

CHAPTER 4



Climate change – the early warning

Climate change is offering us the ultimate early warning. There is a vast amount of scientific evidence uniting experts the world over, which points to a highly changeable climate for the coming decades and beyond. True, there are uncertainties attached to these predictions, but it is very likely that extreme weather events – floods, droughts and storms – will become both more frequent and more severe. They may occur in areas where they were previously either unknown or extremely rare. Sea levels will rise as ice caps melt. These, and perhaps other unknown changes in the world's climate, will increase the risk of climate-related disasters.

We know more about this impending 'disaster' than any other in history. It potentially threatens more lives and livelihoods than any other disaster the world has faced. But are we acting on this early warning? So far, the risk posed by climate change has been addressed on a piecemeal basis. Some countries and communities are well on the way to protecting themselves; others, though often aware of the danger, have no means to act.

The latter are mostly the poorest countries and communities around the world, and they are already struggling with the effects of climate in their day-to-day lives. In sub-Saharan Africa, for example, a large proportion of the population is dependent upon small-scale rain-fed agriculture and is therefore highly vulnerable to drought. People's homes are generally not built to withstand extreme weather, and they are unable to take out insurance to protect themselves financially. Yet paradoxically, they are the people least responsible for climate change, which is almost entirely due to fossil fuel use in developed countries.

The threat of disaster resulting from climate change is twofold. First, individual extreme events will devastate vulnerable communities in their path. If population growth is factored in, many more people may be at significant risk. Together, these events add up to potentially the most significant threat to human progress that the world has seen. Second, climate change will compound the already complex problems of poor countries, and could contribute to a downward development spiral for millions of people, even greater than has already been experienced.

According to the United Nations Development Programme (UNDP) in its *Human Development Report 2007/2008*: "As the incremental risks created by climate change intensify over time, they will interact with existing structures of disadvantage. Prospects for sustained human development in the years and decades after the 2015 target date for the MDGs [Millennium Development Goals] are directly threatened" (UNDP, 2007).

Photo opposite page:
A resident collects
rainwater from a dried-
up reservoir on the
outskirts of Yingtan
in Jiangxi province,
central China.

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Action is needed on two levels. Effective early warning systems (EWS) can reduce the impact of individual extreme events, and such systems need to be in place. But more important is action to reduce vulnerability over the longer term, so that communities are able to cope with climate variability and extremes, and unpredictability, and continue to prosper in spite of them. That unpredictability is perhaps the most immediate challenge that climate change brings – and already people are struggling to cope with weather patterns they no longer recognize. “It’s cold when it should be warm and warm when it should be cold,” said a fisherman in Tonga (see Box 4.1).

Box 4.1 Talking change: the interface between science and experience

Community members on the remote Pacific island atoll of Ha’apai in Tonga had never heard of the term ‘climate change’ before. But it turns out they knew more about it than they could ever imagine. “The initial introduction to climate change can be challenging to present and I have to change the message according to what people can understand,” says Peti Viokoso of the Tonga Red Cross Society. “I have to make sure we get to the point where we are speaking the same language, but once people begin to talk about the changes they have noticed to their surrounding environments, they don’t stop giving examples.” Talking about climate change when presenting the Red Cross’s disaster preparedness and first-aid programme means that people can begin to understand one of the factors that is influencing their lives.

Fishermen use traditional knowledge about the seas, taught to them by their fathers and passed to their fathers by their fathers’ father. But things are all wrong these days, they say; the fish are confused and not breeding when

they would usually breed. It becomes difficult to know when is the right time to fish for different types of fish because they are no longer behaving as they used to. “People in the communities very much rely on resources that are vulnerable to changes caused by climate change,” explains Veikoso. “For example, in the outer islands, people are dependent on the sea’s resources as their main source of income. However, changes in weather patterns cause disruptions to these and this causes more vulnerability.”

Using tools such as seasonal calendars and historical timelines also resulted in further stories and more discussion about climate change. Local communities noticed changes in flowering and fruiting times of plants. They told the Tonga Red Cross about them – and began to realize that some of the changes could be caused by global warming. These sorts of anecdotes can be fed into the development of national adaptation plans for dealing with climate change to ensure that they are based on the needs and concerns of communities. ■

Mainstreaming climate risk management is the main early action that is needed. In fact, people already practise climate risk management in the broad sense. Farmers use weather forecasts or traditional methods to predict when the rains will come, and use this information when making climate-sensitive decisions such as when to sow and when to apply fertilizer. If possible, people site their homes away from flood plains. In other words, people try to minimize the risks the climate poses to them. But the

term ‘climate risk management’ has also been used more recently to mean a more systematic approach to incorporating climate into decision-making. As climate change begins to make its presence felt, such an approach can help people and organizations at all levels to cope better with climate and its uncertainties.

Climate risk management has emerged in direct response to the threat of future climate change, yet it is firmly rooted in the present. The rationale behind climate risk management is improved management of climate risk *today*, as a way of preparing to manage future risks. Those future risks may be largely unknown, but by learning to incorporate climate risk into decision-making now, we are paving the way for development to continue and people to prosper, whatever the climate brings tomorrow. Climate risk management is essentially early action for climate change.

However, there is still a need for greater coordination between two communities, the newer one of climate change adaptation and the older one of disaster risk reduction:

“Although the relationship between disaster risk reduction and climate change adaptation is increasingly recognized by researchers, policy makers and practitioners within both communities, the two communities have yet to develop coordinated efforts towards reducing climate change risks and vulnerability, which includes increasing the capacity to cope with and adapt to rapid changes, complex emergencies, and considerable uncertainty about the future. Thus far, many of the discussions taking place on adaptation to climate change are not well-informed by disaster risk reduction strategies, tools, frameworks and experiences.

“At the same time, the disaster risk community has not fully incorporated climate change dimensions and information on climate impacts into its work. The risk of more complex, frequent, intense or unpredictable extreme weather events associated with global temperature increases, changing precipitation patterns and sea-level rise, coupled with both gradual and non-linear changes to ecosystems and natural resources, suggests the need for a renewed focus on the ways that disaster risk reduction and adaptation can influence the context in which climate change occurs.”

(O’Brien et al., 2008)

Adaptation entered into the United Nations Framework Convention on Climate Change (UNFCCC) agenda in 2007 when an action plan was adopted at the Bali (Indonesia) climate change conference. At the 2008 climate change conference, held in Poznan, Poland, adaptation was strongly addressed and the humanitarian agencies of the Inter-Agency Standing Committee (IASC) were much in evidence stressing the

humanitarian impacts of climate change and the importance of adaptation actions chiefly around disaster risk reduction. The strengthened cooperation of the IASC agencies was manifest in meetings with climate negotiators to raise awareness of risk management and risk reduction as key components of adaptation actions. IASC agencies not only agreed on the priorities, they also submitted a paper to the UNFCCC's ad hoc working group to promote concerted action around four key recommendations (IASC, 2008):

- Recognize the necessity and relevance of disaster risk reduction strategies and risk management mechanisms as a first line of defence against the impacts of climate change. Such strategies and mechanisms are particularly relevant in the immediate term, while capacity to address longer-term adaptation strategies and programmes is being developed.
- Build upon existing strategies and mechanisms for disaster risk reduction and risk management. Ensure that UNFCCC institutional enabling environments and regional supporting mechanisms for knowledge-sharing, capacity-building and technology support, build on existing mechanisms, tools and capacities for disaster risk reduction.
- Take account of, and manage, the humanitarian consequences of climate change and protect human security, through the systematic reduction of disaster risks. This must include not only prioritizing social and economic development, but also strengthening emergency preparedness, response and recovery mechanisms at all levels.
- Ensure that substantial and additional human and financial resources are available for disaster risk reduction and risk management. Ensure that the criteria for funding are consistent with the priorities of the Hyogo Framework for Action.

Climate change and disasters: facts and predictions

What do we know about the future climate? Normally, we base our expectations for the future on what has happened before, but with climate change in the picture we can no longer simply extrapolate from the past. Instead, we can take what we know about the past and combine it with the best that science can offer to try and predict the likely future.

There is no doubt that climate change is already with us. Because of the greenhouse gases we have released into the atmosphere since humans began burning first coal and then oil, the global average temperature is rising at a rate faster than ever before measured. Temperatures are currently an average of 0.7°C higher than they were 100 years ago, and 11 of the 12 warmest years since 1850 occurred between 1995 and 2006. These temperature changes have been accompanied by distinct changes in rainfall patterns, more frequent and more severe extreme weather events, and a rise in sea levels (IPCC, 2007).

What will happen next? We know that the 'stock' of greenhouse gases currently in the atmosphere will cause temperatures to continue to rise for many decades, even if all emissions were stopped today. An increase of 2°C over pre-industrial levels is broadly agreed to be a critical 'tipping' point, beyond which dangerous climate change becomes increasingly likely. How much the temperature actually rises will largely depend on national and international mitigation efforts in the coming years (see Box 4.2), but most scenarios are bleak (IPCC, 2007).

Box 4.2 Mitigating the effects of climate change

Climate change is already with us, but the challenges we may face in the future depend to a large extent on measures taken now to reduce greenhouse gas emissions into the atmosphere. While everyone is talking about mitigation, however, action is lagging far behind.

Fundamentally, we need to start using alternative, cleaner energies and, where we do burn fossil fuels, we must use them much more efficiently. There are already many options, from hybrid and electric cars, to more energy-efficient appliances, to solar, wind and tidal power. Energy efficiency and conservation need to be placed at the heart of transport, construction, urban planning and manufacturing.

A new technology, which 'captures' carbon and stores it so that it does not reach the atmosphere as carbon dioxide, is ready and waiting for large-scale trials. Another vital approach is to conserve natural 'sinks' that hold carbon – forests in particular, but also grasslands and soils.

A concerted effort is needed to motivate people, businesses and governments to embrace the changes needed. Developed countries, which are almost entirely responsible for the greenhouse gases released into the atmosphere so far, should be leading the way. Targets for cutting emissions need to be backed up by new energy policies that make the targets achievable. Some countries have such policies in place, but most do not.

A starting point is to put a price on carbon – either directly through a tax on carbon emissions or through a 'cap-and-trade' system. Under such a system, a government sets an overall carbon 'allowance' and businesses can trade their parts of that allowance; those who can reduce emissions can sell their part of the allowance to others, hence there is an incentive to reduce emissions.

These measures are appropriate for developed countries, as they have the necessary resources and access to technologies. It is a very different story for most developing countries where many people do not have electricity in their homes and have no option other than to cook over open fires. The approach needed here is to combine sustainable development with mitigation efforts, and this offers 'win-win' opportunities. Saving the rainforests will conserve biodiversity and open up livelihood options, for example, and improved energy efficiency has many development benefits, not least economic.

Action is needed at all levels, from individuals and communities to governments and beyond. The problem is a global one; actions must be coordinated within a coherent framework at international level. The Kyoto Protocol was an attempt to provide this, but waning commitment undermined its impact. Now, the next phase is being negotiated. Will the world finally unite to address climate change seriously? Failing to do so could be disastrous. ■

The consequences of these higher average temperatures on the climate have been the subject of much debate, but there is now general agreement among climate scientists on what we might expect (see Table 4.1). Droughts, floods, storms and heatwaves all look set to increase, in both frequency and severity. Sea levels will continue to rise. It is important to note, however, that things may be much worse than these predictions. The real threat is a destabilized global climate with catastrophic ecological, economic and social impacts. Climate scientists are talking about ‘surprises’ – both ‘imaginable surprises’ but also ‘true surprises’.

Table 4.1 Recent trends and projections for extreme weather events for which there is an observed late 20th century trend

Phenomenon and direction of trend	Likelihood of future trend based on projections for the 21st century
Warm spells/heatwaves – frequency increase	Very likely*
Heavy precipitation events – frequency increase, or proportion of total rainfall from heavy falls increase	Very likely
Area affected by drought – increase	Likely
Intense tropical cyclone activity – increase	Likely
Extreme high sea level (includes tsunamis) – incidence increase	Likely

Source: Adapted from IPCC, 2007

*Very likely = >90% probability of occurrence, according to expert judgement. Likely = >66% probability of occurrence.

While scientists are anticipating surprises, many people are already living with them. Across the world, weather patterns that people once knew and relied upon are changing. Floods are higher than ever before, cyclones are threatening areas that were previously safe and droughts are affecting more regions and more people. And where people are taken by surprise they are usually unprepared and vulnerable.

Climate information

“In planning for adaptation to climate change, information is power” (UNDP, 2007). Climate information comes in various forms. Potentially the most useful is forecasts. These are produced by various climate science groups around the world, for different periods from just a few hours ahead to seasonal forecasts up to three months in the future, and beyond for climate change projections. There is obviously an inverse relationship between the reliability of forecasts and their distance into the future, which is captured to some extent in probability estimates. Short-term forecasts are important for decision-making during unfolding disasters. They can save lives. But

longer-term forecasts offer great opportunities for early action ahead of a climate threat; they can save crops and livelihoods, homes and infrastructure. Seasonal forecasts may be particularly useful – for farmers before the growing season and for emergency and medical services prior to the cyclone season, for example. These are derived from sea and land surface temperatures, to which the atmosphere has been shown to respond slowly over several months. Scientific and technical progress in recent years has greatly increased our understanding of the climate system and enhanced this level of forecasting (though there will always be uncertainties).

The other main types of climate information are historical data and real-time data, which are important for setting a context for current and future weather and for identifying trends, among other things.

Despite its importance, climate information is currently one of the ‘weakest links’ in climate risk management. The problem is fourfold. Much of the information that exists fails to reach potential users in a useable format (if at all), information is lacking about some of the regions of the world where it is most needed, the information is normally too technical for end-users and in most situations the information users have no proper resources to act or utilize the information they receive. All these problems can in fact be addressed relatively easily; all that is needed is commitment and funding.

Information where it’s needed

How can existing information reach those who need it? An example from Mali shows how it can be done. For the last 25 years, a group of farmers has been involved in a project that supplies them directly with weather information and advice to help them with critical decisions, such as when to sow seed and when to apply fertilizer.

The information comes from a variety of sources – the African Centre of Meteorological Application for Development, the International Research Institute for Climate and Society (IRI), the national meteorological service, the World Meteorological Organization (WMO), extension agents and farmers themselves who have rain gauges in their fields. The information is ‘processed’ by a technical team and provided as weather forecasts and practical advice to farmers, mainly through local radio. Yields and incomes have been shown to be higher as a result (IRI, 2007).

Regional climate outlook forums (RCOFs) provide another good example of getting climate information to those who need it; in this case, seasonal forecasts to sector planners and decision-makers. Facilitated by WMO and pioneered in Africa, the RCOF process begins with meetings of regional and international climate experts to agree on a regional forecast for the season ahead. The forum itself then brings together climate scientists and representatives from the user sectors to identify impacts and

implications of the forecast and to develop appropriate responses. Training workshops on seasonal climate prediction are also part of the process, to strengthen the capacity of national and regional climate scientists, as well as special outreach sessions involving the media, to develop effective communications strategies.

Many parts of the developing world now benefit from RCOFs, but there is still a need to scale up further to cover all countries and to improve the usability of information for end-users. Meanwhile in some areas, as a 'spin-off' from the RCOFs, specialized sector-oriented forums have been set up, such as malaria outlook forums in Africa.

Addressing the second information constraint – lack of information – is perhaps more straightforward. More weather stations are desperately needed in most developing countries. In Africa, for example, there is on average just one-eighth of the number of stations recommended by WMO (Washington et al., 2006). This lack of stations is perhaps not surprisingly accompanied by a lack of capacity in climate services – people who have the skills to collect, analyse and process climate data into useable formats. Again, commitment and funding can solve the problem.

Global trends complicating climate change effects

Whether the changing climate, with all its uncertainties, contributes to more disasters that affect more people, does not depend merely on what happens with the weather. Climate change and the accompanying risks will be superimposed on an unequal world, where vulnerability to disasters is directly linked to poverty. There are also other global trends that further complicate the picture.

Population growth is perhaps the most obvious. The population explosion of the 20th century is predicted to continue until at least the middle of the current century, with most of the growth happening in less developed parts of the world – where 80 per cent of the world's population were already living by the end of the 20th century. More people will need more resources, and the limited resources that exist are already under threat from unsustainable use.

This is before climate change is factored into the equation. There will be many millions more people on the planet in the coming decades. The question is, will they be millions more people who are vulnerable to climate disasters or will they have the knowledge and capacity to cope with whatever the climate presents?

Linked to population growth and unsustainable development practices are a range of worrying environmental trends, such as loss of biodiversity, changes in hydrological systems and freshwater supplies, desertification and land degradation. In the words of the World Resources Institute (2008):

“Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fibre and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth.

“The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of non-linear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.

“The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals.”

Climate change, therefore, is just one of several global trends that threaten the stability and sustainability of our planet. Addressing any one trend in isolation is not the way forward. What is needed is an integrated approach that gets to the heart of the policy failures and inequalities that have contributed to these problems and that leave many people vulnerable to their impacts. Climate risk management offers a starting point from the climate perspective, but it will need to be integrated into a broader sustainable development strategy that addresses the failures of current approaches.

Climate risk management

Climate risk management is about incorporating climate into decision-making at all levels. It is about enabling and supporting the use of climate and related information by decision-makers, and particularly those who are directly at risk from the climate. With this information, people can make better decisions. They can learn to cope with increasing climate variability day to day. They can protect themselves in advance of extreme weather, but can also take advantage of favourable weather and can learn to address the issue of uncertainty.

Climate risk management is important for all climate-sensitive sectors, including agriculture, food security, water resources and health, as well as for climate-related disaster risk reduction. Agriculture, for example, is highly dependent on the climate and farming communities are often vulnerable to climate extremes, such as drought or flooding. Yet, as IRI points out, “Agricultural crises can often be predicted. Responses can be planned and executed before the adverse impacts of climate shocks result in hunger or famine” (IRI, 2007). If climate information can be routinely included in

planning and decision-making, farmers can not only cope with changes in the weather, but may also be able to benefit (see Chapter 5). Weather forecasts are obviously potentially very useful, but risk transfer tools such as index insurance may also have an important role (see Box 4.3).

Box 4.3 Managing weather 'surprises' through index insurance

Insurance plays a major role in helping people cope with climate-related disasters, but only in certain parts of the world. In developing countries those who are most vulnerable to disasters are generally unable to insure themselves. But this may change with a new type of insurance, called index insurance, which is currently at pilot project stage in several developing countries.

Index insurance is different from traditional insurance in that it pays out in response to the weather itself (through an index), rather than to a consequence of the weather, such as crop failure. A simple weather index is rainfall where, for example, the insurance aims to protect a small-scale farmer against drought. The insurance pays out if the rainfall over the growing season is below an agreed threshold. This is obviously very closely aligned to crop failure, but doing it this way has several distinct advantages for developing countries. An important one is that transaction costs are kept low; high transaction costs are one of the main limitations to insurance markets in developing countries. With traditional crop insurance, insurance company representatives must visit the farmers' fields to verify crop damage, but this is not needed with index insurance. Instead, reliable weather data are needed, for example from a nearby weather station. Thus index insurance is financially more viable both for private sector insurers and for small farmers.

Another benefit is that payouts can be made quickly, so that farmers avoid having to sell assets to survive during a crisis. And, if farmers are insured, lenders are much more likely to extend credit to them so they can buy fertilizer,

for example, and increase crop yields when the weather is good. For these reasons, index insurance has a role in helping people out of poverty traps, as well as through crises.

The first project in Africa began in Malawi in 2005. Groundnut farmers who farmed within 20 kilometres of a weather station were able to insure themselves against drought through a rainfall index-linked contract. If the rainfall data from the nearest weather station showed a deficit in one or more critical stages of the growing season, the insurance paid out. The insurance was combined with a loan scheme. Over the following two years, the project was extended to maize and tobacco farmers. Still in the early stages, the project has revealed some limitations of index insurance, but it also shows a great deal of promise. Quent Mukhwimba is one of the farmers in the project. He has been able to improve his yields in good seasons by using his loan to buy improved seeds, and is doubly pleased because "in case of severe drought, I do not have to worry about paying back loans in addition to looking for food to feed my family".

Another project in India, which began in 2003, has successfully scaled up and now has more than 100,000 clients. Contracts have been improved over time and include cover against low or high rainfall, extreme temperature variations and weather-linked diseases, among others.

It is not only farmers who can benefit from index insurance. Governments can also take out index-based insurance so that they can

quickly mobilize funds in the event of a disaster. Normally, governments must wait until a crisis happens before declaring a state of emergency and waiting for donors to respond. By the time relief aid comes through, people have often had to sell their assets and have lost their livelihoods. With index insurance, funds are available much more quickly and can save livelihoods as well as lives.

The Ethiopian government, with the World Food Programme, is currently piloting this approach. They have developed a 'livelihood loss' index that reflects crop (and income) losses at different stages of the growing season if the rains fail. The insurance is helping bridge a gap between early warning and early action, by ensuring funds are available when they are needed.

Index insurance is, however, far from being a simple solution. Contracts must be drawn up on an individual basis and the client needs to fully understand what she or he is – and is not – covered against. Basis risk (when insurance payouts do not correlate with actual losses, that is, there are losses but no payout or a payout is triggered even though there are no losses) confounds the process. Good weather data are needed, but are not always available in developing countries. Capacity-building will also be critical so that index insurance can be managed at the local level. Furthermore, a regulatory framework is needed. However, if these hurdles can be overcome and index insurance successfully scaled up, it could have a wide-scale impact on many people's lives. ■

Water resources will need careful, climate-sensitive planning in the years ahead. Population growth and urbanization are already challenging water management systems in many parts of the world. Climate risk management can promote more efficient use of water resources and reduce the impacts of climate change.

Many infectious diseases are affected by climate. Here, climate risk management can save lives in the very immediate sense. Malaria epidemics, for example, occur when conditions are favourable for the mosquito that carries the parasite.

An early warning of these conditions through forecasting means that early action can be taken: medical supplies and treatment centres can be ready and waiting ahead of the epidemic, for example (see Box 1.5 in Chapter 1).

Climate risk management can play a critical role in preparedness for climate-related disasters. In the Pacific region, for example, it is recognized that:

“The most effective instruments for risk management of natural hazards are those that address current risks. The adverse consequences of storm surges, king tides [unusually high tides], tsunamis and cyclones need to be addressed now through hazard mapping, vulnerability assessments and assets-at-risk inventories. Coastal assets and infrastructure can be protected now rather than repaired after damage from extreme events.”
(Bettencourt et al., 2006)

Here, climate risk management may mean building additional robustness into infrastructure, ahead of extreme climate events that may not have been seen before. With sudden-onset climate-related disasters in particular, the unexpected needs to be anticipated and catered for as part of early action.

According to the Red Cross Red Crescent Climate Centre (2007), climate change “does not mean that we need new programmes...The new reality requires only that climate change be mainstreamed into disaster management, health and care, as well as other weather-sensitive areas of work (such as food security or water and sanitation).” This is climate risk management in action.

Dealing with ‘surprises’

Facilitating access to, and understanding of, climate and related information is the crux of climate risk management and will be vital in the years to come to help people deal with variable and extreme climate.

But how can ‘surprises’ be built into this approach? By definition they are unexpected, so how can we prepare for them? “Preparing for the unpredictable is what is called for” (Red Cross Red Crescent Climate Centre, 2007).



Unpredicted and unexpected weather is already becoming a part of life for many people in climate ‘danger zones’. “I don’t remember we ever had floods like this before. The water rose so quickly to four metres, reaching our second floor,” said Deasy Sujatiningrani of the floods that hit Jakarta, Indonesia in February 2007.

Far away in Kenya, “the weather is upside down” according to Abdishakur Othowai Abdulla, drought project manager for the Kenya Red Cross Society. “In the months that used to be rainy there may not be rain,” he said. “The winters that used to be cold are no longer cold. When it rains it floods and that kills people. When it doesn’t rain there’s a drought and that kills people, too.”

Not surprisingly, people are struggling to understand these changes. Unexpected events are challenging traditional knowledge, for example on when to plant or harvest. Traditional early warning systems are also no longer reliable (see Chapter 3).

The challenge may be essentially one of communication. Where traditional methods have been undermined by rapid change, science could step into the breach, but only if people can access and understand it. In Mozambique, farmers watched a video on climate change, which helped them to understand that they were not being ‘punished by God’, and that climate change was occurring around the world.

With information and understanding comes empowerment, enabling us to face surprises. But surprises are almost always multi-faceted and, as such, need to be addressed in a holistic approach. An Indonesian Red Cross Society project is showing how climate can be included in the ‘real-life’ picture, along with other risks people face day to day.

Over 100,000 people living in slum areas of Jakarta are the focus of the programme. Increased flooding is the main threat climate change brings, but there are several ‘causes and effects’ that play their part and cannot be ignored. Vulnerability to flooding is due to diverse physical and social factors, such as poverty and living in low-lying areas, while the floods threaten agriculture and fisheries, infrastructure and transportation, drinking water supplies and health, among others.

Combining community-based risk reduction activities with microfinance, the programme aims to help people anticipate and prepare for a range of shocks, while providing a financial safety net for the times when crises do occur.

Communities are educated about factors that contribute to increased risk, such as poor waste management, and they are trained in emergency first aid, evacuation and early warning. Awareness of climate change is integrated into training. Red Cross volunteers are also being trained in how to mobilize, support and motivate self-help groups in these areas (see Box 4.4).

Photo opposite page:
Living with the consequences of global warming: damage to a police station on Sagar Island (West Bengal, India) as a result of rising sea levels and coastal erosion.

© REUTERS/Jayanta Shaw

Box 4.4 Using video for community-level climate risk management

A major challenge for the Red Cross Red Crescent Movement and other humanitarian organizations is how to scale up successful pilots addressing climate risk. It is clearly not feasible to dispatch technical experts to every location where poor people are threatened by extreme events. Community-level initiatives need to provide information and knowledge in a form that is accessible and useful to local decision-makers.

Audiovisual technologies are increasingly affordable for capturing, processing, storing and disseminating information. Videos and other communication tools, if combined with participatory approaches, may help extend the benefits of available information to all those who could take advantage of it, in a way that is sufficiently tailored to local needs and constraints. While other disciplines, such as the health sciences, have been dedicating considerable efforts to developing and evaluating intervention strategies that involve the use of video for people at risk, the humanitarian sector has yet to seriously consider such technology for the community-level management of changing climate threats.

The Red Cross Red Crescent Climate Centre has been working with Red Cross and Red Crescent Societies to develop video tools since 2005 in order to support awareness, action, advocacy and analysis. The first pilots were developed informally with volunteer film-makers in Argentina, Bangladesh and Mozambique, and more than 20 video tools had been developed for community-level work on the issue of climate change by the end of 2008.

Why should the humanitarian sector use video for climate issues?

The making of, and discussion about, a video can provide an ideal mediation space to bring

together the multiple stakeholders needed to address extreme weather events and climate change. Participatory video is a particularly relevant methodology, which aims at involving a group or community in shaping, creating and filming their own film, from producing a storyboard to interviewing people and operating the camera.

Participatory video establishes trust and treats local knowledge with respect. It is increasingly used in community development and anthropological research. It has the potential to create spaces for transformation by providing a practice of looking 'alongside' rather than 'at' research subjects. This is fully aligned with the growing recognition that end-users of information need to be co-producers of new knowledge. For example, through a participatory video project in Malawi, subsistence farmers proposed six simple yet innovative measures to manage increasing flood and drought risks, and crafted a 12-minute video aimed at sharing these ideas with neighbouring communities.

The rationale for investing in video was built on the awareness that community adaptation is essentially about change in human behaviour, and such change is more likely to happen when people find both intellectual and emotional reasons to think and act differently. Audiovisual tools can help communicate scientifically complex issues in simple ways, with reliable accuracy, and using aesthetic approaches that can inspire and motivate, sometimes in surprising ways.

For example, after a workshop on flooding and climate change with Mozambican farmers, participants watched a four-minute video from a similar workshop held in a flood-prone Argentinian shanty town. After seeing the short film on a laptop screen, one of the women farmers

said to the workshop facilitator: "I had followed your explanations of global warming, but didn't fully believe you... We've had the 2000 floods that killed so many people and since then two dry spells, and like everybody else I thought it was God punishing us, or that the ancestors were angry... and we can't do much about it. But now in the film I see that white women in the other end of the world have the same problem we have! So maybe it is true that the global rainfall is changing, and so if I *can* do something about it, I will." The video had touched this farmer in a way that motivated her to consider changing crops to adapt to different climatic conditions.

In the Caribbean region, the European Commission helped National Societies to develop a set of short videos to promote community-level hurricane preparedness. Importantly, the very making of these videos created a remarkable spirit of collaboration between the Red Cross and stakeholders such as technical experts, media, government agencies and communities at risk. After joining a workshop on participatory video and climate change organized by the Bahamas Red Cross Society, the National Emergency Management Agency (NEMA) called for a high-level government meeting attended by about 30 people to discuss adaptation needs and support the Red Cross video work. Today, the Bahamas Red Cross and NEMA have a core team of instructors who travel together to the different islands to lead workshops on disaster preparedness and risk reduction.

Similarly, in the context of a two-year programme on integrated community-based risk reduction and climate change by the Indonesian Red Cross Society, a participatory video initiative was carried out in a flood-prone shanty town in Jakarta. Self-selected staff and volunteers contributed strong facilitation skills and joined local residents (both adults and children) in making a short film. A local screening, followed by an open discussion on the issues addressed in the video (such as flooding, waste management, violence and health) established a platform for dialogue and the exploration of transformative action.

While progress on this front has been remarkable, much remains to be done in order to establish teams involving climate adaptation experts, film-makers, vulnerable communities and humanitarian or developmental organizations working with the poor in the field. The literature from other disciplines and the Red Cross Red Crescent experience suggest that the video production process needs to be frequently in use and deeply collaborative, with constant feedback and involvement from the affected stakeholders into the creative process. Team dynamics and complementarities need time to mature into a shared understanding. ■

For more information about video-mediated approaches for community-level climate adaptation and the Red Cross Red Crescent experience, see Suarez et al. (2008). Examples of short films can be found at www.climatecentre.org.

Early action – now

There is a lot we do not know about climate change. But we do know who is vulnerable and we know how to reduce that vulnerability. Action can be taken today to help people manage climate risks – both current and, with experience, those of the future.

While there are some good examples of climate risk management in practice in various parts of the world, it is at the moment mainly an ad hoc activity, carried out on a limited scale. Climate change threatens many millions of people and their livelihoods. For climate risk management to make a real difference in reducing their vulnerability, it needs to be mainstreamed into development and disaster risk activities, at all levels.

How are the main development and humanitarian actors addressing this need? And equally important, how are they working together to provide a coherent strategy for effective action? The short answer is, a lot remains to be done. This section looks at some groups that are beginning to think about how to incorporate climate risk management into their activities. It is not an exhaustive account of all the different groups' efforts; rather, it offers examples of how some of them are tackling the climate issue.

The International Federation of Red Cross and Red Crescent Societies set up its Climate Centre in 2002. The aim is to integrate climate into regular activities:

“Addressing the rising risks is not something new – we just need to integrate the notion of changing risks into everything we do, aware that the range of extreme events may be growing. We must enhance our ability to respond and help people to reduce their vulnerability.”

(Red Cross Red Crescent Climate Centre, 2007)

With many National Societies working under the Red Cross Red Crescent banner, experiences so far have been diverse. The Climate Centre is trying to bring together these experiences to develop a shared approach that will support and improve their ongoing humanitarian work. Climate risk management fits this bill (see Box 4.5). Work on managing climate risks is based on experience, knowledge, tools and investment that the Red Cross Red Crescent has been making in community-based disaster preparedness, disaster risk reduction and disaster response.

“We are working on preparedness for climate change,” explains Maarten van Aalst, associate director of the Climate Centre, “but we’re looking at a different kind of programme. We are focusing on people and communities – after all, that is where disasters are felt. We are asking communities to think about how risks are changing, how this will affect them and what they need to do about it.”

The programme showed its worth in Nicaragua in September 2007 when Hurricane Felix devastated the Caribbean coastline. Disaster preparedness workshops carried out throughout the region for several years prior to the hurricane meant that people were not taken completely by surprise and thus were able to remain calmer during the crisis and to make better decisions.

“The training organized here by the Red Cross helped a lot,” says Romero Rivera Bayardo, pastor of one of the local churches where people took refuge. “It gave us direction, information, strategies about how to act in a natural disaster – before and after.”

One of the main areas of focus for the core components of disaster risk reduction activities of Red Cross Red Crescent Societies includes risk assessment and identification, and the establishment of community-based early warning and prediction. This follows on the principle that accurate and timely information saves lives and helps mitigate economic damage, regardless of the nature of the hazard. Successful community-based early warning systems have been profiled in Bangladesh, Cambodia, Dominican Republic, Honduras, Jamaica and Mozambique (see Chapter 2 for more on community-based early warning systems).

For example, in 2002, following deadly landslides, the Costa Rican Red Cross began working directly with communities to introduce early warning systems. This was done on the understanding that the communities themselves would follow through and operate the system. Nine months after the disaster another, very similar, landslide occurred. This time the losses were cut dramatically. Community training had increased people’s coping strategies.

Community-based disaster preparedness is a cornerstone of all Red Cross Red Crescent disaster risk reduction programmes. It inherently seeks to build the capacities of communities by supporting them to identify and address specific disaster risks. In effect, reducing vulnerabilities and increasing coping strategies to resist and recover from disaster impacts as well as building resilience to future hazards.

After the Indian Ocean tsunami, the Indonesian Red Cross Society stepped up its activities, using both vulnerability and capacity assessment and geographic information systems, to identify local risks and relevant solutions for recovery and community-based programmes in the affected areas of Aceh and Yogyakarta. Maps were created to illustrate survey results, shelter locations and housing construction areas. The maps have been used by the Indonesian Red Cross to identify further needs and coordinate use of Red Cross Red Crescent partners’ resources.

The Mongolian Red Cross Society, through its regional disaster preparedness centres, has developed a series of regional hazard maps (marking drought areas, earthquake-prone areas, dangerous lakes, hazardous mountains and water sources) in consultation with nomadic herders and volunteers. The regional maps have been consolidated into a national hazard map, which was shared with the government and is used by the National Society to assess its preparedness and response needs.

The dissemination of information and the role of advocacy, education and awareness-raising are paramount to building a greater consciousness of the risk factors faced by

communities and the ways in which these can be addressed within a range of different programmes. This can lead to a reduction of future vulnerabilities and the identification of dangers, assessment of capacities and vulnerabilities and solutions.

According to statistics, 38 National Societies run community education programmes with schools while 28 societies run similar programmes among neighbours. School-based disaster management activities have been profiled in Algeria, Indonesia, Kazakhstan and Central America.

In Algeria, the Red Crescent's community education programme with schools has been extended to more than 164 schools, 372 teachers have been trained and 60,000 students have been sensitized. The Algerian Red Crescent and its partners (which include the ministries of education, health and the interior, universities, public health and civil protection institutions, and the American and Spanish Red Cross) have developed training materials for use in the programme.

Box 4.5 Preparing for climate change – taking the first steps

In El Salvador, the Salvadorean Red Cross Society joined the Red Cross Red Crescent Climate Centre's preparedness for climate change programme in 2007.

Mirna Zelaya of the Salvadorean Red Cross explained that in the beginning, not many people had a good knowledge of the issue, but this has changed following a process of research and network-building to lay the foundations for working on the issue of climate change. "We have begun to understand it and what we can do about it," said Zelaya.

The four-step programme was developed to improve understanding of climate change among Red Cross and Red Crescent Societies with the aim of integrating it into their programmes and addressing the humanitarian impacts.

El Salvador has done just that. Their journey started with a national workshop on climate change that involved their staff, board members and volunteers. They also engaged with their national meteorological office and environment department to improve their understanding of

the issue, the trends and projections for their country and to obtain a picture of who was doing what and who was responsible for what in the country already.

It soon became apparent that climate change would exacerbate situations that are already present, such as water-related health problems. "If we don't work on these problems," said Zelaya, "we will become even more vulnerable."

Next, a deeper analysis of the humanitarian consequences of climate change was undertaken in the country, as well as an investigation into the implications for the National Society's programmes.

A background document was created and distributed to a wide range of stakeholders; it concluded that disasters are becoming more complicated in El Salvador. For example, Red Cross intervention programmes in the region of Usulután have reported winds of hurricane strength where they have never been experienced before, posing new challenges for disaster response. Hydro-meteorological changes have

been especially apparent since the 1970s, particularly a reduction of surface water from rivers in the dry season. In the east of the country, there has also been an astonishing decline in rainfall of up to 800 millimetres in the past 70 years.

All of these changes have very real human impacts. Farmers have indicated that winters are more difficult to predict thus affecting crops. Zelaya reflected on the importance of understanding how climate change impacts these changes but also how factors such as deforestation can aggravate the situation.

Diseases are also undergoing changes. The country's dengue season used to appear in April every year, but this is no longer the case. Due to changes in seasons a few years ago, dengue has started to appear in March, meaning that the response to the problem lasts for a larger part of the year. "We have to work very hard to avoid the mosquitoes and dengue," commented Zelaya.

The third step in the programme was a regional workshop, hosted by the Salvadorean Red Cross, to engage with other Central American Red Cross Societies tackling the issue. Topics shared at the meeting included engaging with government and non-governmental organizations (NGOs), and scientific, education and research centres as well as engaging volunteers on the issue.

Learning from each other's approaches was key, including an understanding of which communication tools were effective. It also presented the opportunity to enhance regional collaboration.

Regional and national communication with meteorological and knowledge centres has resulted in the enhancement of partnerships for early warning. After all, increased climate risk creates an opportunity to increase use of climate information. With the assistance of the International Federation, a cooperation agreement has been signed with the Salvadorean meteorology

department that will be an integral part of a nationwide pilot project for early warning systems in Central America.

The three main activities will include assisting with the design of the communication chain for early warning delivery, using forecasts for timely decision-making and promoting more active participation between the Salvadorean Red Cross and the meteorology department. The agreement will enable the Red Cross to obtain the information it needs to undertake effective community risk reduction measures.

In its final step, the National Society is developing an action plan that aims to reduce the impacts of climate change. Young people are very interested in climate change and the Red Cross's youth groups have prepared a 'nature and youth' campaign for action in 2009. This will include instructions on how to take care of water resources and tree planting initiatives.

The Red Cross also wants to work with the Education Ministry and reach many more people by integrating climate change into disaster training in the coming year. "We want to work not only on explaining what the problem is," said Zelaya. "We want people to work to avoid the problems of the future."

In its future plans, the Salvadorean Red Cross also wants to communicate what climate change is to a wider audience and permeate the entire organization to identify the most important areas to work on.

They aim to further their reach to schools and communities as well as form closer alliances with NGOs or governments: "For us it is important to work together. We can't get anywhere if we work alone in this situation of climate change. We have to work together with every organization to find synergies. We have to work and work and work! We can't be islands," stressed Zelaya. ■

In 2005, the Kazakh Red Crescent Society, in collaboration with the United Nations Development Programme, local non-governmental organizations and the Ministry for Emergency, developed material for a project for schools on earthquake preparedness, including training courses, a cartoon strip and four videos.

Community-based climate risk management empowers those who are directly in the path of climate change. It provides them with options that they might not otherwise have, allowing them to cope better with climate variability and uncertainty. However, to be fully effective, it needs to be supported by an enabling policy framework at both national and international levels. Are governments, and the international community, providing this? Again, the answer is that much more needs to be done, and urgently. Less developed countries are struggling with an uphill task. Climate risk management needs to be built into all aspects of policy, but this is an immense challenge.

Box 4.6 The importance of multi-stakeholder dialogues and collaboration

Around the world, as civil society has taken on board the issue of climate change, it has sought dialogue with governments and local authorities, with meteorological offices, universities and other centres of knowledge, and with fellow NGOs. By reaching out to others, civil society organizations have enhanced their networks and their response to climate change. A well-informed, coordinated and multi-sectoral approach is essential to enable greatest efficiency and impact.

In Tuvalu, a small Pacific island nation often associated with the rising impacts of climate change, WWF (formerly the World Wildlife Fund) is a founding member of the Tuvalu Climate Action Network that brings together government, church, NGOs and the Red Cross.

The group promotes cooperation in relation to climate change by pooling resources, raising awareness of the issue and sharing skills and knowledge. The network nominated a civil society representative to attend the conference of the parties to the Kyoto Protocol on their behalf.

Some members of the group also conducted joint activities for World Environment Day,

such as planting *pandanus* (screwpine tree) along the coastline and a nationwide quiz among youth groups. Such activities combine well with messages promoting disaster preparedness and a cleaner, safer environment.

When Red Cross Red Crescent Societies begin discussing climate change with their partners, they sometimes have to explain that they haven't 'gone environmental'; it is the humanitarian consequences of climate change on which they wish to focus.

One of the lessons learned at the Nicaraguan Red Cross has been the value of the Red Cross Red Crescent as a bridge between the climate change world and that of disaster risk management.

In most countries, climate change is dealt with by environment-related government departments focusing on pollution issues, with little involvement of disaster-related sectors. The Red Cross Red Crescent can facilitate dialogue and strengthen the disaster management component in national climate change policy.

In southern Africa, the Mozambique Red Cross Society has brought government agen-

cies together with community leaders at national, district and local levels to share information about extreme weather and the need to develop more resilience to storms, floods and droughts.

The Malawi Red Cross Society is working with its meteorological service and rural community leaders to ensure that subsistence farmers can receive, understand, trust and act upon the climate information provided by scientists. ■

National Adaptation Programmes of Action (NAPAs) are intended to outline a country's most pressing needs and develop a framework for integrating climate risk into national planning. But only a relatively small number of countries have completed NAPAs, and most of these programmes of action are less than adequate. A better approach is to mainstream climate through Poverty Reduction Strategy Papers (PRSPs).

PRSPs set out national development priorities and form the basis of funding arrangements with major donors, yet they currently pay scant attention to climate and climate risks. Incorporating climate into these planning documents will be a very good start to addressing both the current climate-poverty trap conundrum and the threat to future development that climate change represents.

Donors can perhaps lead the way at higher policy levels. Most are beginning to take climate seriously, perhaps driven by evidence that many of their activities and investments are in jeopardy if they ignore the climate risk. The African Development Bank (AfDB), whose focus region is perhaps the most vulnerable to climate change, has made a significant effort to incorporate climate into its activities.

Daniele Ponzi, manager of the sustainable development division, explains: "The bank is developing an innovative climate risk management and adaptation strategy to both climate-proof its own portfolio of operations and also provide support to regional member countries. The aim is to build adaptive capacity and enhance resilience to climate change at both country and regional levels."

But according to the AfDB, governments must play their part, too:

"African governments have a special role in establishing the policy frameworks to encourage adaptation by individuals, communities and businesses – in particular to tackle the wide range of constraints that limit the current capacity for adaptation by these groups... Another element for success is that the primary in-country stakeholders are not the environment ministries or meteorological offices, but the sectoral decision-makers in the line agencies, such as water, agriculture and energy departments (sometimes complemented by central agencies

such as finance and planning); as well as individuals, the private sector and NGOs working in the sector.” (van Aalst et al., 2007)

The African Development Bank is also supporting a programme called ClimDev Africa, which is attempting to tackle the climate information deficit in Africa. Activities under the programme aim to mainstream climate information into development practices throughout Africa and make improvements in climate observations, climate services and national policies related to climate information needs.

Climate information is key, and climate information providers will need to be at the centre of a coherent and coordinated climate risk management strategy. The World Meteorological Organization provides leadership for cooperation between global and regional climate centres and the national meteorological services to facilitate the collection of climate data, their standardization and their exchange, as well as to develop climate forecasts and future climate scenarios.

According to Maryam Golnaraghi, chief of WMO’s disaster risk reduction division, customized information for climate-sensitive sectors is what is most needed. “Decision-makers are looking for relevant information to support their decisions,” she said. “We’re trying to strengthen cooperation at international, regional and national levels, so that this type of information is produced on the basis of the latest scientific knowledge, and using the latest tools, and it can be made available for risk management at national levels.”

Climate science is no less important – indeed, it is crucial to sound policy, planning and practice. But it must be guided by real needs, and then reach out to and be useable by those who need it. According to Stephen Zebiak, director general of IRI, we need “continued advancement of the underpinning science, more demonstrations of improved outcomes in practice, increased awareness, demand and uptake of climate risk management and continued attention to education and the building of capacity globally”.

Conclusion

The early warning on climate change has unequivocally sounded. The climate change conference in Poznan, in December 2008, was the first meeting of the UNFCCC where adaptation was strongly addressed and the humanitarian agencies were very much in evidence, stressing the importance of adaptation actions chiefly around disaster risk reduction.

We have an opportunity for early action and we must seize it right now. Vulnerability to climate extremes, variability and uncertainty can be addressed today, to build resilient communities that can cope with whatever the climate brings in the future.

To achieve this, climate needs to be mainstreamed into sustainable development strategies that address current inequalities and failings. Climate information is needed in decision-making processes at all levels, from individual farmers deciding what crops to plant, to urban planners and infrastructure designers, to policy-makers. Sound and relevant climate science must provide the foundation for generating such information, and a concerted effort among the main actors is needed to carry forward this agenda in a coherent and coordinated way.

Chapter 4 was written by Anne Moorhead, a science writer and editor. She also contributed Boxes 4.2 and 4.3. Boxes 4.1, 4.5 and 4.6 were written by Rebecca McNaught, and Pablo Suarez wrote Box 4.4. Both contributors are staff of the Red Cross Red Crescent Climate Centre.

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