

STRATEGIC FRAMEWORK FOR DROUGHT RISK MANAGEMENT AND ENHANCING RESILIENCE IN AFRICA

WHITE PAPER

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ACRONYMS AND ABBREVIATIONS

ACMAD	African Centre for Meteorological Applications to Development, Niamey, Niger	IPCC	Intergovernmental Panel on Climate Change
AfDB	African Development Bank	ITCZ	Inter-Tropical Convergence Zone
AGRHYMET	Regional Centre for Training and Application in Agro-meteorology and Operational Hydrology, Niamey, Niger	NAPs	UNCCD national action programmes
ARC	The African Risk Capacity Center	NASA	National Aeronautics and Space Administration, U.S.A.
AU	African Union	NDMA	National Drought Management Authority, Kenya
CAADP	NEPAD's Comprehensive Africa Agriculture Development Programme	NDMC	National Drought Mitigation Center, University of Nebraska-Lincoln, U.S.A.
CBD	Convention on Biological Diversity	NDMP	National Drought Management Policies
CILSS	Permanent Inter-State Committee against Drought in the Sahel	NEPAD	New Partnership for Africa's Development
CMIP5	Coupled Model Intercomparison Project	NEWFIS	Namibia Early Warning and Food Information System
CPP	Country Programme Paper	NGO	Non-governmental organization
COP	Conference of the Parties	NMS	National meteorological service
CRED	Centre for Research on the Epidemiology of Disasters	NOAA	National Oceanic and Atmospheric Administration, U.S.A.
CST	UNCCD Committee on Science and Technology	NPSDRM	National Policy and Strategy on Disaster Risk Management, Ethiopia
DMC	Drought Monitoring Centre	PRB	Population Reference Bureau
DRAPA	Drought Resilient and Prepared Africa	RCMRD	Regional Center for Mapping of Resources for Development
DRMFSS	Disaster Risk Management and Food Security Sector, Ethiopia	RCP	Representative Concentration Pathway
DRR	WMO Disaster Risk Reduction Programme	SADC	Southern African Development Community
EDE	Ending Drought Emergencies	SADC-CSC	SADC Climate Services Centre
EM-DAT	CRED International Disaster Database	SDGs	Sustainable Development Goals
ENSO	El Niño–Southern Oscillation	SFDRR	Sendai Framework for Disaster Risk Reduction
FAO	Food and Agriculture Organization of the United Nations	SPEI	Standardized Precipitation–Evapotranspiration Index
FEWS NET	Famine Early Warning Systems Network	UNCCD	United Nations Convention to Combat Desertification
GFDRR	Global Facility for Disaster Reduction and Recovery	UNDP	United Nations Development Programme
GIEWS	Global Information and Early Warning System on Food and Agriculture	UNECA	United Nations Economic Commission for Africa
GIS	Geographic Information System	UNEP	United Nations Environment Programme
GRIP	Global Risk Identification Programme	UNESCO	United Nations Educational, Scientific and Cultural Organization
GWP	Global Water Partnership	UNFCCC	United Nations Framework Convention on Climate Change
HFA	Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters	UNICEF	United Nations Children's Fund
HHAfi	Harvest Help – African Food Issues	UNISDR	United Nations International Strategy for Disaster Reduction
HMNDP	High-level Meeting on National Drought Policy	UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
ICPAC	IGAD Climate Prediction and Application Centre, Nairobi, Kenya	UNW-DPC	UN-Water Decade Programme on Capacity Development
IDDRISI	IGAD Drought Disaster Resilience and Sustainability Initiative	USAID	United States Agency for International Development
IDMP	Integrated Drought Management Programme	WACDEP	Water, Climate and Development Programme
IDMP-CEE	Integrated Drought Management Programme in Central and Eastern Europe	WBG	World Bank Group
IGAD	Intergovernmental Authority on Development	WFP	United Nations World Food Programme
		WMO	World Meteorological Organization

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FOREWORD

Concerted global and regional efforts to mitigate the effects of droughts and associated risks are vital. The unusually strong El Niño in 2015–2016, coupled with record-high temperatures, had a catastrophic impact on rainfall across southern and eastern Africa. It crippled countries from Ethiopia to Zimbabwe and affected as many as 36 million in the region. Namibia experienced its worst harvest in 80 years. The drought prompted many African countries to declare a state of emergency.

This report highlights six principles for a Drought Resilient and Prepared Africa (DRAPA). It was developed in the framework of the African Drought Conference held in August 2016 in Windhoek, Namibia. The six principles are:

1. Drought policy and governance for drought risk management;
2. Drought monitoring and early warning;
3. Drought vulnerability and impact assessment;
4. Drought mitigation, preparedness and response;
5. Knowledge management and drought awareness and
6. Reducing the underlying factors of drought risk.

Together we can strengthen early warning systems in a way that will urge, facilitate and lead to early action by stakeholders. African countries can prepare themselves for drought by developing sustainable irrigation schemes for crops and livestock, rain water harvesting, boosting the recycling and reuse of water and wastewater, exploring the potential of growing more drought tolerant crops, expanding crop insurance schemes and establishing alternative livelihood projects. Countries can adopt a national drought policy with a focus on risk reduction at various levels of government. Drought is not a sector but a connector. So let us organize more widely and move away from ‘silo thinking’ to more coordinated approaches. There is beginning to be real hope and real ambition across Africa. With the necessary policy tools we can deliver drought resilient societies.

I hope you find the report useful and informative. I trust these principles can help guide your path to a more drought resilient future.

Monique Barbut
Executive Secretary, UNCCD



EXECUTIVE SUMMARY

Drought is a complex natural hazard that is global in nature and has cross-cutting impacts on many aspects of livelihoods and sectors of society, such as agriculture, energy, food security, health, water resources, migration and conflicts over resources. Of all the dramatic events in nature, drought is perhaps the one with the most lasting effects (NDPC, 2000). For generations, Africans have grappled with the far-reaching consequences of drought that has killed millions of people and caused significant social, environmental and economic damage throughout Africa's history.

Today, drought impacts are even more complex, since they affect a larger number of economic sectors, creating more conflicts between water users, whose societal vulnerability has become dramatically different and varied. According to the recent IPCC (2014) report, the threat of climate change can increase the frequency, severity, duration and spatial extent of drought events in the future. In addition, drought threatens decades of development progress by diminishing the ability of communities to absorb climatic shocks and adapt to a changing climate. Furthermore, the explosive population growth in Africa acts as a challenge multiplier when it comes to impacts of drought.

Drought response practices in Africa reflect the social and economic situation of the countries located on the continent. Even though some progress has been made, the current experience in many countries in Africa suggests that most governments have not yet given a proper priority to drought risk management and continue to rely on the crisis management approach (ICPAC, 2016). Governments and donors provide more resources for response activities rather than long-term developmental programs that address the planning, mitigation and disaster preparedness aspects. Given the urgency and insufficient time to plan during a drought crisis, emergency response is usually implemented inefficiently, resulting in significant damage. Several studies and scientific research reports have indicated that drought planning and proactive mitigation programs can reduce drought impacts, minimize conflicts over water, save millions of lives and lower emergency relief expenditures in drought-stricken regions. Drought needs to be seen as a recurring natural disaster that needs to be planned for and taken into account in the national policies.

The recurrent droughts in Africa, exacerbated by climate change, created a need for more effective drought planning and the development and implementation

of appropriate mitigation strategies. The integration of a drought risk management approach into the national policies would allow long-term development intervention measures to be adapted to the changing climate. New measures that allow anticipating and coping with drought by focusing on long-term drought resilience in addition to short-term response are needed to keep up with the evolving climate conditions. Strategically, Africa needs to ensure food security for an ever-increasing population while reducing its drought vulnerability and protecting the environment. African countries should also strengthen their efforts to tackle the crosscutting and multidisciplinary global challenges that include climate change, energy, food, agriculture and nutrition, global health and water.

While several initiatives have been implemented nationally, regionally and internationally, ensuring substantial progress towards a paradigm shift to drought risk management and efficient proactive actions, a coherent and collaborative effort towards developing a strategic disaster management framework is needed now more than ever. Efficient and effective organizational structures and mechanisms along with human resources that provide rich experience, knowledge and skills are vital to an effective disaster risk management system. However, current assessments in Africa indicate that these have not yet been fully achieved. African nations need to establish a drought risk management and resilience strategy framework that is more focused on the human dimensions of drought together with proactive drought risk reduction measures. A strategic framework that considers socioeconomic and gender asymmetries of drought impacts will help Africa reduce economic and human losses, as well as identify and prioritize drought risk management instruments and mitigation activities.

Leveraging past and present experiences and lessons learned in Africa, in line with the global disaster reduction frameworks such as the Sendai Framework and the High-level Meeting on National Drought Policy (HMNDP), a new strategic framework called "Drought Resilient and Prepared Africa (DRAPA)" is proposed. DRAPA is designed to build an effective drought risk management approach along with enhanced resilience at continental, regional, national or local and community levels. The DRAPA strategic framework will have six main elements that are aligned with the priorities of African regional networks, such as the IGAD drought disaster resilience and sustainability initiative, national action programmes (NAPs), and the global disaster

risk reduction frameworks, for example, the Sendai Framework. The elements include:

1. Drought policy and governance for drought risk management;
2. Drought monitoring and early warning;
3. Drought vulnerability and impact assessment;
4. Drought mitigation, preparedness and response;
5. Knowledge management and drought awareness; as well as
6. Reducing underlying factors of drought risk and cross-cutting issues, such as capacity development and reducing gender and income inequality.

The proposed DRAPA strategic framework structure is centered on African countries that specifically address the drought issues in Africa. It proposes to develop and implement a strategy integrating national and regional institutes in Africa under African Union leadership in collaboration with the international community including United Nations (UN) agencies. The outcome

of the development and implementation of the strategic framework will be people-centered, including women and minorities, and sharpening the focus on drought issues to reduce drought impacts and enhance drought resilience across all segments of society. The development of a strategic framework for drought risk management and enhancing drought resilience is a step forward to achieving these goals.

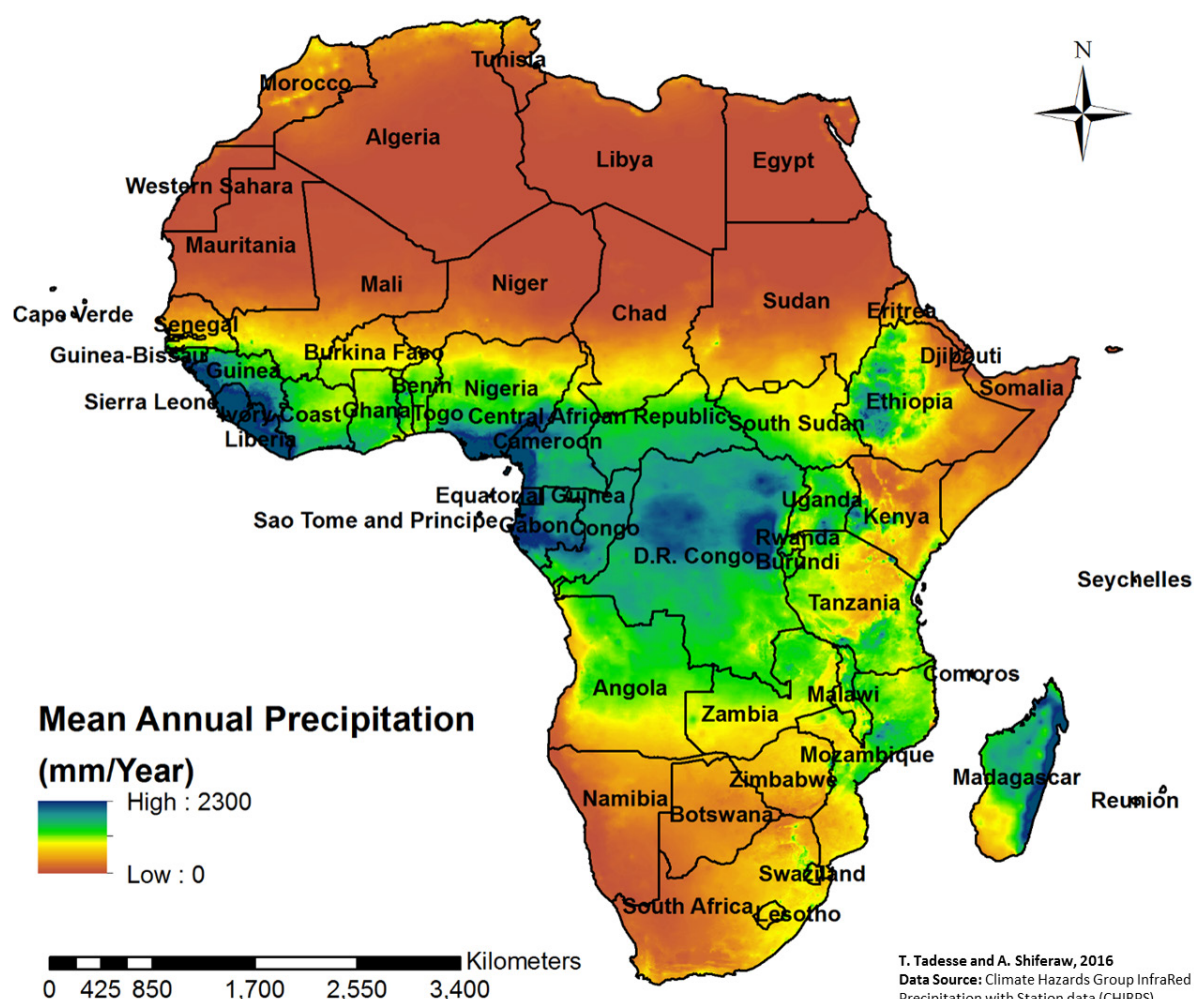
The DRAPA strategic framework and its implementation are expected to ensure a substantial reduction of drought impacts on human lives in Africa. It would also lead to a significant reduction in drought impacts on economic and environmental assets of communities and countries in Africa. In collaboration with international institutes and countries around the world, Africa can integrate drought risk management into sustainable development policies and planning. In addition, African countries need to focus on the development of national and regional institutions, cultivate efficient mechanisms for addressing drought and build disaster resilience.

INTRODUCTION

Drought is a complex natural hazard that occurs in every part of the world and adversely affects the lives of millions of people each year, causing significant damage to the economy, environment and property (Tadesse et al., 2008; Wilhite, 2000). Drought, as any other natural hazard, has both natural and social dimension. In most cases, the social dimension is the factor that turns drought into a disaster. For any region, the risk associated with drought is a product of both the region's exposure to the event – in other words, the probability of drought and various levels of drought severity, as well as the vulnerability of society to drought (Wilhite et al., 2014; Cutter et al., 2003; Blaikie et al., 1994).

The climate in Africa is characterized by distinct wet and dry seasons. The spatial distribution of mean annual precipitation for Africa is shown in Figure 1. Climatologically, the annual rainfall maximum over the continent typically develops from March to May, when convection is extremely active within the inter-tropical convergence zone (ITCZ) in the Gulf of Guinea, the Congo rain forest region and the equatorial eastern Africa. This maximum is followed by the annual minimum during the months between May and October, when rainfall shifts to the northern tropical belt region (0°-20°N) between the Sahara Desert and central Africa, coinciding with the West African monsoon (Novella and Thiaw, 2013).

Figure 1: Mean annual rainfall (1981-2014) patterns of the African continent. (Data source: Climate Hazards Group <http://chg.ucsb.edu/data/chirps/>)



Source: Climate Hazards Group <http://chg.ucsb.edu/data/chirps/>

After September, the gradual increase in seasonal mean precipitation correlates with the onset of the rains in Central Africa, Southern Africa and equatorial Eastern Africa. During this time, the distribution of rainfall is quite robust across much of the continental southern hemisphere and the southwestern Indian Ocean basin until approximately April (Novella and Thiaw, 2013). The annual variability of rainfall in Africa is influenced by several factors, including the change in sea surface temperatures of the surrounding oceans and global waters. For example, drought in Eastern and Southern Africa exhibits a correlation with El Niño (a warming of the surface water of the eastern and central Pacific Ocean) and the Indian Ocean, while rainfall in Western Africa is influenced by the Atlantic Ocean.

Historically, Africa has been experiencing moderate to extreme droughts. The drought occurrences are natural phenomena that vary temporally – seasonally and annually, and spatially. There is little, if anything, that people can do to keep drought from happening (Wilhite et al., 2014). For example, meteorological drought, or precipitation deficiency over an extended period of time, is a result of the occurrence of persistent large-scale disruptions in the global circulation pattern of the atmosphere (Dai, 2011; Zaho et al., 2010; Nicholls et al., 2005). Drought vulnerability, on the other hand, is determined by social factors such as population changes, population shifts between regions and from rural to urban, demographic characteristics, technology, government policies, environmental awareness and degradation, water use trends and social behavior (Shiferaw et al., 2014). Since these factors are dynamic

and change overtime, drought vulnerability is also likely to increase or decrease in response to these changes. Subsequent droughts in the same region will have different effect, even if they are identical in intensity, duration, and spatial characteristics, because each drought event is affecting a society that is different from the one that existed during a previous drought event (Wilhite et al., 2014). Adding to the complexity of the issue, some countries and regions in Africa are more prone to drought, and each country or region differs in its capacity to effectively prepare for and respond to drought.

The rapid population growth in Africa is an enormous concern for vulnerability reduction efforts. According to Population Reference Bureau (PRB), Africa's population is currently about 1.1 billion, and is projected to increase by 46 per cent and exceed 2.4 billion by 2050 (PRB, 2015). Meanwhile, a number of African countries with rapidly growing populations are threatened by social, economic and environmental impacts of drought, since Africa's food security and its economy mainly rely on rain-fed agriculture and associated industries, while most countries on the continent have an arid or semi-arid climate (Figure 1) with a high degree of climate variability and frequent occurrences of drought (Ogallal, 2010). Feeding 1.5 billion people by 2030 and 2.4 billion by 2050 is a daunting task that cannot be fulfilled without incorporating drought risk management and enhanced resilience policies into continental, regional and national strategies to cope with current and future climate variability and ensure sustainable socio-economic development.



DROUGHT CHARACTERISTICS AND MANAGEMENT IN AFRICA

A BRIEF HISTORY OF DROUGHT AND ITS IMPACTS IN AFRICA

Drought is a regular fact of life in Africa that often has an enormous social, environmental and economic impact, particularly on communities that already experience water shortages. During the XX century, the continent has experienced several periods of intense drought. Studies indicate that there have been droughts in the 1910s and 1940s in the Sahel region. The 1910 drought was severe and extended throughout the Sahel, lasting until 1916 (Sircoulon, 1976; Vannitsem and Demaree, 1991). Since the late 1960s, West Africa experienced severe drought, which peaked in the mid-1970s and lasted for several decades, displacing millions of people from sub-Saharan Africa (Shanahan et al., 2009). The West African Sahel region experienced severe droughts that ravaged the region in the 1970s and 1980s (Nicholson, 2013). Several studies have documented Sahelian droughts occurred during the years 1968-1987, notably the works of Nicholson (1981, 1985), Lamb (1985) and Sircoulon (1976, 1985). The severity of the 1960-1980s drought has been named as the cause of a famine and a large number of displacements from 1968 to 1974 and the early- and mid-1980s (Batterbury, 2001). The 1972-1984 Sahelian drought killed more than 100 000 people. More than 750,000 people in Mali, Niger and Mauritania relied on food aid in 1974, and most of the Sahel's 50 million people were affected in some way (Wijkman and Timberlake, 1984). Bader and Latif (2011) have shown in their case study that the El Niño-related drought in 1983 has reached extreme levels across the West African Sahel region (Figure 2). Recently, the North Africa region has experienced its worst historical drought – or example, the 1999-2007 drought in Algeria and Tunisia appears to be the worst since the middle of the XV century, and is possibly linked to climate change (Hoerling and Kumar, 2003; Seager et al., 2007).

For several decades, the Greater Horn of Africa has experienced recurrent severe droughts that resulted in serious food security emergencies, mainly driven by a combination of food availability and access issues, when countries of the region were threatened by famine at least once each decade between 1970 and 2000 (FAO, 2000). According to FAO (2000), the Horn of Africa, which includes Djibouti, Ethiopia, Eritrea, Kenya, Somalia, Sudan, South Sudan and Uganda, is one of the world's most vulnerable regions in terms of drought and food insecurity. Out of the combined population of 160 million people in these eight countries, 44 per cent, or about

70 million people, live in areas prone to extreme food shortages. In 2006, extreme drought affected several countries in the Horn of Africa, especially Ethiopia, Somalia, Kenya, Eritrea, and Djibouti, and about 18 million people were suffering from food shortages during the drought's peak in early 2006 (UNISDR, 2009a). The 2010-11 drought affected, in particular, the pastoralist communities in Kenya, Ethiopia and Somalia, causing migration across the borders along with immense loss of human lives and livestock, with more than 13 million people affected (Slim, 2012; UNISDR-AF, 2012). The chronic livelihood crisis of 2011 across East Africa dramatically elevated food prices, and put extreme pressure on water and food availability, threatening the lives of people and livestock (UNOCHA, 2012).

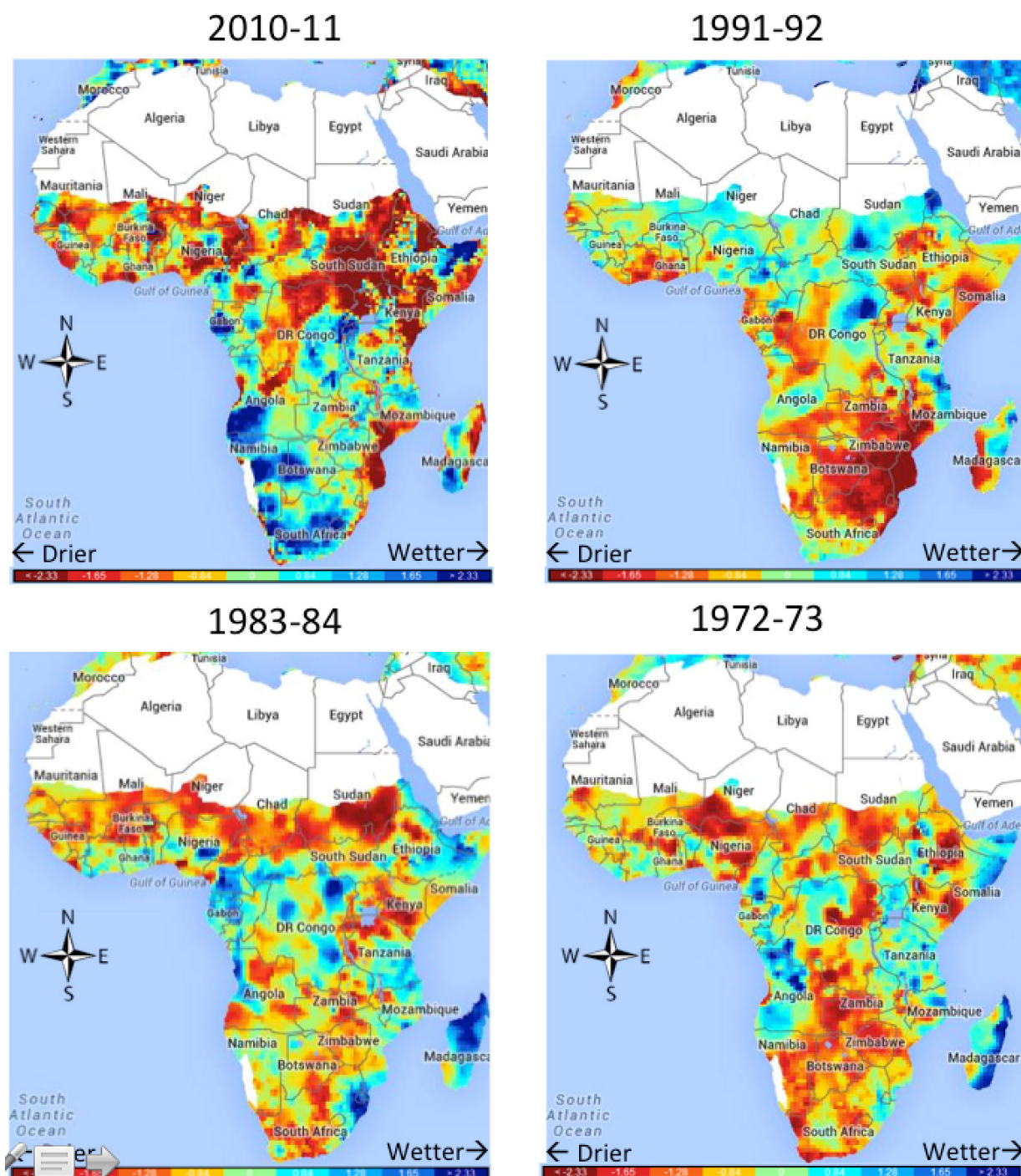
Frequent droughts have been recorded across southern Africa in the XX century. From 1895 to 1910, a continent-wide decrease in rainfall resulted in severe droughts that culminated in 1910-1911 in southern Africa. Severe droughts in most of the southern African countries were also observed in 1923-1924, 1946-1947, 1972-1973, 1981-1982, 1986-87, 1991-1992, and 2001-2002 (Otter et al., 2007). Zimbabwe has experienced serious food shortages in 1903, 1916, 1922, 1933 and 1942 (Chigodora, 1997). In parts of southern Africa, moderate to severe drought has been reported between 1930-1931 and 1932-1933. The 1946-1947 famine received a lot of attention in the media (Otter et al., 2007). The 1967-1968 droughts marked the beginning of a period of successive unusually dry years across Africa, ending around 1972-1973 in the southern part of the continent. In 1982, drought intensified and prevailed throughout much of subtropical Africa. By 1983, drought or below average rainfall affected nearly the entire continent, including southern Africa, which has also been ravaged by a severe drought in 1991-1991 (Vogel et al., 1998).

In 2002, about sixteen million people faced starvation in southern African countries, including Malawi, Zambia, Zimbabwe, Mozambique, Swaziland and Lesotho (WFP, 2003). A prolonged dry season resulted in widespread crop failure in 2013 across Namibia. An estimated 780 000 people – approximately one-third of Namibia's population – were classified as food insecure. Of these, 330 000 were in need of urgent support, according to the government of Namibia, which declared a state of emergency on 17 May, 2013 (Wilhite et al., 2014).

The reported fatalities shown in Table 1 illustrate the historical impact of drought on African lives. The

Figure 2: Examples of historic droughts in Africa in the XXI century. The maps show the severity and patterns of drought based on the twelve-month Standardized Precipitation-Evapotranspiration Index (SPEI) values. The twelve-month index calculated using precipitation and temperature data indicates the cumulative climatic conditions from October of the previous year to September of 2011, 1992, 1984 and 1973 drought years

OCTOBER TO SEPTEMBER (12-MONTH) STANDARDIZED PRECIPITATION-EVAPOTRANSPIRATION INDEX



numbers indicate only the reported total deaths, the actual total could be even higher. For example, the 2015 drought report (Table 2) shows the number of people that have been affected, but the fatalities have not yet been recorded on the EM-DAT (the CRED/OFDA International Disaster Database).

Since Africa's food security depends mostly on rain-fed agricultural systems, the impact of drought on food insecurity remains significant. Food crises in Africa in the second half of the XX century were caused by a

combination of factors, but all were preceded by failed harvests due to drought or flood that have caused food shortages. Millions of people were affected by malnutrition, and thousands (if not millions) died from starvation despite the relief efforts of the international community. The most severe food crises in Africa in the last 40 years include the Ethiopian famine in 1983-1985, the Malawian food crisis in 2005, the Niger food crisis in 2005-2006, the Horn of Africa food crisis in 2006 and 2011, and the severe food shortages in West Africa (Sahel) in 2010 (FAO, 2011; HHAFL, 2016).

Table 1: Reported drought fatalities from 1900 to 2015

Country	Year	Total deaths	Total affected
Somalia	2010	20 000	4 000 000
Sudan	1983	150 000	8 400 000
Ethiopia	1983	300 000	7 750 000
Chad	1981	3 000	1 500 000
Mozambique	1981	100 000	4 750 000
Somalia	1974	19 000	230 000
Ethiopia	1973	100 000	3 000 000
Ethiopia	1965	2 000	1 500 000
Cape Verde	1946	30 000	n/a
Cape Verde	1940	20 000	n/a
Cape Verde	1920	24 000	n/a
Niger	1910	85 000	32 000
Cape Verde	1900	11 000	n/a

Table 2: Reported drought fatalities from 1900 to

Year	Country	Total affected
2015	Ethiopia	10 200 000
2015	Somalia	4 700 000
2015	Malawi	2 800 000
2015	South Africa	2 700 000
2015	Niger	2 588 128
2015	Zimbabwe	1 490 024
2015	Sudan	800 000
2015	Namibia	11 500
2015	Botswana	n/a
2015	Gambia	n/a

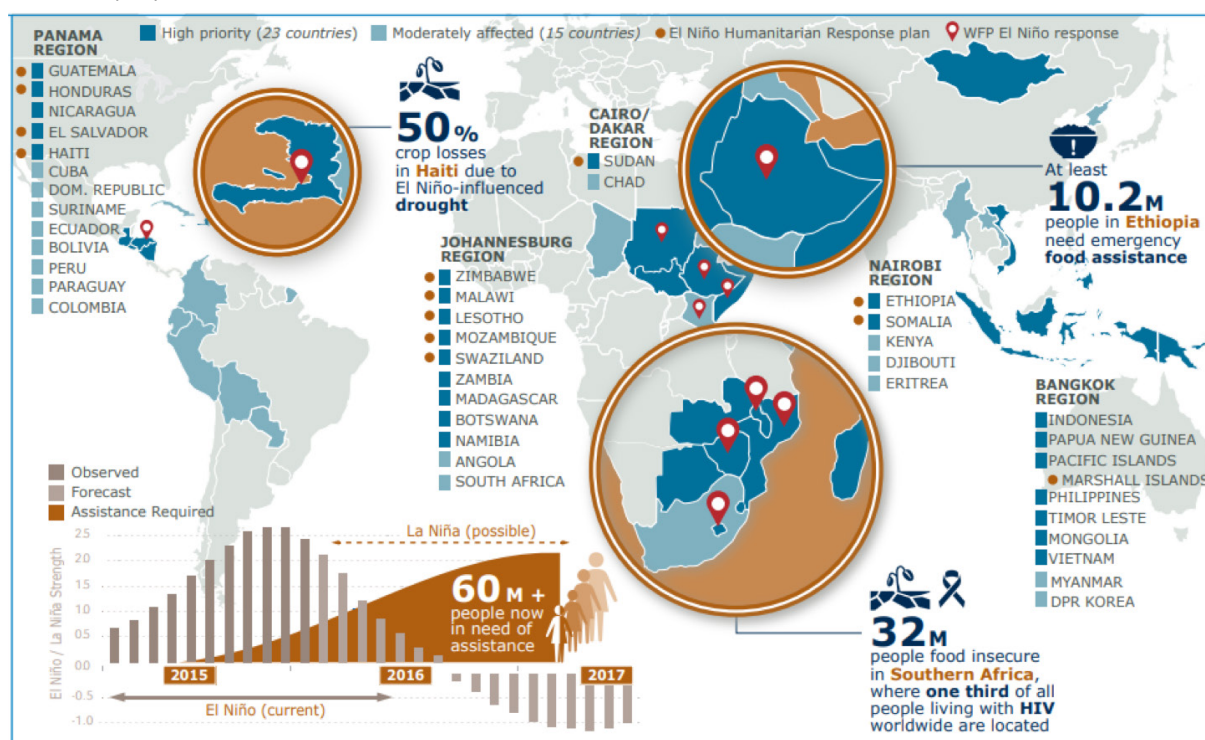
Source: EM-DAT: The CRED/OFDA International Disaster Database – <http://www.emdat.be/database>

Recent droughts in Africa

Since 2015, drought has affected millions of people in many countries, including Botswana, Ethiopia, Gambia, Malawi, Namibia, Niger, Somalia, South Africa, Sudan and Zimbabwe (Figure 3). For example, during the 2015–2016 growing season, Ethiopia faced its worst drought in decades, which created the need for food aid for over 10.2 million people. The failure of two

consecutive rainy seasons, including the long rainy season from June to September, had devastating effects on livelihoods and greatly increased malnutrition rates across the country. About 435 000 children faced severe acute malnutrition, and more than 1.7 million children, pregnant and breastfeeding women needed food aid. In addition, more than 5.8 million people needed emergency water, sanitation and hygiene services. Water shortages have resulted in water-related public health

Figure 3: Recent (as of April 2016) El Niño-related food security impact in the world. Over 50 per cent of affected people live in Africa



Source: WFP, 2016b

concerns. The drought has also caused an interruption of school attendance for about two million children in Ethiopia (UNICEF, 2016). In 2015, drought resulted in crop failures, the death of livestock from lack of water and pasture and the failure of crops across north east Kenya and areas of Somalia. Up to 60 per cent of cattle perished in some areas.

In April 2016, UNOCHA issued a stark warning to the global community that 32 million people across southern Africa were in need of some form of assistance, and that figure was expected to increase by the end of the year (UNOCHA, 2016). According to a UNOCHA Press Release (July 2016), more than 60 million people around the world were affected by severe El Niño-linked drought and climate impacts. More than half of these drought-affected people are in Africa. WFP (2016b) reported that the 2016 El Niño-related drought has continued to severely affect the southern Africa region (Figure 4), which is suffering from the driest cropping season in at least 35 years. According to WFP, about 1.5 million people (16 per cent of the rural population) were affected by drought in Zimbabwe through June 2016 (WFP, 2016a). In South Africa, a severe drought reduced agricultural production and hydroelectricity generation (WBG, 2016). On 24 June 2016, Namibia declared a state of emergency because of the persisting drought that has occurred in all regions of the Republic of Namibia.

The year-to-year variability of rainfall in sub-Saharan Africa is influenced by several factors, including the surface temperatures of the surrounding waters. Most of the seasonal rainfall in eastern and southern Africa exhibits a strong correlation with El Niño–Southern Oscillation (ENSO), and especially with sea surface temperatures in the Indian Ocean, while the Atlantic

exerts an influence on western Africa (Novella and Thiaw, 2013; Ogallo, 2010; Manatsa et al, 2008; IPCC, 2014).

DROUGHT MANAGEMENT IN AFRICA: A FEW EXAMPLES

Some drought-prone countries in Africa have decided to consider or develop national strategies and policies to manage droughts more effectively. A few African countries' activities as well as regional, continental and international efforts to manage drought are briefly described below.

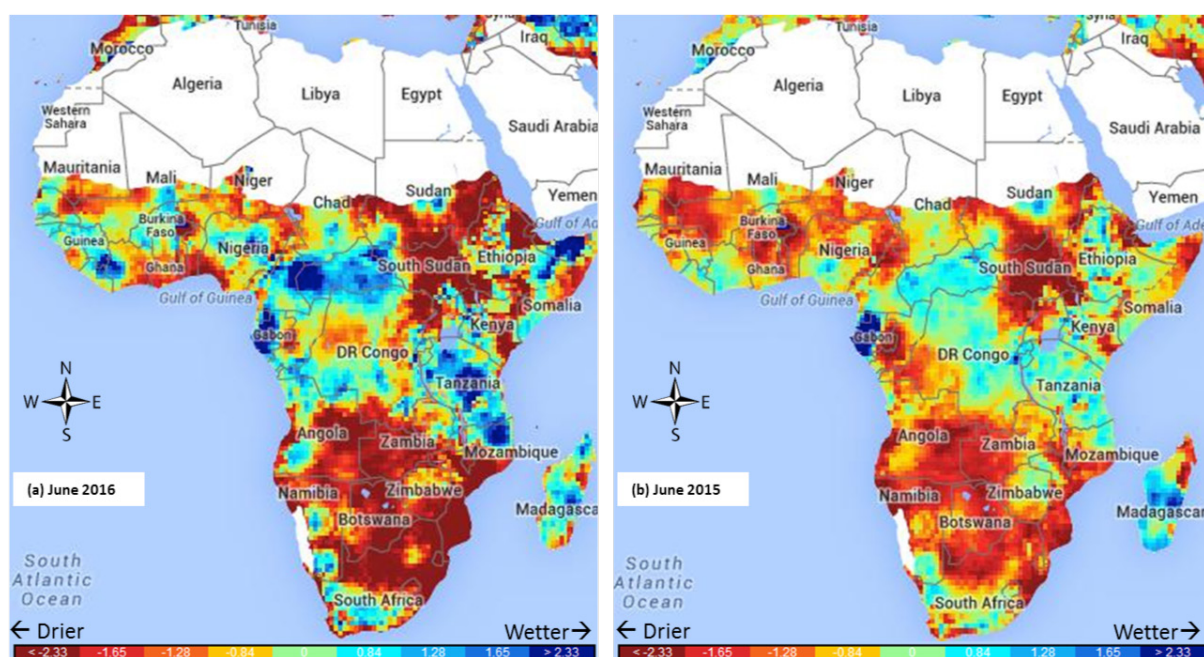
National level efforts

Ethiopia and Kenya

Government plays a leading role in identifying needs and coordinating overall drought risk management efforts. Progress has been made as both countries have learned from past experiences in managing and responding to drought, but multiple challenges still exist. (Hillier and Dempsey, 2012).

Ethiopia has experienced droughts in intervals of a few years since the 1970s, with serious drought impacts in 1972–1973 and 1984–1985, and more recently in 2006, 2011 and 2015. The 1972–1973 drought led to famine; at that time, the country did not have a disaster management system. In 1973, an ad-hoc response to the crisis resulted in the formation of the Relief & Rehabilitation Commission (RRC), which in 1995 evolved into the Disaster Prevention and Preparedness Commission (DPPC). The DPPC had a mandate and an emphasis on linking relief with development. In 2004, the DPPC evolved into the Disaster Prevention and Preparedness Agency (DPPA) and Food Security Coordination Bureau (FSCB), with a revised mandate for

Figure 4: The 2016 drought in Africa as compared to the previous year. The maps show the twelve-month SPEI values as of (a) June 2016 and (b) June 2015



Source: Global SPEI database <http://sac.csic.es/spei/map/maps.html>

DPPA to focus on emergency response and for FSCB to focus on responding to chronic food insecurity. In 2007–2008, the Disaster Risk Management and Food Security Sector (DRMFSS) was established under the Ministry of Agriculture with a primary emphasis on proactive disaster risk management instead of reactive crises management (IGAD, 2013; UNISDR-AF, 2012; Hillier and Dempsey, 2012). Ethiopia has been formalizing disaster risk management over the past three decades, and is now in the process of revising its disaster prevention and management policy to improve preparedness and response systems. In 2009, Ethiopia drafted a “National Policy and Strategy on Disaster Risk Management (NPSDRM). The policy includes planning for emergency response, as well as the development of an integrated risk management facility, with contingency funds and a weather-indexed insurance scheme (UNISDR, 2012; NPSDRM, 2009). Under this policy, the Disaster Risk Management Commission (DRMC) monitors and reports to the prime minister all disasters that the country is facing, including drought.

Kenya: The country has experienced more than ten recurrent droughts since the 1970s. About 80 per cent of Kenya’s landmass is classified as arid and semi-arid lands (ASALs), which are the most vulnerable to drought. However, the ASALs also account for more than 80 per cent of ecotourism and house 50 per cent of the national livestock in Kenya (Abass, 2008). Since 1985, Kenya has been attempting to address the drought management issue, starting with the design of a drought contingency planning system in Turkana, Kenya. In the early 1990s, the system was extended to include other arid districts. Since 1992, the system has been gradually expanded through the Emergency Drought Recovery Project and its successor, the Arid Lands Resource Management Project (ALRMP). These short-term, project-based interventions have been being carried out at a time when the periods of drought were becoming increasingly frequent and intense, directly affecting the food security and livelihoods of millions of people. The recurrent drought and associated crisis has led Kenya to promote a new approach to drought management, along with better co-ordination and coherence in long-term and short-term efforts to promote resilience. Recently, Kenya established a Country Programming Framework that combines the efforts of the local communities, the Government of Kenya, civil society, the private sector, states in the Horn of Africa and development partners (EDE CPP, 2012) to end recurrent drought emergencies (EDE). In 2016, recognizing the need to strengthen the sustainability and quality of drought management, the Kenyan government established the National Drought Management Authority (NDMA). NDMA has a mandate to establish mechanisms that ensure that drought does not lead to emergencies and that the impacts of climate change are sufficiently mitigated. The NDMA provides a platform for long-term planning and action, as well as a mechanism for coordination across government bodies and all stakeholders (NDMA, 2016).

Namibia and South Africa

Namibia: In 1995, the Namibian government established a national drought task force that originally included representatives of the Ministry of Agriculture, Water and Rural Development; the Ministry of Environment and Tourism; the Ministry of Lands, Resettlement and Rehabilitation; and the country’s two farmers’ unions, the Namibia National Farmers’ Union and the Namibia Agricultural Union. The task force set out to draw up a national emergency and long-term drought management policy, together with a package of short-term drought relief measures, convening several meetings from 1996 until the endorsement of the national drought policy by the government in 2005. According to the Namibian government policy, declaring drought frequently results in elevated costs, creating dependency on government support among aid recipients and leading to degradation of resources through inappropriate assistance. Namibia’s 1997 drought policy emphasizes the development of an efficient, equitable and sustainable approach to drought management. The policy aims to shift responsibility for managing drought risks from the government to the farmer, with financial assistance and food security interventions implemented only after a drought disaster is declared. The policy also recognizes the need to enhance the national capacity in information management and water provision, as well as drought monitoring and early warning systems. For the policy implementation, the Namibia Early Warning and Food Information System (NEWFIS) is the focal point for gathering, analyzing and reporting on drought-related issues. A large number of people in Namibia have been affected by recent droughts, including the one in 2006–2007 and the current prolonged drought that started in 2012–2013, and as a result, the state of emergency was declared. It should be noted that the 1997 National Drought Policy and Strategy of Namibia is currently under review.

South Africa: South Africa has long history of drought management. In early 1930s, a serious drought coincided with the Great Depression, and other significant droughts occurred in the 1960s, 1980s, and early 1990s mobilizing policy makers to address the problem. South Africa has invested a great deal of time and effort into developing a cohesive national drought policy. These efforts were accelerated by the development of the National Consultative Forum on Drought in the early 1990s, which brought more stakeholders to the planning table and allowed more sectors to be included in the process (Wilhite, 2005). These efforts resulted in new drought policies that encourage risk management, assist farmers financially, protect natural resources, promote the best use of resources by individual farmers and help farmers preserve a nucleus breeding herd during a drought. To be eligible for financial aid, farmers must adopt specific resource conservation and long-term sustainability measures – for example, adhere to established grazing options. The drought policy continues to evolve, influenced by the dynamic political environment in

South Africa. In 2002, an agricultural risk insurance bill was developed, proposing to supplement the income of agricultural producers most susceptible to crop and livestock losses from natural disasters, including drought. However, the South African government still faces the challenge of maintaining a balance between encouraging a risk management approach for large agricultural enterprises and providing a safety net for the resource-limited sectors of the population (Williams, 2016). Overall, while there is some evidence of the shift from emergency response to more holistic drought risk management and disaster risk reduction approaches in southern Africa, the focus across various governance levels is still on technical and financial relief solutions (Vogel et al., 2010).

Regional level efforts

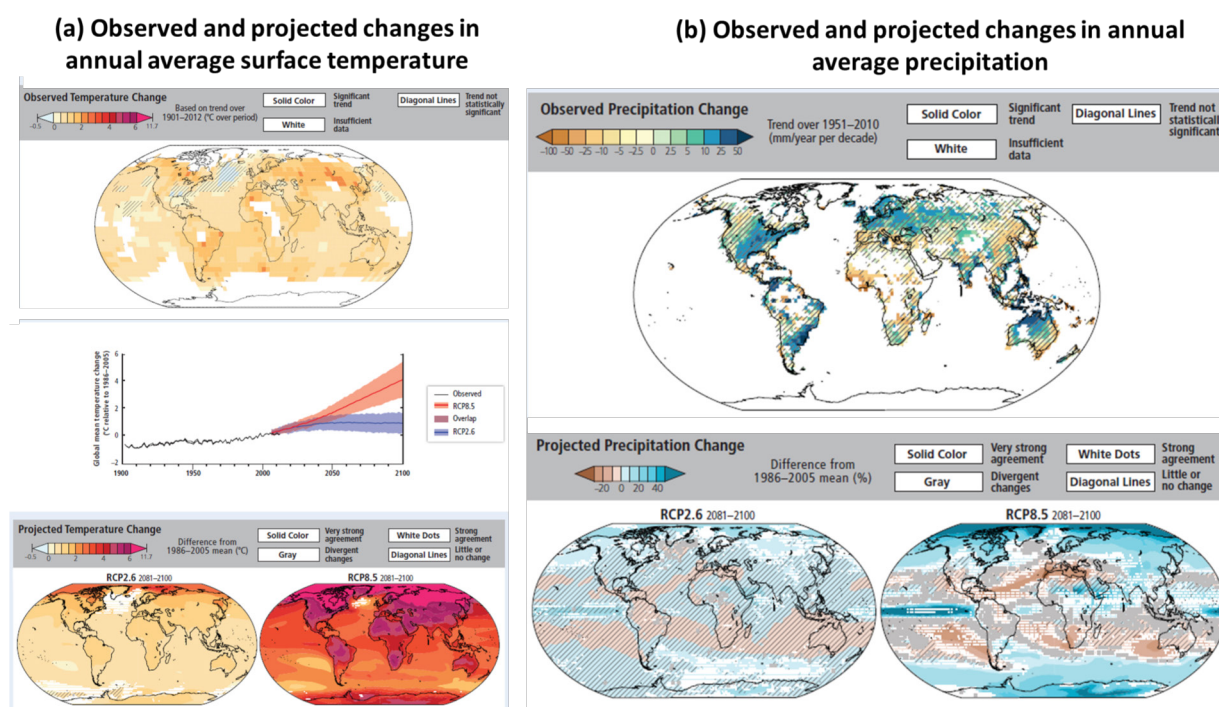
A few regional centers established in Africa have contributed to drought management, including AGHYMET Regional Center/Permanent Interstate Committee for Drought Control in the Sahel (CILSS), African Centre of Meteorological Applications for Development (ACMAD), Climate Prediction and Applications Centre (ICPAC), SADC Climate Services Centre (SADC-CSC). These regional centers, supported by the World Meteorological Organization (WMO) and other international institutes, have made progress in different sub-regions of Africa to provide climate information and prognosis to decision makers in Africa. For example, the Regional Climate Outlook Forums (RCOFs), which

include the Greater Horn of Africa Climate Outlook Forum (GHACOF), Southern Africa Regional Climate Outlook Forum (SARCOF), and Prévision Saisonnière en Afrique de l'Ouest (PRESAO), have successfully carried out regular real-time operations over a period of time. Despite the need for better developed infrastructure and a larger number of personnel, African RCOFs have achieved remarkable progress in expanding regional networks and connecting data users, as well as substantially contributing to capacity building and public awareness, particularly in developing and least developed countries (Aldrian et al., 2010; Njau, 2010). See Appendix 3 for brief summaries of the activities by these regional centers efforts.

Africa – continent-wide efforts

New Partnership for Africa's Development (NEPAD) – This African Union (AU) strategic framework for pan-African socio-economic development presents both a vision and a policy framework for Africa. In 2001, NEPAD was established as a merger of the Millennium Partnership for Africa's Recovery Programme (MAP) and the Omega Plan. NEPAD is an intervention by AU to address Africa's critical challenges, including poverty and economic development. NEPAD facilitates and coordinates the development of continent-wide programs and projects, mobilizes resources and engages global stakeholders, regional economic networks and national authorities in the implementation of these programs and projects. NEPAD's thematic

Figure 5: Observed and projected changes in annual average: (a) temperature and (b) precipitation maps of CMIP5 multi-model results for the scenarios RCP2.6 and RCP8.5 in 2081–2100. Changes are shown for temperature relative to 1991–2010 and for precipitation relative to the 1986–2005 mean, in per cent. This confirms changes observed to date and projected changes under continued high emissions versus under ambitious mitigation



Source: IPCC (2014)

areas include agriculture, food security and nutrition. The Comprehensive Africa Agriculture Development Programme (CAADP), an integral part of NEPAD, is a policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all African people. The CAADP implementation support program aims to catalyze transformation of Africa's agricultural systems and stimulate increased and sustainable agriculture performance in member states as a means of achieving economic growth and inclusive development. CAADP is a pan-African framework – a set of principles and broadly defined strategies – to help countries critically review their own situations and identify investment opportunities with optimal impact and returns. It enables an evidence-based planning process with knowledge as a key primary input and human resource development and partnership as a central factor (NEPAD, 2016). Since 2003, NEPAD, the African Development Bank (AfDB) and the United Nations International Strategy for Disaster Reduction (UNISDR) have been working together to provide guidance and direction to mainstream disaster risk reduction in sustainable development planning and process (AU, 2010). In addition, the AU, NEPAD and UNISDR developed an early set of guidelines for mainstreaming disaster risk assessment (UNISDR-AF, 2014). The United Nations Development Programme (UNDP) has also created the Global Risk Identification Programme (GRIP). Most of these efforts are focused on disaster reduction and development rather than specifically addressing drought issues. Building a strategic framework for drought risk management and enhancing resilience will sharpen the focus on drought and strengthen the ongoing activities in Africa for comprehensive agricultural, environmental and socio-economic development (Benson and Garmestani, 2011).

FUTURE PROSPECTS OF DROUGHT IN AFRICA

There is growing evidence that the frequency and extent of drought have been increasing as a result of climate

change. According to the most recent IPCC report (2014), projections of an increased frequency and severity of drought conditions create grounds for further concern. The report indicates that the frequency and intensity of drought have increased in the Mediterranean and West Africa since 1950. The projections of the multi-models presented under two scenarios of Representative Concentration Pathway (RCP) by the end of the century indicate an increased risk of drought (Figure 5). For example, RCP8.5 shows that drought is likely in presently dry regions linked from regional to global scale projected decreases in soil moisture. Specifically, soil moisture reduction is most prominent in the Mediterranean and southern Africa, consistent with projected changes in the Hadley Circulation and increased surface temperatures, and surface drying in these regions is highly likely to occur by the end of the XXI century (IPCC, 2014; IPCC, 2013).

Under the projected climatic conditions, droughts are expected to become more frequent and intense in many parts of world, including Africa, raising serious concern of increased societal vulnerability and confirming the need to develop more effective drought planning and mitigation strategies that can ensure an integrated response that includes drought preparedness.

In the future, the impacts of climate change, as well as growing population and declining agricultural capacity per capita, are expected to increase food insecurity, environmental degradation and raise the risk of plant and animal diseases (FAO, 2000). Since many of the drought-prone African countries are also the least developed, they have a limited capacity to respond to drought or food crises. To prevent humanitarian emergencies and reduce pressure on agricultural production, farmers' livelihoods and natural resources, African countries need to strengthen their long-term drought resilience and address the root causes of their vulnerability to drought.

PROACTIVE DROUGHT RISK MANAGEMENT: CONCEPT, PRINCIPLES AND APPROACH

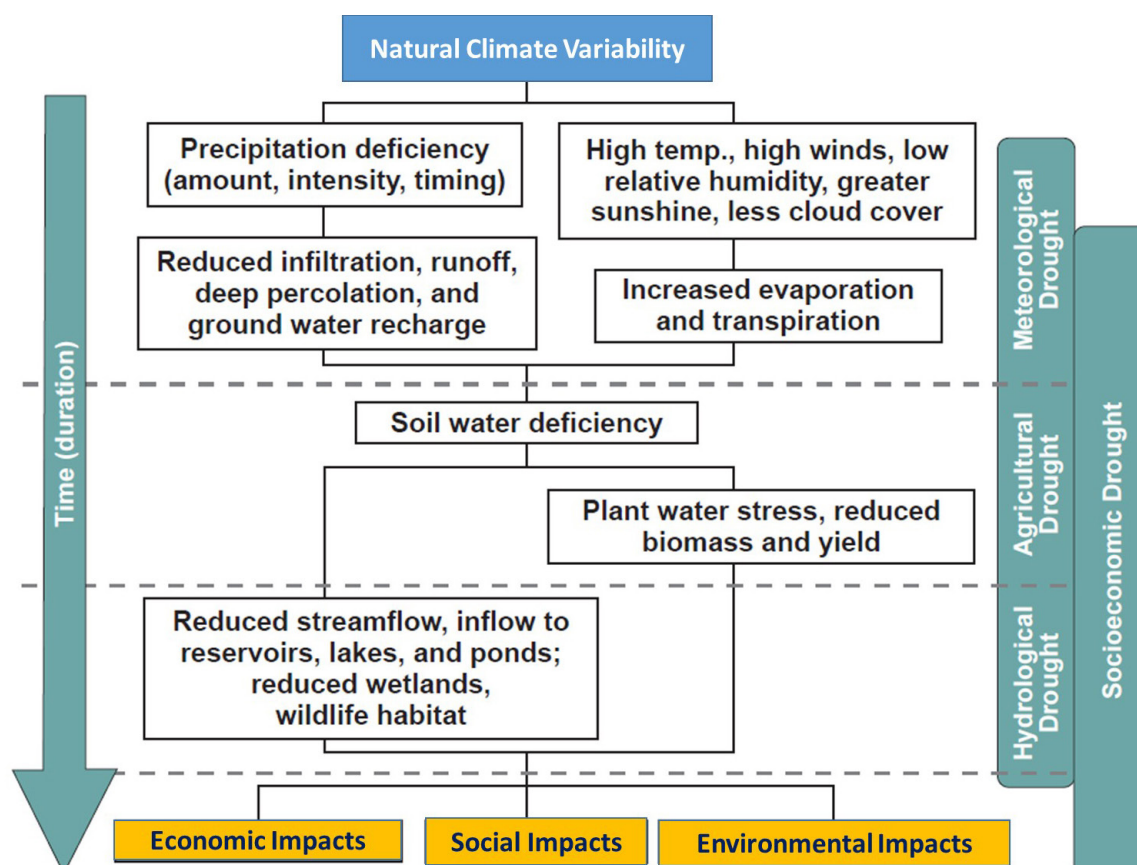
DEFINITION OF DROUGHT CONCEPTS

Drought is caused by a deficiency of precipitation over an extended period of time (usually a season or longer) resulting in water shortage for an economic activity, a group of society, or an environmental sector (NDMC, 2016). Since drought cannot be viewed solely as a physical phenomenon, it is usually defined both conceptually and operationally. For example, a definition such as “drought is a protracted period of deficient precipitation resulting in extensive damage to crops, leading to the loss of yield” is a conceptual definition of drought that may be important in establishing drought policy. Operational definitions help define the onset, severity and the end of drought. No single operational definition of drought works in every context, and this is largely the reason why policy makers, resource planners and others face more challenges in recognizing and planning for drought than for other natural disasters (NDMC, 2016).

The definitions of drought need to be region and application- or impact-specific (Wilhite, 2000). In general, there are four types of drought (Wilhite, 2000; Wilhite and Glantz, 1985):

- Meteorological drought – a deficiency of precipitation, as compared to average conditions, over an extended period of time;
- Agricultural drought – a reduction in soil moisture availability below the optimal level required by a crop at each different growth stage, resulting in impaired growth and reduced yields;
- Hydrological drought – when precipitation deficiencies begin to reduce the availability of surface and subsurface water resources, when there is substantial deficit in surface runoff below normal conditions, or when there is a depletion of ground water recharge; and

Figure 6: Relationships between meteorological, agricultural, hydrological, and socio-economic droughts and their impacts



Source: National Drought Mitigation Center, University of Nebraska-Lincoln, USA

- Socio-economic drought – when human activities are affected by reduced precipitation and related water availability. Socioeconomic drought associates human activities with elements of meteorological, agricultural and hydrological drought. Figure 6 shows the relationships between meteorological, agricultural, hydrological and socio-economic drought and their impacts.

Drought Drivers: Several factors affect the development of drought. For example, for agricultural and hydrological droughts, the main drivers include reduced precipitation, increased temperature and/or increased evapotranspiration from higher vapor pressure, often linked to increased temperature. Under strong drought conditions, reduced soil moisture results in limited evapotranspiration, leading to further soil moisture depletion. In addition, since soil moisture, groundwater and surface waters are associated with water storage, they have a characteristic memory that stimulates the pre-conditions for drought. Other drivers, such as change in sea surface temperature, could have an impact on the global atmospheric circulation. For example, the El Niño teleconnection results in changes in the atmospheric circulation and subsequent ground-level climate impacts – it can trigger a cascade of noticeable departures from the normal rainfall patterns around the globe.

Drought usually has significant economic, social and environmental impacts (Figure 6), and to assess and reduce them, efficient drought assessment and information systems are necessary when responding to climate-related risks (Pulwarty and Sivakumar, 2014). As shown in Figure 7, these climate risks span the weather-climate continuum with drought drivers ranging from short-term (days to months) to long-term (decade to century) timescales. For this reason, drought risk management should include both spatial and temporal dimensions.

INTEGRATED DROUGHT RISK MANAGEMENT

Drought risk management involves a process of identifying and understanding relevant components of drought risk, as well as analyzing alternative strategies to manage drought (Hayes et al., 2004). Drought risk management is an activity that concerns every segment of society, necessitating the development

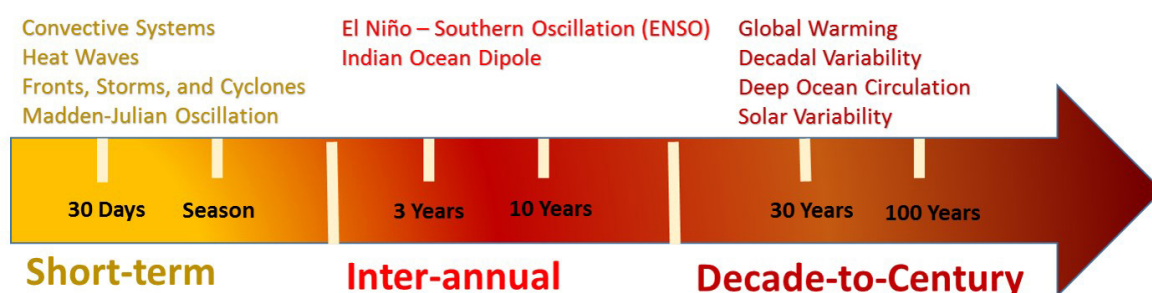
of comprehensive management structures that encompass all levels of government and community. The concept of drought risk management covers all aspects of planning and response, with the objective of managing both risks and impacts. This includes policy and administrative decisions as operational activities to deal with various stages of a drought at each level (Wilhite et al., 2014; Pulwarty and Sivakumar, 2014; Botterill and Cockfield, 2013).

On the other hand, crisis recovery measures primarily focus on addressing impacts without putting due emphasis on the root causes of drought vulnerability – the crisis management approach treats only the symptoms of drought (UNW-DPC, 2015).

While emergency response has a place in drought risk management, it can also lead to greater vulnerability and decreased resilience to future drought events (Wilhite, 2014). Risk management – a proactive approach to drought that includes pre-impact programs, or mitigation measures that reduce vulnerability and impacts – is essential for the sustainable development in Africa.

Several studies have indicated that the decisive shift from crisis to risk management has several advantages, including reducing conflicts between water users, promoting wise stewardship of natural resources for sustainable development and reducing the need for governmental assistance, allowing resources to be invested more wisely (Wilhite et al., 2014; Pulwarty and Sivakumar, 2014; Kruse and Seidl, 2013; Botterill and Cockfield, 2013; Martin-Carrasco et al., 2013). As part of the international efforts to promote pro-active drought risk management, WMO, FAO and UNCCD organized a High-level Meeting on National Drought Policy (HMNDP) in March 2013, in Geneva, Switzerland, in collaboration with several other institutions and organizations (WMO, UNCCD, and FAO, 2013). The Integrated Drought Management Programme (IDMP) runs two regional sub-programs in West and East Africa through the Global Water Partnership (GWP). These regional programs, based at GWP regional offices in both regions, are currently being developed further to increase the capacity for drought management by cooperating with key drought management institutions and stakeholders in the region to expand the network of the country water partnerships.

Figure 7: Examples of drought drivers in a weather-climate continuum across climate timescale



Source: modified from Pulwarty and Sivakumar, 2014

KEY ELEMENTS OF INTEGRATED DROUGHT RISK MANAGEMENT

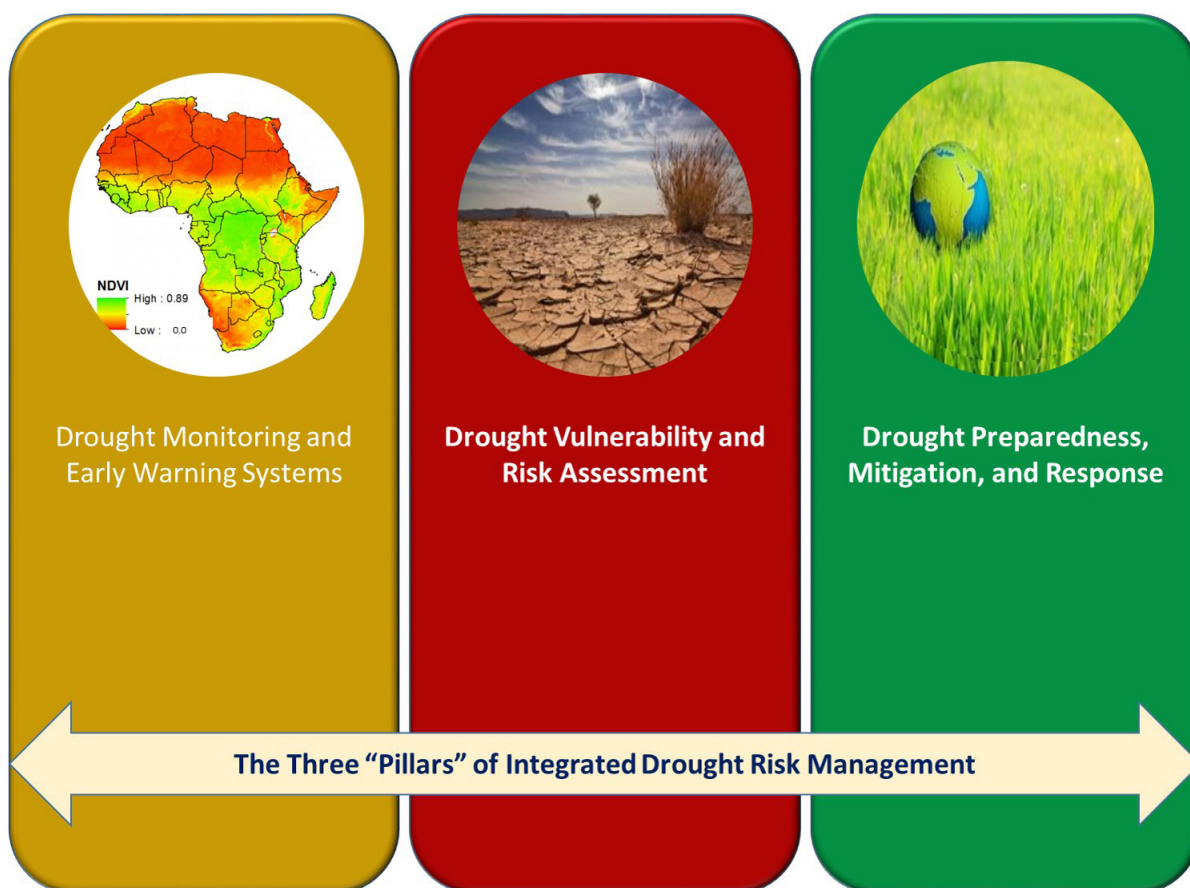
Based on the proposed elements in the Compendium of National Drought Policy (Wilhite, 2011) three key elements (also known as the three pillars, shown in Figure 8) of a national drought preparedness plan include:

1. Drought monitoring and early warning systems;
2. Vulnerability and risk assessment; and
3. Drought preparedness, mitigation and response.

The first element includes drought monitoring that employs tracking drought indicators and indices based on several climate and biophysical variables, such as precipitation, temperature, soil moisture, vegetation condition, stream flow and ground water (Svoboda and Fuchs, 2016). The second element includes the assessment of societal vulnerability as a result of social, economic and environmental factors or processes that

increase susceptibility of a system to the impacts of drought. It also focuses on understanding the human and natural processes that add to drought vulnerability and community resilience. The third pillar consists of any structural or physical measures (such as selection of appropriate crops and construction of dams) and non-structural measures (such as policy development, awareness raising, knowledge development, public commitment, legal frameworks and operating practices) that can limit the adverse impacts of drought. Response to drought includes the provision of assistance or intervention during or immediately after a drought disaster, in line with long-term drought plan. The drought mitigation and response aspect is aimed at building greater resilience to drought and eliminating or at least reducing its impacts. Drought mitigation and response should cover all sectors affected by drought. Details on the three-pillars of drought risk management are outlined in Appendix 2.

Figure 8: The three key elements of integrated drought risk management





STRATEGIC FRAMEWORK FOR A DROUGHT-RESILIENT AFRICA

THE CHALLENGE

According to the IGAD Climate Prediction and Applications Centre (ICPAC), the current experience in the Horn of Africa suggests that most governments have not given a proper priority to drought risk management – instead relying on the crisis management approach (ICPAC, 2016). In addition, more resources are provided by governments and donors for response activities than for long-term developmental initiatives that deal with planning, mitigation and disaster preparedness across the Horn of Africa region (ICPAC, 2016). The situation is similar in many other African countries. Given the urgency and insufficient time to plan during a drought crisis, emergency response is often ineffective. Most importantly, countries rarely learn from past droughts, leading to little or no reduction in response time and risk.

Social issues related to race, class and gender need to be addressed to develop engaged and drought-resilient communities. Several studies have indicated the need to maintain gender as a variable in all studies of the social impacts of disaster (Stehlik et al., 2000). Women are an important target group in all drought-risk management activities, along with drought risk managers, planners, risk communicators, family health-care providers, neighborhood preparedness participants and voluntary community responders. Gender-focused action can shape drought risk management responses of women and men both within and outside formal drought management agencies (UNISDR and UNDP, 2009). For example, in Australia, Stehlik et al. (2000) found that women experienced the stresses and hardships of drought differently from men; and that couples who shared the burden through mutual decision-making found their partnership strengthened and supported, while their personal perception of the disaster became less overwhelming.

Even though progress has been made towards more gender-responsive approaches to drought, the role of women in drought risk management in Africa is still limited. Reflecting their historical underrepresentation in disaster management agencies nationally and internationally, women's engagement in Africa still tends to be outside the formal disaster agencies (Enarson, 1998). To better target planning, mitigation, response and recovery initiatives, African countries should assess their particular political, economic and historical factors shaping the lives of women. For example, gender can influence many dimensions of drought risk management, such as risk assessment and evacuation decisions, voluntary preparedness and post-disaster assistance

patterns, as well as after-shock communication. Gender-focused drought risk management research can help explain why and how women and men make critical disaster decisions (UNISDR and UNDP, 2009).

Severe drought, together with complex socioeconomic and political factors, has been a growing driver of migration in many parts of Africa. Governments, international organizations and policymakers have begun to recognize the increasing challenge of climate-related migration and its potential social implications (MPI, 2015). For example, on 13 October 2015, 110 countries participating in the Nansen Initiative's final global consultation ahead of COP21 in Paris, adopted a non-binding contract to protect those displaced by natural disasters including drought (MPI, 2015). African countries should also take appropriate action as part of drought risk management.

Drought risk management in Africa reflects the social and economic situation of the countries located on the continent. The lack of financial resources is one of the main challenges. Resource mobilization, strong involvement of the private sector and investment in drought risk management are necessary to build a proactive and resilient Africa. In addition, the lack of full commitment in several African countries is a big challenge for progress in building drought risk management at national, regional and continental levels. At the national level, according to UNW-DPC (2015), the factors that contribute to the lack of necessary government commitment could include:

- The lack of awareness among various levels of government and other stakeholders regarding the extent of drought impacts on various sectors, population groups and communities;
- The lack of systematic assessments of drought severity among the primary ministries and agencies – for example, the absence of comprehensive early warning and information delivery systems;
- The lack of drought-impact monitoring as well as insufficient knowledge of vulnerabilities and their cause; and
- The slow-onset nature of drought, which does not capture the same amount of attention from the media, policy makers and the public compared to other extreme events, such as floods and hurricanes.

RATIONALES AND JUSTIFICATION

Africa should strengthen its efforts to tackle the greatest global challenges of the XXI century that cut across international boundaries and disciplines, including climate change, energy, food, agriculture and nutrition, global health and water security. In recent years, the recurrent droughts have resulted in loss of lives along with long-term negative economic, social and environmental consequences for vulnerable populations in Africa. Several studies of drought response in Africa undertaken in the past few decades have demonstrated that disastrous consequences can be averted by proactive drought management, strengthening and protecting livelihoods and building their capacity to withstand the inevitable occurrence of drought. Proactive approach represents an opportunity to reduce drought risks in a meaningful and coherent manner.

The complexity of drought as a creeping phenomenon and its significant impacts necessitate more effective measures of disaster management. The current assessment of drought management in Africa shows that it is either narrowly focused on emergency response, which is often ineffective, or it is contained within disaster reduction frameworks. According to the UNISDR (2014), there is a positive trend to establish or review national and regional institutional, legislative and policy frameworks for disaster risk reduction (DRR). However, the lead institutions for DRR still lack sufficient influence over all relevant sectors of governments (UNISDR, 2014). Drought-prone African countries are facing several challenges due to their higher vulnerability and risk levels that largely exceed their response and recovery capacity. The majority of African countries still lack resources and capacity to engage communities at risk or implement local drought resistance initiatives (UNISDR, 2014).

Certain progress has been achieved through the efforts of the international community. In 2005, the UN member governments endorsed the Hyogo Framework for Action (HFA) 2005–2015: Building the Resilience of Nations and Communities to Disasters, with the primary goal of achieving a substantial global reduction in disaster risk, contributing to the sustainable development of nations. The HFA has provided comprehensive action-oriented policy guidance based on a holistic understanding of disasters, as determined by human vulnerability to natural hazards, and it reflects a solid commitment by governments and organizations to implement an effective disaster reduction agenda. To support the implementation of the HFA at all levels, a strong partnership has been forged through the UNISDR system, including representatives of the government, international, regional and UN organizations, as well as civil society, to coordinate programs and activities, identify good practices and gaps, and promote positive action. In 2015, the HFA successor, the Sendai Framework for Disaster Risk Reduction 2015–2030, was adopted at the third UN World Conference in Sendai, Japan (UNISDR, 2015b). The Sendai Framework is built

on elements that ensure continuity with the work done by states and other stakeholders under the HFA, introducing a number of innovations. The emphasis of Sendai Framework represents a paradigm shift from crisis to risk management. The global targets of the framework include preventing new risk, reducing existing risk, strengthening resilience and developing guiding principles to emphasize the primary responsibility of states to prevent and reduce disaster risk through society-wide and statewide institutional engagement. In addition, the scope of disaster risk reduction has been broadened to focus on natural as well as man-made hazards and related environmental, technological and biological risks.

Any drought management policy needs to be endorsed by the national government. While this vital step should be spearheaded by national authorities, it is often not the case in Africa. A focused action of African countries is needed within and across sectors at the local, national, regional and global levels, in line with the global disaster risk reduction frameworks. In addition, there is a need for collaboration on drought management practices with national governments in Africa. While each country in Africa has the primary responsibility for managing and reducing drought risk, it is also a shared responsibility of all African governments and relevant stakeholders, scientific institutions and the private sector, as well as UN agencies. All these groups play an important role in providing support to countries in the implementation of strategic frameworks at the local, national, regional and global levels in accordance with to national policies, laws and regulations. However, community engagement along with collaboration of local governments and non-state actors must be central to risk analysis, program design and implementation.

The current global efforts, specifically the Sendai Framework, emphasize the need for improved understanding of every dimension of disaster risk, including:

- Exposure, vulnerability and hazard characteristics; Strengthening of disaster risk governance, including national platforms;
- Accountability for disaster risk management; preparedness to “build back better;”
- Recognition of stakeholders and their roles; mobilization of risk-sensitive investment to avoid the creation of new risk;
- Resilience of health infrastructure, cultural heritage and workplaces; and
- Strengthening international cooperation and global partnership and risk-informed donor policies and programs, including financial support and loans from international financial institutions.

Even though progress toward the shift to drought risk management and efficient proactive actions has been achieved on the national, regional and international levels, collective and collaborative actions that sharpen

the focus on drought preparedness are needed now more than ever. Building a strategic framework for Africa, in line with the global efforts such as Sendai Framework, could help strengthen long-standing drought resilience initiatives in Africa at the regional, country and local levels and advance Africa's drought-resilience capabilities continent-wide. The framework is also intended to help achieve Africa's sustainable development goals (SDGs) that are included in the UN's the 2030 Agenda for Sustainable Development and AU's Agenda 2063 consistent with the Common African Position (CAP). Government bodies need to work in tandem with all organizations involved in drought risk management to synchronize efforts and make the strategy as effective as possible. The "Drought Resilient and Prepared Africa (DRAPA)" strategic framework is an attempt to leverage past and experiences and lessons learned to develop an integrated approach to drought risk management and resilience building with the specific focus on Africa.

GUIDING PRINCIPLES AND VALUES OF THE STRATEGIC FRAMEWORK

The general guiding principles and values of the DRAPA framework include good governance and decision making that respect fundamental human rights, partnerships and cooperation, peaceful resolution of disputes, adherence to the principles of gender sensitivity and equity, recognition that each country is at different levels of development and supporting development efforts of each country. Drawing from the global principles contained in the HFA and its successor, the Sendai framework, as well as Africa regional frameworks such as IDDRISI, the implementation of the DRAPA framework will be guided by the following principles, while taking into account national circumstances and keeping consistent with domestic laws as well as international obligations and commitments:

- (a) Each African country has the primary responsibility to prevent and reduce drought risk, including through international, continental, regional, transboundary and bilateral cooperation. The reduction of drought risk is a common concern for all African countries, and the extent to which countries are able to effectively enhance and implement national drought risk management policies and measures in the context of their respective circumstances and capabilities can be further enhanced through the provision of sustainable continental and international cooperation;
- (b) Drought risk management requires a high level commitment and accountability under an overarching institution – for example, a national drought commission – for all responsibilities to be shared by central governments and relevant national authorities, sectors and stakeholders, as relevant to their national circumstances and systems of governance;
- (c) Drought risk management is aimed at protecting people and their property, health, livelihoods and productive assets, as well as cultural and environmental assets, while promoting and protecting all human rights;
- (d) Drought impact reduction requires the engagement of the entire society and strong partnerships. It also requires empowerment and inclusive, accessible and non-discriminatory participation, with special attention to the needs of people disproportionately affected by droughts, particularly the poorest populations. The gender, age, disability and cultural perspectives should be integrated in all policies and practices, the leadership of women and youth should be promoted and local initiatives should be encouraged. In this context, special attention should be paid to the improvement of organized voluntary work by citizens;
- (e) Drought risk management depends on coordinating mechanisms within and across sectors and with all relevant stakeholders, requiring the full engagement of all executive and legislative institutions at national and local levels along with clear definitions of responsibilities among public and private stakeholders, including business and academia, to ensure mutual outreach, partnerships and complementarity in roles, as well as accountability and continuity;
- (f) Although the enabling, guiding, and coordinating roles of national governments remain essential, it is necessary to empower local authorities and local communities to reduce drought risk, including through resources, incentives and decision-making responsibilities;
- (g) Drought vulnerability and impact assessment requires an inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data (by sex, age and disability), as well as easily accessible, comprehensive, timely and scientifically sound risk information, complemented by traditional knowledge;
- (h) Since drought risk management can play an essential role in fulfilling the sustainable development agenda, the policies and mechanisms that manage drought should also contribute to other areas, such as food security, health and safety, climate change adaptation and mitigation, environmental protection and disaster risk reduction;
- (i) While the drivers of drought risk may be local, national, regional or global in scope, the local specifics of drought must be understood and evaluated to design appropriate measures that reduce drought risk;
- (j) Addressing underlying drought risk factors through targeted public and private investments is not only more cost-effective than reliance

on disaster response and recovery – it also contributes to sustainable development.

GOALS AND OBJECTIVES OF THE STRATEGIC FRAMEWORK

This white paper presents the DRAPA strategic framework as a blueprint for building effective drought risk management networks and enhancing resilience to drought at continental, regional, national and community levels. The overarching goal of the proposed framework is to develop drought risk management strategy for Africa that will enhance resilience to drought impacts. The strategic framework will also inspire African countries to develop short-, medium-, and long-term drought mitigation and adaptation measures. The proposed DRAPA framework structure is centered on African countries, integrating regional institutes under AU leadership in collaboration with the international community, including the UN agencies. Figure 9 shows the recommended strategic framework structure of DRAPA for drought risk management and enhancing resilience in Africa. DRAPA includes six main elements aligned with the priorities of the HFA and its successor the Sendai Framework (UN, 2015), taking into consideration the recommendations of international meetings, such as the Third African Drought Adaptation Forum in Addis Ababa, Ethiopia, ongoing discussions and good practices to build an effective drought risk management and resilience strategy at continental, regional, national and local levels. In addition, African regional experience in drought management and resilience – for example, the IGAD drought disaster

resilience and sustainability initiative (IDDRSI – is also considered. This framework is designed as part of global collaboration and implementation strategy efforts, building on the science and policy documents and the final declaration of the HMNDP (WMO and GWP 2014).

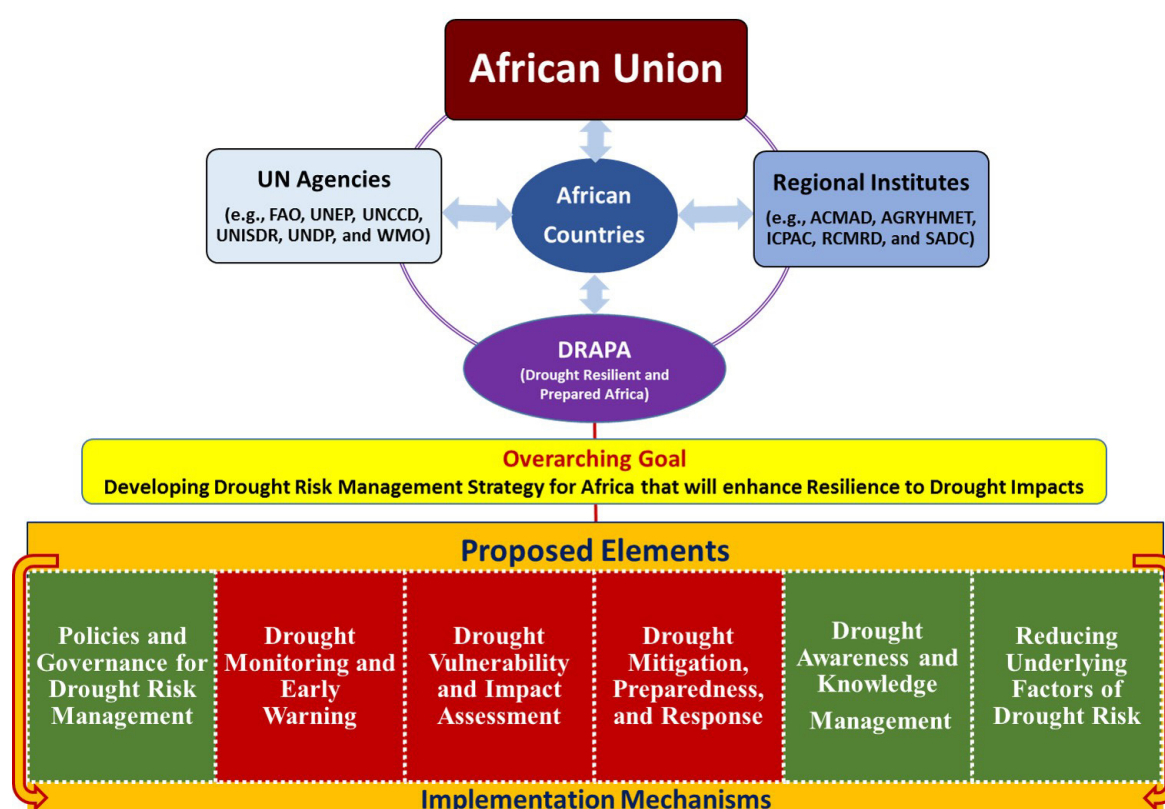
The strategic objectives of the framework include:

- Encouraging development of national drought policies for drought risk management, while enhancing capacity at all levels of government to mitigate the effects of drought;
- Institutionalizing a systematic approach for drought monitoring and early warning systems to enhance drought resilience, as well as share best practices for drought risk management among countries;
- Identifying drought vulnerability and improving risk assessment;
- Improving public awareness and focusing international, regional and national attention on the issue of building drought resilience; and
- Strengthening partnerships and cooperation to improve drought resilience.

The strategic framework includes the following six elements that address goals and objectives outlined above:

1. Drought policy and governance for drought risk management;
2. Drought monitoring and early warning;
3. Drought vulnerability and impact assessment;

Figure 9: Proposed strategic framework structure of “Drought Resilient and Prepared Africa” (DRAPA) for drought risk management and enhancing resilience in Africa



4. Drought mitigation, preparedness and response;
5. Knowledge management and drought awareness; and
6. Reducing underlying factors of drought risk.

These strategic elements of DRAPA are focused on the three pillars of drought risk management (elements 2, 3, and 4 – red boxes in Figure 9) and the enablers (elements 1, 5, and 6 – green boxes in Figure 9).

PROPOSED ELEMENTS OF THE STRATEGIC FRAMEWORK AND THEIR GUIDING PRINCIPLES

The six elements of DRAPA and their guiding principles are described below.

1. Drought policy and governance for drought risk management

The development of policies for drought risk mitigation and resilience cannot be performed by drought risk management institutions alone – other relevant sectors need to be closely involved. In addition, policy and governance should consider local needs, existing networks and mechanisms and resource availability, as well as ensure community participation and political commitment. In addition to national and state or provincial drought policies, emphasis needs to be placed on community-level drought policy development and planning, emphasizing self-reliance. The following principles for the development of continental, regional, national and local strategies to reduce drought risk in Africa in collaboration with international community and organizations are proposed, based on the suggestions of the Third African Drought Adaptation Forum and UNISDR strategic framework:

1. Political commitment, high-level engagement, strong institutional setting, clear responsibilities at the central and local level, along with appropriate governance, are essential for integrating drought risk issues into a sustainable development and drought risk management process;
2. A bottom-up approach with effective decentralization and active community participation in the planning and implementation of drought risk management measures is essential to move from policy to practice;
3. Capacity building and knowledge development are required to help build political commitment, strengthen competent institutions and create an informed constituency;
4. Drought risk management policies should establish a clear set of operating guidelines to govern the management of drought and its impacts, including the development of a preparedness plan that lays out a strategy to achieve these objectives;
5. Drought-related policies and plans should emphasize risk management that includes

planning, mitigation and preparedness, rather than rely solely on drought relief;

6. Drought monitoring, risk assessment and other appropriate risk management measures need to become the principal components of drought policies and plans;
7. Institutional mechanisms – policy, legislative and organizational – should be developed and enforced to ensure that drought risk management strategies are carried out; and
8. Sound development of long-term investment in risk management measures – planning, mitigation and preparedness – is essential to reduce the effects of drought.

Political commitment, high-level engagement, strong institutions and appropriate governance are essential for building and maintaining the necessary support to formulate drought policies and integrate drought risk issues into a disaster risk management and sustainable development agenda. Drought risk management is a long-term commitment that should complement long-term sustainable development planning efforts. Developing national drought policies is one of the most important steps in drought risk management.

BOX 1.

THE TEN-STEP DROUGHT PLANNING PROCESS

1. Appoint a national policy commission
2. State or define the goals and objectives or risk-based national drought management policy
3. Seek stakeholder participation; define and resolve conflicts between key water use sectors, considering transboundary implications
4. Inventory data and financial resources available and identify groups at risk
5. Prepare/write key tenets of a national drought management policy and preparedness plans (monitoring, early warning and prediction; risk and impact assessment; mitigation and response)
6. Identify research needs and fill institutional gaps
7. Integrate science and policy aspects of drought management
8. Publicize the national drought management policy and preparedness plans, build public awareness and consensus
9. Develop education programmes for all age and stakeholder groups
10. Evaluate and revise drought management policy and supporting preparedness plans

Developing and/or Improving Drought Plans and Policy: An increasing number of resources has been developed around the world to assist countries in devising national drought plans. For example, the National Drought Mitigation Center (NDMC) in the United States created the Ten-Step Drought Planning Process (Box 1) (Wilhite et al., 2000; Wilhite and Knutson, 2008) that governments in both developed and developing countries have utilized to develop drought plans (Smith et al., 2016; Wilhite et al., 2014). A drought plan should be dynamic – it needs to be updated regularly to address present and future challenges. Generally, countries should develop or improve their national drought policies so that they:

- (i) Establish a clear set of risk-based proactive principles or guidelines to govern drought risk management;
- (ii) Can be part of a disaster risk reduction or climate change adaptation framework;
- (iii) Are consistent and equitable for all regions, population groups, economic and social sectors;
- (iv) Are consistent with the goals of sustainable development;
- (v) Reflect regional differences in drought characteristics, vulnerability and impacts; and
- (vi) Promote the principles of drought risk management by encouraging development of early warning and delivery systems, preparedness plans at all levels of government, vulnerability assessments, mitigation actions, and coordinated emergency response that ensures targeted and timely relief, consistent with drought policy goals.

Community participation and capacity development, both in decision-making and implementation, is essential for advancing from policy to practice. Participation is required to develop policies and strategies that are relevant, feasible and equitable at local level. It may also help create a stronger feeling of community ownership among stakeholders that will foster commitment and responsibility in implementing drought policy. Developing an effective drought risk management strategy and translating it into practical actions requires the contribution and coordination of organizations and institutions at all levels. Participation can make the results of planning more widely accepted. This will also raise the acceptance of final planning results and increase the support and participation in the implementation. If the stakeholders feel that their interests are considered in the planning process, they are more likely to understand and accept final results, whether or not their own ideas are visible in the end product. The main stakeholders include community-based organizations (particularly those representing the most vulnerable groups), local and national governments, regional institutions and organizations, multilateral and bilateral international bodies, civil society organizations, the private sector, the media and the scientific community. Each has a particular role, which comes with full responsibility and accountability. To build an effective national drought management

plan, all relevant agencies, stakeholder groups, sectors and regions must be included in the drought policy and planning process (Wilhite, 2000) coming together as an inclusive forum to ensure a holistic approach that provides innovative responses, works across multiple sectors and addresses multiple needs.

In addition, capacity development is a central strategy for drought risk management. Although political momentum may exist to create new policy, legislative and organizational mechanisms for reducing risks, lack of dedicated financial resources and the shortage of trained personnel may hinder the implementation and operation of early warning systems. Drought risk management requires training and specialized technical assistance along with capacity development in communities to recognize and reduce risks. It includes technology transfer, information exchange, management training and the development of professional networks through institutions that support capacity building as a permanent objective.

2. Drought monitoring and early warning

Components of drought early warning systems include forecasting, monitoring, efficient communication and drought risk reduction planning (Svoboda et al., 2009). The onset and progression of drought must be predicted, monitored and evaluated continually. Enhancing drought monitoring, early warning and impact assessment capacities is essential to drought risk management. To make drought monitoring and early warning systems more efficient, decision makers and scientists should work together, creating systems that are timely, relevant, understandable, affordable and people-centered. To achieve this goal, it is essential to develop the appropriate social and technological capacity to research and implement programs for better understanding, monitoring and communication of drought occurrences and their impacts. This also includes fostering the ability of national governments and other planning entities to support the development and sustainability of the required infrastructure and scientific, technological and institutional base needed to research, observe, analyze, map and predict drought and its impacts.

Data policy to conduct research and improve drought-monitoring tools has been a big challenge in Africa. It is essential to support the development and improvement of relevant databases and the promotion of full and open exchange and dissemination of data for assessment, monitoring and early warning at international, regional, national and local levels. This includes the development of tools and models for the dissemination of drought-related information to users along with appropriate methods for collecting feedback on the use of climate and drought assessment products, and other forms of early warning information. The guiding principles for drought monitoring and early warning systems include:

1. Drought prediction, monitoring and early warning systems play an important role in drought risk identification, assessment and management;

2. Drought monitoring and early warning systems need to consider multiple socio-economic and environmental variables simultaneously;
3. Promotion of open exchange and dissemination of data for drought monitoring, prediction and assessment helps to improve drought monitoring tools and drought early warning;
4. Providing forecast and early warning information to decision makers in each sector linked to drought triggers – for example, agriculture – regularly and in a timely manner; and
5. Technology transfer, information exchange, network development and professional networks at international, continental, regional, national and local levels can help improve drought monitoring tools and early warning systems.

A global survey by UNISDR in 2006 stated that early warning systems for drought are more complex than those for other hydro-meteorological hazards and are relatively less developed worldwide. There is a difference between drought monitoring and early warning systems. According to WMO (2006), a drought monitoring system is one that will track, assess and report climate and water supply trends and current conditions such as rainfall, soil moisture, reservoirs and impacts. An early warning system facilitates the provision of timely and effective information by identifying institutions that will enable those exposed to a hazard to take action and avoid or reduce the risk, producing an effective response. Individuals exposed to the hazard need to be able to consider alternative activities and options before drought starts.

To monitor drought, decision makers and scientists rely on drought indicators or indices. Drought indices are the means of identifying, classifying and communicating drought conditions, and they are often used as triggers for decision making in risk management and emergency relief decisions. The preferred methodology on a country level is an integrated approach for assessing drought severity using a single drought index that combines parameters related to meteorology as well as to water, crops and other primarily impacted sectors. Recently, there has been a strong global interest in developing several new combined drought indices based on a variety of indicators. While combined can provide policy makers with more choices, it can be challenging to produce a synthesized product that is simple enough to understand or relay to the public. However, with the advent of geographic information systems (GIS) and increased computing and display capabilities, the ability to produce simple maps has increased. The satellite remote sensing technology with sensors in different regions of electromagnetic radiation, coupled with improved spatial resolution, swath and revisit time has improved various national and international early warning tools. Data and indices derived from the Earth observation have been widely used for drought monitoring and early warning systems, providing an opportunity to transfer understandable and actionable drought information to decision makers.

The availability of relevant data is crucial to build efficient and effective drought monitoring tools. However, data on drought characterization as well as the capacity to transform that data into information products in several African countries is very limited at best, and often absent. In the past few decades, several satellite-derived datasets and tools have been developed to help drought monitoring, but they still need to be evaluated and validated using ground-based observations. Strong collaboration and open data exchange can help improve and further develop drought monitoring tools and enable decision makers to utilize publicly available satellite imagery and geospatial technologies in drought risk management.

A drought early warning system is the foundation of a drought mitigation plan. To provide a broader context for designing, building and maintaining drought early warning systems, African countries should consider how an early warning system fits into the disaster-planning process and what role it plays. The drought information analysis is only as good as the spatial resolution or scale that can be monitored. A bottom-up approach from site/point data to grid and then to basin or provincial/district level or national analyses are generally preferred in a drought early warning system. However, many countries and regions employ a top-down, or national to local approach due to limited resources. A combination of both approaches may be the best way to leverage resources and develop the most comprehensive system for all users. Drought forecasts and warnings should also be targeted for specific users to provide key information for decision-making. Traditional knowledge can also supplement drought monitoring and early warning systems. In addition, while developing or improving their own drought monitoring tools and triggers along with warning systems, African countries can leverage the freely available global drought information. The national early warning systems in Africa may capitalize on techniques, methods and products shared by researchers and several operational global programs, such as the Global Information and Early Warning System (GIEWS), the Climate Prediction Center (CPC) of the National Oceanic and Atmospheric Administration (NOAA), and the Famine Early Warning Systems Network (FEWS NET) drought information and products that cover Africa.

DRAPA, in collaboration with national, regional and global networks, can help improve drought monitoring tools and early warning systems by customizing drought information to a specific sector, such as agriculture or water, and specific country in Africa. Greater collaboration to enhance the international, continental, regional, national and local climate observation networks and information delivery systems to improve public understanding and preparedness for drought is necessary for DRAPA drought monitoring and early warning systems. Drought monitoring and early warning in Africa is vital, because early identification of populations at risk can enable the timely and appropriate actions needed to avert possible widespread hunger, destitution or even famine. Developing some form of

extension service to interpret drought information for small rural farmers can help improve drought monitoring tools and early warning systems by tailoring drought information for a specific sector. In addition, there is an ever-increasing need to develop and implement measures that reduce societal vulnerability to drought, stressing preparedness and risk management rather than crisis management.

3. Drought vulnerability and impact assessment

Drought vulnerability and impact assessment can be a basis for promoting a culture of resilience in combination with enhancing knowledge about drought occurrence, the potential effects of the drought and the related vulnerability of affected people and activities. There are three types of drought assessment that are interlinked. They include future projections of probability of drought losses, ongoing monitoring of drought through observations of hydrological and climatic variables, vegetation cover, as well as food prices and assessment of impacts to define the most appropriate response measures (Bantilan, 2013). Drought risk assessment methodologies, such as drought impact assessment and vulnerability analysis, can help understand specific trends, vulnerability and impacts of drought for specific drought-prone areas. Common methodologies for defining and assessing risks as well as appropriate drought hazard and vulnerability indicators should be developed to meet specific local needs. Although vulnerability is location-specific, it takes into account the socio-economic and cultural factors as well as coping capabilities of different communities (Bantilan, 2013). The guiding principles for drought vulnerability and impact assessment include:

1. Drought risk is the combination of natural hazards as well as human, social, economic and environmental vulnerability of a community or country, and managing risk requires understanding these components in the context of space and time;
2. Increasing individual, community, institutional and national capacity is essential to reducing vulnerability to drought;
3. Impact assessment plays an important role in drought risk management – in particular, identifying most vulnerable groups, including women and children, along with the aspects and the extent of their vulnerability to drought; and
4. Changing climate and the associated changing nature of drought poses a serious risk to the environment, and as a result, to the sustainable development and human security.

In many African countries, there is no consistent methodology for assessing drought impacts, dissemination of drought information, or archiving this information in a database. Integrated drought monitoring and early warning system needs to be comprehensive in scope, combining meteorology, soil, water, crop and other relevant data. Drought

vulnerability and risk assessment requires reliable data on drought impact and vulnerability to generate relevant information for decision makers and end users. DRAPA can assist in developing a country-level database on past drought incidences and impacts in collaboration with international databases, such as the Global Risk Identification Programme (GRIP). Gathering necessary data for drought risk assessment, reviewing existing data, identifying data gaps and improving availability of data and data management systems, as well as on user interfaces is a crucial step in the process of developing national drought preparedness. DRAPA should collaborate with the national and international community to address the issues of data scarcity and unavailability. In addition, developing assessment tools and approaches to quantify drought vulnerability and impacts is a necessary step to identify and reduce drought vulnerability and impacts.

Drought risk assessment enables decision makers and the public to build a fundamental understanding of the African countries' exposure to drought impact and its social, economic, environmental and physical aspects and prevent future adverse effect on the population and the economy. For example, an improved understanding of the economics of drought is essential for drought risk management. While it is generally agreed that the economic, social and environmental impacts of drought exceed those of any other natural hazard (Wilhite, 2011), more precise estimates of the costs associated with a proactive approach to drought management versus the traditional crisis management need to be calculated as part of the economics of drought preparedness (EDP). An African consortium proposed by DRAPA will bring together government bodies, research institutes, UN and international organizations, the private sector, civil society and donor organizations to deal with the EDP.

4. Drought mitigation, preparedness and response

Enhancing drought mitigation measures and preparedness can significantly reduce drought impacts and losses if decision makers, communities and individuals are well equipped with the knowledge and capacity for effective drought management and ready to act. It should be recognized that mitigation and preparedness have a greater impact on reducing the scale and effects of drought than ad-hoc emergency response measures. The guiding principles of drought mitigation and preparedness should prioritize the following components:

1. Drought mitigation and preparedness are central components of drought risk management, and are more important than relying solely on ad-hoc emergency response measures;
2. Information coordination: dialogue, exchange of information and coordination are needed between drought risk management, development and emergency management actors;
3. Integrated approach: the selection of appropriate drought risk management – planning, mitigation

and preparedness – measures should take into account several aspects, such as integrated environmental and natural resource management, social and economic development, land use planning opportunities and climate change adaptations;

4. A combination of top-down and bottom-up approaches is required for the development and implementation of effective mitigation and preparedness measures;
5. Institutional capacity, coordinated mechanisms, identification of local needs and indigenous knowledge are required to implement effective mitigation and preparedness strategies;
6. Monitoring and early warning are key elements of drought risk management and must be closely linked to other risk reduction actions; and
7. Long-term commitment: drought risk management – planning, mitigation and preparedness – also requires long-term allocation of resources.

Drought mitigation includes structural or physical measures, such as appropriate crops, dams and engineering projects, as well as non-structural measures, such as policies, awareness, knowledge development, public commitment, legal frameworks and operating practices that can limit the adverse impacts of drought. Response to drought includes all efforts, such as the provision of assistance or intervention during or immediately after the disaster, to meet the immediate or short-term life preservation and basic subsistence needs of the affected populations. The drought mitigation and response element of drought risk management is aimed at building greater resilience to drought and eliminating or at least reducing the impacts of drought by taking appropriate measures and actions. Drought mitigation and response cover all sectors affected by drought, including agriculture, water and the environment, health, transport and tourism.

A customer-oriented response that coordinates national, continental and international institutes and drought programs is an effective and efficient approach. The level of integration of drought information should be country-specific depending on the kind of data available. Prioritizing the timely delivery of information to users and the development of decision-support tools that incorporate users' feedback are recommended when designing a drought risk management plan. In addition, recognition of a safety net of emergency relief based on sound stewardship of natural resources and self-governance at multiple levels are important factors for drought response. Proactive mitigation and planning measures, risk management, public outreach and resource stewardship are among the key components of DRAPA. Global partnerships, such as the Global Facility for Disaster Reduction and Recovery (GFDRR), can help Africa better understand and reduce its vulnerability to drought and contribute to the climate change adaptation.

5. Drought knowledge management and drought awareness

The drought awareness, knowledge management and education are some of the most important enabling factors in drought risk management and resilience building. Collection, compilation and dissemination of relevant knowledge and information on drought hazards, vulnerabilities and approaches should be linked to community drought risk management awareness campaigns, programs and projects. Interaction between the generators and the users of information is essential for developing targeted messages and helping ensure the usefulness of information. Education in drought risk management is an interactive process of mutual learning among the population and institutions that also involves traditional wisdom and local knowledge. Various educational programs focusing on drought risk management exist in addition to general programs on disaster management. The guiding principles for drought awareness and knowledge management activities include:

1. Informed and motivated citizens: the effects of drought can be substantially reduced if people are well informed and motivated to build drought disaster prevention and resilience;
2. Effective information management and exchange requires strengthening dialogue and networks among drought researchers, practitioners and stakeholders to foster consistent knowledge collection and dissemination;
3. Public awareness programs and extension services should be designed and implemented with a clear understanding of local perspectives and needs, and should promote engagement of the media to stimulate a culture of drought resilience and strong community involvement; and
4. Education and training are essential for all stakeholders to ensure effectiveness of efforts that reduce drought risks.

Although drought risk management requires an investment of financial and human resources, the crisis management approach is commonly more resource-consuming and increases the vulnerability of society long term. Educational programs that raise awareness of short- and long-term water supply issues can help understand how to respond to drought and ensure that drought planning does not lose ground during non-drought years. Knowledge, including local and indigenous knowledge, innovation and education should be applied to build a culture of safety and resilience. A regional and sub-regional network for knowledge management that includes traditional knowledge needs to be developed (UNISDR, 2014).

One campaign that could be used as a template for raising the profile of risk-reduction efforts in Africa is the Disaster Risk Reduction Begins at School Initiative – a part of the World Disaster Reduction Campaign 2006–2007 that was coordinated by the UNISDR secretariat

in cooperation with United Nations Educational, Scientific and Cultural Organization (UNESCO). The initiative actively engages school children, teachers, non-academic staff and the surrounding communities to raise awareness, build a culture of prevention and make school buildings safer (UNISDR, 2007).

6. Reducing underlying factors of drought risk

Reducing underlying factors of drought risk can also contribute to reducing drought vulnerability. Effective environmental and natural resource management, social and economic development practices and land-use planning and other technical measures can all contribute to reducing drought risks. These measures need to be reflected in national poverty reduction strategies, development plans, sector development planning and programs, environment and natural resource management strategies, as well as in post-disaster situations, so that effective preparedness and mitigation measures can be devised. The guiding principles for reducing underlying factors of drought risk include:

1. Mechanisms that systematically bring together practitioners in drought risk management, such as national platform members, and key institutions involved in environmental management, such as adaptation to climate change, desertification and biodiversity, should be in place;
2. Overlapping areas and potential synergies between existing environmental programs and drought risk management activities should be identified;
3. A mechanism for carrying out assessments that integrate drought risk management and environmental protection parameters, such as integrated risk and environmental impact assessments, should be developed on the institutional level;
4. Socio-economic high risk factors such as age, disabilities, social disparities and gender should receive focused attention to reduce the impacts of drought on the most vulnerable population groups;
5. Post-drought recovery planning can incorporate drought risk management strategies for the future; and
6. Safety nets such as insurance mechanisms for property as well as microcredits and financing for ensuring minimum livelihood means should be devised to accelerate post-drought recovery processes.

The impacts of drought are most immediately and intensely felt at the local level, placing communities at the frontline of any attempts to prepare for, respond to, and mitigate the effects of droughts. However, in some parts of the world, including Africa, many top-down approaches have failed to recognize the important role of communities in addressing the specific local needs of vulnerable people. By ignoring the local

potential to face the drought, the vulnerability of people to the disaster may have been increased (ADPC, 2016).

Strengthening human and institutional capacity of stakeholders at all levels – policy and decision makers, researchers, meteorologists, technology experts, communities and farmers – is crucial for effective interpretation and usage of forecasting and early warning products in drought risk management. For most organizations dealing with early warning products, the low level of applied knowledge, when it comes to technical personnel as well as management, is a major concern.

In many African countries, the level of drought awareness and the institutional capacity to improve it are limited. It is essential to develop the capacity of relevant players, including policy makers, state authorities and resource managers at different levels, as well as promote public awareness of drought impacts and drought risk by developing and implementing training and advocacy programs. In addition, bringing science, policy and best practices together can contribute to a more integrated and proactive approach to drought management.

Incorporating comprehensive governmental and private insurance along with financial strategies into drought preparedness plans can help reduce the underlying factors of drought risk. For example, the African Risk Capacity (ARC), a specialized agency of the AU, offers a weather insurance mechanism that African countries can use to build resistance and recover from natural disasters, including drought. Through ARC, countries could purchase insurance against a drought risk and if the Africa Risk View system – a sophisticated database that sends an alert when a country has experienced a drought at the level of severity that warrants payment. The ARC tool combines existing operational rainfall-based early warning models on agricultural drought in Africa with data on vulnerable populations to form a standardized approach for estimating food insecurity response costs across the continent, providing information that is critical for financial preparedness in the case of drought and for providing the basic infrastructure needed to establish and manage a parametric risk pool, triggering early disbursements (ARC, 2016).

Integrated strategies combine agricultural technologies for drought management including drought-tolerant crops and varieties, improved crop management practices and water conservation methods, improved climate forecasting and early warnings systems, weather information communication, weather-index insurance systems, input/output market development and price information that will enhance drought risk management (Shiferaw et al., 2014). To reduce food insecurity and contribute more decisively to sustainable change in the agricultural sector, African countries need to promote change and transformation from within the continent, putting more emphasis on farming as a

business and a profitable venture, and raising the profile of the farming profession. In addition, Africa needs to commit to the systematic preference for sustainable agricultural systems from the socio-economic as well as the environmental perspective, limiting use of high-carbon inputs and promoting agro-ecology and agroforestry. Trans-sectoral dialogue and strong partnerships that ensure the alignment with agricultural development strategies can also contribute to reducing drought-related risks.

Integrated drought risk management should also prioritize the approach that takes into account economic, political and cultural factors across various sectors of economy and puts people's livelihoods at the center of drought analysis. Understanding the asset base, including physical assets such as land and livestock, human capital, and social capital is also important. Generally, the resilience of a household to drought depends on the strength and diversity of its asset base, which gives it ability to switch between different livelihood strategies at times of drought. For example, drought conditions can severely affect agricultural and pastoral livelihoods and increase vulnerability and risks for farmers and pastoralists (UNISDR, 2009a). Protection of biodiversity should also be included in drought risk management, since drought can threaten biological resources that people use for food, economic activities such as tourism and for genetic material that supports development of drought-resistant crops and livestock. It is critically important to capture these and other dimensions in vulnerability assessments and drought mitigation measures (UNW-DPC, 2015).

Significant efforts are required to make drought risk management gender-sensitive at all levels to make DRAPA more effective and efficient, enhance drought mitigation, preparedness and response and ultimately create a more drought-resilient society (Figure 11).

IMPLEMENTATION OF THE STRATEGIC FRAMEWORK

Efficient organizational structure combined with human resources rich in experience, knowledge and skills are all vital elements of an effective disaster risk management system. However, current assessments indicate that these conditions have not yet been fully achieved in Africa.

The development of a drought risk management framework involves four key components (IDMP-CEE, 2015):

- (i) Institutional: coordination set-up and key institutional capacities required to develop drought risk management systems;
- (ii) Methodological: necessary procedures for assessing drought risks;
- (iii) Public: interventions that depend on the risk profile within a given context, providing an overview of the types of drought risk management options to be adopted for ensuring immediate responses, enhancing short-term preparedness and promoting long-term resilience; and

- (iv) Operational: components that provide guidance and recommendations for developing and implementing a decision-support system based on indicators that are achievable within a set timeframe to support drought risk management.

The necessary mechanisms for drought risk management and enhancing resilience include (Wilhite, 2014):

- (i) Political will and leadership;
- (ii) Initial investment in building greater institutional capacity;
- (iii) Collaborative environment to support and encourage coordination within and between countries, at all levels of government and including the private sector of each country;
- (iv) Engaged and supportive citizens and stakeholders; and
- (v) Involved research community, including higher education institutions and strong outreach and media programs.

The implementation of a strategic framework can assure that droughts in Africa no longer:

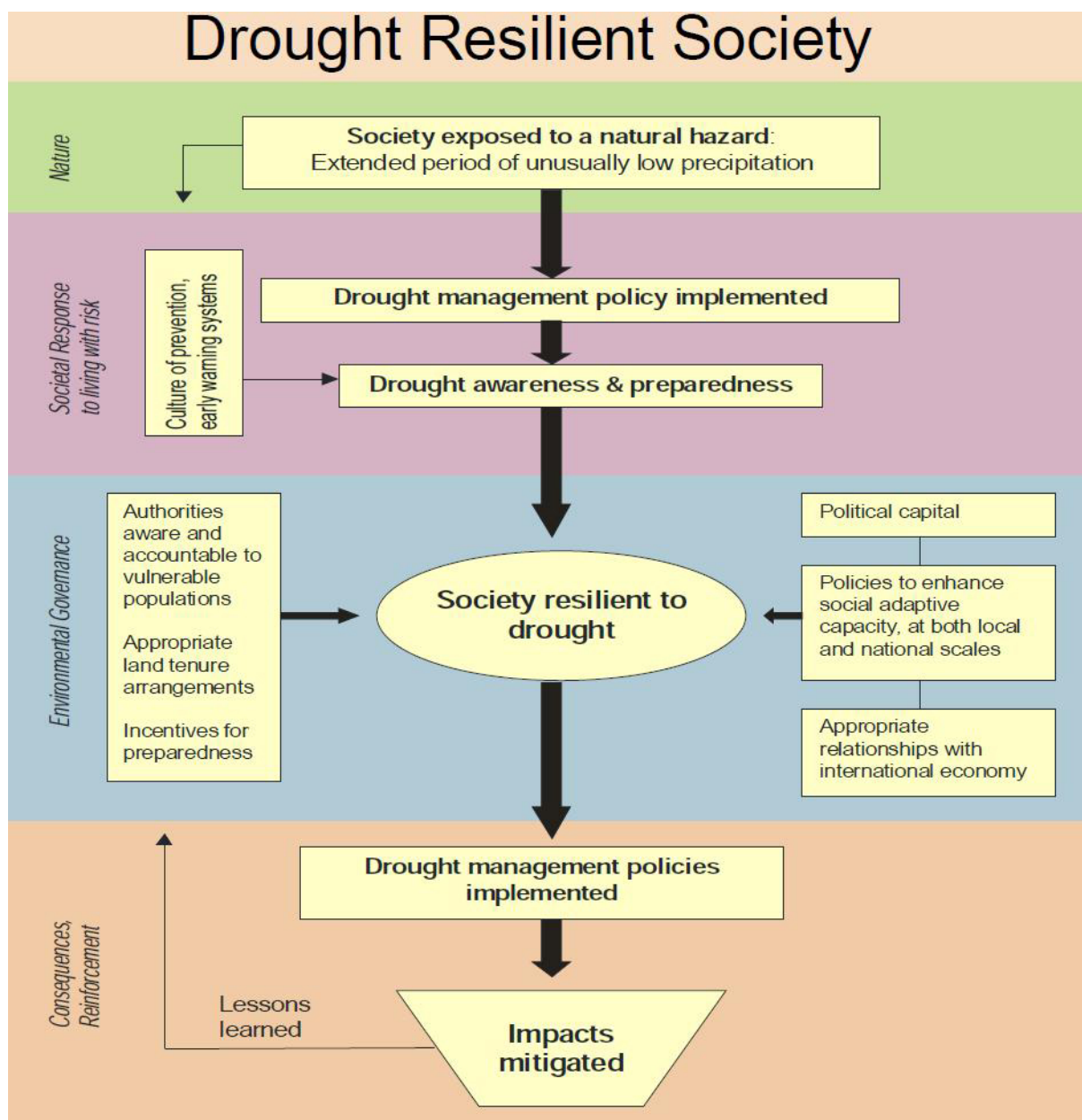
- (i) Lead to famine, human suffering and death;
- (ii) Aggravate poverty and result in low nutritional standards of poor populations;
- (iii) Disproportionately affect women and children;
- (iv) Lead to the liquidation of family assets as a result of distress; and
- (v) Cause migration in large numbers.

Implementing efficient proactive management through DRAPA can increase understanding and awareness and emphasize planning ahead, leading to major impacts on economies, ecosystems and the environment if expected outcomes are ensured by coordinated efforts at all levels.

INNOVATIVE SOURCES OF FINANCE FOR ENHANCING RESILIENCE TO DROUGHT EVENTS

The costs associated with the traditional crisis management can be significantly greater than the price of a proactive approach to drought management. Innovative financing strategies need to employ various options that enhance drought resilience. Funding sources should include private, community, national, continental and international financial resources provided by a wide variety of stakeholders. There is also a need to systematically and strategically re-assess existing financing opportunities, in particular the climate change adaptation financing and the private funding. In addition, public initiative in financing, subsidies and taxes to compensate for drought impact losses and philanthropic investments should be considered (WACDEP, 2016), and other opportunities for enhancing African drought resilience, such as the new LDN Fund, can be explored. Evaluation of options to catalyze and strengthen existing drought, emergency and disaster funds can help fast-track the

Figure 11: A drought resilient society takes societal behaviour, vulnerability factors and consequences into consideration.



Source: UNISDR, 2009a

establishment and implementation of national drought policies, including early warning systems in vulnerable communities.

RECOMMENDATIONS FOR THE IMPLEMENTATION OF THE STRATEGIC FRAMEWORK

The lessons learned from recurrent droughts in Africa indicate that national governments and the international community need to collaborate to build and implement DRAPA, aligning it with the international disaster risk reduction initiatives. Recommendations for collaborative approaches are listed below:

1. Manage the drought risks, not the crisis. National governments should acknowledge the primary responsibility and provide leadership in drought risk reduction. All decision makers and drought

risk managers need to review their approaches to drought risk management accordingly. Drought monitoring and early warning specialists need to develop common drought management triggers for early action to be used by both humanitarian and development actors;

2. Develop an integrated drought risk management approach that allows long-term development interventions to adapt to the changing climate and undertake preventative humanitarian work. This includes developing livelihood protection and no-regret options; assisting communities in preventing, mitigating, preparing for and responding to crises. To ensure that drought risk management is fully included in the development and humanitarian cycles, significant investments in human resources and partnership building need

to be made, while organizational structures and systems need to be reviewed;

3. Institutionalize gender-sensitive drought risk assessments, implement gender-sensitive early warning systems and use gender-sensitive indicators to monitor the gender mainstreaming progress. Affirm gender consideration and participation of the youth in all drought-related issues;
4. Strengthen the collaboration among African countries, regional bodies and international organizations in drought risk management and implementation plans;
5. Establish a common drought management platform for all African countries and facilitate the negotiation of a binding drought and land degradation protocol;
6. Develop an Africa-wide network as an integral part of the global network on drought preparedness;
7. Design and develop an African drought information clearinghouse;
8. Improve and use national, sub-regional and regional drought preparedness networks for capaci-

ty building, development and technology transfer, exchange of information and best practices;

9. Mobilize adequate, secure and timely financial and technical resources to address drought issues at all levels;
10. Create an African initiative that brings government bodies, research institutes, UN and international organizations, the private sector, civil society and donor organizations together to deal with the assessment of the economics of drought preparedness;
11. Promote partnerships among public institutions, private sector, civil society, research institutions and academia to develop and finance programs that create public drought awareness. Educate young people by including drought risk management issues into school curricula and providing short- and long-term training, improving citizen science encourage volunteerism and community involvement.
12. Ensure that DRAPA is adopted by the summit of the African Union heads of state at appropriate sessions.

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APPENDIX

KEY DEFINITIONS

Typology of drought risk reduction measures (modified from UNISDR Terminology of Disaster Risk Reduction, <http://www.unisdr.org/>).

Drought preparedness: contingency planning through established policies and specified plans and activities undertaken before drought to prepare people and enhance institutional and coping capacity, to forecast or warn of approaching dangers, and to ensure coordinated and effective response in a drought situation.

Drought planning: actions taken by individual citizens, industry, government and others before drought occurs to mitigate impacts and conflicts arising from drought.

Response to drought: immediate, short- or long-term efforts, such as provision of assistance or intervention during or immediately after a drought, to meet life preservation and basic subsistence needs of people affected.

Recovery from drought: decisions and actions undertaken after a drought to restore or improve pre-drought living conditions of the affected community, while encouraging and facilitating necessary adjustments that reduce drought risk.

Drought mitigation: any structural or physical measures, such as selecting appropriate crops, building dams and implementing engineering projects, as well as non-structural measures, such as developing policies, awareness, knowledge development, public commitment and operating practices undertaken to limit the adverse impacts of drought.

Drought risk assessment: a methodology to determine the nature and extent of risk by analyzing potential drought impacts and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.

Drought vulnerability: the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a drought.

Drought early warning system: the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a drought to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

Drought risk management: the systematic process of using administrative directives, organizations, operational skills and capacity to implement strategies,

policies and improved coping capability to lessen the adverse impacts of drought.

Drought resilience: the ability of a system, community or society exposed to drought to resist, absorb, accommodate to and recover from the effects of drought efficiently and within a reasonable timeframe, including through the preservation and restoration of essential basic structures and functions.

KEY ELEMENTS OF INTEGRATED DROUGHT RISK MANAGEMENT

According to the Wilhite (2011) three key elements, or pillars, of a drought preparedness plan include:

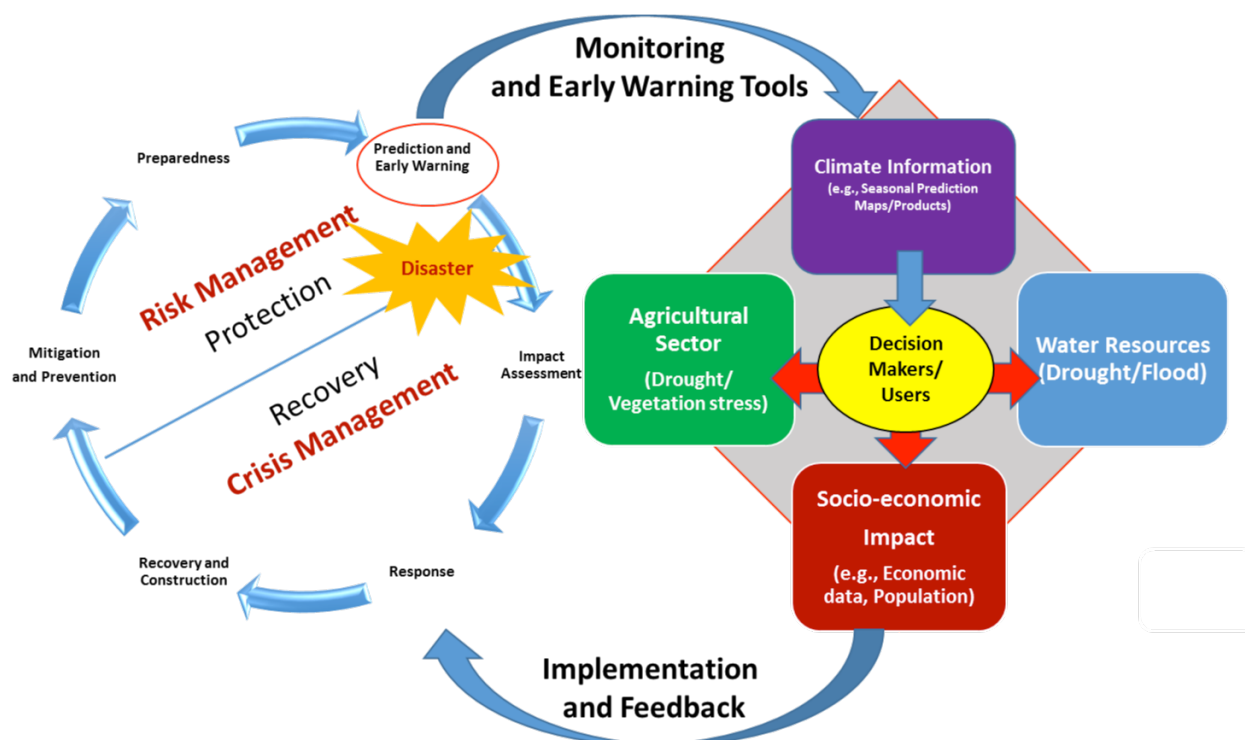
1. Drought monitoring and early warning systems:

Drought monitoring entails tracking indicators and indices of precipitation, temperature, soil moisture, vegetation condition, stream flow, snowpack and ground water. It is also important to monitor the impacts of drought on vulnerable sectors, such as agriculture. The development of more reliable seasonal forecasts and decision-support tools, such as drought monitoring indices for key sectors affected by drought, is also crucial. An early warning system (Figure 12) should be linked to risk information, including people's perception of risk and communication system that actively engages communities in drought preparedness (Pulwarty and Sivakumar, 2014). Early warning systems analyze a range of factors, including weather, agriculture, livestock, markets and nutrition, and are becoming more sophisticated and reliable (Verdin et al., 2005; Hillier and Dempsey, 2012). All early warning systems (EWS) must address the following five questions (Glantz, 2004), which can be also used to educate the public about the drought hazard:

- What is happening and what are the potential hazards?
- Why is this a threat and what are the potential adverse impacts?
- When is the impact likely to occur, and how much do the threatened populations have to prepare?
- Where are the most threatened regions located?
- Who are the most vulnerable people who need to be warned?

The EWS is the foundation of a drought plan that identifies early drought detection, improves proactive response and triggers mitigation actions or measures

Figure 12: Monitoring and early warning systems that include drought monitoring tools and linked into decision-making and drought risk management



Source: modified from Tadesse et al., 2015

within a drought plan. The major components of early warning systems include timely data and information acquisition, synthesis and analysis of data that is used to trigger a set of actions within a drought plan and an efficient dissemination system or network through the web, media, extension and publications. The EWS also uses drought indicators and tools such as climate- and satellite-based drought indices as well as vegetation monitoring indices that provide drought information for diverse audiences, including decision makers, simplifying complex land-atmosphere-ocean observations and relationships (Svoboda and Fuchs, 2016). The drought indices are useful for quantitative assessment of anomalous climatic conditions such as drought intensity, duration and spatial extent. In addition, local knowledge systems, including traditional knowledge of farmers and pastoralists, should be incorporated into the information systems.

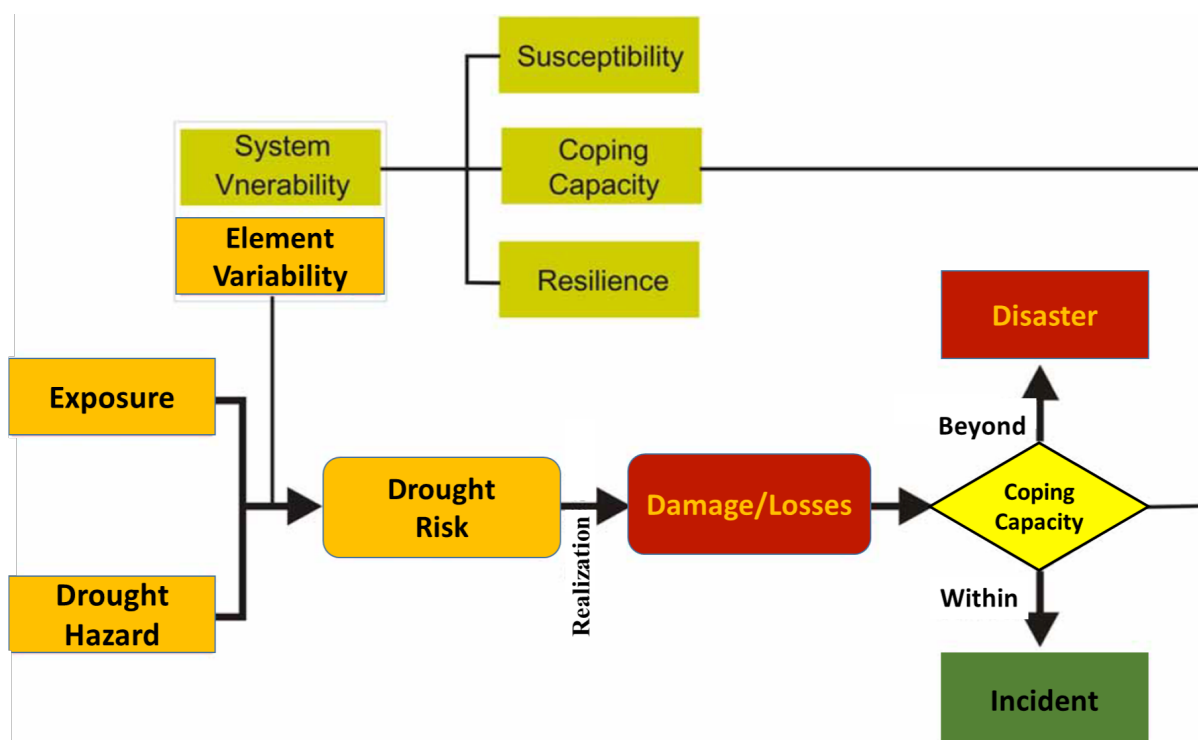
Vulnerability and impact assessment: Vulnerability is the result of social, economic and environmental factors or processes that increases susceptibility of a system to the impact of drought. Despite improvements in weather forecasting and early warning systems, government programs and the development of new tools and technologies, the economic losses caused by droughts around worldwide are high and continue to rise, indicating growing societal vulnerability to drought (Hayes et al., 2004). Drought impact and vulnerability assessments (Figure 13) should focus on understanding the human and natural processes that add to drought vulnerability, including a vulnerability profile for key sectors and affect community resilience. It should also include vulnerability mapping for threatened

communities (GRIP, 2010). Developing criteria for vulnerability assessment is needed to assess mitigation actions and should include:

- (i) Recording drought impacts on vulnerable economic sectors such as rain-fed and irrigated agriculture, livestock, environment (including biodiversity), energy, tourism and health;
- (ii) Determining who and what is at risk, and why – before, during, and shortly after drought. This requires assessment of the physical, social, economic, and environmental pressures on communities, measured at various geographical scales;
- (iii) Assessing conditions or situations that increase the resistance or susceptibility of a system to drought;
- (iv) Assessing the degree or extent of potential damage or loss in the event of a drought; and
- (v) Assessing the coping capacity of communities affected by drought.

Drought risk assessments for the various population groups, such as women, children, the elderly, the sick, the landless, farmers, pastoralists, marginalized and indigenous communities, should also be conducted. Common methodologies to measure progress in reducing vulnerability at multiple spatial scales can be done by assessing factors to identify vulnerable population groups and communities that include gender, age, ethnicity, dependency on agriculture and livestock, poverty and education level (Lynn et al., 2011; Cutter, 2003; Adger, 2006; Cutter, 1996).

Figure 13: Drought vulnerability assessment flow chart



Source: GRIP - Global Risk identification Programme, UNDP Bureau for Crisis Prevention and Recovery (2010)

Drought mitigation and response: Drought mitigation comprises any structural or physical measures such as selecting appropriate crops, building dams and implementing engineering projects, and non-structural measures, such as developing policies, creating awareness, improving knowledge base, generating public commitment, strengthening legal frameworks and improving operating practices that can limit the adverse impacts of drought. Response to drought includes such efforts as the provision of assistance or intervention during or immediately after a drought to meet the immediate or short-term life preserving and basic subsistence needs of the affected people. The drought mitigation and response elements of drought risk management are aimed at building greater resilience and eliminating or at least reducing the impacts of drought by taking appropriate measures and actions. Drought mitigation and response cover all sectors affected by drought, including agriculture, water, the environment, health, transport and tourism.

Mitigation and response actions can be divided into long-term, medium-term and short-term options. Development strategies should include development of a long-term mitigation and response plans, and these plans should be periodically revisited. Medium-term measures target the mitigation of specific impacts prior to their occurrence and are implemented in a timely manner prior, during and after drought, based on triggers, such as predetermined thresholds of specific drought index values that are provided by monitoring in early warning systems. Short-term or emergency response measures are implemented in response to

a sudden occurrence of severe to extreme drought to provide targeted and timely relief, consistent with long-term drought management strategy.

An effective, proactive risk management strategy requires the best available information from operational and reliable drought monitoring tools that provide objective information for near real-time drought risk management (Tadesse et al., 2008). Several climate- and satellite-based global drought indices that can be used for early warning have been developed recently (Svoboda and Fuchs, 2016). These drought monitoring and early warning products, freely available at national, regional and continental scales via the internet, may help many countries in Africa to develop necessary preparedness capacities. However, the definition of drought levels to trigger action, the climatological and environmental parameters to monitor drought, and the type of drought index to adopt may differ for each country in Africa. Examples of successful communication of the results of drought monitoring and early warning should be recorded and serve as a guide for future awareness-raising campaigns. Indigenous local practices and knowledge are often important in mitigating drought impacts. Such relevant practices should be included in the drought plan. Integrated drought risk management must also be aware of the climate change, eco-system management, and risk-proof investments for sustainable development. In addition, it must be multi-sectorial and include all stakeholders from humanitarian and development fields ensuring that communities are central in risk reduction initiatives.

REGIONAL LEVEL EFFORTS IN DROUGHT MONITORING AND MANAGEMENT IN AFRICA

AGHYMET Regional Center/Permanent Interstate

Committee for Drought Control in the Sahel (CILSS) – CILSS was created in 1973–1974 in response to a severe region-wide drought. The thirteen member countries of CILSS are Benin, Burkina Faso, Cape Verde, Chad, Ivory Coast, Gambia, Guinea, Guinea Bissau, Mali, Mauritania, Niger, Senegal and Togo. The research of CILSS focuses on food security and combating the effects of drought and desertification, with the aim of helping vulnerable populations in the Sahel and West Africa to prepare for, adapt to and recover from drought. In 1995, CILSS focused its activities on basic food security and the use of natural resources.

Created in 1974, the AGRHYMET Regional Center is a specialized agency of CILSS. Its main objectives include contributing to food security and increased agricultural production in member countries of CILSS and ECOWAS, and helping improve the management of natural resources of the Sahel and West Africa. AGRHYMET also provides information and training in agro-ecology – for example, agro-climatology and hydrology – in the region. The 2015–2016 joint UN and CILSS work plan defines priority areas for cooperation aimed at strengthening households' abilities to cope with climate shocks, natural and manmade disasters. The core of the UN-CILSS partnership is the creation of a resilience measurement platform dedicated to analyzing communities' exposure to risks and their ability to withstand shocks. The AGRHYMET priority areas include development of policies and practices to strengthen the resilience of the region's pastoralist communities, collaboration on disaster risk reduction, as well as management and governance of natural resources (UNISDR, 2015a).

African Centre of Meteorological Applications for Development (ACMAD):

ACMAD, the weather and climate center with the focus on the African continent, was created in 1987 by the Conference of Ministers of the United Nations Economic Commission for Africa (UNECA) and the WMO, starting its operations in Niamey in 1992. ACMAD is composed of the (then) 53 member states of Organization of Africa (OAU) to provide weather and climate information and promote sustainable development on the continent as part of national strategies for poverty eradication, working in the sectors of agriculture, water resources, health, public safety and renewable energy. ACMAD is involved in capacity building for the national meteorological services (NSMs) of its member countries in weather prediction, drought and climate monitoring, transfer of technology and research. In addition, ACMAD encourages the NSMs to prepare strategic development plans that integrate new African initiatives such as NEPAD and the socio-economic conditions related to the changing global environment (ACMAD, 2016).

Climate Prediction and Applications Centre (ICPAC): In 1989, the Drought Monitoring Centre–Nairobi (DMCN)

and a sub-center in Harare (Drought Monitoring Centre–Harare, DMCH) were established as a project by 24 African countries with support of the UNDP and WMO in response to devastating weather-related disasters. In 2003, DMCN was adopted as a specialized IGAD institution and its name changed to IGAD Climate Prediction and Applications Centre (ICPAC) to better reflect its mandates, mission and objectives within the IGAD system. ICPAC has eleven member countries: Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania and Uganda. Since its establishment, ICPAC has been able to demonstrate that mainstreaming of climate information can significantly contribute to climate risk reduction and climate change adaptation for sustainable development. The IGAD's Drought Disaster and Sustainability Initiative (IDDRISI) is another effort to end drought emergencies in the Horn of Africa.

SADC Climate Services Centre (SADC-CSC): The center provides operational regional services for monitoring and forecasting extremes in climate conditions. SADC-CSC develops and disseminates meteorological, environmental and hydro-meteorological products that contribute to improved disaster risk management in the region, and helps ensure that SADC member states are better prepared for weather and climate disasters, conservation and protection of natural resources. SADC-CSC, established in 1990 as the Drought Monitoring Centre, has achieved a significant progress in its member states, and many users have publicly evaluated its products and services as crucial to their operations. Among the principal beneficiaries of SADC-CSC products are the member states' national meteorological and hydrological services, which are a part of disaster preparedness and management committees (Aldrian et al., 2010).

Regional Center for Mapping of Resources for Development (RCMRD):

The RCMRD was established in 1975 in Nairobi, Kenya under the auspices of the UNECA and the (then) Organization of African Unity (OAU), today African Union (AU). RCMRD is an inter-governmental organization that currently has twenty contracting member states in the Eastern and Southern Africa: Botswana, Burundi, Comoros, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Somali, South Africa, South Sudan, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. The RCMRD's primary goal is to promote sustainable development of its member states through generation, application and dissemination of geo-information and associated technology, products and services. RCMRD has been instrumental in capacity building for resource survey, mapping, remote sensing, GIS and natural resources management on the continent, providing training for technical officers from its member states and other African countries in the fields of surveying and mapping, remote sensing, GIS, natural resources assessment and management. In 2008, RCMRD established a joint partnership with the United States Agency for International Development (USAID) and

National Aeronautics and Space Administration (NASA), in collaboration with regional institutions in East Africa, Himalaya and Mesoamerica. The partnership enabled RCMRD to establish the SERVIR's Eastern and Southern Africa Hub – a unique science and technology project that enables improved environmental decision-making in the region. The overarching goal of the SERVIR is to improve environmental management and resilience to climate change. The SERVIR project works toward this goal by building the capacity of SERVIR regional hub institutions, governments and other key stakeholders to integrate Earth observation information and geospatial technologies into environmental decision-making.

The Famine Early Warning Systems Network (FEWS NET) is one of providers of early warning and analysis on food insecurity. FEWS NET was created in 1985 by USAID after devastating famines in East and West Africa. FEWS NET provides objective, evidence-based analysis to help government decision-makers and relief agencies plan for and respond to humanitarian crises. FEWS NET provides evidence-based analysis for more than 36 most food-insecure countries, including African nations. FEWS NET products include monthly reports and maps detailing current and projected food insecurity, timely alerts on emerging or likely crises and specialized reports on weather and climate, markets and trade, agricultural production, livelihoods, nutrition and food assistance. FEWS NET is also active in humanitarian and development communities, participating in global committees that work to improve classification, remote sensing and other aspects of food security analysis. FEWS NET also supports and conducts trainings for national early warning systems, weather services and other agencies.

INTERNATIONAL EFFORTS TOWARD DROUGHT RISK MANAGEMENT AND RISK REDUCTION

The international community has responded to Africa's drought challenge in several ways, mainly through humanitarian action. While countries and international institutes have been assisting Africa for a long time, there still a need for a paradigm shift from crisis management to a drought risk management

concept. International organizations are now working with African governments, private sector and non-governmental organizations (NGOs) to promote a proactive approach to drought management. The UN organizations and specialized agencies, including the Food and Agriculture Organization (FAO), United Nations Convention to Combat Desertification (UNCCD), United Nations Development Programme (UNDP), United Nations Environment Programme (UN Environment), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Office for Disaster Risk Reduction (UNISDR), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations World Food Programme (WFP), and World Meteorological Organization (WMO) are making efforts to accomplish this transition. For example, WMO leads a DRR Programme to provide scientific and technical services that include observing, detecting, monitoring, predicting and early warning of a wide range of weather-, climate-, and water-related hazards. The UNCCD provides information and advice on scientific and technological aspects of combating desertification and mitigating the effects of drought through its Committee on Science and Technology (CST)

In addition, WMO, FAO, UNCCD, and the Convention on Biological Diversity (CBD) in collaboration with the UN-Water Decade Programme on Capacity Development (UNW-DPC) have cooperated to implement a capacity-development initiative on national drought management policies (NDMP). The main goal of the initiative is to increase the capacity of developing countries and countries in transition to build risk-based national drought management policies. Six regional capacity-building workshops on national drought management policy took place from 2013 to 2015. Since food security is one of the biggest challenges in Africa, the international community together with UN agencies such as FAO and WFP have been actively involved in promoting disaster risk management as one on the main ways to eradicate hunger, food insecurity and malnutrition; eliminate poverty; ensure economic and social progress and sustainably manage natural resources in Africa and worldwide.

STRATEGIC FRAMEWORK FOR DROUGHT RISK MANAGEMENT AND ENHANCING RESILIENCE IN AFRICA

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