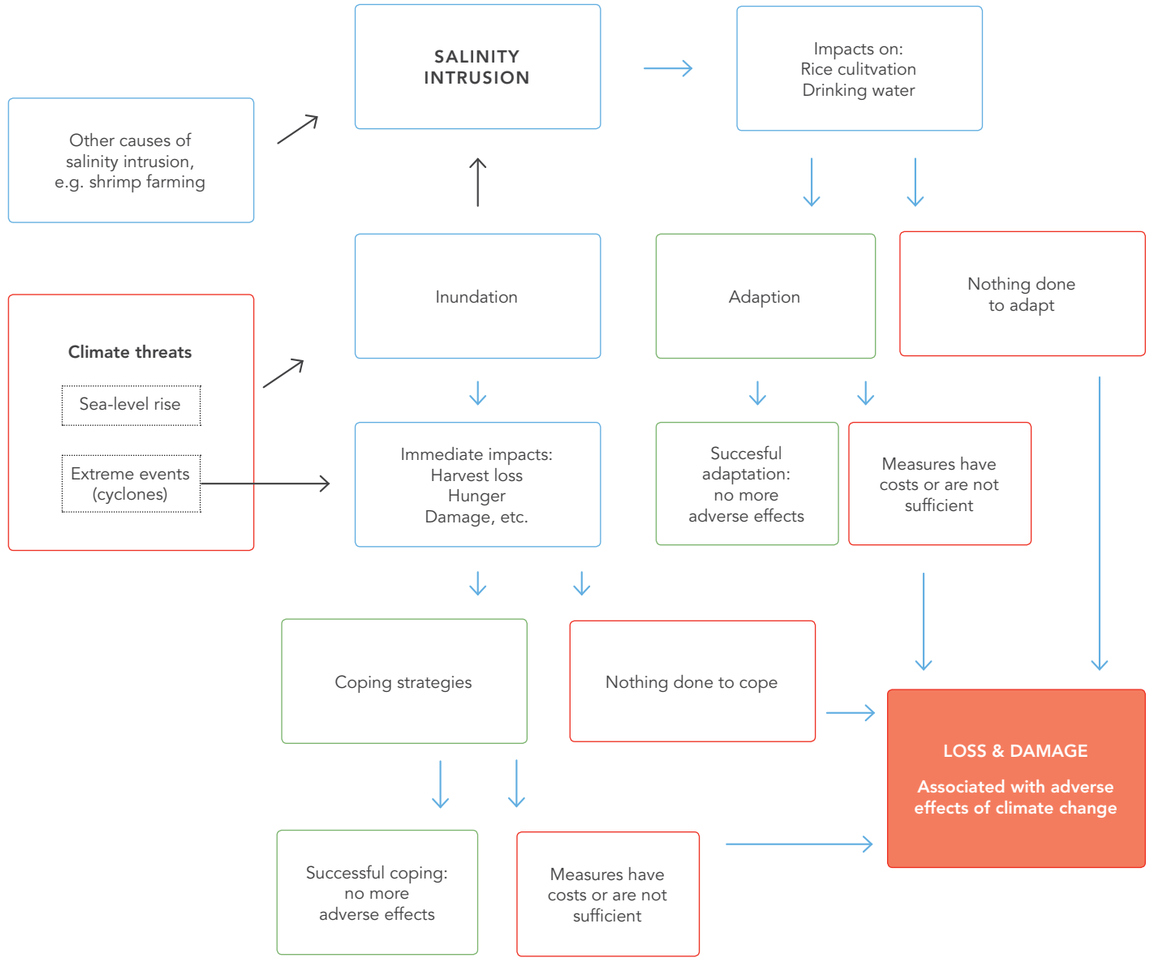


Figure 5: Example of complexity of climatic stressors

Source: Author's own, based on Rabbani et al. (2013)

1. Education	Level of education of household head: none=5; literacy training=4; primary=3; lower secondary=2; higher secondary or tertiary=1.
2. Dependency ratio	Dependent household members (aged <18 and >65) / adult household members (18-65) * 100 (score based on quintiles).
3. Land ownership	Size of land owned by the household (score based on quintiles).
4. Livestock ownership	Expressed in Tropical Livestock Units (score based on quintiles).
5. Livelihood diversity	Number of the following livelihood sources: crop cultivation, livestock keeping, fishing, trees, farm labour, non-farm income, remittances, other (mostly pension, rent).
6. Total cash income	Total amount of cash income from all sources (score based on quintiles).
7. House quality	Based on floor material (more vulnerable if earth, mud, cow dung) and own perception of house quality.
8. Location	Based on respondents' own perceptions of how risky the location of their house is; how exposed it is to landslides.
9. Food security	Based on months of food shortage in the past year and years of food shortage in the past decade.
10. Preparedness	Based on the number of different preventive measures the household adopted to reduce likelihood and impact of a landslide (e.g. gabion walls, tree planting, and house adaptations).
MDVI	Average score on the 10 indicators, allowing for 2 missing values.

Table 4: List and description of 10 Multi-Dimensional Vulnerability Indicators (MDVIs)

Source: Authors' own

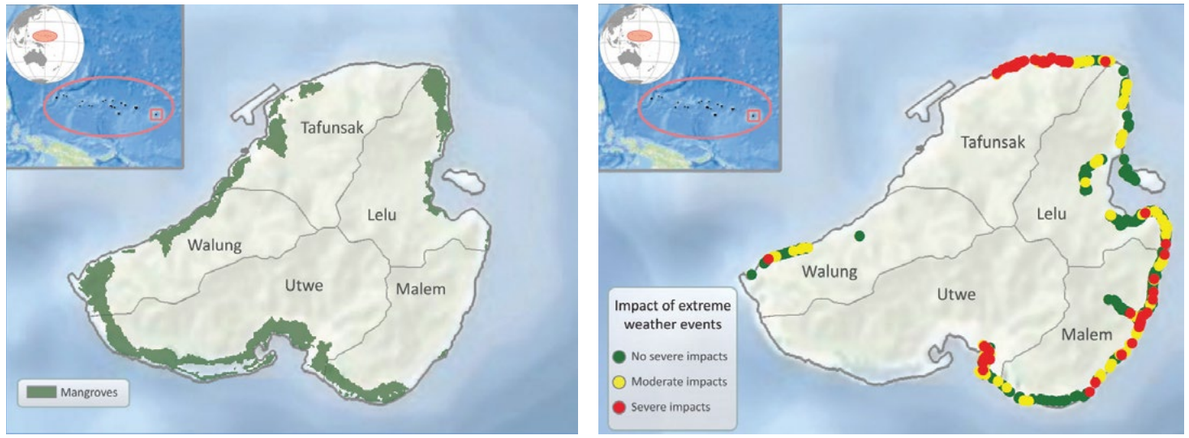


Figure 6: Example from the pacific: Mangroves, climate impacts and the importance of location

Source: Warner et al. (2012)
Note: Households living in coastal areas without mangroves were much more likely to experience severe impacts of storm surges (the red dots on the right map) than households living in areas with mangrove vegetation (the green areas on the left map). Maps created by the Center for International Earth Science Information Network (CIESIN) for UNU-EHS.

RESEARCH DOMAIN 3, 5 AND 6: PREVENTIVE MEASURES, COPING AND ADAPTATION

Households adopt preventive measures in response to normal characteristics (including variability) of the climate and environment and in anticipation of unusual events. Preventive measures differ from coping strategies in that the former are adopted ex-ante, in *anticipation* of an adverse event, to avoid impacts, while the latter are adopted ex-post, to deal with unavoided impacts. Coping strategies are short-term responses to the impacts of sudden or unusual events. The third type of measures or strategies we distinguish is adaptation, which refers to longer-term adjustments to more permanent changes in the livelihood context (including climatic changes).

An interesting difference between preventive measures and adaptation on the one hand and coping measures on the other is that the types of coping strategies that households adopt do not depend on the type of natural hazard and its impacts. This is not as surprising as it may sound. For example, it does not make much difference whether a household loses its harvest because of a drought, a flood, a cyclone or a landslide. The coping measures adopted to deal with the harvest loss will be similar independent of the hazard. The first generation

of loss and damage case studies has shown that over 95 per cent of all measures fall in the following categories:

- Use of buffers, such as savings and stored food
- Support from social network
- Taking loans
- Support from organizations (food aid, relief)
- Selling assets
- Reducing expenses
- Migration and remittances
- Relying on non-farm income sources
- Modifying food consumption

In the household questionnaire, we recommend to first use an open question to ask respondents how they dealt with impacts of a disaster. After this, the questionnaire continues with closed questions about the use of the nine types of coping strategies. The questionnaire part on coping strategies would end with a question on whether households had adopted any other coping measures besides the ones covered in the closed questions. However, no matter what natural hazard the assessment focuses on, these nine coping strategies are likely to cover the full spectrum.

By contrast, preventive and adaptation measures are very specific to the type of climate-related stressors the loss and damage assessment looks at. For example, to prevent impacts of drought, households need to adopt measures that are very different from those that are geared towards avoiding flood impacts. In the case of drought, farm households would need to switch to drought resistant crop varieties, intensify soil and water conservation measures. By contrast, to prevent flood impacts, households could move their houses or livelihood activities to higher lands or build flood protection measures. Just as in the case of preventive measures, adaptation measures are stressor-specific. Adapting to sea level rise requires a totally different strategy than adapting to desertification. And adaptation to increased risk of cyclones requires other action than adapting to increased risk of landslides or riverbank collapse.

Besides the stressor-specific preventive and adaptation measures, there are two broad categories of livelihood changes that are common ways for people to spread risk and make their livelihoods less dependent on one source for food and income. These categories are livelihood diversification into non-farm activities and migration. When a farm household diversifies its livelihood with non-farm income generating activities, it becomes less vulnerable in the face of specific natural hazards. When a drought destroys their harvest, they can still meet part of their demands for food and cash with the other income sources. Similarly, when families disperse geographically through migration, they spread risk. When migrants' home area is hit by a flood, they can help their remaining family deal with flood impacts.

RESEARCH DOMAIN 4: IMPACTS, DESPITE PREVENTIVE MEASURES AND ADAPTATION

When the climatic stressor is severe and the preventive or adaptive strategies are not effective enough, then people will incur impacts of those stressors. Even when exhaustive preventive measures are taken, some impacts may still be incurred.

The types of impacts households incur are quite specific to the type of climate-related stressors the loss and damage assessment looks at. In the questionnaire design phase, it is important that the researchers have already gathered information about prevalent impacts, for example through a desk-study, expert interviews or pilot with FGDs in the study area.

In the questionnaire, it is always good to start a new section with an open question. In the Nepal case study questionnaire, we simply asked: How did this landslide affect your household? This question was followed by a table in which we had included predetermined categories of impacts, based on the desk study. The categories we used were: Impact on crops, loss of soil or land, mental stress, impact on trees, damage to housing, drinking water, health impacts, livestock losses, loss of properties, increased food prices, loss of stored food, loss of life, impact on non-farm income sources and fishing activities (see Table in Section K of the Questionnaire, Appendix 1). For each impact type we asked respondents whether and how the household was affected and we asked them to quantify and estimate the monetary costs when possible.

RESEARCH DOMAIN 7: LOSS AND DAMAGE RELATED TO THE COSTS AND ADVERSE SIDE-EFFECTS OF PREVENTIVE, COPING AND ADAPTATION MEASURES

When preventive, coping or adaptation measures are adopted, they often come at a cost. For example, poor implementation, unexpected events, or a lack of options can lead to adverse side-effects. These side-effects can range from wasted money (e.g. if the measure is ineffective), to causing serious harm to those affected. More serious adverse side-effects could include the destruction of farmland by building protective structures, the loss of identity due to resettlement efforts that failed to consider non-economic factors, or the threat to a household's economic stability because of unsustainable loans that were taken on to cover the losses and damages caused by a disaster.

When assessing the effectiveness of measures, it is important to consider both their long- and short-term effects. Especially measures that provide a 'quick fix' to a problem, such as taking a loan, may seem highly effective in the short-term, but can have severely negative effects in the long-term. Hence, the time component (i.e. how long after the measure was adopted does the research take place?) is essential to accurately evaluating the effectiveness of a measure.

3.3 Site selection

This section lists a set of criteria for site selection.

- Relevance: The study area must have experienced and be vulnerable to climate-related stressors. The team can decide to study the losses and damages associated with a certain event (e.g. a cyclone or flood that hit the area in a certain year) or focus on a broader range of climate-related stressors.

- Goal: The objective of the study should always inform the site selection, not the other way around. If the objective is to assess loss and damage associated with impacts of climate *change* (as opposed to climate variability and extremes) – for example to prepare a compensation claim, which seems unrealistic at this stage – then the study must focus on a climate-related stressor that has a clear link to increased greenhouse gas emissions. The climate has always changed, also without human interference, and extreme weather events have always occurred. Attributing specific climate-related events to anthropogenic global warming is extremely complex in most cases. Though there has been substantial progress with Probabilistic Event Attribution (Angélil et al., 2014; Otto et al., no date), the science of attribution is still in its infancy. Linking slow-onset processes (e.g. sea level rise and

temperature increase) to global warming is usually more straightforward than in the case of sudden-onset events (e.g. floods and cyclones). In addition, some extreme events (e.g. heatwaves) are more directly linked to global warming than others (e.g. floods). The objective of this methodological handbook is to provide tools for studies that contribute to the protection of lives and livelihoods against climatic disturbances. Therefore, the question to what extent a climatic stressor can be attributed to greenhouse gas emissions is less relevant.

- Data availability: Availability of at least 30 years of meteorological and/or hydrological data is highly desirable. Depending on the focus of the study, daily data on rainfall, temperature, wind speed, water levels and/or river flow volumes would be used to provide a more solid scientific base for independent variable (climatic stressors) of the study. It is extremely helpful to conduct a pre-fieldwork analysis of meteorological and/or hydrological data to ensure that the selected study area has, in fact, experienced climatic disturbances or deteriorations. For example, if the assessment focuses on loss and damage from changing monsoon patterns or increasing temperatures, it is important to ascertain, in advance of the fieldwork, that the meteorological data for rainfall and temperature does indeed show adverse changes. If the research team does not have access to local meteorological data at the time of site selection, it is worth checking online databases with high-resolution environmental data (see de Sherbinin, 2014).

- Climate sensitivity: The population in the study area should have livelihoods that are sensitive to climatic perturbations. This is more typical in rural than urban areas. The most climate-sensitive livelihoods occur in areas with predominantly rain-fed griculture, in areas that are relatively remote with few opportunities for earning a non-farm income, and in areas that are in unstable transition zones between agro-ecological systems (e.g. the desert margins and areas close to the permafrost limit).

- Local contacts: It is helpful if the implementing organization has well-established contacts in the study area, preferably through a local NGO or government agency with an office in the area or very nearby. Inhabitants and local leaders can also serve as valuable local contacts. While they may lack the formal and bureaucratic capacities, as well as the network of contacts that NGOs or government may have, they may provide unique insights to specific areas that NGOs or the government are unaware of. These contacts make it easier to organize the fieldwork and disseminate findings or organize follow-up activities afterwards.

- Study area: Depending on budget and transport conditions, the choice of study location should have a good balance between distance, access, comfort and cost on the one hand and relevance on the other. While it is easy, cheap, fast and comfortable to select a study site just outside of the researchers' city of residence, such a location is usually not the most suitable in terms of vulnerability to climatic stressors. Poverty tends to concentrate in remote areas, far away from urban centres and tarmac roads, as Robert Chambers (1983) already described over three decades ago. 'Urban bias' and 'tarmac bias' in research is still as common today as it was then.

- Infrastructure: It is helpful (but not indispensable) if the research team has access to electricity and mobile phone networks in the study site or nearby. This criterion can be at odds with the previous point.

- Communication: The best research results are attained if the team speaks the same language as the study population. This should be considered when selecting a study area.

PILOT STUDY

It could be useful to split the fieldwork for assessing loss and damage into two parts: a 'pilot study', followed by the main research. During the 'pilot study' a small team, including the principal investigator, tests the questionnaire, prepares the sample framework, conducts one or two FGDs and organizes logistics for the arrival of the whole research team. Subsequently, possible lessons learned are considered, before the full-fledged research begins.

This methodological handbook contains a template questionnaire that should be relevant and applicable in all study sites. However, the closed questions on impacts and adaptation are location- and stressor-specific. The pilot study can be used to insert the right questions about impacts and adaptation in the questionnaire.

FIELDWORK TIMING

The community-based assessment of loss and damage requires the intensive participation of inhabitants of the study area. In planning the fieldwork, it is important to avoid times of peak labor demands, such as the harvest season. In areas with large-scale seasonal migration, it is advisable to plan the fieldwork in a time of the year when most seasonal migrants are at home.

Image 9: Questionnaire interview in Sindhupalchok District, Nepal.

4. Research tools

This section describes the research tools used to assess loss and damage. It includes methods for measuring measurable losses and damage and qualifying non-measurable losses and damage. The assessment uses a mixed methods approach (Burke-Johnson et al., 2007; Morgan, 2007). Six broad work streams are distinguished:

- Desk study
- The household questionnaire
- Participatory Rural Appraisal
- Expert interviews
- Stories of loss and damage
- Participatory evaluation of CCA and DRR initiatives
  - Project recall
  - Participators evaluation
  - Needs assessment

4.1 Training of the fieldwork team

Typically, two days of intensive training should suffice to provide a good knowledge base for the fieldwork. Using this handbook as supplementary literature in the training of enumerators and field staff could be useful as it is an easy way

to convey the context and relevant aspects of loss and damage research. The principal investigator should walk the team through this handbook and the questionnaire in detail. The team members should then discuss among themselves how to ask questions in the field, and test the results of their work on each other to detect potential problems.

4.2 Desk study

The desk study consists of a literature review and an analysis of existing data about the climate variable (e.g. rainfall data) and, if available, impact variables (e.g. crop yields). The literature review should focus on relevant existing knowledge about impacts of climate change, coping mechanisms and adaptation in the study area and similar places nearby. In most cases, the climate threats we are studying are not new. Farmers in the Sahel, for example, have had to cope with occasional droughts since time immemorial. Impacts of- and responses to drought in the Sahel have been studied extensively, and our work should build on such knowledge. The methods described in this handbook go a step further by exploring the limits and constraints of adaptation and the impacts of climate stressors beyond adaptation. The literature review should give a brief overview of such existing knowledge and identify knowledge gaps.

4.3 Household questionnaire

The household questionnaire is a central tool in this handbook for assessing loss and damage in vulnerable communities. The questionnaire is about 10 pages long and a questionnaire interview should take approximately 45 to 60 minutes. The design and structure of the questionnaire is in line with the conceptual framework in Figure 2 (p. 36), as well as the research domains depicted in Figures 3 (p. 42) and 4 (p. 43). A balance is sought between measuring and understanding loss and damage, quantitative and qualitative information and open-ended and closed questions.[18] For example, the questionnaire first asks the respondent how a certain climate-related event, such as a drought, affected his or her household. This is an open question. After this, the questionnaire inquires in more detail about specific impacts and tries to quantify losses and damages if possible.

The questionnaire has been designed as a template that should be applicable across different types of study sites in rural areas of developing countries. Most questions in the questionnaire have relevance in all rural areas in developing countries. However, there are two sections in the questionnaire that need to be customized per study area. First, the closed questions about risk reduction and adaptation, and second, the closed questions about impacts. These sections need to be stressor-specific. For example, adaptation to sea level rise requires very different action than adaptation to increased drought risks. Similarly, impacts of a flood are quite different from impacts of a drought. Appendix 1 shows the questionnaire that was used in the Nepal case study, which looked at loss and damage from a catastrophic landslide. Future users of this handbook will need to phrase specific questions about impacts and adaptation for the climatic events and changes that their studies focus on (e.g. drought, flood, cyclone, sea level rise, heat wave).

When applied in the field, it is also imperative that the questionnaire is translated into the local language. If several languages are spoken in the study area and no 'common' language can be identified, questionnaires should be prepared in all relevant languages.

18 Caution: The team leader has to be on top of enumerators to ensure that the answers to the open questions are written down in sufficient detail.

Part 1: Household info, livelihood and vulnerability

The questionnaire begins with the most basic socio-demographic information about the household (max 1 page), and then continues with questions that feed into 10 Multi-Dimensional Vulnerability Indicators (MDVIs), described in Van der Geest and Warner (2015a) and in section 3.2 (Research domains). The method is based on the Alkire-Foster method for measuring the multiple dimensions of poverty (Alkire and Foster, 2011). In the analysis phase, household scores on the MDVI are used to depict differences between more and less vulnerable households in the first-order impacts of climatic stressors, the uptake of coping and adaptation measures and residual loss and damage. The MDVIs have a livelihood perspective and should also reflect household *exposure* to climate-related stressors and their *coping capacity* when stressors hit.

It is desirable to develop generic MDVIs for the study areas, but this might be a challenge because of vast differences between study areas in terms of socio-economic development and socio-cultural systems. Separate indicators will be needed if the methodological handbook is to be used in urban areas.

Part 2: Climatic stressors, impacts, responses and loss and damage

In this part of the questionnaire, we try to quantify the quantifiable (crop losses, damage to houses and properties) and to qualify the unmeasurable (e.g. loss of social cohesion, identity, burial sites, etc.). This section includes questions about the following topics:

- Changes in frequency and intensity of climatic stressors
- Preventive measures to deal with 'normal' climate risks in the area
    - Effectiveness of the preventive measures, structured around loss and damage pathways (See Section 1.2)
- Impacts of a specific climatic event on different elements of the household economy and well-being, e.g. crops, livestock, fishing, non-farm income, food prices, housing, properties, health.
- Short-term coping with impacts of events for survival
    - Effectiveness of the coping measures, structured around the four loss and damage pathways (see Section 1.2)
- Longer-term adaptation to climatic changes and impacts
    - Effectiveness of the adaptation measures, structured around the four loss and damage pathways (see Section 1.2).
- The questions about preventive measures, coping and adaptation were asked at two levels. First, we asked about households' own measures were and their limitations. After that, we inquired about the measures developed by organizations in the area.

Survey sample

To obtain representative results from a selection (sample) of households in a certain location or area that can be generalized to the whole population, a systematic random sampling procedure is required. Random sampling means that each household in the study site has the same chance of being

selected for an interview. There are different techniques for achieving this, for example:

1. All households living in a location or area are listed, and a random selection is drawn from this list. A computerized way of doing this is through the RAND function in Excel.[19] This method can be convenient if an existing list of households can be obtained from local authorities, other organizations or the population census. In the absence of such a list, when all house holds need to be identified by the research team, this method can be time-consuming.

2. Households are selected from a map that is detailed enough to identify houses. All houses on the map are numbered and listed and a random sample is drawn from the list, for example by using the RAND function in Excel. For most locations in the world, the 'Earth View' in Google Maps can be used to create such a detailed map, but there may be quite a bit of 'noise' because not every physical structure is, in fact, a house (e.g. barns, livestock shelter, haystack, companies, public buildings, etc.). Moreover, a house can contain several households. A systematic approach is required to deal with this noise.

3. Line sampling: lines are drawn through a location, and households are selected randomly along those lines, e.g. every fifth house on the left and right within 50 meters from the line. Some knowledge of spatial distribution of households (in terms of ethnicity, wealth, occupational groups, etc.) is required to draw the sample lines in a correct way.

In many cases, it will be desirable to sample households in two steps. Typically, the study area for a loss and damage assessment is not a single location, but a district, a municipality, a catchment area, an island or another area unit containing several localities. In this situation, a two-stage sampling procedure is desirable. The following example aims to illustrate this. If the area has a population of approximately 100,000 inhabitants in 50 localities, assuming an average household size of five (can be checked with census data), and a 1 per cent sample is required (i.e. 200 households), the team could decide to first select five localities and then randomly select 40 households per locality. The selection of localities can be random, but in many cases, it can be desirable to use a purposive selection procedure to make sure that certain characteristics that can influence vulnerability to climatic stressors (such as altitude, distance to main roads, distance to river, etc.) are well represented in the overall sample.

The choice of sampling methods mostly depends on the information that the research team has at its disposal and the time and human resources it is willing to invest in a quality random sample.

19 The procedure is simple and explained here: https://www.youtube.com/watch?v=q8fU001P2II

4.4 Participatory Rural Appraisal

Participatory Rural Appraisal (PRA) methods, such as focus group discussion, can be used to ask participants open questions that are subject to detailed and in-depth answers which help the researchers better understand the dynamics between key concepts of this research (climate threats, impact, vulnerability, coping, adaptation and loss and damage). PRA tools compliment the household survey (questionnaire) in that they yield more qualitative information on how climate variability and climate change can lead to losses and damages among local populations. Another advantage of conducting PRA sessions is that they depict the different experiences of men and women, young and old, and possibly of different occupational groups (e.g. crop cultivators, pastoralists, labourers, traders) and wealth groups. This can be achieved by having separate groups for these different categories. A checklist example for focus group discussions (FGDs) utilized in the Pakistan case study is included in Appendix 3.

4.5 Expert interviews

Expert interviews (EIs) were conducted to obtain information that would not easily be obtained from PRA sessions and the questionnaire survey, or to cross-check information from these research tools. For example, questionnaire respondents and participants in FGDs may be able to compile a list of projects by government agencies and NGOs that aim to address adverse effects of climate variability and climate change in the study area. However, certain information about these interventions (such as the year it started and ended, the back donor, etc.) are often unknown. EIs were primarily used in the Participatory Evaluation of climate change adaptation (CCA) and disaster risk reduction (DRR) initiatives (see section 4.7), but were also important in the pilot study phase when the main fieldwork was prepared. Appendix 4 provides example questions for EIs as utilized in the Pakistan case study.

4.6 Stories of loss and damage

A select number of households could be interviewed in more depth to extract compelling stories of loss and damage. An efficient way to do this would be to instruct questionnaire enumerators to alert the principal investigator when they come across a household that has experienced particularly adverse effects of weather-related extreme events. These stories can find their way to the case study report and/or journal article in the form of boxes and quotes.

Based on open interviews with check-lists, these aim to give a face to the data we gather. The stories could take a life history perspective. This method requires quite advanced interviewing and writing skills (a social science background is preferable), and can be time-consuming. Typically, the senior researcher would do these interviews once the rest of the team is familiar with the questionnaire work.

In the case studies, stories of loss and damage effectively illustrated the effect that climatic stressors had on the respondents' lives. For example, the India case study featured the story of 57-year old Kalandy Bhoi from the coastal state of Odisha in India, which illustrated how a family struggled to get by after a cyclone hit their community in 2013 (Textbox 1, p. 60).

Another example of how stories of loss and damage can be included in a case study report is the usage of local folklore, which is often applied to major events. Three folk explanations of how and why the Jure landslide occurred (given in Textbox 3, p. 77) serve as an example of this.

4.7 Participatory evaluation of CCA and DRR initiatives

The objective of this work stream is to assess the ability (and constraints) of existing CCA and DRR projects to protect people in the study areas from loss and damage. This work stream complements the household questionnaire that focusses more on autonomous adaptation and risk reduction measures by households themselves. Moreover, the exercise can inform possible actions and solutions for each research site, and local practitioners can learn a lot from the analysis as

Cyclone Phailin: The story of Kalandy Bhoi

Even before Cyclone Phailin hit, Kalandy Bhoi (57) was struggling to provide for herself and her family. Her husband was sick, and without any land of their own for cultivation, the family was reliant on Kalandy and her four daughters to provide for their livelihood.

When the cyclone reached the Berhampur village of Madhuban Gram Panchayat, in the state of Odisha in eastern India in 2013, a tree seriously damaged Kalandy´s asbestos roof. She also lost her livestock, as three of her goats had died. The destruction that Cyclone Phailin brought to the region meant that opportunities for daily work in the surrounding fields, with which Kalandy earned the money for her family, declined significantly. While her membership of a self-help group meant that she could borrow some money, this was not enough for the family to get back on their feet.

Kalandy took out an additional loan of more than Rs10,000 from a local money lender in order to pay for repairs to her home. As life in the village returned to normal, she began to get more opportunities for paid labour and took on a share in two goats.

With the loan now repaid, Kalandy is working to ensure her children's education. She has also started planning for the marriage of her eldest daughter. However, though her life is back on track, this may just be a temporary respite: As well as limited work opportunities, an inadequate support base and enduring poverty, Kalandy and her family will continue to live under the constant threat of natural hazards, including another cyclone.

Textbox 1: Phailin's story

Source: Adapted from Bhatt et al, 2016.

it sheds light on what works, what does not, and why, from the point of view of intended beneficiaries.

This work stream builds on prior experiences from the Participatory Assessment of Development project (Dietz et al., 2013; Pouw at al., 2016)[20] and the Gibika Research to Action project (Ayeb-Karlsson et al., 2016).[21] Data is gathered in FGDs and EIs to study to what extent interventions by governments and NGOs, concerning adaptation, disaster risk management and building livelihood resilience, have been successful and why (not). The work stream consists of three sub-streams, in chronological order (see PEPA examples in Appendix 2. Note that including meta data in the recordings of responses can be useful for future reference):

- Institutional landscaping
    - Project Recall (in FGD)
    - Cleaning and completion of list of project (in EIs)
- Participatory Evaluation of Planned Adaptation (in FGD)
- Needs assessment (in FGD)

Institutional landscaping (IL) / Project Recall

First, a list of past and current projects/interventions in the field of CCA, DRR and building resilience against climatic stressors were compiled for each study site. This is done through FGDs, preferably with men and women separately, as they tend to know different types of projects. Though there is overlap in knowledge, men tend to be more familiar with projects in the productive realm (e.g. introduction of drought resistant seeds) and women tend to be more familiar with projects in the field of reproductive health and access to drinking water. Another reason to have separate discussions for men and women is that in some cultural contexts, women feel less free to talk in the presence of men.

Interventions include projects of different types of organizations, such as NGOs, CBOs, local government and private sector actors. If possible, such a list should be started before going to the field.

A good approach is to start the project recall exercise with community members, and after that, show the list to local experts (e.g. people working for local governments or NGOs) who can probably add/correct certain information about the projects already mentioned and add more projects to the list. For each project, some basic info is gathered:

- Project name or label (if name unknown or not applicable, e.g. "primary school in village X")
- Agency/organization (name of NGO, government department, etc. can also be a partnership, and be careful to note differences between back-funding, e.g. WorldBank and implementing agency, e.g. WorldVision).
- Year the project / intervention started
- Year it ended, or if it's ongoing
- A bit more description on what the project was about

The recall exercise starts with rounds in which one by one each participant mentions a project. A 'microphone' or 'talking stick' (see Dietz et al., 2013) can be used to structure this process. The person whose turn it is to mention a project holds the

20 See also: www.padev.nl

21 See also: https://ehs.unu.edu/research/gibika.html#outline

microphone and passes it to his/her neighbour once all information has been gathered. When the participants no longer recall projects, a checklist can be used to prompt for projects in specific sectors, such as:

- **Crops**, e.g. introduction of saline-tolerant rice cultivars.
- **Livestock,** e.g. vaccination, introduction of new types.
- **Fish farming**, e.g. technical support, start-up credit.
- **Natural Environment**, e.g. conservation of mangroves.
- **Early Warning Systems,** e.g. early warning against floods or cyclones.
- **Infrastructure**, e.g. construction of dykes.
- **Water**, e.g. rain-water harvesting project.
- **Energy,** e.g. providing alternatives to cutting trees.
- **Education**, schools, literacy program.
- **Health**, e.g. clinics, mosquito nets, prevention of skin diseases related to salinity.
- **Credit / business**, e.g. Non-farm, making people less dependent on natural resources.

After having entered the data and done some rough cleaning, the list can be shown to local experts who can be asked to cross-check and supplement information. Should an expert think that some of the information in the list is incorrect, this does not automatically mean that he is right. Rather, these pieces of information should be flagged for further investigation.

Participatory Evaluation of Planned Adaptation (PEPA)

In the second sub-stream of this procedure, the current and past activities are evaluated in a participatory way through FGDs (see Dietz et al., 2013): were they successful, what were constraints, what makes some interventions successful and others not, do they reach the most vulnerable, what is not yet done, what is most needed? Instead of evaluating the whole list of projects that were mentioned in the project recall, it might be advisable to select 15 to 20 interventions to have a bit more time to evaluate each relevant project. Selection criteria could include relevance for CCA and DRR (hence preventing and minimizing loss and damage), size, uniqueness (if five different projects offer micro-insurance, it might be sufficient to evaluate just the two or three most important ones, or one by an NGO and one by the private sector).

For each project in the list, several open questions are asked, such as:

- → How useful was this project? Why? Why not?
- → Do certain groups in the study site benefit more from this project than others? Explain.
- → Does the project also benefit poor people? Explain.
- → The last time a [climatic] event hit, was the project able to avoid or reduce impacts?
  - → Yes, all impacts avoided, nobody was affected.
  - → Yes, most impacts were avoided; but some households were still affected.
  - → Yes, some impacts were avoided; but most households were still affected.
  - → No, the project did not help to reduce any impacts.w
  - → No, the project even worsened the impacts.
- → What could/should this project have done better?

Needs Assessment

After PEPA, the researcher should spend another 15 minutes with the focus group to do a 'needs assessment'. A starting question would be: "You have told us about all the different-projects that have come to your community. Some of them were very helpful, and others less so… What do you think should really be done here to make people less vulnerable to impacts of climatic stressors?".

Needs assessments are important if an aim of the research is to gather local ideas about suitable interventions that could minimize loss and damage. It helps to assess the gaps in policy and action, and to learn what people really think could be done to minimize loss and damage and make them more resilient to climatic and other shocks.

4.8 Briefing and debriefing

Having daily briefing and debriefing sessions are essential for attaining good results from the fieldwork. Briefing sessions should typically take place around breakfast, when the team starts the day. These sessions take approximately ten minutes in which the principal investigator can provide information about the study area where the team will work that day. Also, he or she can remind team members about important details (e.g. writing down the surveyed house's GPS coordinates). Also, it can be used to motivate the team and check for potential issues and questions that may need to be discussed.

The daily debriefing should last a bit longer than the briefing (about 30 minutes), albeit not too long, as the team should rest after an eventful day. An essential component of the debriefing is to do one round of 'amazing discoveries'. During this round, every team member gets approximately two minutes to report one new and surprising thing that he or she heard, which could be something that the person heard from a respondent, saw on the move, or overheard randomly during the day. These remarks are written down by the principal investigator. This is important to make enumerators feel appreciated and to make the results of the research less anonymous (e.g. from the questionnaire). To this end, it is useful for the principal investigator to identify stories that he or she may wish to follow up on. For research work in general it is often desirable to have some preliminary findings before the final analysis is done, so that material can be shared with donors or the media. The 'amazing discoveries' are a helpful tool to support this.

The principal investigator, who would be the person who writes the final report, usually does not have the same level of contact with the respondents as the enumerators. A useful property of the debriefing is that it helps to bridge this gap between the principal investigator and the respondents, so that the principal investigator's understanding of the study area becomes more accurate and he or she may identify potential problems with the different research streams. Further, providing a forum for daily experiences allows enumerators to help each other and enhances homogeneity in research approaches among enumerators.

Image 10: A ruler painted against an observation station measures the height of the flood prone Lai stream, Pakistan.

5. Data entry, analysis and reporting

It may appear that data entry, analysis and reporting is a coherent process that follows the fieldwork. In fact, the different elements should be considered as an interwoven process. The data entry process needs to be done with the analysis and reporting already in mind, and the following processes strongly depend on knowledge of the previous steps to be done successfully. This section describes how the processes fit into a greater whole and into each other.

5.1 Data entry

There are several programmes that can be used for data entry. Some of them are Microsoft Excel, STATA and SPSS. For the Nepal case study SPSS was used as, unlike Excel, it works with codes and labels. Thus the codes used in the questionnaire could easily be transferred and combined, which increased speed and reduced the potential for errors. Ultimately, the programme used depends on personal preference and previous experience. The SPSS data entry sheet that was designed for the data generated by the Nepal case study questionnaire, which is available online (See Appendix 5, Digital Resources) and can be customized for alternative use in other case studies.

When the data is entered, it is important to differentiate between the three types of data that can be used by a statistical software package. First, there is so-called 'string data'. String data refers to descriptive entries, such as further qualifications of responses that are entered into a survey by writing it in. In other words, string data is an array of words that can contain any types of character.

Numerical data, on the other hand, is data encoded with a certain numeral to allow for statistical analysis. It is also data that can be ranked in terms of 'higher' or 'lower'. For example, the age of respondents should be entered as numerical data, so that a statistical software package can recognize and compare the different entries, and thus analyze them. If numerical data were entered as strings, a software package would not recognize the relationships between the different entries and would be unable to produce meaningful results from them.

Categorical data cannot be ranked (e.g. gender, occupation, etc.), but differentiated. A statistical program typically needs to be told that a certain entry is to be treated as categorical data, for the program to understand it as such.

The way data is entered into a dataset determines the way it can be used in the analysis phase. Therefore, data entry should always be done with the analysis phase in mind. When data from the initial questionnaires is entered, the principal investigator needs to be fully involved in the process to eliminate errors.

In the Nepal case study, the person responsible for data entry was already identified before starting the fieldwork. Instead of waiting for the research to finish, he joined the team in the field and did some questionnaires himself, which improved his understanding of the material. He also started data entry, cleansing and preliminary consistency checks while data gathering was still ongoing. Through this process, problems could be identified and clarified early on, and structural errors were avoided more easily and addressed in time. Ultimately, this approach was very beneficial for the quality of the data.

5.2 Analysis

It is important that the data analysis considers both, quantitative and qualitative data sources, as they can serve as checks for accuracy on one another and because they complement each other in terms of the kind of information they provide. For the quantitative analysis, the data needs to be formatted coherently. This ensures that users who are unfamiliar with the data entry process will also be able to use the data, and it minimizes potential errors. The quantitative information mostly comes from the household questionnaire and the qualitative information comes from the other research streams (FGDs, EIs, the loss and damage stories, etc.) and from the open questions in the questionnaiare.

The combination of quantitative and qualitative methods used to gather the data should also be reflected in reporting the findings. Tables and figures can be used to highlight quantitative elements, while quotes and text boxes can be used to highlight the people's individual perceptions, or to emphasize certain points of importance.

In the Nepal case study, the data gathered was suitable for more advanced statistical analysis (e.g. binary logistic regression), and this will also be the case for data gathered by applying this handbook's template in other study sites. However, the most telling findings are often based on simple descriptive statistics. (Examples of this are Figure 7 and 8 (p. 72)). Including too many advanced statistical analyses may also scare off potential readers.

5.3 Reporting

A typical outline for reporting could be structured as follows:

1. Acknowledgements:
Mentioning the names of individuals involved in fieldwork support, organizations that provided funding, and other individuals or organizations that were crucial to the creation of the research at hand.

2. List of graphic materials:
This could include figures, boxes, images, maps, diagrams and other elements that were included for illustration.

3. Executive summary

4. Introduction:
The content of the study, the conceptual framework, research questions and a brief structural outline of the report.

- **a.** What happened?
- **b.** How could this happen?
- **c.** Loss and damage: Conceptual framework
- **d.** Research questions
- **e.** Outline of the report

5. Methods:
Explanation of how the data was gathered and how it was evaluated

- **a.** Household questionnaire
- **b.** Survey sample
- **c.** Other methods

6. Study area:
An outline of the geographical area in which the study was conducted.

7. Survey population:
Sample size and socio-economic overview of the sample.

What follows is reporting on findings. This is how they were structured in the Nepal Case Study:

8. Livelihood and vulnerability

- a. Sources of livelihood (food and income)
- b. Land
- c. Poverty
- d. Food security
- e. Multidimensional vulnerability index
- f. Perceptions of vulnerability

9. Preventive measures

- a. Uptake
- b. Effectiveness
- c. Constraints
- d. Prevention by organizations
- e. Main findings on preventive measures

10. Impacts

- a. Type, extent and depth of impacts
- b. Loss and damage to land
- c. Damage to infrastructure, public places and the natural environment
- d. Psychological impacts
- e. Spatial analysis of impacts
- f. Loss and damage by income group
- g. Main findings on impacts

11. Coping strategies and relief efforts

- a. Uptake
- b. Effectiveness
- c. Constraints
- d. Relief
- e. Main findings on coping and relief

12. Conclusions

- a. Policy recommendations
- b. Recommendations for future research

13. References and Appendices.

Visualizations (e.g. maps, figures, tables) are an important aspect of reporting research findings. They should not be underestimated, as visualizations put key aspects of the research in the spotlight for the reader and can convey complex relationships in a simplified manner. The following figures and illustrations from the Nepal case study, which assessed loss and damage from a catastrophic landslide, may serve as examples of this.

5.3.1 Maps

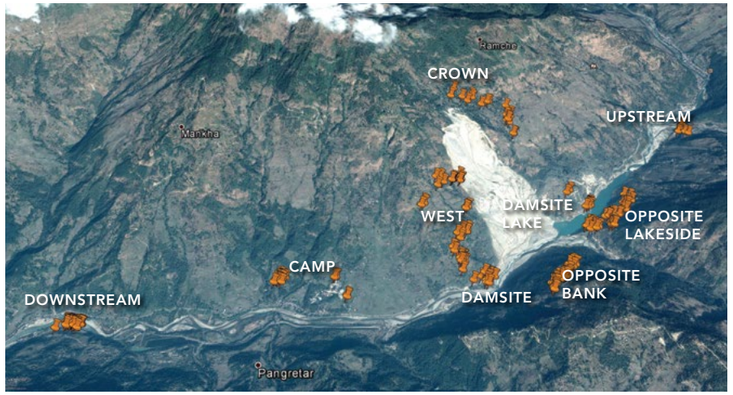
Either in realistic or stylistic fashion, maps are effective at creating transparency about a research area. Map 1 (p.70) shows the spatial distribution of households for the Nepal case study. To create this map, a Google Earth satellite image of the research area was combined with the GPS locations of the households interviewed during fieldwork. Naturally, this required recording GPS locations while in the field. Map 2 (p.70) is a stylized representation that shows the reader where the research area was located on a larger scale.

Beyond representing simple geographical information, maps can also relate research results to geographic locations in the research area. In Map 3 (p.71), a stylized representation of the different areas defined in Map 1 (p.70) is used to show the prominence and severity of the different impact types for the respective locations.

5.3.2 Figures

Some figures serve to visualize simple aspects of the data, such as the assessment of effectiveness of preventive measures, or the proportion of households who took up a certain coping measure before a disaster (fig. 7 and 8, p.72). Figure 7 is a pie chart, as this type of figure is best suited for depicting data that adds up to 100 per cent. Figure 8 adds up to more than 100 per cent, as respondents could give multiple replies to this question, hence a bar chart was more suitable to represent the responses. Next to these simple but meaningful depictions, the option to visualize data on different axes can also show more complex relationships.

As an example, Figure 9 (p.73) depicts the proportion of households that engage in a certain activity in blue on the primary axis, while the secondary axis shows the mean revenue households attained from that activity – all in the same figure. Plotting these two variables together in one figure has the advantage that it shows very clearly that certain livelihood activities, such as crop cultivation, are very widespread but low-yielding in terms of cash income. Figure 10 (p.73) follows a similar logic, but this time it is applied to the proportion of



Map 1: Spatial distribution of the respondent households

Source: Google Earth; Authors' own

Map 2: Location of Sindhupalchok District in Nepal

Source: Authors' own

LANDSLIDE IMPACT MAP

Impact types

Icons appear when > 50% reported experiencing the impact

LIVELIHOOD

- Crops
- Livestock
- Soil/Land
- Trees

ASSETS

- Housing
- Drinking water
- Properties

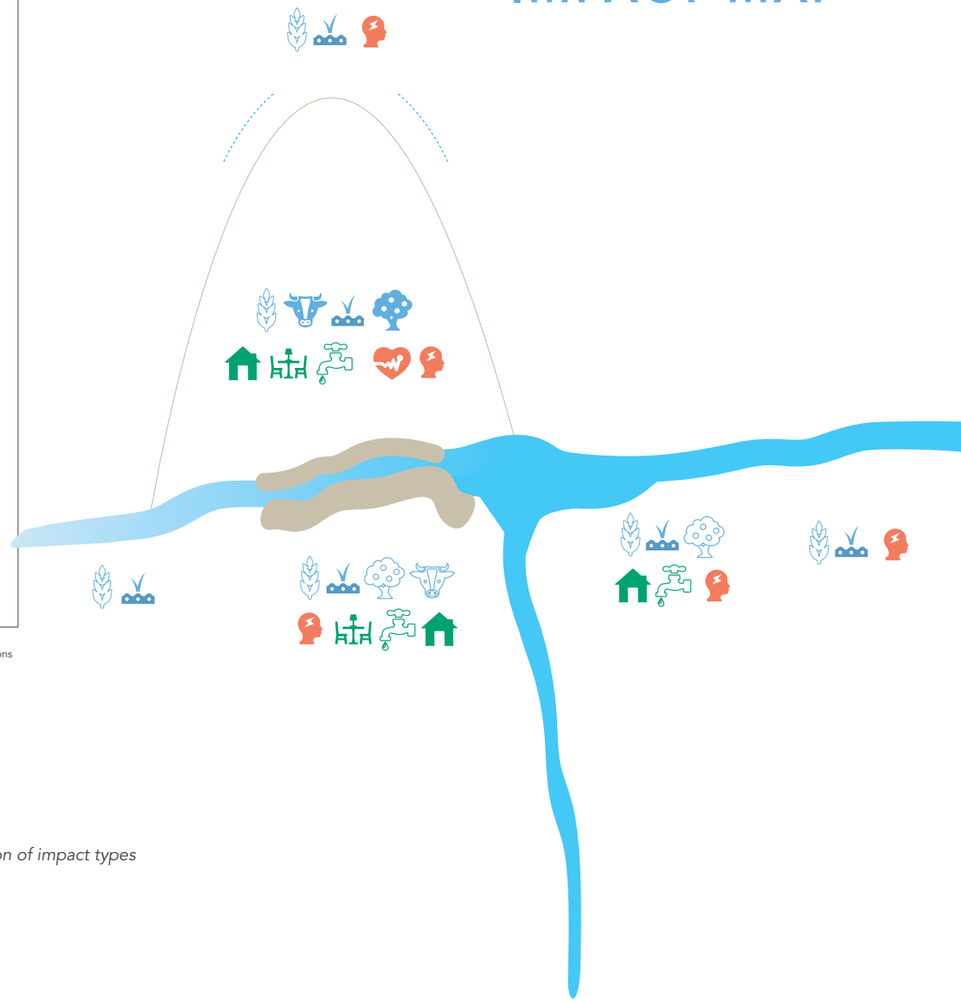
NON-ECONOMIC

- Health
- Mental stress

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

Solid: More than $1,000

White: Less than $1,000



Map 3: Spatial distribution of impact types

Source: Authors' own

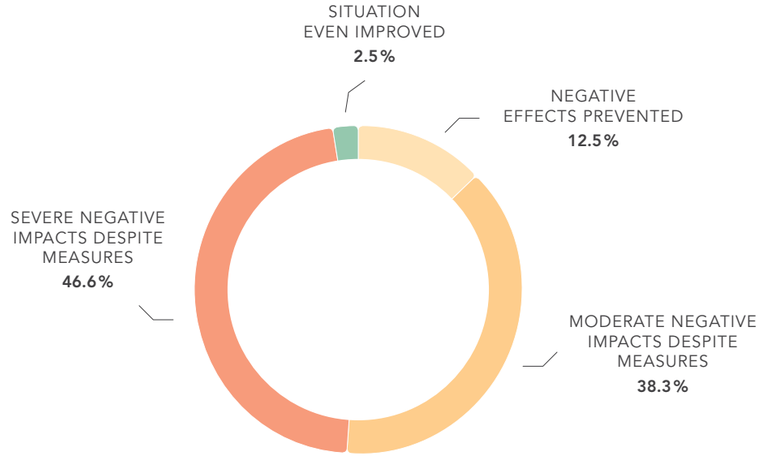


Figure 7: Overall effectiveness of prevention

Source: Authors' own

households that were affected by a certain impact type on the primary axis, and the mean cost this impact resulted in on the secondary axis. In Figure 11 (p.74), this technique is applied to stacked bars, to expand the amount of information per figure even further: the total height of the bars shows the proportion of households who engaged in the respective preventive measure and the bars themselves are divided into sections that reflect the respondents' evaluation of the effectiveness of respective measures. At the same time, the secondary axis (represented as dots) visualizes the composite effectiveness score, which results from combining the respondents' evaluations of effectiveness into one overall score per measure.

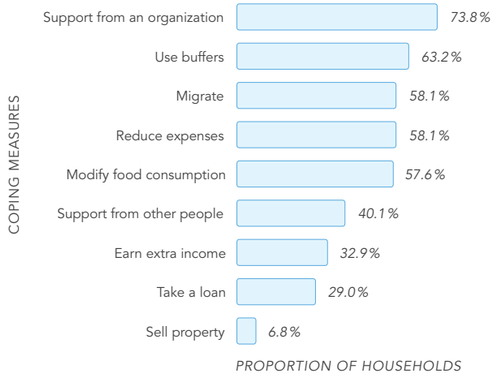


Figure 8: Uptake of coping measures

Source: Authors' own

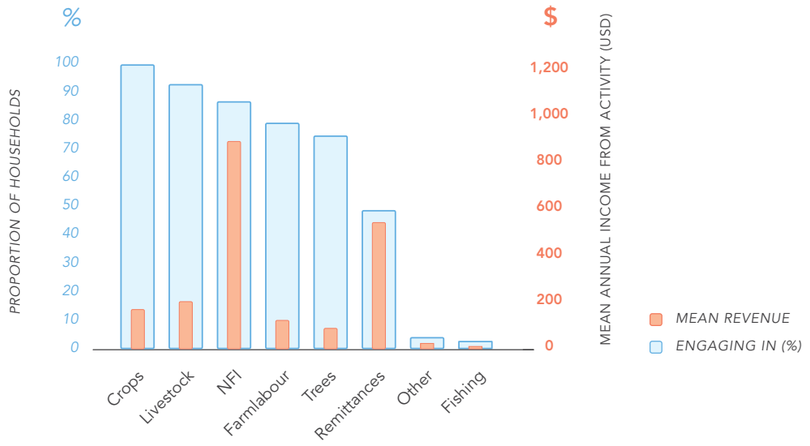


Figure 9: Livelihood sources and cash income

Source: Authors' own

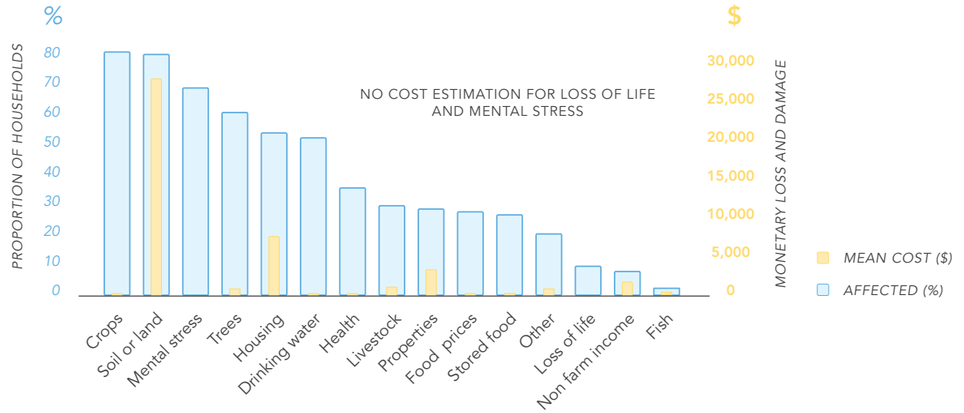
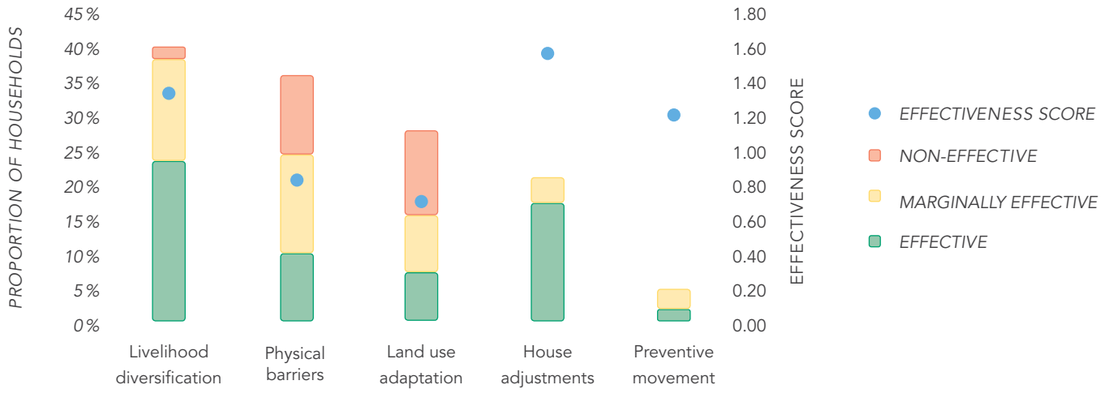


Figure 10: Proportion of affected households and mean cost by impact type

Source: Authors' own



*Note: Effectiveness scores were calculated as 'fully effective'*5 + 'quite effective'*3 + 'marginally effective'*1 + 'not effective' *0 + 'negative effects'*-2.*

Figure 11: Effectiveness of households' preventive measures

Source: Authors' own

5.3.3 Tables

In reporting case study findings, graphics are generally preferable to tables, as they often make it easier to convey interesting results. Table 5 (p. 75) and Figure 12 (p. 75), for example, are based on the same data, but the figure is much more powerful in conveying the finding that richer households' losses were higher in absolute terms and poorer households' losses were higher in relative terms (in relation to their annual income). Tables should be used only when the exact numbers are more important than the overall finding, but that is usually not the case in loss and damage assessments. To get the best of both worlds we suggest mentioning some key percentages in the main text when referring to the figure. In the text, accompanying Figure 12, for example, one could specify the median losses of non-poor households in detail.

5.3.4 Text Boxes

Text boxes are commonly used when certain information needs to be given prominence without disturbing the flow of the text. In the Nepal case study, text boxes were used to highlight stories of loss and damage that effectively illustrated the landslide's effect on the respondents' lives. Most prominently, the case study report featured the story of 18-year-old Nirjala Adhikari, who vividly recounts how she experienced the landslide and its aftermath (Textbox 2, p. 76). A text box was also used to include folk explanations from the Nepal case study of how and why the landslide occurred (Textbox 3, p.77).

Next to full-fledged text boxes, short, key excerpts from the text can be highlighted to draw the reader's attention to important information. Ideally, these excerpts do not add any information that is not already mentioned in the text, but repeat content in a more prominent way.

> Excerpts do not add any information that is not already mentioned in the text, but repeat content in a more prominent way.

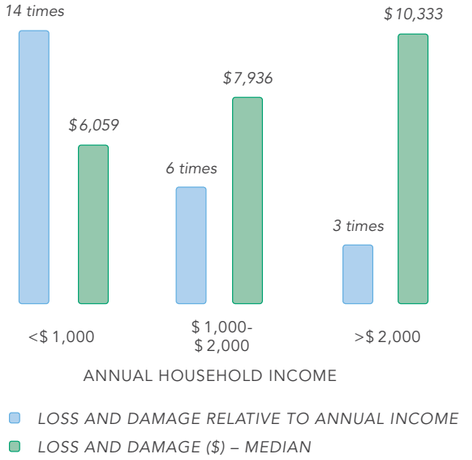


Figure 12: Loss and damage in US$ and as proportion of annual income

Source: Authors' own

	LOSS AND DAMAGE RELATIVE TO ANNUAL INCOME	LOSS AND DAMAGE ($) – MEDIAN
<$ 1,000	14 times	$ 6,059
$ 1,000 - $ 2,000	6 times	$ 7,936
>$ 2,000	3 times	$ 10,333

Table 5: Loss and Damage in US$ and as proportion of annual income

Source: Authors' own

5.3.5 Use of photos

A picture is worth a thousand words – as such, photos are an important part of case study reports. They help to convey emotion, the actual extent of a natural disaster (see Image 11, p.77), or the situation on the ground, to a reader who likely does not know much about the study area. Due to their importance, taking photos should be taken seriously while in the field. They should be taken with a good camera and with the case study report in mind. They should also be taken by the principal investigator or a member of the team that joins the fieldwork specifically for that purpose.

Nirjala Adhikari (18 years old)

"It was a very scary moment and I couldn't think of anything else than grabbing my mobile phone and my school certificate before I ran out of the house", said Nirjala, a secondary-school graduate. "I secured my certificate because only this will help me establish a bright future."

Nirjala and her family, along with nine other affected households, are currently residing in tents at an abandoned magnetite factory (picture on the left). The landslide made her homeless and destroyed her school. Her family also lost its paddy field, which was the mainstay of their livelihood. It also killed some of her close friends.

She feels especially lucky to have survived, as her house was only 30 meters from where the landslide occurred. While she sometimes visits her former home to salvage belongings, the house has become uninhabitable. Fear of future disasters has kept her family from attempting to rebuild the ruins. She reports that organizations provided in-kind relief, some following up on recipients every two to three months. The government provided Rs3,000.

Her mother is the key breadwinner, working at a small restaurant nearby. Her father sends remittances from Kuwait every three months, to finance her and her siblings' education.

Textbox 2: Nirjala's story

FOLK EXPLANATIONS

Sacrilege

Nagraj, the Hindu serpent god of rain, appeared in the area that was hit by the landslide when people were butchering cows. Eating beef is against Hindu beliefs and not heeding the snake's warning led the perpetrators to their untimely death by the disaster. Other accounts describe how a tyre-sized snake was killed by blows to its head; this split into five heads shortly before it died, spelling doom for the killers of cows and snakes.

The Children

A different event was reported by the Nepalese Army, which, while working to open the dam, spotted some children walking across the river in the landslide area. When they got to the river to save the children, they had disappeared. Following this event, a Mataji (a 'God-driven') lady declared that the water would not flow out of the blocked lake until the children were found, and trying to release the water will provoke painful repercussions. Finally, the Serpent God was seen flying eastwards at lightning speed, before water burst out of the landslide dam in early September.

Acts of the Creator

People told of the God of all gods (Mahader), who visited the valley and blocked the river because he wanted to take a bath, which caused the creation of the dam lake. Other explanations have it that Mahader, the Creator, Ruler and Destroyer of the world, sought to liberate people who died in the landslide.

Textbox 3: Folk explanations for landslide occurrence, recounted by Ram Krishna Kunwar

Image 11: The extent of the Jure landslide in Sandhupalchok District, Nepal.

Source: Authors' own

Image 12: Questionnaire interview in Sindhupalchok District, Nepal.

6. Resources needed

This section contains practical information about what is needed to assess climate-related loss and damage. It includes sub-sections about financial resources, human resources and materials. In some countries, it might be necessary to get permission from local and/or national authorities to conduct research. If that is the case, procedures should be started well-ahead of the planned fieldwork dates, as it can take a long time to get formal approval.

6.1 Financial resources

Fieldwork budgets vary depending on the scale of the study, how expensive the study area is, the distance to the study area and other factors. Below is an example of what a budget could look like (Table 6, p. 80). In this example, which reflects the situation for the APN project case studies, a fieldwork budget of US$20,000 was available, excluding the time of the principal investigator (which was an in-kind contribution from the organizations involved).

6.2 Human resources

Just as with the required financial resources, the human resources needed to assess loss and damage depend on the scale of the study.

Item	Units	Quantity	Rate ($)	Total
Principal investigator (PI)				
Fieldwork preparation	Days	10	120	**1200**
Fieldwork	Days	24	120	**2880**
Analysis and reporting	Days	30	120	**3600**
Sub-total PI				**7680**
Seven junior field staff	Days	168	40	**6720**
Accommodation of field staff	Days	192	20	**3840**
Meals for field staff	Days	192	20	**3840**
Transport to/from/in study area	Days	24	80	**1920**
Pre-fieldwork training costs	Days	2	400	**800**
Data entry	Days	25	40	**1000**
Compensation for survey respondents	Respondents	200	2	**400**
Focus group discussion	FGDs	5	100	**500**
Expert interviews	EIs	10	25	**250**
Stationary				**250**
Unexpected costs				**480**
Sub-total				**20000**
Total				**27680**

Table 6: Example fieldwork budget

Source: Authors' own

- **A principal researcher** who leads the team. This person needs to have a solid background in climate change adaptation, disaster risk reduction and/or human development, preferably with an advanced degree in a social science field (for example human geography, sociology, anthropology, economics or development studies), and ample fieldwork experience in rural communities. The principal researcher supervises the junior team members, conducts focus group discussions and expert interviews and is responsible for analysis and reporting.

- **A data entry officer** who joins the rest of the team, conducts some questionnaires and begins with data entry while research is still underway. Depending on the size (234 respondents for Nepal case study) and timeframe of the study, more than one data entry officer may be required. Questionnaire enumerators could be suitable data entry officers if they have enough computer or typing skills.

- **A note taker** for the qualitative research tools. This person accompanies and assists the principal investigator in all fieldwork activities. He or she makes notes during PRA sessions and expert interviews and is responsible for organizing the notes and entering them into a computer program (Word, Excel) at the end of the day. It is advisable to use an audio recorder during the sessions and transcribe later.

- **Five enumerators** for the questionnaire survey.

- **A logistics manager** who organizes food, accommodation, transport, financial administration etc. It is important that the research staff can dedicate themselves full time to the research. Further, as the time in the field is intensive for everyone involved, ensuring adequate supply of food and a proper place to sleep is critical. Therefore, it is necessary to have a team member dedicated to taking care of the logistics.

- In some cases, it might be necessary to hire an **interpreter**, but the best research results are attained if the team speaks the same language as the study population.

- Having a reliable and full-time **local contact person** in the community is essential. This person should be a respected community member who acts as a bridge between the research team and the community. He or she also has the important task of organizing and selecting participants for focus group discussions.

- It is important for the team to include **female members**. This is especially true for study areas in which women are not allowed to interact with or are not comfortable with men.

6.3 Material resources

The list below includes the material resources that are needed or can be useful for conducting the field research successfully

- Flip charts (for FGDs and PRAs)

- Note cards (different colours)

- Markers (different colours)
- Pens and paper for note taking
- Cameras
- Laptops
- Audio recorders
- Printer
- GPS tracker for case studies where household location influences exposure to climatic stress (e.g. in the case of floods/landslides). Most modern smartphones offer this feature.
- A map of the study area
- Printed questionnaires
- Printed data entry forms for qualitative research tools

Image 13: Maya Gurung, aged 30, stands in the kitchen of a temporary shelter in Gupsi, Pakha, Gorkha District, Nepal.

Image 14: Urban living in Taiwan, Province of China.

7. Alternative applications

This methodological handbook provides methods for assessing loss and damage at a local level and in rural areas of low and middle income countries, where most people's livelihoods are sensitive to climatic disturbances. However, the methods can be adjusted for assessments in urban areas or in high income countries, and at higher scale levels (e.g. regional or national). This section suggests configurations of the methods to meet specific research needs or for application in different types of geographic areas.

- In urban areas, an alternative set of vulnerability indicators needs to be used, as assets and activities that provide security in the face of climatic stress are different there. Important differences also exist in terms of the balance between autonomous (more in rural areas) and planned (more in urban areas) interventions in climate change adaptation (CCA) and disaster risk reduction (DRR). Therefore, the PEPA method, which focuses on evaluating the effectiveness of planned CCA and DRR, should receive more attention in urban areas.

- In high income countries, far fewer people depend on climate-sensitive sectors for their livelihood. Typically, only a few per cent of the population in high income countries works in agriculture. Hence, people's need to adapt to climatic stressors is also more limited. The usefulness of this handbook

in high income countries is probably limited to assessing losses and damages from climatic stressors, such as floods, that affect people's housing and properties.

- Scaling up: With smart sampling methods, an N=1,000 sample can provide enough information to say something that is representative of a whole country. George Gallup, the father of modern polling, puts it this way: "You don't need to drink a whole bowl of soup to know if it is too salty – providing it is properly stirred, a single spoonful will suffice.[22]

- This handbook can also be used in combination with regular disaster loss assessments. While conventional disaster loss assessments gather data about material and measurable impacts (casualties, number of injuries, number of people displaced, damage to houses and properties, economic losses, etc.) this handbook could complement such endeavours by providing a broader view on loss and damage, including non-quantifiable impacts, differences between groups of people based on their vulnerability profiles, and the limits, constraints and effectiveness of coping mechanisms and adaptation measures.

22 http://ukpollingreport.co.uk/faq-sampling.

Image 15: Pregnant 19-year-old woman in small fishing village near Varkala South Cliff, India.

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Appendix 1: Loss and Damage Case Study Questionnaire

This questionnaire is intended to function as a template. It was originally designed to be applied in the context of a landslide in Nepal, and should be adapted to specific research contexts when used elsewhere.

A. Interview information - no need to ask respondent

A1. Questionnaire number:

A2. Date of interview: _ _ / _ _ / _ _

A3. Name of village or town:

A4. Name of VDC:

A5. Name of interviewer:

A6. Date of data entry: _ _ / _ _ / _ _

A7. Name of data entry officer:

A8. GPS location (use decimals):

a. Latitude:

b. Longitude

Part 1: Respondent and household, livelihood and vulnerability

B. Household information

B1. Name of respondent: _____

B2. Relation to household head (HH-H): 1=HH-H | 2=Spouse | 3=Other member, specify _____

B3. Household composition [by gender/age group]: Adult men (15-64) ___ | Adult women (aged 15-64) ___ | Boys (<15) ___ | Girls (<15) ___ | Elderly men (65+) ___ | Elderly women (65+) __

The questions in the rest of section B are to be answered for the respondent

B4. Sex: 1=Male | 2=Female | 3=Transgender

B5. If respondent is not the HH-H: What is the sex of the HH-H? 1=Male | 2=Female | 3=Transgender

B6. Birth year (Nepalese year)(write age if easier): _____ | -77=Don't know

a. If unknown: Please estimate: _____

B7. Marital status 1=Single | 2=Married | 3=Widowed | 4=Separated | 5=Other, specify _____

B8. Place of birth: 1=This VDC | 2=Elsewhere in the district | 3=Elsewhere in the Zone, specify district_____ 4=Elsewhere in the country, specify Zone _____ | 5=Abroad, specify country _____

B9. Education level (highest attained): 1=None | 2=Literacy classes | 3=Monastery | 4=Primary | 5=Secondary | 6=Tertiary | 7=Technical/vocational, specify _____ | 8=Other, specify _____

B10. Ethnicity/mother tongue: _____

B11. Religion: 1=Hindu | 2=Muslim | 3=Buddhist | 4=Christian | 5=None | 6=Other, specify _____

B12. Caste: (skip if castes do not exist in study site) _____

C. Land, farm and farm labour

C1. What is the land ownership situation of your household? 1=Landless | 2=Full private ownership | 3=Other, explain _____

a. If household owns land: For what do you use the land? (multiple options) 1=House | 2=Crop cultivation | 3=Livestock raising | 4=Renting out | 5=Nothing | 6=Other, specify _____

b. What is the total land size you own? Number _____ Unit (e.g. acre)_____ | -77=Don't know

C2. Do you (or does your household) farm? 1=Yes | 2=No (if no, go to Question C10)

C3. What is the size of the land that you cultivate this year? Number _____ Unit _____ | -77=Don't know

C4. Do you own the land you farm? 1=Yes, all | 2=Yes, partly | 3= No, none

a. If 2 or 3: How do you get access to this land? (multiple options) 1=Renting | 2=Sharecropping | 3=Borrowing | 4=Community land | 5=Other, explain _____

C5. Is your farm entirely rain-fed? 1=Yes | 2=No

a. If no: What is the source of water? 1=Irrigation canal | 2=Tube well | 3=Small dam | 4=Other, specify

b. On how much of your land do you water crops? Number _____ Unit _____ | -77=Don't know

C6. Which crops did you cultivate last year? [in order of importance] (1) _____ (2) _____ (3) _____ (4) _____ (5) _____ (6) _____

C7. How much of your crop production do you usually sell? 1=Everything | 2=More than half | 3=Approximately half | 4=Less than half | 5=Nothing

C8. Please estimate the income your household derived from crop sales in the last 12 months?

Amount _____ Currency _____ | -77=Can't estimate

C9. In the last 10 years, did your crop production… 1=Decrease a lot | 2=Decrease a little | 3=Remain the same | 4=Increase a little | 5=Increase a lot

a. If decreased or increased: What was/were the cause(s) of this change:

C10. Do you or household members sometimes work on other people's farms? 1=Yes | 2=No

a. *If yes*: How many household members? _____

b. How much do you usually earn per person per day? _____ | -88=We don't get paid by day, explain the labour arrangement: _____ -77=Don't know

c. Please estimate the total income from farm labour in the last 12 months (in case of in-kind payments, kindly estimate market value): Amount _____ Currency _____ | -77=Can't estimate

D. Livestock, fishing, gardening and trees

D1. Do you or other household members own livestock? 1=Yes | 2=No

a. *If yes*: Please indicate the number of: (a) Cows/bulls _____ | (b) Goats/sheep _____ | (c) Pigs_____ | (d) Poultry _____ (e) Others, specify _____

b. Please estimate the income from livestock raising in the last 12 months (this includes livestock sales and selling produce, such as milk + eggs)? Amount _____ Currency _____ | -77=Can't estimate

D2. Do you or any other household members engage in fishing or fish raising? 1=Yes | 2=No

a. *If yes*: Please specify: 1=Fishing | 2=Fish raising | 3=Both

b. Please estimate the income from fish in the last 12 months: Amount _____ Currency _____ | -77

D3. Do you or does your household have a vegetable garden? 1=Yes | 2=No

a. *If yes*: What vegetables do you grow? _____

b. What is the size of the garden? Number _____ Unit (e.g. m2)_____ -77=Don't know

c. How much was your income from gardening in past 12 months: Amount ____ Currency _____ | -77

D4. Does your household have an orchard or trees (fruit, timber, etc)? 1=Yes | 2=No

a. *If yes*: What kind of trees? _____

b. Please indicate the number of trees: (1) <10 | (2) 10-50 | (3) 50-100 | (4) >100

c. Please estimate the income from trees in the last 12 months: Amount _____ Currency _____ | -77

E. Other income generating activities

E1. Do you or any household members have income from non-farm activities (NFIs)? 1=Yes | 2=No

a. *If yes*: How many household members engage in such activities? _____

b. In which activities do they engage? (multiple options) 1=Official salary work, specify _____ | 2=Informal salary work, specify_____ 3=Petty trading, specify _____ | 4=Other non-farm income, specify _____

c. Please estimate the total income from NFIs in last 12 months? Amount _____ Currency _____ |-77

E2. Does your household receive remittances from migrant relatives/friends? 1=Yes | 2=No

a. *If yes*: From whom [relation to respondent]? (multiple options) 1=Daughter | 2=Son | 3=Brother | 4=Sister | 5=Parents | 6=Other, specify _____

b. Where do they live? (multiple options) 1=Within this district | 2=Elsewhere in the region, specify ___ | 3=Else where in the country, specify _____ 4=Abroad, specify _____ -77=Don't know

c. Please estimate the total remittances in the last 12 months: Amount _____ Currency _____ |-77

E3. Do you have any other sources of income besides the ones you mentioned? 1=Yes | 2=No

a. *If yes*: Please specify source _____

b. Please estimate income from this source in the last 12 months: Amount ____ Currency _____ |-77

E4. Please estimate the amount of money your household usually has to its disposal:

Amount _____ Currency _____ per 1=week | 2=month | 3=year (choose easiest time unit)

E5. Compared to other households in your village/town, would you say that your income is:

1=Much less | 2=A bit less | 3=Average | 4=A bit more | 5=Much more

F. Housing and other assets

F1. Do you own the house you live in? 1=Yes | 2=No

F2. Please indicate the building materials of the house you live in:

a. Roof (multiple options): 1=Roofing tiles | 2=Iron sheets | 3=Concrete | 4=Natural materials, e.g. thatch or earth | 5=Other, specify_____

b. Walls (multiple options): 1=Cement blocks/concrete| 2=Baked bricks | 3=Sun-dried bricks | 4= Iron sheets | 5= Wood | 6=Other natural materials | 7=Other, specify ___

c. Floor (multiple options): 1=Cement | 2=Earth | 3=Wood | 4=Other, specify _____

F3. Compared to the other houses in your village/town, how do you rate the quality of your house? 1=Much higher quality | 2=A bit higher | 3=Average | 4=A bit lower | 5=Much lower

F4. Compared to other houses in the village, is the location of your house relatively risky or safe in case of landslides? 1=Much riskier| 2=A bit riskier | 3=Average | 4=A bit safer | 5=Much safer

a. Why? _____

F5. Does your house have electricity? 1=Yes | 2=No

a. *If yes*: What is the source? (multiple options) 1=Power grid | 2=Solar | 3=both | 4=Other, specify ___

F6. What is the source of your drinking water? (multiple options) 1=Surface water (river, lake, pond) | 2=Well | 3=Borehole/ Pump | 4=Pipe | 5=Other, specify _____

F7. Does your house have a private pit latrine or WC? 1=Yes | 2=No

F8. Please indicate whether your household owns the following assets [and how many]: (a) TV __ (b) (Mobile) phone __ (c) Bicycle __ (d) Motorbike __ (e) Car __ (f) Fridge __ (g) tractor ___

G. Food security

G1. How many meals a day do adults in your household eat on a 'regular day'? _____

G2. In the past year, have there been months that your household had to eat less? 1=Yes | 2=No | 3=Only in case of fasting for religious purpose

a. *If yes*: In which months did this happen? (multiple options) 1=Jan | 2=Feb | 3=Mar | 4=Apr | 5=May | 6=Jun | 7=Jul | 8=Aug | 9=Sep | 10=Oct | 11=Nov | 12=Dec

b. What was/were the reasons(s) that your household had to eat less?

G3. In the past ten years, have there been years that your household had to eat less? 1=Yes | 2=No

a. *If yes*: In how many out of ten years? (mention number between 1 and 10) _____

b. What was/were usually the reasons(s) that your household had to eat less?

G4. How much of the food your household consumes is usually bought (i.e. not self-produced)? 1=Everything | 2=More than half | 3=Approximately half | 4=Less than half | 5=Nothing

Part 2: Loss and damage from climate-related events

H. Climatic event history and trend

H1. In the past twenty years, how many years have you lived in this district? ____

a. *If not* 20 years: Please explain: 1=I came more recently | 2=I've been away | 3=Other, explain _____

H2. Has your household ever experienced a landslide? 1=Yes | 2=No [If no, go to PART 3 on last page]

a. *If yes*: Please estimate how many landslides in the past twenty years? ____

b. Do you see any changes in the frequency of landslides over the past 20 years? 1=Increased a lot | 2=Increased a bit | 3=No change | 4=Reduced a bit | 5=Reduced a lot | -77=Don't know

c. Do you see changes in the intensity of landslides over the past 20 years? 1=Much more intense | 2=A bit more intense | 3=No change | 4=A bit less intense | 5=Much less intense | -77=Don't know

d. Do you see changes in the impacts of landslides over the past 20 years? 1=Increased a lot | 2=Increased a bit | 3=No change | 4=Reduced a bit | 5=Reduced a lot | -77=Don't know

e. If any change in landslide impact (positive or negative): What do you think caused this change? _____

The questions in the rest of the questionnaire focus on the landslide of August 2014, and the situation right afterwards, when a lake formed above the debris dam, which emerged settlements downstream, and created risk of outburst floods for villages downstream.

I. Adaptive/preventive measures: what people do to prevent landslides or impacts

I-1. Before this landslide, did your household do anything to reduce impacts of landslides? 1=Yes | 2=No

a. *If yes*: What did you do?

I-2. Before this landslide, did your house have any characteristics that helped reduce impacts of landslides? (if difficult to answer, use the examples under follow-up question) 1=Yes | 2=No

a. *If yes*: What? (multiple options) 1=It is built on safer location | 2=Resistant building materials | 3=Elevated dry places to protect properties against landslides | 4=Other, specify ____

I-3. Before this landslide, did you have any physical barriers around your house or farms to prevent impacts of landslides? 1=Yes | 2=No

a. *If yes*: Where? (multiple options) 1=House | 2=Farms |3=Elsewhere, specify _____

b. What materials did you use? _____

I-4. Before this landslide, did you do anything on your fields to reduce impacts of landslides (e.g. plant trees, repair erosion gullies)? (if difficult to answer, use examples below) 1=Yes | 2=No

a. *If yes*: What did you do? (multiple options) 1=Plant trees | 2=Cultivation techniques, specify _____ | 3=Measures related to livestock keeping, specify _____ | 4=Repair erosion gullies on fields | 5=Other, specify _____

I-5. Before this landslide, did your household take up or intensify non-farm income (NFI) activities to reduce your dependence on agriculture and so reduce the impacts of landslides? 1=Yes | 2=No

a. *If yes*: Which NFI activities? _____

b. Were children (age<15) engaged in these NFI activities? 1=Yes | 2=No

I-6. Before this landslide, did your household use migration as a way to be less affected by impacts of landslides (for example pre-landslide evacuation or risk spreading)? 1=Yes | 2=No

a. *If yes*: How important was the risk of landslides as a reason to migrate? 1=Not so important | 2=Quite important | 3=Very important

b. Who migrated? (multiple options) 1=Household head | 2=Other HH-member(s) | 3=Whole HH

c. For what periods? (multiple options) 1=Short-term (<6 months) | 2=Longer-term (>6 months)

d. Where to? (multiple options) 1=Within district | 2=Other district in region, specify _____ | 3=Other region, specify _____ | 4=Abroad, specify _____ | -77=Don't know

e. Was migration destination rural or urban? (multiple options) 1=Rural | 2=Urban | -77=Don't know

I-7. Have households in the village left permanently due to landslides? 1=Yes | 2=No | -77=Don't know

a. *If yes*: Can you estimate how many households? _____

I-8. Before this landslide, did you conduct rituals or prayers to prevent landslides? 1=Yes | 2=No

a. *If yes*: Please explain: _____

I-9. Before this landslide, did you do anything else to reduce impacts from landslides? 1=Yes | 2=No

a. *If yes*: What did you do? _____

J. Planned adaptation + disaster risk reduction: things organizations do to minimize impact

J1. Before this landslide, did organizations (government, NGOs, the army, cooperatives, companies, etc) do anything to prevent impacts of landslides in your village/town? 1=Yes | 2=No | -77=Don't know

a. *If yes*: What did they do? _____

J2. Did organizations operate Early Warning Systems against landslides? 1=Yes | 2=No | -77=Don't know

a. *If yes*: Which organization(s)? _____

b. How does the EWS work? _____

J3. Did organizations construct physical barriers against landslides? 1=Yes | 2=No | -77=Don't know

a. *If yes*: Which organization(s)? _____

b. Which material was used? _____

J4. Did organizations resettle people from landslide-prone areas? 1=Yes | 2=No | -77=Don't know

a. *If yes*: Which organization(s)? _____

b. Where did they move people to? _____

J5. Did organizations provide insurance to reduce impacts of landslides? 1=Yes | 2=No | -77=Don't know

a. *If yes*: Which organization(s)? _____

b. What kind of insurance? 1=Against property damage | 2=Against crop loss | 3=Other-specify _____

J6. Did organizations do anything else to reduce impacts of landslides? 1=Yes | 2=No | -77=Don't know

a. *If yes:* Which organization(s)? _____

b. What did they do? _____

K. Effectiveness and costs of preventive/adaptive measures - [if none, go to Question K5]

If no preventive measures were taken at all by HH or organizations (section I and J), go to question K5

K1. How effective were the things that your household or organizations did to avoid or reduce impacts of landslides? In table below, add <u>each measure</u> to the first column (use question number, e.g. I-3 or J-2), and ask how effective each measure was (mark the appropriate cell with an X).

Preventive measure: Use question number	**1-Fully effective: All impacts avoided**	**2-Largely effective: Most impacts avoided**	**3-Marginally effective: Reduced impact just a little bit**	**4-Not effective: Did not reduce impacts at all**	**5-Counter-effective: Made situation worse, explain!**

K2. Did the things your household or organizations do to prevent or reduce impacts of landslides have costs (monetary) or negative side-effects (non-monetary)? In table below, add each measure to the first column (use question number), and ask about monetary costs and other negative side-effects.

Preventive measure: Use question number	Monetary costs? 1=Yes 2=No	If yes, what costs? Explain in words	How much (money)?	Negative effects? 1=Yes 2=No	Explain

Use this white space for additional explanation (use question number):

K3. Overall, were the preventive measures enough to avoid negative effects? 1=No, still severe negative effects | 2=No, still moderate negative effects | 3=Yes, it prevented negative effects | 4=Yes, the measures taken have even improved our situation

a. Please explain:

K4. If 1 or 2, what made it difficult to adopt more effective measures to prevent impacts of landslides? (multiple options) 1=There was nothing else we could do (why?)| 2=Lack of money (to do what?) | 3=Lack of skills/knowledge (to do what?) | 4=Lack of other resources (to do what?) | 5=No priority | 6=Not my task | 7=Other, specify _____

a. Please explain: (e.g., if "Lack of money", what would they have done with sufficient money?)

K5. If household did NOT take any preventive measures, why not? (multiple options) 1=There was nothing we could do (why?) | 2=Lack of money (to do what?) | 3=Lack of skills/knowledge (to do what?) | 4=Lack of other resources (to do what?) | 5=No priority | 6=Not my task | 7=Other, specify

a. Please explain: (e.g., if "There was nothing else we could do", why not?)

K6. If organizations did NOT take preventive measures, why not? (multiple options) 1=There was nothing they could do (why not?) | 2=Lack of money (for what?) | 3=Lack of skills/knowledge (for what?) | 4=Lack of other resources (for what?) | 5=No priority | 6=Not their task | 7=Other, specify_____ | -77=Don't know

a. Please explain: (e.g., if "Not their task", why not?)

L. Impacts despite preventive measures

L1. How did this landslide affect your household?

L2. For each item in the table below, how did the landslide affect your household?

Type	Impact?	If yes: how did landslide affect household?	Quantity (if applicable)	Estimate costs (if applicable)
A-Crops	Yes | No			
B-Livestock	Yes | No			
C-Fish	Yes | No			
D-Trees	Yes | No			
E-Soil / land	Yes | No			
F-Non-farm income	Yes | No			
G-Stored food	Yes | No			
H-Food prices	Yes | No			
I-Housing	Yes | No			
J-Properties	Yes | No			
K-Drinking water	Yes | No			
L-Loss of life	Yes | No			
M-Health	Yes | No			
N-Other, specify	Yes | No			

L3. Did the landslide damage infrastructure (e.g. bridge, market) in your community? 1=Yes | 2=No

a. *If yes*: How did this affect your household?

L4. Did the landslide damage important places or things (e.g. graveyard, mosque) in your community? 1=Yes | 2=No

a. *If yes*: How did this affect your household?

L5. Apart from the above did the impacts of this landslide affect you in any other ways (e.g. psychologically, socially or culturally)? 1=Yes | 2=No

a. *If yes*: Please explain:

M. Coping measures: What people do to deal with the impacts of a landslide that they have not been able to avoid through preventive/adaptive measures

M1. What did your household do to deal with the impact of this landslide after it occurred? 1=Yes | 2=No

M2. Did you rely on support [e.g. food, money, shelter] from other people to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: From whom? (multiple options) 1=Relative | 2=Neighbour | 3=Friend | 4=Other, specify

b. How did they support? (multiple options) 1=Food | 2=Money |3=Shelter |4=Other, specify __

c. Were the people who supported you migrant relatives/friends from your village who live elsewhere now? 1=Yes, all | 2=Yes, some | 3=No

M3. Did you receive support from an organization to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: From whom? (multiple options) 1=Government agency, specify _____ | 2=NGO, specify_____ | 3=Religious organization, specify _____ | 4=Other, specify_____

b. What support did they provide to you? (multiple options) 1=Food aid | 2=Money | 3=Temporary shelter | 4=Building materials | 5=Other, specify _____

M4. Did you take a loan (money or in-kind) to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: From whom? (multiple options) 1=Bank | 2=Government | 3=NGO | 4=Cooperatives | 5=Local money lender | 6=Relative | 7=Friend | 8=Other, specify _____

b. Were you able to pay back the loan? 1=Yes, all | 2=Yes, partly | 3=No, but I will | 4=No, and I don't think I will be able to

c. *If no* (3 or 4): What will the consequences be if you can't pay back the loan?

M5. Did you sell properties to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: What kind of properties? (multiple options) 1=Land | 2=Livestock | 3=House | 4=Productive assets, specify _____ 5=Means of transport, specify _____ | 6=Luxury items, specify _____ | 7=Other, specify _____

M6. Did you use buffers (e.g. stored food, savings) to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: What kind of buffers? (multiple options) 1=Stored food | 2=Savings | 3=Other, specify ____

M7. Did you or HH-members try to earn extra income to deal with landslide impacts? 1=Yes | 2=No

a. *If yes*: Which NFI activities? _____

b. Were children (age<15) engaged in these NFI activities? 1=Yes | 2=No

M8. Did you or household members migrate to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: Who migrated? (multiple options) 1=Household head | 2=Other HH-member(s) | 3=Whole HH

b. For what periods? (multiple options) 1=Short-term (<6 months) | 2=Longer-term (>6 months)

c. Where to? (multiple options) 1=Within district | 2=Other district in region, specify _____ | 3=Other region, specify _____ | 4=Abroad, specify _____ | -77=Don't know ? (multiple options)

d. Was migration destination rural or urban? (multiple options) 1=Rural | 2=Urban | -77=Don't know

M9. Did you reduce expenses / spend less money to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: How? (multiple options) 1=Spent less on food items | 2=On school fees | 3=On healthcare | 4=On productive investments, specify_____ | 5=On house maintenance | 6=Other, specify_____

M10. Did you modify food consumption to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: How? (multiple options) 1=Bought less expensive foods | 2=Limited portion sizes | 3=Reduced number meals per day |4=Adults ate less so children could eat | 5=Less people eating at home | 6=Other, specify_____

M11. Did you do anything else to deal with the impact of this landslide? 1=Yes | 2=No

a. *If yes*: Specify _____

M12. Apart from organizations' direct support to households (see Question M3) did they do anything else to support the village / community to deal with the impacts of this landslide? 1=Yes | 2=No

a. *If yes*: Which organizations? _____

b. What did they do? _____

N. Effectiveness and costs of coping measures - [if no coping measures, go to Question N4 and N5]

N1. How effective were the things your household or organizations did to deal with landslide impacts? In table below, add each measure to the first column (use question number, e.g. M-3), and ask how effective each measure was in dealing with impacts / recovering (mark the appropriate cell with an X).

Preventive measure: Use question number	**1-Very effective: Helped to recover fully and quickly**	**2-Quite effective: Helped to recover substantially**	**3-Marginally effective: Helped to recover just a little bit**	**4-Not effective: Did not help to recover**	**5-Counter-effective: Made situation worse, explain!**

Use this white space to explain scores, e.g. if 5, what were negative side-effects? (Use question number)

N2. Did the things your household or organizations did to deal with impacts of this landslide have costs (monetary) or negative side-effects (non-monetary)? In table below, add each measure to the first column (use question number), and ask about monetary costs and other negative side-effects.

Coping/relief measure: Use question number	Monetary costs? Yes | No	What costs? Explain in words	How much?	Negative side-effects? Yes | No	Explain

Use this white space for additional explanation:

N3. If measures were taken to deal with landslide impacts, were these enough to recover and get back to the same level of well-being as before the landslide? 1=No, we will never fully recover from this landslide | 2=No, we still haven't recovered | 3=Yes, but it took a long time to recover | 4=Yes, we were able to recover quite fast | 5=Yes, these measures even made our situation better than before

a. If 1, 2 or 3: Why were there still negative effects? (multiple options) 1=Measures were not enough | 2=Measures had costs that were not regained | 3=Measured had negative effects in the long-term or | 4=Other reason, specify _____

b. Why did you not adopt more effective measures to deal with the impacts of this landslide? (multiple options) 1=There was nothing else we could do (why not?) | 2=Lack of money (to do what?) | 3=Lack of skills/knowledge (to do what?) | 4=Lack of other resources (to do what?) | 5=No priority | 6=Not my task | 7=Other, specify

c. Please explain:

N4. If no measures were taken at all, why not? (multiple options) 1=There was nothing we could do (why not?) | 2=Lack of money (to do what?) | 3=Lack of skills/knowledge (to do what?) | 4=Lack of other resources (to do what?) | 5=No priority | 6=Not my task | 7=Other, specify _____

a. Please explain:

N5. If organizations did not do anything to help people deal with landslide impacts, why not? (multiple options) 1=There was nothing they could do (why not?) | 2=Lack of money (to do what?) | 3=Lack of skills/knowledge (to do what?) | 4=Lack of other resources (to do what?) | 5=No priority | 6=Not their task | 7=Other, specify_____ | -77=Don't know

a. Please explain:

Part 3: Perceptions

O. Perceptions of vulnerability, gender, age and policy needs

O1. Do you think your household is more or less affected by impacts of landslides than other households in the village/town? 1=Much more | 2=A bit more | 3=Average | 4=A bit less | 5=Much less

a. What makes your household more, less or averagely vulnerable?

O2. Who are most affected by landslide impacts in your village? 1=Women | 2=Men | 3=Same

a. Please explain why:

O3. Who are most affected by landslide impacts in the village? 1=Children | 2=Adults | 3=Old people | 4=Same

a. Please explain why:

O4. What do you think the government or other organizations could do to reduce the impacts of landslides?

Appendix 2: PEPA Data entry sheets

The participatory evaluation of planned adaptation work stream had three elements: The project recall, the evaluation and the needs asssessment.

Project Recall

The project recall template is used to gauge the different activities that were conducted by different stake- and shareholders in the context of a natural disaster. We have filled the table with two imaginary examples.

	Type of project/ sector	Project name/ activities	Implementing agency	Donor	Agency type(s)	Description	Where? Which villages, VDCs, wards
1	Relief	A	Agency X	Donor X	NGO	Blankets, bed sheets, mos-quito nets	Location X
2	Preventive	B	Agency Y	Donor Y	Government	Built dam along river	Location Y

Evaluation of Planned Adaptation and DRR Projects

The evaluation exercise seeks informants' views about the effectiveness of the CCA and DRR projects and interventions that have been implemented in their area.

	Sector	Project name/ activities	Implement-ing agency	How useful was this project, why, why not?	Do certain groups in the study site benefit more from this project than others? Explain	Does the project also ben-efit poor people? Explain	The last time an event hit, was the project able to avoid or reduce impacts?	What could/ should this projects have done better?	Why?
1	DRR/Reief	Project X	NGO X	[…]	[…]	[…]		[…]	[…]
2	Irrigation	Project Y	Organisa-tion Y	[…]	[…]	[…]		[…]	[…]
3	Relief	Project Z	Govern-ment agency Z	[…]	[…]	[…]		[…]	[…]

Needs Assessment

In the needs assessments, informants indicate what type of CCA and DRR interventions are missing in their area and why they are needed.

Which measure is needed?	Why? Please justify	Will it also benefit the poor/most vulnerable people? How?
Measure X	[…]	[…]
Measure Y	[…]	[…]
Measure Z	[…]	[…]

Appendix 3: Checklist example for focus group discussions (FGDs)

The checklist in this appendix was used in a loss and damage case study in Pakistan that that analyzed flooding flooding in Punjab Province (Rahman et al., 2017).

INSTRUCTIONS

- Ideal group composition: 8-10 persons, separated by gender and, potentially, livelihood groups, e.g. farmers, pastoralists, landless farm labourers, etc., depending on the local context.
- The questions in this document represent a checklist. Additional questions may come up.

- Focus is on acquiring a qualitative understanding of similar things we ask in the questionnaire. Much effort should go into the "WHY?" and "EXPLAIN" questions!

- The role of the note taker is very important. He or she needs to write down all relevant information in detail. For this purpose, use of an audio recorder can be advisable so that parts can be listened back after the FGD.

- The note taker should also be alert to interesting quotes by FGD participants that can be used in final reporting.

FGD number:

Name of FGD facilitator:

Date of FGD: _ _ / _ _ / _ _

Name of note taker:

Name of village or town:

Type of group (e.g. men/women):

Date of data entry: _ _ / _ _ / _ _

Name of data entry officer:

	Name	Gender	Age	Education	Occupation	Description
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

LIVELIHOOD

1. What are the main sources of food and income of households in this community?

DROUGHT

2. What were drought years in this community?

3. Check for different years whether the problem was low total rainfall or prolonged dry spells during the rainy season.

4. Has the frequency of droughts changed over the past 20-30 years? 1=Increased a lot | 2=Increased a bit | 3=No change | 4=Reduced a bit | 5=Reduced a lot Explain_____

5. Has the severity of droughts changed over the past 20-30 years? 1=Increased a lot | 2=Increased a bit | 3=No change | 4=Reduced a bit | 5=Reduced a lot Explain_____

6. What other changes in rainfall patterns do you notice?

IMPACTS

7. How do droughts affect crop production of households in this community?

8. How do droughts affect livestock production of households in this community?

9. What other negative effects do droughts have on households in this community?

10. Have the impacts of droughts changed over the past 20-30 years? Why? (*Focus needs to be on changes in how people are affected now, not changes in frequency and severity of droughts*) 1=Increased a lot | 2=Increased a bit | 3=No change | 4=Reduced a bit | 5=Reduced a lot. Explain_____

PREVENTIVE MEASURES

11. What do households in this community do to prevent negative impacts of droughts?

    a. Preventive measures in crop production

    b. Preventive measures in livestock production

    c. Livelihood diversification

    d. Preventive measures in household water provision

    e. Other measures…

12. What do the government and organizations do to prevent negative impacts of droughts?

    a. Support to farmers in soil and water conversation

    b. Support to farmers in water harvesting techniques

    c. Promoting/providing drought-tolerant seeds and livestock

    d. Support on irrigation

    e. Early Warning Systems

    f. Insurance

    g. Credit and support for shifting to non-farm income

    h. Other

13. Are there any measures to prevent negative impacts of droughts at *community* level (where several or all household collaborate)?

14. Are these preventive measures (of households, community and government/organizations) effective enough to avoid negative effects? Why (not)?

15. Which are more effective and which are less effective? Why?

16. Do the households' preventive measures have costs that are not regained? Explain

17. Do these measures have adverse effects on people's lives and livelihoods in the longer term?

18. What makes it difficult to adopt more effective measures to prevent drought impacts?

    a. There is just nothing else we can do

    b. Lack of financial resources (to do what?)

    c. Lack of skills/knowledge (to do what?)

    d. Lack of other resources (to do what?)

    e. Other, specify

19. The same question can be asked for barriers to more effective preventive measures at government/organizations level…

COPING MEASURES

20. What do households in this community do to deal with impacts of drought that they cannot avoid through preventive measures?

    a. Support from social network (relatives, friends, neighbours, etc.)

    b. Rely on support of organizations

    c. Rely on non-farm income

    d. Rely on support/remittances from migrant relatives

    e. Engage in seasonal migration

    f. Rely on buffers (stored food, savings, etc)

    g. Take loans

    h. Selling possessions

    i. Other

21. What do the government and organizations do to deal with negative impacts of droughts?

    a. Food aid

    b. Other

22. Are there any measures to deal with negative impacts of droughts at *community* level (where several or all households collaborate)?

23. Are these coping measures effective enough to recover quickly from drought impacts? Why (not)?

24. Which coping measures are more effective and which are less effective? Why?

25. Do these coping measures have costs that are not regained?

26. Do these coping measures have adverse effects on people's lives and livelihoods in the longer term?

27. What makes it difficult for households to adopt more effective measures to deal with drought impacts?

    a. There is just nothing else we can do

b. Lack of financial resources (to do what?)

c. Lack of skills/knowledge (to do what?)

d. Lack of other resources (to do what?)

e. Other, specify

28. The same question can be asked for barriers to more effective relief/support measures at government/organizations level…

VULNERABILITY, GENDER, AGE, POLICY

29. Which types of households are more and less likely to suffer from the impacts of droughts?

30. Do droughts affect men and women differently? Please explain differences.

31. Do droughts affect children, adults and elderly people differently? Please explain.

32. Do men and women play different roles in dealing with the impacts of droughts? Please explain.

33. How can preventive and coping measures by government agencies and other organizations be enhanced to reduce impacts of droughts?

Appendix 4: Example questions for expert interviews

These 15 example questions are taken from the loss and damage case study in Pakistan that focused on drought in Tharparkar District (Rahman et al., 2017). The questions can be adapted for use in different research contexts.

1. What do you think the government should do to minimize the impact of droughts?

2. What is the role of the Agricultural Extension Department?

3. What is the estimate of damages caused by droughts to people?

4. Has there been any change in frequency of drought in recent years?

5. What is the impact of climate change on crops?

6. Do farmers know about the season changes? How have they adapted?

7. How can your department reduce the impact of droughts on the community members?

8. What can we do for the community?

9. What type of livestock rearing is practiced in the area?

10. What impacts do floods have on livestock?

11. What steps has the District Government taken to increase the preparedness of farmers to deal with the impact of flood on livestock?

12. What constraints does the District Government face in implementing preventative measures to reduce the impact of floods on livestock?

13. What types of diseases are livestock mostly affected by?

14. What kind of coping measures are required by livestock farmers during floods?

15. How can the District Government reduce the impact of floods on livestock?

Appendix 5: Digital resources

http://collections.unu.edu/view/UNU:6032

→ Soft copy of the questionnaire

→ Data entry sheet for household questionnaire

→ Data entry sheet for PRA sessions

→ Data entry sheet for Institutional Landscaping (IL), Participatory Evaluation of Planned Adaptation (PEPA) and the Needs Assessment (NA)

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