Loss and Damage in Vulnerable Countries Initiative

# Evidence From the Frontlines of Climate Change: Loss and Damage to Communities Despite Coping and Adaptation

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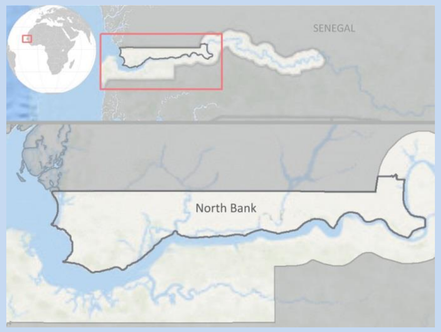
Mapping was done by Dara Mendeloff, Tricia Chai-Onn, Malanding Jaiteh and Al Pinto of the Center for International Earth Science Information Network (CIESIN) of the Earth Institute at Columbia University to complement case studies developed by United Nations University Institute for Environment and Human Security and the Africa Climate Policy Centre of the United Nations Economic Commission for Africa.

*Case Studies: How does the impact of **climatic stressors** on **societal impacts** lead to loss and damage among households in The Gambia, Kenya, Bhutan, Bangladesh and Micronesia?*

## ***The Gambia*: Limited coping capacity: loss & damage associated with drought**



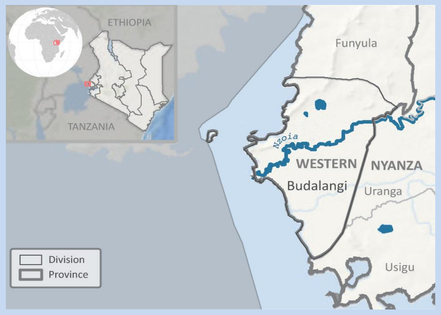

*The research area in The Gambia: North Bank Region.*

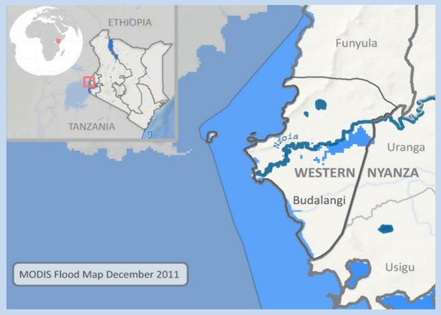

*Land use and location of study villages in The Gambia.*

- *Stressor: Drought*
- *Impact: Millet production*

The Gambia has a history of recurrent droughts and is especially vulnerable to climate change as its economy is based primarily on agriculture. A study investigated how households coped with a severe drought that occurred in 2011. Next to receiving food aid, people coped with the drought by looking for additional income to buy extra food, for example by selling their property. Despite this, the study found that 63% had to modify their food consumption, for example by changing from 3 to 2 meals a day. This suggests that food aid and people's own coping measures were not enough to prevent serious negative effects on people's food intake.

## ***Kenya*: Erosive coping: loss & damage associated with the 2011 floods**



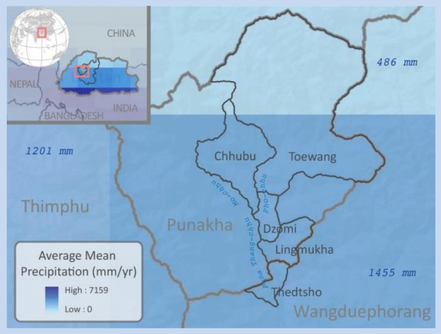




*Left to right: The research area in Kenya: Budalangi Division in Bunyala District; Flooded area (lighter blue) along the Nzoia river.*

- *Stressor: Flooding*
- *Impact: Crops, livestock & fish*

In Kenya, floods are expected to increase in severity and frequency, with potentially devastating effects for the people living near riverbanks. The flooding of River Nzoia in December 2011 resulted in widespread damage to crops, the loss of livestock and fish. The study found that people's coping strategies included temporary relocation and migration, engagement in extra income-earning activities and reduction in non-essential expenditures. Many respondents also said they had sold property, such as land and cattle, in order to cope with the effects of the flood. This type of coping behaviour has a long-term negative effect on the sustainability of household livelihoods.

## ***Bhutan*: Costs of adaptation: loss & damage associated with changing monsoons**

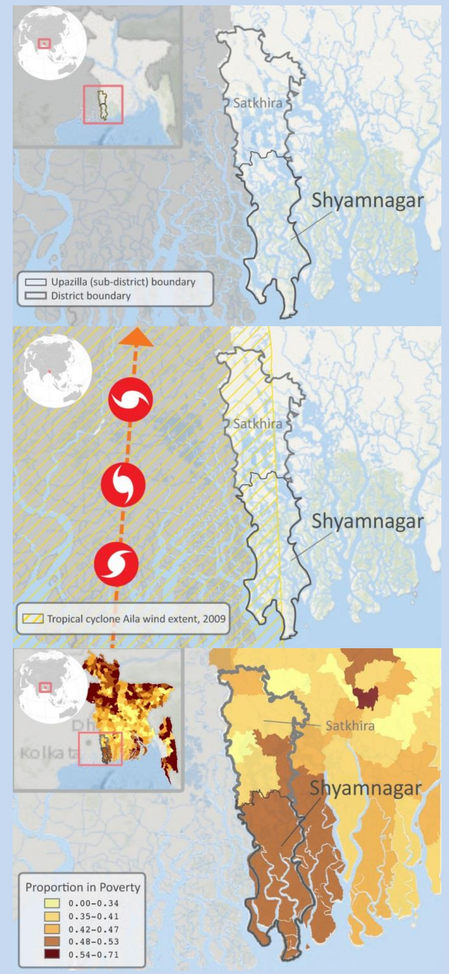




*Left to right: The research area in Bhutan: Punakha District; Mean precipitation in Punakha District and Bhutan.*

- *Stressor: Changing monsoon*
- *Impact: Rice production*

Changing monsoon patterns affect farmers who depend on these rains to irrigate their rice fields. The case study in Punakha District identified various ways in which respondents adapt to the changes in water availability, such as shifting crops, developing water-sharing mechanisms and intensifying the maintenance of their irrigation channels. These measures are mostly considered insufficient. Moreover, they come with extra costs – in terms of money, time, social cohesion and livelihood security.

## ***Bangladesh*: Limits of adaptation: loss & damage associated with salinity intrusion**




*Top to bottom: The research area in Bangladesh: Shyamnagar Sub-district; Extent of Cyclone Aila (2009); Proportion of population in poverty.*

- *Stressor: Salinity intrusion*
- *Impact: Rice & drinking water*

Shyamnagar Sub-district faces the double threat of sea level rise and frequent cyclones. Both result in saltwater intrusion, which has a severe impact on rice cultivation, the mainstay of the local economy and the principal source of food for the majority of the population. To adapt to higher salinity in soils, farmers have planted new, saline tolerant-rice varieties. This strategy worked reasonably well until 2009, when cyclone Aila hit the area and caused a sudden and drastic increase of salt content in the soil. Almost all farmers in the area lost their complete harvest that year. The study estimates that between 2009 and 2011 the total loss of rice harvest amounted to US$1.9 million for just the 4 villages surveyed. The 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.

## ***Micronesia*: Limits of adaptation: loss & damage associated with coastal erosion**


*Left to right: The research area in Micronesia, Kosrae State; Elevation map; Mangrove vegetation along the coast; Impacts of extreme weather events experienced by households.*

- *Stressor: Coastal erosion*
- *Impact: Housing*

Small-Island Developing States are particularly vulnerable to climate change; rising sea levels are expected to exacerbate coastal erosion, inundation, storm surge and other coastal hazards. Measures adopted in response to coastal erosion, such as building sea walls and planting trees along the shore, do reduce some of the adverse impacts. However, 92% of the respondents who adopted adaptation measures reported that these are not sufficient and some have negative side effects. For example, big rocks from ancient ruins have been used to build seawalls, resulting in severe damage to the cultural heritage of the island.

Based on work by: *Warner, Koko, van der Geest, Kees, Kreft, Sönke, Huq, Saleemul, Harmeling, Sven, Koen Kusters and Alex de Sherbinin (2012). Evidence from the frontlines of climate change: Loss and damage to communities despite coping and adaptation. Loss and Damage in Vulnerable Countries Initiative. Policy Report. Report No. 9. Bonn: United Nations University Institute for Environment and Human Security (UNU-EHS).* **http://www.lossanddamage.net/download/6815.pdf**