

The human face of climate change

A Christian Aid report



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We believe in life before death

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Conclusions and recommendations

The case studies in this report are intended to highlight examples of the impact of climate change on people. While it is not possible to attribute particular events or changes to the phenomenon, many of the local shifts described are consistent with those expected under climate change. Similarly, the examples of adaptation are part of a more comprehensive range of responses that communities and governments should consider.

Cover photo: This child's family lives on the edge of an estuary in southern Bangladesh, where it moved after losing a previous home to river erosion – a problem that is being exacerbated by climate change. Fresh water supplies are another problem, because the rising sea level is making even inland rivers salty. Christian Aid/Mohammadur Rahman

Introduction

Climate change is a major threat to development. It is happening now and more changes are certain. Whether or not they would call it climate change, poor people are aware of these changes as they have to cope with harsher and more dangerous weather.

This briefing looks at those changes. They are not only a warning to us all but they also require urgent action, a redoubling of efforts to fight poverty and a focus on the additional challenge of climate change. Christian Aid has already called for international payments to meet the costs of this new challenge. This may require funds, perhaps drawn from charges levied on CO₂ emissions, to the tune of US\$100 billion each year.

Climate change and poverty are mixing in the lives of the world's poorest people, to deadly effect. More frequent drought and more severe seasonal flooding are testing the limits of community resilience, pushing already precarious lives closer to the edge. This demands three simultaneous responses.

First, the battle against poverty has to be fought with renewed vigour so that poor people stand a better chance of surviving climate change. This means that past promises by rich countries to increase levels of overseas aid and to reform the terms of international trade must be fulfilled. It also means questioning the unsustainable and short-sighted focus on economic growth as an end in itself. The test for any economic policy must be that its benefit to poor people can be sustained.

Second, the challenges of climate change itself – which, even for better off people may still prove ruinous – must be taken into account. This is no trivial task but, initially, countries need to be supported to develop strong plans for coping with climate change, which should be interwoven with poverty reduction strategies. Adaptation to climate change will require additional funding. It is unacceptable to expect poor people to meet the costs of a problem largely not of their making; the polluter must compensate.

Third, climate change must be tackled at source, through massive and rapid cuts in greenhouse gas emissions; the polluter must stop polluting. Adaptation to climate change is already necessary and will inevitably become more so as a result of what has already been emitted. But it will also have its limitations. The 189 nations who will be represented at the forthcoming UN climate change summit in Bali, Indonesia must focus on the fight to prevent global warming exceeding 2°C.

In *Truly Inconvenient*, a briefing published alongside this one, Christian Aid calls for an 'emergency programme' to be launched at the UN climate change summit in Bali. It argues that the costs of urgent cuts in global CO₂ emissions and of unavoidable adaptation must be shared out according to responsibility for the problem and ability to deal with it. On both counts, it is the industrialised nations that must shoulder the bulk of the burden.

This briefing reinforces that call. The air is currently thick with climate change rhetoric but thicker still with an increasing concentration of greenhouse gases. As ministers prepare for the Bali summit, the stakes could not be higher. Simply talking about climate change is no longer enough: it risks confounding the fight against poverty and condemning millions to further upheaval, unrest, disease and life-threatening disaster.

1. The impact of climate change

We know more and more about how the world's climate is already changing and scientists are constantly refining their forecasts of future changes. But large and important gaps remain.

The pictures scientists paint tend to be broad-brush ones, illustrating the present and future at continental and regional scales, rather than at the community level where people experience the changes. This is partly because many developing countries do not have comprehensive weather records or monitoring. Furthermore, the mathematical models used to forecast the future look at the world in chunks that are, typically, several hundred kilometres square.

Scientists say that, in addition, it is harder to collect and analyse information about extremes – droughts, downpours and storms – than to monitor averages.¹ This is an important obstacle for scientific attempts to understand climate change because more extreme weather is one of its main consequences, along with gradual changes in rainfall and temperature, rising sea levels and the melting of polar and glacial ice.

Despite these challenges, scientific generalisations are crucial to an understanding of the phenomenon. But so are individual and community experiences of climate change, such as those highlighted in this briefing. They tell us what climate change means at a human scale. They also reveal changes that cannot be captured by remote weather monitoring stations and satellites. At the same time, local observations tend to confirm broader trends.

For years, and in some cases decades, people who are more exposed to the climate have noticed that local weather patterns are changing. In many cases, the seasons are shifting and the weather has become more extreme and unpredictable. Traditionally used indicators, such as the blossoming of particular flowers or the nesting places chosen by particular birds, which were used to make critical decisions about, say, crop planting dates, are proving less reliable.

People around the world are noticing changes in the climate but it is the rural poor who are most exposed. In many countries, they were struggling with droughts, floods and hurricanes even before climate change started to bite. Now, their problems are intensifying.

Supplies of food and other basic goods for families are often heavily dependent on what they can grow, or feed their animals. When the rains come late or not at all, their crops are damaged or destroyed, leading to hunger and sometimes migration to urban slums.

The poorest people lack the savings, insurance, skills and secure ways of making a living to help them recover from the failed harvests or disasters that destroy their homes. Even before the climate shifted, they were living close to the edge, with little or nothing to spare. Now climate change is making them still poorer, as the case studies below illustrate, and still more vulnerable to its effects.

Poor people also tend to live in vulnerable housing on flood plains, riverbanks or slopes, which are especially prone to floods and resultant landslides. They are also struggling with a host of other problems, alongside climate change. Population growth is intensifying competition for resources, leading to conflicts over water and

land. Poverty and population pressures are also leading to deforestation, which causes soil erosion and desertification, making survival harder than ever.

1.1 Bolivia: freak weather, unreliable rains

'It used to rain slowly; now it rains fast and dries fast. It rains hard, digging trenches in the soil. Rivers were small; now they are wide and deep.' These are the words of Isidro Poma, in his early 60s, of Calahuancane Baja, a community 4,100 metres above sea level in a cold mountain pass in western Bolivia.

The changes Poma describes are consistent with those outlined in formal studies of the weather in Bolivia and South America generally. Getting a detailed scientific picture of how the climate has changed in recent years is difficult, because Bolivia still has relatively few weather monitoring stations.²

However, the Intergovernmental Panel on Climate Change's (IPCC) latest impacts report notes evidence that across South America heavy rains are becoming more common, along with consecutive days without rain. 'Highly unusual extreme weather events' have also been recorded since 2001, including 'unprecedented and destructive' hailstorms in Bolivia in 2002. Heavy rains are reported to have increased the number of Bolivians killed and injured in floods, storms and landslides. The melting of the country's glaciers is described by the IPCC as having reached 'critical conditions', implying that temperatures are rising.³

Christian Aid research in two areas where it funds partner organisations, Norte Potosí in south-western Bolivia and Ancoraimes in the west, near the border with Peru, found that communities themselves have noticed detailed and profound changes in the local weather, and in plant and animal life. These are having knock-on effects on their food supply, the clothes they wear, sources of income and even where they live.

In the Ancoraimes area, people summed up the profundity of the changes by saying that 'the world is upside down and is trembling' and that 'the earth is drying as if hanged up to dry in the sun'.⁴

In the community of Chillcapalca in Norte Potosí, Manuel Huara, who is in his 80s, says: 'There are new crop diseases that we didn't have before. In old times, there were different bushes; now a single species is growing everywhere. The animals that we used for weather forecasting have left; the new ones that are coming behave as if they were still in their own zones. The whole system has moved.'

People in Chillcapalca say that in the past they had enough rain at the right times to grow good potato crops. Now, the rainy season has roughly halved in length, to around three months, frosts come at unexpected times, sometimes damaging crops, and the rain is torrential, sweeping away the soil. Hailstorms are more common and the hailstones are so big that they damage crops and kill birds in the trees, while snow can fall at any time, even in the middle of summer.

The harsh, unpredictable weather and loss of soil, along with the arrival of new pests, have reduced crop yields dramatically. Domingo Kari, who is in his 70s, remembers a time when people had enough produce to take dozens of heavy sacks by llama to sell in the town of Llallagua, twice a year. Now, he says, people only grow enough to cover their own needs for eight months of the year, and have nothing spare to sell.

The sheep and llamas kept by the community have also suffered, because the shorter rains have damaged the pasture they eat and warmer temperatures have allowed fleas and ticks to multiply. For these reasons, families keep far fewer animals than before – around 20 sheep rather than 60 each. This in turn affects their supply of sheep's cheese and wool for clothes, which could be used, sold or bartered with other people. Problems such as these are leading young people to leave the community, to seek work in the *Chapare* (coca producing area) and Chile.

It is a similar story in the village of Inca Caturapi, 3,500 metres above sea level in the Ancoraimas area, where 77 families live near the border with Peru. One villager says the shorter, more intense rains of recent years are 'like it were judgement day'. Frosts, which were once confined to winter time, now occur unpredictably, although they are lighter than before and the temperature is generally warmer.

In 2007, the village lost its entire crop of *oca*, a long yellowish potato, and all the potatoes grown on the collectively owned land to hailstorms, so people will find it hard to make ends meet. The villagers are also looking for new varieties of potato that grow more quickly, because the rainy season is much shorter than before. Although they have adopted one new variety, *papa huaycha*, which grows in four months rather than the six needed by traditional varieties, this produces relatively few potatoes per plant. As a result, people generally don't have enough to last all year, and end up having to buy them.

In addition to the damaging effects of climate change, people are inheriting smaller and smaller vegetable plots, as land is divided between children from one generation to the next. Because of the difficulties of making a living from the land, temporary migration has become normal practice for men in the village, who spend most of the year working in mines and on plantations, returning at sowing and harvest times. Some young people are leaving the village permanently.

While people are in no doubt that the climate has changed, they have different views about the reasons for it. Some blame air pollution from factories and the burning of rubbish while others cite failure to observe traditional rituals or the hole in the ozone layer (which could be making the sun feel stronger than before).

1.2 Mali: drought, poverty and migration

The north of Mali borders on the Sahara and gets very little rainfall, while the country's far south borders on semi-tropical Côte d'Ivoire. Over time, Mali has been getting progressively less rain. Records from its meteorological office show that the country's rainfall has been decreasing since the mid-1920s, when 750mm of rain fell each year. Now, the annual total is around 400mm a year.⁵

According to the IPCC, droughts have been a particular problem for countries in the Sahel region (which includes Mali) since the end of the 1960s, although floods also occur. Besides climate change, other influences on rainfall patterns are thought to be deforestation and other changes in land use, mineral dust in the atmosphere from the Sahara and the El-Niño phenomenon.

The changing weather and environment have made life so hard for people in farming villages that many young adults are leaving them. They go to work in the cities or move to places that have irrigation and so do not depend on the unreliable rain. The very old and very young are left behind to fend for themselves.

Although people in some African countries have long used seasonal migration to help them survive the dry season, a growing number are leaving Mali's villages permanently. So many are actually leaving the country and trying to reach Europe that an organisation – the Association for Return, Work and Dignity – has been created in Mali to offer moral support to those who try to reach new countries but are forced to return.⁶

N'Dogo Karambe, in his early 80s, is the chief of a village called Tounoulna on the Dogon Plateau in eastern Mali. It is a tough environment, with little cultivable land and water, severe soil erosion and frequent droughts. Over the course of his life, Karambe says he has seen dramatic changes. 'When I was a child there was a lot of rain and a lot of food,' he says. 'When my father died I was already an adult – even then things were that way – but as it no longer rains as it used to, we're all now experiencing a severe lack of food.'

'We now have to spend the little money we have buying extra food just to feed our families. This has changed the village – it has made people even poorer. I didn't even harvest one basket of millet this year. Before, when we had rain and food, we were a happy community with few worries, but now we can only worry about having enough food.'⁷

Hawa Tebsougue, vice-president of the Women's Association in Tounoulna, says some of her members have already moved to urban areas within Mali, because of the lack of rain. 'Without rain, how are we going to live, to survive?' she asks. 'It's a growing concern because the lack of rain is persisting. The amount of cereals we produce diminishes every year. When it rained a lot we used to celebrate after the harvest but we don't do this anymore. After 1973 (the year of a devastating drought), some continued to do it but the more the lack of rain persisted, the more people stopped. We cannot even celebrate marriages because there's no money to buy food for the celebration.'⁸

Armand Kassogue is director of the local development organisation Action pour la Promotion Humaine (APH), a Christian Aid partner. He explains that the effects of climate change have been exacerbated by local people cutting down of trees. In turn, this has made it made it harder for remaining trees to survive. 'People cut trees for household needs. The lack of rain meant no more trees could grow,' he says. 'Lack of trees then exacerbated erosion of the soil. If there were trees or grass or rocks, it would stop the rain and capture it underground but there is none here now. The water washes away and takes fertile land with it.'⁹

1.3 Honduras: one disaster after another

Hurricanes in the north Atlantic have become more frequent and more severe over the past decade or so, even allowing for the natural, long-term temperature variations that are unrelated to climate change. 'The number of major hurricanes per year has risen from 2.6 in the previous warm phase to 4.1 in the current warm phase – an increase of 60%,' says the 2006 report *Hurricanes – More Intense, More Frequent, More Expensive*, issued by reinsurance company Munich Re.¹⁰

During the 2007 hurricane season, two category 5 (maximum intensity) hurricanes hit coastal areas (a record in that area), including Hurricane Dean which struck Mexico in August, and Hurricane Felix which slammed into Nicaragua in September.¹¹

People in the Caribbean and Latin America are particularly hard-hit by the growing number of hurricanes because of the many other problems they face. As the IPCC

points out in its latest impacts report, these include population growth, poverty, the unregulated growth of towns and cities as people migrate from rural areas and lack of investment in infrastructure and services.

'Some of these vulnerabilities are because people live in the path of hurricanes (about 8.4 million in Central America), on unstable lands, in precarious settlements, on low-lying areas, and in places prone to flooding from rivers.'¹²

Hurricane Mitch, which crashed into Central America in October 1998, was the region's worst disaster for at least a century, killing 9,700 people, destroying around 94,000 homes and leaving several million people temporarily dependent on aid.¹³

Mitch hit Honduras hardest of all. The country, where one-fifth of the population lives on less than US\$1 a day, suffered more deaths than any other affected country. Property damage amounted to 70% of its GDP and the same proportion of the country's crops was destroyed.¹⁴ The country's then president, Carlos Flores, declared that the disaster had set the country back by 50 years.¹⁵

In the town of Santa Rosa de Aguán on the north coast of Honduras, where most people were from the Garifuna ethnic minority descended from slaves, Mitch had two particularly devastating impacts. First, it moved the course of the Aguán River by a quarter of a mile and enlarged it dramatically, leaving large areas of land and houses submerged or only accessible by boat.

Second, the hurricane ripped up the coconut trees whose roots had held the beach sand in place. As a result, what was left of the town became increasingly covered in sand. Most of Santa Rosa's inhabitants have since left the town for the northern coast of Honduras, which is notorious for sex tourism and high rates of HIV and AIDS.¹⁶

It would be comforting to imagine that, after the horrors wrought by Mitch, Honduras would be left in peace and gradual recovery. That has not happened. Instead, since 1998, the country has been hit by 11 further hurricanes and tropical storms; flooding in 2003 and a drought in 2004.¹⁷

1.4 Tajikistan: scorched crops and mudslides

The former Soviet republic of Tajikistan is a poor, mountainous country that borders China to the east, and Afghanistan and Pakistan to the south.

Meteorological records show that the temperature increased while rain and snowfall decreased across the country between 1961 and 1990, although with big variations between the mountains and valleys, and between rural and urban areas.¹⁸ The IPCC notes that across Asia generally, while total annual rainfall has decreased, very heavy rains are more frequent, leading to severe floods, landslides, and debris and mudflows.¹⁹

Farming is by far the most common occupation in the country, and so people are very exposed.²⁰ Researchers funded by Christian Aid were told of unusually warm weather, drier soils, snowfall at unexpected times and crops failing because of 'scorching' weather, leading to conflict over water and people migrating from rural areas in search of more reliable incomes.

Animals, crops and even trees are said to be getting 'sick' because of the spread of diseases and parasites that benefit from the warmer weather. The melting of snow in the mountains has meanwhile led to more mudslides and floods.²¹ 'There are 560 families and 2,600 inhabitants in our village, and all of us are engaged in agriculture,' two women farmers from Jabar-Rasulov district in the north of the country told researchers. 'In 2005, quarrels began...over water distribution to each family's land. Much of the harvest was "burnt" when the summer heat came.'²²

In Kyrgyzstan, Tajikistan's northern neighbour, temperatures rose by an average of 1.6°C in the 20th century – much higher than the global average rise of 0.6 degrees.²³

Abdumabi, a farmer from Kora-Yantog village in the Osh region in the south of the country, likens recent weather conditions to the end of the world. 'Now it's hotter and there is less rain,' he says. 'I'm 50 years old and I can't remember weather like we've had in the last few years during my lifetime. Now when it's hot it is really hot and when it rains it is either very light, not enough, or too much, which causes flooding. Maybe this is a sign of Armageddon coming.'²⁴

Murat Baikarimov, a village elder in his mid-40s from Aloschi village, also in Osh region, reports that the climate has become unpredictable. 'The seasons used to be very reliable – winter was winter and summer was summer,' he says. 'Now it seems the winter has got its independence, just like Kyrgyzstan [another former Soviet republic]. For the past ten years, there has been less snow. Also, the summers are hotter – 45-55°C. [In fact, the average summer temperature in Osh is around 26°C; the maximum ever recorded was 44°C.]

'In spring, it shouldn't be hot, but this year was really hot,' says Murat. 'Summer is usually hot with no rain but this year we had lots of rain. I grow tomatoes and normally have enough to eat and some to sell. This year the weather killed my tomatoes and I am having to buy them instead. Because the harvest was bad, the prices have gone up... Things are changing for the worse.'²⁵

1.5 Bangladesh: rising tides mean less fresh water

People in Bangladesh are experiencing several of the major impacts of climate change. Temperatures are rising, according to the Government of Bangladesh's National Adaptation Programme of Action (NAPA). Flooding has also become much more frequent over the past 50 years, the plan shows, with major floods occurring in 1954, 1974, 1984, 1987, 1988, 1998, 2004 and 2007.²⁶

Cyclones (tropical depressions producing sustained gale force winds of at least 63km/hr) originating in the Bay of Bengal have become less common since 1970 but they are more intense and do significantly more damage than before, according to the IPCC.²⁷

The sea level is rising much faster than the global average – partly because the landmass in this region is subsiding. In addition, the plan notes evidence that salty water is salinating previously fresh water near the coast, as a result of higher sea levels and stronger wave and tidal surges. However, salination cannot be blamed on climate change alone: the construction of dams in India is also a factor, and some scientists believe that groundwater depletion caused by irrigation and declining rainfall is also important.

Sea water has now travelled so far inland that salt can be tasted in water from deep groundwater sources at least 100km inland.²⁸ The salty water is killing fruit trees, reducing the quality and quantity of many crop yields and destroying the Sundarbans mangrove forests on the Ganges delta. These forests protect coastal areas against cyclones. Fresh-water fish numbers are also declining, affecting the fishermen who make a living from them and leading some to resort to sea fishing. This in itself creates new challenges with reportedly greater waves and stormier waters.

Almost one in three of the country's population lives in the coastal regions of Bangladesh. Women are hardest hit because, traditionally, it is they who collect fresh water for their families, sometimes travelling miles to do so.

Minu Basar, a member of the water committee in Kayabunia village in south-west Bangladesh, sometimes has to travel up to 10km to buy fresh water for her family. 'When there is no rainwater, we buy water from the government for 20 *taka* (around 17p) for 20 litres,' she says. 'The journey there to get it is about 10kms across the river and through the forest. It can take up to a whole day to fetch water. Normally we can bring home about 40 litres. But each day my family needs at least 40 litres.'

She continues: 'Because of the saltwater, we have to suffer hardship just to survive. We can't even wash our own vegetables or fish with the water. If you wash anything with it and then leave it, you'll see it goes black. When we wash our hair, it becomes sticky and smelly. Once a month, when we go to collect water from freshwater sources far away, we take all our clothes and wash them there.'²⁹

The rising sea is also starting to inundate small islands in the low-lying Sundarbans forest area, which straddles Bangladesh and India, forcing thousands of people to migrate. If current trends continue, by 2020 the number of displaced families could reach 30,000.³⁰

As in many other countries, farmers in Bangladesh are also struggling with an increasingly erratic climate. Gazinid Akhar Ali, 51, is a farmer who lives on a *char* – an island formed by the natural deposition of silt in a river – called Khuri Khordia in the wide River Padma-Ganges, in the Manikganj district.

He says that the weather has definitely got worse over his lifetime, with terrible consequences for his livelihood. 'A few weeks ago, because of the heavy rainfall and the huge waves [in the river], half my peanut crop was drowned. Because I had borrowed money from a money lender to pay for the peanut seeds and I have lost half the crop, now I can't repay my loan. The money lender is shouting at me and chasing me. I'd like to find another business.'

He adds: 'Looking back over my 51 years, the weather has definitely got worse. During the winter, it's got colder and now the summers are too hot. The monsoon has changed and it rains much harder than it did before. Last year, there wasn't enough rain and my crops all dried in the drought.'³¹

2. Adapting to climate change

The climate is changing rapidly and dramatically, and will continue to do so for decades, regardless of any greenhouse gas reductions. Past emissions have already 'locked in' many years of further warming. So there is an urgent need to enable people to adapt to the negative effects of climate change, at the same time as making deep cuts in emissions.

Discussions about adaptation can sound dull and remote, because they are often strewn with abstract jargon such as mainstreaming, capacity building and dynamic adaptation, which mean little to anyone other than those working on climate change.

However, adaptation is important. It can make the difference between life and death, and between a reasonable quality of life and destitution. In practice, as the case studies below show, adaptation means making changes that help to protect people from some of the consequences of climate change.

Some simple examples of how people and governments are adapting include:

- in Bolivia, poor farmers are introducing new varieties of potato which grow better in the shorter rainy seasons, as well as crops they could not previously grow, such as fruit trees, alfalfa and maize. They are also planting bushes and trees to prevent the soil being washed away by heavy rain, and would like to introduce irrigation to supplement the erratic rains.
- in Nepal, the government, supported by international donors, initiated a four-year project to drain water from the Tsho Rolpa glacial lake high in the mountains. Because glaciers are melting, the lake has expanded dramatically. If the dam holding the water in had burst, downstream communities would have been hit by a catastrophic flood.³²
- in El Salvador in Central America, where hurricanes cause flooding, Christian Aid partner Aprodehni has helped communities to build walls made from old tyres filled with sand, to contain the local river. It is also working with people who live on the coast to replant the mangroves, which form a natural defence from storm surges – dramatic rises in sea level that are caused by hurricanes.
- in the Philippines, Christian Aid partner Coastal Core has helped poor fishing communities reduce their financial dependence on fishing. It has given them technical and financial support with setting up home-based businesses such as seaweed noodle production, shell crafts and crab farming. Now the fishermen no longer have to endanger their lives by going out when the sea is stormy.

While climate change poses additional problems for poor communities and adaptation is the term used to describe the response to these problems, it is poverty that makes people vulnerable. Climate change exposes the gap between rich and poor – therefore efforts to reduce poverty and inequality are as important as adaptation in closing this gap.

Indeed, some experts argue that there is little obvious difference between standard development projects and adaptation projects. The difference, they say, is not in what people are doing, but why and with what knowledge.³³

As this implies, adaptation work should increase people's understanding of climate change. While people in developing countries are aware that their environments are changing, their knowledge of the causes is generally low. Rather than blaming greenhouse gas emissions and the attendant injustice of having to cope with a problem not of their making, common explanations include God's wrath, women having abortions, failure to observe traditional rituals, the hole in the ozone layer and even the advent of space flights.

Education through the media, non-governmental organisations, governments and schools could increase people's appreciation of the need to adapt, and also encourage them to demand action from the true culprits: people in rich countries, who create the overwhelming majority of greenhouse gas pollution.

Adaptation is needed at every level, from household and local council to governmental and international. However, the benefits of adaptation – and the consequences of failure to do so – are felt at local level. And at times of crisis, local people and organisations are the first to respond. So governments and NGOs doing adaptation work should aim to reinforce and create local strengths on which communities can draw to anticipate, resist, cope with and recover from disasters and the more gradual impacts of climate change.

Even with better understanding of climate change, local communities can only do a limited amount without support from various levels of government, and from international organisations. For instance, they may need financial and technical help (as in the Philippines and El Salvador examples above). Communities will need government action to ensure that adaptation is tied in with existing laws and procedures, such as those supposed to ensure that infrastructure and buildings are sufficiently robust and built in places where they will not be flooded by rain or sea water.

People have been adapting to climatic shifts for thousands of years but today's climate is changing rapidly and unpredictably, limiting people's ability to protect themselves. As the IPCC notes, these limitations will be especially important over the long term, 'as most impacts increase in magnitude'.³⁴

There are limits on people's capacity to adapt when they are already dealing with stresses such as extreme poverty, HIV/AIDS, unfair economic competition, conflict and desertification. There are also financial and organisational limits to what governments can and are willing to do to protect their citizens. In addition, there are technological and natural limits: humans cannot prevent glacial ice from melting, for instance, nor prevent the sea level from rising.

Without the necessary support and resources, increasing numbers of vulnerable people will be forced to take drastic measures such as migrating to already overstretched cities – often extremely vulnerable to climate change impacts too – or even venturing, perhaps illegally, across borders to avoid the increasing risks.

In Bangladesh, Mirza Shawkat Ali, vice-director of the Department for the Environment, says his country is up against financial limits as well as the sheer difficulty of persuading thousands of government officials to take climate change seriously. He says: 'Unfortunately, finance for adaptation is simply not adequate. There is only US\$100 million available in the [UN's] Least Developed Countries Fund. Bangladesh's NAPA projects need \$87 million, however.'³⁵

Similarly, Cambodia's National Adaptation Action Plan states: 'Villagers may be aware of possible coping and adaptation mechanisms, such as rehabilitating water storage structures and irrigation canals, building dykes and water control structures, strengthening dwellings against windstorms. However, the lack of financial resources has generally prevented local communities from implementing these projects.'³⁶

The NAPA also cites cases of failed adaptations, such as where farmers unsuccessfully changed the dates on which they planted crops in response to the shifting climate because there were no local weather forecasts. Some people adopted flood-resistant varieties of rice, which could not survive periods of drought. In some areas, attempts to irrigate crops with water pumped from the ground failed because the water ran out after a single season and the pumps lowered the water table.

As these examples suggest, another great difficulty with adaptation is knowing what will work. No-one can be sure how the climate will change in future, or what impact it will have on the natural and man-made environments. Furthermore, there is relatively little experience and few evaluations so far of existing adaptation projects.³⁷

As communities and governments increasingly begin to explore different adaptation options, it is vital that channels are made available for sharing successes and failures with others. Local-level institutions and groups should also be supported in building on and strengthening their experiences and knowledge in order that they can begin to cope and adapt more rapidly without being placed further at risk.

2.1 Bangladesh: harvesting rain

Some 40 million people in Bangladesh still lack safe drinking water. Twenty years ago in the coastal regions of Bagerhat in south-west Bangladesh, freshwater was once abundant. Ever since sea water began salinating local sources of fresh water, women and children have had to travel miles to buy fresh water from the state supplier. Because of the remoteness of the communities, the only realistic local solution is rainfall.

Christian Aid's partner organisation, the Bangladesh Centre for Advanced Studies (BCAS), is helping people in this area of the country to run their own community water organisations, called *pani parishad*, rather than relying excessively on outside bodies to fill gaps left by government. The *pani parishad* bring people together to identify the best water supply methods for households and the wider community in their villages. Women make up more than 50% of the membership of each *pani parishad*, not least because they are traditionally responsible for collecting their families' water.

In the past, rainwater harvesting has been inadequate and unhygienic. Now, hundreds of households have learnt how to collect rainwater hygienically and efficiently, in larger quantities than before. BCAS engineers have helped communities to adapt their traditional technologies so that adequate amounts of rain can be collected and stored.

One of several collection methods involves sinking a traditional large clay water jar into a concrete base with a tap attached. Water is collected from corrugated tin roofs or tin supported on poles. The jars are kept clean with bleach powder and covered with mesh and a small metal plate to exclude insects and bacteria. Regular cleaning is the key to safe storage of water.

Rina Begum, a 20-year-old mother and member of the Chila Bazar village *pani parishad*, says: 'Before we learnt about the dangers of drinking water, we used to drink water from the pond or the river and even dirty rainwater that we'd collected. We used to harvest rainwater but we didn't know how to do it safely. Now we have very clean water. We preserve it safely and collecting it has become very easy. We even have less health problems now.'

She adds: 'I like being a member very much. I feel like I can do something and I also feel that I am much more aware than I used to be. Our living conditions have now improved and I feel like we are not as poor as we were before.'

'We now have clean toilets, safe water and, through the pani parishad, we are trying to protect the riverbank [from erosion that threatens to swallow up their homes and land].'

The pani parishads provide forums for communities to solve other social and environmental problems that prevent them from rising above the poverty line, such as providing schooling for children or loss of land to widespread coastal and riverbank erosion.³⁸

2.2 Jamaica: living with hurricanes

In Jamaica, Christian Aid partner organisation the Women's Resource Outreach Centre (WROC) is helping people to be better prepared for hurricanes so that they suffer less damage. Volunteers in Whitehorses, in Botany Bay on Jamaica's south-east coast are being trained to help their communities remove to safe places when the storms strike, while small-scale poultry farmers are being given hurricane-resistant chicken coops. These protect the birds and the farmers' livelihoods.

Hurricane Dean hit Jamaica on 19 August 2007. It was a category 4 hurricane – one step down from the most severe possible. Conroy Gouldbourne, a member of a disaster management committee in the Whitehorses area, was trained by WROC. Immediately after receiving the hurricane warning, he told local people to gather in safe shelters.

'I was better prepared this time,' he says. 'I stocked essential food items. I assisted ten people to take refuge in my house, which has got a concrete roof, in addition to preparing other community members to take refuge in other safe shelters.'³⁹

Esilia Lang, who keeps chickens nearby, says: 'My chicken coop and 75 chickens survived the hurricane so my livelihood has not been affected. This will help me to earn my income in the coming days.'

By contrast, Mrs Harvey, another chicken farmer in the area, lost 50 of her birds. As a result, she lost her income for two months, along with the money she had spent rearing the chickens, leaving her dependent on aid, friends and family.

2.3 Kyrgyzstan and Tajikistan: fighting floods

Flooding is a serious, recurrent problem for the people of Osh district, in southern Kyrgyzstan. The causes include heavy rain and snowfalls in the spring and summer and, villagers believe, the blocking of irrigation channels by mudslides and rubbish. Christian Aid partner organisation Mehr Shevkat is working to help people prevent and prepare for floods.

In the villages of Jangy-Aryk and Krzyl-Korgon, Mehr Shevkat has trained adults and children to form village and school disaster teams, each with special groups for early warning, evacuation, rescue, first aid and inspection. Team members are trained in skills including rope rescue, first aid and mountain safety.

When there is a flood, the early warning group of the school disaster team alert the village by banging pan lids and shouting out to villagers. They also ask for assistance from local authorities. The evacuation group leads people to the designated refuge place on higher ground, and then the rescue group searches for people in trouble and takes them to safety or gives them first aid.

In Jangy-Aryk village, the adults' disaster team has concentrated on clearing rubbish and mud from their crop irrigation channels, which they believe will reduce the risk of the river flooding. They have also used concrete to strengthen the bend in the river next to the school in order to stop the water breaking through and flooding the school. In addition, they want to plant trees on the river bank in the hope that this will reduce soil erosion and the severity of flooding.⁴⁰

2.4 Mali: making the most of rain

On the Dogon Plateau in eastern Mali, Christian Aid partner APH is working with people in 21 communes teaching them to lay stone walls along the contours of the land, which stop the rain from running away taking the soil and nutrients with it.

APH also teaches the use of organic fertilisers to feed crops, the digging of holes in the earth to capture rainwater, the planting of new trees and protection of existing ones. Trees help to prevent soil erosion, offer shade and, in some cases, edible seeds but in the past people have cut them down for firewood and building materials.

Armand Kassogue, director of APH, says his organisation encourages villages to create teams called watching committees to try to preserve the remaining trees. 'We organise villagers in watching committees of maybe five or seven people. It is up to the committee how they decide to penalise offenders – those caught cutting down the trees. There are rules established in the zone, and all villages and villagers are informed.'⁴¹

Ambagara Banou, in his 50s, lives in another Dogon village called Oritoumon. He says people have started growing new crops which do better in the changing climate. 'We use the same farming techniques as we used to and we grow the same crops but also have some new ones. They are a different type of millet, and we introduced some that ripen faster, which is necessary when there is less rain.'⁴²

2.5 Nicaragua: Strengthening lives against storms

Hurricanes and tropical storms, and the floods they cause, are a recurring danger for the poor farmers who live near the Rio Grande in the Department of Matagalpa, central Nicaragua. Over the past 25 years, Matagalpa has suffered four hurricanes and two tropical storms (which have lower wind speeds than hurricanes).⁴³

Christian Aid's partner in the area, Community Movement of Matagalpa (MCM), is helping people become more resilient to flooding, landslides and even drought.

In the hillside area of Los Molinos, people have created maps identifying the homes most vulnerable to floods, landslides and drought. The three maps show which families need to be evacuated first during an emergency, and the best escape routes.

Maritza Sevilla, in her early 30s, lives in the Nuevo Amanecer (New Dawn) community. She helped create the maps and emergency plans: 'As we are prepared [for floods and landslides], we know we will have time and we know what to do,' she says. 'If there was a flood then we know we have to get the family who live on the other side of the river out first. We've put markers in the river, sticks and stones to measure the height of the water. So when the river has risen above the marker, then that's our signal to act.'⁴⁴

People have also built a community centre in a safe place, to which they can retreat in severe weather. The centre acts as a store for maize and beans that have been put aside for emergencies. Ciriaco Ortiz, in his late 20s, says the stored grain acts as

insurance. 'This grain is our contingency plan for the community. It's primarily against drought,' he says.

Conclusions

Supporting poor communities to cope with the climate change they are currently experiencing and work out how to deal with inevitable future changes is mainly about tackling poverty. While being an urgent issue in its own right, climate change is also a symptom of a global economic system that fails to distribute resources equitably, and to value their use so that they are preserved for future generations. Poverty is a symptom of the same inequitable and unsustainable approach to economics.

It is a scandal that the promises made at the G8 summit in Gleneagles, Scotland in 2005 have since been reneged on.⁴⁵ It is equally shocking that the rhetoric about development in the Doha round of world trade talks at the World Trade Organization has not been matched with any serious commitments to allow concessions for poorer nations. High agricultural subsidies in the EU and US persist, while developing nations are expected to sign up to further market liberalisation.

The lack of focus on addressing poor people's social and economic needs, and reducing their exposure to risks – including climate change – must change. The past two decades have been dominated by a push on the part of wealthy nations and international institutions to sign up non-industrialised nations to a single focus on growth. And yet between 1990 and 2001, for every US\$100 of GDP growth generated globally, only US\$0.60 found its way into the pockets of poor people.⁴⁶

While the fight against the structural causes of poverty needs renewed vigour and some serious rethinking, a new effort to understand and finance the additional needs of poor people resulting from climate change must also begin. This is likely to cost US\$100 billion per year or more, could help support initiatives similar to those highlighted in this briefing and should be financed from compensatory payments related to CO₂ emissions. The polluter must pay the costs of polluting.

Industrialised nations have a legal obligation to support adaptation in poor countries⁴⁷ and in 2001, they agreed to give \$410 million a year towards the costs of adaptation and clean technology in the developing world, starting in 2005. Had they kept to the pledge, then by now (November 2007), they would have given \$1.2 billion. However, by September 2007, they had pledged less than \$300 million to the climate change funds by the Global Environment Facility (GEF), which funds projects in poor countries. Actual payments to the GEF were still lower, at just \$177 million.⁴⁸ A separate pot of money – the Adaptation Fund – is financed through a 2 per cent levy on transactions through the Clean Development Mechanism. It is not yet up and running, but holds greater promises as it is not reliant on voluntary contributions. Meanwhile, the Alliance of Small Island States is proposing a broader UNFCCC Adaptation Fund related to levels of CO₂ emissions and GDP.⁴⁹ Under this, they propose a regular and adequate source of funding for adaptation that could be based on countries' responsibility for emissions and ability to pay.

However, neither tackling poverty nor responding to the impact of climate change on poor communities will be manageable unless CO₂ emissions are cut. Globally, reductions of up to 80 per cent by 2050 with an average annual decline of around 5 per cent in the meantime, will be required to minimise the risk of global warming in excess of 2°C. Given that current levels of CO₂ in the atmosphere appear significantly higher than had been predicted,⁵⁰ an emergency programme of emissions reductions is now necessary.

Industrialised countries with the historical responsibility for climate change and current capability to deal with it must lead with much deeper domestic cuts in emissions. They must also help to pay for emissions reductions overseas in countries where the process of development is the main priority. Christian Aid has proposed that an equitable international emergency programme would have at its heart an index of countries ranked by historic responsibility for CO₂ emissions and the capability to help put things right.⁵¹

Recommendations to governments meeting in Bali

The success of adaptation strategies depends on cutting emissions. Adaptation has its limits. These are not fully understood but relate directly to atmospheric concentration of CO₂ emissions. Therefore, effective, comprehensive and robust efforts to reduce emissions are needed in advance of any meaningful adaptation plan.

- Conference of the Parties (COP) 13 in Bali must be the launch pad for an emergency programme of global emissions reductions, precise details of which need to be agreed by 2009.
- An emergency programme must be based on equitable principles, with the right to sustainable development guaranteed.
- Countries with the greatest responsibility for climate change and capability to mitigate and adapt must take on the lion's share of the global burden, making big emissions reductions at home and in poorer nations.⁵²

It is in the interests of poorer nations to argue for stringent cuts in global CO₂ emissions since the most promising and reliable source of financing for adaptation will come from measures to price and reduce CO₂ emissions (not from voluntary commitments by rich countries). For instance, where carbon taxes are levied, a proportion could be earmarked to support essential adaptation in poorer countries. If carbon trading develops further, levies on transactions could be used similarly.

- Industrialised nations must compensate developing nations for the damage already done to the climate. The polluter must pay according to the principles of responsibility and capability articulated in the UN Framework Convention on Climate Change (UNFCCC).
- This legal and moral duty would best be discharged through financial mechanisms attached to reducing emissions.
- Carbon trading systems and carbon taxation must therefore be designed to finance adaptation in developing nations as well as provide incentives to mitigate.

The adaptation debate is critical to the international discussion. Those countries that are most threatened by climate change also need to play a more active role in negotiations. To do so, they would need confidence that their adaptation requirements would not only be discussed, as is currently the case under the 'Nairobi Work Programme on Impacts, Vulnerability and Adaptation', but also fully supported and financed as an integral part of an emergency programme on climate change.

Further recommendations

Successful adaptation needs to happen at all levels, but particularly at a local level. In addition to strengthening people's ability to adapt by reducing poverty, providing the level of additional adaptation support needed will require innovative financing mechanisms that offer transparent, predictable and sustained funding. Financing for

adaptation must be provided along the lines of compensation and according to the 'polluter pays' principle.

New funding through levies and taxes must be provided to increase national development budgets, enabling affected countries to reduce risks related to and made worse by climate change. Simple reallocations from existing development budgets cannot remain the default funding response to climate-related crises and disasters.

For local adaptation to work and benefit affected communities, more resources need to reach those at the grassroots. However, these resources need to be first guaranteed at international level and channelled so that they reach the most vulnerable communities at a local level. National and local governments will play an important role in this process.

Successful community-level adaptation will ultimately require:

- a high percentage of carbon-related funding to be allocated for community-based adaptation, risk reduction and sustainable human development.
- substantial committed funding for community-based development, particularly in the areas of infrastructure, agriculture, natural resource and water management, energy, health and education.

At the national level, there are many things that governments are already in a position to do. They can:

- ensure sure that their strategies for reducing poverty take into account climate change and adaptation options
- build on experience in disaster management and make use of existing risk management tools
- raise awareness and improve coordination by building knowledge of climate change across government ministries as well as establishing focal units or persons in each ministry
- identify priorities for action by drawing up action plans, similar to the National Adaptation Programmes of Action (NAPAs) already produced by least developed countries.

Governments should also focus on reducing exposure to risk and therefore must prioritise:

- reducing underlying risk factors, such as limited access to resources and right to land
- enhancing knowledge and education for increased resilience.

However, all these activities will need to be matched by more substantial investments. Dedicated funding must be made available to governments to:

- develop comprehensive risk assessments incorporating climate data and forecasting as a basis for development planning
- implement large-scale adaptation projects at national level
- implement adaptation initiatives at local level that have clear benefits for vulnerable communities and that involve local institutions and communities.

If poor people are to stand a better chance of surviving climate change, governments and organisations at international, national and local levels must strengthen their efforts and act together to reduce both poverty and emissions.

Endnotes

- 1 See, for instance, Topic 6 in the IPCC's *Fourth Assessment Report Synthesis Report*. This was unpublished at the time of writing.
- 2 Ibid. Also: Ann Chaplin, *Perceptions of Climate Change in the Bolivian Altiplano: Ancoraimes and Norte Potosí*, Christian Aid, January 2007.
- 3 Latin America chapter of *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*.
- 4 All quotes in this section from Chaplin, 2007.
- 5 *Human tide: the real migration crisis*, Christian Aid, 2007, p 42; also Sarah Filbey, unpublished trip report for Mali and Burkina Faso, December 2006, p 14.
- 6 See Mali chapter in *Human tide: the real migration crisis*, Christian Aid, 2007.
- 7 Filbey trip report, as above, 2006, p 19.
- 8 Ibid, p 26.
- 9 Ibid, p 17.
- 10 *Hurricanes – More Intense, more frequent, more expensive*, Munich Re Group, 2006, p 13.
- 11 The Pew Center on Global Climate Change: www.pewclimate.org/hurricanes.cfm#2007
- 12 *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p 585.
- 13 International Federation of the Red Cross and Red Crescent Societies, Central America: Hurricane Mitch, Appeal number 33/98, Situation Report number 7, 28 December 1998.
- 14 Alernet profile of Honduras, www.alertnet.org/thefacts/countryprofiles/216184.htm; also International Federation of the Red Cross and Red Crescent Societies, Central America – Hurricane Mitch: *transitional relief and first phase rehabilitation*, situation report No. 2, 20 August 1999.
- 15 BBC website: 'Mitch Hits Poor Hardest', 8 November 1998: http://news.bbc.co.uk/1/hi/programmes/from_our_own_correspondent/210342.stm
- 16 Information supplied by Jose Luis Penya of Christian Aid and James C McKinley, 'Still Locked in Storm's Horror, Hondurans Are Fearful of Future', *New York Times*, 17 January 1999.
- 17 Reliefweb: www.reliefweb.int
- 18 *Public Perceptions of Climate Change in Tajikistan and Kyrgyzstan*, Youth Ecological Centre Tajikistan report, 2007, p 22.
- 19 *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p 473.
- 20 See Asian Development Bank website: www.adb.org/Documents/Books/Key_indicators/2006/pdf/TAJ.pdf
- 21 *Up in Smoke Asia*, Working Group on Climate Change and Development, draft copy, September 2007, p 36.
- 22 *Public Perceptions of Climate Change in Tajikistan and Kyrgyzstan*, Youth Ecological Centre Tajikistan report, 2007.
- 23 First National Communication of the Kyrgyz Republic under the UNFCCC, 2003, p 49.
- 24 Sarah Moss, *Reducing risks in a changing climate in Kyrgyzstan*, unpublished Christian Aid briefing. 2007
- 25 Ibid.
- 26 Under the United Nations Framework Convention on Climate Change, the world's least developed countries are all expected to develop NAPAs, which set out the impacts of climate change and their top priority projects to help people adapt to the new conditions. In theory at least, those projects will then be paid for by rich countries.

27 Climate Change 2007: *Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p 473.

28 Amanda Farrant, *Water, rights and women*, unpublished report on a Christian Aid-funded Bangladesh Centre for Advanced Studies project, Christian Aid, October 2007, p 12.

29 Ibid, p 24.

30 'La montée des eaux noie inexorablement les îles des Sundarbans', *Le Monde*, 23 August 2007, p 7.

31 Amanda Farrant, *At the Tipping Point!*, unpublished report on the social impacts of climate change and the challenges of adaptation in Bangladesh, Christian Aid, 2007, p 14.

32 Climate Change 2007: *Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p 723.

33 For instance, see Saleemul Huq and Hannah Reid, *Community-based adaptation*, a briefing, International Institute for Environment and Development, 2007.

34 Topic 4, unpublished draft of IPCC Fourth Assessment Report – Synthesis Report, p 1.

35 The Least Developed Countries Fund was created under the United Nations Framework Convention on Climate Change and is supposed to pay for the poorest countries' most vital adaptation projects. However, it is funded by voluntary contributions from rich countries and, as Mr Ali says, it would be almost exhausted by the adaptation projects needed in Bangladesh alone. Mr Ali's comments were made in an interview with Amanda Farrant of Christian Aid, 4 July, 2007.

36 Cambodia *National Adaptation Programme of Action*, p 6. This document, along with the roughly 20 others which have been submitted so far, are available on the climate change convention website: www.unfccc.int

37 One sign of the lack of experience in this area is that the Global Environment Facility, which funds adaptation projects in the world's Least Developed Countries, has organised a conference on the evaluation of mitigation and adaptation projects, to be held in May 2008.

38 Amanda Farrant, *Water, rights and women*, Christian Aid, unpublished partner project report, October 2007, p 39.

39 *Resilient livelihoods that reduce the risks*, Christian Aid briefing, 2007.

40 Sarah Moss, *Adapting to a changing climate in central Asia: a livelihoods approach*, unpublished report, Christian Aid, 2007.

41 Sarah Filbey, trip report for Mali and Burkina Faso, Christian Aid, December 2006, p 7.

42 Ibid, p 29.

43 European Commission Grant Agreement with Christian Aid, relating to the project 'Developing community capacity for disaster risk reduction in the Department of Matagalpa', 2007.

44 Ibid.

45 At the Gleneagles G8 summit, leaders promised to increase overseas aid by US\$48 billion per year by 2010 and to fund universal access to HIV/AIDS drugs. But during the 2007 summit at Heiligendamm in Germany, a promise of US\$60 billion funding for HIV/AIDS carried with it no timescale and no clear commitment to universal treatment. Also, with the exception of the UK, aid increases have not kept pace with promises and total aid levels actually fell between 2005 and 2006.

46 New Economics Foundation, *Growth Isn't Working*, 2006.

47 Annex II of the UNFCCC, including the EU 15, the US, Canada, Japan and Australia, lists nations that have agreed to provide funds to support adaptation in poorer countries.

48 Global Environment Facility Status Report on the Climate Change Funds as of September 30, 2007. In addition to the two funds covered by this document, there is \$50 million in the Strategic Priority on Adaptation under the GEF Trust Fund.

49 <http://unfccc.int/files/meetings/dialogue/application/pdf/wp14-aosis.pdf>

50 Canadell et al, *Global and Regional Drivers of Accelerating CO2 Emissions*, Proceedings of the National Academy of Sciences, 22 May 2007, 10.1073/pnas.0700609104

51 *The Right to Development in a Climate Constrained World*, EcoEquity, 2007. See also *Truly Inconvenient*, Christian Aid, 2007.

52 Ibid.