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## Adapting to climate change and addressing drought – learning from the Red Cross Red Crescent experiences in the Horn of Africa



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### ABSTRACT

The paper presented here is intended to share lessons learnt from the operations that the International Federation of Red Cross and Red Crescent Societies (IFRC) and its National Societies undertook from 2008 to 2010 in the Horn of Africa, related to the adaptation to climate change and addressing drought. It acknowledges that to avoid further suffering from drought, not only in Africa (in the Horn and the Sahel region) but also other parts of the world, we need to change the way we invest. The IFRC advocates that for a national drought policy to be effective in its implementation, the policy itself will need to be developed with an integrated approach, a strong linkage to climate change adaptation and disaster risk reduction in a country.

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### 1. Introduction

The International Federation of Red Cross and Red Crescent Societies (IFRC) is the world's largest humanitarian organisation, providing assistance without discrimination as to nationality, race, religious beliefs, class or political opinions. Founded in 1919, the IFRC comprises 189 member in Red Cross and Red Crescent National Societies, a secretariat in Geneva, five Zone Offices and more than 60 delegations strategically located to support activities around the world.

The IFRC carries out relief operations to assist victims of disasters, and combines this with development work to strengthen the capacities of its member National Societies to enhance the service delivery to the most vulnerable. The IFRC's work as outlined in its Strategy 2020 (IFRC, 2010a) is with three strategic aims: (1) save lives, protect livelihoods, and strengthen recovery from disasters and crises, (2) enable healthy and safe living, and (3) promote social inclusion and a culture of non-violence and peace. The unique network of National Societies – which covers almost every country in the world – is the IFRC's principal strength. Cooperation between National Societies gives the IFRC greater potential to develop capacities and assist those most in need. At a local level, the network enables the IFRC to reach individual communities.

The paper presented here is intended to share lessons learnt from the operations that the International Federation of Red Cross and Red Crescent Societies (IFRC) and its National Societies undertook from 2008 to 2010 in the Horn of Africa, related to the adaptation to climate change and addressing drought. It acknowledges that to avoid further suffering from drought, not only in Africa (in the Horn and the Sahel region) but also other parts of the world, we need to change the way we invest. The IFRC advocates that for a national drought policy to be effective in its implementation, the policy itself will need to be developed with an integrated approach, a strong linkage to climate change adaptation and disaster risk reduction in a country.

### 2. Climate change induced drought, its humanitarian and development consequences and the need for national drought policies

Drought is an insidious phenomenon. Unlike rapid onset disasters, drought related disaster tightens its grip over time, gradually destroying an area. In severe cases, lack of rainfall leads to inadequate water supply for plants, animals and human beings and drought can last for many years and have a devastating effect on life and livelihoods. A drought may result in food insecurity, famine, malnutrition, epidemics and displacement of populations. According to the World Meteorological Organisation (WMO), climate change is projected to increase the frequency, intensity, and duration of droughts, with impacts on many sectors, in particularly food, water and energy.

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As drought is a slow onset process, we need to move away from a crisis-driven approach and develop integrated risk-based national drought policies and consolidated efforts for implementation. A policy for reducing risk of disasters, including droughts, made with a holistic and coherent approach, which provides an integrated overview of activities meeting the local needs and building resilience is more than a necessity! In drought-affected countries, such a policy could provide guidance and facilitate coordinating supports from partners from national to local level to address drought and its consequences effectively.

Climate change risks for many people are existential – the drought phenomenon, as discussed in this paper, is just one of them, but a serious one. Drought, with its slow-onset process and effects, is creating negative impacts – economic, environmental, and social (and security, in affected countries with fragile situations) – across countries and without borders. For example, the 2012–2013 North American Drought (C2ES, 2014), expanded from the 2010–2012 Southern United States drought, included most of the US, parts of Mexico, and central and Eastern Canada (Wikipedia, 2014).

Although highly industrialised countries have widely contributed to the increase of global greenhouse gas emissions, the emissions of economies in transition and large emerging economy countries are growing rapidly (<http://www.un.org/wcm/content/site/climatechange/pages/gateway/the-negotiations>). While the per capita emissions of developing countries are low compared to the industrialised countries, it is estimated that developing countries will bear 75–80% of the costs of damages related to climate change (World Bank, 2010) as a result of increased droughts, floods and strong storms coupled with a rise in the sea level.

In addition to an increase in the number of climate-related disasters, higher temperature and increased vulnerability, together with population growth, will result in increased incidence of food shortages and vector-borne diseases (IPCC, 2007). From a humanitarian point of view, this will stretch existing resources substantially, particularly considering the increased number of small-scale weather events that are increasingly undermining people's capacities to cope with and recover from disasters. The most vulnerable people will be the ones hardest hit by these changes in climate. For example, African countries dominate the top 10 list in terms of disaster victims as a proportion of total population size (Sylvain et al., 2012), mainly due to major droughts and the consecutive famines that have affected parts of the continent.

### 2.1. *Linking drought policies with National Adaptation Plans (NAPs) at country level*

Under the United Nations Framework Convention on Climate Change (UNFCCC), all developing countries are invited to establish so-called National Adaptation Plans (NAPs). NAPs are an emerging concept to plan and prioritise national adaptation activities. The concept was introduced through the Cancun Adaptation Framework ([http://unfccc.int/adaptation/cancun\\_adaptation\\_framework/items/5852.php](http://unfccc.int/adaptation/cancun_adaptation_framework/items/5852.php), paras 11–35) that was adopted during the Conference of the Parties (COP) of the UNFCCC held in Cancun in 2010.

In other words, governments determine their long-term priorities for climate change adaptation in their NAPs. Once a NAP has been established, the national government is likely to remain on the adaptation path identified in it. Nevertheless, the adaptation plans will be reviewed on a regular basis to include new information. Most available or planned funding for climate change adaptation and mitigation from multilateral and bilateral donors is being channelled through national governments and conditional to activities identified as priorities in the NAP. Therefore, the priorities identified in the NAP will determine where and what types of adaptation activities will take place in that specific country.

The NAPs can be understood as a list of priorities for climate change adaptation activities developed by the national governments. This priority list is meant to kick-off the planning for adaptation in developing countries and give an overall framework for the concrete implementation of the activities. Therefore, NAPs will not only play a major role in determining the future path that climate change adaptation will take in a country, but they will also be closely linked to available funding sources. For developing countries, the success of the implementation of a national drought policy will depend on the level of integration within NAP. It is important that relevant governmental officials in charge of developing and implementing a national drought policy and NAPs connect and consult each other and understand where the government stands in the process of developing a NAP, who the key stakeholders are and in which form a national drought policy can contribute to the development and implementation of the NAP.

As climate change adaptation can benefit from enhanced mitigation measures and some of these measures contribute to reduce drought impact, in particular in the land-use sector (afforestation and reforestation including agroforestry, provision of safe water or water for irrigation with clean technologies e.g., solar pumping, drip irrigation, water filters, etc.), national drought policy makers also need to take into account of National Appropriate Mitigation Actions (NAMAs) of the UNFCCC ([http://unfccc.int/cooperation\\_support/nama/items/6945.php](http://unfccc.int/cooperation_support/nama/items/6945.php)).

### 2.2. *Linking drought policies with disaster risk reduction (DRR)*

The Horn of Africa, for example, provides an extremely complex developmental and humanitarian context with which to engage. Political structures in the region, for instance ranging enormously from stateless to highly centralised states, also create challenges in good governance. Political volatility is high and conflict is recurrent. Extremely high levels of poverty and vulnerability to natural and man-made shocks are evident. Seasonal hunger and seasonal stress occur to varying extents virtually every year and many or most large-scale crises have a slow-onset character (IFRC, 2010b).

In the region, drought is not the only natural hazard impacting the daily life of people and communities. For example, in the case of Kenya, flood and drought crises are inextricably linked. As a consequence, food security is affected on all sides. While a drought can be the worst memory for a farmer, one can still be afraid of a coming flood. In this case, a drought policy not providing for flood protection could mean that rivers that could help families grow crops could instead ruin the land and destroy livelihoods. Where flood protection is appropriate, techniques such as rock-filled metal mesh gabions covered with earth can defend the land at critical points where the river is most likely to burst its banks. The protected land can be cleared and pumps can feed the irrigation system.

This kind of flood protection combined with upgraded irrigation systems, with canals that bring water to fields far from the river and using ponds as reservoirs for pumping the water further, not only protect the farmers from flood, but also contribute to avoiding the drought.

This is evidence of why disaster risk reduction in communities must become a priority. What assails the Horn of Africa today is a chronic crisis rooted in past complexity and major socio-economic developments. Lives and livelihoods have been undermined paving the way for recurring drought to exacerbate poverty, ill health, malnutrition and hunger. With outdated means of coping bound to fail, the Horn of Africa limps in and out of disaster. The bottom line is this: drought will remain a common occurrence in the region. What happens today will be repeated in the near future.

The main reason for this repetition is that the respective countries are not in a position to address the root causes of vulnerability to drought hazards and their preparedness capacity is non-existent. A national drought policy is needed to give direction for actions from national to community level, and needs to be developed with an integrated strategy so that it can guide investment in multi-hazard protection, risk reduction and climate change adaptation. It is only then that countries can engage in providing an integrated overview of all required activities, including innovative approaches to protect the environment and ecosystem, improve water and food security, strengthen livelihoods and tackle malnutrition, healthcare and social issues.

A few disaster risk reduction measures for the consideration of national drought policy makers are indicated below.

### 2.2.1. Early warning and early action

One critical component for disaster risk reduction is effective early warning systems (EWS). In contrast to disaster response mechanisms, early warning systems are one of the many important tools that contribute to the prevention of disasters as well as preparedness for hazards and threats, of any kind, including droughts. However, early warning systems will not be effective in saving lives if they are not combined with early actions facilitated by “people-centered” approaches and networks.

In the effort leading to early warning and early action, factors as diverse as knowledge, power, culture, environment, lifestyle and personality often determine whether people heed warnings. There is therefore a consensus that communities must, at the very least, be active in production of information as well as being recipients of information. Some may even need to be engaged in monitoring so as to facilitate their adoption of protective actions. By engaging communities in the development of the early warning systems from the beginning many of the challenges encountered can be addressed.

Recently IFRC issued a publication entitled “Community early warning systems: guiding principles” (IFRC, 2012). Its collection of case-studies from more than 50 countries across the world provides useful references and an overview of successful practices from the field for the disaster risk reduction/management practitioner interested in EWS.

The four EWS components (IFRC, 2012) include the following (Fig. 1):

- 1) Risk knowledge builds the baseline understanding about risks (hazards and vulnerabilities) and priorities at a given level.



Fig. 1. The four components of Early Warning Systems (IFRC, 2012).

- 2) Monitoring is the logical follow-on activity to keep up-to-date on how those risks and vulnerabilities change through time.
- 3) Response capability insists on each level being able to reduce risk once trends are spotted and announced – this may be through pre-season mitigation activities, evacuation or duck-and-cover reflexes, depending on the lead-time of a warning.
- 4) Warning communication packages the monitoring information into actionable messages understood by those that need, and are prepared, to hear them.

It is well known that to be effective, early warning systems must be understandable, trusted by and relevant to the communities that they serve. Warnings will have little value unless they reach the people most at risk, who need to be trained to respond appropriately to an approaching hazard.

For instance, in Ethiopia, even though the National Meteorological Agency provides valuable information on climate science in the country and the Disaster Management and Food Security Sector provides an analysis of the same information and tailors it into a drought bulletin, the major challenge remains the flow of information towards end users in an understandable manner to instill the practice of early action in the face of disaster, into communities and disaster risk reduction practitioners. In addition, the information dissemination through national media focusing on cities and specific administrative regions has been limited to weather forecasting (UNISDR Africa, 2012).

The 3rd World Climate Conference (WCC-3), organised by the World Meteorological Organisation in 2009, identified current limitations, which include the above mentioned, in the provision of climate information and services that are critical for early warnings and early action. In response, one of the WCC-3 outcomes, the Global Framework for Climate Services (GFCS), is with capability characterised in its “pillars”: Observations and Monitoring; Research, Modelling and Prediction; Climate Service Information Systems; User Interface Platform (UIP); and the overarching one of Capacity Building. It is being crafted to enable the availability of information and services to support decision-making in the identified initial four priority areas for its first phase implementation – disaster risk reduction, health, water, and agriculture/food security – with an important focus on linking the climate service requirements with the end-to-end GFCS capability (WMO, 2011). As the consequences of drought cross cut these four identified areas, it is crucial for governments to bring on board relevant stakeholders for drought policy making and implementation.

### 2.2.2. Public education and awareness-raising

Combating drought requires both collective and individual efforts in risk reduction. However, without appropriate public understanding on drought, including current events and future effects due to climate change, not much can be accomplished effectively at both levels. Risk reduction as well as safety and resilience require dramatic behavioural changes. These are only possible when there is a common public understanding and ‘everyone is doing it.’

For behavioural change messages to catch hold, people need to understand the reasons for carrying out specific measures and feel not only convinced of their effectiveness but capable of implementing them. The better each household can plan ahead, reduce its risks (through structural, non-structural, infrastructural and environmental measures), develop response skills and store response provisions, the greater its resilience will be.

A scientific analytical research made in 2002 (Kirschenbaum, 2002) highlights three logical and consistent spheres of activity that emerge from a wide mix of household hazard adjustment activities:

- Assessing risks as well as planning activities to reduce and/or respond to identified risks,

- taking risk reduction measures to make built and natural environments safer, and
- developing response capacity, through learning skills and storing provisions.

Looking beyond household hazard adjustment to consider the wider range of disaster reduction activities suggested at micro and macro levels, these same spheres of activity still apply. Indeed, risk reduction outcomes require action in all three of these areas, and at every level of society. Cutting across all these efforts is the need to consider all members of households and communities, from the youngest to the oldest and including women and men, girls and boys, recognising their individual access and functional needs, and those of the animals in their care.

In January 2013, IFRC also launched a publication to provide guidance in this area “Public awareness and public education for disaster risk reduction: key messages” (IFRC, 2013). By following this guidance, households and families can protect themselves, bounce back quickly, and contribute to the rapid recovery of their community. Each household can be part of the solution. This work starts with each and every one of us, and government support at the community level is indispensable to make it work.

### 2.2.3. Appropriate provision of basic services and increased investment to empower local population and build their resilience

Effective disaster risk reduction can never be achieved in a community where people lack the means to meet their basic needs, such as food, health care, education, water, shelter and roads. This is emphasised by the United Nations' Millennium Project which stresses the need for simultaneous investments in direct service delivery and in building capacity. Equality and non-discrimination as principles for delivery ensure that the services reach all of the population, especially the most disadvantaged.

Nevertheless, national scale-up is a major managerial challenge for many developing countries. It requires a carefully designed multiyear planning framework by governments to ensure that investments have the expected impact. While governments have the primary responsibility for managing this complexity, by planning and funding the core services required, the services can often be delivered by stakeholders such as NGOs, private sector and with

local level input from civil society. Public service managers need to work more closely with community-based organisations, including National Red Cross and Red Crescent Societies, which at a minimum should participate in the design and monitoring of scale-up plans through representation in the strategy group and through regular civil society consultations.

Governments crafting a national drought policy need to take local actors on board and have a strong commitment to ensure that basic services reach people in arid lands through locally appropriate delivery mechanisms. With such an engaged political leadership, governments can facilitate the involvement and ownership of communities and civil society organisations and mobilise the private sector. This can lead to long-term and predictable support, including funding commitments and technical assistance, from donors to give countries the means to scale up their engagement.

### 3. Learning from the Horn of Africa: Red Cross and Red Crescent experiences

Every year, Africa is faced with consequences of weather and climate extremes such as droughts, floods and cyclones. From 2000 to 2008, the continent accounted for more than 20% of all global weather and climate-related disasters. It is this increased climate variability and long-term changes brought about by global warming that are resulting in a rise in the frequency and severity of hydro-meteorological hazards. At the same time, environmental degradation is exacerbating existing vulnerabilities and limiting people's ability to cope with and recover from disasters.

The absence of precipitation and excess evapotranspiration from the soils and crops over a long duration can be a result of climate extremes. They can lead to droughts and affect many sectors including water, agriculture, disease control, food and livelihoods etc. Recurrent droughts have a particularly severe impact on the continent of Africa and its people. (Projected change in annual average precipitation by the end of the 21st century (NOAA GFDL, 2008), based on a medium emissions scenario (SRES A1B) is shown in Fig. 2.)

In the Horn of Africa, drought is endemic to the region and no one has known it otherwise and inhabitants of the driest regions

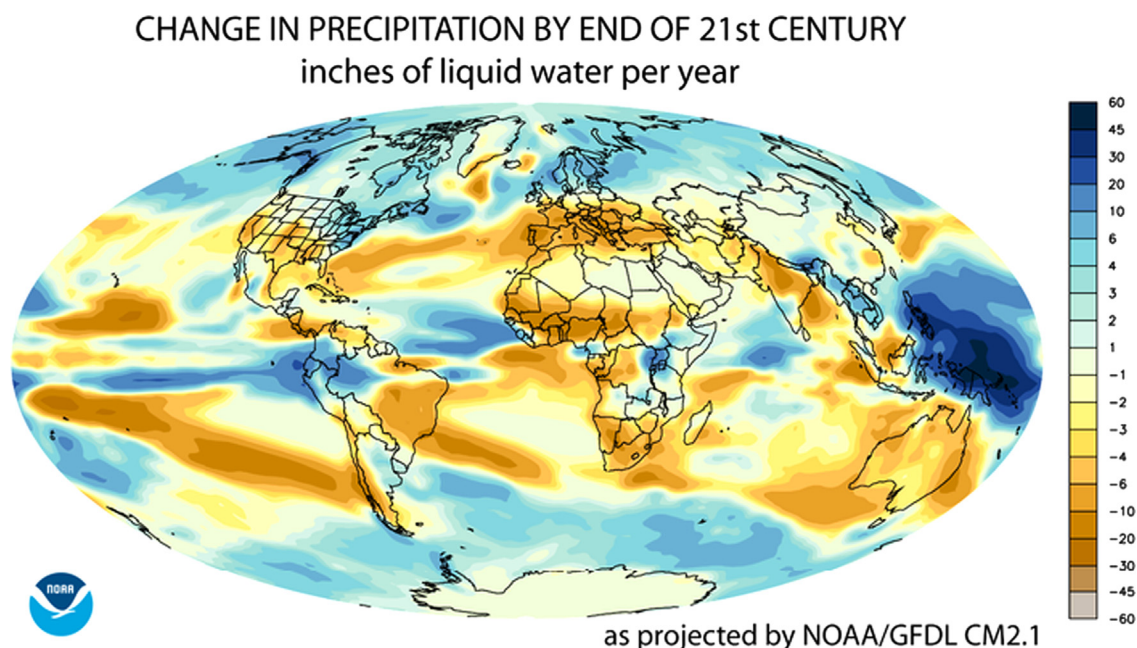


Fig. 2. Projected change in annual average precipitation by the end of the 21st century, based on a medium emissions scenario (SRES A1B) (NOAA GFDL, 2008).

have lived and thrived through peaks and troughs of precipitation for centuries. However, since decades, the realities brought by climate change have left these people – who were in the past masters of survival – and their usual coping methods, with little change of success.

In the last 30 years, a series of droughts have occurred in sub-Saharan Africa. One-third of the African population lives in drought prone areas and Africa has the highest mortality-related vulnerability indicators for drought. In 2008–2010, the Horn of Africa's most serious drought in decades brought severe, and all too familiar, humanitarian consequences. Famine was declared in parts of Somalia, and hundreds of thousands of Somalis crossed the borders into refugee camps in Kenya and Ethiopia. Over 13 million people were affected.

The following are some of the key facts and figures from the review (2008–2010) conducted by the IFRC on the drought in the Horn of Africa (IFRC, 2011a):

- Drought in the Horn of Africa affected over 13 million people, including 3.75 million Kenyans.
- The World Food Programme was able to assist only 7.4 million people (77 per cent of those it would like to help).
- Approximately one in three Somalis were displaced due to the drought.
- Almost 3.7 million people in Somalia (close to half the population) were facing a humanitarian crisis.
- 1 in 3 children in southern Somalia were malnourished.
- Over \$1bn (US) had been committed to respond to the emergency but a further \$1bn was still needed to save thousands of lives.
- In the Dollo Ado refugee camps in Ethiopia, 50 per cent of children under five years old were acutely malnourished.
- According to the UN, unless operations were increased, 750,000 people were at risk of death in the next four months.
- The food aid coming to Somalia could only meet about 10 per cent of the country's needs.
- Over 30 per cent of people were malnourished in drought affected areas.

Much of the suffering in these situations could be avoided with stronger political will, from respective governments and the humanitarian and development agencies supporting them, to prepare ahead of time and respond to the prevailing drought situation in the region in a timelier manner. In a region plagued by such recurrent droughts, the greatest challenge today is preventing the next disaster.

The Red Cross and Red Crescent National Societies have been responding to drought for decades. Between 2008 and 2010, the IFRC launched four international appeals to respond to drought and food insecurity in the Horn of Africa. The results were decidedly mixed. For the most part, the Appeals themselves failed to generate significant donor support, and the largest of the Appeals was only 9% funded!

Learning from the Red Cross Red Crescent experiences in providing support to the people the Horn of Africa – although some of the challenges are commonly attributed to donor fatigue and the inherent logistical challenges of managing relief operations in the region – it is clear that the way we invest must change! Four lessons from a review (IFRC, 2010b) of this operation from 2008 to 2010 are worth noting and can serve as useful references for humanitarian and development activity planning in the region:

- Droughts are natural and recurring in the Horn of Africa. Therefore measures addressing sudden, large scale emergency relief operations are often less relevant for addressing the long term challenge of supporting communities to become

more resilient to the cycles of drought. The twin-track approach – combining emergency humanitarian assistance and development aid – is more appropriate for building more drought-resilient societies.

- The above-mentioned review acknowledges the progress that the wider humanitarian sector (and some Red Cross Red Crescent National Societies) has made in the use of early warning systems and analysing food security trends. With drought, the interventions in the region have become more sophisticated, and so must the stakeholders in the region, if their interventions are to remain relevant.
- Protecting livelihoods should be a core principle of responding to drought, and food aid is often not the best option to achieve that end. More attention needs to be given to innovating with cash responses, protecting livestock and addressing health as well as food and nutrition security threats.
- There is a need to advocate for increased investment in community resilience work, even when the rainfall is good, as this can provide opportunities to engage in long term solutions. A slow on-set disaster such as drought requires responses which focus on long-term resilience building. We must build community resilience and empower the people of arid lands to rise above the natural hazards that so frequently confront them.

#### 4. Partnerships for effective drought policy formulation and implementation aimed at building local resilience

As drought affects a wide range of sectors, the involvement of appropriate stakeholders in the consultation process to craft a national drought policy is a key to ensure successful drought policy joint implementation. Relevant actors can contribute to the drought policy formulation processes by providing needed references in the following areas:

- The general development challenges of regular drought prone areas such as drylands,
- the specific impact of drought on populations, their resource base and livelihoods, and
- different ecological and/or economic zones, as they may have different degrees of rainfall dependence and different types and degrees of coping and adaptive capacity (UNISDR Africa, 2012).

As mentioned above, an appropriate national drought policy can guide coordinated efforts for its implementation with partners. This reduces not only risk and vulnerability, but also strengthens resilience to shocks such as recurrent droughts and other adverse events. It will also help to build sustainable household livelihoods.

#### 5. Conclusions

Learning from the Horn of Africa, the IFRC calls for the following actions to address the recurrent drought effectively. We urge that these actions be taken into account when making a national drought policy:

- Empower communities to influence national policy and its implementation, to decide on their own development and humanitarian priorities and enable them to monitor the use of funding allocated to them.
- Establish joint accountability mechanisms that ensure public, development and humanitarian funding is directed and spent adequately based on the priorities identified by communities.

- Increase government investment in community infrastructure and social services with a focus on education suitable to lifestyles in arid areas, market infrastructure, development of small businesses and alternative livelihoods that complement pastoralism.
- Protect communities from rising food prices that magnify the impact of drought. As set out in the 2011 World Disaster Report (IFRC, 2011b), new regulations must curb the ability of speculators to exert excessive market power over food commodities.
- Support smallholder farmers and pastoralists with investments focusing on innovative natural resource management, increased access to information, introduction of flexible and adequate financial schemes and services and introduction of drought resilient livestock breeds and crop varieties.
- Establish fairer trade relations and transparent foreign investments in natural resources to ensure natural resource sustainability, and a fair return back to local communities without jeopardising their traditional livelihood sources.
- Facilitate timely access to weather forecast information, early response funding mechanisms and technical support for farmers and pastoralists.
- Develop and implement community risk management strategies as a priority.
- Use a twin-track approach to bridge the divide between humanitarian aid and development assistance and ensure sustainable livelihoods with a focus on strengthening community resilience, good governance and equitable distribution of public budgets and investments.
- Continue efforts to mitigate conflicts, ensure regional peace and security. This might include establishing safe crossing corridors for pastoralists to facilitate their access to grazing and water resources.

In the long term, sustainable livelihoods do reduce food insecurity. The IFRC believes that a well integrated drought policy at national level is essential to support and protect people and communities and enable them to be more resilient to the consequences brought by recurrent droughts.

## References

- C2ES, 2014. Drought and Climate Change. Center for Climate and Energy Solutions. (<http://www.c2es.org/science-impacts/extreme-weather/drought>).
- IFRC, 2010a. Strategy 2020: saving lives, changing minds. International Federation of Red Cross and Red Crescent Societies. Geneva, Switzerland. 35 pp. (<http://www.ifrc.org/en/who-we-are/vision-and-mission/strategy-2020/>).
- IFRC, 2010b. Early warning – delayed response? Lessons from IFRC Horn of Africa Appeal. International Federation of Red Cross and Red Crescent Societies. Geneva, Switzerland.
- IFRC, 2011a. Drought in the Horn of Africa: preventing the next disaster. International Federation of Red Cross and Red Crescent Societies. Geneva, Switzerland. 22 pp.
- IFRC, 2011b. World disasters report 2011: focus on hunger and malnutrition. International Federation of Red Cross and Red Crescent Societies. Geneva, Switzerland. 251 pp.
- IFRC, 2012. Community early warning systems: guiding principles. International Federation of Red Cross and Red Crescent Societies. Geneva, Switzerland. 80 pp.
- IFRC, 2013. Public awareness and public education for disaster risk reduction: key messages. International Federation of Red Cross and Red Crescent Societies. Geneva, Switzerland. 64 pp.
- IPCC, 2007. Summary for policymakers. In: Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M., Miller, H.L. (Eds.), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, England.
- Kirschenbaum, A., 2002. Disaster preparedness: a conceptual and empirical reevaluation. *Int. J. Mass Emerg. Disasters* 20, 5–28.
- NOAA GFDL, 2008. Will the wet get wetter and the dry drier? GFDL climate modelling research highlights, vol. 1, February 2007. Revision 15 October 2008. The National Oceanic and Atmospheric Administration (NOAA) Geophysical Fluid Dynamics Laboratory (GFDL), Princeton, New Jersey, USA.
- Sylvain, P., Sapir, D.G., Below, R., 2012. *Annual Disaster Statistical Review 2011. Center for Research on the Epidemiology of Disasters (CRED), Brussels, Belgium*.
- UNISDR Africa, 2012. Africa informs: special issue on drought 2012. United Nations International Strategy for Disaster Reduction Regional Office for Africa. Nairobi, Kenya. 67 pp.
- Wikipedia, 2014. 2012–14 North American drought. ([http://en.wikipedia.org/wiki/2012%E2%80%9314\\_North\\_American\\_drought](http://en.wikipedia.org/wiki/2012%E2%80%9314_North_American_drought)).
- WMO, 2011. Climate knowledge for action: the global framework for climate services – empowering the most vulnerable. WMO No. 1065. World Meteorological Organisation. Geneva, Switzerland. 240 pp.
- World Bank, 2010. *World Development Report 2010. The International Bank for Reconstruction and Development/The World Bank, Washington DC, USA (21 pp)*.