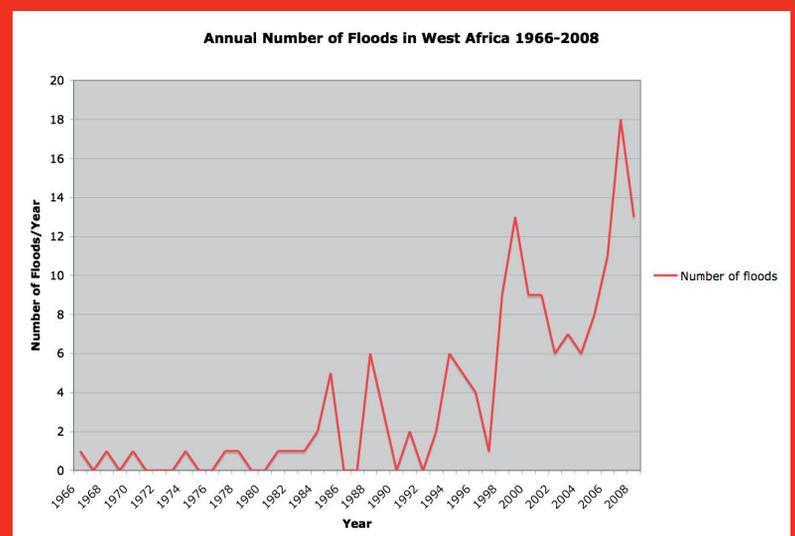




Early Warning, Early Action

An Evaluation of IFRC West and Central Africa Zone Flood Preparedness and Response, 2008



International Federation
of Red Cross and Red Crescent Societies

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The International Federation's activities are aligned with its Global Agenda, which sets out four broad goals to meet the Federation's mission to «improve the lives of vulnerable people by mobilizing the power of humanity».

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Goal 1: Reduce the numbers of deaths, injuries and impact from disasters.

Goal 2: Reduce the number of deaths, illnesses and impact from diseases and public health emergencies.

Goal 3: Increase local community, civil society and Red Cross Red Crescent capacity to address the most urgent situations of vulnerability.

Goal 4: Reduce intolerance, discrimination and social exclusion and promote respect for diversity and human dignity.

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It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

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The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

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The International Red Cross and Red Crescent Movement, in which all Societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.

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Cover Photo: Urban Flooding in Senegal (Noora Kero –IFRC WCAZ)

Graphic : Floods in West Africa : Data Source: EM-DAT/CRED

List of Acronyms

ACMAD	African Centre for Meteorological Applications for Development
AGRHYMET	Authority for Meteorological Applications for Food Security and Hydrology in the Sahel. A specialized institution of the CILSS (Permanent Inter-governmental Committee to Fight Against Drought in the Sahel),
DM	Disaster Management
DREF	Disaster Response Emergency Fund
EW>EA	Early Warning to Early Action
FACT	Field Assessment Coordination Team
FEWS NET	Famine Early Warning Systems Network
GRCS	Ghana Red Cross Society
IFRC	International Federation of Red Cross and Red Crescent Societies
IPCC	Intergovernmental Panel on Climate Change
IPCC AR4	IPCC Fourth Assessment Report
ITCZ	Inter-Tropical Convergence Zone
IRI	International Research Institute for Climate and Society
NGO	Non-governmental Organization
NFI	Non-food Items
NRDT	National Disaster Response Team
NS	National Society
PRESAO	French Acronym for Seasonal Prediction in West Africa
RC	Red Cross
RC/RC	Red Cross Red Crescent
RDRT	Regional Disaster Response Team
RDRT TL	Regional Disaster Response Team, Team Leader
SAIC	Spanish Agency for International Cooperation
SANOBIL	A power utility company in Burkina Faso
TOT	Training of Trainers
UN	United Nations
USAID	United States Agency for International Development
VCA	Vulnerability and Capacity Assessment
VRA	Volta River Authority
WATSAN	Water and Sanitation
WCAZ	West and Central Africa Zone (IFRC Zonal)
WMO	World Meteorological Organization

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Executive Summary

In 2008, the West/Central Africa Zone (WCAZ) of the International Federation of Red Cross and Red Crescent Societies (IFRC) for the first time ever initiated an emergency appeal based on a seasonal climate forecast. Seasonal forecasts were being monitored more closely by the Zone in light of concerns about increasing risk of intense rainfall events related to global climate change. In May 2008, the seasonal forecast anticipated above-normal rainfall for the upcoming rainy season, implying above-normal flood risk. Having been caught off-guard by devastating floods in 2007, the WCAZ decided to take a series of actions to improve flood management and response in preparation for the 2008 rainy season. These actions included pre-positioning relief items, improving disaster response capacity through trainings, development of flood contingency plans, and launching of pre-emergency funding requests for preparedness activities and response.

These actions are important for several reasons:

1. They represent a significant shift in the Red Cross approach to disaster management, from one that was reactive, to one that is now also proactive.
2. With the onset of climate change, the Red Cross must be ready for a potential increase in the incidence of intense precipitation events; the 2008 season shows how this awareness particularly pays off when combined with use of climate information at shorter timescales.
3. The WCAZ's partnership with meteorological institutions and climate scientists helps close the gap between climate information providers and users, by using forecast information to directly benefit people's lives and facilitate adaptation of vulnerable populations to climate change.
4. These actions provide a model for the Red Cross to improve and scale-up the use of climate information, allowing translation of early warnings into early action (EW>EA) for better disaster management and response.

This report examines how the WCAZ used climate information in 2008, as well as the decisions for action, which were made based on seasonal forecasts. Interviews were conducted with a number of WCAZ staff, as well as the Disaster Managers and Coordinators in the National Societies (NS) of the Gambia, Ghana, Togo and Senegal. In addition, the report identifies what the Zone did well, opportunities for improvement, and the concrete benefits from the WCAZ's first-time implementation of EW>EA. A framework is also proposed for future quantitative monitoring and evaluation of the value of climate information and EW>EA in improving disaster management. In the future, data collected in the areas of flood severity, the extent of EW>EA implementation, timeliness of RC response, and resource requirements would enable more quantitative impacts of EW>EA to be monitored.

Some Concrete Benefits of 2008 Implementation of EW>EA

- Although relief supplies were not pre-positioned quite early enough for some national societies in 2008, most countries received needed supplies in a matter of

days after flooding. In contrast, in 2007 the Zone had been an estimated 40 days late in starting flood response operations.

- A *preliminary* quantitative comparison between the costs of flood response alone (2006 and 2007) and the cost of flood response with *EW>EA* (2008), shows a 33% lower cost per beneficiary with *EW>EA*.
- Anecdotal evidence from WCAZ suggests that in 2008 there was a lower reliance among national societies on international support through the Disaster Relief Emergency Fund (DREF), due to the investments made in advance that enabled national societies to mobilize local resources and be ready to quickly respond.
- Ghana: When forecasts for heavy rainfall indicated the possibility of excess water spillage from Bagre and Kopinga reservoirs in Burkina Faso, early action was taken to avoid a repeat of the dam spillage and downstream flooding that occurred in 2007. A controlled release of the dam waters was agreed upon, and a two-week warning was issued prior to the release. The Ghana Red Cross Society (GRCS) took full advantage of this warning, mobilizing volunteers to raise awareness about potential risks, hazards and vulnerabilities in advance of the Bagre dam release. GRCS volunteers informed communities not to go near the riverbanks during the scheduled spillage of the dam, significantly contributing to the reduction of lives lost to flooding, from 30+ lives lost in 2007, to 2 lives lost in 2008.
- Togo: After the Zone's Regional Disaster Response Team, Team Leader (RDRT TL) training, the Togo Red Cross Society held its own Training of Trainers (TOT), in which 38 new volunteers were trained in disaster management. The TOT brought the number of the National Society's trainers up from 138 to 176, a 27% increase from the year before.
- Togo: A newly developed early warning communication system enabled the small community of Atiégon Zogbéjé (*pop.* 2000) to evacuate just before flooding. Due to the early warning system, physical damage occurred without loss of life.
- The Gambia: In response to being informed of the seasonal forecast and the Zone's RDRT TL training, the Gambia held its own National Disaster Response Team (NDRT) training, in which volunteers and branch officers from seven different branches were trained in disaster preparedness. As a result of this training and preparation, the Gambia Red Cross was able to perform a post-flood needs assessment and submit a funding request within 2 days of flooding.

Successful elements of the WCAZ implementation of *EW>EA* and areas for improvement can be summarized as follows:

Things that the WCAZ Did Well

- Employed "no-regrets" strategies to focus and plan for probable (but not certain) events.
- Monitored forecasts on multiple time-scales to reduce uncertainty in longer-term outlooks.
- Consulted multiple sources of forecast information for greater scientific consensus.

- Utilized tools that combined the seasonal precipitation forecast with hydrology for flood risk mapping (important since a precipitation forecast is not a flood forecast).
- Held a flood-preparedness meeting, in response to early forecasts, involving key stakeholders to develop strategies for action.
- Sent a WCAZ representative to attend the 2008 PRESAO forecast forum.
- Increased capacity to respond to floods in the Zone through the RDRT TL training.
- Issued the first-ever Preliminary Emergency Appeal, and made use of the more immediately available DREF for preparedness activities.
- Pre-positioned relief stock in three strategic locations.
- Facilitated the development of flood contingency plans in nine flood-prone countries.
- Developed close partnerships with scientific institutions that provide climate and weather information.
- Communicated the seasonal forecast through the Zone's preparedness meeting, RDRT TL training, and direct conversations with national societies.
- Made advanced logistical and administrative arrangements for visas and medical insurance for RDRT members to facilitate rapid deployment.

Things that the WCAZ Could Do Better Next Time

- Interpret forecasts more carefully (see p. 30).
- Make sure that limitations of the IRI Federation Map Room are well understood (see Box 2)
- Hold the RDRT TL training earlier. (By the time the training occurred in late June, flooding had already begun).
- Pre-position relief stock earlier. (First shipment did not arrive until August 18th when rain and floods were already underway).
- Create a system so that seasonal forecasts shared with NS filter down to communities for action (see p. 32).
- Designate and train someone at each NS to receive forecasts and alerts. Ensure that the designated individuals have both the authority and operational knowledge to mobilize warning and response mechanisms quickly and appropriately (see p. 32).
- Address capacity issues that limit full implementation of EW>EA (e.g. transportation)
- Create a system to gather data on proposed indicators for monitoring and evaluation of EW>EA impacts (see p. 35 and Appendix 3)

Introduction

In recent decades, severe floods have killed thousands of people and caused significant material damage in West and Central Africa.¹ In 2007, the region suffered from some of the worst floods in decades, affecting more than 800,000 people, destroying homes, infrastructure and crops, and killing over 300 people. Not only were the 2007 floods devastating, they caught humanitarian agencies off-guard. Meteorological organizations and climate scientists, however, were not surprised. Above-normal precipitation for the region had been forecasted well in advance.² Meteorological forecasts have been available for decades. However, the onset of climate change and associated increased rainfall variability are making traditional short-term meteorological forecasts and longer-term seasonal forecasts increasingly valuable to a variety of sectors. The importance of this information to Red Cross Red Crescent (RC/RC) programs in disaster management, food security, health, and water and sanitation cannot be overstated.

A growing effort seeks to bridge this gap by partnering humanitarian and scientific organizations. In 2008, a partnership was formed between the International Federation of Red Cross and Red Crescent Societies (IFRC), the Red Cross Red Crescent Climate Centre, the African Centre for Meteorological Applications for Development (ACMAD), and the International Research Institute for Climate and Society (IRI) at Columbia University. Through this partnership, the IFRC West and Central Africa Zone (WCAZ) Disaster Management (DM) office received and reviewed seasonal forecasts for above-normal precipitation, issued by ACMAD and the IRI. In an effort to avoid the repeated devastation of the 2007 floods in the region, the WCAZ took a number of unprecedented early actions in response to these forecasts.

Purpose and Approach

This report aims to document the early actions in 2008, assess their impact, and provide insight on how to build on progress made.

Assessing the impact of early actions based on early warnings is achieved largely through interviews with key participants in EW>EA activities. Specific actions taken by the Zone and experiences of the national societies in Togo, the Gambia, Senegal and Ghana are summarized. Based on these actions and interviews, the report identifies the most effective actions taken, areas for improvement, and tangible benefits from the first

¹ International Federation launches emergency appeal for floods preparedness in West and Central Africa. IFRC Press Release. July 11, 2008 Online at: <http://www.ifrc.org/docs/news/pr08/4808.asp> and West and Central Africa Zone invests in early warning measures, IFRC News, September 10, 2008. Online: <http://www.ifrc.org/docs/news/08/08091002/index.asp>

² IRI Multi-Model Probability Forecast for Precipitation for June-July-August, 2007, Issued May 2007. 2007 Map Archive Online: <http://portal.iri.columbia.edu/portal/server.pt?open=512&objID=944&PageID=0&cached=true&mode=2>

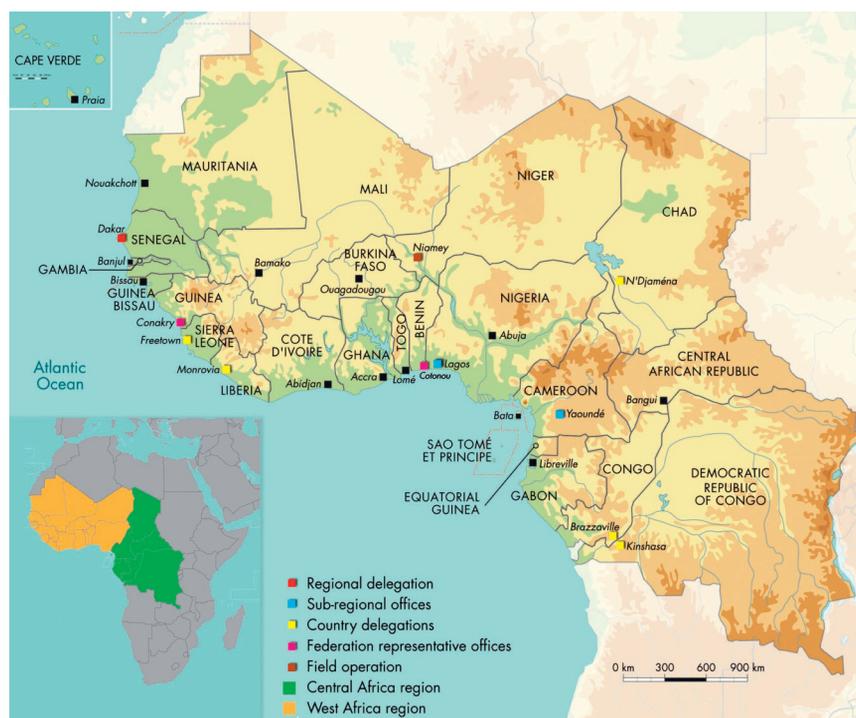
implementation of EW>EA in the region. The potential for quantitative measures to evaluate EW>EA success is also explored, and a framework is proposed for future quantitative monitoring of the benefits of EW>EA.

Part I: Background

Role of the IFRC West and Central Africa Zone

The IFRC West and Central Africa Zone in Dakar, Senegal, and supports 24 national societies in the region: Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Democratic Republic of Congo, Côte d'Ivoire, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone and Togo (see Figure 1). In event of an emergency, the Zone provides the national societies with disaster management advice and coordination, alerts, Regional Disaster Response Teams (RDRTs), Field Assessment Coordination Teams (FACTs), and administers funds through the Disaster Response Emergency Fund (DREF). In non-emergency situations, the WCAZ assists national societies with program support and preparedness, staff development, and training for food security and nutrition programs. Aside from disaster management, the WCAZ also assists with health programs, including water and sanitation, and provides logistical and organizational support.³

Figure 1: The WCAZ Region



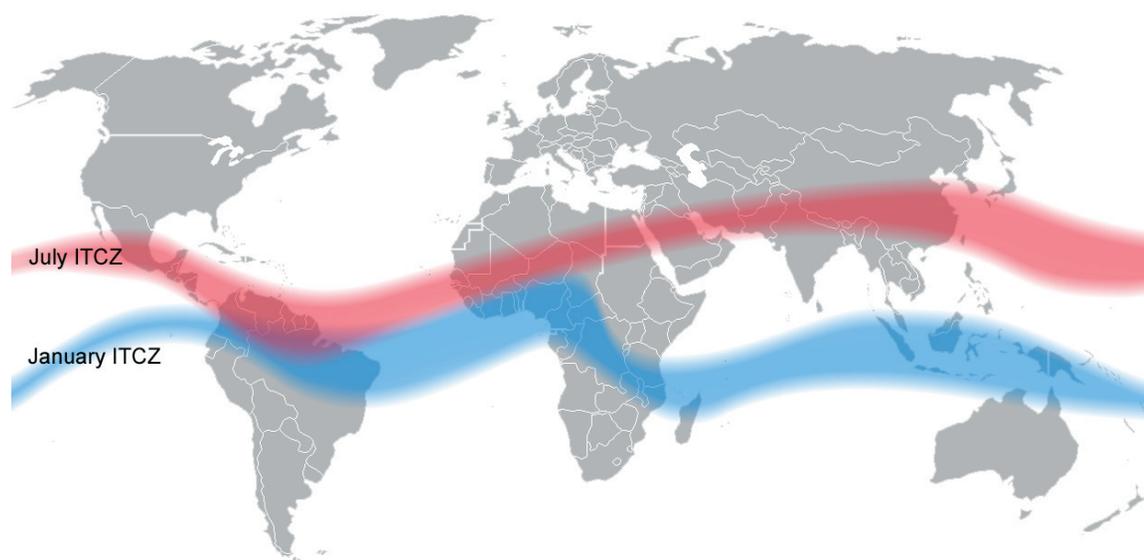
³ Services WCAZ Office Departments Provide to National Societies. Information compiled by Sandra Black, Health Department Intern, 19/3/08.

Climate of West and Central Africa

The continent of Africa is largely tropical or subtropical, with many factors contributing to its climate. One dominant factor in the continent's climate is the seasonal migration of the tropical rainbelts (technically called the Inter-Tropical Convergence Zone (ITCZ)).⁴ Figure 2 below illustrates how during the early part of the year, rain is concentrated in the southern region of Central Africa. As the year progresses, the rainbelt gradually shifts northward to Mali and Niger. As it reaches the limits of its northern range, the area of precipitation then shifts back south, eventually returning to the southern part of Central Africa, bringing rainfall up and down the continent as it shifts with the seasons.

This means that the WCAZ should be monitoring precipitation forecasts and conducting flood preparedness activities at all times of the year, since there will always be part of the Zone experiencing a wet season. However, the interviews in this report largely focus on West Africa's wet season, which occurs from June-September, since this is when early warning activities began and where early action was targeted in 2008.

Figure 2: Seasonal Shifting of the Inter-Tropical Convergence Zone



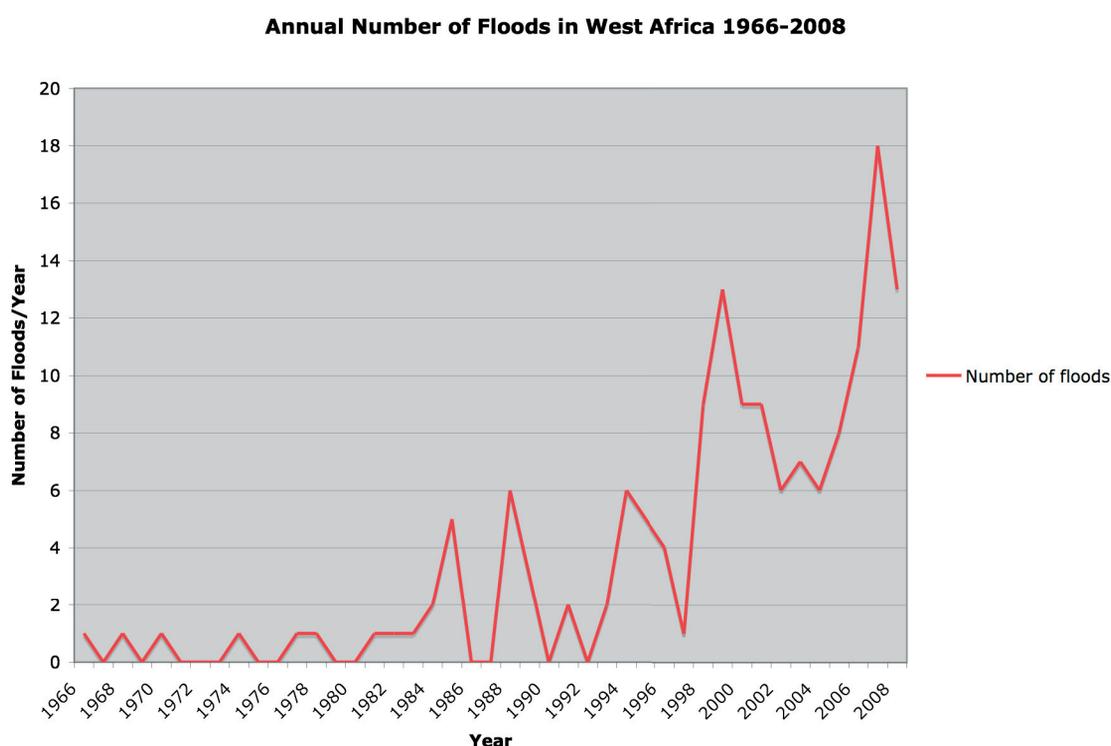
Climate Change Projections for the Region

The Fourth Assessment Report (AR4) by the Intergovernmental Panel on Climate Change's (IPCC), projects that warming in Africa over the 21st century is likely to be

⁴ Christensen, J.H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, I. Held, R. Jones, R.K. Kolli, W.-T. Kwon, R. Laprise, V. Magaña Rueda, L. Mearns, C.G. Menéndez, J. Räisänen, A. Rinke, A. Sarr and P. Whetton, 2007: Regional Climate Projections. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

greater than the average global warming. There is still uncertainty among climate models as to whether overall precipitation will increase or remain the same in tropical portions of Africa. However, the IPCC does find that, “A general increase in the intensity of high-rainfall events, associated in part with the increase in atmospheric water vapour, is expected in Africa. . . .”⁵ As the atmosphere warms, its capacity to hold water vapor increases. An increase in the amount of water building up in the atmosphere translates into an increase in the intensity of rainfall events when the water is released. Figure 3 below shows that there is already evidence from flood records that in recent decades the frequency of extreme precipitation events in West Africa has been increasing.

Figure 3: Annual Number of Floods in West Africa, 1966-2008⁶



Fortunately, advances in climate science are helping to predict rainfall in a coming season, week, or day. These forecasts can be communicated in terms of whether precipitation is likely to be within the range of what is historically normal for a particular region, or if it is likely to be an anomaly (either above or below that range of normal). As disaster managers and relief organizations cope with the increased rainfall variability

⁵ Ibid, pp. 871

⁶ Data Source: EM-DAT: The OFDA/CRED International Disaster Database – www.emda.net - Université Catholique de Louvain – Brussels – Belgium. Data covers the West African countries of: Benin, Burkina Faso, Cape Verde Is; Cote d’Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, St Helena, Togo. “For a disaster to be entered into the database at least one of the following criteria must be fulfilled: Ten (10) or more people reported killed; Hundred (100) people reported affected; Declaration of a state of emergency; Call for International Assistance.”

associated with climate change, these tools can be very useful in preparing for what is otherwise an increasingly unpredictable future.

Part II: 2008 Early Warning, Early Action Timeline

This section outlines the sequence of early actions that the WCAZ took in response to early warnings. Documenting how warnings were used and translated into early action shows that the WCAZ has made a groundbreaking contribution, not only to itself and the Red Cross Movement, but also to the field of climate change adaptation, by providing a framework for the use climate information in disaster management.

May

In early May 2008, the IRI issued its July, August, September (JAS) seasonal precipitation forecast, indicating the likelihood of above-normal rainfall over areas of West Africa. In the same month, IRI also issued its *Multi-Model Probability Forecast of Extreme Precipitation for June-July-August 2008*, which showed a highly enhanced likelihood of precipitation extremes over Senegal, the Gambia, and neighboring countries in West Africa.

In response to the likelihood of extreme precipitation, the WCAZ held a “2008 Flood Preparedness Meeting for West and Central Africa.” The meeting took place in Dakar from May 13-15, with the purpose of exploring disaster preparedness measures, including early warning systems, and the need for adaptation to the increasing risk of disasters due to climate change. The meeting was a first step towards the WCAZ’s larger objective to institutionalize and improve flood risk management in the region. Secretary Generals, Disaster Management Coordinators, as well as UN and NGO partners and flood stakeholders were invited. The flood preparedness meeting is intended to become an annual event, in which representatives from all 24 national societies attend. In its first year however, the meeting was limited to 60 participants, with representatives invited from the countries most exposed to flood hazards, including: Burkina Faso, Congo-Brazzaville, Cameroon, the Central Africa Republic, Chad, the Democratic Republic of Congo, Gambia, Ghana, Liberia, Mali, Mauritania, Niger, Nigeria, Sierra Leone and Togo.⁷ A major outcome of the meeting was an action plan, based on lessons learned from floods in 2007, to develop: contingency plans, country-specific risk maps, an Early Warning System (EWS), partnerships, and better coordination for preparedness and mitigation of impacts.

On May 21, 2008, the WCAZ Disaster Management Coordinator, Youcef Ait-Chellouche attended the PRESAO forum, a first for disaster managers within the Red Cross. At the forum, the WCAZ received the warning that the upcoming rainy season (July, August, September) would be likely to produce above-normal rainfall in significant parts of West Africa. Although this forecast is made available publicly, by attending the forum, the WCAZ also learned a great deal about climate science, helped climate scientists

⁷ Internal IFRC Document. “2008 Flood Preparedness Meeting for West and Central Africa” Dakar, May 13-15, 2008. Terms of Reference. West and Central Africa Zone -Disaster Management Team.

understand the needs of disaster managers, and formed partnerships with contacts within the scientific community. These partnerships benefited the WCAZ in several ways by: providing expertise in the interpretation of climate information during the 2008 flood season; establishing DM contacts and thus a means of communicating climate information to the WCAZ; and building a foundation for collaborative projects, to better facilitate the WCAZ's use of climate information and to tailor that information to Red Cross needs.

June

On June 26-30th, 2008 the WCAZ held a five-day *Regional Disaster Response Team (RDRT) Team Leader's Training*. The primary objective of the training was to establish a Regional team of RDRT Team Leaders, ready to be deployed by the WCAZ in the event of a disaster in the zone. The training was designed to provide leaders with skills and tools to ensure coordination of relief operations and to support National Societies during disasters. Although RDRT members have played important roles in the past, by supporting national societies in distribution of food and non-food items, logistics, health and water and sanitation, a gap had been identified in the efficacy of coordination and management of emergency operations. Thus the WCAZ selected 12 of the best RDRT members from flood-prone countries in the region, for training to become RDRT team leaders. During the training they were equipped with coordination and management skills, including how to: conduct a rapid assessment of the impact and needs of the most vulnerable victims of the disaster, write a flood contingency plan, write a DREF request, mobilize and manage human resources, as well as logistical, financial and administrative procedures. Furthermore, team leaders were presented with the seasonal forecasts and learned how to interpret 6-day precipitation predictions in context from the IRI Federation Map Room. This training was the first of its kind in the zone, and was made possible with the support of the Spanish Agency for International Cooperation (SAIC).⁸ In addition, logistical preparations were made in advance for RDRT team leaders (e.g. securing visas and medical insurance) so that their deployment to a national society in need could be expedited.⁹

June 27, 2008: The WCAZ received an updated seasonal forecast from ACMAD, affirming its May 21st forecast.

July

On July 11, 2008 the WCAZ issued the first-ever emergency appeal to precede a probable disaster. Appeals traditionally provide funds for disaster response, and thus it was unprecedented that the WCAZ launched a preliminary appeal for 750,000 Swiss

⁸ West and Central Africa Zone. Internal documentation of the Regional Disaster Response Team (RDRT) Team Leaders' Training, June 26th-30th 2008 Laguna Beach Hotel, Mbodiene. Information also obtained through interviews with Norbert Allale, WCAZ Disaster Management Response Manager. January 9, 2009.

⁹ West and Central Africa Zone invests in early warning measures. IFRC News. September 10, 2008. Online: <http://www.ifrc.org/docs/news/08/08091002/index.asp>

francs (EUR 460,000/USD 730,000) to fund preparedness activities throughout the region. Based on the forecast and past flood seasons, the WCAZ could anticipate the needs of flood victims. Floods cause people to be displaced from their homes, and to require support in the means of food, potable water and household items. Houses would have to be rebuilt or repaired, water sources would be contaminated and sanitation facilities would be rendered inoperable. Crops would be ruined, and access to markets, health care, and other essentials would be minimal, due to collapsed or submerged roads and infrastructure. The risk of water born diseases and malaria would be heightened. The need for Red Cross kits for water and sanitation (WATSAN), cooking and shelter could be high. Knowing that relief supplies commonly take 2-3 weeks to arrive from the logistics unit in Dubai, the WCAZ sought funds in advance of the likely event of floods.

However, the donor community did not have the systems in place to respond to a request for funds for a disaster that had not yet struck. Donors needed time to respond to such a relatively novel pre-disaster request. In fact, most funding in response to the preliminary emergency appeal did not arrive until mid August, once flooding disasters were already underway. Fortunately, the WCAZ could also use funds more immediately available from the IFRC Disaster Relief Emergency Fund (DREF) to initiate preparedness activities and pre-position the emergency stocks around the region.¹⁰ This was made possible by a recent change in policies and procedures related to the Red Cross's internal DREF allocation process, making it possible to disburse funds in advance of a disaster. This process of procedural adjustment, and its demonstrated success in the WCAZ's 2008 flood operations, is an important contribution to the Federation's approach to disaster management, by paving the way for national societies throughout the world to now request DREF funds for preparedness activities in advance of a disaster forecasted as probable by credible climate scientists. (For more on the DREF, see Appendix 2). Advocacy to change wider donor procedures for pre-disaster relief will take time.

The WCAZ requested 483,047 CHF from the DREF to purchase non-food items (NFI), including blankets, kitchen sets, soap, water and sanitation kits, cholera kits, and tents etc. to meet the needs of 47,500 beneficiaries.¹¹ These NFI were then pre-positioned in warehouses around the region, in Dakar (Senegal), Yaoundé (Cameroon) and Accra (Ghana). Warehouse locations were chosen based on accessibility, ease of transport, and closeness to sub-regional Federation offices. Without pre-positioned stock in multiple areas, supplies can take up to three weeks to get to the region from Dubai, and then in times of flood, it can take multiple days to be transported from the zone in Dakar, to the exact location where they are needed. Pre-positioning stocks was intended to enable beneficiary needs to be met within 24-48 hours.

¹⁰ Diallo, 2008 and Emergency Appeal n° MDR61003. Online at: <http://www.ifrc.org/docs/appeals/08/MDR61003PreIEA.pdf>

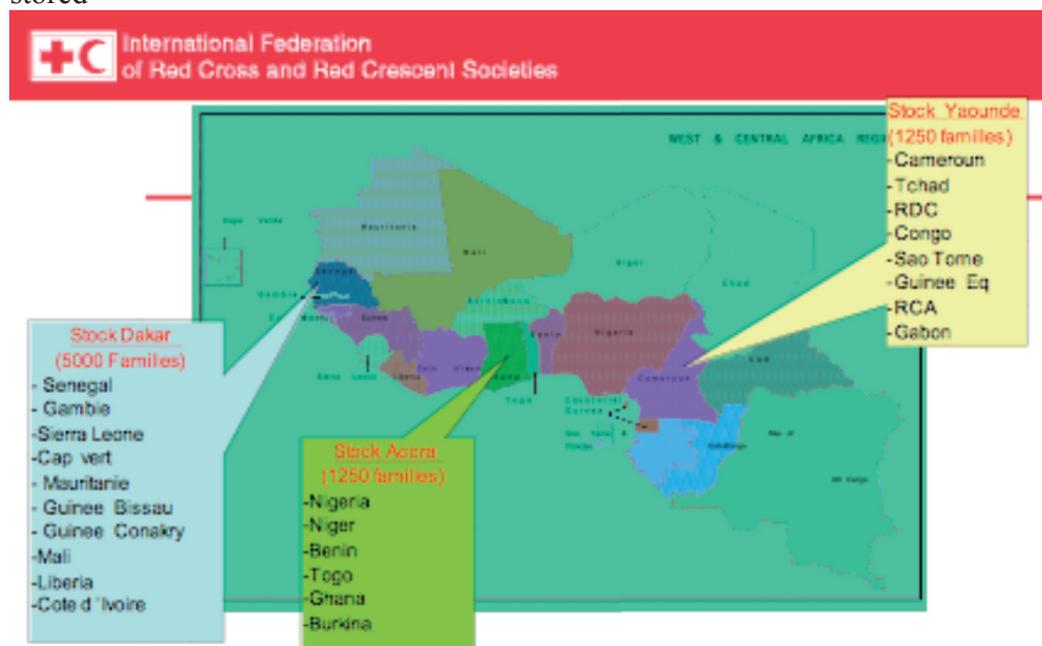
¹¹ Emergency Appeal n° MDR61003. Online at: <http://www.ifrc.org/docs/appeals/08/MDR61003PreIEA.pdf>

By July 15, 2008, seven of the flood-prone countries (Senegal, Nigeria, Benin, Togo, Gambia, Niger and Burkina Faso) had prepared flood contingency plans.¹²

August & September

On August 18, 2008, the first shipment of emergency stocks (blankets) reached the warehouses (Figure 4). Yet interviews with National Societies show that in many cases these stocks did not arrive early enough. Shipments continued until September 24th (when cholera and kitchen kits arrived).¹³ However the stocks were not sufficient for the season, and on September 10th, in response to the floods in Togo and Benin, the WCAZ launched a revised appeal for 1.08 million Swiss francs (US\$ 983,000 / € 670,000) to support 2,025 families over two months.¹⁴

Figure 4: Location of three warehouses with pre-positioned supplies. Captions indicate which warehouses distribute stock to which countries and the amount of stock stored



¹² West and Central Africa Zone. Internal documentation of the Regional Disaster Response Team (RDRT) Team Leaders' Training, June 26th-30th2008 Laguna Beach Hotel, Mbodiene and West and Central Africa Zone invests in early warning measures. IFRC News. September 10, 2008. Online: <http://www.ifrc.org/docs/news/08/08091002/index.asp>

¹³ Information gathered from conversation with Norbert Allale, WCAZ Disaster Management Response Officer, January 15, 2009.

¹⁴ West and Central Africa Zone invests in early warning measures. IFRC News. September 10, 2008. Online: <http://www.ifrc.org/docs/news/08/08091002/index.asp>. For original source, see also: Revised Emergency Appeal n° MDR61003 West and Central Africa: Flood Preparedness. Emergency Appeal. September 11, 2008. Online: <http://www.ifrc.org/docs/appeals/08/MDR61003revappl.pdf>

Part III: Perspectives from the Field

In January 2009, Disaster Management Directors and Coordinators from Senegal, Togo, Ghana and the Gambia were interviewed regarding their experience with the 2007 and 2008 floods. Staff members were asked whether 2008 EW>EA activities in the Zone and within in their National Society had improved their ability to respond, and if those early actions had made a difference for flood victims. All four of the national societies interviewed received early warnings of an above-normal wet season, sent representatives to participate in the Zone's RDRT TL training, completed flood-specific contingency plans and were affected by floods in both 2007 and 2008.

Togo

In 2008, Togo was hit hard by floods in the Plateaux and Maritime regions. Heavy rainfall over the course of July 15-27, 2008 caused the level of the Plateaux River to rise. Excess water from the Plateaux River fed into smaller rivers of the Zio, Haho and Yoto. On July 29th, the Zio and Haho rivers began to flood, affecting Togo's capital city, Lomé (population of 1 million) and spreading to villages from west to east, affecting over 10,000 households. Floodwaters remained high from July 29th until August 10th. Witnesses of the flood told the Head of Disaster Relief for the Togo Red Cross, Victor Sodogas, that when the water left the riverbed, it reached points that it had not reached for the past 30 years. The floods and heavy rain destroyed three bridges essential for transport and communication. Although floods affected less area in 2008 than in 2007, the 2008 flood locations were much more densely populated. As a result, the damage and number of households affected in 2008 was much greater (only 2,771 households affected in 2007 as opposed to 10,000+ in 2008).¹⁵

In spite of more people being affected by floods in 2008 than in 2007, data tracked by the IFRC Geneva Headquarters indicate that fewer people in Togo died from floods in 2008 than in 2007 (16 deaths in 2008, as opposed to 25 in 2007). This reduction in flood related deaths between the two years may be due to factors beyond EW>EA (such as remoteness of affected communities, and the large geographical area required for emergency response). However, staff at the Togo Red Cross believe their 2008 response was better and faster because they had received seasonal forecast information early on from the WCAZ, and because they had learned lessons from 2007. Both lessons learned and the early warning enabled the Togo Red Cross to engage in a number of early actions.

Togo-Early Actions

1. A flood contingency plan was put in place.
2. The National Society held a training of trainers (TOT) in which 38 new volunteers were trained in disaster management. The TOT brought the number of Togo's RC trainers up from 138 to 176, a 27% increase from the year before. The 38 new trainers were also trained comprehensively in DM, whereas trainers in the past might have briefed in DM, but not fully trained. For example, during the previous year, of the 138 trainers, only 20 were active trainers in first aid.

¹⁵ Interview with Victor Sodogas, Head of Disaster Relief for the Togo Red Cross. January 15, 2009.

3. A communication system was established, that allowed information to pass to and from national headquarters, to contact focal points in the regions, to the districts, to community leaders, to communities.

Box 1: Togo -Spotlight on Communication & Early Warning Systems

Although it did not involve the use of a meteorological forecast, a successful example of Togo's early warning communication system developed in response to 2008 seasonal forecasts, was demonstrated by the small community of Atiégon Zogbéjé located north of Lomé. When riverbed water levels were identified as dangerously high, the community leader went through the flood-prone community with a loudspeaker, spreading the message that floods were coming and asking people to evacuate. With just an hour and a half's notice, *the population of 2000 was able to evacuate. When the floodwaters arrived, physical damage occurred, but not loss of life.*

Admittedly, it was a bit of luck that the dangerous water level was spotted in just enough time. During the rainy season 2009, the Togo Red Cross will test out a pilot project in five communities that links a basic early warning system with a communication system for action. Each of the five pilot communities now has four poles stationed along their riverbeds. The poles are color coded, with the bottom rung being green. As long as water is at this green level, it is considered safe. If the water rises to the next rung (yellow), this means it is time to put important belongings up above ground level. Once the water reaches the top rung (red) it is time to evacuate. Twenty volunteers and five community leaders have been trained to monitor the river level and communicate warnings to the community. The communications plan that has been put in place includes placement of posters in the village, as well as stipulation that there be communication to headquarters in Lomé for the national society to support relief efforts. The system holds promise, particularly since it was developed in consultation with the community, community leaders, and heads of villages. The communities understand the importance of the system, which allows them to save their own lives. Community volunteers, who have been trained to monitor and communicate risk levels, already have established key elements of trust and credibility within the community.

Togo –Challenges, Lessons Learned, and Things to Do Better Next Time

1. Early Action by the WCAZ wasn't quite early enough: Unfortunately, the first shipment of the WCAZ's pre-positioned stock of non-food items had not yet arrived to the warehouses when floods occurred in Togo.¹⁶ Some kits were available from the Lagos office and arrived to Lomé within 24 hours. However other non-food items like blankets and mats had to be purchased in Ghana, and took three days before reaching Lomé, due to border crossings.
2. The National Society sees room for improvement in terms of their collaboration with meteorological institutions. In October 2008, the Zone connected the National Society with regional information providers including ACMAD, FEWS-Net and AGRHYMET. However, the National Society has yet to fully utilize those connections and tools. Since the WCAZ flood preparedness meeting, the National Society has worked to advance similar partnerships at the national level. However, the Togo National Météo Service does not yet have enough equipment

¹⁶ Floods began on July 29th 2008, and the first shipment of pre-positioned stocks would not arrive until August 18, 2008.

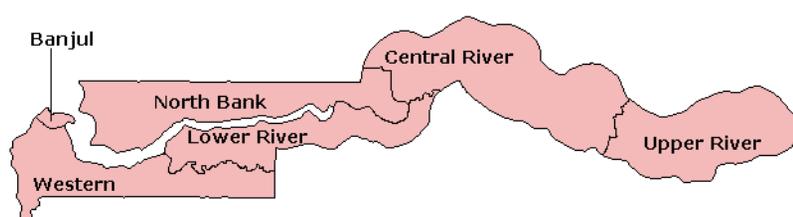
to provide the National Society with reliable information, and relies itself on information from ACMAD and the World Meteorological Organization (WMO). The National Society has been proactive in initiating contact with the University of Lomé's Geography Department, to explore a potential partnership in which RC volunteers are trained to monitor hydrological stations and data collected is utilized and shared by the University, Météo Service and the National Society.

3. Transportation is another area the Togo Red Cross has identified for improvement. They would like to be able to transport relief items to affected communities on their own, instead of waiting for the Zone to deliver supplies in rented trucks.

The Gambia

The Western Region of The Gambia (Figure 5) experienced a severe storm on June 2, 2008, damaging 15 compounds, leaving 60 families homeless, and affecting a total of 300 people. Small-scale flash floods occurred on June 30, 2008, destroying 20 houses and removing 15 roofs. On September 2nd, a storm caused flooding in the Ebo Town community of the Kanifing Municipality, primarily affecting water and sanitation systems. On September 9th, heavy rains from another storm destroyed 37 houses in five communities in the Lower River region. On September 30th heavy rains and strong winds caused flooding in the Western region. Seventy compounds were flooded, of which 20 were completely destroyed. It was estimated that in total, the floods affected 765 people. A three-week operation was launched in response to the September 30th flooding event. All 70 households required assistance to repair/rebuild their houses. Food items were also needed, since food stocks had been lost to flood waters.¹⁷

Figure 5: Map of The Gambia



The Gambia -Early Warning

Katim Nget, Program Manager at The Gambia Red Cross, had been alerted that the coming wet season would be above-normal through e-mails from the Zone and by attending the mid-May flood preparedness meeting in Dakar. At the RDRT training, Nget was trained on how to access forecasts through the Internet. During the wet season, Nget now checks the weather forecast on a weekly basis, however during the dry season it is felt that checking the forecast is not needed. When Nget checks the forecast online, he usually starts at the IFRC Disaster Management Information System (DMIS), from

¹⁷ Information obtained from DMIS reports online. January 20, 2009.

which he can link to the IRI Federation Map Room, where he observes the 6-day precipitation forecast in context.

Nget is thankful that he attended the WCAZ training and learned how to use the IRI Federation Map Room. Before the training he hadn't normally looked at weather forecasts, so in his words, the training "opened up my eyes." Upon arriving back to Gambia, he shared the information informally with volunteers and branch officers.¹⁸

The Gambia National Society's DM Coordinator Buba Darboe, did not attend RDRT TL training with Nget, but stays apprised of flood-risks through weekly and 24 hour alerts he receives from the Zone. He also receives monthly forecasts from HYDROMET and AGHRYMET. The Gambia is new to using this information, but Darbou explained that they have shared these short timescale forecasts with the flood-prone community of Ebo Town. Although sharing of this information has not been established as a systematized procedure, the National Society did send volunteers to inform the community of the forecast. They also shared forecast information with the Gambia's DM agency and authorities.¹⁹

Box 2: Red Flag – A Common Misinterpretation of Forecasts from the IRI Federation Map Room

Nget noted that The Gambia is a very small country, and when he looks at the IRI Federation Map Room forecast, it is hard for him to know exactly which regions of the country will be affected. Using the tool, he first zooms into Senegal, and knowing where Gambia starts, divides the country into four parts, in an effort to identify the regions at risk. If the forecast is for above normal rainfall, he calls to inform the Community Disaster Response Teams (CDRTs) in the region(s) at risk. While the monitoring of forecasts and communication of elevated risk levels to communities is model behavior for any NS, unfortunately data in the IRI Federation Map Room is not high resolution enough to provide reliable information to The Gambia Red Cross. The IRI has recently posted the following advisory: "The grid spacing of this forecast is 2.5° latitude/longitude; it represents a forecast of large-scale precipitation. DO NOT USE THIS TOOL TO FORECAST CYCLONE TRACKS OR THE INTENSITY OR LOCATION OF FINE-SCALE OR HIGHLY LOCALIZED PRECIPITATION."²⁰ Thus, monitoring of more localized weather updates should complement monitoring of forecasts via the IRI Federation Map Room. Nget reported that in two instances where he checked the forecast and was alerted that there would be above-normal rainfall in the region, rain did in fact fall, however the magnitude of the rain was not bad enough to destroy compounds. It is important that all trainings and explanations of the IRI Federation Map Room include a clear section on its' limitations in order to prevent misinterpretation that can lead to distrust and/or non-utility of the information.

The Gambia-Early Action

1. According to Nget, the Gambia Red Cross really only began to focus on DM in 2008, when it held a National Disaster Response Team (NDRT) training for volunteers and officers from seven different branches. Training was also conducted in the Lower River, Upper River and Western Region, through a

¹⁸ Interview with Katim Nget, Program Manager, Gambia Red Cross. January 13, 2009.

¹⁹ Interview with Buba Darboe, Gambia Red Cross Disaster Management Coordinator, January 13, 2009.

²⁰ Description of Data for Precipitation Forecast in Context Map Tool. International Research Institute for Climate and Society. Online: <http://iridl.ldeo.columbia.edu/maproom/.IFRC/.Forecasts/>

capacity building project. Due to this training, volunteers were able to perform needs assessments and submit funding requests to the zone within two days of the floods.

2. Although a standard DREF was issued in response to the June 2nd storm,²¹ relief funds for the September events were available from the Zone through the Preliminary Emergency Appeal initially launched in mid-July.

Box 3: The Gambia -Spotlight on Communication

Observing how communication worked in the Gambia's response to floods is helpful when considering how to implement future early warning communication systems. This is because seven languages are spoken in the Gambia. In order to sensitize communities about how to prevent water-born diseases after floods, the National Society trained volunteers to go into communities, and train other volunteers from those communities in how to convey this same information, but in the native language of their community. Not only did communities receive this important information in their own language, but the advice was trusted, as it came from individuals (volunteers) from their own communities.²²

The Gambia –Challenges, Lessons Learned, and Things to Do Better Next Time

1. Not all regions in The Gambia have been provided the DM training. Building capacity through training will improve the response capacity, and thereby increase the visibility, trust and confidence the National Society needs to communicate early warnings and other information.
2. In spite of an expedited assessment and DREF process, Darboe felt that ultimately response time was about the same as usual, taking roughly a week. Darboe noted that although it is important to build the community capacity through preparedness training, it is also important to equip the teams and have materials for response readily available.
3. Major constraints to the speed of response are logistical, relating to a lack of communication and mobility. Thus, even with forecasts and preparedness training, limited supply of vehicles and radios stalls response.
4. One of the best things that could be done to reduce flood risk is to improve drainage. No effort to improve drainage systems has yet been made.
5. Like Sodogas in Togo, Nget identified the need to close the gap between the National Society and the National Met Service. In the case of The Gambia, however, there are fewer barriers, "we have the information next door at the local met department," reports Nget, "but we haven't established a relationship with them." Plans to work with the met service are emerging through a partnership on the National Society's climate change program.
6. Closing the gap between national societies and the national met services would also help close the gap between seasonal forecasts and shorter timescale forecasts. Seasonal forecasts enable early action through capacity building, pre-positioned stocks etc. Forecasts on shorter-term timescales (from high resolution data) could

²¹ DREF Operation, The Gambia: Storm. DREF operation n° MDRGM004, GLIDE n° ST-2008-000083-GMB, 6 June 2008. Online: <http://www.ifrc.org/docs/appeals/08/MDRGM004.pdf>

²² Telephone interview with Katim Nget, Program Manager, Gambia Red Cross. January 13, 2009.

be better utilized and systematically translated into more immediate early-action, such as community warnings or evacuation.

Senegal

On June 28th, just two days into the RDRT TL training, heavy rains began in Senegal and flooding occurred in regions of Dakar, Saint-Louis and Kaolack. The response machine kicked into gear, providing RDRT TLs in attendance of the training with the opportunity to assist with real damage and needs assessments.²³ In early August heavy rains came again. Rains continued, reaching their peak in late August and early September. Areas hardest hit included Pikine, Saint Louis, Guediaway, Rufisque and Dakar. It was estimated that the floods affected more than 23,591 families. Of those, 4,000 families (24,000 people) lost all their belongings or were displaced from their homes. 173 of these families were being sheltered in schools, and 1,425 of the families most in-need received non-food items from the Red Cross.²⁴

Early Warning

Throughout the wet season, the DM department received information bulletins from ACMAD through the Zone. Whenever the National Society received warning of increased likelihood of heavy rains in a particular region, the Operations Manager, Sonko Mamadou, would directly call people in the field to inform them and have them on alert.²⁵

Early Action

1. Early warnings from the Zone prompted the National Society to help flood-prone households be prepared for rains with sandbags and drainage systems.²⁶
2. In one case (August 1st), when the National Society received an alert, the early warning enabled them to carry out an assessment immediately after the floods on August 2nd. Needs had been both identified and addressed by August 3rd, through distribution of non-food items (mosquito nets and sleeping mats) to 20 displaced families.²⁷

Senegal –Challenges, Lessons Learned, and Things to Do Better Next Time

1. Although Mamadou took care to transmit warnings from the Zone to volunteers in the field, Mamadou noted that for lack of strategy and tools, volunteers did not communicate the available data to the community members themselves.

²³ Interview with Sonko Mamadou, Senegal NS Operations Manager, January 14, 2009.

²⁴ Response to Floods in Senegal. Project Title: Assistance to Persons Affected by 2008 Floods in Senegal. Internal document requesting funds to the WCAN to conduct health and WATSAN programs in affected areas over October & November of 2008.

²⁵ Interview with Sonko Mamadou, Senegal NS Operations Manager, January 14, 2009. And, DMIS Field Report, July 31, 2008.

²⁶ Interview with Sonko Mamadou, Senegal NS Operations Manager, January 14, 2009. And, DMIS Field Report, July 31, 2008.

²⁷ Senegal: Floods. Information Bulletin n°1. September 16, 2008. Online: <http://www.ifrc.org/docs/appeals/rpts08/IB150908.pdf>

2. There is also a sense that communities currently have little reason to listen to Red Cross volunteers' early warnings, when the volunteers have no training in meteorology, rainfall monitoring, or water level tracking to identify flood risk.²⁸
3. The Senegal National Society believes developing the relationship between the National Society and the Met Service is crucial for communication of early warnings for two reasons:
 - a. It takes less time to have the met service contact the national society than it does for ACMAD to go through the Zone to reach the national society.
 - b. A partnership with the national met service would give Red Cross volunteers more credibility and trust to effectively communicate warnings to communities.²⁹
4. EW > EA could take place even earlier. Senegal experienced its first floods of 2008 during the late June RDRT TL training.

Ghana

It is possible that the most dramatic and quantifiable benefits from the Red Cross's use of EW>EA come from the national society in Ghana. The content of this section relies largely on the written response of John Atisu, Disaster Manager for the Ghana Red Cross, who addressed questions on the topic via e-mail correspondence.

Lessons Learned in 2007

In 2007, continuous and exceptional rains that set in from mid-July 2007 resulted in flooding that caused considerable damage to life and property in the Northern and Upper East Regions of Ghana. The floods were an unexpected reversal of the harsh conditions that had threatened agriculture in the northern part of the country following two months of drought (5 June to 15 August 2007).

The situation was made worse due to swiftly rising water levels behind the Bagre Dam in Burkina Faso. During the last week of August 2007, when it became necessary for the excess water to be released, the discharge caused the Volta River to overflow, washing away 52,000 hectares of farmland and extensively damaging 58,000 crop fields in the country. Altogether, 800 communities were hard hit in one way or another, with 20 percent of them totally submerged. According to government figures, over 200,000

²⁸ The National Society operations manager envisions a partnership in which RC volunteers are trained by the national met service to monitor rain gages and document river levels. The idea is that trained volunteers could then become designated recipients of early warning information and immediate forecasts. Certification through this training and appointment of this designated role, would equip volunteers with the necessary credibility to keep communities informed for early action. Involving the volunteers in this process would also help the national met service, by providing assistance with data collection and monitoring. Finally, this training could incorporate an element of how to communicate meteorological forecasts in local vocabulary, so that elements like probability can be communicated. This is essential in order for forecasts not to be discredited when a "likely" event does not occur.

²⁹ In the summer of 2008, Red Cross/Red Crescent Climate Centre intern, Arame Tall, had implemented channels for communication between the NS and met service. However, there unfortunately had been a lack of understanding, on the part of NS governance, regarding the importance of developing this relationship. Now in January 2009, the NS and met service are working to schedule a meeting to build upon this potential partnership.

people were affected, with many temporarily displaced. Many of the affected had either lost part or all of their livestock and crops; their houses were damaged or collapsed. Over 30 deaths were reported as a direct consequence of flooding, mainly by sudden crumbling of mud houses, drowning or acute watery diarrhoea.

In order to prevent a repeat of what happened in 2007, the Ghana Red Cross decided to build resilience into recovery. A replicable model for flood-resistant houses was developed and constructed. Information provided by Météo agencies was used to engage in public education and awareness to reduce the impact of the floods that were expected in 2008.

Ghana –Early Warning 2008

Information received from ACMAD in Senegal and SANOBIL, a power utility company in Burkina Faso, indicated the possibility of excessive rainfall in Burkina Faso from July to September 2008. This could lead to the repeated spillage of excess water from Bagre and Kopinga reservoirs in Burkina Faso, potentially causing the White Volta to increase and occupy its flood plains (in Ghana) once again. This time when heavy rains ensued, SANOBIL was able to provide the Ghanaian authorities with roughly two weeks notice before excess water would be spilled from the dam. Therefore, communities along the White Volta Basin in the three Northern Regions were warned to take precautionary measures to avoid imminent flooding.

Additionally, the Volta River Authority (VRA), a power utility in Ghana, and their Burkina Faso counterpart SANOBIL, agreed on a control regime to protect areas along the White and Black Volta Rivers from spillage of the Bagre Dam. To this end, the dam was opened every other day and closed in the evening to control the volume of water spilling from it. Through this method only 100 cubic meters per second of water was spilled on the specified days. This agreement was beneficial to both countries. Too much water in the reservoir in Burkina Faso would damage their dam, while too much water released would flood communities along the banks of the Volta River in Ghana.

Ghana -Early Action

1. The District Branches of the Ghana Red Cross Society (GRCS) mobilized 150 volunteers who embarked on raising community awareness and public education regarding potential risks, hazards and vulnerabilities in advance of the Bagre dam release.
2. The volunteers moved from house to house to inform farmers of the dangers of farming close to riverbanks. Those living on low lying areas were advised to move upland, to farm in areas not prone to floods, and to vacate unsafe areas.
3. The communities were also educated to fortify their roofs as well as build embankments along their walls to strengthen them.
4. In Accra the RC Emergency Response Teams educated communities in flood prone areas to not dump refuse into the gutters and to develop evacuation plans.
5. In some communities Red Cross volunteers gave first aid lectures on basic life support and carried out health education talks on diarrhea, cholera and other water- borne diseases.

6. The volunteers also advised fishermen not to go near the river between August 21st and 23rd (the period of excess water spillage from the Bagre dam in Burkina Faso).

Ghana -Challenges, Lessons Learned, and Things to Do Better Next Time

1. Volunteers need working tools for preparedness activities: Some of the communities were inaccessible and the volunteers had to walk long distances on foot without wellington boots, torchlights or raincoats.
2. The GRCS experienced a lack of funds to purchase stock and pre-position them at the regional and district level.

Ghana -Concrete Benefits from EW>EA

The EW>EA reduced loss of lives and large-scale damage to property during the floods between the last week of August and early September 2008. Only 2 lives were lost, as opposed to the 30+ that were lost in 2007.

After the 2007 floods the Ghana Red Cross initiated a pilot project in which 320 flood-resistant houses were constructed in eastern Ghana. John Atisu noted that one of the greatest outcomes is that people observed the construction of these structures, and began replicating the Red Cross model of flood resistant houses on their own.

According to records from the WCAZ, 320 houses out of the 359 destroyed by the floods of 2007 were rebuilt through the pilot project to be flood-resistant. In 2008, only 10 houses in the pilot project area were lost. While it is impossible to know how many houses outside of the pilot project were rebuilt in Ghana according to the Red Cross model, there was adoption of this model during reconstruction and only 500 houses were lost to floods during 2008, as opposed to the 3,742 that were lost the year before.³⁰

WCAZ Disaster Preparedness Manager Jerry Niati attributes the reduced need for funding in 2008 to these EA>EW activities. As seen in Table 1 the appeal amount in 2007 was 2.5 times greater than it was in 2008.

Perspectives from the Zone

Successes

- In 2008, most countries received needed supplies in a matter of days. In 2007, the zone was about 40 days late in starting flood response operations due to problems getting materials to countries where they were needed. The decrease in response time is important, particularly given that the longer flood victims are without relief items like clean water, food, shelter, and sanitation, the higher the chance they will experience illness or death indirectly from the flood event.³¹
- The impact of the RDRT TL training in 2008 was apparent to disaster managers. This training meant that the Zone had a team of people on standby specifically

³⁰ Number of houses lost obtained in conversation from Norbert Allale, Disaster Management Response Manager for the WCAZ.

³¹ Interview with WCAZ Health & Care Coordinator Hans Jürgen Ebbing. January 12, 2009.

trained in flood response and disaster management, and was not relying on inactive or untrained volunteers. It meant that disaster managers at the Zone did not need to deploy to the field, and could focus on their regular responsibilities and support operations.

- WCAZ staff emphasized that EW>EA in 2008 changed the position of the Red Cross itself as key player in disaster response in the region. According to Jerry Niati, Disaster Preparedness Manager, in 2007, there was much more of a tendency for the Red Cross to be asked to do things, as opposed to 2008, when the Red Cross was initiating activities by raising awareness, and sharing forecast information with relevant organizations as well as with countries/regions that were identified as having a high flood risk.
- Norbert Allale, WCAZ Disaster Management Response Manager pointed out that in 2008, several countries did not have to request funding for response from DREF, because they had early warning systems in place, which enabled them to mobilize local resources and be ready to respond.
- Youcef Ait-Chellouche, WCAZ Disaster Management Coordinator, reflected that seasonal forecasts help disaster managers gain time, and time is major element for effective preparedness and response. Early action, by providing support to affected communities at the early stage, helps prevent further deterioration in a disaster victim's poverty status by increasing the chance for quick recovery.

Challenges

- Even with pre-positioned stock, it takes 48 hours to transport supplies from Dakar to The Gambia. This is due to both poor roads and boarder crossings. In November, 2008, the WCAZ worked with the IFRC Coordinator in Geneva on International Disaster Response Law, to minimize boarder crossing formalities.
- Although it would be ideal to have stock pre-positioned in each country, national societies do not always have sufficient warehouses, and even with warehouses locked and guarded, there have been cases where supplies disappeared, unaccounted for, and then were not available during emergency. Until the WCAZ can resolve these security issues, pre-positioned stocks will be maintained within the three warehouses of the region.
- One of the limitations of early warning systems identified by the Zone is that in some areas people have built their houses on soil that is problematic during floods. When warnings are sent, these communities receive the information, however they often don't have anywhere to go or the means to move. The Red Cross has offered to help them rebuild their houses if the government helps them relocate, but there has been no response from the government. These communities may as well not receive the information, because they cannot take action with it.
- Although progress has been made with the Red Cross now allowing funds from the DREF to be used for preparedness activities, the larger donor community is still adjusting itself to be able to provide for a disaster that is probable, but hasn't yet struck. While most donors understand that an ounce of prevention is worth a pound of cure, changing the donor framework takes time. Although the preliminary emergency appeal was launched on July 11th, appeal funds did not

come in until August 18th, once preparedness activities had already taken place and floods were underway. The appeal was fully funded, however more than half of it came in the form of in-kind donations, which did not enable full monetary reimbursement of the DREF for preparedness activities.

- EW>EA results can be inhibited by capacity issues. We cannot expect the EW>EA will resolve all capacity issues, and it is important not to diminish the value of EW>EA just because those capacity issues are still at play.³²

Part IV: Use of Climate Information

The WCAZ's use of climate information in 2008 is notable and provides a model and lessons learned for future use of the information by other segments of the Red Cross Movement.

Success in Bridging Timescales

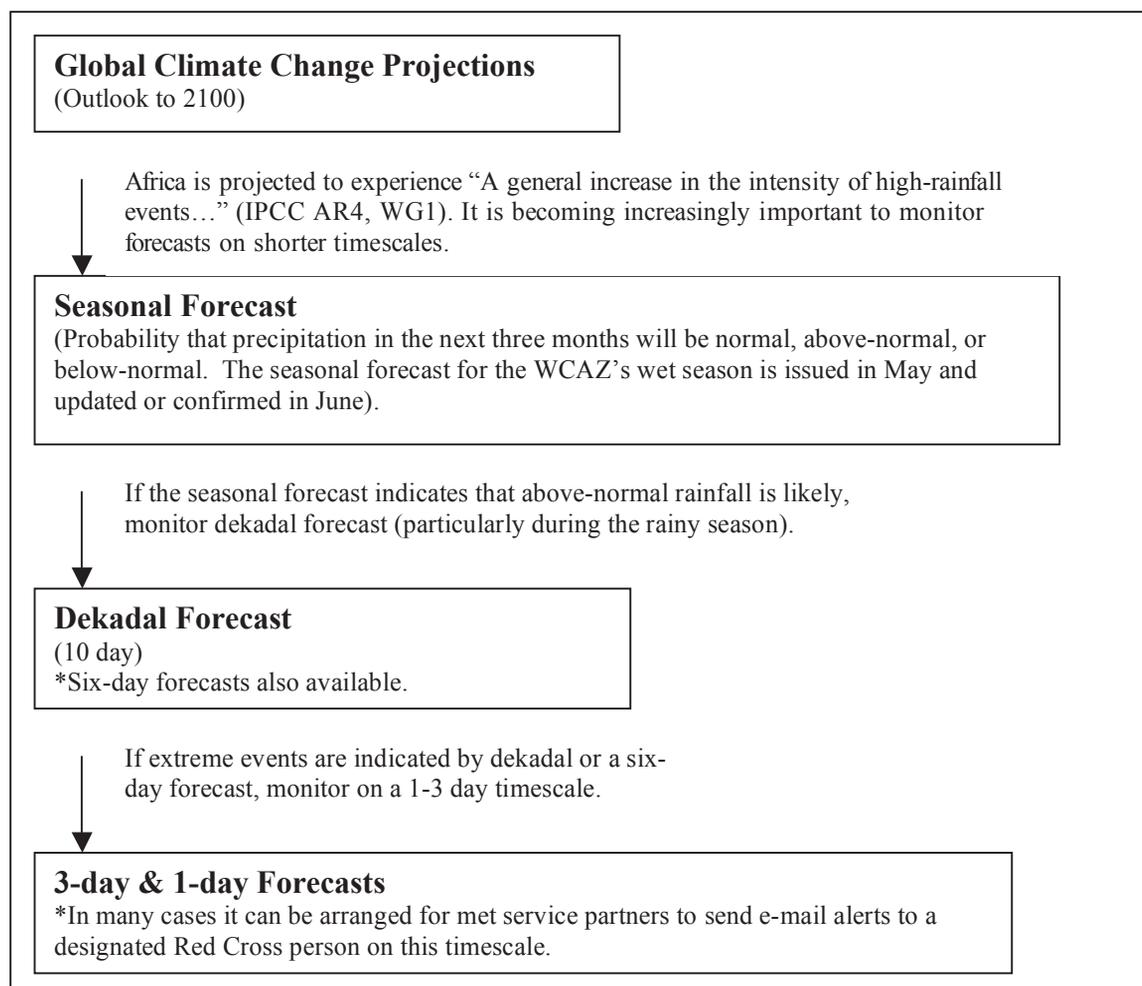
There are many challenges with using climate information in decision-making. First and foremost, the forecasts are probabilistic (providing the likelihoods of a range of possible future conditions) rather than deterministic (providing one specific most likely future condition). This means it is up to the user to decide what actions to take in light of the uncertainty. The WCAZ looks at seasonal forecasts as a tool with which to focus, plan, and allocate scarce resources. There are a large number of disaster scenarios for which the zone could be planning at all times, and a number of areas in which capacity could be built. In reality, the zone does not have enough resources to prepare for everything all the time. In fact, without an impetus for focus, preparedness activities and capacity building generally take a back seat to the onslaught of disaster *response* activities. By receiving a seasonal forecast, the Zone has reason to focus on events that are probable or likely. The Zone does so through “no regrets” actions, in which efforts made do not go to waste if the forecasted event does not take place. For example, the forecasts in 2008 brought the sense of urgency necessary to develop flood contingency plans in nine flood prone countries. Development of these contingency plans would not have happened without the seasonal forecast for above-normal rainfall with which to focus and fund preparedness activities. If these plans had been developed and normal rains occurred, all nine countries would still be better prepared to manage floods in the future.

Another challenge with using climate information is that the further in advance a forecast is made, the less accurate it is likely to be. Therefore it was important that, upon receiving the seasonal forecasts, the zone not only began planning for above-normal rainfall, but continued monitoring the situation through forecasts on multiple timescales. The seasonal forecast was confirmed by a monthly bulletin, and from there it was important to monitor on shorter timescales including 10-day (dekadal) forecasts, weekly forecasts, as well as 3-day and 1-day forecasts leading up to any anticipated extreme rainfall event (see

³² Success and Challenges were shared by WCAZ staff Youcef Ait-Chellouche, Norbert Allele, and Jerry Niati in interviews and information conversations.

Figure 6). By monitoring on multiple timescales, uncertainty can be reduced, the geographic area at risk can be specified, and early actions can be accelerated leading up to heavy rainfall events. Communication to national societies can allow them to anticipate the disaster rather than merely react to it.

Figure 6: Forecast Timescales

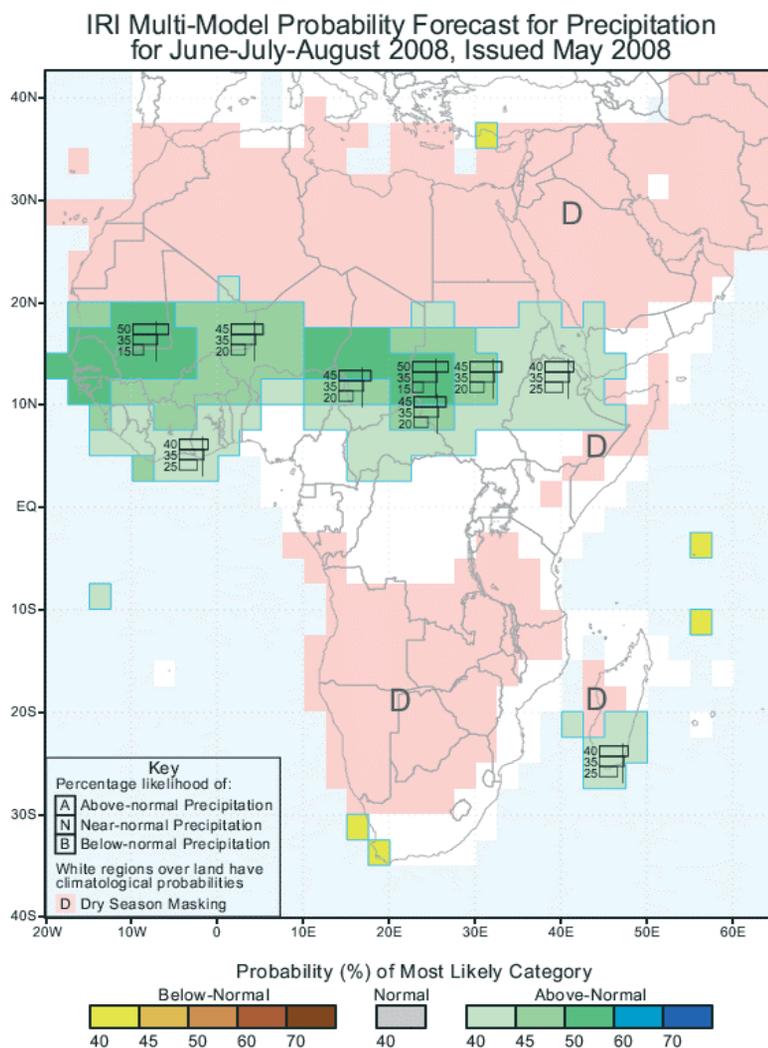


Rather than relying on one source of forecasts to determine action, the WCAZ also made use of information from multiple forecast providers. Since forecasts are not correct all of the time, it is a good idea to compare one forecast with a forecast from another source, to see if there is agreement among the two. Yet, while having multiple forecasts greatly increases the confidence level, the Red Cross is not always in a position to be monitoring multiple model results, and even less to weigh their relative strengths. Fortunately, this sort of consensus building is already done for West Africa through the PRESAO (a French acronym for “seasonal prediction in West Africa”) forum. In this annual forum, seasonal forecasts are contributed from 18 countries, 4 global producing services including the World Meteorological Organization (WMO), IRI, Météo France, and the

Met UK.³³ At the forum, forecasts are shared, discussions take place, and a scientific consensus is reached, followed by a verification process, to produce the PRESAO seasonal forecast for the region.

The WCAZ received the first indications of above-normal rainfall from the IRI precipitation and extreme weather forecasts in early May 2008 (Figure 7 and Figure 8).³⁴ The Zone gained greater confidence and higher resolution information when they received the PRESAO forecast on May 21st. The PRESAO was then updated for greater accuracy on June 27th (Figure 10).³⁵

Figure 7: IRI Seasonal Precipitation Forecast

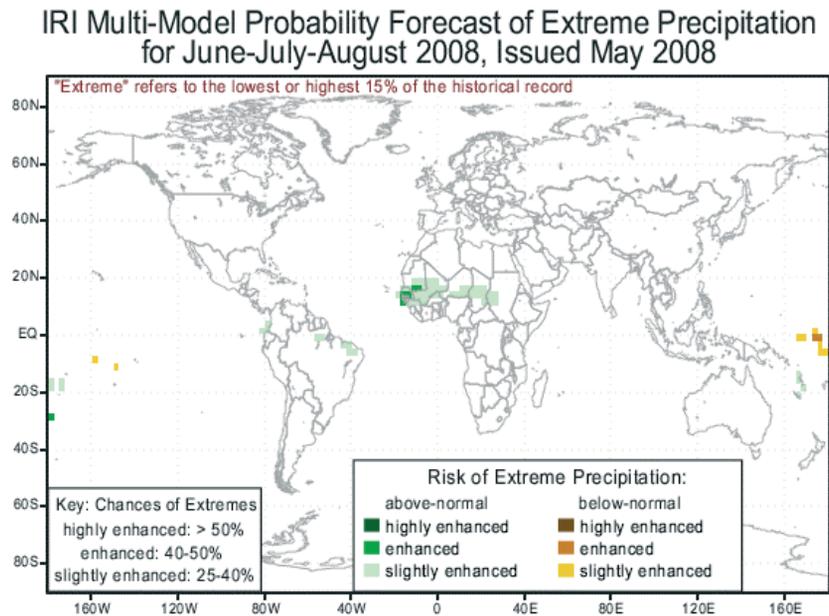


³³ PRESAO-11 Forum. Niamey-Niger. May 2008. PowerPoint Presentation. "Presao 2008, GCM's Forecasts." L. Ferranti-ECMWF, S. Trzaska-IRI, JP. Cévon-Météo France, R. Graham-UK Met Office.

³⁴ Online: http://iri.columbia.edu/climate/forecast/net_asmt/2008/may2008/JJA08_Afr_pcp.html

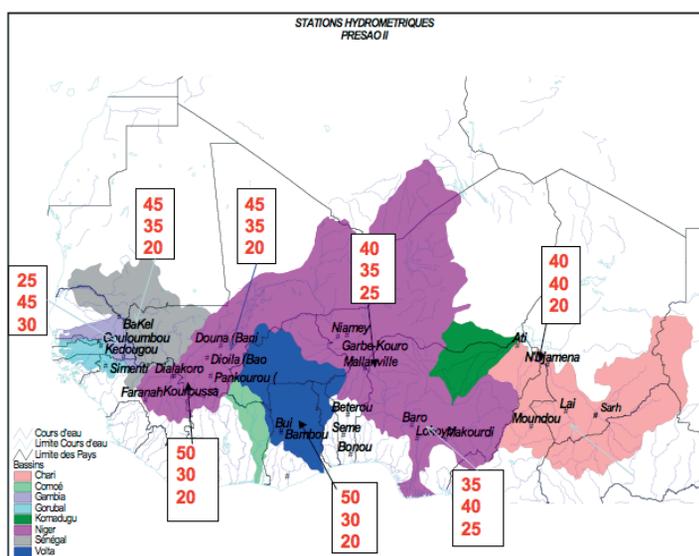
³⁵ Online: http://www.acmad.ne/en/climat/presao11_up.htm

Figure 8: IRI Extreme Precipitation Forecast



In addition to monitoring on multiple timescales and seeking forecasts from multiple sources, the WCAZ also made use of a combined seasonal precipitation forecast with hydrology information (Figure 9).³⁶ On their own, seasonal forecasts are not forecasts for floods, but merely for precipitation. There are many other factors, including soil type, topography, location of rivers etc. that can help translate a precipitation forecast into a more directly applicable forecast of flood risk.

Figure 9: Flood Risk by River Basin (produced by integrating seasonal precipitation forecast probabilities with hydrology).

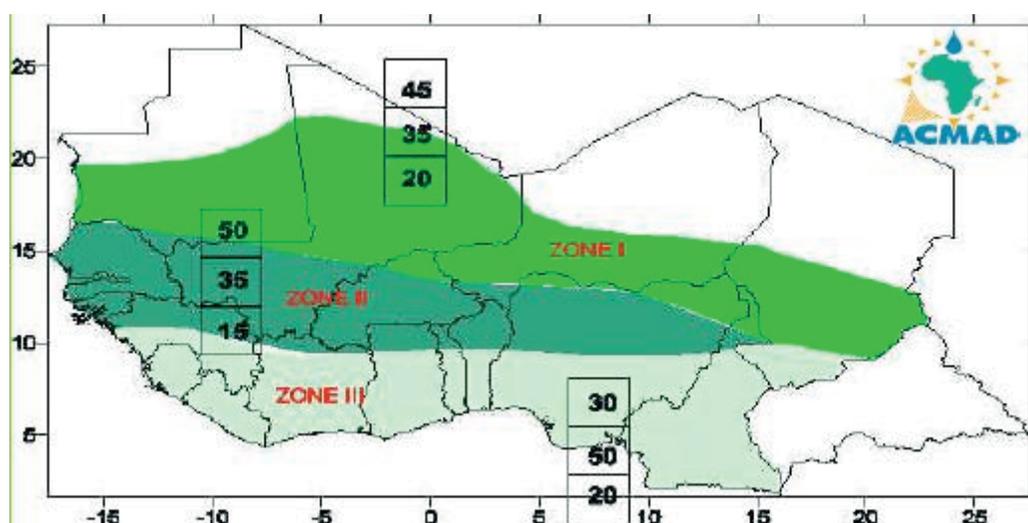


³⁶ PRESAO-11 Forum. Niamey-Niger. May 2008. PowerPoint Presentation. “Presao 2008, GCM’s Forecasts.” L. Ferranti-ECMWF, S. Trzaska-IRI, JP. Cévon-Météo France, R. Graham-UK Met Office.

Challenges in Interpreting Forecasts

Forecasts require careful interpretation. The PRESAO-11 (Figure 10, below) can be read as follows: Top boxes indicate probability for above-normal rainfall. Middle boxes indicate probability for normal rainfall. Lower boxes indicate probability for below-normal rainfall. It is important to read the figure this way. However, there is a tendency to incorrectly simplify the reading to: Zone I = wet, Zone II = very wet, and Zone III = normal.³⁷ In fact, the PRESAO-11 does not at all indicate the degree to which rainfall is likely to be above-normal, but merely indicates the *likelihood* of it being above-normal. (For a look at the magnitude of the rainfall anomaly predicted, the WCAZ should refer to the IRI Federation Map Room). The PRESAO-11 shows that Zones I and II are most likely to experience above-normal rainfall, with 45% and 50% likelihoods respectively. Zone III on the other hand, is most likely (50%) to receive normal rainfall.

Figure 10: PRESAO-11 Precipitation Forecast for July, August, September - updated on June 27, 2008. Based on Forecasts from UKMO, Météo France, IRI, ECMWF, NOAA as well as WMO



Although the probabilities for above-normal rainfall in zones I and II were high, it is important to remember that combined, the probabilities for normal and below-normal rainfall in those same zones were comparable. In other words, at the same time as the greatest likelihoods were for above-normal rainfall in Zones I and II, Zone I also had a 55% chance of experiencing normal or below-normal rainfall. Zone II had 50% chance of receiving normal or below-normal rainfall. Although Zone III was most likely to have normal rainfall, there was also a 50% chance it could receive above-normal or below-normal rainfall. This is important background information for correct reading of the forecasts. For planning and decision making purposes, however, it is valid to target preparedness efforts and limited resources in zones with the greatest likelihood for above-normal rainfall, as long as the likelihoods for normal and below-normal outcomes are understood.

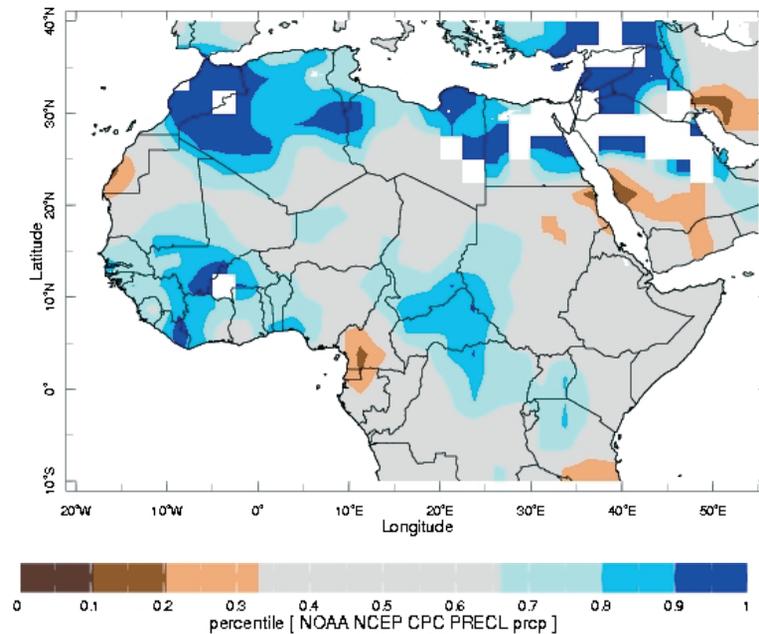
³⁷ Tall, Arame. Internship Report: "Climate forecasting to serve communities in West & Central Africa: Bridging the Gap Between the IFRC-WCAZ & the Climate Science Community." July 31, 2008 pp. 4. See also PRESEO 11 online: http://www.acmad.ne/en/climat/presao11_up.htm

A Look at the Season in Retrospect

Looking back at observed rainfall for June-September 2008, Figure 11 shows that much of West Africa did indeed receive rainfall that was above normal. In this case, “normal” rainfall is being defined as what was average for the same months (June-September) during past years, from 1971 to 2000. The darkest blue shading indicates areas where it was excessively wet, i.e. wetter than 90% of past years. The blue areas are where total June-September rainfall was also above normal, but only wetter than 67% of past years. Brown areas are where it was drier than normal. White areas over land mean there is no information.

Figure 11: Africa Precipitation for June-Sept 2008 Percentile Ranking³⁸

Shows how total rain for June, July, August and September 2008, compared to rainfall during the same months in past years (1971-2000).



Some of the heaviest precipitation occurred in the area the PRESAO forecasted as least likely (only 30% chance) to experience above-normal rainfall (Zone III, Figure 10). This type of discrepancy is somewhat expected due to the coarse resolution of longer-term seasonal forecasts, which cannot produce the same kind of geographic detail as shorter-term weather forecasts. For a side-by-side visual comparison of the difference between forecasted and observed precipitation anomalies in both 2007 and 2008, see Figure 12 and Figure 13 in Appendix 1. To see the extent of flooding that resulted from the season’s rainfall see Figure 14, also in Appendix 1.

³⁸ This climatological perspective was provided by IRI upon request on January 23, 2008. Data source: Precipitation Reconstruction for Land (PRECL) from NOAA/NCEP and served by IRI Data Library

Part V: Current Status of Communication and Decision Making Chains

The previous sections show that in many cases the seasonal forecast and the Zone's EW>EA activities served as a catalyst for flood preparedness activities within National Societies. However, it is interesting to note that the seasonal forecast itself was generally not shared with branches or communities.³⁹ A greater effort was made to filter short timescale forecasts down the communication chain. It has been shown that many times when the Zone forwarded short-term forecast information to a national society, the national society informed its branches and or volunteers. But the information rarely made it all the way down to the community. Generally speaking, climate information flows from the zone, through the national society, to the appropriate branch offices, which are in contact with community leaders and volunteers. Volunteers inform the populations at risk, by posting notices in central locations, riding through communities with a megaphone, and/or going door to door. One WCAZ disaster manager reported that through such networks, information from the Zone can be received by a community within an hour and a half.

Communication chains do vary across and within national societies. But, theoretically, if the information is understandable, and the networks are in place to communicate it, there should be no problem with translating warnings into action for communities at risk. The problem most likely lies in the ability of this new type of information to keep all links in communication networks and decision-making chains activated. A single weak link in the chain of communication and decision-making can block the flow of EW>EA information. For this reason it is important to ensure that every person receiving this type of information:

1. Has been designated to receive it
2. Understands how the information should be used
3. Understands how time-sensitive it is
4. Has been given both the authority to make decisions, as well as the operational knowledge to mobilize people, networks and resources necessary for further communication and appropriate action⁴⁰

³⁹ Victor Sodogas, Head of Disaster Relief for the Togo Red Cross described how he envisions delivering such information to communities in the future: When a seasonal forecast is issued by ACMAD and transmitted from the WCAZ to the Togo Red Cross, Sodogas plans to translate the information for the population, by removing all technical language to make it readably understandable. He would simplify the forecast to clearly state that there is a possibility of heavy rains, and indicate the current level of soil saturation (which affects the risk of flooding). He would e-mail this alert to the branches, where a photocopy would be made, and sent through the districts to the communities.

⁴⁰ Strictly following existing hierarchical structures when communicating climate information does not guarantee that information will be received by a person that knows what kinds of decisions/actions to take with it, or that they will be able to take necessary actions/decisions fast enough. If information is sent from the WCAZ to a National Society Secretary General (based on hierarchical structures), rather than to a DM manager (based on functional structures), then the information may not get translated into action before the

The WCAZ is aware of this need, and it is on their to-do-list to create an Action Plan in which warnings and corresponding actions are clearly connected to individual staff members. There are many elements that would need to go into such a plan:

1. Organizational decisions would need to be made about which staff position should have EW>EA alert management incorporated into their job description.
2. Organizational policies would need to be written regarding how the Red Cross makes decisions for evacuation/resource mobilization under uncertainty.
3. Policies for making decisions under uncertainty may require development of a system of numeric or color-coded alert levels with corresponding action.
4. As partnerships with meteorological organizations evolved, a system would need to be established for designated NS staff members to receive alerts directly from ACMAD/the met services (rather than being filtered through the WCAZ).
5. The designated staff members would each need to develop contingency plans for actions to take based on various alert levels and scenarios.
6. Decisions would be needed regarding the best mode of communication for alerts to the designated individuals, i.e. e-mail, fax, SMS or telephone.
7. A thorough review of each National Society's communications system and networks would help ensure that blockages in communication chains are resolved.
8. In order for warnings to reach a broader public audience, the Red Cross could work with the Météo Services and Public Authorities to transmit warnings through radio broadcasts. Together the authorities and the Red Cross could offer tips or instructions on appropriate preparedness measures. The Red Cross could work to ensure that leaders of remote and poor communities have radios, and facilitate how community leaders could act on radio alerts to mobilize RC volunteers, share the information with the community, and carry out pre-arranged contingency plans.

Fully developing this process will take time and effort, and it is important that use of climate information and EW>EA continue even as all the systems evolve over time. Public media such as radio broadcasts can play an important role in the future. In an interview, Senegal's DM Coordinator, Sonko Mamadou reminisced about how he often listens to French radio maritime broadcasts warning of treacherous conditions at sea. The coastal waters covered by the broadcast are specific to France and have nothing to do with Africa, but Mamadou listens anyway, just because "the broadcasts are so well done."⁴¹

Part VI: Preliminary Quantitative Analysis

The IFRC Headquarters in Geneva maintains a database of information from the national societies compiled through Information Bulletins, DREF Bulletins, Emergency Appeals, Operations Updates and DMIS Reports. Although data from this source only reflects

disaster strikes. If hierarchical structures are not respected, important relationships can be damaged. A balanced approach would weigh both considerations in developing chains of communication.

⁴¹ Interview with Sonko Mamadou, Senegal NS Operations Manager, January 14, 2009.

what was reported, it serves as one of the more comprehensive sources of information within the Federation. In order to provide a quantitative analysis of EW>EA impacts for the Zone as a whole, a request for information relating to proposed indicators was made to the Operations Support Department at the IFRC Headquarters in Geneva. The data that was gathered is presented in Table 1 below. It should be noted that data regarding the number of flood victims and the number of *vulnerable* flood victims is not yet tracked in designated categories, and it is unclear whether the current definition of beneficiary has changed in 2008 to include people simply receiving warnings. For these reasons, the results of this analysis (Table 1) are preliminary and mainly included to illustrate how indicators can be used to evaluate the use of EW>EA for floods in the region.

This analysis compares impacts over three years:⁴²

- 2008 represents an above-normal rainfall year, in which EW>EA was implemented for the first time.
- 2007 represents an above-normal rainfall season in which no EW>EA was implemented.
- 2006 represents a year in which there was neither above-normal rainfall nor use of EW>EA.

Table 1: Indicators of EW>EA Efficacy in the Zone on an Annual Timescale

WCAZ Floods	2006	2007	2008
Number of Floods Reported by RC in WCAZ	9	32	29 ⁴³
Number of people affected	103,892	816,198	155,322
Number of Beneficiaries	6,870	115,006	70,530
Number of Deaths due to floods	77	322	34
Number deaths per 1000 affected people	0.74	0.39	0.22
Timescale of heavy precipitation warning, if any (<i>eg. Seasonal, x weeks, x days, x hours, none</i>).	None	None	Seasonal to immediate
What actions did the RC take leading up to the flood? (<i>ex. evacuation, assistance moving food stocks</i>)	None	None	Contingency plans in 7 out of 24 NS. Pre-positioned supplies.

⁴² Data was provided for the region upon request from the Operations Support Department of the IFRC in Geneva on January 19, 2009.

⁴³ Includes floods categorized by Gambia as storms or storm surges.

<i>etc.)</i>			RDRT TL training.
Amount from DREF used	285,829 CHF	1,484,290 CHF	563,449 CHF
Amount of Emergency Appeal	None	3,922,365 CHF	1,520,349 CHF
Total Financial Resources	285,829 CHF	5,406,655 CHF	2,083,798 CHF
Financial Resources per Beneficiary	41.60 CHF per beneficiary	47.01 CHF per beneficiary	29.54 CHF per beneficiary

Preliminary Results

As seen in the table above, the amount of money spent on flood management (both preparedness and response) per beneficiary was roughly 33% lower in 2008 than the amount of money spent on response alone, per beneficiary, in the two previous years. With just one year in which EW>EA has been implemented, it is too early to do a statistical analysis to see whether the reduction in cost per beneficiary is statistically significant. Once data is collected over time in the prescribed categories, it will not be possible to do a historical comparison (because the data categories didn't exist in the past for comparison to the future). However, it will be possible to do a statistical comparison of indicators between countries (or years), in which a similar level of flood severity occurred, but the level of EW>EA implementation may differ.

Part VII: Proposed Indicators for Future Monitoring and Evaluation

How can we quantitatively track the impact of EW>EA on flood response over time? Although there will be bad rainfall years and good rainfall years, no wet season will be exactly the same. For instance, in Togo, the amount of precipitation received in 2007 was greater than the amount received in 2008 when EW>EA was first utilized. However, the number of people affected by floods in Togo in 2008 was much greater than the number affected in 2007. Should we then conclude that EW>EA action was ineffective in Togo? In fact, scratching just below the surface shows that while there was less precipitation in 2008, the floods that occurred took place in the city of Lomé, which has a population of 1 million people. The floodwaters that came in 2007 mainly affected areas that were only sparsely populated.

Tracking the effectiveness of EW>EA will be essential in the context of adapting to climate change. As EW>EA becomes systematized within DM, the RC will want to know where it is working well, so that best practices can be shared. Donors will need to understand that funding EW>EA can improve the efficacy of disaster response and save lives. EW>EA may, in fact, save money over the long-term by reducing the cost and increasing the efficiency of disaster response. Anecdotes received during interviews, as

presented in this report, are useful in understanding this first time use of EW>EA in the region. Over the long term quantitative monitoring will be needed to understand the impact of EW>EA. What type of indicators can be used to compare the efficacy of response across years, given that flood circumstances will almost always be different from each other?

The interviews and anecdotes described here have helped identify five categories of information which would be needed in order to develop comprehensive indicators of how well EW>EA is working:

- 1. Background and Extent of the Flood:** Important to gain context with which to evaluate needs and response.
- 2. Implementation of Warnings and Early Action:** This section gauges whether early warnings were actually received, communicated, and if they led to any preparatory activities within the National Society.
- 3. Timeliness of RC Response:** No matter the circumstances of the flood (big/small, urban/rural) response is really only *response* if it happens quickly. Waiting 3-6 weeks after a flood for relief can cost lives, exacerbate health problems, and slow down the ability of a community to recover. One of the key benefits intended by EW>EA activities is that they should enable the RC to provide its quality services faster, and thereby prevent ongoing suffering from floods. The ability of the Red Cross to accelerate its response will also depend on whether there was time to have all preparations in place before the expected floods began. As seen through national society interviews and by examining the dates that stocks and funds arrived in 2008, there is room to improve EW>EA just by doing these things even earlier.
- 4. Resource Requirements:** In order to see if EW>EA actually saves donors money by providing more cost effective humanitarian response, this section asks the national society to report how much money was spent on flood response per beneficiary. Any *preliminary* DREFs or Emergency Appeals would also need to be included in this section on financial requirements for response. Although the overall costs of floods is likely to go up due to climate change, the amount used to provide assistance to each beneficiary may go down due to EW>EA if, for example, communities are warned and evacuated, food stocks are moved to higher ground, and relief comes quicker, preventing later costs of treating people for post-flood diseases or malnutrition.
- 5. Optional Section on Disease Prevention:** It is not uncommon for national societies to issue DREFs for support to manage disease outbreaks like cholera and diarrhea within a few months after experiencing floods. Thus, an effort should be made to note whether risk of these diseases had been identified early on, and if timely measures were taken to prevent them where needed. Taking early measures in the area of health sensitization and Water and Sanitation (WATSAN) should reduce the number of lives lost, and cost of health programs for outbreaks of post-flood diseases.

Currently, the RC tracks numbers on the affected population (estimated by the number of people living in the flooded area) and the number of beneficiaries (people that receive help from the Red Cross). However, with the changing role of the RC as providers of EW information, it is apparent that RC disaster managers are inclined to count all RC warning recipients as RC beneficiaries. In order for the method of tracking proposed below to be useful, agreed-upon separate definitions of the following categories must be developed and/or solidified:

- a. **A beneficiary** (someone who received a blanket, kitchen set, resources water purification etc. from the RC)
- b. **A recipient of an early warning** from the RC
- c. **A flood victim** (this distinguishes people from the “affected population” to quantify the number of people whose lives are significantly disrupted by the flood event)
- d. **A vulnerable flood victim** (this distinguishes flood victims from those that have the resources to help themselves out of the situation, and those that do not and are thus are in need of RC assistance).⁴⁴

Tracking data in these categories will provide good indicators for comparison of:

1. **Flood severity** (by looking at number of flood victims)
2. **If EW>EA allows the RC to assist more people in need** (by looking at the proportion of beneficiaries to vulnerable flood victims).
3. **If EW>EA reduces costs of overall flood management over time** (by looking at costs per beneficiary)

While comprehensive information in these three categories was not available for analysis in this report, it would be helpful if national societies provide the Zone with this information going forward, possibly using indicators proposed in Appendix 3.

⁴⁴ Conclusions based on interview with WCAZ Disaster Preparedness Manager, Jerry Niati (January 22, 2009). Who explained that: 1. The affected population does not tell you how *severely* people are affected. For instance, if someone has flood damage in their house, but can continue to function and live there, their life is not disrupted such that they would be in need of RC assistance. Yet this person would still be considered part of the affected population. Alternatively, if someone’s house is destroyed, but they have the resources/means to rebuild it, then it is not the role of the RC to assist. Yet this person would still be considered as part of the affected population. For this reason, I have suggested that future comparisons of percentages of victims assisted by the RC be according to the *number of vulnerable victims* and not the affected population. 2. There is no standard criteria that defines who qualifies to be a beneficiary and then entitles them to RC assistance. The idea is to target the most vulnerable victims in need of assistance. The selection of beneficiaries from the affected population depends on many factors including the magnitude of the disaster, the vulnerability of the population, and the human and financial resources available. 3. It is important to note that the definition of a beneficiary is itself being changed by EW>EA. The RC is now inclined to consider anyone who receives a warning from the RC as a beneficiary, making it difficult to compare this type of beneficiary data with past estimates.

Part VIII: Conclusion

The WCAZ has done an incredible job as a pioneer within the Red Cross movement utilizing climate information for EW>EA. They have established working partnerships with scientific and meteorological institutions, initiated a change in the way donors think and operate in regards to disasters, drastically increased the preparedness and response capacity of flood-prone regions through training and facilitating the development of contingency plans within all 9 flood-prone countries, and provided a framework for how the Red Cross can utilize climate information and translate Early Warnings into Early Action (though the use of multiple forecasts, on multiple timescales, for no regrets early action). These innovations not only have far reaching implications for the future of disaster management within the Red Cross, but they have also already produced concrete benefits in the lives of flood victims and populations at-risk of flooding.

Summary of Recommendations

1. Be mindful for careful interpretation of forecasts, see discussion on page 30.
2. Create an Action Plan to close the gap between communication of seasonal forecasts and short-term forecasts and early action in communities (See, Part V).
3. Develop direct connections between national societies and national météo services, so that national societies receive region-specific and time-sensitive information directly. Establishing direct links between ACMAD and national societies would also be beneficial, particularly in countries where there is no national météo service.
4. Start EW>EA activities earlier. In some cases, the training, contingency planning, and/or pre-positioned stocks came after heavy rains and floods began. While these activities still helped, many National Societies expressed that they were not able to fully implement EW>EA because the process was initiated too late. Due to the size of the region and the annual migration of the ITCZ, the WCAZ should be monitoring and ready to conduct EW>EA for floods at multiple times during the year.
5. Be aware that just because a season is forecast to exhibit normal or below-normal rainfall, the possibility of intense rainfall events is not excluded. Though rain may occur less frequently over the season, if/when it does rain, a warmer atmosphere will increase the incidence of more-intense rainfall events.
6. Although there is emphasis among some parties on the full transition of EW>EA activities to the national society level, maintaining the appeal and pre-positioning of stock on the zone level will likely allow for smoother continuation of a no-regrets planning approach. When there is an above-normal seasonal rainfall forecast, the likelihood that heavy rainfall will occur somewhere in the region, as opposed to any specific country, is greater. For instance, the 2007 forecast shows how above-normal rainfall was expected to occur at slightly higher latitudes than what was observed (see Figure 12). By being prepared at the zone and/or regional level, there is a greater likelihood that preparation efforts will be utilized.
7. Identify and resolve blockages in transportation, logistics and communication, in order to improve the efficacy of EW>EA activities.
8. Create a system to gather data and monitor the impacts of using EW>EA over time.

Appendices

Appendix 1: Facts About the Season

Figure 12: 2007 Comparison of IRI Seasonal Precipitation Anomaly Forecast for JJA Precipitation (Left) to Observed Anomalies in Precipitation (Right)⁴⁵

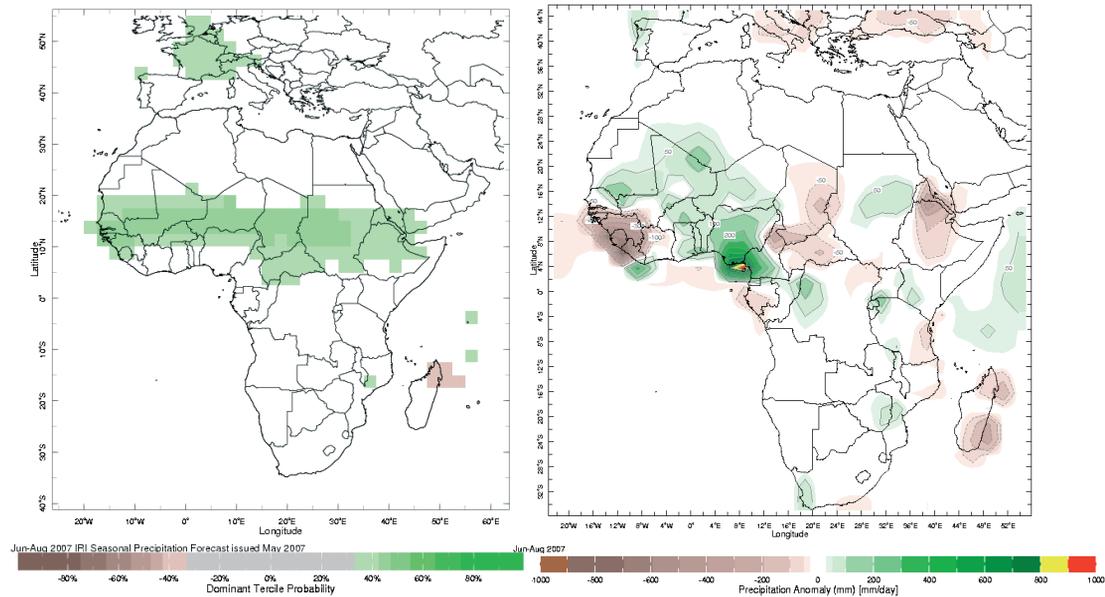
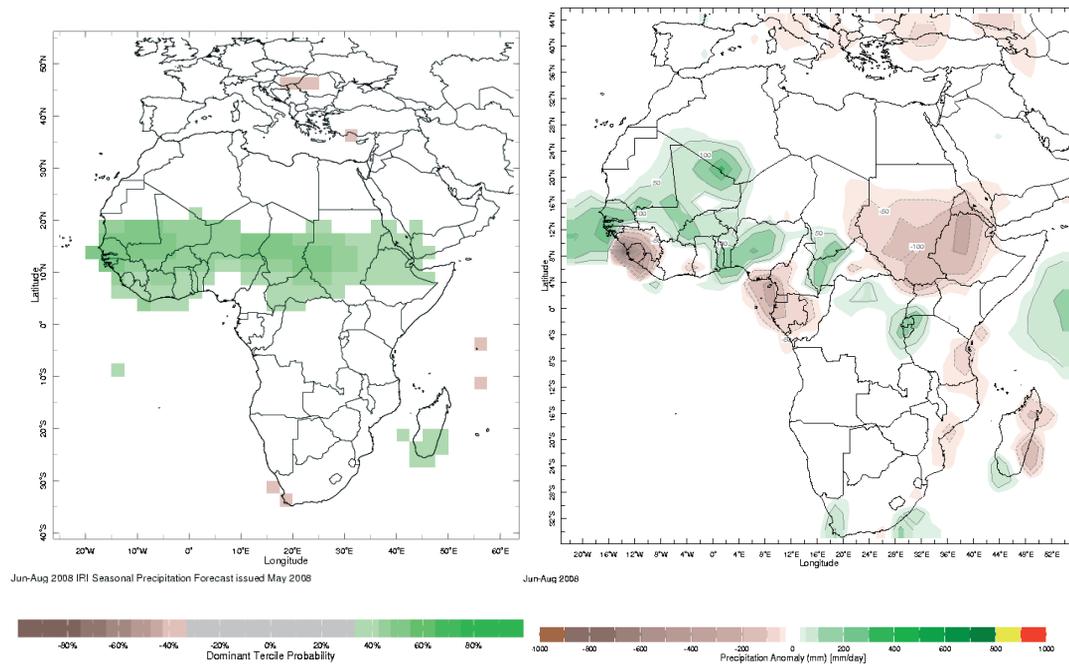


Figure 13: 2008 Comparison of IRI Seasonal Precipitation Anomaly Forecast for JJA Precipitation (Left) to Observed Anomalies in Precipitation (Right)



⁴⁵ Forecast maps were generated from the IRI Precipitation Forecast In Context Map Tool, online at: http://iridl.ideo.columbia.edu/maproom/IFRC/Forecasts/instructions.html#prcp_fcst. Observed anomaly precipitation maps were generated through the IRI Map Room: <http://iridl.ideo.columbia.edu/maproom/.Global/.Precipitation/Seasonal.html>

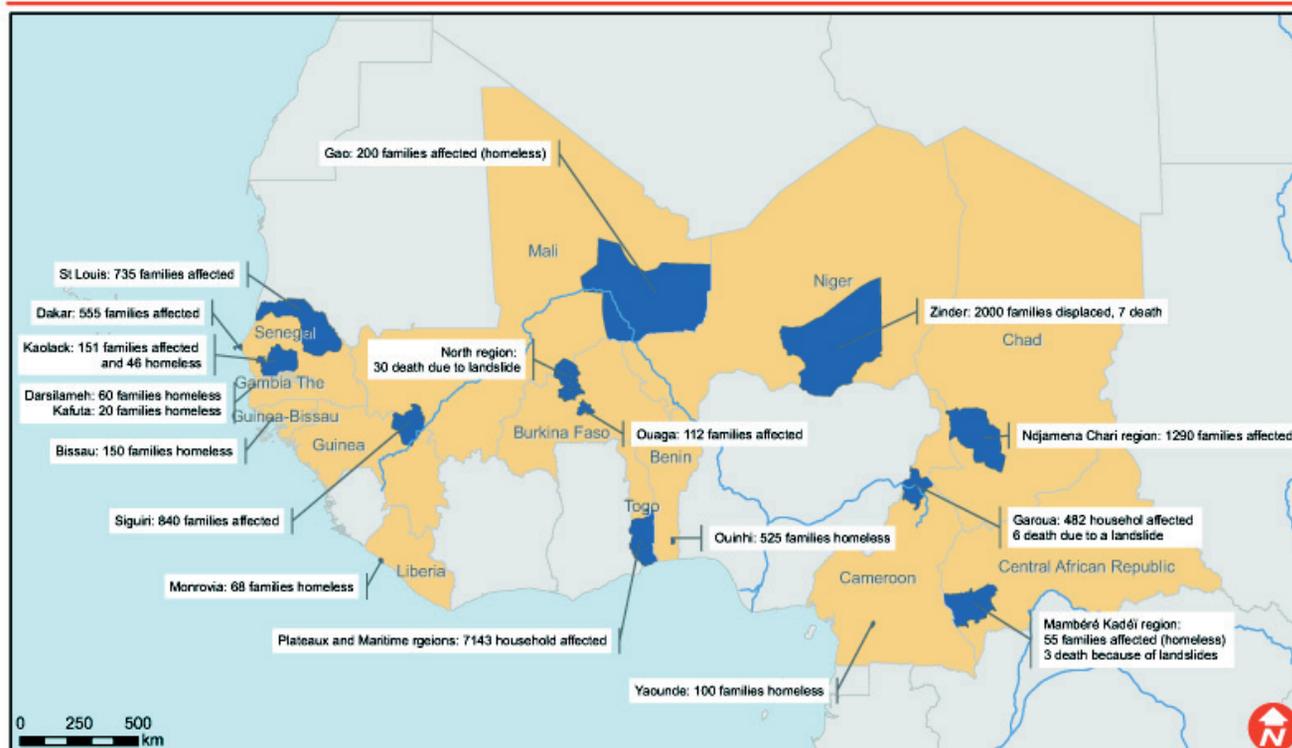
Figure 14: Floods in Western and Central Africa



International Federation of Red Cross and Red Crescent Societies
 Fédération internationale des Sociétés de la Croix-Rouge et du Croissant-Rouge
 Federación Internacional de Sociedades de la Cruz Roja y de la Media Luna Roja
 الاتحاد الدولي لجمعيات الصليب الأحمر والهلال الأحمر

Floods season mapping
 September 2008

Floods in Western and Central Africa



The maps used do not imply the expression of any opinion on the part of the International Federation of the Red Cross and Red Crescent Societies or National Societies concerning the legal status of a territory or of its authorities.
 Map data sources: ESRI, DEVINFO, International Federation, floods2008.mxd

Appendix 2: Additional Background and Analysis

About the DREF

The following excerpt is from Box 3.4 of the IFRC World Disasters Report 2009 p. 76-77, Elisabeth Soulie:

“The International Federation of Red Cross and Red Crescent Societies is in the process of strengthening its entire early warning early action system from improved forecasting and analysis of data to efficient early warning systems at community level, in collaboration with partners such as IRI, NASA and the Red Cross red Crescent Climate Centre. In its discussion paper *Ways Forward on Humanitarian Financing* in 2008, the Inter-Agency Standing Committee commented: “Humanitarian preparedness stands to gain most from improved localized response capacities.” It also underlines that emergency funding mechanisms cannot always support local response or emergency preparedness.

The International Federation’s Disaster Relief Emergency Fund (DREF), while providing emergency funding as start-up funds for major response operations, also has the flexibility and rapidity to fund small-scale local disaster response and emergency preparedness. Red Cross and Red Crescent Societies can request grants to allow them to prepare for response to imminent crises, whether for forecasted weather-related events, to fight the outbreak of epidemics or to prepare for civil unrest or population movement. The eligible costs are listed as:

- Mobilization and equipment of volunteers, including transport costs, per diems, visibility items
- Activation of community early warning procedures
- Evacuation of people at risk
- Preparation of shelters
- Pre-disaster assessment of capacity to respond to imminent crisis
- Activation and implementation of existing contingency plan
- Pre-positioning of relief supplies, logistics and human resource assets
- Provision and pre-positioning of additional resources, both human and material
- Communications (both telecommunications and media)

DREF has been used in the past to prepare for imminent crises, in hurricane preparedness and for example in Guinea at the beginning of 2007, when implementation of contingency plans for population movement following growing civil unrest was funded by a DREF allocation. Emergency preparedness allowed the Red Cross Society of Guinea to save many lives and to be acknowledged for its humanitarian work by the government, military and members of the public. In 2008, better access to forecasting and data led to several pre-emptive large-scale operations to prepare for expected damage from excessive rainfall, including in West and Central Africa in July [as discussed in this report]. However, while the DREF underwrote the operation to a level of CHF 483,000, donors have not supported the emergency appeal sufficiently to allow the allocation to be

reimbursed to the fund. This may indicate that donors are not yet able to find or use funding to support emergency preparedness.

Since 2004, the use of DREF has grown from CHF 4.7 million to CHF 17.8 million in 2008. The biggest increase is in grants for small-scale disaster response.... The majority of operations funded in 2007 and 2008 are in response to weather-related disasters. It is here that the International Federation anticipates using DREF more and more to support early action and to allow communities to act ahead of disasters and reduce the loss of life and property, and reduce injuries.”

A Note on Using Climate Information for RC Food Security Programs

Though it was not evaluated in this report, it is worth mentioning that the WCAZ also took a first step towards utilizing climate information to benefit its food security programs. In October 2008 the IRI issued its seasonal precipitation forecast indicating above-normal rain for the dry season in October, November, and December (OND). Although the region's upcoming dry season was not anticipated to produce nearly as much rain as its preceding above-normal *wet* season, the region was expected experience more rainfall compared to its average *dry* season.

In response to this warning, the WCAZ held a community meeting to consider what might be at risk from an above-normal rainfall forecast during the dry season. Farmers quickly raised concerns for crops, mostly nuts and cereals that are typically dried outdoors during the OND season. If there was going to be rain during this time, the crops could easily rot, putting food security at risk.

In partnership with the World Food Program (WFP) and the Food and Agriculture Organization (FAO), the WCAZ identified the exact drying period for certain crops in the region. WCAZ staff then contacted national societies in the region, asking them to inform farming communities that rain was possible during the harvest drying time, and they should be prepared to cover or shelter their crops in case of rain. While the impacts have not yet been evaluated, it is believed that this simple bit of information enabled many farmers to preserve their drying harvests.

Plans for Future use of Climate Information and Early Warning, Early Action in WCAZ

1. Using lessons learned from 2008, and recommendations from this evaluation, the WCAZ plans to create action plans for use of forecast information and systematize EW>EA in National Societies through pilot programs and the development of replicable models.
2. The WCAZ would also like to explore the use of climate information and satellite imagery to support its food security programs. A project outline for a pastoralist tool in which satellite imagery of vegetation guides farmers to good grazing areas has been drafted.
3. The WCAZ is also working to formalize partnerships with scientific organizations like ACMAD to establish clear channels of communication, receive expert advice on climate and weather information, and develop forecasting and monitoring tools specifically tailored to the needs of the Red Cross.
4. A grant from the World Bank has been secured for projects in community risk reduction activities using climate information in Burkina Faso and Senegal.

Appendix 3: Recommendations on Indicators

Worksheet with Proposed Indicators of EW>EA Efficacy

To minimize reporting requirements, the Zone might decide to only request this information in the case that the flood was extensive enough to require assistance from a DREF or Appeal. The worksheet could also be abbreviated to starred items (*), which mark priority indicators.

NS Floods in Year x	Flood 1	Flood 2...	Annual Totals (where appropriate)
Section A: Background and Extent of the Flood			
Date(s) of flood*			
Estimated duration of response operation required			
Emergency Level (DREF, Appeal, Information Bulletin)			
Number of people affected*			
Number of Flood Victims*			
Number of Vulnerable Flood Victims*			
Number of Beneficiaries* ⁴⁶			
Number of Deaths*			
% of people in need who received RC assistance (number of beneficiaries/number of vulnerable flood victims) x 100%*			
Section B: Efficacy of Warnings and Early Action			
Time between warning and flood (eg. Seasonal, x weeks, x			

⁴⁶ With the use of early warning information the definition of beneficiary is now changing. Some disaster managers are inclined to count all those within earshot of a megaphone to receive early warning information as beneficiaries. While these are indeed beneficiaries, it is important for this analysis to separate out the traditional beneficiary, who might have received non-food items, food, or shelter from the Red Cross, and those that did not (perhaps because they received a warning). By receiving warnings, the number of traditional beneficiaries should go down. The proceeding section will capture the number of people warned. This section asks for number of beneficiaries in the traditional sense.

<i>days, x hours, none).</i> *			
Estimated number of early warning recipients*			
Estimated population of flood-prone area*			
% of flood-prone population that were recipients of warnings (number of warning recipients/size of flood-prone population x 100%)*			
What actions did the RC take leading up to the flood? (<i>ex. evacuation, assistance moving food stocks etc.</i>) *			
Extent of food reserves lost to flood?			
Number of volunteers trained in DM before the flood* (NDRT & CDRT)			
Was a flood contingency plan in place? If yes, include date last updated.*			
Had VCA's been carried out in the affected communities?			
Were your EW>EA preparedness measures all in place before the floods began? If not, what was still lacking?			
What barriers did you face and/or overcome in implementing EW/EA? (e.g. logistics, communication, transportation, political, procedural?)			
Section C: Timeliness of RC Response			

Number of days between flood event and completion of needs assessment			
Number of days between flood event and submission of DREF (if applicable)			
Number of days between flood event and submission of Emergency Appeal (if applicable)			
Number of days flood victims waited for relief from RC volunteers*			
Number of volunteers mobilized for response after the flood*			
Number of days relief items took to arrive (from date requested)			
Number of days flood beneficiaries waited for RC relief items*			
Were NFI pre-positioned by the zone available to you?			
Section D: Resource Requirements			
Financial Resources utilized from DREF *			
Financial Resources utilized from Appeal *			
Total Financial Resources Used*			
Total Financial Resources Divided by Number of Beneficiaries*			

Optional Section: Disease Prevention⁴⁷
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⁴⁷ This section was not designed in consultation with any of the WCAZ's health staff. It is only based on the observation of water-borne disease outbreaks following floods.

Need for WATSAN and health sensitization programs identified?			
Number of days after the flood before WATSAN and health sensitization programs were implemented (if applicable)			
Number of beneficiaries from WATSAN/health programs			
Estimated % of WATSAN/health sensitization needs met.			
Number of post-flood cases of water-born and/or vector-born diseases*			
Financial resources used for preventative WATSAN and health promotion programs			
Financial Resources used to manage post-flood disease outbreaks *			

Only some of this information was available in 2008 for the national societies, and the data that was available is utilized in the *Preliminary Quantitative Analysis* section. A future reporting scheme along the lines of what has been proposed above could enable concrete evidence of benefits of EW>EA to be demonstrated. In sum, using data of this type it would be possible to see through annual comparisons over time:

- The extent to which early action took place based on early warnings
- Obtain a relevant measure of flood severity
- If EW>EA impacts response time
- If EW>EA impacts RC costs related to floods (per beneficiary)
- If EW>EA impacts the number of deaths (relative to the number of flood victims)
- If the RC is able to serve a greater percentage of those in need
- If the number of people in need of RC assistance is impacted by EW>EA

- Identify kinks in the system/capacity issues that are pre-existing or unresolved, and limit the realization of EW>EA's full potential.⁴⁸

Inclusion of the health section would also help identify any impacts on healthcare costs and suffering due to early action disease prevention programs.

⁴⁸ Informal conversation, Norbert Allele, WCAZ Disaster Management Response Manager. January 22, 2009. These issues, along with factors beyond the WCAZ's control can disrupt the best-laid plans. Examples of these include: Scarce financial resources, -Capacity limitations, -The scope, diversity, poverty and vulnerability of the region, -Political, hierarchical and bureaucratic challenges (internal and external), -Personalities and staff competencies, -Skill and state of probabilistic forecasts, -The reality of the wet season in a changing climate -Pre-existing logistical limitations in technology, communication and transportation. An alternative method of evaluation, suggested Allele, would be to compare actions taken to the original objectives. Original objectives and planned activities are outlined in the appeal and in contingency plans. Outlined objectives could be used as a sort of checklist, through which the various categories are evaluated. This method of evaluation would clearly show how well the WCAZ accomplished what it had set out to do. However it would not capture tangible benefits that result. This worksheet benefits for Allele's suggestion that when evaluating the success of EW>EA in DM, it is important to look at the process and not just the impacts.

Appendix 4: Links for Further Information

1. IFRC, www.ifrc.org
2. Red Cross Red Crescent Climate Centre, www.climatecentre.org
3. IFRC World Disasters Report, 2009 (Chapter 3)
<http://www.ifrc.org/publicat/wdr2009/summaries.asp>
4. International Research Institute for Climate and Society,
<http://portal.iri.columbia.edu/portal/server.pt>
5. Federation Map Room, <http://iridl.ldeo.columbia.edu/maproom/.IFRC/>
6. African Centre of Meteorological Application for Development (ACMAD),
<http://www.acmad.ne/>
7. AGRHYMET Regional Centre, <http://www.agrhymet.ne/eng/index.html>
8. Tall, Arame. Internship Report: “Climate Forecasting to Serve Communities in West & Central Africa: Bridging the Gap Between the IFRC-WCAZ & the Climate Science Community.” July 31, 2008 Online:
<http://www.climatecentre.org/downloads/File/reports/internship%20reports/Arame%20Final%20Internship%20Report.pdf>



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