

Disasters needn't be disastrous

African communities can adapt to climate extremes



Mozambique Red Cross aquatic rescue team, January 2008.
(Alex Wynter/International Federation)

'Early Warning Early Action' that encompasses scientific advances from climate research and experience with risk reduction now offers the best hope of making humanitarian action in Africa more timely and effective, says the Red Cross Red Crescent Climate Centre. Local disaster managers' awareness that National Societies will increasingly be confronted with the impacts of climate change and extreme weather has been growing for several years: in Africa some countries are experiencing a destructive cycle of drought and flood. More recently concrete operational responses have begun to find their way from the drawing board to the field.

THE FLOOD disasters in 2007 – Africa's year of rains – were the worst in several decades. Hundreds of thousands of people were displaced in nearly 20 countries. More than 200 died across the continent.

In Togo, one badly hit country, the local Red Cross drew on their experience of "normal" rainy-season floods, but asked for international assistance to help them reach especially the remote Savanes region in the north, where in some villages more than half of all homes were washed away.

In West Africa, Ghana suffered most: an estimated 400,000 people there were affected. "Ghanaians never experienced anything like these floods," said Mustapha Ali Idris, minister for the Northern Region.

A vast swathe of territory from the Atlantic coast to the Red Sea eventually experienced very serious flooding. But part of the tragedy of the 2007 monsoonal floods in West and Central Africa is that they were forecast.

The World Meteorological Organization (WMO) had warned in July that the precipitation effect of cool seas off Latin America's Pacific coast – "La Niña" – might be felt all over

the world. On 20 September WMO climatologist Omar Badour told journalists of a "very close relationship between La Niña and...flooding in West Africa".

No one is sure how global warming interacts with La Niña and El Niño, the influential temperature fluctuations in the tropical eastern Pacific. But as the Intergovernmental Panel

"Climate extremes are part of life in sub-Saharan Africa"

on Climate Change (IPCC) confirmed last year, climate change is increasing the risk of extreme weather, and this has encouraged people to record patterns and trends, and utilize seasonal forecasts that are getting better from advances in climate science.

"Climate variability and extremes are very much a part of life in sub-Saharan Africa," says Molly Hellmuth of the International Research Institute for Climate and Society (IRI) at New York's Columbia University – a formal International Federation partner since December 2007. "But where people are poor and vulnerable, these factors can add greatly to the hardship of their lives."

"An estimated 70 per cent of the population of sub-Saharan Africa survive by subsistence agriculture; their livelihoods depend fundamentally on rain, and may fail when the rains fail." Climate, in itself, presents a risk, Hellmuth argues.

What's new in the Federation's strategy of Early Warning Early Action (EWEA) is the idea of routinely taking humanitarian action – moving supplies, people and money – based on flood and storm warnings that may only give a few hours notice, seasonal forecasts from the ever-more sophisticated field of climate science, and even longer trends like climate change and urbanization.

"By acting on all this information we can beat the odds," says Maarten van Aalst, the Climate Centre's leading specialist. "Not waiting for disasters to happen, but avoiding them as much as possible.

"And EWEA means bridging both timescales and specialisms – from the scientific community to humanitarian responders, and involving community members themselves."

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Now the *humanitarian* impacts of climate change – arguably greater in Africa than many other parts of the world – have increased the urgency of incorporating climate information into both development and disaster planning. The IPCC spelt them out in detail in their Fourth Assessment Report, projecting with at least "high confidence" that:

- By 2020 up to about 250 million Africans will be exposed to increased water stress, affecting livelihoods and aggravating water-related communal tensions.
- Arable land, growing seasons and crop yield, particularly around arid areas, are all expected to decrease – reducing yields from rain-fed agriculture in some countries by up to 50 per cent by 2020.
- Lake fisheries will be depleted because of rising water-temperatures and over-fishing.
- The cost of adapting to rising sea levels could be as much as 10 per cent of GDP by the end of this century. Coastal mangroves and coral reefs may also be degraded, affecting fishing and tourism.

A 2006 joint survey by the Dutch national meteorological office and the Red Cross Red Crescent Climate Centre (see Box 1) also pointed up "clear trends in extremes", according to van Aalst, such as "increasing drought in the Kalahari and increasing floods in East Africa, and in some places – like Somalia and eastern Ethiopia – a worrying increase in the intensity of both floods and droughts.

"Completely disentangling weather extremes due to 'normal' variability from those due to climate change will never be possible," he explains. "But in any case, it's largely irrelevant: the key thing is that forecasting is getting better across the board. And we can use it to help people adapt and prepare."

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In December 2007, with Africa's rains at their southernmost extreme and the Christmas and New Year holidays approaching, a mass evacuation was gathering pace, virtually unnoticed by the outside world, in a country that has learnt flood preparedness the hard way and greatly raised its forecasting game: Mozambique.

On Christmas Eve, nearly four weeks before even the International Federation's emergency appeal, Mozambique's leading newspaper led with the news that the Cahora Bassa dam on the Zambezi river was increasing its discharge rate to 4,450 cubic metres per second because of heavy rain upstream in Malawi and Zimbabwe ("HCB aumenta descargas", *Notícias*, 24 December 2007).

Once more in the space of less than a year, the Mozambican Zambezi valley was threatened with a flood disaster:



Egyptian Red Crescent volunteers survey community resilience in Nahda, near Cairo. Egypt is one African country that could be vulnerable to water stress under climate change. (International Federation)

the river was already approaching the level of January 2007, when a full-scale international disaster-response effort had been triggered. The Buzi river to the south, *Notícias* reported, was only a metre below its critical level.

Buzi town was also the training base of the Mozambique Red Cross (CVM) aquatic rescue team, which was able to replenish its stocks of fuel and outboards thanks partly to a cash grant to the National Societies of the region on 11 January 2008 from the International Federation's Disaster Relief Emergency Fund (DREF). Paulo Inacio Maguanda, the 52-year-old branch president who manages the team, gently pointed out that "evacuations cost money".

The Red Cross dovetailed with a detachment of Mozambican marines and the bulk of the evacuations in the Buzi river basin were actually completed in December.

The Mozambicans have shown the world that disasters need not be disastrous. But the mass evacuations that now seem almost routine there – completed in 2008 without compulsion and virtually without loss of life – are only part of the story.

By the end of January there were tens of thousands of rural Mozambicans in the "wrong place" – mainly in tented resettlement centres or new huts they had built themselves in villages where the population had more than doubled almost overnight.

Safe drinking-water, food, health and livelihoods all became urgent priorities for the CVM, helped by the Federation's emergency appeal for the region that followed the DREF cash by exactly a week.

"Unusually, we decided to send emergency funds to the Southern Africa flood countries based on the clearly flagged potential for the situation to deteriorate, including seasonal

“Seasonal forecasts give us a ‘probabilistic’ message we have to interpret”

forecasts," according to Peter Rees, who manages DREF as head of the Federation's operations support department and has been developing EWEA over the past year.

"Seasonal forecasts are never actually 'right' or 'wrong'," he says. "They give us a 'probabilistic' message that we have to interpret.

"But if you lived in a highly flood-prone area and someone you trusted told you there was a 'better than 50 per cent' chance of extremely heavy rainfall, you might think about moving your most precious possessions somewhere safe, wouldn't you?"

"Well that's exactly the situation we faced in West Africa this year."

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Disaster managers at the International Federation's West and Central Africa zone headquarters in Dakar, Senegal, have also resolved to take advantage of new partnerships with climate professionals to prevent history in their region repeating itself. They've been working on disaster preparedness with the African Centre of Meteorological Application for Development (ACMAD) as well as with the Permanent Interstate Committee on Drought Control in the Sahel.

The most authoritative voice on likely conditions for the July–September rainy season in West Africa emerges from an annual scientific forum that, in 2008, was held in the Niger capital, Niamey. The first relevant PRESAO (a French

West Africa need never be caught with its guard down again

acronym for "seasonal prediction in West Africa") forecast was issued by ACMAD on 21 May and warned of warm conditions over the tropical Atlantic with a high probability of "wet" and "very wet" conditions.

IRI's own seasonal forecast painted essentially the same troubling picture and its projected-rainfall map, in particular, showed some West African countries as the only ones in the world with a greater than 50 per cent chance of "extreme precipitation" (see back cover).

"All sources – national, regional, international – asserted with one voice that the season was highly likely to be much wetter than usual over most parts of West Africa," according to Arame Tall, a Columbia University graduate student working on climate applications as an intern at the zone.

Youcef Ait-Chellouche, disaster-management coordinator in Dakar, and his colleagues acted quickly. In early July they helped the International Federation launch a wholly pre-emptive flood-preparedness appeal worth nearly three quarters of a million US dollars. And like the appeal for the



The Togo Red Cross distributed aid to nearly 1,500 flood-affected families in 2008. (Moustapha Diallo/International Federation)

Southern Africa floods earlier in the year, it was primed with a substantial contribution from DREF.

Before the end of the month, hundreds of people in the Liberian capital Monrovia were made at least temporarily homeless in floods described as the "worst ever" in the city, while extremely heavy rain had caused deaths and damage in Benin, Burkina Faso, Chad, Gambia, Ivory Coast, Niger, Nigeria and Togo.

The emergency appeal and a revised version in September enabled the Federation "to provide tactical support to National Societies for action during disasters," says Ait-Chellouche, "especially with relief stocks positioned in Dakar, Accra and Yaoundé.

"While there was no very big emergency, a series of widespread smaller emergencies occurred, especially in Benin and Togo – but together they are just as serious and difficult to manage.

"The seasonal forecast was also widely disseminated, through the Red Cross Red Crescent Movement's network in Africa, and now we're piloting a purpose-made early-warning system for Togo with the National Society there."

West Africa is still vulnerable to floods, but 2008 shows the region need never be caught with its guard down again.

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Not for the first time, science, in the shape of climatology, is nudging both humanitarians and the people they strive to assist into thinking "outside the box". But how are these "probabilistic" messages – on reducing risk rather than offering the certainty of eliminating it altogether – best conveyed?

The Climate Centre believes the experience of Malawi could be instructive, where the National Society participates in the Red Cross Red Crescent Preparedness for Climate Change Programme.

For the past two years a Malawi Red Cross project, funded by the United Nations Institute for Training and Research and supported by the centre, has been using the latest video

"Chickens are washed away. Ducks swim and survive"

technology to get climate-adaptation messages across to largely illiterate subsistence farmers. One of the project's main achievements is to take educational DVDs to villages that have no TV.

"Inequalities in the flow and use of information remain a fundamental challenge of modern times," says project adviser and film-maker Pablo Suarez. "It's vital to explore the possibilities offered by modern technology. Audio-visual media offer a superb opportunity to do that."

"While the medical profession and other disciplines have been dedicating considerable efforts to interventions based on video, climate-adaptation research and practice has yet to."

It might have been difficult to get across in writing or verbally, but when residents of the Malawian village of Mphunga saw images of domestic ducks in Bangladesh that had survived one of that country's regular storms, they were instantly converted to the idea of switching to waterbirds.

Villagers like Esnath Lewis, 37, pregnant with her second child and nursing an invalid husband. She complains the climate is changing and affecting the harvest. Floods are also getting worse, she says. "Chickens are washed away with the floods and die. The ducks swim and survive."

Other simple adaptation messages, illustrated visually, covered irrigation methods, crop diversification, food storage, drainage and flood-warning techniques like whistles.

All the science might suggest that serious climate-change impacts are now inevitable – whatever is agreed internationally. But not all the losses that go with them need be.

Box 1

Climate Change^{Science}

Good data on what's happening at the extreme ends of the meteorological spectrum is sparse in Africa. A 2006 joint assessment by the Dutch meteorological office KNMI and the Red Cross Red Crescent Climate Centre used a selection of IPCC models to try to predict what might happen on the continent. Here's what it found.

For **Southern Africa** the models show a drying trend, including shorter rainy seasons, for much of the 21st century in parts of Malawi, Mozambique, South Africa, Zambia and Zimbabwe

Most models predict an increase in droughts in the Kalahari by up to 30 per cent – conducive to eastward desertification.

Owing to their inability to simulate tropical storms, one of the causes of flooding, changes in Southern African wet extremes were not well captured, but the models do suggest an increase in wet extremes in eastern South Africa and Lesotho.

Three out of four models project a continuation of the wetting trend observed over much of **East Africa** during both rainy seasons. There is also a good chance of heavier rain in the Great Lakes region and much of Uganda. But it's the intensity rather than the duration of the rainy seasons that's likely to increase.

The models suggest an increase of more than 20 per cent in very extreme rainfall by around 2100, notably in northern Kenya and southern Ethiopia and Somalia; this could have long-term implications for floods.

Rainfall over **eastern Sudan and central Ethiopia** was short during the last decades of the 20th century, and there is evidence of a continuation of the drying trend in the future climate. However, some models suggest wetter conditions over parts of northern Ethiopia bordering the Red Sea.

Simulations for Ethiopia imply a shift of the whole rainy season, with October receiving more rainfall than at present, and a similar shift in eastern Sudan. The models show differing responses over Ethiopia generally, with some projecting more rain, others less, but both the dry and wet extremes increase in severity in a simulated future climate.

In Somalia there is more consistency, with most models showing an increase in high-rain seasons of more than 20 per cent.

Box 2

Climate Change^{Burundi}

The Burundi Red Cross, operating in a post-conflict environment with already overstretched resources, has limited capacity to cope with extreme weather. But it recognizes that climate change is a reality and has started to map out risk zones across the country.

"We need to train our volunteers so that they can integrate the early-warning system into other activities," says Anselme Katunguruza, secretary general of the Burundi Red Cross (BRC).

"Our advantage is that volunteers live in every village of the country," he adds, "so we always get 'breaking news' of what's happening at the grass-roots level."

The plan is to incorporate things like early-warning systems and better identification of vulnerable people into staff training.



Flood water on the road to Buzi, Mozambique in January 2008. (International Federation)



It seldom rains in Dida Guchi, Ethiopia, where people depend on cattle, and droughts have become more prolonged over the past decade. The Federation appealed for more than 8 million Swiss francs in August 2008 to combat food insecurity. (Jakob Dall/Danish Red Cross)

The head of the BRC's disaster management department, Venerand Neigarnasabo, agrees: "A more holistic approach is also needed, such as planting trees, using seeds that are resistant to drought and disease, improving agricultural techniques and promoting short-term crops such beans and maize that can be harvested quickly."

Building volunteer capacity is considered very important: the aim is to increase the number of Red Cross units to 2,725 – one in every *colline* (village) by 2009.

Balthazar Bacinoni, head of organizational development, points out that awareness-raising is crucial with climate change. "People don't know what to do," he says. "When

"We get 'breaking news' of what's happening at grass-roots level"

they see drought, people don't have a solution. Also floods. They don't even know that outbreaks of disease are due to floods. So people should be prepared."

The Burundian strategy now is to decentralize, placing more decision-making in the regions. Regional offices are now being built, in the north-west provincial capital of Cibitoke, for example.

The big challenge now, according to Bacinoni, "is to make people believe they can be self-sufficient after many years of war."

Box 3

Climate ChangeKenya

Kenya is one of many countries where climatic extremes – especially flood and drought – seem to overlap, then become embroiled with human factors like HIV, deforestation and conflict to produce virtually permanent disaster conditions.

In 2007 the Kenyan Red Cross (KRC), another participant

in the Red Cross Red Crescent Preparedness for Climate Change Programme, began a major livelihood-recovery effort to support farming and fishing families hit by massive floods at the end of 2006, just as they were still struggling to recover from severe drought.

Amidst the more familiar after-effects of flood, the price of food "soared beyond the purchasing capacity of many families," according to Abdishakur Othowai Abdulla, KRC drought project-manager and a vocal Red Cross advocate of climate preparedness in Africa.

"In the months that used to be rainy there may not be rain," he explains. "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."

"The farmer will tell you that they plant and it doesn't rain and they lose their seeds. After the crop has sprouted it is supposed to rain continuously until the crop matures, and

"There is no cropping season"

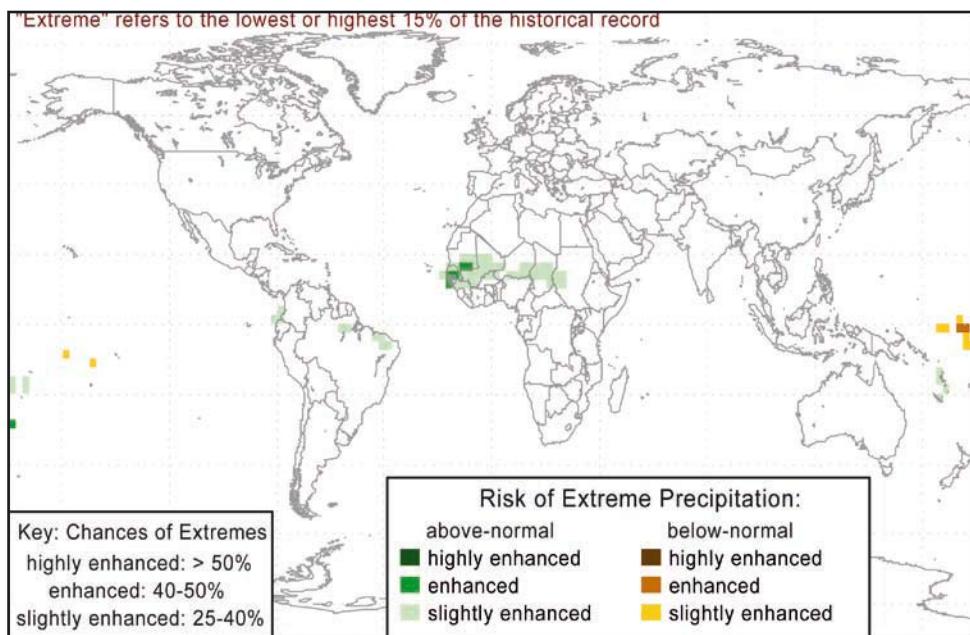
when the crop matures the rains are supposed to stop. But it doesn't happen like that any more. Or it may rain just before the farmer is due to harvest and the crop rots.

"Once people would have said this was an act of God, but it's been going on for ten years. They're saying the weather has changed, the climate has changed. There is no single, normal season, no cropping season."

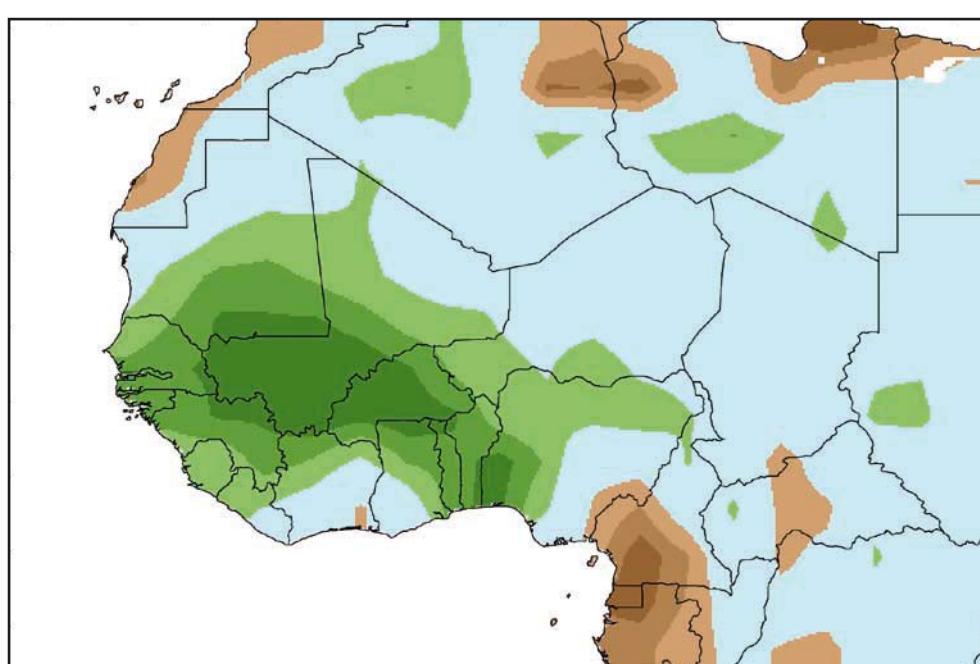
One contribution the Red Cross has developed is its ingenious "de-stocking" project. The National Society buys cattle in poor condition during drought and slaughters them for meat, enabling farmers to save the money they earn. Healthy cattle are then sold back to farmers once the drought abates.

Othowai Abdulla adds: "The traditional Red Cross role is blood, ambulances, giving people blankets after disasters. But we also have to move to safeguarding livelihoods as well as lives."

West Africa '08: the seasonal forecast...



...and what happened



Observed rainfall for July–August 2008. Brown shading indicates the drier than average areas, green shading the wetter areas. (Source: IRI)

THE UPPER MOST IRI map, first issued in May 2008, showed an increased probability of above-normal rainfall throughout West Africa, but with a centre of risk in and around Senegal.

The map below it shows what actually happened: observed rainfall for July–August 2008, compared to a statistical average.

Much of West Africa has indeed been wetter than average, and climate experts have concluded there's a "reasonable overlap" between the two maps, especially over southern Mali.

"In other words," says IRI's Simon Mason, "although it is a direct prediction only of *rainfall*, not floods, the seasonal forecast did give disaster managers a good chance to bet with the odds."