



Even the Himalayas Have Stopped Smiling

CLIMATE CHANGE,
POVERTY AND
ADAPTATION IN

NEPAL

Executive Summary

In February and March 2009, Oxfam conducted interviews in rural communities in three ecological zones (Terai, Hills and Mountains) and in the Mid and Far Western Development Regions to capture a snapshot of how climate change is already affecting people living in poverty. The results were remarkably consistent with regional climate change projections, and deeply worrying.

Climate Change is already happening and there is more to come

According to available data, average annual mean temperatures have been increasing in Nepal by 0.06°C between 1977 and 2000 and these increases are more pronounced at higher altitudes and in winter. There is a general increase in temperature extremes with warmer days and nights becoming more frequent and cooler days and nights less frequent. Again these changes are greater at higher altitudes. As a consequence, Nepal's high altitude glaciers are retreating at an alarming rate, faster than the world average, resulting in the creation of glacial lakes and the threat of catastrophic Glacial Lake Outburst Floods (GLOFs). Lake Imja Tsho is a remarkable example of a glacier lake that was nonexistent in 1960 and now covers nearly one square km. The Imja glacier that feeds the lake has retreated 75m between 2001 and 2006.

For precipitation, the trends are less certain but there is evidence of increasing occurrence of intense rainfall events, and an increase in flood days and generally more variable river flows. Importantly, the above changes, which are consistent with a range of climate change models, are predicted to continue into the 21st Century. The summer monsoon is likely to become more intense with increasing occurrence of heavy rainfall events, whilst winter precipitation is predicted to reduce. Widespread glacial retreat is expected to continue, resulting in significant



"Before the rainfall was predictable. And we knew when to sow seeds, to plough land and to harvest. Production was sufficient to feed a family. Now rainfall is very uncertain and crazy. I have noticed a decrease in rainfall in the last 10 years and the monsoon is starting late. Maize production is hardly enough for 3 months to feed a family and we cannot get seeds from the last year's harvest... now we have 5 pathi (12.5 kg) of grain. This is the only food I have for the next year."

Dila Pulami, Tunday Village,
Kalyan Village Development Committee, Surkhet District.



Photo: Paribesh Pradhan/ICIMOD Nepal

Dig Tsho Glacier Lake in Solukhumbu – Dig Tsho Glacier Lake (4,365m) burst on August 4, 1985 spilling an estimated 200 to 350 million cubic feet of icy water with a flood wave 35 to 50 feet in height. It partially destroyed a hydro-power project, 14 bridges and various trails and patches of cultivated land roughly 55 miles below and likely to burst again if climate change glacial retreat continues

changes to hydrological regimes (flows) and increased risk of GLOFs. As glacier melt accelerates, increased run-off can be expected initially followed by a steady decline. With a 2°C increase in temperatures by 2050, 35% of the present Himalayan glaciers are predicted to disappear. Runoff will increase peaking at 150 to 170% of initial flows between 2030 and 2050 before declining until the glaciers disappear between 2086 and 2109.

What are the likely climate change impacts and who are the most vulnerable?

Nepal is already a country vulnerable to natural disasters, particularly floods and landslides. Much of the population is reliant on rain fed agriculture that is vulnerable to localised drought and more variable precipitation in terms of form (rain, snow and hail), timing and intensity. With increased intensity of summer monsoon rain events the risk

of flash flooding, erosion and landslides will be increased. With warmer winters, particularly at higher altitudes, less precipitation will fall as snow, further accelerating glacial retreat but also reducing soil moisture and accelerating erosion and therefore impacting on winter crops. However due to Nepal's diverse topography and range of ecological zones, the overall impact of climate change on agriculture and ecosystems is likely to be highly variable depending on location, making it difficult to detect patterns and plan national responses.

With increasing temperatures there is increased risk of disease particularly vector-borne diseases such as malaria, *Kala-azar* or Leishmaniasis (a parasitic disease) and Japanese Encephalitis, as well as water-borne diseases such as cholera and typhoid. The increasing occurrence of these diseases associated with rising temperatures has already been observed and recent outbreaks of diarrhoeal diseases (with more than 240 deaths in 2009 in remote Hill and Mountain districts) has

been attributed in part to water shortages due to winter drought and delayed onset of the summer monsoon.

Changing hydrological flows both due to glacial retreat and increased and more variable precipitation will impact on the many irrigation systems, water-powered grain mills, hydropower plants and drinking water supply systems throughout the country. This will affect agricultural production and water and sanitation, leading to increasing levels of malnutrition and incidence of water-borne disease. However, the impact of glacial retreat will be felt far beyond Nepal's borders, with the annual glacial melt from the Himalayas accounting for as much as 70% of the summer flow in the Ganges and 50 to 60% of the flow in Asia's other major river systems. Recent analysis has suggested that some of Asia's greatest rivers could become seasonal should the Himalayan glaciers disappear and this could happen within the span of 30 years. The impact on riverine communities would be catastrophic and could include much of inland China, Central and South Asia and the mainland of Southeast Asia. The river basins in these regions are home to 1.3 billion people and in South Asia alone (Nepal, India and Bangladesh) include up to 500 million people.

The most vulnerable to climate change are the poor and marginalised who generally are least able to cope with disasters, live in areas most at risk to hazards and generally have the least information, knowledge and resources to reduce their risk. The predicted impacts of climate change will heighten existing vulnerabilities, inequalities and exposure to hazards and will therefore impact most on those least able to cope. In Nepal the highest incidence of poverty is found in the Mountain and Hill areas particularly in remote areas of the Mid and Far Western Development Regions, and particularly among the most marginalised sectors of society by gender, caste and ethnicity. These zones are also considered the most food insecure and also have proportionately higher population of Dalits and ethnic minorities. Within these groups women are further marginalised. These vulnerable groups tend to

own fewer assets including land and livestock, receive lower income, have lower levels of education and less access to community and government services.

The farming poor will be the most vulnerable to the predicted impacts of climate change. They tend to be reliant on rain-fed agriculture and occupy land that is most at risk to flood and landslide hazards. Even small changes to rainfall patterns can have devastating consequences throughout the growing cycle. Many of Nepal's poor farmers occupy small parcels of land that can barely produce enough for the family. They are more reliant on local natural resources such as forests and water and would therefore suffer most from the drying up of local water sources and changes to vegetation cover. Seasonal migration of men and boys in search of wage labour is both widespread and linked to low agricultural productivity. Increasingly women, boys and girls and the elderly are left to cope with food shortages and the management of the home and farm in an increasingly unpredictable environment.

For many people interviewed the above predicted changes are happening already. At present up to 3.4 million people are estimated to require food assistance in Nepal due to a combination of natural disasters (particularly winter drought) affecting agricultural production and higher food prices (that reduces the capacity to purchase



Due to the winter drought, this agriculture land has been left uncultivated, Taday Village, Kalyan VDC, Surkhet District



Women carrying firewood, Khordepe Village, Baitadi District. Women and girls are increasingly bearing the brunt of climate change through increased hard labour

food). The 2008/09 winter drought in Nepal was one of the worst on record both in terms of rainfall but also the breadth of the area impacted. It was also one of the warmest winters on record.

Although singular drought events cannot be attributed to climate change, these events are likely to become more frequent under most climate change scenarios and the current situation could be an indicator of things to come.

Oxfam's discussions with a range of community members in three ecological zones (Terai, Hills and Mountains) and in the most vulnerable areas (Mid and Far Western Development Regions) has illustrated in human terms much of what the climate change science predicts. Increasingly warmer and drier winters and more variable precipitation in form (less snow, more rain and hail), timing (early or late rains, increasing frequency of drought events) and intensity are wreaking catastrophic consequences for poor farmers. Food insecurity and access to sufficient water are key concerns. With much of the men folk seasonally migrating for wage labour women and girls are increasingly bearing the brunt of climatic

changes through increased hard labour. This includes further distances to collect firewood and water for both household use or livestock and wage labour that is consistently more back-breaking work - portering goods and materials for others. People report of children no longer able to attend school and the constant worry of having enough to eat.

In the Terai region people report of more frequent and less predictable monsoon flooding (in terms of swiftness, intensity and occurrence) making it



Floods are becoming more frequent and faster leaving people less time to respond, Rampur Khadauna VDC, Nawalparasi District

more difficult to prepare for and to cope with. They also talk of more extremes, including severe 'cold waves' that destroy winter vegetable crops.

These stories are remarkably consistent with experiences described by poor people Oxfam has interviewed for similar reports in a range of other countries including Uganda, Malawi, South Africa, Vietnam, Bangladesh, Russia, Haiti, Bolivia and various nations in the Pacific Ocean. The injustice is that the people of Nepal and many of these other countries are suffering the consequences of a situation that they have the least resources to cope with and bear little responsibility for creating. Nepal is one of the 100 countries most affected by climate change, yet it has one of the lowest emissions in the world- just 0.025% of Greenhouse Gas Emissions.

What are people doing to adapt?

Some communities are already undertaking adaptation measures. These include changing crops

such as growing vegetables instead of grain crops. These can be sold as well as consumed, require less water and can be harvested quicker than rice or wheat.

Improved water management is crucial, such as catchment management, re-use of water for water mills and rainwater harvesting, as is improving non-agriculture income through enterprises such as small businesses and goat rearing. Implementation of Disaster Risk Reduction approaches have also proved to be effective such as flood mitigation works using 'bio-engineering' – the use of plants to bind soils and stop erosion – and the development of early warning systems for floods. However, these examples are few in number compared to the vast numbers of families facing climate related hunger and uncertainty. Importantly the poorest, and women in particular, are the least able to adapt, lacking the resources to undertake new activities, the mobility and confidence to seek information and the time and energy to take on more hard labour.



As rains are becoming more unpredictable people are switching to vegetable farming, Kaphala, Silanga VDC, Dadeldhura District



With the men of many families migrating to India for seasonal work and declining farm production, women are increasingly taking on more hard labour to generate extra money to feed their families, Gaira VDC, Doti District

Much is happening in Kathmandu – the Government of Nepal has recently embarked on creating a National Adaptation Programme of Action (NAPA) that many hope will result in significant funding for climate change adaptation. Many activities are underway supported by a range of donors including those related to Nepal's accession to the United Nations Framework Convention on Climate Change. The non-government sector is piloting a range of small-scale adaptation projects but these are not yet ready to be institutionalised in order to have greater impact. Awareness of climate change at the national, district and community level is still a challenge as is coordination of the many actors. Complex climate change initiatives continue to progress at a slow pace in Kathmandu while increasing evidence of climate change related impacts in communities continues to grow.

Much discussion continues regarding the differentiation of ongoing poverty related impacts with those directly linked to climate change. The causes of impacts are complex. This discussion is likely to continue into the future and will be a key

question for the NAPA process to address. However, it is clear that climate change impacts are already exacerbating existing poverty and inequality and will continue to do so unless people can adapt. It is also clear that for the poor living in remote areas of rural Nepal this continued discussion, that may ultimately be impossible to resolve, will only delay interventions that could make a real difference to their lives and those of their children, right now. There really is no time to waste.

Short term recommendations include:-

- **Immediate action to ease food shortages**, focusing on the Hill and Mountain districts of the Mid and Far Western Development Regions and including measures to both address current hunger and to support affected communities to take advantage of the next planting seasons. This will require improved Government leadership and the development of a long-term strategy for chronically food insecure areas that is based on the climate change scenario of increasingly unreliable rainfalls.

- **Awareness raising on climate change:** In order to lay the foundation for prioritisation of climate change actions within Government and increased coordination within Government and between Government and non-state actors. A key priority is to ensure mutual understanding of climate change concepts and predicted impacts in order to move the discussion beyond the science to the human impacts at the community level. Importantly increased efforts must also be made to raise awareness at the community level, in order to support a shift from passivity to one of taking the initiative with regard to DRR and climate change adaptation.

- **Institutionalisation of Disaster Risk Reduction approaches:** This is essential to reduce vulnerability to natural disasters that are predicted to increase as a result of climate change. The wealth of existing DRR experience focused on the *Terai* must be institutionalised into Government policy firstly through enactment of a revised Disaster Management Act and then through the implementation of the appropriate policies and strategies. Importantly current DRR approaches must be expanded to incorporate climate change related scenarios including the more obvious related hazards such as GLOFs but also the less obvious related hazards such as localised drought, floods, landslides, disease outbreaks etc.

- **Securing lives and livelihoods of vulnerable groups:** All interventions should ensure that the specific needs of the most vulnerable groups are met. This includes particular attention to the already excessive workload, limited mobility and education experience of women and girls. Agricultural and technological advisory support should be designed and implemented according to the needs of the target groups. That will include informal education strategies, school-based extension strategies for children and design of training that ensure effective participation. This will require a change in traditional agricultural

extension strategies and the development of partnerships with non-state actors including the NGO and private sectors.

Long term recommendations include:-

- **Support for rural livelihood adaptation:** This will require an analysis of the future of current farming systems based upon the predicted climate changes in different ecological zones. Likely strategies include the development of new crop varieties, farming system approaches that reduce weather related risk, improved water management, more diversified cropping strategies, improved market linkages, increased integration of livestock rearing, management of local natural resources and the development of community insurance schemes for key assets. This process should be farmer-based and built around improved extension services and the capacity strengthening of key target community members recognising that men, women and children all play an important role in household food security.
- **Incorporation of Climate Change into national level planning:** This will require line agencies and policy makers to actively identify and plan for climate change related scenarios and hazards in addition to ongoing DRR approaches. This includes improved land use planning, catchment management and the development of scenarios and contingencies to address the more dramatic predicted impacts of climate change including glacial retreat, GLOFs and the long-term impact on river flows. Reviews of existing plans and policies in key sectors such as agriculture, water resources, disaster management etc. will be required. The current NAPA process should be utilised as a catalyst to develop appropriate policies and strategies and as a means to build a shared understanding and coordination between Government, non-state actors and the international community. The donor community should provide harmonised and sustained support for this process.

■ **Improved international advocacy:** The impacts of climate change will be felt well beyond the borders of Nepal, particularly in those countries that rely directly on the snow and ice of the Himalayas to feed the river systems that many of their populations rely upon. This includes inland China, Central and South Asia and the mainland of Southeast Asia. Nepal should engage in diplomatic discussions with these countries to form an Alliance of Himalayan Countries to call for ambitious global emission reduction targets and substantial support (financing and technological) for adaptation to be agreed in

Copenhagen in December 2009 and in any other relevant fora. In addition, it is important for Nepal to work with India and Bangladesh to ensure a River Basin Approach that addresses management of their common river systems particularly in light of predicted climate change impacts. This approach should ensure that development projects along the common river systems are planned, reviewed and managed to minimise negative impacts on all riverine communities and that water management is made more equitable, effective and sustainable.



Women in Chhiudipusakat Village, Dailekh District



Cover Photo : Imja Glacier Lake, Solukhumbu

Credit : Govinda Joshi/ICIMOD Nepal

Imja Glacier Lake (5010m) is growing rapidly resulting from melting of the Imja Tsho Glacier, due to rise in temperature. The lake is at high risk of Glacier Lakes Outburst Flood (GLOF) threatening communities living below.



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