Assessing Loss and Damage in Vulnerable Communities

Panel contribution to the Population-Environment Research Network Cyberseminar, "UNFCCC's New Work Program: Loss & Damage from Climate Change" (October 2013), http://www.populationenvironmentresearch.org/seminars.jsp

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(With thanks to the case study researchers, Koko Warner, Sönke Kreft, other colleagues at UNU-EHS, and Alex de Sherbinin for their input in this.)

Introduction

At COP-16 in Cancun, Parties created a Work Programme on Loss and Damage with an objective to assess loss and damage in vulnerable countries. This was the rationale behind the Loss and Damage in Vulnerable Countries Initiative, funded by the Climate and Development Knowledge Network commissioning local-level case studies in least developed countries (LDCs) and small island development states (SIDSs), as a first step towards developing methodologies for assessing loss and damage in vulnerable communities. I was the scientific coordinator of the project at the Institute for Environment and Human Security of the United Nations University (UNU-EHS). This short paper introduces our research: the methods, limitations and results of this multi-country study on climate change-related loss and damage in vulnerable communities in Africa, Asia and the Pacific.

The study presents a people's perspective on loss and damage, which is experienced when people face constraints to adaptation and/or when they approach or exceed adaptation limits (see Kirstin Dow's contribution on day 1). Case study fieldwork was conducted in Bangladesh, Bhutan, Burkina Faso, Ethiopia, Gambia, Kenya, Micronesia, Mozambique and Nepal (see Table 1). A wide range of climate-related stressors were investigated: droughts, floods, changing monsoon patterns, cyclones, sea level rise and associated stressors, such as coastal erosion and salinity intrusion. The findings are based on 3269 household interviews and over 200 focus group discussion and expert interviews. The study focuses on the effect of climatic stressors on households, what measures they take to prevent loss and damage, and the consequences when they are unable to adjust sufficiently. An overall conclusion is that despite coping and adaptation efforts, vulnerable communities are experiencing losses and damages that threaten their welfare, food security and future sustainable development.

Table 1: Case study overview

Country	District/Region	Climate-related Stressor
Bangladesh	Sathkira District	Salinity intrusion
Bhutan	Punakha District	Changing monsoon
Burkina Faso	Sahel Region	Drought
Ethiopia	Gambella Region	Flooding
Gambia	North Bank Region	Drought
Kenya	Budalangi Division	Flooding
Micronesia	Kosrae State	Coastal erosion
Mozambique	South & Central	Drought and flood
Nepal	Udayapur District	Flooding

Limitations: As this research effort represents a first attempt to study loss and damage in vulnerable communities in a comparative research framework, many questions remain unanswered. The case study methods were not designed to assess the extent to which local climate-related stressors can be attributed to global warming, nor was an attempt made to come up with precise economic values for loss and damage (see James Morrissey's contribution on day 2). As of now, in the emerging body of literature on loss and damage, a debate is underway about the urgency of attribution and valuation. The importance of these depends on one's research objectives. Is the objective a legal one: to hold polluting countries liable for loss and damage caused in vulnerable countries? In that case, attribution and monetary quantification is important. Or is the objective to address current and future loss and damage by reducing exposure to climate stressors (by reducing GHG emissions and otherwise) and by increasing peoples' and societies' resilience vis-a-vis climate change? In that case, the 'attribution problem' is less relevant along with the need to assess loss and damage in monetary terms.

We hope that the discussion during this PERN seminar will help us to further refine our methods for future case studies.

Working definition

Although there is no widely accepted definition of loss and damage, the term broadly refers to adverse effects of climate variability and climate change that occur despite mitigation and adaptation efforts. It includes impacts of sudden-onset events as well as slow-onset changes. For the case studies, the working definition was adjusted to make it more operational for local-level and people-centred assessment of loss and damage.

Loss and damage refers to negative effects of climate variability and climate change that people have not been able to cope with or adapt to.

The terms 'coping' and 'adaptation' are often used synonymously. This is problematic because of substantively different types of responses to different types of stresses. In the loss and damage case studies, coping strategies were defined as short-term responses to the impacts of discrete events (droughts, floods, cyclones). Adaptation was defined as longer-term responses to more gradual changes (sea level rise, changing rainfall patterns, changing frequencies and severities of

extreme events). Besides coping and adaptation, a third type of response involves preventive measures, which are adopted to deal with 'normal' risks and uncertainties (Table 2).

Table 2: Different types of responses to different types of stressors

Climatic stressor	*Household response*
1a: Climate variability • 'Normal' uncertainties, e.g. unreliable rainfall • 'Normal' risk of extreme weather events	**1b: Preventive measures** • Risk spreading • Creating buffers • Building safety nets • Physical protection, e.g. against floods
2a: Extreme weather-related events • Floods • Droughts • Cyclones/storms	**2b: Coping** • Relying on social networks • Food aid and other relief • Alternative income • Selling assets
3a: Climatic changes • Changes in 'average' conditions • Changes in risk of extreme weather events	**3b: Adaptation** • Agricultural change • Livelihood diversification • Migration • Changes in 'normal' risk management

Source: Adapted from Van der Geest and Dietz (2004), and inspired by Davies (1996).

Methods

The research design for the loss and damage case studies is rooted in a longer tradition of investigating impacts of climate change, livelihood vulnerability and household responses in risk-prone environments that emerged in the late 1990s. Our research methods extend this tradition to systematically investigate people's coping and adaptation strategies and the extent to which household responses are successful in avoiding residual loss and damage. In each case study country, a **desk-study** was conducted to develop criteria for site selection and collate additional relevant data sources. The **questionnaire survey** (n = 273 to 465 households per case study, with a total of 3,269 households) aimed to assess the proportion of people in the research areas experiencing different climate change impacts, their strategies to deal with climate pressures and shocks and the extent to which these responses were successful. In each case study area, **open interviews** were conducted with five to ten questionnaire respondents to hear their personal stories of impacts, responses and residual loss and damage. **Focus group discussions** were organised to gather more qualitative information on the complex dynamics between the key concepts of this research – climate variability and changes, societal impacts, vulnerability, coping, adapting, and residual impacts— and detect differences in the experiences of men and women, young and old, and different occupational groups (e.g. crop cultivators, pastoralists, labourers, traders) and members of different social strata. Lastly **expert interviews** were conducted to obtain information that would not easily be obtained from the questionnaire survey and focus groups, for example about the activities of government agencies and non-governmental organisations (NGOs) in the area.

Findings

Findings from the nine case studies have been published in peer-reviewed papers in a special issue on loss and damage from climate change (available in the *International Journal of Global Warming* at http://goo.gl/gSS06G). The synthesis of case study results (Warner and van der Geest, 2013) revealed four different situations in which the households we surveyed incurred loss and damage. These were identified as 'loss and damage pathways' and were present across the research sites, albeit in varying degrees. Residual impacts of climate stressors occur when:

1. measures to cope or adapt are **not enough** to avoid loss and damage;
2. measures have **costs** (economic, social, cultural, health, etc) that are not regained;
3. despite short term merits, measures are **erosive** and make people more vulnerable in the longer term;
4. **no measures** are adopted, due to:
    a. **lack of capacity** to respond to climate threat (constraints)
    b. coping/adaptation currently **not possible** (limits).

Below, the key findings are described for each case study separately.

Bangladesh: Satkhira, a coastal district in Bangladesh, faces the threat of sea-level rise and cyclones. Both result in saltwater intrusion, which severely impacts rice cultivation, the mainstay of the local economy and the principal source of food. Eighty-one per cent of respondents reported high salinity levels in their soils, compared to just 2% 20 years ago. To adapt, farmers have planted new saline tolerant-rice varieties. This worked well until 2009, when cyclone Aila hit and caused a sudden and drastic increase of salt content in the soil. Almost all farmers lost their complete harvest that year. Two years later, rice yields were still extremely poor. These findings exemplify a case where seemingly successful measures to adapt to slow-onset processes are not strong enough to avoid loss and damage when the situation is aggravated by an extreme weather event (Rabbani et al., 2013).

Bhutan: Changing monsoon patterns are affecting the livelihoods of small-scale farmers in Bhutan who depend on these rains to irrigate their rice fields. Ninety per cent of respondents indicated that the amount of rainfall has been decreasing over the last two decades. Respondents try to adapt to the changes in water availability in a variety of ways, including shifting crops, developing water-sharing mechanisms, and intensifying the maintenance of irrigation channels. However, these measures are insufficient and come with additional monetary and non-monetary costs. For instance, water-sharing arrangements have led to increased tensions between households and villages, and shifting from rice to maize cultivation resulted in much lower yields per acre (Kusters and Wangdi, 2013).

Burkina Faso: Extreme droughts in the Sahel region of Burkina Faso are severely disrupting the lives of local people who depend on the land for livestock keeping and crop cultivation. In the past, the region was primarily composed of pastoralists who moved with their livestock in search of pasture. However, intense droughts, competition over natural resources and urbanization, have reduced pastoral land and forced pastoralists to decrease herd sizes. Many took up crop cultivation to diversify the risk they experienced. However, as livestock rely increasingly on crops for feed in lieu of grazing, households find themselves in a precarious position where drought-induced crop failure results in cascading impacts that lead to food insecurity and large scale livestock losses. Households employ many coping strategies to deal with these impacts, including migrating for work, and selling property and livestock. While offering short term relief, these

strategies ultimately erode coping capacity for future droughts. Households become more vulnerable as livestock are sold and not replenished and migration of youth and heads of household weaken crucial social networks (Traore and Owiyo, 2013).

Ethiopia: Increased frequency and severity of flooding in Ethiopia is affecting the livelihoods of small-scale agropastoralists who rely on the land for subsistence. The study conducted in the Itang District of Gambela region, found that households apply a variety of preventive measures against flooding, including digging ditches, erecting boundary walls and moving property and livestock to unaffected areas. These measures were quite effective during normal flood years; however, during an extreme flood in 2007 households experienced severe negative impacts despite preventive measures. In addition to losing crops and livestock, which are relied upon for sale and consumption, large scale destruction of crops also leads to increased food prices, forcing households to reduce their food consumption. Following a flood, households often rely on social networks for assistance; however, repeated floods erode this social capital as less-affected households do not have endless resources to support flood victims. By overburdening their networks, affected households find themselves in a more vulnerable position with each subsequent flood (Haile et al., 2013).

Gambia: The North Bank Region of The Gambia has a history of recurrent droughts. Rainfall levels in the last three decades are over 35% lower than previous decades. In 2011, the region experienced a severe drought that affected 98% of the respondents, many of whom lost their entire harvests. In addition to receiving food aid, people coped by looking for additional income (e.g. sale of property) to buy food. Despite this, 63% still had to modify their food consumption, for example by changing from three to two meals a day. This suggests that coping measures were insufficient, as one of the most basic human needs was still compromised (Yaffa, 2013).

Kenya: In December 2011, River Nzoia in Western Kenya broke its dykes and wreaked havoc in Budalangi Division. Crops were washed away, livestock drowned, houses were severely damaged and there was an outbreak of waterborne diseases. This low-lying area on the shores of Lake Victoria is prone to periodic flooding. However, over 96% of respondents indicated that floods have become more frequent and intense over the past decades. The case study in Kenya focused on coping strategies in the aftermath of the December 2011 floods. While the majority of respondents received relief aid, this was often not enough. For survival, many households were forced to adopt erosive coping strategies (e.g. sale of productive assets and taking children out of school to earn a meagre income in the informal sector), which had severe implications for future livelihood security (Opondo, 2013).

Micronesia: As a Small Island Developing State (SIDS) the island of Kosrae in the Federated States of Micronesia is particularly vulnerable to climate change. Sea-level rise around the island has been 10mm a year over the past decades, compared to a global average of 3.2mm. This is expected to exacerbate coastal erosion, storm surge, and other coastal hazards. Communities adopt many measures against coastal erosion (the focus of this study), such as building sea walls and planting trees along the shore. However, these measures are not sufficient and some have additional costs. For example, cultural values and heritage are being lost as ancient ruins are being dismantled and used to build seawalls. As individual households are largely left to their own devices to combat as pervasive a problem as coastal erosion most adopted measures are insufficient (Monnereau and Abraham, 2013).

Mozambique has a long history of suffering from both droughts and floods. Following a severe flood in 2001, the government resettled vulnerable households to drier upland areas that are instead susceptible to drought and have poorer soils. This study focuses on resettled households in southern and central Mozambique. As most households in the region depend on crop cultivation, many moved their fields back to more fertile lowland areas, while living in upland areas. This adaptation leads to better crop yields, but in case of flooding there is a high risk of losing entire harvests. Valuable time and energy is also wasted commuting the large distances between upland and lowland areas. Households try to cope with impacts of droughts and floods (including high food prices) by finding alternate sources of income (e.g. petty trade), relying on government aid, and selling property, particularly livestock. Interviews with respondents in the study area showed that the stress and uncertainty of trying to cope with and adapt to the double blow of droughts and floods pushes households to exhaustion (Brida et al., 2013).

Nepal is particularly susceptible to climate-related disasters, such as floods, landslides, and debris flows, due to its varied topography and geological characteristics. The current study surveyed households in the Udayapur district that are especially vulnerable to floods. Over the past 20 years households have reported that while the frequency of floods has decreased, the severity has increased. In the short term severe floods critically reduce or destroy crop yields, in the long term they reduce soil fertility by increasing topsoil erosion and sedimentation. These effects are catastrophic in a region where most households depend on crop cultivation for their livelihoods and subsistence. In addition to losing crops, many also experience food shortages as a result of rising food prices in the aftermath of a flood. Households apply both preventive (e.g. building physical barriers) and coping measures (e.g. reliance on aid, migration, selling property) to deal with the floods. While much effort is expended on such efforts it has not been enough to counteract adverse effects (Bauer, 2013).

References

The case study results have been published in a special issue of the International Journal of Global Warming that came online last week (23 Oct 2013). Below are the full references of nine case studies and one synthesis paper (Warner and van der Geest, 2013). All papers are open access, at http://www.inderscience.com/info/inarticletoc.php?jcode=ijgw&year=2013&vol=5&issue=4

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