

A photograph of a man from behind, walking through a landscape covered in debris. He is carrying a large blue plastic water container on his head and a white plastic bag in his right hand. He is wearing a light-colored t-shirt with a logo on the back and blue shorts. The ground is sandy and littered with branches, leaves, and pieces of trash. In the background, there are some damaged buildings and bare trees under a cloudy sky.

Taken By Storm: responding to the impacts of climate change

March 2014

christian
aid



Monica Kilindi is a widow caring for eight children in a drought-prone part of east Kenya. She used to survive on crops from a small plot of land, but the rains have dried up. Now, years pass with no harvest.

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Poverty is an outrage against humanity. It robs people of dignity, freedom and hope, of power over their own lives.

Christian Aid has a vision – an end to poverty – and we believe that vision can become a reality. We urge you to join us.

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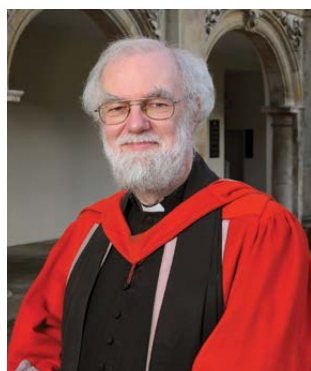
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Cover: In the aftermath of Typhoon Haiyan, a man picks his way through the debris with relief items provided by one of our partners.

Photographs: Magdalene College (page 4), Christian Aid/Hannah Richards (pages 5, 6, 11, 22, 24 and 25), Christian Aid/Antoinette Powell (page 9), Christian Aid/Melanie Smith (cover, pages 10 and 15), Christian Aid/Genevieve Lomax (page 12), Christian Aid/Matthew Gonzalez-Noda (page 16), Christian Aid/Branwen Niclas (page 16), Christian Aid/Susan Barry (pages 17, 19, 28 and 29), Christian Aid/Sarah Filbey (page 18), Christian Aid/ Sian Curry (page 20), Christian Aid/Tabitha Ross (page 21), Christian Aid/Tom Pilston (page 26), Christian Aid/Kathleen Prior (page 27), Christian Aid/Jodi Bieber (inside front cover)

Foreword



**Dr Rowan Williams,
Chair of Christian Aid
and former Archbishop
of Canterbury**

During the first few months of 2014, the UK experienced a dramatic wake-up call as to the level of chaos that climate change can bring. Storms and floods have brought misery to thousands of

homes across the country. With waves destroying the railway line in the Devon town of Dawlish, and the Severn and the Thames bursting their banks, it became impossible to ignore the fragility of much of what we take for granted in the face of an unpredictable climate.

All this chaos in the UK came as a shock for most of us; but for millions of people around the world, living with this sense of fragility is nothing new. Far from being a vague threat in the distant future, a warming world is very much a present reality, with global temperatures already having risen by 0.8°C since before the industrial revolution. Stronger storm surges, heavier rain, and scarcer resources are part of what countless people across the world live with daily, with far fewer resources to deal with it than we have.

As this report is released, the world's leading climate scientists are publishing new findings of their own, the second part of the Intergovernmental Panel on Climate Change's (IPCC) fifth assessment report. What they have to say about the global effects of climate change put our own troubles both in context and in perspective.

Among all the facts and statistics, the summits and debates, it is essential for us to remember the specific human faces of those who suffer because of climate instability. Countless communities and families in every affected region of Africa, Latin America and Asia, people with needs and hopes and anxieties like ours, are already forced to cope with circumstances whose difficulty increases daily, and so with the prospect of an extremely bleak future for themselves and their children if nothing changes.

This report introduces us to some of these specific faces. And we need to remember that these are stories from some of the poorest people in the world. Those who suffer most acutely from the menacing effects of climate change, such as the quilombolas of Brazil, or the pastoralists in northern Kenya, are those who have done least to contribute to it; and there is a deep injustice in this.

So the significance of a report like this is that it gives a platform for the voices of those, especially from the poorest global communities, who live on the front line of climate chaos. These are the voices that Christian Aid believes must be heard as a central element in persuading our governments and policy makers to act justly in this area, recognizing that the impact of climate change is something in which basic issues of human dignity and security are involved. The case studies found in the following pages embody the kind of wisdom and experience that comes only from people whose livelihood and, indeed, whose very lives depend on the land, and who have seen at first hand what the changing of climate and landscape can do to the environment on which they depend.

In the discussions around climate change, there are some who take a somewhat fatalistic attitude, arguing that we should give up all efforts to prevent further changes and instead direct our efforts solely towards adapting to the inevitable. After all, the examples given in this report showcase impressive adaptation projects that have succeeded in enabling communities to survive and even thrive against the odds in a changing situation. But the response from those experiencing the effect of climate change is clear: adaptation is not enough. Fundamental changes need to be made at the level of global policy making, and made as a matter of urgency.

With such voices echoing in our ears, we must continue to make the strongest possible call for climate justice to be a focal question in the key meetings coming up in 2014 and 2015. The negotiations ahead will be a critical moment for agreeing appropriately ambitious plans and targets for the transition to a safe, sustainable, low-carbon future.

Our hope at Christian Aid is that readers of this report will be moved to add their voices to these calls for urgent action, and to reinforce the passionate pleas of those on the front line who have most right and authority to be heard on the subject.

A handwritten signature in dark ink, reading 'Rowan Williams'.

Rowan Williams

Executive summary

Climate change is too often thought of as a problem for the future. Despite widespread warnings from scientists about the consequences of failing to curb carbon pollution now, the drastic action needed has been constantly deferred to some later date. A sense of fatalism is also at large, harking back to an ancient worldview that portrays the weather as something altogether out of our hands, for which we have no responsibility.

Negotiations over the coming months are of urgent importance if the world is to reach a crucial new global deal to tackle climate change in 2015.

The IPCC is now 95% certain that human activity is driving global warming, according to the fifth assessment report in September 2013.

Further inaction amounts to a betrayal – not only of future generations, but a betrayal of some of the poorest communities in the world, who today are already confronted by a changing and chaotic climate.

Ironically, people in developing countries who bear the brunt of extreme weather events have done least to cause the problem, having far smaller carbon footprints than people in richer, more industrialised countries.

This report strongly calls for decisive action to be taken at every possible opportunity in the coming months.

Key meetings happening in 2014 include a climate summit of world leaders led by UN Secretary General Ban Ki-moon, and the United Nations Framework Convention on Climate Change (UNFCCC) conference (COP 20) in Lima, Peru.

These meetings must move climate policy forwards to prepare for the big decisions to be made in 2015: a new global climate deal at the UNFCCC conference in Paris, (COP 21), agreeing a new set of poverty reduction goals (which will be a post-2015 replacement for the Millennium Development Goals), and a replacement for the Hyogo Framework for Action (which is designed to reduce the impact of natural disasters).


This report also demonstrates how climate change is already having a devastating effect on poor communities around the world, destroying development efforts and forcing them to drastically adapt their way of life. Seven case studies – from the Philippines, Kenya, Brazil, Bolivia, Malawi, Bangladesh, and El Salvador – provide first-hand accounts from the front line.

It explores the innovative ways in which local organisations that partner with Christian Aid are responding to communities' needs. But their message is clear: short-term adaptation is not enough. Structural change must come from binding commitments at a global level, and must happen now.

As Rowan Williams says in his foreword: 'With such voices echoing in our ears, we must continue to make the strongest possible call for climate justice'

Below: The Illimani glacier, just south of La Paz, Bolivia. The glacier is melting and so providing less water for the communities who depend on it to live.



A woman, Carmen Quispe Dermarca, is shown working in a field of carnations. She is wearing a blue bucket hat, a white short-sleeved shirt with a geometric pattern, and a long, pleated skirt with a red and white floral design. She is holding a wooden-handled tool, possibly a hoe or a similar agricultural implement, and is focused on the plants. The background features a steep, rocky mountain slope under a clear blue sky. The carnations are in various stages of growth, with some showing green buds and others beginning to bloom.

Carmen Quispe Dermarca tends her carnations on the slopes beneath the Illimani glacier. Water is scarce because the Illimani glacier is melting, so she has to try to grow carnations because they require less water than other plants.

Introduction: the enemy of development

Over the past 10 years, international development agencies such as Christian Aid have been confronted by a new and significant challenge to our efforts to lift people out of acute poverty. The challenge is climate change. It has profoundly changed the context in which we operate, rendering previously tried and tested methods inadequate.

Climate change has proved itself the enemy of development efforts.

A formidable adversary, climate change weighs down a heavy burden on the poorest and most vulnerable people in the world. As weather patterns become more chaotic, extreme and less predictable, the poor tend to be most exposed to the forces of nature, and least equipped to survive disasters.

Smallholder farmers find they can no longer effectively predict rainfall patterns using traditional methods, so their farming methods are rendered useless. Informal business owners watch their livelihoods destroyed by hurricanes, storm surges and floods. Children have their education disrupted when their schools have to be used as emergency refuges.

For many of the communities that we support, climate change is now an everyday reality. If it is allowed to continue unchecked, an extremely bleak future awaits the world's most vulnerable communities.

Two major responses are necessary:

Firstly, a long-term solution to climate change must be found by tackling its root cause and getting a global deal to reduce carbon-dioxide emissions.

Globally, emissions are currently rising at more than 2% every year.¹ Last year saw the highest level of CO₂ in the air we breathe for 800,000 years,² rising at one point to more than 400 parts per million.³

The need to prevent future climate change and to stop global temperatures rising above 2°C is urgent. If real progress is to be made, we need fundamental changes – particularly an end to the use of fossil fuels – and a transformation in the consumption patterns of wealthier people and countries.

2015 is shaping up to being the crunch year for the world's most vulnerable people, with three global agreements on climate change, poverty reduction and disaster response set to be struck.

1. **The UNFCCC** needs to agree an ambitious emissions reduction plan at the UN summit in Paris in November 2015.
2. **The poverty reduction aims**, which will replace the Millennium Development Goals when they expire in 2015, must include targets that secure a safe and sustainable environmental future.
3. **The replacement for the Hyogo Framework for Action**, the globally agreed approach to managing disaster risk reduction, needs to focus clearly on helping communities vulnerable to threat because of climate change.

It is essential that all three of these agreements perform the key function of helping direct the world towards a low-carbon, climate-smart future so the planet and its people can prosper.

Secondly, the impact of climate change on development must be acknowledged by everyone, and strategies sought that build resilience to both climate change and potential climate disaster.

Climate change adds to existing problems of poverty, increasing the risks that already vulnerable people face. It must be addressed directly when planning for future development.

Persisting with conventional approaches to development, whether agricultural investments or helping the urban poor, without factoring in the need for climate resilience both now and in coming decades, would be extremely short sighted, jeopardising any real chance of making a material difference to the lives of the disadvantaged and marginalised.

This report presents a number of case studies from our partners, each demonstrating how we are helping communities adapt so they can respond quickly to change, and even thrive in the face of the climate threat.

Their innovative measures include switching to more climate-resilient crops and working increasingly with climate scientists to provide farmers with early warning of changes in the weather.

What is the science telling us?

There is almost no doubt about it: the Earth is heating up, weather is becoming more extreme, and it's our fault.

Governments have entrusted research on climate change to a body of the world's leading climate scientists called the Intergovernmental Panel on Climate Change (IPCC). Since its founding in 1988, the IPCC has published five 'assessment reports' on the state of the world's climate.

The first part of its fifth assessment report, produced by Working Group 1, was published in September 2013, confirming among other things that the concentration of CO₂ in the atmosphere has increased by 40% since pre-industrial times.⁴

Scientists also said they were 95% certain – the same degree to which we can be certain that smoking causes lung cancer – that this increase is almost all due to the burning of fossil fuels and deforestation, and has been the main cause of observed warming of average global temperatures since the mid-20th century.

The second part of the fifth assessment report, by Working Group 2, examines the impact of this on global climate⁵, while Working Group 3 makes recommendations on the most effective responses to climate change.

The IPCC confirms that each of the past three decades has been successively warmer than any preceding decade since 1850, causing melting snow and ice caps, disappearing glaciers, warmer oceans and raised global-mean sea levels. As a result, tidal storm surges accompanying extreme weather events are larger and the strength of events such as droughts and intense rainfall and flooding have increased. Continued emissions of greenhouse gases will lead to further warming, inducing changes in all components of the climate system.

Weather patterns we are witnessing globally can now be interpreted in the context of a fundamental change, with recent high-profile weather extremes all in line with the weather trends predicted by climate science.

The devastating Typhoon Haiyan in the Philippines, the strongest recorded storm ever to make landfall,⁶ has raised concerns over how vulnerable countries and people will cope with further events of unprecedented ferocity.⁷ Flooding in the UK,⁸ heatwaves and forest fires in Australia,⁹ and even the extreme cold weather experienced in North America in early 2014¹⁰ have all been linked to the new climate reality.

The first part of the fifth assessment report predicted further temperature rises this century, between 1.5°C and 4.5°C depending on the level of action taken to prevent increased warming. Beyond a 2°C rise, the science says, we could enter a world of climate chaos.

A whole world under threat

The impact that climate change is already having right across the globe is staggering, and there are substantial further risks to come.

If we don't take urgent action to reduce carbon emissions, climate change will continue to impact on economic growth, food insecurity, settlements and infrastructure, global poverty, and national and regional stability, bringing risk of conflict. IPCC Working Group 2 assesses the impacts and risks of climate change on different regions of the world and on different sectors, such as agriculture, cities and economies, global and local.¹¹

A warmer global climate produces a wide range of impacts on local weather systems, some showing a gradual shift and others a more abrupt change in weather systems. In particularly fragile environments, such as coral reefs or the Arctic ice, even small temperature rises are already having devastating effects, having an impact on whole ecosystems.¹² Sudden extreme weather, such as Hurricane Sandy in the US or Typhoon Haiyan in the Philippines, will have enormous one-off impacts that result in massive loss of life and economic damage. Recurrent impacts, such as increased frequency of droughts or floods, reduce the recovery time between devastating events, knocking communities further back each time.

Assessing all the science on climate change now available from the IPCC and elsewhere, a variety of threats to people and their local environments around the globe become apparent particularly in Africa, Asia and Latin America.

Africa

In Africa, prolonged drought in some areas and floods in others make food insecurity a particular threat. Raised average temperatures and unpredictable rains will affect crop productivity and also increase the spread of vector-borne diseases such as malaria. Even warming of less than 2°C is predicted to have a severe impact on food security and to destroy farming and pastoralist communities.¹³



In recent years, as the rainfall in their area of Kenya has reduced, Lilian and Albert Nthiga have found it difficult to grow enough food. Without information to help them assess when to plant to make the best use of the available water, they sometimes waste large quantities of seeds. Our partner Christian Community Services Mount Kenya East helps farmers get access to and interpret weather forecasts so they can increase their yields even in dry times.

Asia

Coastal flooding, storm surges and sea-level rise are the big risks for coastal areas and small island states. There is a significant threat to human lives and risk of widespread migration and economic loss. Marine life is also threatened by warmer and more acidic oceans, hitting the livelihoods of fishing communities.

Floods, storms and periods of extreme heat also pose particular threats to growing populations in large urban areas and can lead to collapse of infrastructure networks and critical services.¹⁴

South Asia will face water shortages, both in terms of drinking water and for agricultural use. Changes to the monsoon season, extreme temperatures and intense cyclones combine to threaten communities, particularly large coastal cities where there is high risk from flooding and storm surges.¹⁵

An estimated 54% of the Asian and Pacific urban population live in low-lying coastal zones.¹⁶ Dhaka, Bangkok, Ho Chi Minh City, Jakarta, Kolkata, Shanghai and Manila, among others, are highly vulnerable to sea-level rises, storm surges and flooding.



'The waves swept everything away. All our belongings are gone,' Marina Acaylan says. 'I used to make rice cakes and sell them in the market place, but now the market place has been washed away.' For Marina and her husband Kao in the Philippines, Typhoon Haiyan didn't just destroy their home and belongings, it destroyed their way of life. Marina and Kao received emergency relief items from our partner CODE.

Latin America

Melting glaciers in the Andes will reduce long-term water availability in parts of South America, including Bolivia and Peru. Across Latin America, food production will suffer and people in many areas will have to face more extreme flooding and stronger weather events such as hurricanes.¹⁷

Climate change will impact on all sectors of the global economy, but it is the poor countries and the marginalised within middle-income and rich countries that will be at greatest risk. The reasons are many: poor people tend to have more vulnerable employment, fewer assets to buffer them through times of hardship, fewer choices and less access to basic services. Poverty undermines the ability of communities and individuals to adapt, and their resilience in the face of change.

People who are already marginalised and vulnerable, both socially and economically, will be least able to respond to climate change without support. Those marginalised because of gender, disability, age or ethnicity will often have least mobility to move away from a threat, have little financial security or insurance, and may be physically limited in how they can respond. If these vulnerable groups are not properly supported, they'll struggle to survive the impacts of climate change. This means that underlying inequalities must be dealt with, alongside building resilience to the climate threat.

Planned responses will give greater resilience against future changes, and so save lives, reduce the potential economic and environmental damage, and enable communities and individuals to recover faster.



Alivio Aruquipa has seen first-hand the changes to glaciers in Bolivia. 'I was born here. I went away for a number of years because we have problems with droughts, and with landslides when the waters do come. We don't have enough water to grow our crops. There are conflicts over water between the different communities because we all need water and there isn't enough for everyone. These past three years we have suffered a lot with the lack of water. People feel that they have to leave the country, or leave their home to look for work and find a way of feeding their families.' A lifeline has come from our partner Agua Sustentable, which helped Alivio's community to build a reservoir that serves up to 40 families.

Adapting development to become climate-smart

Development work in a new climate context means we have to do things differently, and crucially, we have to join together with others. Much of the climate-proofing work Christian Aid is doing is supported by funds from the UK Government.

With our partners, we are building up experience and learning to help strengthen the climate resilience of our programmes in Asia, Latin America and Africa. It is important to share experiences between countries that face common climate threats, but also to recognise the specific knowledge and culture of local communities.

Sharing understanding increasingly means working with the scientific community to help appreciate the changes that are happening in order to guide responses at a local level. Weather updates and early warning systems have a new importance for our programme partners. Future predictions of change will require a longer-term perspective to ensure that development investments, such as training programmes or infrastructure improvements, are adaptable and robust.

There also needs to be closer working between people and organisations working on development, climate adaptation and disaster risk reduction,

as these disciplines are becoming increasingly interdependent.

Reducing risk and strengthening the ability of communities, businesses and local governments to recover from climate shock will reduce the need for humanitarian aid in the future. Particular focus will be needed on marginalised communities and on the informal businesses on which poor people depend.

Mofazzal Kagzi is a fisherman in Bangladesh. When Cyclone Aila hit in 2009, it destroyed his pond and all his fish escaped. Our partner Shushilan supported Mofazzal to rebuild his pond so it is less likely to be affected by future cyclones. It also supported him to replenish his stock with fish that are better adapted to the highly salinated water caused, in part, by climate change. When Mofazzal sells the fish he will buy better food for his family and pay for education and books for his grandchildren.

Small projects alone will not be enough to reach the scale of change and adaptation needed; it will require a transformation in how we do business, in our economic aims and in the technologies we use, ensuring that they are all prepared for the future. We need to be climate-smart. This is why a number of Christian Aid partners advocate for changes in local and national policy, legislation and investment – to ensure that adaptation and disaster resilience are secured for the long term.

Below: Mofazzal Kagzi and his son Lutfur work together to farm fish in Bangladesh. They have had to adapt to cope with cyclones and salinated water.



A crucial year: opportunities in 2015

Critical decisions will be made in 2015 that will affect how the global community responds to both global poverty and climate change. This provides an opportunity to align global processes between sustainable development, disaster risk reduction and climate change. The recommendations and stark warnings from the IPCC's fifth assessment must be factored into the decisions that will be made in 2015.

To climate-proof the future it is clear that a number of outcomes need to be reached in each of the key negotiating processes:

- **The United Nations Framework Convention on Climate Change** has a deadline of December 2015 for agreement on a new climate deal. This will show whether world leaders are willing to take the action together to stem further climate destruction and help poor communities effectively adapt to the changing climate. Challenges include doubts around the commitment of some powerful countries in both the developed and developing worlds to contribute their fair share in the common global effort to tackle climate challenge. What must be addressed is whether measures will be introduced to keep global warming below 2°C, the critical threshold for avoiding the worst climate chaos. The deal should commit all countries to cooperate over limiting greenhouse gas emissions and agree the required levels of funding to help the poor adapt and develop cleanly.
- **A new framework of post-2015 sustainable development goals (SDGs)** will also be agreed by the United Nations in 2015 to replace the Millennium Development Goals. As they aim to end global poverty, the SDGs will need to respond to the challenges presented by climate change in the coming decades. This post-2015 development framework should set clear targets for building climate resilience and disaster risk reduction for both rural and urban settings. Targets must be designed to reduce the impacts of both extreme disasters and 'everyday' impacts, to promote justice by specifically reducing the effects for the most vulnerable groups and to stimulate greater action on reducing the underlying vulnerabilities.

In addition, the SDGs must deliver a lower-carbon future, ensuring that all sectors, including energy, urban development and food production, invest now in the low-carbon and resource-efficient methods needed for a safe future.

- **The Hyogo Framework for Action**, which is the globally agreed approach to managing disaster risk reduction, will be replaced after 2015. The new resilience framework should address the challenges posed by disasters, climate change, natural resource management, conflict and poverty in an integrated way. The new framework should be more rights-based and have a greater focus on vulnerability and equity.

It is imperative that the three deals to be brokered are not seen in isolation but reinforce each other. A new vision for development is needed that guides all three sets of deliberations and pulls them together. However, this will need political vision and leadership from world leaders, supported by civil society and progressive business.

'We are going to track the adaptation benefits and climate disaster-risk benefits for all development spending... to ensure that they are disaster resilient and that they work for adaptation to the maximum ability'

(World Bank President Dr Jim Yong Kim, December 2013)¹⁸

To support these global processes there a number of other actors who can play a crucial role:

i) The international investors

Of the £12bn the UK currently spends on official development assistance (ODA) each year, about half a billion is officially classed as climate finance. This covers both adaptation – helping those affected adapt to a changed climate – and mitigation, which covers activities that reduce greenhouse gasses, such as cutting emissions and reforestation. All projects by the UK's Department for International Development (DFID) with budgets of more than £400,000 must now carry out a Climate and Environment Assessment (CEA).¹⁹ This template is used to identify risks and opportunities relating to the environment and climate change, which should then be used to inform the project's business plan.

However, while business plans are published online, CEAs are not, so there is no scrutiny of the process apart from that by DFID's own climate and environmental advisers. Greater transparency is needed to ensure that such assessments are more than a tick-box exercise and, instead, are used to ensure that all development investment is fully climate-smart, and geared for further climate change.

Climate proofing will not only identify potential threats, but should also identify solutions that are more resource efficient, adaptable to change and more economically sustainable in the long run.

ii) The community planners

There must be greater national planning in poorer countries for development, disaster risk reduction and humanitarian responses, with communities involved in identifying, developing and delivering appropriate solutions. Effective management of disaster risk reduction and climate response is important.

We can address the disproportionate impact of climate hazards on the poorest communities by ensuring that they are prepared for disasters, and have systems in place to tackle them. This is a very effective approach and can be adapted for both rural and urban contexts.²⁰ It enables people to identify specific risks and vulnerabilities that affect them, and plan appropriate responses.

iii) The climate scientists

Most parts of the developing world, particularly Africa, have very limited meteorological capacity, with a very low level of climate data being recorded. Historic records are often tied up in hard copy reports in dispersed climate stations, which need to be recovered for analysis. The lack of data makes climate prediction and responses extremely difficult for many vulnerable communities. Investment in climate science capacity is essential to ensure development is responsive to the changing climate. Climate scientists need to work closely with other public advisory services, such as agriculture and urban planning departments.

iv) The private enterprises

The private sector, including huge multinationals, smaller national companies and local small and medium enterprises, will play a significant role in delivering a climate-resilient future. This will require companies to shift the emphasis of their objectives from short-term economic gain to the long-term sustainability of the business, and to investments that make sense in the context of a changing climate. There is also urgent need for robust regulation of business by governments, to ensure that companies are accountable for their environmental impacts. This will require clear, transparent reporting from larger private sector companies, which tends to encourage positive environmental and social outcomes, drives good practice, and reduces negative impacts on people and the environment.

Seven cases in point

The case studies in this paper demonstrate a range of responses through which our partners are acting to reduce poverty and minimise future risks in the context of climate change.

The Philippines: prone to typhoons and urban flooding, the emphasis in the Philippines is on emergency relief, building preparedness using meteorological data collection and increasing community resilience.

Kenya: in the face of erratic rainfall and unpredictable seasons, mobile technology (text messaging) is being used to provide accurate weather forecasts to farmers.

Brazil: supporting access to land rights and preventing deforestation is mitigating the impact of climate change on indigenous and forest-dwelling people.

Bolivia: melting glaciers and water shortages are already causing migration. As a result, water conservation methods are essential.

Malawi: drought and higher temperatures are leading to the development of new farming techniques and water conservation.

Bangladesh: sea-level rise and water salinisation is forcing communities to cultivate alternative crops and livestock to survive.

El Salvador: erratic rainfall and extreme weather has led to the development of crucial early warning systems to aid preparedness, thus saving lives.



Above: In the aftermath of Typhoon Haiyan, a man picks his way through the debris with relief items provided by one of our partners.

The Philippines – ‘We refuse to accept’

The Philippines has long been battered by tropical storms but was the subject of particular attention in late 2013 when Typhoon Haiyan struck, killing more than 6,000 people. It was the strongest storm to make landfall that has ever been recorded.²¹ The 24th typhoon to hit the Philippines that year, it came on the heels of Typhoon Bopha at the end of 2012, another Category 5 super typhoon. Although no single weather event can be attributed to climate change, scientists suggest that a warmer, moister climate enhances the likelihood of stronger cyclones. They also predict increasingly extreme weather events in future. Crucially, much of the damage caused by Typhoon Haiyan, and Hurricane Sandy on the eastern seaboard of the United States in 2011, was the result of greater tidal storm surges, caused by climate change-related sea-level rise since 1950.²²

In total, Haiyan affected more than 14 million people, displacing some 4 million, and destroying half a million homes. The city of Tacloban, with a population of more than 200,000, bore the brunt of the typhoon and was largely destroyed. Christian Aid staff on the ground confirmed the view of US Marine Brigadier General Paul Kennedy who said: ‘I don’t believe there is a single structure that is not destroyed or severely damaged in some

way – every single building, every single house.’ Along with typhoons, the Philippines is also prone to widespread flooding, particularly during the monsoon season.

Metro Manila is a sprawling network of 16 cities, inhabited by 20 million people. Snaking through it is the Marikina River, which swells significantly during heavy rain, breaking its banks and flooding the homes of the shack dwellers who come to the city in search of work and live along its banks – the only land available to them.

Buklod Tao, one of our partners through the Centre for Disaster Preparedness, works with people living along the river, alerting them to impending floods and helping them evacuate.

Manuel Abinales, known as Ka Noli, is founder and president of Buklod Tao. He says: ‘The rains are getting worse, it’s getting unpredictable.’

But using scientific weather data, communities are better able to forecast when the river will flood. He explains: ‘They have radars now and the webpage where I can get information about rainfall intensity, probability, and even flooding situations in some parts of the country and region... It will tell us the probability of rainfall for the next few hours so we can plan our activities. The website is a tool for us to

begin to monitor the river. We know if there is a lot of rain in the Antipolo mountains we can expect a lot of water here.'

Buklod Tao coordinates a group of volunteers who monitor the river, checking against water-level

'We refuse to accept that running away from storms, evacuating our families, suffering the devastation and misery, having to count our dead, become a way of life. We simply refuse to'

markers. One such monitor, a volunteer-turned-staff member, is Belen de Guzman who lives in Banaba, a community of 20,000 shack dwellers.

She describes how she alerted the community when the Ketsana floods hit in August 2012: 'The water level had risen to 18.5m, close to 19m or alert level 2. Rain was continuously pouring and water continued to rise. I grabbed the megaphone and alerted the community, sounded off the siren for evacuation and instructed my family to go to a safe and higher place.

It took me the whole day until the next morning checking the area up to the evacuation centre. I also counted how many people were in the evacuation centre already.'

Humanitarian aid to typhoon victims and emergency evacuations of urban flood victims is of course invaluable work. But it was the impact of Typhoon Haiyan on the global politics of climate change that might prove to be most significant in 2014 and beyond.

The UN climate summit in November 2013, hosted in Warsaw, Poland, opened the day after Typhoon Haiyan struck. Yeb Sano, head of the Filipino delegation, gave a tearful speech to delegates about the tragedy unfolding in his country and said he would fast for the two-week duration of the talks or until substantial progress was made towards a climate deal. He said: 'We can take drastic action now to ensure that we prevent a future where super typhoons are a way of life. Because we refuse, as a nation, to accept a future where super typhoons like Haiyan become a fact of life. We refuse to accept that running away from storms, evacuating our families, suffering the devastation and misery, having to count our dead, become a way of life. We simply refuse to.'

Below: In Banaba, in the Philippines, the community look at this stream gauge to monitor when the river is starting to rise above normal levels, alerting them to the possibility of flooding so that they know when to begin evacuation procedures. (Find out more about projects linking communities with climate scientists at christianaid.org.uk/bigriverrising)





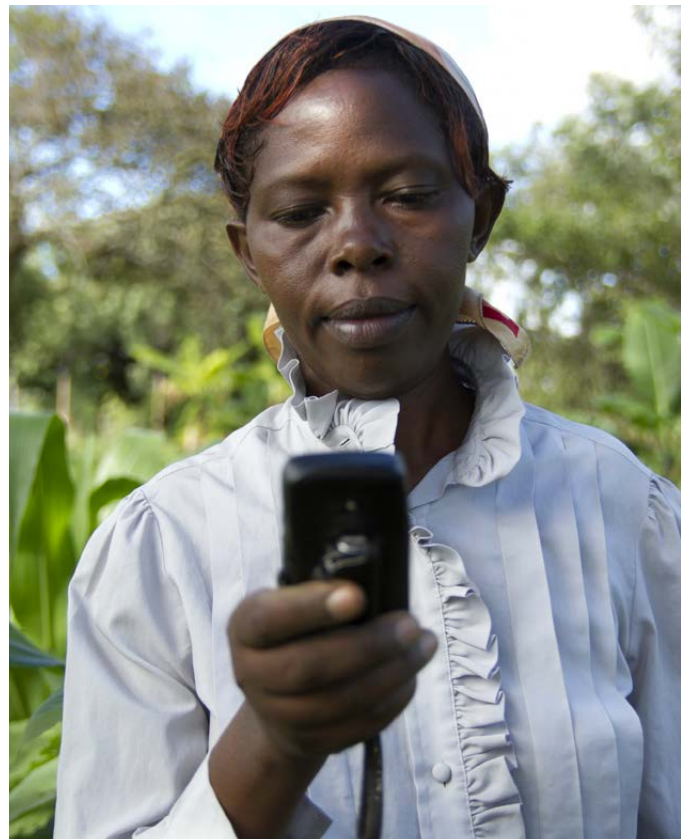
Above: This shepherd from Toricha, near Kenya's Ethiopian border, lost all of his livestock to drought.

Kenya – 'Information is power'

Because of climate change, Kenya's climate is starting to look chaotic, unpredictable and contradictory. Scientists think that there will be more rainfall overall, but research has also shown a link between a warming Indian Ocean and a rainfall decline in the main, long rainy season.²³ This means drought stress is likely to be on the increase in some parts of the country, as well as neighbouring parts of Somalia and Ethiopia.

In addition, average temperatures will continue to rise – Kenya has already experienced an increase of 1°C since 1960²⁴ and can expect another 1-2.8°C by 2060. Farmers say, and the data also suggests, that rainfall events are becoming increasingly intense, and projections show that rainfall lasting just one day will deliver 25mm more rain by 2090.²⁵ This means soil erosion when it rains, but desiccated soil and wilted crops during longer, hotter dry spells when it doesn't. Both spell danger for small-scale farmers relying on the next harvest of maize or sorghum, and for pastoralists whose cattle and goats rely on healthy pastures. The United Nations Environment Programme estimates that environmental vulnerability costs Kenya 40% of its GDP.²⁶

The disruption of historically less volatile seasons is particularly perilous for a country whose most vulnerable people live off the land. For farmers,



Above: Truphena Ireri has lived through years of painful food shortages. But SMS messages with accurate weather information enable her to farm more effectively.

knowing when to plant is crucial to getting a harvest good enough to feed their family. In the past, farmers used the signs of nature that heralded the coming rains, but these are no longer reliable.

Truphena Ireri is a mother of three who lives in the Mbeere district in eastern Kenya. She says: 'When there is poor judgement of the weather and we find ourselves in crisis – the crops have dried up because the weather was poorly judged or there was no information – it becomes very painful and frustrating for a mother or for a family, looking at the children looking at you and you've got nothing to offer to them.'

'We've learnt that there are a lot of changes in the climate. There isn't enough rain for us. It was there before; now it is getting hotter and drier than it used to be, with erratic rainfall. You cannot predict it.'

'The hope of tomorrow – today may be bad, but there is tomorrow to live, so that helps us to keep on struggling'

The seemingly unpredictable weather, which hampered harvests, meant that Truphena's family struggled to feed themselves and led to the death of their dairy cow, which didn't get enough to eat during the drought. This in turn had an impact on their farming, as they no longer had access to the manure for fertiliser. Projects such as the construction of a water-harvesting tank and the digging of a borehole had to be shelved as income from the farm dried up.

Fellow Mbeere farmer John Ngari has also experienced the fluctuating climate and seen the suffering it has caused. He says: 'There are extra hot, long periods of drought when the temperatures are very high and water becomes scarce. It is a struggle for the livestock too. Even the long rains have changed, the March-April-May rains have become shorter and the shorter rains have become longer. The rivers used to hold water throughout the year, but now the river beds are dry. To eke a living some people scoop sands from the river beds to sell it for building.'

As traditional methods of predicting the weather are becoming less dependable, our partner Christian Community Services Mount Kenya East (CCSMKE) has combined detailed scientific forecasting with mobile-phone technology, enabling farmers to make better-informed decisions about what and when to plant, boosting their crop yields.



Above: Rural farmers like John Ngari can receive weather information by text message because of local 'booster' telephone masts.

Jimmy Wetindi, part of our team based in Nairobi, explains that the few weather forecasts that farmers are normally able to pick up are ones for the major towns, which have completely different weather to the rural areas of Mbeere. 'We decided to get tailor-made information from the Kenyan Meteorological Department and then disperse this information to the farmers on the ground,' he says.

Recognising that mobile phones were the best way to share information, with approximately 80% of farmers in the area owning a basic handset, we worked with UK software company Frontline SMS to design a system that suited the needs of the project.

Known as the Sustainable Agricultural Livelihood Initiative (SALI), the scheme sees detailed meteorological data, supplied by the Kenyan Met Office, translated according to local dialect and sent to farmers as understandable abbreviated texts.

John Ngari says the benefits have been considerable: 'The SMS messages are helping with our planning. A message might say that reduced rainfall is predicted, so I delay planting in one area of maize and cowpeas.'

You are able to know which day you are going to hire labour or not. You can ask for daily forecasts. They tell you about the sun intervals and rain intervals and you can schedule your work on the *shamba* [farm]. The impact of this is that you now know what to do: the time you should start preparing the land, the type of seeds you should plant and the time to plant them. It's very useful; it's an empowerment to our farmers. Not many have TVs or radios for forecasts. Information is power.'

Samuel Mariuki from the Ministry of Agriculture's office in Mbeere South is delighted with the impact of the project. 'We're now able to disseminate it to over 3,000 farmers in a very short time and in a language they can understand,' he says. Farmers also have regular contact with SALI staff who teach them new farming techniques and give them advice about what varieties of crop to plant.

Faith Njiru, who lives off a four-acre plot in the village of Kageeri, says the text alerts have transformed her entire farming operation. 'Crucially, we've learnt about the weather and how the weather changes,' she says. 'We get an SMS message from SALI, so

we're able to plant early before the rains come, maybe two weeks before... We can plan, and decide whether we want to plant or not. If there is no rain forecast then we can plan how else we might get food. The SMS will affect when we have to weed, or spray insecticides. For others who are near a water source or irrigation then they might water their crops. The information we get is very reliable – and we trust and accept the information and act on it. I stop planting if that is what it advises, or get planting if it suggests this.'

Truphena Ireri has found the SALI project has empowered her and her community. 'Since we got involved in the project, we have been enlightened more on climate change and the ways to cope, such as water harvesting and the right seeds to plant. When we wake up we think about what we plant, when we should plant it, and how we plant.'

When asked what helps her persevere, she says: 'The hope of tomorrow – today may be bad, but there is tomorrow to live, so that helps us to keep on struggling.'

Below: Faith Njiru receives weekly and seasonal weather forecasts from the SALI project, allowing her to plan her planting and harvesting.



Brazil – ‘We have the knowledge’

Below: A quilombola fisherman sets out at dawn in the northern Amazon.



Known as the lungs of the world, Brazil’s Amazon rainforest is never long out of discussions about climate change. It is one of the planet’s largest carbon sinks, storing between 80 and 120 billion tonnes of carbon; so all activity there, be it forest destruction or protection, has a significant effect on climate around the world.

The destruction of forests worldwide is responsible for up to a fifth of the world’s greenhouse gas emissions, more than every car, truck, ship and train on the planet combined.²⁷ Before 1970, only 1% of the Amazon was deforested but between then and 2011, 18.2% of the forest (745,289km²) was destroyed – an area larger than France. But it’s not just those outside the Amazon that suffer the effects of climate change. The indigenous and other forest-dwelling communities that live here also feel the impact of a changed and less predictable climate.

In 2005, exceptional heat caused the worst drought in decades in the Amazon, leaving communities without water and food. Destruction by forest fires increased by 300% in the month of September that year, with rain only returning in October.

Months later, the Amazon experienced other climate extremes. Very intense rainfall at the beginning of 2006 caused a major flood that engulfed the homes of thousands on the Amazon riverside. Older residents said that they had never seen such a great drought followed by a ‘deluge’.²⁸

Erratic and extreme weather is increasingly evident to those who rely on predictable seasons. Carlos Printes is one of the quilombolas, descendants of slaves brought to Brazil from Africa who escaped and hid in the depths of the rainforest, who practise sustainable subsistence agriculture that does not destroy the Amazon. He lives in the quilombola territory of Alto Trombetas. ‘In the past people could read nature’s

signs and then knew when it was going to rain, when it would be sunny, what the water levels would be. People knew what the weather would be so they had some control,’ he says. Now things happen with no warning, people can’t read the weather anymore, they’re lost. It’s all very confusing. Now, when people go to hunt or collect fruit they have to go further and further afield.’

Another group of people who live off the land in Brazil are the indigenous Guarani people. An elder from a Guarani group in Brazil’s eastern Mata Atlantica forest, known only as Pedro, recognises that the developed western world is to blame for much of the climate problem: ‘I know about worldly climate cycles, I have been taught this from generations before me,’ he says. ‘In the Guarani we have two cycles, autumn and winter. During autumn we gather animals and hunt, and God is very present. Winter is the time for the renovation of nature, when we start planting and we know we cannot hunt.

‘As the effects of climate change increase, we can no longer clearly identify and define cycles. Why doesn’t the white man understand climate change when you can see it is clearly destroying and changing the world? When there is a flood in a city, people do not take responsibility for their action, white people blame other people but never themselves. Everything that is part of nature needs each other – water, fire and land all need each other. Concrete destroys land and therefore land is unable to reach water and is ruined.’

Another Guarani from the same area, Osmar Tupa Mirim, says verbal tradition is how understanding of the seasons is passed down from generation to generation. ‘We Guarani people have the knowledge of climate change but not the materials to put it down on paper,’ he says. ‘We hope that in the future with the help of [Christian Aid partner] CPI that food will return and families will be able to feed their children, with more land to guarantee the growth of vegetables.’

Although the people here suffering from climate change did nothing to cause it, they are actively involved in tackling the problem through their stewardship of the ancient forests and their fight for land rights. Inequality of land ownership is a huge issue in Brazil, because of the legacy left by its colonial past, in which both people and environment were heavily exploited.

Indigenous people and quilombolas live in the forest without damaging it, practising techniques such as plot rotation so that they do not cause deforestation. Studies have shown that where collective land titles are held by indigenous or quilombola communities, deforestation stands at about 1%, as opposed to 20% in the rest of the Amazon. Yet the majority of



Above: Raimundo Printes do Carmo brings his village together to make collective decisions on how they use the land. Quilombola communities like his are experts at living sustainably in the forest.

communities do not hold these titles, and where they do, mining and timber corporations, dam-building projects and a general lack of power continue to threaten forest-living communities and their ability to protect their environment.

Our partner CPI helps disenfranchised communities to acquire land rights. Quilombola community leader Domingos Printes, also from the territory of Alto Trombetas, says that when they acted together they could successfully fend off loggers. 'A timber company came and tried to make deals with all of the quilombola communities whose lands had been titled,' he explains. 'They promised money for the families but we turned them down. We do need money, but this isn't the way to get it. Logging is not the solution for us or for the forest.'

He adds: 'It was because we held the collective title to our lands that we were able to say no and stop the timber company coming here and cutting down our trees. It enables us to protect the forest. We are very happy that we do not have logging today. We know that once we've got the land title the problems continue – the loggers, the miners, the dam construction projects. But the land title enables us to have a stronger defence against these things.'

Elected village coordinator Raimundo Printes do Carmo explains: 'We only cultivate an area for four or five years and then we leave it so that the forest

can grow back. After leaving it for five years or so, the trees have already grown way up high above your head again. After having rested the land, you can start again and cultivate that patch again. We understand the forest. When we walk through it, we know what all the plants and trees are, and what their uses are.'

'The destruction of forests worldwide is responsible for up to a fifth of the world's greenhouse gas emissions, more than every car, truck, ship and train on the planet combined'

These forest-dwelling people have a crucial role to play in the battle against climate change and the destruction of the Earth's Amazonian respiratory system. The work of CPI shows how international development will increasingly have to be inextricably linked with climate change mitigation, unless action is taken at a global level to reduce greenhouse gas emissions.



Above: Alivio Aruquipa with his peach tree. Warmer weather in this part of Bolivia means a lack of water for his crops, new pests, and more diseases for the animals.

Bolivia – ‘There are conflicts over water’

Bolivians used to boast that the ski slope Chacaltaya was the highest in the world. Now there is no longer any snow to ski on.

Since the 1970s, the glaciers of the tropical Andes have reduced by 30 to 50%.²⁹ For the millions of people who rely on the glaciers as their main source of drinking water, this is a worrying trend.

In the Bolivian city of La Paz and its suburb El Alto, more than 2 million people get a third of their drinking water from glaciers, and those glaciers have shrunk by more than a third since the 1960s.³⁰

Glaciers and ice sheets store about 75% of the world’s fresh water. Glaciers play a crucial role in slowly releasing it. Once the flow from glaciers becomes irregular, so does water availability.

The indigenous communities of the Andes in Bolivia depend on glaciers for drinking water, sanitation and growing their food. Glacial retreat and the decreasing availability of water sources is the most immediate threat to these communities in the Andean region. Access to land is not a problem: communities on the slopes beneath the Illimani glacier have land to farm, but not enough water to grow the crops they need to feed and sustain their families.

‘We are the ones who feel the impact of climate change, we’re the ones who are suffering,’ says Alivio Aruquipa, who has seen first-hand how conditions on the glacier are changing.

‘I was born here. I went away for a number of years because we have problems with droughts, and with landslides when the waters do come. We don’t have enough water to grow our crops. There are conflicts over water between the different communities because we all need water and there isn’t enough for everyone. These past three years we have suffered a lot with the lack of water. People feel that they have to leave the country, or leave their homes to look for work and find a way of feeding their families.’

Erratic rainfall and snow melts means Alivio faces the perverse problem of both too little and too much water. ‘When the snows melt and the water does come, it spills out of the channels and washes away bridges, but even then it’s hard to get the water to the places we need it for our crops. Some years it rains a lot here; this year it rained a lot and the water destroyed a lot of bridges. The rain can be destructive but the droughts are worse.’

Higher temperatures have caused the glacier to melt causing landslides, but that is not the only problem.

Alivio says: ‘Climate change is a reality here. We can see the impacts everywhere. There are new insects on our crops because of higher temperatures here. We can’t produce now without spraying the crops. There are new crops we can grow here now – potatoes, peas, cocoa, peach; before we could never grow those. But the insects that come with the higher temperatures eat the crops. If we don’t use insecticide we don’t get a harvest. It’s expensive: sometimes we work hard to grow a crop and we only earn enough to pay for the insecticide.’

'There are new illnesses in the animals. In the cows, we have to give them a dose of vaccine every 40 days. Otherwise the animal gets thin. We are forced to buy these things and a lot of them are expensive, they are imported from overseas, so we might have to sell an animal to pay for the medicines for the rest of them.'

With life now so hard, conflict over water is rife and migration is common, with many people forced to leave their homes. Carmen Quispe Demarca is a mother of four and one of the few that remain. She says: 'Lots of people have left the community. There's no one left, just us, we just have our houses, our plots of land. But that's why my children have gone, we don't have water here. There's no way even to make a living, so people have left and gone far away. That's why they have gone and I live here by myself. You suffer when you live alone.'

Alivio has witnessed the departure of many of his community's young people: 'There are 60 families in this community, around 50% have gone. This year, five more families have left. There was nothing left for them. Often people never come back, people move to the Yungas region if they can, or to the city where they do manual labour, and the young people go to Argentina or Brazil and they never come back.'

A lifeline for those that remain has come from our partner Agua Sustentable, which helped to build a reservoir serving up to 40 families.

Field technician Alan Zagredo explains: 'We've seen the amount of water reaching these communities reducing in recent years, so we saw the need to build infrastructure that could help them adapt to climate change. The community themselves helped to build the reservoir, they did all the labour, they dug the hole, the design and everything. They felt happy and grateful because it was what they needed.'

As well as helping to create practical solutions such as the reservoir, Agua Sustentable also undertakes a variety of scientific and social studies to assist in government programmes supporting vulnerable communities. It studies the glacier in order to project the speed of melting and predict future water availability. It also investigates new farming techniques and crop types to help improve local adaptation strategies.

Martin Vilela of Agua Sustentable says: 'The evidence of climate change is more concrete all the time. Not only by simple observation – we can see the glaciers or the changes in weather patterns, there is increasing instability in weather patterns. But there is also scientific evidence that shows with increasing coherence and certainty that climate change is a reality.'

But he is clear that short-term adaptation is only a temporary fix and that the long-term solution will only be found when the global community addresses root causes of climate change, and takes decisive steps to reduce emissions.

'The evidence of climate change is more concrete all the time. Not only by simple observation – there is also scientific evidence which shows with increasing coherence and certainty that climate change is a reality'

'We can't constantly be adapting,' he says. 'I think it's important that the communities find immediate responses to the changes, but we can't forget that this is a structural problem... So another key area of our work is to show to the global community the reality of the communities... so they can realise that climate change is real and start to take action to find concrete responses at a global level.'

If this is not achieved, many indigenous peoples' way of life will be destroyed permanently. This is something of which Alivio Aruquipa is painfully aware: 'When you leave the home you grew up in it's really sad. We will lose all our culture if people move away. There aren't many of us left.'



Above: Magalita Mafuta can sometimes only produce enough maize for six months from her main harvest, but a new irrigation system gives her an extra harvest during the dry season.

Malawi – ‘It’s an asset that will stay’

Of all African countries facing the impact of climate change, few are as vulnerable as Malawi. Weather extremes such as erratic rainfall, floods and droughts are common and dangerous to a population of which 85% live in rural areas. More than 1 million Malawian people currently depend on food aid.

‘There are so many problems here. So many that I could not list them all here for you, but I will mention a few among many. There is a lack of income, there is a lot of hunger’

Increased temperatures are a major problem and the disruption of historically predictable and reliable seasons is one of the most perilous effects of climate change. The latest climate science shows that annual precipitation is projected to decline across southern Africa.³¹ Climate models also suggest the strong likelihood of more drought in the region by the middle of the century,³² while in Malawi itself projections show seasons becoming more extreme with decreases in dry season rainfall and increases in wet season rainfall.³³

In most parts of rural Mwanza, a region in the south of Malawi, there are two types of household: poor and ultra-poor. In the rural communities of Mwanza

there is no running water, no electricity, no sewage disposal and houses are made with mud bricks and straw roofs. It is a part of the country where climate change is hardest felt.

Magalita Mafuta is a single mother who tries to support her three children by growing enough maize from her small farm. She says: ‘We know what climate change is here. We can feel it. We feel the rise in temperature. It is hotter than before. Mostly the temperature rises but now, at times, the rains don’t come when we need them to. Then it doesn’t dissolve the fertiliser we have put on the plants and it doesn’t get down to the roots and the crop doesn’t grow.’

‘2011 was a very bad harvest, the only rain was at the start of the season. At the end, when the crops needed more water, there was no rain. I had just six bags of maize for the whole year. Six bags will last me just seven months if I use it just for food, and that’s without selling any for money to buy other things we need.’

She has to supplement her crop by doing physical labour and sometimes has to reduce her family’s diet to one meal a day. She says: ‘Once I have eaten the food I got from the harvest I sometimes run out with six months left before the next harvest. Most years we could make it through, but we always have to reduce the number of meals we eat. We eat just one meal a day during the hunger months.’

Fellow farmer Lazaro Kagula concurs: ‘Dry spells are the major problem here, it really affects our crop. You estimate that you can grow a certain amount

in a certain area, but when a dry spell comes it really ruins us. This is new, it hasn't always been a problem.'

Our partner the Evangelical Association of Malawi (EAM) has helped farmers boost crop yields and increase their chances of survival by helping them create water irrigation systems and water pumps, among other initiatives.

EAM, a network of 40 evangelical churches, uses funding given to Christian Aid by the UK Government to provide targeted support for the most vulnerable families. The communities themselves select the people most in need of help, usually single parent families or families led by the older children when both the parents have died.

In the village of Kululuma, a gravity-fed irrigation system was built in 2012 with community-made bricks, which siphons enough water from a river to feed 63 plots of land. Village headman Enock Chedea, known as Chief Kululuma, explains: 'We have seen that there is climate change here. We're seeing the temperature rise. It is difficult compared to what we had before.'

Below: Chief Kululuma's role involves being a bridge between NGOs and his community, to ensure that struggling families can be supported.



'There are so many problems here. So many that I could not list them all here for you, but I will mention a few among many. There is a lack of income, there is a lot of hunger.'

'EAM came along when we were already trying to find a way to carry out an irrigation project like our friends on the other side of the river. We wanted to know how they did it.'

'The main risk for us to be able to cover our needs during the year is the seasonal changes to the weather. The planting rains in October don't always arrive anymore. It might be that the rains don't come until December. The irrigation scheme means at least people have other crops.'

'The difference for the families taking part is that they are better fed, and then more able to farm in the dry season. There is a permanent river. Normally during the wet period we close up the irrigation system and just use rainwater for our crops. But we can open it again if we are having dry spells.'

Magalita Mafuta says building the irrigation system was painstaking work, but all the village contributed: 'We started to excavate the canal from the weir. When the earth canal didn't work we needed to make a better structure, and EAM came with pipes. We would work every morning from very early until 10am. It took us two months to do it.'

The year the irrigation system was built was a particularly bad harvest. Magalita says: 'That was the same year we had the irrigation system for the first time. By the grace of God it came just when we needed it. It came when we most needed hope. This year I managed to grow one bag of maize, and two buckets of beans. This season is April to September. This year we had some difficulties with some bugs and we need pesticides. But I hope to be able to produce more than this. I managed to sell some beans and bought some fertiliser and I kept some beans to eat for food. All 63 families have the same size plot of land. The irrigation system is a big investment that will help and support in the future. It's an asset that will stay.'

Extra crops can be sold to pay for schooling for children or reinforcements for people's home. Lazaro Kagula was able to sell a bag of maize from his irrigated land to buy iron sheets for his roof, which keeps his family dry and prevents the need for repair.

He says: 'It's because of EAM that you can see all these green fields. Everything growing here is because of them. This water means so much to us. It means we can grow where before there was just dust, and we can help support our family and our children.'

Bangladesh – ‘Climate-change refugees’

Some of the most vulnerable victims of climate change in the world are the poor of Bangladesh.



Above: Selina Begum has had training from our partner Shushilan in human rights, gender equality and leadership as well as vegetable gardening and veterinary practice. The skills she learned helped to save lives in the aftermath of Cyclone Aila.

‘In the past, farming used to be a good living. People had goats, cows, rice and fruit trees to feed their families. Now, because of climate change, this is not possible’

As warmer global temperatures melt ice caps and glaciers, sea-level rise is one of the clearest impacts of climate change, resulting in more water flowing into the oceans. Bangladesh is one of the countries most vulnerable to this phenomenon, as about a third of its land is coastal zone, inhabited by 35.1 million people. For these Bangladeshis, sea levels are not simply a statistic but can be a matter of life and death.

Silt deposits from both the Ganges and the Brahmaputra rivers deliver about 1.6 billion tonnes of sediment every year, which is naturally compacted. Although subsistence in the east means there is a difference in sea level rise between east and west, the overall increase in the sea level is considered the result of climate change.³⁴

Even as far as 100km inland, groundwater has become salinised because of the sea level rise. The saltwater boundary has also moved, which has contributed to the destruction of agricultural land.³⁵

The higher sea levels result in greater damage from tropical storm surges, such as that of Cyclone Aila in 2009, which battered Bangladesh and India, leaving 1 million people displaced.

Selina Begum has had to adapt her livelihood because of the impact of climate change. She says: ‘Climate change is causing many changes. Previously I used to cultivate rice, now this is becoming really difficult. People are beginning to cultivate fish because water in this area is becoming so salty. It is too expensive to cultivate rice like we used to. Climate change is affecting this. Sometimes the water is so salty that even the fish are dying. This salty water is harmful to our environment and to the rice fields.’

Fisherman Mofazzal Kagzi provided for his family by tending a small pond of fish, which was ruined by the cyclone in 2009. He explains: ‘Aila destroyed everything, the fish swam away, we were really suffering.

‘In the past, farming used to be a good living. People had goats, cows, rice and fruit trees to feed their families. Now, because of climate change, this is not possible.’

As rice farming and other agriculture has become uneconomic, people have been forced to find alternative, less desirable sources of income. Shrimp farming has increased from 1,330 hectares in 1975 to 115,900 hectares in 2004. The spread of unregulated shrimp farming, compounded by sea-level rise, has affected the salinisation boundary. This has been implicated in the loss of mangrove forests, which act as a crucial buffer to cyclones and storm surges emanating from the Bay of Bengal.

In order to survive in this changing environment people have turned to simple, yet innovative, techniques to make a living.

Shakti Kirtoniya was given training by our partner the Christian Commission for Development in Bangladesh (CCBD) in cultivating a floating garden. Made of bamboo and hyacinth, this is where he can grow chillies, cabbages and okra to eat and sell. Floating gardens are essential during the rainy season when much of the land is completely submerged. Shakti explains: 'I have seen changes like salination-increase in the water. This salty water destroys our crops. It means we can't grow so much and some crops are really affected, like turmeric. Salinated water also can't hold the beds, it makes the beds sink. The sweet water holds the hyacinth better. I worry that, in the future, increased salination will kill the floating gardens.'

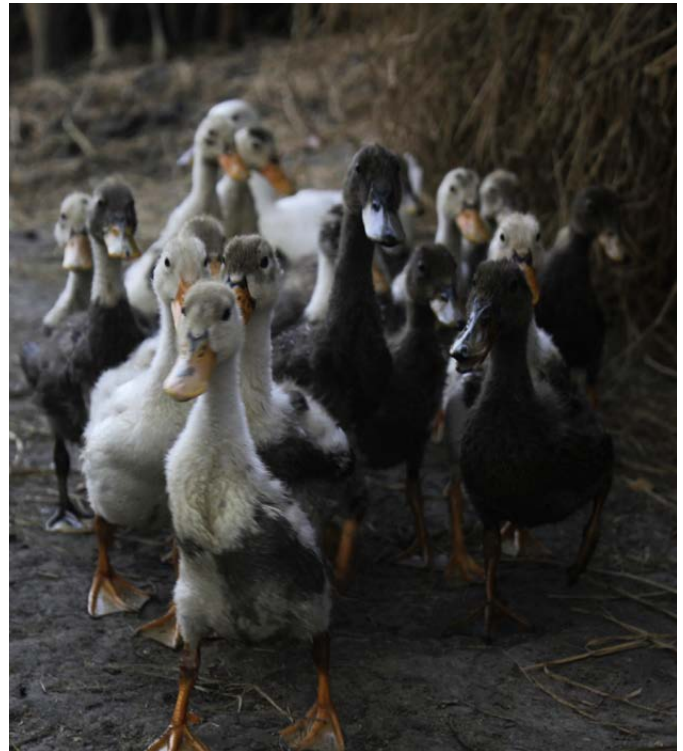
'We do this because of water logging. In the summer and in the rainy season we have lots of water in this area which causes water logging. Year by year the flooding is changing and increasing. When the cyclone came everything was destroyed.'

The salinisation of the water also has an impact on local duck farmers, whose local breeds often become ill and unproductive. CCBD provides people with a particular breed of duck, the Campbell, developed in England in the 19th century, which are more resistant to saline water and produce more eggs. One such farmer, Roban Biswas from Mitradanga village in Gopalganj district, says: 'Before CCDB's support I reared local ducks, but they do not lay many eggs. Local ducks are getting diseases because of the salty water, and they die. They are not resilient to this. But now I have received training, and a different breed of duck. It is a Campbell duck, they lay more eggs and they have been vaccinated so they are less affected.'

Our partner Shushilan has also worked to promote the role of women in patriarchal communities. As women make up a disproportionate share of the Bangladeshi poor, they are often more vulnerable to the effects of climate change – often more calorie deficient than men, they don't recover as quickly from illnesses exacerbated by floods.

Such is the impact of climate change in rural areas of Bangladesh that migration is rife and many people have moved to cities, putting pressure on urban communities.

Selina Begum explains: 'Before Cyclone Aila and Cyclone Sidr, nobody in this village had heard of climate change, or knew how to cope. After Aila we formed a committee with Shushilan. The committee is called "Shusamaj" which means "Good society". We tell people about climate change and how to prepare for it.'



Above: Campbell ducks are more resilient to the saline environment than the local ducks in Gopalganj district of Bangladesh. Our partner CCBD trains farmers in how to rear them.

'We have seen people move away from the community. Many people migrate because it is becoming a difficult place to live. These are the 'floating people' who move to Dhaka and other areas. They are climate-change refugees. I don't want to be like this.'

According to the World Bank, a further 10cm rise in sea level in Bangladesh, which at current rates can be expected in 25 years, will result in an inundation of 15% of the Sundarbans mangrove forest, a vital storm surge buffer, and a loss of 2,500km² of land. A 25cm rise will take 60 years and will inundate 40% of the Sundarbans, putting 6,300km² under sea level. An 88cm rise will inundate the coastal zone completely.³⁶

Despite the challenges, Selina has become a community organiser and was given veterinary training by Shushilan as well as saline-resistant rice seeds, which she plans to use to raise enough money to establish a veterinary clinic.

'I will always stay here and will adapt to changes. This is my own land, this is my locality, I don't want to move from my home.'

El Salvador – ‘We are invisible to others’

‘It is estimated that Central America produces less than 0.5% of global carbon emissions, but it is one of the most vulnerable regions to climate change-related impacts on the planet.’ So says the World Bank on the impacts of climate change in El Salvador.³⁷

For the countries of Central America, climate change makes its presence felt in multiple ways through sea-level rise, extreme weather, increased temperatures and altered rainfall.

The 2013 Global Climate Risk Index, created by NGO Germanwatch, assessed which countries had suffered the most loss from extreme weather-related events such as storms, floods and droughts in the period 1992-2011.³⁸ Central America topped the list with Honduras at number one and Nicaragua at number three. The same study also ranked the impact of climate change on countries during 2011 alone: El Salvador came fourth.

The smallest Central American country, El Salvador has been afflicted with earthquakes, civil war and gang violence, so climate change compounds the country’s already acute poverty. Mauricio Cruz is the leader of one of the local ADESCOs, a group of 10 communities who work together in the event of an emergency.

‘Climate change at the global level exists,’ he says. ‘Maybe people [in the developed world] don’t believe it because you have everything you need – a guarantee that you’ll have everything. But when you’re poor, you see it happening. Poor people experience it more. We are already used to living with a high level of vulnerability, but that vulnerability is increasing.’

He adds: ‘The changes in climate started happening about seven or eight years ago. Sometimes the same amount of rain will fall in one day that used to fall in three to four months. The problem is the rainy season – there are so many days without rain but then you will get three to four months in one day. We used to cultivate during the rainy season, but now you can’t grow at this time of the year because of the risk of floods. Because of climate change we need to find ways of adapting. We need to find new strategies – especially for maize.’

Mangrove forests are a crucial buffer against rising seas and storm surges, as well as vital breeding grounds for fish. But mangroves have been under threat. Mauricio places the blame for climate change at the door of the rich industrialised nations: ‘We have forested areas, like mangroves, and we are looking for ways to conserve and reforest them, as they’re like a nursery for seafood. These forests give us life, and help us confront climate change.’

Below: Mauricio Cruz stands in front of his village’s emergency shelter, built with Christian Aid funds. As a community leader, he is responsible for the safety of hundreds of people when floods hit.





Above: Due to the extreme flooding in 2011, the banks of these shrimp ‘tanks’ were destroyed and the water flowed out. This community lost their entire shrimp harvest.

‘Big countries are responsible for climate change, more than countries like El Salvador. I know that it is impossible for us to do anything here if countries that are responsible for emissions don’t do anything. They need to change their way of life, but we’re trying too, because we understand the impact of climate change.’

The changing climate has had a particularly severe impact on local shrimp farmers. Maria Martinez, one such farmer, explains why: ‘The dry seasons aren’t like they were before. They are longer, and the larvae die during these dry seasons. Then we get the rainy season, and during the floods the shrimp tanks can get very damaged and we have to build them again. The water level is just below the surface of the soil, so we are flooded often. When it rains a lot, the children are affected, it becomes impossible to go to school as the road becomes impassable.’

‘Climate change is increasing because rich people are using our communities like garbage. As poor people, we don’t have a voice – we are invisible to others.’

But it’s not only irregular rainfall and drought that are causing problems in the country. El Salvadorians have seen the number of extreme weather events increase over the past five decades. In the 1960s, 70s and 80s, only one extreme storm struck in each decade, according to data released by El Salvador’s

Ministry of the Environment and Natural Resources (MARN). But in the 1990s there were four, including 1998’s Hurricane Mitch, which killed thousands of people across Central America. There were eight between 2005 and 2010 and in this decade so far, there has already been one: a massive tropical depression in 2011 that killed 196. Called 12E, it lasted 10 days and saw between 762mm and 1,513mm of rain, depending on where in the country it was measured. The higher figure is roughly equivalent to the country’s average annual rainfall in the 1970s, 80s and 90s.³⁹

‘Maybe people [in the developed world] don’t believe it because you have everything you need – a guarantee that you’ll have everything. But when you’re poor, you see it happening’

Our partner Acudesbal helps communities to develop early warning systems ahead of weather events and advises on more effective agricultural techniques.

Farmer Concepción Martínez is one of the community leaders working with Acudesbal.

He says: 'Acudesbal are part of this community, we belong to them. We are not just about the practical work but advocacy too. The biggest impact of the work is the way they have raised our awareness of issues like climate change and how to adapt to it. The early warning systems we now use have helped us greatly, they've saved lives, and we've been able to prevent disasters. We know how to plant new crops like malanga, or new rice varieties that are resistant to floods or drought. The construction of our drainage systems has also had a high impact, and there is usually less flooding.'

Procares, another of our partners, also helps those suffering from extreme weather to rebuild their lives by providing livelihood support. Maria Martinez explains: 'After Hurricane Mitch, Procares supported this community. They are more than a support, they accompany us. When we started here we had nothing, and we didn't know what to do. Then Procares started helping us with their ideas. They didn't just help in a practical way, but also building us as a community. We asked Procares for initial support with the shrimp tanks, and they helped us with the design, the budget and the proposal.'

Conclusion

These seven case studies, picked from countless stories that could have been told, demonstrate that the effects of climate change are not uniform. Communities in each context face complex issues interwoven with local culture and traditional lifestyles. But this only makes it all the more striking that common themes stand out from these stories that span the globe.

It is clear that water is at the heart of many climate-related struggles. Higher volumes of water in a more concentrated time frame, and lack of water at other times disrupt familiar patterns for planting and harvesting, and make many crops difficult – if not impossible – to grow. Salty water and storms and floodwater further add to the disaster and disruption that ultimately drives communities apart and costs lives.

There is no doubt that climate change is significantly hampering development work, compounding the many struggles faced by people already fighting to free themselves from poverty's grip.

These are the voices of long-suffering experience. Governments and policy makers must listen to their adamant insistence that adaptation is not enough. It is the equivalent of life-saving first aid, necessary to treat immediate symptoms but not touching the root cause. As documented in these case studies, those on the front line facing the impacts of climate change are unanimous with the climate science experts: the world must act decisively and urgently to reduce emissions, manage resources and protect the vulnerable. In this way, and only this way, will we have the chance for a future that is sustainable and fair for the poorest people in the world.

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