IGAD Case Study

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Key Messages

- East Africa is one of the regions in the world most affected by droughts. Recent trends seem to show an increase in risk, while longer term projections do not provide clear trends for the whole region and for individual countries.
- Most countries are low income, with some lower middle income countries. Some have diverse agro-ecological conditions, but most of the area in the region as a whole and in all individual countries being assessed is arid or semi-arid lands (ASALs), which has repercussions for national drought vulnerability
- Food security (reduction in food quantity and quality, and even famine) is the biggest threat presented by droughts in East Africa, provoked by losses in agricultural and livestock production and in income, and compounded by already low income and lack of income diversification, problems surrounding water quantity and quality, and weak local and national food markets. Drought events combined with low local coping capacities and state failure, civil war and political interference have provoked some of the worst nature-based humanitarian disasters of the 21st century.
- These factors also affect the medium and long term impacts, such as loss of assets, human (child) development, conflict, migration, self-help will and thus recovery and development. Other important impacts are more localised: hydro-electric generation, and impacts on sensitive aquatic and terrestrial eco-systems (sometimes with repercussions on tourism or development e.g. eco-system services like water retention and biodiversity)
- Early warning systems have been adopted in the whole region, but require more bottom-up linkages with local communities, and need to be connected with constant monitoring of ever-changing vulnerabilities (i.e. not a once-of static vulnerability assessment only). Key to their effectiveness is mutual trust of stakeholders and stringent use (i.e. no politically-motivated manipulation or arbitrary regard of the results) including cooperation with international early warning systems.
- Drought resilience management exists at various layers but yet often proves insufficient to protect lives (with a visible decreasing trend) and livelihoods (increasingly a core problem). Many instruments or approaches must contribute to drought resilience, at the sectoral level, at the level of overarching policies, communication, coordination, monitoring and evaluation, as well as regional cooperation. Some key lessons are:

- Pastoralism is one adaptation to the harsh and varying conditions, but is weakened by a range of factors including less open transhumance routes, reduced reserve areas, higher population densities of people and animals, and overall vegetation degradation caused by drought. Nevertheless, (improved) pastoralism must be part of the solution mix in the region.
- Local populations and communities are familiar with resilience strategies including agricultural practices (like natural resource management), income diversification and infrastructure development (small dams, wells, roads, markets, slaughterhouses), which are partially and slowly implemented. In many of these areas, they need additional support, such as in agriculture (breeding, irrigation, agroforestry, water saving cropping, on-farm water harvesting), landscape management (planning tools, water management and larger-scale water harvesting, community forestry), local private and public infrastructure investments.
- Water management in the region needs integrated water management, from watershed to surface and groundwater use, water harvesting, dam construction, irrigation, animal and human use, electricity generation, etc. The large dams in particular have international perspectives and constitute risks for international conflict, needing very careful planning, policy dialogue and conflict resolution. But also smaller structures need to be embedded into conflict sensitive user planning.
- Local informal solidarity networks play a big role in cushioning the impacts of drought and other risks. However, poverty and lack of non-financial capacities limit local efforts. During intense droughts, social protection (cash or food aid) is thus and still elementary and often the combined result of national and international interventions. Emergency aid and longer-term social protection are additional entry points for ‘building (back) better’, partially blurring the borders between development and disaster relief.
- Local and regional conflicts over water, grazing lands and local land use are frequent and strongly exacerbated during droughts. Conflict-sensitivity in all activities and during all periods of drought-resilience building is indispensable.
- Food markets are weak and weakly integrated so that during droughts, food prices rise (while meat markets plummet). Market integration must be improved, which includes not to overly rely on subsistence production in normal times. Also, local food reserves should be promoted, public and private.
- Linked to that, general economic development and diversification away from drought-dependent income sources is a (albeit long-term) pathway to more resilience and food market integration.
- Financial instruments add to resilience in several forms: beneath the standard insurance instruments, also savings are important buffers, and access to credit before, during and after droughts, with conditions designed according to temporal needs and without harming financial sustainability of the institutions.
- Energy systems should be diversified, so that drought does not overly hurt economic activities, and water in reservoirs can be used for irrigation. Bioenergy through careful management of (encroaching) shrubs and trees in rangelands could be one option.
- There is an important need to better synchronise and harmonise sectoral drought preparedness and emergency interventions. Examples are provided in

Policy domain	Non-drought period	Drought period
Water/landscape	• Landscape/watershed management, water harvesting and conservation on- and off-farm • Water storage • (Water-saving) irrigation • Water contingency planning • Communal forestry including bioenergy • Groundwater exploitation	• Contingency execution (drinking and livestock first) • Protection of forests against emergency charcoal production • Attention to not overexploiting groundwater
Agriculture	• Drought resilience breeding • Cropping system adjustment (new crops) • Fostering livestock markets • Seed (emergency) stocks • Managing pastoralism and crop/livestock integration • Agroforestry	• Irrigation or stop according to drought severity and outlook • Livestock vaccination (as early as possible) and reduction • Protecting key animals, recovery • Seed distribution (recovery)
Finance	• Crop and livestock (weather) insurance • Savings • Cash transfer facilities • Resilient financial institutions	• Ease disbursements • Use for emergency cash transfers (private and public)
Social protection	• Establishing social protection systems	• Scaling up social protection to drought-affected populations, cash or in kind
Food markets	• Fostering food crop markets (integration, commercial linkages, …) • Establishing food price monitoring systems • Local food storage systems (reserves)	• Facilitating commercial food inflows • Situation-sensitive regional food aid • Responsible handling of food reserves
General economic development	• Income diversification • Migration as income diversification measure • Infrastructure (transport, storage, telecommunication, etc.) • Contingency planning	• Infrastructure-building as part of emergency aid and reconstruction (cash/food for work)
Energy	• Electricity diversification • Sustainable bioenergy production (woodlots, agroforestry, forestry, energy crops)	• Coordination of water use for energy and other needs, food security priority • Protection of irreversible damage to trees and forests from emergency charcoal

Table 9. This includes contingency funding so that ongoing development programmes and projects can rapidly and unbureaucratically switch to emergency-oriented activities in case of alert or disaster.

- Overarching these sectoral instruments for more drought resilience, there is a need for clear division and attribution of responsibilities and accountability, coordination, harmonisation, communication, monitoring and evaluation. These efforts need separate (sector independent) support (capacity building and development, funding, political will and highest level), and personal and organisational continuity. Both seems to be lacking at times, but more research would be needed to follow this up at national and sub-national levels.
- Regional organisations (like the IGAD) and international Early Warning Systems (EWS) (FEWS-Net, large NGOs) are important elements of drought risk management in this region, regional cooperation success stories can be seen, but cooperation is still less than optimal.

1 Brief description of the physical and socio-economic characteristics of the case study

1.1 Physical facts

"The IGAD region stretches over an area of 5.2 million km2 that comprises the countries of Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda (Figure 1). The region has about 6960 Km of coastline with the Indian Ocean, Gulf of Aden, Gulf of Toudjoura and the Red Sea. Also, the IGAD region has a total of 6910 Km of international borders with Egypt, Libya, Chad, Central African Republic, Democratic Republic of Congo, Rwanda and Tanzania. Figure 1 shows the region. Some 70 percent 1of the IGAD region is made up of Arid and Semi Arid Lands (ASALs), which receive less than 600 mm of rainfall annually. The rest of the region has a great variety of climates and landscapes including cool highlands, swamp areas, tropical rain forests and other features typical of an equatorial region. Furthermore, the region possesses diverse ecosystems and agro-ecological zones at different altitudes ranging from 150 meters below sea level (Dalul) to about 4600 meters above the sea level (Mount Kenya)." (IGAD 2020a)

"Farmlands account for 7 percent, forests 19 percent and permanent pastures 28 percent of the total land area. The remaining 46 percent is relatively unproductive or marginal land. …" (IGAD 2020)

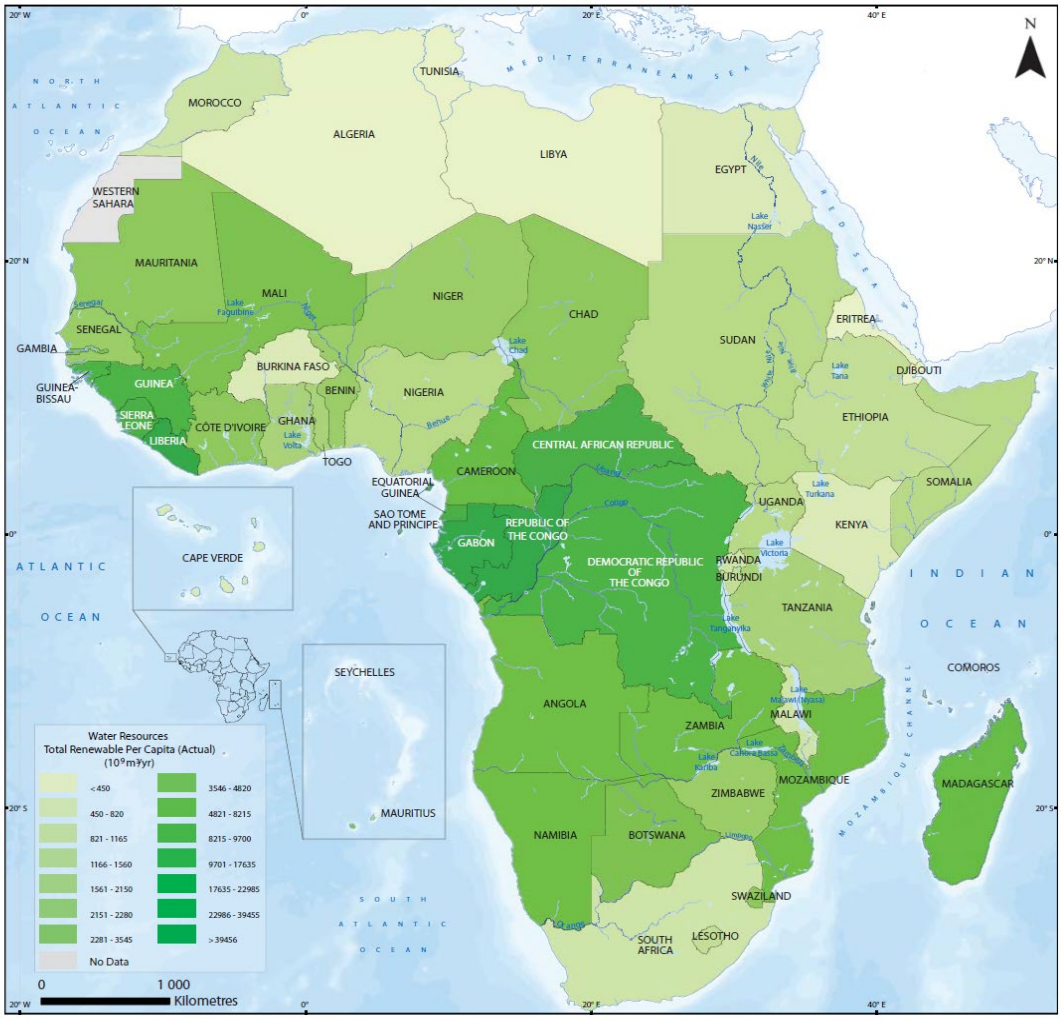
Figure 1 Map of IGAD nations

Source: Wikipedia (2020)

[1] Even 83 % according to Kabubo-Mariara and Karanja (2007, cited in Chirwa et al. 2015) using rainfall and evapotranspiration indicators, including Tanzania.

The main river basin is the Nile basin which covers most of Sudan and South Sudan, Kenya, Uganda and western Ethiopia. Other smaller basins include Shebelle and Juba, which are shared by Ethiopia and Somalia, Omo (Ethiopia) which flows into lake Turkana shared with Kenya, Tana, and several other rivers in Kenya. Water resources in the region are scarce, particularly if calculated per capita (see Figure 2), but less scarce than sometimes assumed. Compared to the international water scarcity threshold of 1,000 m3/inhabitant/year, IGAD countries that fall below this threshold include Djibouti and Kenya. In the other countries, the absolute availability is less of a problem. The greatest challenges there "are not environmentally deterministic; rather, they have to do with political unrest and conflicts that have damaged water and sanitation resources or prevented their development; the influx of people to burgeoning cities and slums; and a lack of resources to support water-management capacity or simply weak management" (UNEP 2010). "There is about one dam to every 683 000 persons in Africa, while the equivalent figure for the rest of the world is 168 000" (UNEP 2010: p. 21). In the IGAD region in particular, there are few dams compared to South Africa or some West African countries for instance.

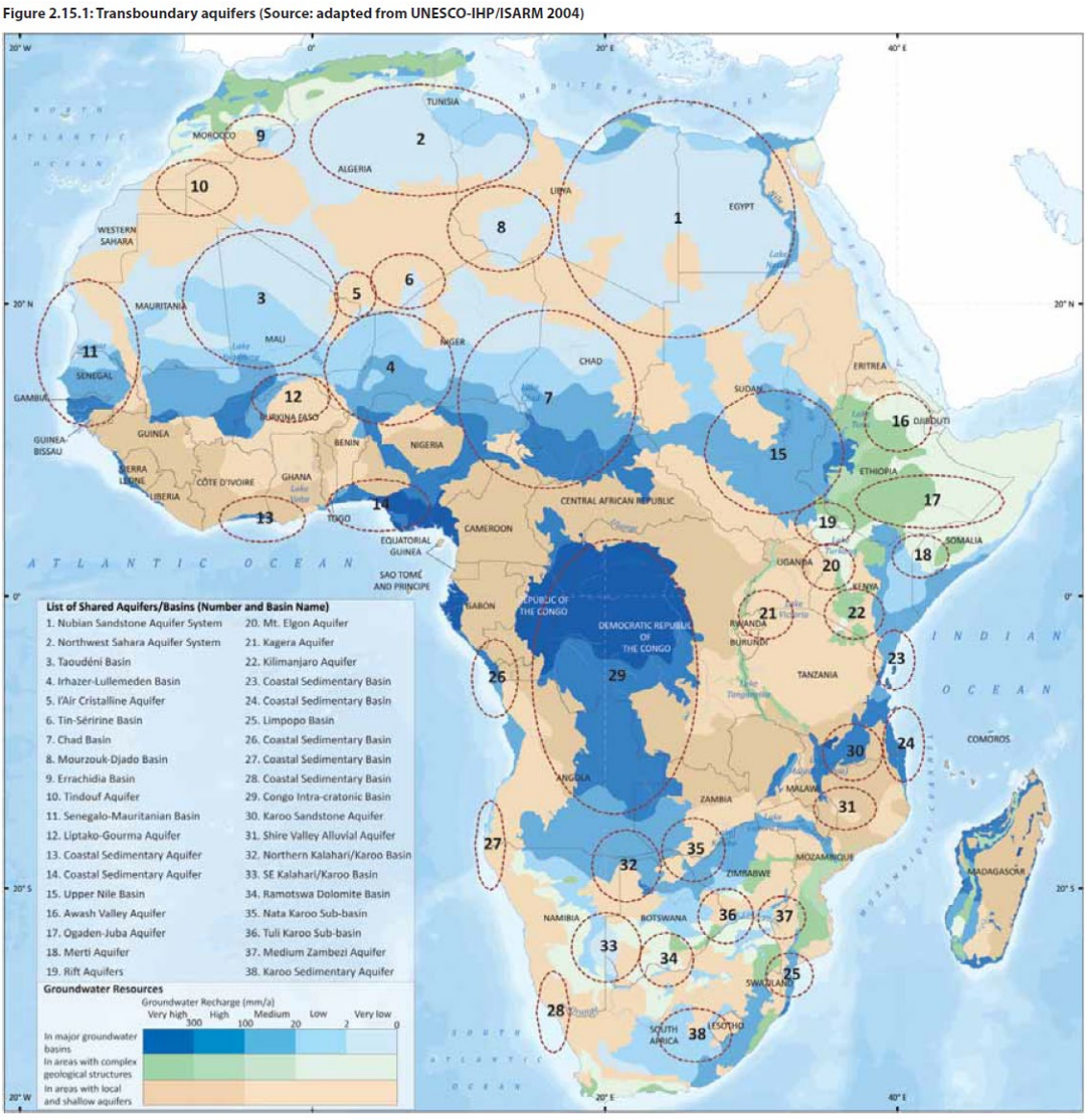
Figure 2 Map of water availability in African countries



Source: UNEP (2010)

It should be noted that the region has a lot of aquifers (Figure 3, often scarcely exploited. Many of the larger ones are transboundary. However, the exploitation is often complex, costly, politically sensitive, and socially sensitive if replenishment is threatened and older users risk missing out on water, land and pastures. Nevertheless, this is a resource only marginally tapped and potentially available to solve many drought problems (UNEP 2010).

Figure 3 Map of Africa aquifers



Source: UNEP (2010)

1.2 Socio-economic facts

"Socio-economically, most of the IGAD Member States belong to the world's Least Developed Countries (LDCs) and share similar economic growth rates and social ethnic groups across their borders, which could be a good opportunity for regional integration, if appropriately utilised." (IGAD 2020). Two exceptions are the lower

middle income countries of Kenya and Djibouti. Table 1 provides an overview of key indicators of the IGAD countries.

Drought and natural resource management are not a minor issue in IGAD countries but, until now, core issues, as IGAD emphasises:

"One of the main challenges in maximizing the agricultural potential of this region is the high degree of variability in rainfall patterns in terms of both space and time. Furthermore, the IGAD region is prone to recurrent droughts and dry spells, making it one of the most vulnerable regions on the African continent for climatic variations, which accentuates the need for policies and programmes that enhance the technical and research capacities of the region. Land and environmental degradation are the most serious threats to the region as both affect its agricultural production and economic growth. Such degradation does not only contribute to food insecurity, famine and poverty, but may equally fuel social, economic and political tensions that can cause conflicts, wider poverty and misery. Sustainable management of natural resources is therefore essential if the IGAD Member States are to achieve sustainable development, eradication of poverty, peace and security. This is particularly true for transboundary natural resources, like surface and ground water resources." (IGAD 2020)

The IGAD region is home to the largest population of pastoralists, mainly in the ASALs, "with evidence showing that transhumance contributes 6-10% of the GDP of the said economies" (IGPALD 2020a). The sector "covers over 60% of the live animal and about 10% of the meat annual demand of Middle East and North Africa (MENA) countries. In the region, over 80% of the above supply is sourced from the pastoral and agro-pastoral communities who mainly depend on livestock for livelihoods and income. This trading is believed to support about 3 million households in the region." (ICPALD 2020b). However, only 30% of the 250 million people live in the ASALs (IGAD 2019). Other agro-ecological regions also rely heavily on livestock which contributes up to 54% of national GDP in some countries of the IGAD region (FAO 2019).

As indicated, absolute water scarcity is not the main constraint on access to water.

"Widespread poverty constrains many communities' ability to address water issues even when significant opportunities such as irrigation, rain-water harvesting, groundwater exploitation or sanitation infrastructure exist. There is also an important relationship between water and gender in Africa. The burden of water collection falls disproportionately on women (72%) and girls (9%), who in some cases spend as much as 40 per cent of their caloric intake carrying water" (UNEP 2010)

In some of the IGAD countries, the generation of electricity relies strongly on hydro-power (2015), providing 83% in Ethiopia, 75% in Uganda, 65% in Sudan, and 27% in Kenya (UNEP 2017). These countries do however have low energy consumption overall, most of it originating from traditional bio-based fuels (wood and charcoal). Of the 20 countries with the least access to electricity, several are in the IGAD region: Ethiopia, Kenya, Uganda, and (the former) Sudan (UNEP 2017).

Table 1 Socio-economic indicators of IGAD nations

	Djibouti		Eritrea	Ethiopia	Kenya	Somalia	South Sudan	Sudan	Uganda	Source
Size (km²)	23 200		117 600 (2018)	1 104 300	580 370	637 660	658 841 a)	1 879 358 b)	241 550	Food and Agriculture Organization, electronic files and web site. a) (according to UN data) b) (according to trading economics)
Population, total (Mill.)	0.96 (2018)		3.21 (2011)	109.22 (2018)	51.39 (2018)	15.01 (2018)	11.00 (2018)	41.80 (2018)	42.72 (2018)	(1) United Nations Population Division. World Population Prospects: 2019 Revision. (2) Census reports and other statistical publications from national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Reprot (various years), (5) U.S. Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Programme.
Population growth rate (% per year)	1.6 (2016)		1.4 (2011)	2.6 (2016)	2.3 (2016)	2.8 (2016)	0.6 (2016)	2.4 (2018)	3.7 (2018)	Derived from total population. Population source: (1) United Nations Population Division. World Population Prospects: 2019 Revision, (2) Census reports and other statistical publications from

										national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Reprot (various years), (5) U.S. Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Programme.
Pop. density (pers/km²)	41.4 (2018)		32 (2011)	109.2 (2018)	90.3 (2018)	23.92 (2018)	NA	NA	213.06 17 (2018)	Food and Agriculture Organization and World Bank population estimates
GDP/cap. (current USD)	3082.5 (2018)		811.4 (2011)	772.3 (2018)	1710.5 (2018)	314.5 (2018)	1119.6 (2015)	977.2 (2018)	642.7 (2018)	World Bank national accounts data, and OECD National Accounts data files.
GDP growth rate	6.46 (2014-2018)		8.7 (2011)	9.92 (2010-2019)	5.89 (2010-2019)	NA	-6.50 (2010-2015)	2.29 (2010-2015)	5.27	World Bank national accounts data, and OECD National Accounts data files.
Agriculture, forestry, and fishing, value added (% of GDP)	1.40 (2018)		14.1 (2009)	31.19 (2018)	34.19 (2018)	NA	10.35 (2015)	31.46 (2018)	24.21 (2018)	World Bank national accounts data, and OECD National Accounts data files.
Poverty headcount ratio at national poverty lines	21.1 (2017)		NA	23.5 (2015)	36.1 (2015)	NA	82.3 (2016)	NA	21.4 (2016)	World Bank, Global Poverty Working Group. Data are compiled from official government sources or are computed by World Bank staff using national (i.e. country–specific) poverty lines.

(% of population)										
Human capital index (HCI) (scale 0-1)	NA		NA	0.385 (2017)	0.518 (2017)	NA	0.302 (2017)	0.379 (2017)	0.382 (2017)	World Bank staff calculations based on the methodology described in World Bank (2018). https://openknowledge.worldbank.org/handle/10986/30498
Land distribution										
Arable land (% of land area) (2016)	0.1		6.8	15.1	10.1 (2016)	1.7 (2016)	NA	1.7 (2016)	34.4 (2016)	Food and Agriculture Organization, electronic files and web site.
Agricultural land (% of land area) (2016)	73.4		75.2	36.2	48.5	70.3	NA	70.3 (2016)	71.8 (2016)	Food and Agriculture Organization, electronic files and web site.
Forest area (% of land area) (2016)	0.2		14.9	12.5 (2016)	7.8	10.0	NA	10.0 (2016)	9.7 (2016)	Food and Agriculture Organization, electronic files and web site.

1.3 Political facts

The political situation in the area is complicated and highly unstable.

"In Africa, no region is more plagued with protracted violent conflicts than the IGAD region. The presence of more than four United Nations and African Union peace support operations with more than 50,000 troops in the region (Darfur-Sudan, Abyei, Somalia, South Sudan), hundreds of Qatari military observers on the Djibouti-Eritrea Border and thousands of western military forces on the Djibouti, emphasizes the peace and security challenges afflicting the IGAD region. According to various studies, IGAD member states, including South Sudan, which was sucked into a deeper political crisis and conflict at the end of 2013, are listed among the thirty-five most countries in the World. Sudan faces conflict in Darfur, Southern Kordofan and Blue Nile. Terrorism has been source of grave threats to the IGAD region's peace and development. Since 1993, Djibouti, Ethiopia, Kenya, South Sudan and Uganda have faced terrorist attacks by Harakat Al Shabaab Al Mujahidden (Al Shabaab) and the Lords Resistance Army (LRA) operating in Uganda and South Sudan." (IGAD 2020)

"Complicated by the legacy of colonialism, border disputes have become factors of distrust, and instability with wider regional implications. In some instances, these border disputes have escalated into border wars and led to military invasions. The Ethiopia-Somalia war of 1977, the recent Ethio-Eritrea conflict of 1998, the Djibouti-Eritrea conflicts of 1995 and 2008, and the Sudan-South and Sudan border related wars in 2012 are good examples. As a result, the IGAD region was plagued by protracted violent conflicts and still is besieged by internal and international, mainly border related, wars." (IGAD 2020).

These overwhelming political problems have made that in the past two decades the IGAD, as an institution, has been transformed from being primarily a group of states determined to fight drought and desertification, into a Regional Economic Community (REC) with its main goal being the peace and security of the region.

There are also positive developments to note:

"The IGAD region is increasingly embracing democratic constitutional reforms and empowerment of local communities through increased decentralization, devolution and federalism. Examples include diversity accommodation and decentralization of power in South Sudan, Kenya, and Ethiopia and to a varying degree in Sudan and Uganda. This has created a feeling of ownership and accountability in the social development process. This trend needs to be deepened to ensure local authorities have the power and the capabilities for designing and implementing of the national development plan, and eventually to create an ultimate desire among the people for further development. Despite being sometimes violent and most often uncompetitive, the IGAD region has witnessed surge of regular elections. Examples include Djibouti (2013), Uganda (2010), Kenya (2007), and Ethiopia (2005). This is a significant success and a trend that should be upheld." (IGAD 2020)

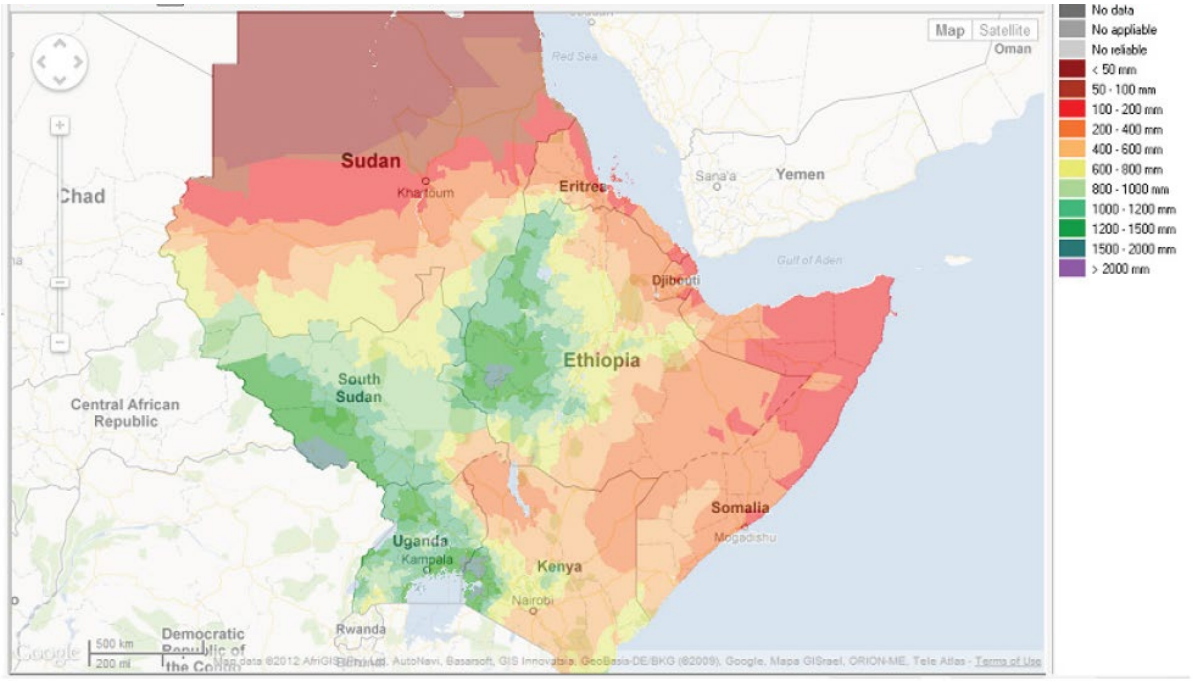
The challenges remain enormous.

“Nevertheless, with such positive mega trends, there are also negative developments, that might portend a more negative scenario in the region. By 2050, the population of IGAD will be 400 million; a substantial increase from today's 230 million. More than 55 per cent of this population will then be at a relatively young age (below 20 years). With an increasingly highly connected, conversant, mobile and vocal but unemployed young population, social unrest could unfortunately outpace reform. The shortage of fresh water, gaps between supply and demand for energy and electricity, and a widening income gap, associated social unrest may increase vulnerabilities of communities to extremists’ ideologies, international crime and transnational threats. Access to land and water remains one of the security and development concerns prevailing in the IGAD region particularly because of cultural, ethnic and economic undertones. With an ever increasing population and the urge for families to secure land, conflicts over land create tensions in communities. While violence could become increasingly localized, its impact will be global with transnational implications such as organized crime in the form of drug trafficking, human trafficking and resultant displacement of populations. … .” (IGAD 2020)

2 Highlight the specific drought characteristics of the area and exemplify with a specific case

Before highlighting the specific drought characteristics of the area, a look at the general pattern of precipitation in the region is needed, since it is extremely diverse and everchanging. Mean annual precipitation is shown in Figure 3. It depicts large differences from extremely arid to quite wet climates. The highland of Ethiopia is the largest water tower of the region, and the highlands of Kenya the second largest, while towards the great lakes and central African regions the general climate becomes wetter.

Figure 4 Map of IGAD countries with mean annual precipitation



Source: IGAD (2019).

Historic trends show that while over a long period the temperature has been relatively stable, rainfall has fluctuated drastically with a high during the Little Ice Age Pluvial and a significant increase in dryness in the last 100 years (Figure 5, Tierney et al. 2015). Particularly the eastern Horn of Africa region has experienced less rainfall, with the reductions mainly occurring in the long rains (MAM) season and June-July-August (JJA) dry season (Figure 6, left side).

Figure 5 Reconstruction of temperature and aridity in the Gulf of Aden for last 2 millenia

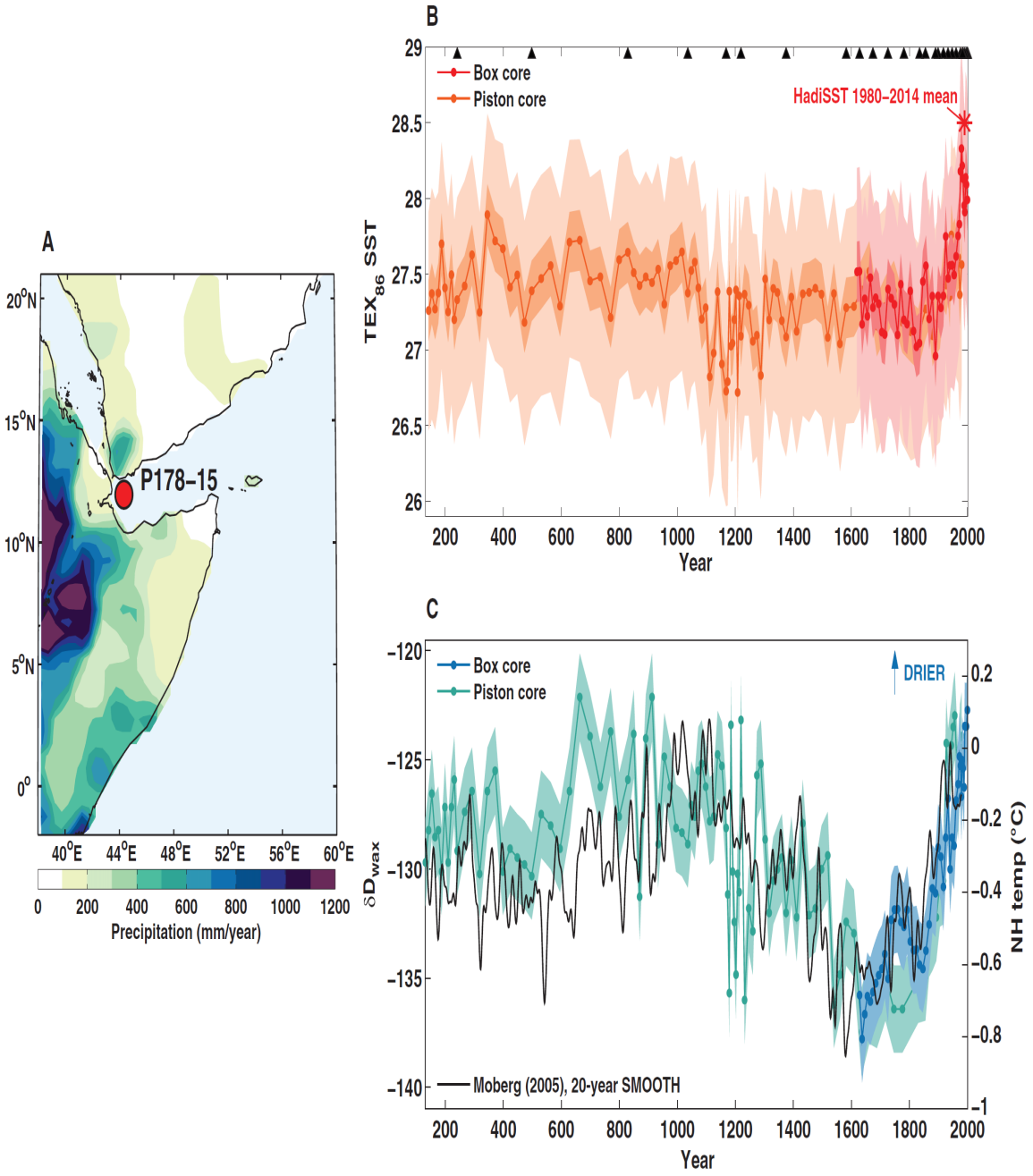


Fig. 1. Temperature and aridity proxy data from marine core site P178-15 in the Gulf of Aden. (**A**) Location of site P178-15 and annual average precipitation in the eastern Horn of Africa region [GPCC (Global Precipitation Climatology Centre) v6 product (*39*)]. (**B**) TEX_{86}-inferred SSTs (in degrees Celsius) for the past two millennia from the box core (in red) and piston core (in orange) at site P178-15. Darker error bars denote the 1σ analytical error, and lighter error bars denote the 1σ calibration error using the BAYSPAR-NRS calibration model (*10*). Black triangles denote intervals where the cores were dated with either ^{14}C or ^{210}Pb. The red star indicates modern mean annual SSTs near the core site (*40*). (**C**) δD_{wax} data for the past two millennia from the Gulf of Aden cores, overlaid with a reconstruction of Northern Hemisphere (NH) temperatures (*41*). Error bars denote the 1σ analytical error. More negative (positive) values indicate wetter (drier) conditions

Source: Tierney et al. (2015)

Figure 6 Trends in 20th century observed versus 21st century simulated precipitation in the eastern Horn of Africa region

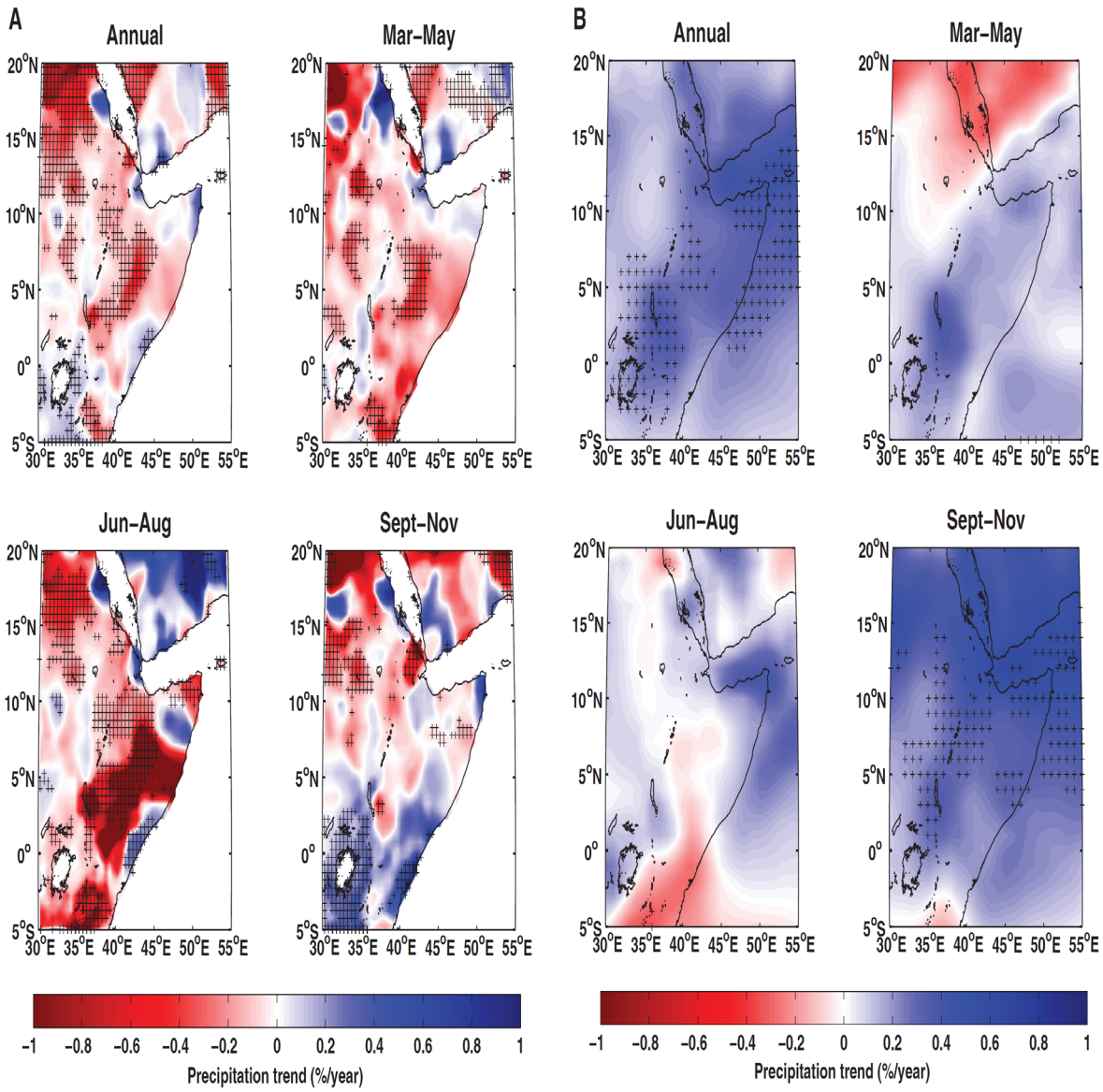


Fig. 3. Trends in 20th century observed versus 21st century simulated precipitation in the eastern Horn of Africa region. (**A**) Trends (percent per year) in observed precipitation across the 20th century [1901–2010; GPCC v6 product (*39*)], including the annual mean, the two major rainy seasons (March–May and September–November), and the dry season (June–August). Stippling indicates that the trend is significant at $P < 0.05$ (Mann-Kendall test). (**B**) Multimodel mean (model $n = 23$) of trends (percent per year) in simulated precipitation in the CMIP5 RCP 8.5 scenario for the 21st century (2006–2099). Panels as in (A). Stippling indicates areas where at least 90% of the models agree on the sign of change.

Source: Tierney et al. (2015)

2.1 Frequency and severity of droughts (incl. trends and projections for the areas, if available)

Droughts are an old and regular phenomenon in the region. Concerning the mechanisms of drought, Masih et al. (2014). A review of droughts on the African continent: a geospatial and long-term perspective. *Hydrology and Earth System Sciences*, *18*(9), 3635.) wrote:

"Contrary to southern Africa, eastern Africa faces droughts during the cold phase of ENSO (La Niña). For instance, Dutra et al. (2013) indicated that strong La Niña event was the main cause of 2010–2011 drought in the Horn of Africa. … Tierney et al. (2013) also suggested that the recent drought in the Horn of Africa, was partly due to the prevailing La Niña conditions in the tropical Pacific. On the other hand, Hasternath et al. (2007) argue that the low rainfall in this region occurs during fast westerlies which are usually accompanied by anomalously cold waters in the northwestern and warm anomalies in the southeastern extremity of the equatorial Indian Ocean basin. This mechanism was found to be responsible for 2005 drought in the Horn of Africa. Tierney et al. (2013) suggested that the Indian Ocean drives rainfall variability in eastern Africa by altering the local Walker circulation. Moreover, it is argued that warming of the central Indian Ocean accelerated by greenhouse gas and aerosol emissions after the latter half of the 20th century are correlated with the decline in precipitation over eastern Africa (Funk et al., 2008; Williams and Funk, 2011). These studies suggested that warming of the central Indian Ocean drives changes in the local Walker circulation causing reduction in the seasonal rainfall and inducing drought conditions in the region."

Historical data on droughts are rare.

"Verschuren et al. (2000) investigated droughts over the period AD900 to 2000 based on sediment analysis of Lake Naivasha, Kenya. The period AD1000 to 1270 (Medieval Warm Period) was found to be the driest one over the last 1100 years. Additionally, dry conditions were found around AD1380–1420, 1560–1620 and 1760–1840 during relatively wet period of AD1270–1850 (Little Ice Age). These drought episodes were more severe than recorded droughts in the 20th century. Bessems et al. (2008) noted extreme droughts in equatorial eastern Africa about 200 years ago based on the sediment analysis of three lakes (Chibwera and Kanyamukali in western Uganda, and Baringo in central Kenya). The authors, Verschuren et al. (2000) and Bessems et al. (2008), compared their findings with the available evidence from the cultural history of eastern Africa and found consistency between two sets of observations." (Masih et al. 2014). Best documented impact of drought is found for Ethiopia where drought-related famines have been documented since 253 BC (Comenetz and Caviedes 2002). In Sudan, "the 1888-89 famine is considered to be the greatest famine, caused by two consecutive years of poor rains and by political instability and unrest. Hundreds of thousands of people died of hunger and disease" (GoS 2018).

The average decreasing rainfall trend over the last century corresponds to an increase in droughts across most of the region. Haile et al. (2019) provide "a comprehensive spatiotemporal drought pattern analysis during the period of 1964–2015 over the GHA. The Standardised Precipitation-Evapotranspiration Index

(SPEI) at various timescales (1 month (SPEI-01), 3 month (SPEI-03), 6 month (SPEI-06), and 12 month (SPEI-12)) was used to investigate drought patterns on a monthly, seasonal, and interannual basis. The results showed that despite regional differences, an overall increasing tendency of drought was observed across the GHA over the past 52 yr […]. Droughts were more frequent, persistent, and intense in Sudan and Tanzania, while more severe droughts were found in Somalia, Ethiopia, and Kenya. Droughts occurred frequently before the 1990s, and then became intermittent with large-scale impacts occurred during 1973–1974, 1984–1985, and 2010–2011. A turning point was also detected in 1989, with the SPEI showing a statistically significant downward trend during 1964-1989 and a non-statistically significant downward trend from 1990 to 2015. Seasonally, droughts exhibited an increasing trend in winter, spring, and summer, but a decreasing trend in autumn." A comparison of this data-based analysis with historically recorded disastrous drought events (from the Emergency database EM-DAT) during the same period confirms the increase in the frequency of drought in the region, particularly in Ethiopia, Kenya and Somalia (Table 2). Ayugi et al. (2020) examine drought and flood events in Kenya from 1981 to 2016 and the data shows a decrease in moderate drought events, while severe and extreme cases were on the increase towards the end of the twentieth century.

Table 2 Occurrence of drought events in East Africa (including countries outside IGAD) 1964-2013

Countries in East Africa	Years' range				
	1964–1970	1971–1980	1981–1990	1991–2000	2001–2010
Burundi	–	–	–	1999	2003, 2005, 2008, 2009, 2010
Djibouti	–	1980	1983, 1988	1996, 1999	2005, 2007, 2008, 2010
Eritrea	–	–	–	1993, 1999	2008
Ethiopia	1965, 1969	1973	1984, 1987, 1989	1997, 1998, 1999	2003, 2005, 2008, 2009
Kenya	1965	1971, 1979	1983	1991, 1994, 1996, 1999	2004, 2005, 2008, 2010
Rwanda	–	1976	1984, 1989	1996, 1999	2003
Somalia	1965, 1969	1973, 1980	1983, 1987, 1988	1999	2004, 2005, 2008, 2010
South Sudan	–	–	–	–	2010
Sudan	–	–	1980, 1983, 1987, 1990	1991, 1996, 1999	2009
Tanzania	1967	1977	1984, 1988, 1990	1996	2003, 2004, 2006
Uganda	1967	1979	1987, 1998	1999	2002, 2005, 2008, 2010

Note: non-drought periods are represented by an em dash (–).

Source: Haile et al. (2019).

Regarding the prediction of future trends, most models predict an average increase in precipitation in the coming century with climate change, particularly in the highlands, but a few decreases are predicted in the Northern and Southern regions (Figure 6 right side, compare Krampe et al. 2020 and similarly IPCC 2019 p.199, particularly Figure 3.13). The IPCC (2019: 196)[2] predicts for the 1,5 and 2 ° C

[2] IPCC (2019) warns, however, that "there was low confidence in the attribution of global changes in droughts and did not provide assessments for the attribution of regional changes in droughts (Bindoff et

scenarios hardly any change in dry spells (consecutive dry days) for the Eastern Africa Region (Figure 7), as well as a small improvement in precipitation minus evapotranspiration and Nile basin run-off (IPCC 2019: p. 202, Figure 3.15).

Figure 7 Projected changes in consecutive dry days (CDD)

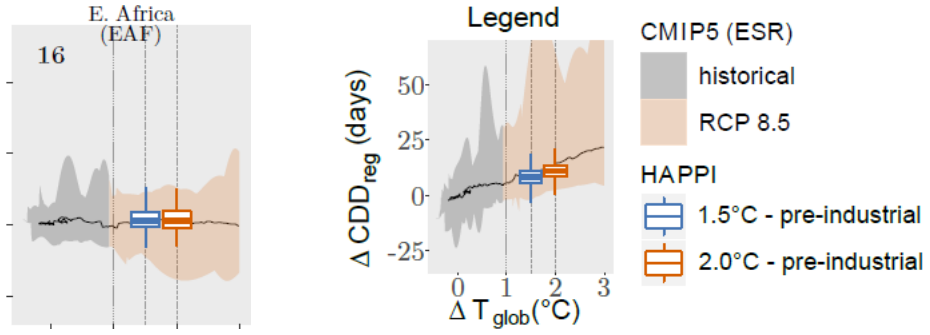


Figure 3.13 | Projected changes in consecutive dry days (CDD) as a function of global warming for IPCC Special Report on Managing the Risk of Extreme Events a to Advance Climate Change Adaptation (SREX) regions, based on an empirical scaling relationship applied to Coupled Model Intercomparison Project Phase 5 (C together with projected changes from the HAPPI multimodel experiment (bar plots on regional analyses and central plot, respectively). The underlying methodol data basis are the same as for Figure 3.5 (see Supplementary Material 3.SM.2 for more details).

Source: IPCC (2019). Long-term spatiotemporal variation of drought patterns over the Greater Horn of Africa)

Locally, this can be differentiated. “For Eastern Africa, Osima et al. (2018) found that annual rainfall projections show a robust increase in precipitation over Somalia and a less robust decrease over central and northern Ethiopia. The number of consecutive dry days and consecutive wet days are projected to increase and decrease, respectively. These projected changes could impact the agricultural and water sectors in the region.” (IPCC 2019). Concerning the heavy drought of 2016 in Kenya affecting 3.6 million people, Uhe et al. (2018) write that “by analysing precipitation minus evaporation and soil moisture, simulated by one climate model only, we did not see a reduction in moisture in simulations in the current climate compared with simulations without climate change. However, there are expected effects of higher temperatures that our simulations do not cover, such as increased demand on water resources and stress on livestock. Although we find no significant influence of climate change on precipitation, we cannot rule out that temperature-related impacts of drought are linked to human-induced climate change.”

The positive predictions, however, stand in contrast to the observed recent trend. It seems that most models do not predict the regional seasonal patterns well – they underestimate the long rains and overestimate the short rains. “The dominance of the short rains response to a weakening Walker Circulation in the model simulations can be understood as a product of the limitations of the models’ ability to simulate regional climate and the magnitude of the projected changes in Indo-Pacific climatology. Regarding the simulation of regional climate, the CMIP5 models poorly

al., 2013a)” [in SREX and AR5], and that “recent literature does not suggest that the SREX and AR5 assessment of drought trends should be revised, except in the Mediterranean region (IPCC 2019: 196)

reproduce the seasonal cycle in rainfall in East Africa in general and in the eastern Horn of Africa in particular." (Tierney et al. 2015).

Rising temperatures complicate the assessment of the effects of climate change on water availability. Krampe et al. (2020) write that "both [Nile and Juba-Shabelle] basins are projected to see temperatures increase by 1º to 2ºC." They continue: "Recent research on the modelling of future impacts of climate change on streamflow in the Horn of Africa projects there will be significant flow reductions in major rivers in Ethiopia, subsequently affecting water in the country and the transboundary basin. The simulations suggest that the river flows in Ethiopia would decrease by a mean of 10–25 per cent by the 2080s." ... "Due to its interaction with socioeconomic and political factors, the projected changes will have a significant negative impact on water access and subsequent multidimensional security in the Horn."

In conclusion, it seems that the research has not yet reached a consensus on the future of climate in Eastern Africa in general or in smaller regions in particular. It is clear however that droughts will continue to play an overwhelmingly important role for ecosystems and people.

2.2 Recorded and expected direct and indirect socio-economic and environmental impacts in the region and elsewhere

The impacts of drought in the IGAD region are numerous and severe. The most important one is still food insecurity and famine. Table 3Table 2 indicates the number of deaths and people affected for East African countries over the period 1900-2013 according to the EM-DAT databank. For the nine IGAD countries, about 150 million people have been affected and about 420,000 people killed, most in Ethiopia during the disastrous famines of the 1970s and 80s.

The numbers may be far from complete. In Somalia for example the drought of 2010-12 alone is said to have caused 260,000 deaths (BBC 2013 based on an FAO report) while the EM-DAT databank reports 20,000 in 2010 and none in the two following years. "An estimated 4.6% of the total population and 10% of children under five died in southern and central Somalia, the report says" (BBC 2013). The same drought was reported to have affected at least 13 million people across the horn of Africa (IFRC 2011). Also, the material damage is likely significantly underestimated. There are simply no insurance companies or authorities which could deliver such data.

According to Devereux (2018: 195), "in the early twenty-first century, Africa has already suffered four mass mortality food crises, in Ethiopia (2000), Malawi (2002), Niger (2005) and Somalia (2011)" (thus two in the study region), and "[all] were triggered by droughts that reduced crop harvests and livestock herds in rural communities", He continues by saying that "however, "drought causes famine" is no longer an adequate explanation – if it ever was", indicating that the death toll of a drought is not necessarily an unavoidable consequence. Many authors, e.g. Sen (1982) or Devereux (2006), have emphasised for a long time that famines are often the consequence of bad governance, arguing that governments did not sufficiently

care for the hungry or even that they use crises for political reasons. A famous example in the study region is the Ethiopian famine of 1973 in the Wollo area which did not trigger available help from the emperors' regime (Dimbleby 1998) and caused at least 80,000 (EM-DAT: 100,000) deaths. Another example is the famine of 1983-85 which was embedded in activities (trade and aid restrictions) and abused by the then DERG regime to curb politically hostile regions and people (de Waal 1991) and caused about 300,000 deaths (EM-DAT) (1,2 million according to de Waal 1991). In both cases, these (in)actions strongly contributed to the overhaul of the regimes. Thus interactions of drought with aggravating factors is further discussed in the following chapters 3.3. (intervening factors generally) and 3.4 (conflict).

Table 3 Occurrence and summary impacts of drought events in East Africa (including countries outside IGAD) 1900-2013

Region/countries	Drought years	# of events	# of people killed	# of people affected	Economic damage (USD x 10^3)
East Africa		122	523 561	220 892 229	371 900
Burundi	1999, 2003, 2005, 2008, 2009, 2010	6	126	3062 500	0
Comoros	1981	1	0	0	0
Djibouti	1980, 1983, 1988, 1996, 1999, 2005, 2007, 2008, 2010	9	0	1 188 008	0
Eritrea	1993, 1999, 2008	3	0	5 600 000	0
Ethiopia	1965, 1969, 1973, 1983, 1987, 1989, 1997, 1998, 1999, 2003, 2005, 2008, 2009, 2012	15	402 367	66 941 879	92 600
Kenya	1965, 1971, 1979, 1983, 1991, 1994, 1996, 1999, 2004, 2005, 2008, 2010, 2012	13	196	47 200 000	1500
Madagascar	1981, 1988, 2000, 2002, 2005, 2008	6	200	3 515 290	0
Malawi	1987, 1990, 1992, 2002, 2005, 2007, 2012	7	500	21 578 702	0
Mauritius	1999	1	0	0	175 000
Mozambique	1979, 1981, 1987, 1990, 1998, 2001, 2003, 2005, 2007, 2008, 2010	12	100 068	17 757 500	50 000
Rwanda	1976, 1984, 1989, 1996, 1999, 2003	6	237	4 156 545	0
Somalia	1964, 1969, 1973, 1980, 1983, 1987, 1988, 1999. 2004, 2005, 2008, 2010, 2012	13	19 673	13 183 500	0
Tanzania Uni Rep	1967, 1977, 1984, 1988, 1990, 1996, 2003, 2004, 2006, 2011	10	0	12 737 483	0
Uganda	1967, 1979, 1987, 1998, 1999, 2002, 2005, 2008, 2010	9	194	4 975 000	1800
Zambia	1981, 1983, 1990, 1995, 2005	5	0	4 173 204	0
Zimbabwe	1981, 1990, 1998, 2001, 2007, 2010	6	0	14 822 618	51 000

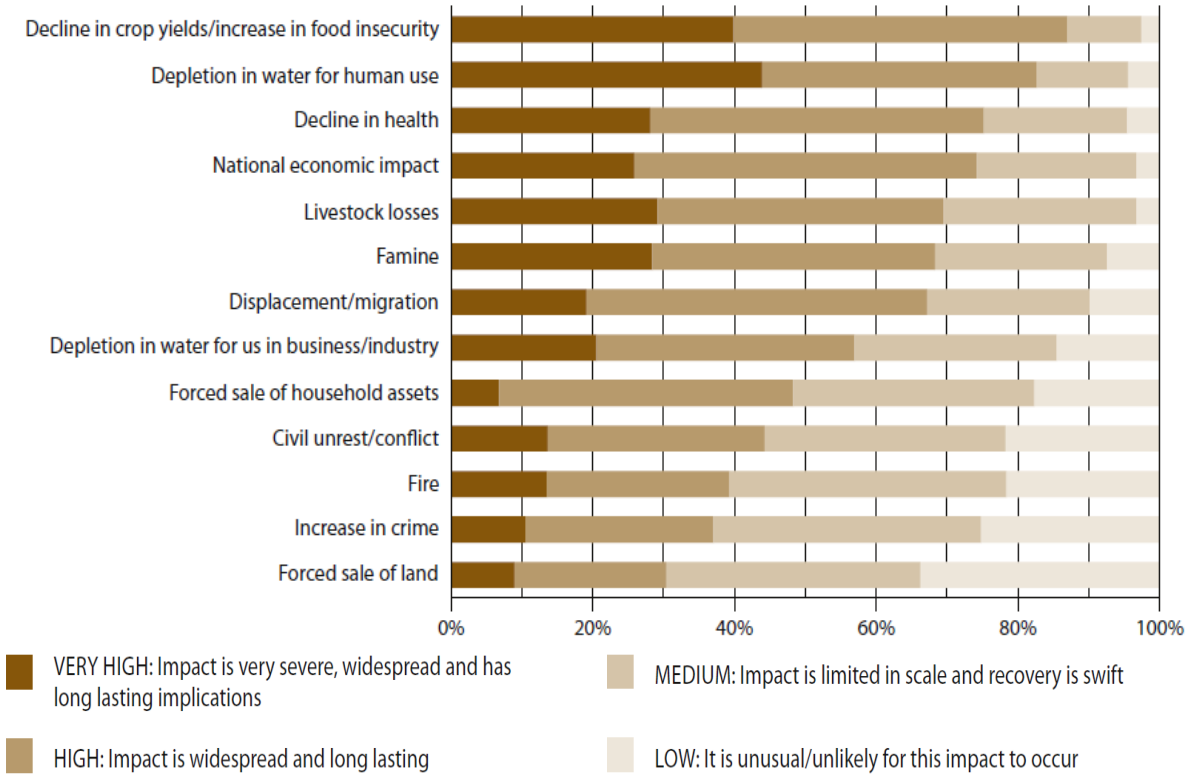
Source: Masih et al. (2014). A review of droughts on the African continent: a geospatial and long-term perspective. *Hydrology and Earth System Sciences*, *18*(9), 3635.)

The death toll caused by famine is only the tip of the iceberg of many important impacts. A survey among experts about impacts of drought in Asia and Africa revealed the following spectrum and rating for Africa (Figure 8 Drought impacts in Africa, ratings by an expert Figure 8, not specifically IGAD region). Agriculture is the leading impact, but water availability, health, national economic losses, livestock and migration are similarly high.

These immediate impacts are the result of drought combined with the high vulnerability of the population. Vulnerability is to a certain extent inherent to the region and its climate (see historical droughts) as well as the large number of people reliant on natural resources, but is often exacerbated or modified by other factors internal to the households and local communities as well as external ones. Regarding these so-called "root causes", the UNDP survey has compiled expert

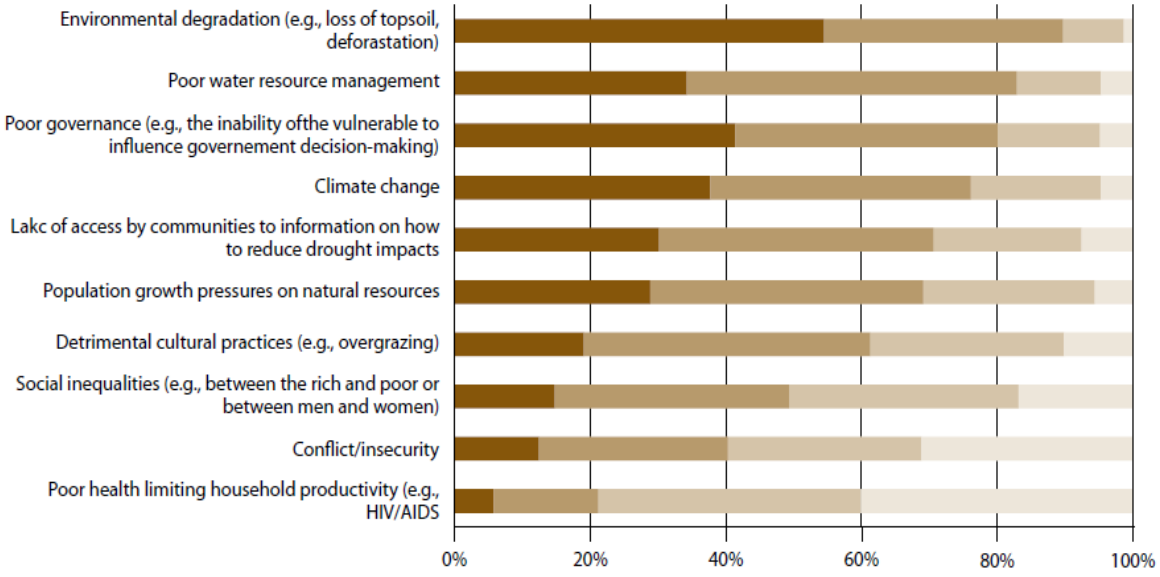
opinions (Figure 9). Environmental degradation is an important example of these, including for example loss of top soil (which can reduce rainwater run-off and store it locally) and deforestation (the removal of a more resilient microclimate, and water-regulating ecosystem services).

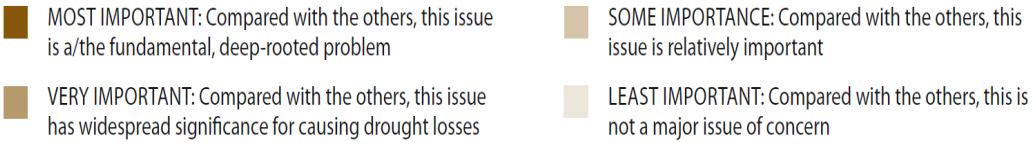
Figure 8 Drought impacts in Africa, ratings by an expert survey



Source: UNDP (2012)

Figure 9 Root causes of drought impacts in Africa, ratings of an expert survey





Source: UNDP (2012)

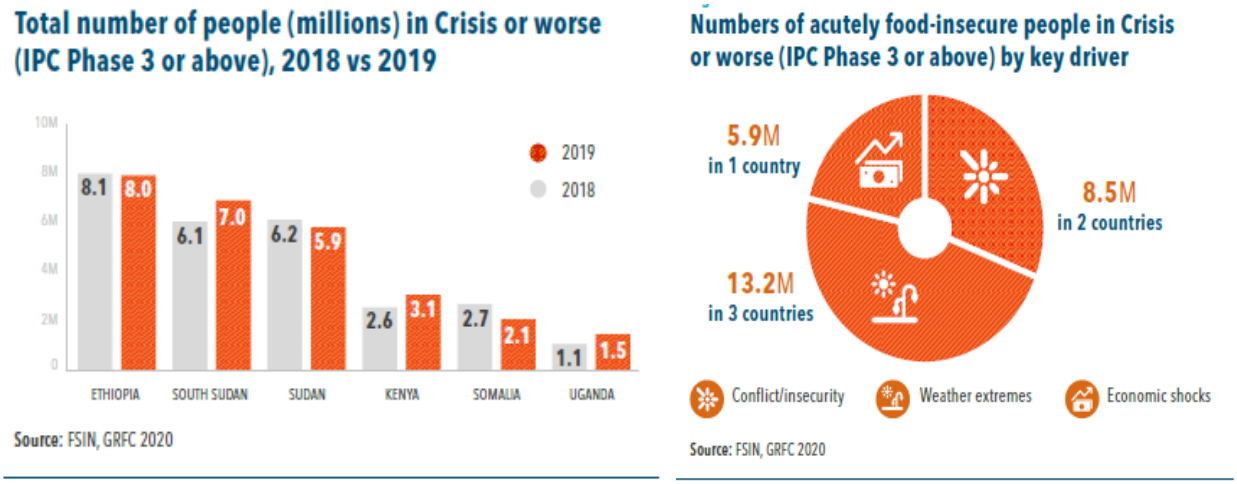
Impacts not very systematically covered by drought reporting in the region but with severe (cascading) consequences (see also next chapter):

- A fall in **hydroelectricity** production, with serious repercussions for urban areas and industry, has been reported in Uganda in 2005/06 and 2009 due to drought in the great lake region and reduced water in Lake Victoria (TNH 2005, Energypedia 2020). It has also been reported in Kenya 2018 (Harris 2018) and in Ethiopia in 2003, 2015 and 2019 (TNH 2003, PEI 2015, Sleet 2019). In Ethiopia, in addition to local consequences, power export contracts also had to be suspended.
- Negative consequences of drought for **wildlife and tourism** were reported, for example in Kenya in 2009 and 2017 (The Guardian 2009, Yusuf 2017). Wildlife is not only directly affected by water and fodder shortage, but also by activities such as hunting and charcoal making, an activity that is often resorted to for income in the region (Orindi et al. 2007).

For all of these impacts there are numerous examples in the study region (a search in google scholar for "drought impacts"+"eastern Africa" provides more than 400 hits and more than 5000 in google due to many non-academic articles from NGOs and press reports, many anecdotal but also some well-documented). These impacts are not only historical- there is clear evidence that the situation is not seeing significant improvement: In Djibouti, the drought in 2016 has resulted in 37% - 62% of the livestock population perishing, mostly from starvation and lack of water (IGAD IDDDRSI Djibouti n.d.). At the IGAD level, the 2018 drought has cost pastoralists alone an estimated by 2 % of GDP for these countries (FAO 2019). And still in 2019,[3] about 28 million people were in crisis or worse of which almost half due to weather extremes, notably drought (Figure 10).

[3] Integrated Food Security (IPC) level 3 (out of 5 levels from low (1) to high (5)): Households either have food consumption gaps that are reflected by high or above usual acute malnutrition; or are marginally able to meet minimum food needs but only by depleting essential livelihood assets or through crisis-coping strategies. 10‑14.9% of children are acutely malnourished.

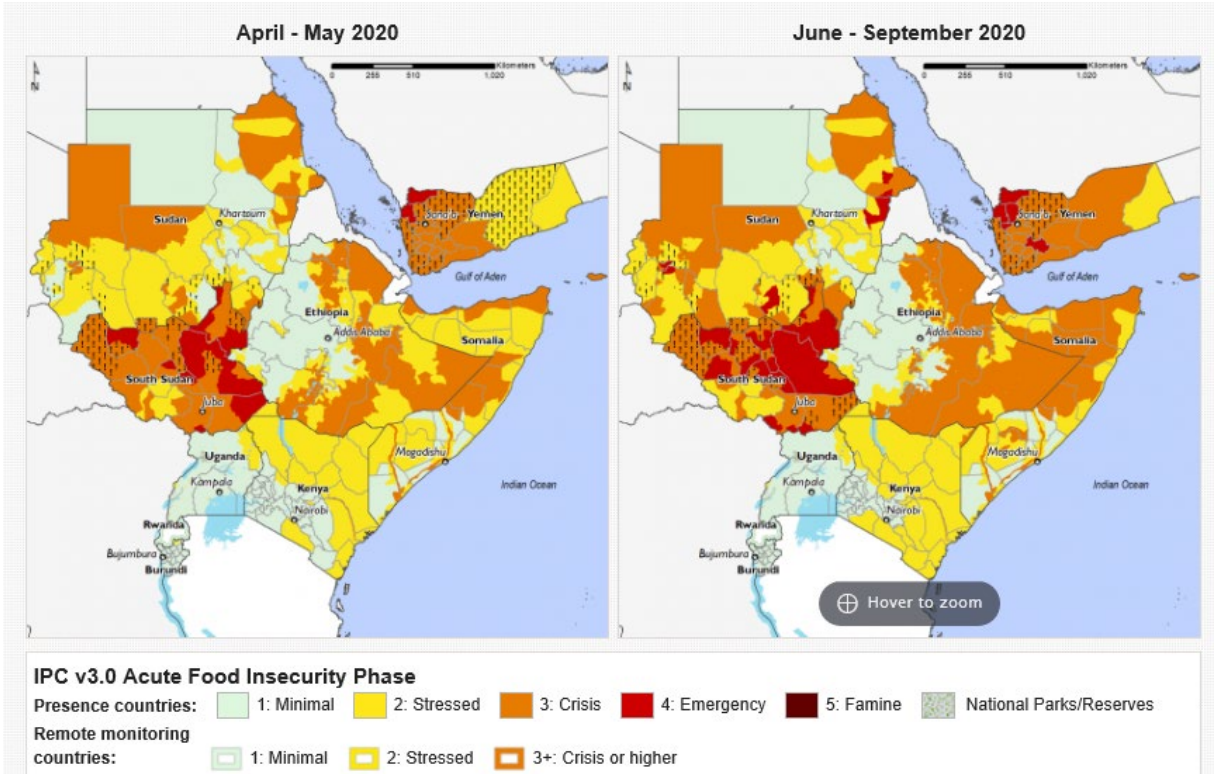
Figure 10 People in crisis state (IPC 3) or worse in six IGAD countries, 2018 and 2019, and key drivers



Source: FSIN (2020)

The first assessments and projections for 2020 are bleak with COVID-19 worsening an already desperate situation induced by droughts, heavy rainfalls and locust infection, as well as the consequences of political conflict in Southern Sudan ((Figure 11).

Figure 11 Food security situation 2020, stand April/May and projection June-September



Source: FEWS-Net (2020)

2.3 Cascading and compounding impacts, risks of systemic failures

The multitude of severe impacts already shows that there are many cascading impacts of drought, and the catastrophically high death toll and number of damaged livelihoods are evident signs at least in the past of “systemic failure”, i.e. failure from the point of view of humans in the system to survive and recover from drought shocks (see Garnett 2018 for a definition of systemic failure). The systems that recurrently fail are that of agricultural production (food, feed, fodder); multiple markets; economic welfare and income; financial services (credits and insurances); and support from national and international institutions. Conflict further aggravates these failures and can prevent access to aid (see Chapter 3.4).

There is a long list of structural factors that compound the effects of drought. The following section aims to further characterise the factors which contribute to large numbers of victims and affected people, thereby preparing to present some areas and policies where remedies could contribute to lower vulnerability and higher resilience.

Climate change has already been discussed as a compounding factor for drought risk, and it also compounds impacts through several other mechanisms (see Table 4 for Ethiopia).

Table 4 Impacts of climate change effects on selected vulnerable sectors in Ethiopia, including drought

Sectors	Climate risks	Potential impacts
Agriculture (crop and livestock)	Frequent droughts and occasional floods Seasonal shift in rainfall and temperature regime Extreme events including heat waves. Storms	• Shortening of crop plant maturity period • Expanding crop diseases • Low productivity of soils and animals • Increase in crop failure • Decrease in livestock feed availability and quality • Reduced animal health, growth and reproduction • Increase in distribution of some infectious diseases • Increased in decomposition rate of organic matter • Contracting of pastoral zones across the country • Increase in livestock death
Forestry	Increase in temperature, flood, landslide, frost, and extreme events including heat waves, and storms	• Expansion of tropical dry forests and the disappearance of lower mountain wet forests; • Increased biodiversity loss • Increased loss of indigenous species and decline of natural regeneration • Expansion of toxic weeds • Increased prevalence of forest fires, • Increased emission, • Increase in diseases, pests • Increase in GHGs in the atmosphere
		• Desertification
Health	Increase in temperature and drought frequency, and extreme events, including heat waves, and storms	• Increase of vector borne diseases • Increase in water borne diseases • Severe malnutrition • Increase in flood incidence, displacement
Transport	Increase in temperature and flooding	• Increase in infrastructural design costs, • Damage of roads, bridges, rail road's and airport landings
Power	Increased temperature, frequent and extended of drought, flood	• The impact of erosion and silting problem on hydropower dams • Upstream degradation of natural resources results in increased silting of hydropower dams • Scarcity of water reduces the generation of energy • Physical damage of dams
Industry	Increase in temperature, and rainfall variability	• Natural resources degradation leads to resource scarcity, leads to raw material limitations affecting industrial development/systems • Infrastructural damage • Increase in incidence of fire • Increase in costs • Declining productivity • Increase environmental pollution
Water	Increase in temperature; decline in soil	• Decrease in availability of potable water • Increase in water pollution
	moisture and ground water levels	• Decline in water supply • Increase in damage and decline on aquatic habitat and life forms
Urban	Increased droughts and flood	• Increase in hunger and famine • Intensifying migration of rural dwellers to towns • Damage on urban infrastructure (e.g., roads, building) • Increased both solid and liquid waste accumulation

Source: GoT (2019)

Population and growth: With 2,7% population growth, the region has one of the highest population growth rates in the world (Worldometer 2020). Where in 1960 about 80 million people lived, today almost 450 million live, approximately 70% of which still live in rural areas with agriculture and livestock as their main income source, and with wood for their energy needs.

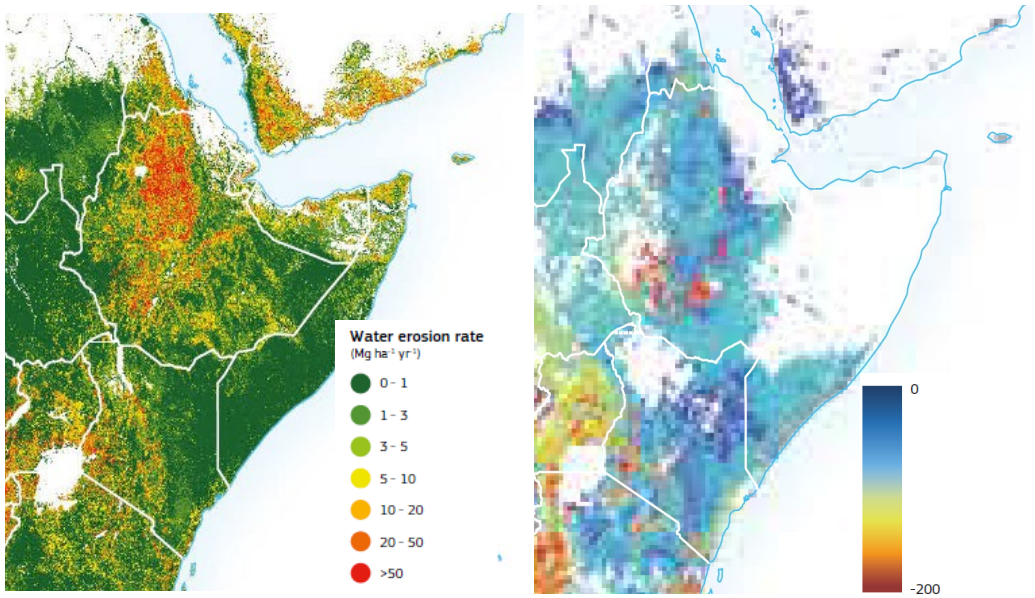
Cropping area: The cropping area has increased with the needs of the growing population. For example, in the Ethiopian Rift Valley over the last 5 decades, cultivated lands increased threefold while the dense acacia coverage declined from 42% in 1965 to 9% in 2010 (Biazin and Sterk 2013). This has led to the reduction in fallows (where still practised), the conversion of pastures into agricultural land, deforestation, forest degradation, and the use of ever steeper slopes. Some of the cropping area expansion has been organised in large private and often public irrigation schemes, replacing lower intensity cropping and pasture uses of the land (often the most precious pastures in the valley bottoms). This often results in land ownership and user rights being reorganised, and if this land expansion is not carefully done, they not only risk injustice and social disruptions, but also ecological ones.

Animal population and density: The region is famous for livestock, particularly pastoralism. In 2004, the IGAD region counted 98 million cattle and 173 million sheep and goats, amounting to nearly half the populations of these species in sub-Saharan Africa. 53% of the IGAD region's cattle (51 million), 71% of the region's sheep (58 million) and 68% of the region's goats (50 million) are held in pastoral and agro-pastoral production systems. However, the total number of animals does not seem to have increased but rather decreased, with droughts and lower carrying capacities identified as the main reasons (Abule 2008, Headey et al. 2012, Angassa 2012). Combined with population growth, this means that herd sizes per household are shrinking, thereby increasing vulnerability. Drought is the number one cause of animal death (Devereux cited in Heady et al. 2012). Below a certain herd size, households are forced to become sedentary in dire poverty due to lack of land, knowledge and education, and availability of non-farm income-generating activities.

Land degradation: Cropping area has not only expanded, but also the patterns of farm land use have changed. This can lead to positive or negative effects for soil and water. On the negative side, agricultural land and soil degradation and erosion can occur through the cultivation of steep slopes, bare soils without organic cover susceptible to wind and water erosion, soil mining (not restoring the nutrients extracted through harvest back in the form of fertilisers), lack of contour ridging and other measures to reduce run-off and avoid soil compaction and chemical degradation, incorrect fertilisation, or inappropriate agro-forestry management (Figure 12). Overgrazing leads to similar effects on pastures, often causing vegetation degradation and sometimes encroachment of native and (in some regions) invasive species. On the other hand, terracing, diligent agro-forestry management, further integration of animals into farming systems, organic manure management, good crop rotations (including cover and fodder crops), minimal soil disruption cropping, and careful fertiliser application, can maintain or restore soil fertility. In some areas (e.g. Tirgai), historical photos show that 150 years ago, natural vegetation was already seriously degraded and erosion was significant,

while today the landscape is much healthier (Nyssen et al. 2014). In some instances, it is unclear what “degradation” entails, and/or what can be labelled so. In particular, in many pastoralist rangelands, a steady increase in woody species is observed, in Ethiopia likely linked to the government’s prohibition of fire control of woody species (Liao et al. 2016). Since this is observable in the whole region (and also in other parts of Africa), other factors are likely decisive, such as climate change, introduction of alien species, and in particular, changes in communal rangeland use (Abule 2008). Bush encroachment is reducing the carrying capacity of grazers (cattle and sheep) in favour of browsers (camel and goats), and has higher carbon storage but lower biodiversity. While it is undisputed that degradation reduces the resilience of the landscape for droughts, the immediate effect on drought is unclear: “Lott et al. (2013) investigated whether the 2010–2011 drought was caused by human intervention or not. They did not find any evidence of human activities on this event and also attributed this with La Niña events” (Masih et al. 2014)

Figure 12 Map of soil erosion (left) and soil carbon change (right)



Source: Cherlet et al (2018)

Borders and border controls: Pastoralists, before the creation of modern states, roamed relatively free in the ASAL rangelands, following rains, fodder and water sources. With ever-increasing enforcement of modern borders (partly due to violent conflicts, see below), these movements have been hindered, increasing their vulnerability to drought and overexploitation of natural resources (McCabe 1990).

Crop markets: All too often, droughts in the region are accompanied by rapidly increasing food crop prices or even food unavailability. Well-functioning food markets (and storage to a certain extent) make food availability independent of local harvests and are key to the much lower vulnerability of modern societies towards droughts. Only then can income, savings or cash transfers serve to allow to buy food (at least at reasonable prices). Local storage can protect only those (households, communities) who crop more than they consume in a year, which is

not the case for pastoralists and, given the small farm sizes and resource endowments, also no longer the case for most farmers who are usually net buyers (not net sellers) of grain (Barrett 2008). It is very disturbing to observe that even in relatively rich Kenya with relatively good information systems, road systems, freedom of traders and trader density, regionally different food markets are not integrated and thus local food deficits, for example due to drought, are not compensated by affluent regions (Gitau and Meyer 2018). This is all the truer in poorer countries and across borders.

Lack of savings other than livestock: Savings can overcome drought impacts (as long as food is available), and also help to avoid the sale of productive assets. Lack of savings thus contributes to vulnerability. It is linked to poverty, but they are not synonymous. People in poverty do save (Mutesasira et al. 1998), but their saving capacity is not sufficient to bridge even smaller crisis. Pastoralists and farmers often save in the form of livestock (which even generates “interests” in form of off-spring, milk, hides, weight, etc.), which in the case of drought are made vulnerable, in particular if social norms and other factors (lack of deposit-taking organisations and branches, far distances, insecurity, lack of trust, etc.) inhibit the timely selling of animals during the slow-onset disaster (Headey et al. 2012).

Social norms and systems: Some studies emphasise that “the maintenance of indigenous drought coping institutions, based on a system of social relations and the redistribution of surplus, is critical for long term survival in this drought prone area of the world; and that these institutions have been made recently vulnerable to stresses beyond the control of the local people.” These stresses include inter-ethnic conflict, raiding, political instability, national boundary restrictions and the famine relief effort itself (McCabe 1990, Morton and Kerven 2013) (see also chapter “conflict”).

Poverty: Clearly, poverty is a huge determinant of vulnerability towards drought and many other risks. A large share of the populations in the IGAD countries live in poverty, though with wide variation in urban (usually richer) and rural (usually poorer) areas, and higher in their ASALs (Demombynes and Kiringai 2011). Vice-versa, drought is a significant contributor to poverty (Goshu 2013).

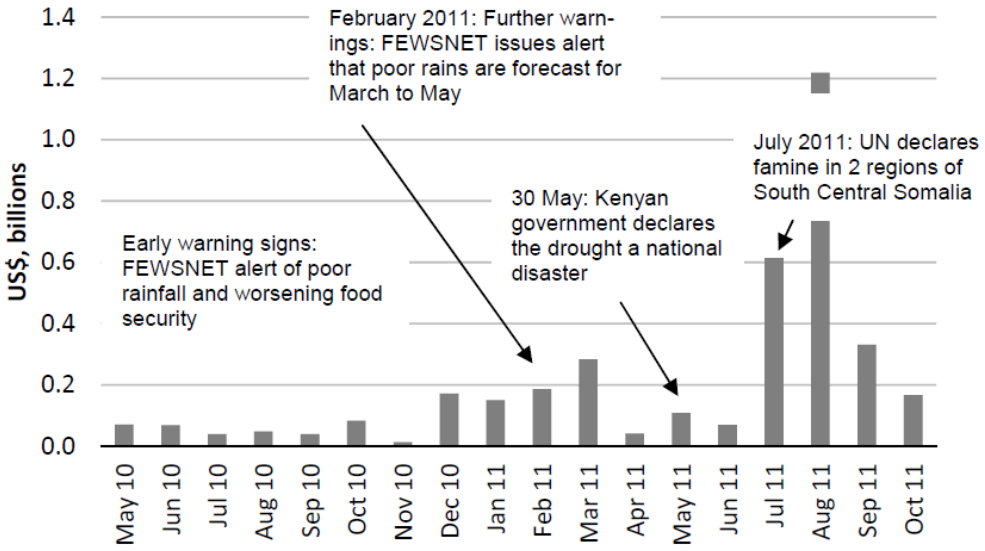
If household and social system resilience is insufficient to cope with droughts, **higher-level institutions** are requested to step in:

Local communities: Local communities may have a certain capacity to assist, but often they have insufficient resources, especially when droughts are larger and affect extended areas, as many communities in rural regions are directly or indirectly highly dependent on rainfall. Only in special circumstances, like marked decentralisation of decision-making power and budgets (like in Kenya), can sub-national governments tackle larger expenditures on their own. Thus, usually national governments have to step in. In poorer countries, often substantial additional support is needed by the donor community.

Poorly designed, low and/or slow reactions of governments and the international community: Delays in response increase the impacts and the costs of reactions (Hill et al. 2019). In several instances in the IGAD region, it was evident

that the reactions of governments were inappropriate or slow, and so were the reactions by donors. For example, during the drought of 2010-2013 in Ethiopia, it took many months before action was taken, with particularly tragic results in Somalia (Figure 13). Similar delays are documented for the 2006 droughts in Kenya (Hillier and Dempsey 2012) and 2015/16 in Ethiopia (Duguma et al. 2017). Reaction to the droughts frequently does not depend on early warnings or the lack of them, but on the political will to react, on public attention (only larger disasters are visible internationally, not the slow-onset signs), and on the level of trust among governments, donors/developing partners, international (civil society) organisations, and other stakeholders. In the case of Somalia in 2011, the militant Islamist group al-Shabab for some time prevented support through a ban on aid deliveries in 2009 and lifted it only in July 2011 (BBC 2011), while the United States feared the misuse of aid deliveries and remained reluctant to deliver aid into Somalia (Siraj Akbar 2011) (see also chapter “conflict”).

Figure 13 Humanitarian funding for Ethiopia, Somalia, and Kenya, May 2010 to October 2011



Source: Hillier and Dempsey (2012)

There are also complications deriving from the **transnational consequences of political decisions**, some of them (partially) related to anti-drought measures. Some examples for the region are provided by Krampe et al. (2020):

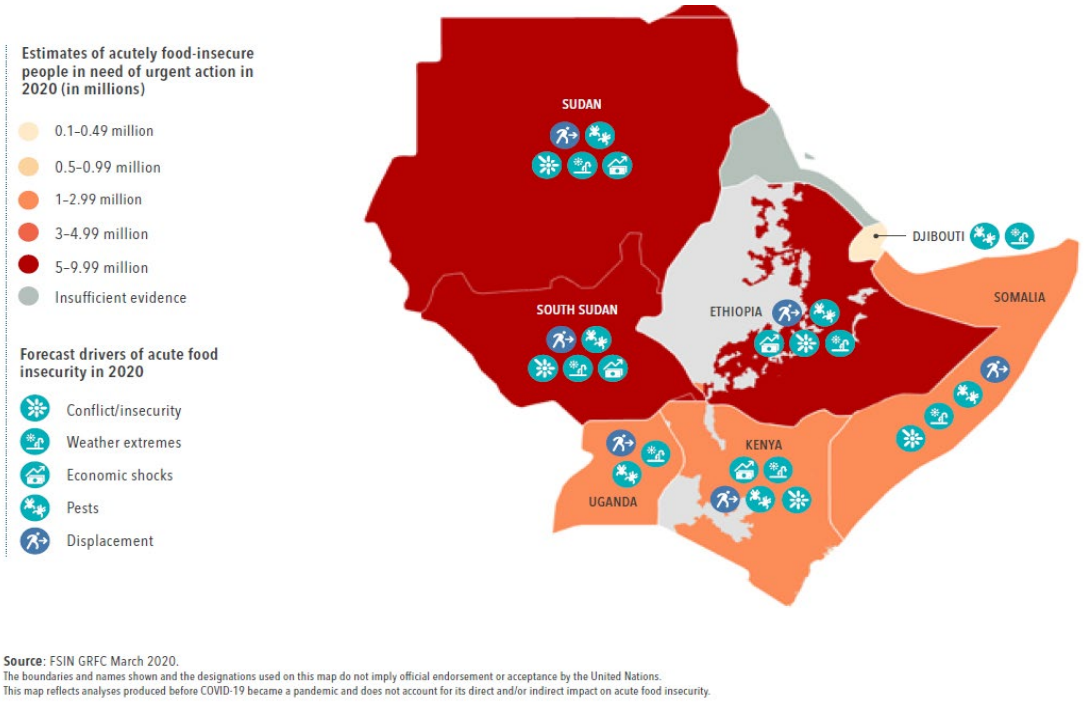
- The decisions of different countries—on issues of water access and governance resources on their territory—have potentially negative (social, political, economic and environmental) effects on other states, water security and governance in the horn of Africa. Examples of such effects are as follows:
- The decision of Ethiopia about the port of Berbera undermines the position of the Somali Government as it leads to de facto recognition of Somaliland

- The Somali and Kenyan governments are unilaterally pursuing their interests in the Indian Ocean and have proceeded with licences for exploration based on their claims of the maritime boundary, which is still an unresolved dispute
- The decision of Ethiopia to build the GERD affects the potential water consumption of Egypt and Sudan
- The independence of Eritrea immediately made Ethiopia a landlocked state in dire need of access to port outlets for commercial and security purposes
- The development of (regional) initiatives will lead to questions of who should be invited to the negotiation table
- Some countries (e.g. Eritrea) demonstrate little interest in multilateral initiatives, thereby blocking regional solutions for regional challenges

To make things worse, there are **collusions of climate-induced disasters**. For instance, droughts and heatwaves together increase the risk of fire occurrence (IPCC 2019), which is the main cause behind the destruction of Miombo forest (Chirwa et al. 2015), a vegetation type widely distributed in Eastern (and Southern) Africa. Further, droughts are often followed by exceptionally heavy rains and floods which are exacerbated by the lack of absorption/infiltration of dry soils and lack of vegetation after droughts. Climate change seems to increase both droughts and extreme rainfall, and thus runoff and river flooding in the region. Rocha et al. (2008, cited in IPCC 2012) found, in a comparison of rainfall regimes over south-eastern Africa simulated by two climate models for present (1961-1990) versus future (2071-2100) periods, “that the intensity of all episode categories of precipitation events is projected to increase practically over the whole region, whereas the number of episodes is projected to decrease in most of the region and for most episode categories.” However, it has to be taken into consideration that extreme rainfall events are the most important contribution to groundwater recharge (Taylor et al. 2013, IPCC 2019).

Finally, there are **other disasters**, economic shocks, crop and livestock pests and diseases, human epidemics, and conflict, that add and compound drought risks. Figure 14 shows that during the pre-Covid 2020 period, all of these drivers are present in various combinations in the IGAD region. In total, 27.6 million people were in Integrated Food Security (IPC) phase 3 or above, that is 20% of the world population in that category. 13.2 million of these were assessed to be affected by weather extremes: first a strong drought (particularly in Djibouti, Eritrea, Ethiopia and Somalia during the first half of the year induced by the cyclone Idai over Southern Africa compounding the after effects of the 2015/16 and 2018 droughts), and then excessive rainfalls, driven by a strongly positive Indian Ocean Dipole, which brought widespread flooding to all countries affecting nearly 3.4 million people from July 2019 - January 2020 (FSIN 2020).

Figure 14Pre-COVID-19 estimates of people in IPC Phase 3 or above, drivers and risks in East Africa in 2020



Source: FSIN (2020)

2.4 Civil unrest and conflict

It has been repeatedly indicated that civil unrest and conflict play a major role in the area, in general and with respect to mitigating and adapting to droughts. The relation is bidirectional: conflicts exacerbate the impacts of drought (the extreme case being Somalia 2011-13 described above in Chapter 3.3, but there have also been many local conflicts between pastoralists and others, UNECA 2018), and drought accelerates or creates violence and conflicts (see Linke et al. 2018).

Conflict is a key aspect of the socio-political landscape of the IGAD region from local to international level (see IGAD self-reported description in Chapter 2.3. “political facts”): competition around water and pasture, unique characteristics of pastoralist societies, ethnic rivalries, ambitions for independence and autonomy, unclear boundaries and unsolved boundary conflicts, and, significantly, past (colonial and even pre-colonial) and present geopolitical interventions by external powers. Poverty, economic stress and political disruptions (see above) also contribute to a high level of conflict. The massive influx of arms, available at cheap prices, after several decades of unrest and (civil) wars is making conflicts more violent (Ambelu et al. 2017, UNECA 2018). Further, some authors see a strong correlation between climate exposure and political fragility (compare Figure 15).

Krampe et al. (2020) summarise the international tensions in the region around drought and water governance as follows:

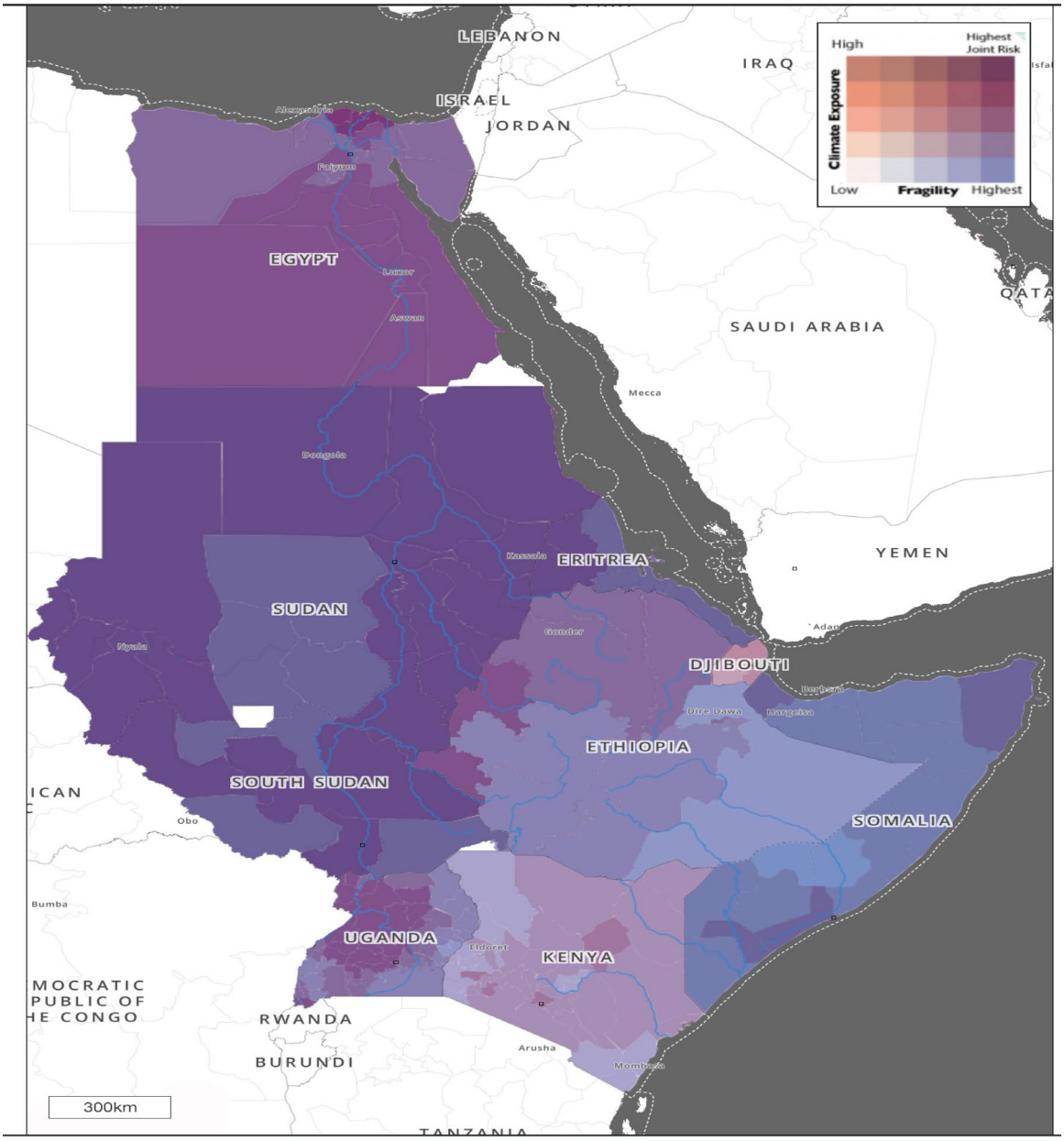
“The Nile and Juba–Shabelle basins are of core relevance for the Horn of Africa because of the interaction and confluence of several political, social, economic and environmental processes. The Nile River—with its two major tributaries, the Blue Nile and the White Nile—is a main source of water, energy and food. The Blue Nile

is of key importance for Egypt, Ethiopia and Sudan. As such the Nile has been a source of social and political tensions and low-intensity conflicts for most of the 20th century.

Tensions related to transboundary water relations retain a potential for violent conflict. The key contentious issue is the construction of the Grand Ethiopian Renaissance Dam (GERD) on the Blue Nile. The tensions among Egypt, Ethiopia and Sudan around the building of the GERD have become part of the larger geopolitical playing field in the Horn of Africa. The tensions are likely to be further complicated by the compounding impacts of climate change. If unaddressed at a regional level, tensions may amplify societal stress and relations and negatively affect political dynamics at the communal, bilateral and regional levels.

Another complex set of security challenges is concentrated along the Juba and Shabelle rivers, shared by Ethiopia and Somalia and to a marginal extent by Kenya. Ethiopia and Somalia have the clearest domestic interests in the Juba–Shabelle Basin's water resources and their development. The region around the basin, marked by three decades of civil war and state collapse, is dependent on the river for agriculture, drinking water and hydropower. Despite the significance of water access, there has never been a bilateral agreement surrounding international cooperation over the rivers' usage. Domestic interests and interstate tensions—as well as Ethiopia's role in the Somali civil war and state-building process—inhibit the potential of transboundary water cooperation in the Juba–Shabelle Basin. Due to its interaction with socio-economic and political factors, climate water security and governance in the Horn of Africa change will have a significant negative impact on water access, and subsequent multidimensional security in Somalia."

Figure 15Correlation between climate exposure and political fragility in Eastern Africa



Source: Krampe et al. (2020)

3 Explain existing and/or potential management/mitigation and adaptation options

3.1 Do drought policies and legislation and/or drought management plans exist?

As drought is an old, common and devastating phenomenon in the region, there have been strategies, policies and legislation in various forms in many of the countries for decades. For instance, the creation of the predecessor of today's IGAD, the *Intergovernmental Authority on Drought and Development (IGADD*) of 1986, was motivated by the overwhelming impact of the 1980s' drought to implement policies. Though it would be unfair to simply label these as ineffective or exclusively reactive, the continuing terrible impacts of drought (see above) indicate that they were insufficient, be it for lack of quality of the strategies, of resources, coordination, or political will, or because of other preoccupations such as military and political conflicts, or the compounding challenges. An exact determination will not be possible, and several factors cannot be changed in the short term, but there are many indications that lack of political will and reliance on short term (or rather lack of dedicated long-term) reactive drought "policies/strategies" had a big share in the weak performance of most countries to fight against the devastating impacts. For Ethiopia and Kenya, see Duguma et al. (2017).

Particularly after the drought of 2010-2011, efforts to reinforce drought risk management were rejuvenated. To that end, not only renewed efforts were made at various national levels (see below), but also at the regional level: the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI) was founded. It is implemented in 3 5-year phases. The second phase, running from 2019-2024, calls itself "arguably the region's most versatile development paradigm ever developed" (IGAD 2019). The overall goal is to achieve "drought disaster resilient communities, institutions and ecosystems in arid and semi-arid lands (ASALs) of the IGAD region achieved by 2027", with "drought disaster resilience ... defined as the ability of individuals, households, communities and countries, to survive the effects of drought shocks and stresses without compromising their long-term living standards through appropriate management of their livelihoods and ecosystems" (IGAD 2019). More concretely,

"the IDDRSI Strategy will identify and address the underlying causes of social and environmental vulnerability; guide the application of holistic approaches to strengthen the capabilities of households, communities and IGAD Member States to cope with and adapt to natural hazards and economic disturbances; attain a "resilient IGAD Region", free from hunger and environmental degradation; and achieve sustainable development. To this end, the Nairobi Summit emphasised the need to do things differently including:

a) *Countries working together as a region.*
b) *Adopting the twin-track approach to drought where emergency response is linked to recovery and long-term development.*
c) *Focusing on priority intervention areas as identified by target communities and Member States.*

d) *Ensuring that the design, development and implementation of the interventions are people-centred and take into account all aspects of human development to ensure drought resilience and food security."* (IGAD 2020b)

The IDDRSI in its current 2. phase has eight (1. phase: seven) Priority Impact Areas (PIAs). They reflect the problems and confounding factors identified above:

PIA 1: Natural Resources & Environment Management

PIA 2: Market Access, Trade and Financial Services

PIA 3: Enhanced Production & Livelihood Diversification

PIA 4: Disaster Risk Management, Preparedness & Effective Response

PIA 5: Research, Knowledge Management and Technology Transfer

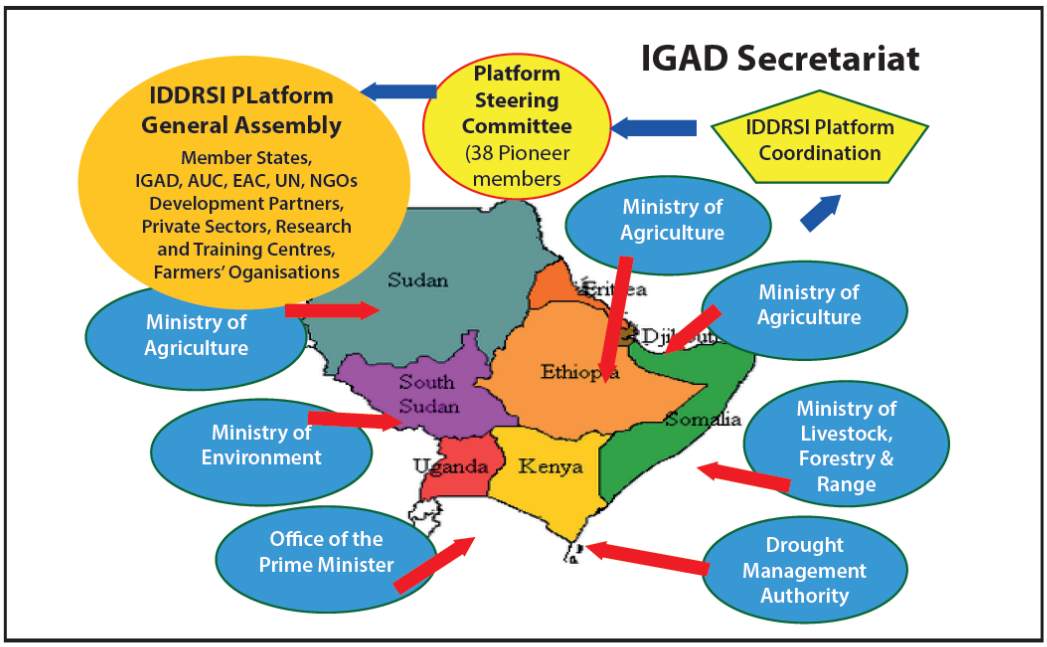
PIA 6: Conflict Prevention, Resolution and Peace Building

PIA 7: Coordination, Institutional Strengthening & Partnerships

PIA 8: Human Capital, Gender and Social Development (new in 2. phase)

Special attention is given to cross-border activities with the communities living in the often remote border areas. “Results-Based Monitoring and Evaluation will form an integral part of the management of the implementation of IDDRSI” (IGAD 2020b). Several development partners are supporting this initiative, inter alia the European Union (EU), Germany, The Netherlands, Denmark, USAID, Norway, Finland, Spain, Sweden, Italy, Canada, the World Bank and the African Development Bank. The FAO is also cooperating with IGAD, including with a special pastoralist programme. The regional platform is constituted of (IGAD 2020c) (compare Figure 16):

Figure 16Components of the IGAD platform and national focal points



Source: IGAD (2019). Long-term spatiotemporal variation of drought patterns over the Greater Horn of Africa)

- General Assembly. This comprises senior representatives of IGAD, AUC, EAC, COMESA, Development Partners, UN, NGOS, private sector,

research and training centres, farmers' organisations and Member states at ministerial level. It provides overall strategic guidance and makes decisions on investment plans and proposals.

- Platform Steering Committee (PSC): With 38 pioneer members at senior policy level and national experts, it guides the Regional Platform on policy issues. It oversees the implementation of the IDDRSI.
- Platform Coordination Unit (PCU): It is administratively embedded in the Division of Planning, Coordination and Partnerships of the IGAD Secretariat and is functionally connected to the national coordination mechanisms in the IGAD Member States, reporting to the Committee of Directors and to the IDDRSI Platform Steering Committee. National IDDRSI Coordinators support coordination mechanisms in the IGAD Member States. Its functional role involves (a) knowledge management and creating awareness; (b) programme planning and implementation monitoring; (c) capacity building; (d) coordination activities, (e) enhancement of partnerships and (f) mobilisation of resources.

There are a couple of specialised Institutes with IGAD. They serve to share regional public goods such as weather forecasts and knowledge, and provide training:

- Conflict Early Warning and Response Mechanism
- IGAD Climate Prediction and Application Center
- IGAD Center for Pastoral Areas and Livestock Development
- IGAD Sheikh Technical Veterinary School
- IGAD Center of Excellence in Preventing and Countering Violent Extremism

The strategy is supposed to be translated and adapted to Country Programming Paper (CCPs). For this, IGAD explicitly "recognizes that its members are at different levels of development and move at different speeds and constellations depending on their priorities" (IGAD 2020b). In each country, there is a national focal point and an IDDRSI representative, in addition to various regional committees with national experts.

As an example of national implementation, the most recently uploaded implementation report - from Djibouti– is presented in Box 1. It is the synopsis of the completion of the first five-year phase, that ran from 2012 - 2017. It clearly shows how the regional IDDRIS drought strategy is nationally embedded in a general disaster risk management strategy, located at a very high level within the government hierarchy in order to warrant participation from all line ministries, and how the line ministries and sometimes inter-sectoral bodies are set up to integrate drought issues. Implementation should take into consideration the priorities and opportunities of the concerned communities. This embedding is also intended to attract, facilitate and improve individual investment and/or development programmes and projects. Another example of the integration of drought into national policies, with many of the IDDRSI issues included is provided by King-Okumu et al (2019) for Kenya. It is argued that Kenya provided many key inputs into IDDRSI.

Box 1: IDDRISI implementation mechanism in Djibouti

Policy framework

Following the adoption by the Djibouti Government in 2006 of the Hyogo Framework for Action, the Government of Djibouti promulgated a National Policy Act and an institutional framework for Disaster Risk Management (DRM). The institutional framework set up by the DRM's Institutional Framework Decree is composed of three committees (Inter-ministerial Committee, Inter-sectoral Technical Committee, and Regional Disaster Management Committee) and the Secretariat of DRM as a permanent forum for management, coordination, enforcement and support of programmes and actions under the authority of the Minister of the Interior.

The drought resilience programme is fully aligned with the existing national policies and initiatives, such as the Poverty Reduction Strategy Paper (INDS) and the Djibouti Vision 2035. Both documents address all PIAs and aim to reduce poverty and enhance the resilience of vulnerable groups.

The sector strategy papers, including the National Programme of Action for the Conservation of Biological Diversity, the Action Programme to Combat Desertification and the National Environmental Action Plan (NAPA) respond to PIA 1 (natural resource management) and PIA 3 (support to livelihoods and basic services).

In addition to the above, the main existing instruments on related sectors on drought resilience include: National Strategy for Risk and Disaster Management; National Programme on Food Security; National Food Security and Investment Programme (PNISA); Water Master Plan; National Microfinance Strategy; National Environmental Action Plan (NAPA); National Strategy for Women; National Strategy on Decentralisation; Vision 2035; Strategy of Accelerated Growth and Promotion of Employment (SCAPE) and National Fisheries Strategy.

National coordination mechanism

A Strategic Coordination Committee, under the co-presidency of the Ministry of Economy and Finance responsible for Industry and the Ministry of Foreign Affairs and International Cooperation, was established by Presidential Decree No. 2015-311/PR/MEFI dated 3 November 2015. It includes all line ministries and technical and financial partners concerned, as well as the senior officials of the cooperation. The Strategic Coordination Committee is the platform designated to implement recommendations of the annual forum for development assistance coordination. It works through sectoral groups and the Technical Secretariat has been placed under the authority of the Ministry of Foreign Affairs and International Cooperation. The Secretariat is responsible for facilitating proper functioning of the committee.

There is a subgroup of Resilience, Climate Change and Food Security, chaired by the Ministry of Agriculture, Water, Fisheries, Livestock and Marine Resources. Members are all line government institutions and development partners. The main mandate of the subgroup is to exchange information related to resilience, climate change and food security and to coordinate all activities related to this theme. It also has a mandate to prepare investment plans and mobilise resources accordingly. It held its first meeting on 30 April 2017. The Government of Djibouti, under the leadership of the Ministry of Agriculture, Water, Livestock, Fisheries in charge of Marine Resources (IDDRSI Focal Point) favours a solid participatory approach (from bottom up) and has created a solid basis for implementation of the

IDDRSI drought resilience strategy. In each ongoing or planned project and programme, there is a steering committee in which the local communities are represented.

Key messages and recommendations

The following additional policies are required to implement the CPP:

- Updating the water master plan. The old scheme was valid for five years (2008-2012)
- National pastoralist policy consistent with the CPP
- National strategy for adaptation and attenuation of the effects of climate change
- National strategy for combining emergencies and development programmes
- National strategy for construction of feeder roads to facilitate pastoralist's access to market.

Source: IGAD IDDRSI Djibouti (2018)

Further, over the course of the years, drought has also received a prominent place in climate change discourse and the negotiations around the Paris Agreement, notably in the National Adaptation Plans (NAPs) and the nationally Derived Contributions (NDCs), as well as in the Agenda 2030 and the strategies to implement the Sustainable Development Goals (SDGs), most notably in the national Land Degradation Neutrality (LDN, SDG 15.3 for which UNCCD is the custodian UN organization) Strategies for which the UNCCD is the custodian. Table 5 summarises the existence of these strategy papers for the IGAD countries. Ideally, these papers should be harmonised with regards to drought as well as to other issues. In addition, the Comprehensive Africa Agriculture Development Programme (CAADP) was implemented in all countries and – with its focus on agriculture and food security – should be closely harmonised. Whether that is the case was not possible to evaluate in the course of this study. Moreover, it is not necessarily the most important question with regards to the usefulness of the strategies, since it must be taken for granted that capacities to implement, and other factors, play a much larger role (see next chapter).

Table 5 Stocktake of Drought Policies in IGAD Region

Country	SDG Voluntary National Reportrs (VNR)	Nationally Determined Contributions (NDCs)	National Drought Plan	Land Degradation Neutrality (LDN) Strategy	(IDDRSI) CPP
Djibouti	NA	2015		NA	CPP
Eritrea	NA	2018 & 2015		2018	NA
Ethiopia	2017	2015		2016	CPP
Kenya	2017 (& 2020?)	2015	3rd MTP 2018-22	NAP2002	NA (/MTP?)
Somalia	NA	2015		NAP2018	CPP
South Sudan	NA	NA		2020	CPP
Sudan	2018	2015	2018	2018	CPP
Uganda	2016	2015		2018	CPP

Source: based on King (2020)

3.2 If yes, have they been useful?

To begin with, the sheer number of people affected and threatened by drought in the region (see above: 27 million) could create doubt over whether IDDRSI's and its member states' overall goal (a drought-resilient region by 2027) could be reached, and thus that the strategy can be called successful. However, this assessment would not be fair, and the usefulness of regional and national drought strategies cannot only be measured against the (unchanged and unsatisfying) status quo. The assessment of their usefulness is an extremely difficult question to answer for several reasons:

- Drought is only one of several fundamental and often interlinked problems of the region (see above). There are many more and pressing needs and policy areas in the region, which sometimes contribute to drought resilience, such as economic growth, trade integration, democratic governance, agricultural development, etc., while there are others that have side-effects with repercussions on drought resilience and other development impacts which are counter-effective (see Chapter 3.3).
- There is no perfect way to compare the situation with or without the policies.
- There is a significant difference between good policies and their successful implementation, often depending on financial, human, organisational, technical and other capacities. These capacities are evidently lacking in these very underdeveloped and struggling countries.
- Implementation of policies which by nature spread across many different sectors is extremely difficult to follow-up, measure, and attribute.
- The countries in question are extremely varied in terms of climate, economy, demography and social structure, meaning that transnational policies may come up against these differences.
- The nature of drought itself makes it difficult to evaluate impacts. For dry spells, measures are very different than from recurrent or even mega droughts, and the quality of prediction is very different dependent on whether it is an ENSO or another kind of drought. The geographical extension also plays a large role, for instance for pastoralists or food markets.
- It is extremely difficult to identify which sources have contributed to national drought policies – personal experience, peer learning, development assistance, international frameworks, regional cooperation, bottom-up participatory and technocratic approaches all exist and co-influence each other.

However, ECDPM (2017) summarised the mid-term review of IDDRSI (Table 6Table 6 IDDRSI Coordination mechanisms at national level and national level commitments

):

Table 6 IDDRSI Coordination mechanisms at national level and national level commitments

Country	IDDRSI coordination mechanism	Degree of functionality	Committed/mobilised (USD)
Kenya	National Drought Management Authority (NDMA). CPP integrated into the government of Kenya Vision 2030, translated in Ending Drought Emergencies (EDE) program	Strong leadership NDMA, ASAL donor working group. Resource mobilisation challenges	2.4 billion
Uganda	National Disaster Risk Reduction Platform under the Office of the Prime Minister	Has not provided enough leadership to mobilise different ministries and DPs	65 million
Ethiopia	Ministry of Livestock and Fisheries. CPP is being implemented mainly through two donor-funded programs, the DRLSP and the RPLRP	Absorption rate of funds is low	248,5 million (inc 192 million DP funds e.g. AfDB, WB)
Djibouti	Ministry of Agriculture, Water, Livestock, Fisheries and Marine Resources	Seems to be little capacity to implement	433,8 million
South Sudan	Ministry of Environment, temporary arrangement. New coordination mechanism underway, with Min of Environment as chair and Min of Agriculture, Forestry, Cooperatives, and Rural Development as co-chair	Effective implementation compromised due to security situation	
Sudan	Chaired by the President, Secretariat housed within the Ministry of Agriculture	Enabling policy environment	Estimated budget: 619,3 million Gov: 12,7 million DP: 882,4 million
Somalia	Overseen by the Office of the Prime Minister through a Steering Committee of key ministries. National IDDRSI Coordinator for Somalia had not been recruited at time of MTR (2016)	Coordination and alignment of the CPP with other on-going programs in Somalia is relatively weak	Growing interest to support CPP from different DPs

Source: IGAD MTR 2016

Source: (2018)

Some further findings on strengths and weaknesses of IDDRSI are:

Efforts to strengthen institutional capacity:

"The IDDRSI Platform is working to a certain extent, relatively high level policy makers showing on a regular basis what progress has been made on their commitments. This accountability mechanism functions relatively well at a national level, but is flawed when it comes to regional accountability, since national level government officials are held accountable for national level activities and not the regional level." On the other hand, *"in the IGAD region the lack of clarity, connection and complementarity between the CAADP and IDDRSI framework is reportedly hindering both governments and development partners." … "The capacity issue at the moment according to a number of interviewees is not so much in terms of quantity of staff but in terms of quality and motivation."* It is also noted that *"there is organisational weakness within IGAD, notably in the IDDRSI Platform Coordination Unit and the financial and administrative systems".* In addition, IGAD is said to need *"a treaty … to provide a stronger legal foundation and a more robust mandate for conducting policy dialogue and providing services in the region".* Further, *"it has proven difficult to meaningfully engage with private sector and civil society organisations". "Assessments point to irregular policy meetings and delayed contributions of Member States, causing IGAD to act with insufficient policy direction*

and financial support. As a consequence, reliance on donor funding has increased rapidly. High-powered donors in the IGAD region have influence to push their own agendas on policies, priorities and strategies". (Molina 2017).

On implementation in member states:

"Commitment in the countries is limited when it comes down to actual implementation on the ground of both IDDRSI and CAADP related actions." … "According to the IDDRSI Mid Term Review, IGAD member states have shown willingness to translate the IDDRSI Strategy into their national drought resilience programmes. IGAD has also been effective in increasing resources and aligning development and humanitarian interventions with the IDDRSI Strategy. At the same time, in all the countries, there are low absorption rates of resources for project implementation (IDDRSI MTR 2017). The IGAD Secretariat is asked 'to liaise with Member States to highlight the low uptake of funds and explore ways of expediting the implementation of resilience projects'. … "This is also reflected in the more recent IDDRSI MTR, which finds that 'Certain priority intervention areas (PIAs) receive proportionately less investment than others; as some countries commit less resources to the implementation of IDDRSI compared with others.' Indeed, the MTR finds that 'ending drought emergencies through building resilience and sustainable development still attracts less attention than does the response with emergency relief interventions.'" … "Both CAADP and IDDRSI meet similar challenges when it comes to national level implementation. Lack of deep commitment at country level and a lack of political will to invest in agriculture. Despite change in discourse, there is little change in action." … "The problem for CAADP [and IDRRSI] is not the funding of DPs, it's the political commitment of governments to invest in agriculture". … "A more elaborate understanding of what has helped and what has blocked effective implementation at member state level is missing in the literature and reviews available." … "The main reason for this implementation gap on food security and resilience issues in the ASAL regions of the IGAD member states is that it is generally acknowledged that IGAD member states have a strong bias towards high-potential commercial agriculture (Afun-Ogidan and de Weijer 2012). In Ethiopia, Kenya and Uganda, and to a certain extent in Sudan as well, highland farming activities are perceived as bigger contributors to GDP than pastoralism in the ASALs or rangelands." "…differences between IGAD member states are reflected in the progress the IDDRSI MTR reports: in most areas Kenya and Sudan show the most progress e.g. in setting up national coordination structures, with Ethiopia being a bit more advanced in aligning humanitarian responses and development interventions, possibly reflecting higher levels of capacity and high levels of technical support at the Ethiopian Ministries. Somalia and South Sudan show lack of progress on all areas, except concerning IGAD sector level and development partner coordination." … "The EU and International Union for the Conservation of Nature (IUCN) have supported IGAD in developing an IGAD Regional Water Resources Protocol but up to date this protocol hasn't landed on the ground or respected as it should. Institutional capacity at MS level to understand, respect and implement the protocol is perceived as problematic." (Molina 2017).

On decentralisation within member countries:

"Although the IDDRSI MTR finds that 'Decentralisation and devolution across IGAD Member States is contributing to the effectiveness of the IDDRSI framework and strategy', this is not always the case. In the region, for example in Kenya and Ethiopia, governance issues, such as breakdown of traditional institutions, have worsened food security crises. Conflicts (inter- and intrastate, ethnic etc), breakdown of local institutions and conflicting political interests can actually reduce space for community participation and engagement in programming (both development and humanitarian) in the region." "Decentralisation processes however also hold a significant risk, as 'development efforts in the ASALs face a formidable challenge by wealthy political elites who variously form cartels that sucks up the bulk of resources, thereby perpetuating marginalisation of their own communities' (ICPALD Strategic Plan 2016-2020).

A systematic review at the various national levels (compare Table 5) was out of reach of the study. Some insights into the usefulness of country strategies and policies are however be provided for two countries, Sudan and Kenya.

Sudan is the only IGAD country to have published its National Drought Plan (NDP), elaborated together with UNCCD (GoS 2018). This document should shed light on the priorities and lessons learned by IGAD countries. GoS (2018) states that "the Sudan NDP made use of the lessons learned from all previous work on combating desertification in the country and good experiences from neighbouring states in the East Africa and IGAD regions." Yet, the name "IDDRSI" is mentioned only one time in the Plan, and reference in the CPP is made only twice, and only with reference to older drought description, not to strategy or operations. "The NDP was also inspired and incorporated the following eight steps that are described in the Model National drought plan guidelines" (WMO and GWP 2014). In particular, it set up a high level National Drought Plan Task Force with 27 members from at least 15 ministries and several national organisations involved in drought. This alone should ensure high ownership and commitment.

As to general weaknesses of the national system to deal with droughts, GoS (2018) continues:

"Government institutions responsible for rural development and natural resource management suffer problems of confused and overlapping roles and mandates and adherence to culture of integration, coordination and information sharing is minimal. Commitment to participatory planning processes is also limited with the top-down approach remains a prevalent practice. Years of underfunding and lack of articulated training and capacity development plans together with the loss of skilled personnel to brain drain and the humanitarian sector dominated by the influx of the international and national associated mainly with the crisis in Darfur have created critical human resource capacity gaps; mechanisms for oversight, accountability and quality control are weakly constituted. Information gap is also acute and available information is widely fragmented and scantly organized". (GoS 2018)

The NDP reviews the historical development of drought; the Organisation and Assignment of Responsibilities activities, Drought Monitoring, Forecasting, and Impact Assessment; Drought Risk and Vulnerability (which includes a longer subchapter on LDN); Cross-Cutting Issues (with a strong emphasis on gender);

Drought Communication and Response Actions; Drought Mitigation and Preparedness; Natural Resources Management (with an emphasis on agricultural production and water resources development) leading to a set of next steps and priority activities (Table 7).

Table 7 Activity table of Sudanese National Drought Plan

What should be done, by when and by who?

Priority actions	When	Responsible Institution	Remarks
Promotion environment, climate change and drought awareness among all parties at different levels.	Continuous process	All sectors	This is part of the national strategic plan that should adapted by each state
Promotion and rational management of rural water sources through proper distribution of water points, (hafirs) and boreholes.	Continuous and reviewed on annual basis	Ministry of Water Resources, Irrigation and Electricity	Dams' Unit in coordination with Ministry of Agriculture and Forestry and Ministry of Animal Resources
Increasing the storage capacity of ground water through the construction of dams, terraces, and water harvesting techniques.	Continuous and reviewed on annual basis	Ministry of Water Resources, Irrigation and Electricity	Dams' Unit in coordination with Ministry of Agriculture and Forestry and Ministry of Animal Resources
Compilation of information and data on natural resources surveying, land use mapping and establishing natural resources information bank.	To cover all drought prone areas by 2020	High Council of Environment and Natural Resources	In close coordination with relevant sectoral ministries and institutions
Improvement and rehabilitation of degraded rangelands through reseeding, nurseries, enclosures, and rehabilitation of vegetation cover especially in the marginal areas between latitudes 10° and 18° N.	Continuous process	Range and Pasture Directorate, Ministry of Animal Resources	In close coordination with Forestry National Corporation
Development of forest cover and afforestation through dune fixation, shelterbelts, community forests, enclosures and greening of public utilities and rehabilitation of gum Arabic belt.	Continuous process	Forestry National Corporation	FNC to reach the target of covering 20% of country area with trees

Source: GoS (2018)

In addition to these processes,

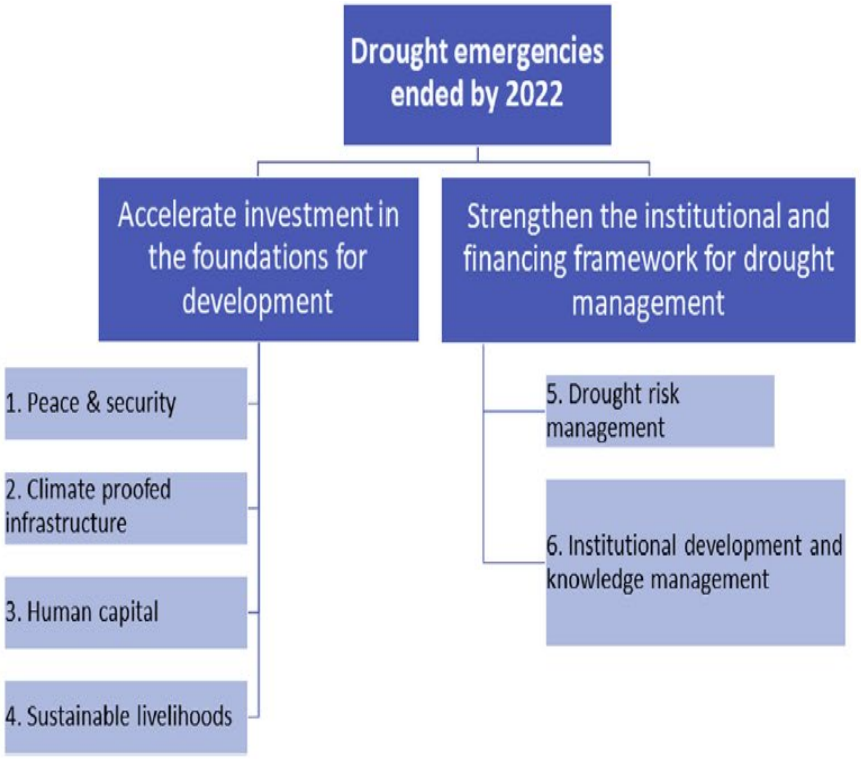
"the government should provide incentives to encourage FDI to invest in subsectors that have the potential to create jobs and infrastructure, decrease poverty, maintain biodiversity and increase food security. It worth noting that the specific policy priorities for famine prevention derived from the quantitative analysis include

- *Promotion of sustainable growth in the traditional rainfed agriculture through expansion of rural infrastructure; provision of labour-intensive public works programs; input supply, with scope for private-sector involvement; adaptive research, technology, and extension; and protection of the environment; and*
- *Emergency preparedness and relief with buffer stocks for price stabilization, improved relief management and early warning systems, strengthening of rural health and sanitation, and comprehensive legislation for famine prevention.*" (GoS 2018)

It is noted that there are long lists of individual interventions for individual sectors as well as at least 15-20 cross-sectoral national frameworks and strategies[4], which are linked, in some way coordinated but also in some way competing with the NDP. How this is achieved, and whether this is useful, is not analysed.

For Kenya, King-Okumu et al. (2019) have reviewed the recent developments with focus on the ASALs. It is to be noted that in 2010, Kenya established a new constitution with drastic decentralisation, driven by, among other reasons, a feeling of neglect in the ASALs. In 2012, a new policy for the ASALs chartered a direction for drought management which embedded it in the development process. It focused on two key strategies: first, investing in human development and economic growth so that those living in the ASALs can better withstand shocks; and second, establishing permanent institutional mechanisms - specifically the National Drought Management Authority (NDMA) and a dedicated drought contingency fund - which would enable action much earlier in the drought cycle, carried out in ways which reinforce (rather than undermine) people's livelihoods. These two strategies are at the core of the Common Programme Framework (CPF) for Ending Drought Emergencies (EDE), launched in November 2015 (Figure 17Table 8).

Figure 17 Kenya's ending drought emergency framework



[4] To only name a few: Poverty Reduction Strategy Paper (PRSP), Land Degradation Neutrality (LDN), Comprehensive Africa Agriculture Development Programme (CAADP), National Strategy for Adaptation to the Effects of Climate Change (NAPA), National Adaptation Plan (NAP), Intended Nationally Defined Contributions (INDCs), National Appropriate Mitigation Actions (NAMAs) , REDD+ National Strategy, National Action Plan for Desertification 2006 – Updated 2018, 5-Year Development Plan, Agricultural Revival Executive Programme (AREP).

Source: King-Okumu et al. (2019)
The four pillars to the left are under the responsibility of the counties, the two to the right for the NDMA. Both receive autonomous funds from the national budget and have the right to donor cooperation and coordination. In addition, drought contingency funds are established at various levels, including risk insurances. The county steering groups are the most recognised structures at local level and link the many local groupings with county and national level organisations. They also are the key actor for the bottom-up part of the drought early warning system which is surveyed and published monthly. The top-down part is organised by the NDMA, using various sources of national and regional weather forecasts.

King-Okumu et al. (2019) summarise three key challenges and lessons from their analysis (Table 8).

Table 8 Key challenges, lessons and recommendations for Kenya's drought management in ASALs

Challenge	Lesson	Recommendation
Limitations in the human resource and institutional capacities	Drought preparedness requires coordination connecting local institutions to government processes and institutions and partners at other scales.	Awareness raising and capacity building are needed to encourage the devolved local institutions to fulfil their new roles and drive improved catchment planning to prepare proactively before droughts hit (whether they are socioeconomic droughts, hydrological droughts, or just temporary meteorological phenomena.
Lack of natural resource information and weak early warning systems	Over the period 2008-18, the Kenyan government and development partners have learned how to manage systematic community-based monitoring systems providing monthly updates for early warning.	There is an opportunity to use the early warning information together with additional information on natural resource conditions to transition through drought response, preparedness, and resilience building toward more sustainable and drought-resilient development planning.
Limited financial resources for DRM and resilience building	Over the period 2008-18, the Kenyan government and donors have learned how to establish financing systems to channel funds to drought-affected areas ensuring budgetary allocation and disbursement on a timely basis for early response/action.	There is an opportunity to make further use of participatory resource accounting and hydro-economic decision support systems to assess the material effects of drought preparedness and management improvements, including value for money. Other nonmonetary impacts also require further consideration and assessment .

Source: King-Okumu et al. (2019)

However, much remains to be done. In their review of policies and agricultural productivity in Kenya's Turkana county, Akuja and Kandagor (2019) state: "There are numerous overlapping policies due to failure to evaluate existing ones. There

is need to involve beneficiaries and to address resource allocation to agriculture to reflect the recommended 10% of overall country budget as per the Maputo agreement of 2003. Proper management of funds and fighting corruption is vital in effective implementation of development programs and realization of economic growth. Investment in both social and physical infrastructure (roads, livestock markets, abattoirs etc.) would ensure effectiveness of the various policies. There is need to prioritize water supply and water use efficiency for dryland agriculture." On the national level and regarding the integration of climate change (including drought) into agricultural policies, Shisanya (2016) also provides a long list of challenges and propositions, including a warning that adaptation and mitigation strategies should not be separated, and highlighting the need for stable funding and stable coordination for long-term planning, and reliable monitoring and evaluation.

3.3 Which steps have been taken to mitigate droughts in case of an event?

Many of the proposed measures in the various drought strategies and policies have been found to be successful. There is a wealth of literature on individual measures, of which only a few selected ones can be reported here. It should be noted that the local communities in the region have longstanding knowledge about droughts and mitigation measures. While many have been constrained or need adaptation due to structural changes (McCabe 1990, Opiyo et al. 2018, compare Chapter 3.3.), many authors highlight the need to take local knowledge into consideration and merge it with new technologies and approaches (Mwangi 2016; Ndiritu 2019, Opiyo et al. 2018). King-Okumu et al. (2019) points out that the investments made by local populations are most likely dwarfing external investment. Mwangi (2019) examines the dynamics of drought-adaptation strategies utilised in Maasai-pastoralism in Kenya and reveals the integrative utilisation of varied and multipurpose adaptation strategies. Migrate-livestock, diversify-livelihood, and diversify-livestock, in that order, dominate as the most widely utilised drought-adaptations.

Better **early warning** to drought has been shown to be possible. Meteorological organisations and their users, such as the IGAD and several other organisations like FEWS-NET and FAO's Global Information and Early Warning system (GIEWS), have improved their forecast capabilities considerably, while remote sensing and data processing technologies have continued to rapidly improve. However, it remains equally important for governments and development partners to recognise and react to these warnings (King-Okumu et al. 2019). This is not yet at its optimum, with reaction slow and often delayed due to reasons of political economy (see above). Nevertheless, progress has been made, especially in Kenya, largely through the collection of bottom-up information on vulnerability and responsiveness (King-Okumu et al. 2019).

Social protection schemes have shown to be necessary and potentially effective against the still severe impacts of drought in the region, mostly felt by financially vulnerable people who are highly and directly dependent on natural resources. The Ethiopia Productive Safety Net Programme phase III served more than 8 million people (but only in the highlands) usually with food or cash-for-work/collective assets, and to a minor extent with direct household asset building, producing positive results for the poorest 20% of the population in terms of reduced asset

stress sales and food security (Nelson et al. 2015). The latest phase IV is now extending into the lowlands. In Kenya, the more recent Hunger Safety Net programme also provides direct cash transfers in four counties for up to 100,000 households with regular, unconditional electronic cash transfers of $25 every month. The scientific literature shows positive (though limited) impact on resilience to severe drought for the Ethiopian Programme, and it is seen as not yet able to make a fundamental positive impact on long-term household-level drought resilience (Andersson et al. 2011, Béné et al. 2012, Singh et al. 2016).

Other social services (health, education) have shown to be positively associated with drought resilience (**Ambelu** et al. 2017), and most likely also with other forms of resilience and well-being. These are a classic example of low-regret, multiple-win interventions.

Investment in **human capital** has been found to be negatively correlated with drought impact, i.e. reducing impacts (Ambelu et al. 2017, Beierl et al. 2017), and there are numerous pathways which can explain this: better connection to extension, service agents and services lead to better crop and livestock management, more options for income **diversification**, better finance management, better health and hygiene knowledge, etc. Again, this is to some extent a non-drought specific intervention, while also some specific capacity development for drought risk is possible.

Infrastructure was found to be positively correlated with drought resilience and better drought management practices, for instance by Kenyan pastoralists, which may be easily explained through better access to markets for inputs, outputs, food, information, etc. (Ambelu et al. 2017, Ndiritu 2019). During heavy drought, food, feed and water can now be **carried** over the main road axes much faster in the regions than before, and populations go there to access assistance.

Natural resource management is a large bundle of interventions to protect soil, vegetation and water sources, mostly linked to agriculture and livestock as well as forestry. There is wide consensus in general that there are many ways to improve drought resilience by improved natural resource management (see for instance Oguge 2019, Venton 2018, King-Okumu et al. 2019, Beierl et al. 2017, Ambelu et al. 2017, Temam et al. 2019, Quandt et al. 2017). GoS (2018) for instance lists the following:

- Preventing and recycling of excess runoff
- Use tillage to absorb and hold maximum moisture.
- Timely weed management to control water loss by evapotranspiration (ET).
- Planning for suitable cropping system.
- Selection of short maturing and drought tolerant varieties and crops.
- Contingency crop planning for abnormal weather situation.
- Management of various inputs to suit the climate.
- Conserving the soil moisture by agronomic practices like mulching.
- To apply irrigation.
- Optimizing of plant population to reduce evapotranspiration (ET).
- Timing of foliage to reduce evapotranspiration (ET).

It should also be noted that in this region of very low agricultural (modern) intensification, there are huge problems of degradation often linked to poor management practices and low productivity. This means that there are many ways to find multiple-win solutions. They must, however be well adapted to the specific sites and farmers' realities. Whether they are useful for drought resilience is, other than for productivity, more difficult to evaluate. One example is the **comparison** of terraces versus contour bunds, two widely adopted soil water management practices. 'Terraces' showed more potential in acting as a buffer against (the 2015 Ethiopian) drought than 'contour bunds', measured by yields (Kosmowski 2018). Yet, contour bunds could still be effective against smaller, shorter dry spells, they help with erosion control, and, importantly, they are less expensive and easier to combine with mechanisation of soil preparation. Another example is the choice of drought-tolerant crops (e.g. manioc or millet and sorghum versus maize) and varieties (including genetically modified ones which are developed by various international and national (Kenya) research organisations): drought tolerance is only one of many characteristics that farmers, processors and consumers consider. So, again, multi-dimensional and multi-stakeholder assessments and development strategies are needed.

In the context of drought, **water resources management** obviously needs particular attention. It is essential for humans and for livestock, and is of key importance to agriculture, and there are many efforts all over the region to improve water access and quality (see for instance IGAD (2020) mapping of water resources in transboundary Karamoja cluster). Huge possibilities exist to employ more water-harvesting and evapotranspiration-reducing technologies, including crop choice (GoS 2018). There is a clear link between irrigation and drought resilience (IFRC 2011, Teman et al. 2019). Whether the **large**-scale dam and irrigation investments, particularly in Ethiopia but also Kenya and Tanzania, pay out and weigh out the many ecological and political problems, is an open question. On the other hand, most advanced countries have done exactly this, so questions of governance and due diligence may be the key (Scheumann et al. 2008).

Trans-boundary approaches for pastoralists are very important for drought resilience and conflict avoidance in this region. "… IGAD Member States and the Secretariat have come up with various strategies to deal with the challenges posed by transhumance including MOUs between countries, strategies on cross border animal health, mapping of transhumance routes, and integrated early warning system on climate change" (IGPALD 2020). Molina (2017) reports that "research conducted [by UNDP] over summer 2016 concluded that the initiatives and activities that have achieved the best results tend to be those that adopt a cross-border approach; involve and build on traditional institutions and practices; balance commercial interests and community needs; integrate peacebuilding; take a market approach; and support already-existing mechanisms".

Index-based **insurance** has been tested and sometimes already extended in several countries and pilots. Lessons learned include: "Kenya and Ethiopia indicate positive impacts on household welfare and ability to cope with drought. The workshop emphasized the role of public-private-partnership approach, and the advantages of long-term financial sustainability of country-level insurance

programmes to benefit from a regional initiative to promote best practices" (FAO 2019). Positive effects of insurance on impact and recovery are also reported in Janzen and Carter (2013) for Kenyan pastoralists. However, there is evidence of low uptake of smallholder crop and livestock insurance in developing countries where premiums have to be paid. Challenges that impede uptake of index-based products include weakness of regulatory environment and financial facilities, basis risk, quality and availability of weather data, capacity building of stakeholders (farmer, insurer, and regulator), and lack of innovation for local adaptation and scalability (Ntukamazina et al. 2017). On the other hand, there might be negative side-effects of insurances: John et al (2019) report that, especially if pastures are very sensitive to grazing, insurance can cause and/or intensify ecological instability. Furthermore, these unintended ecological consequences are most likely where insurance is needed the most. On the other hand, there are interesting models to link insurance with natural resource management, but these require a host of programme improvements, innovations, funding and public-private partnerships (Tsegai and Kaushik 2019). Meso- (e.g. Kenya livestock insurance scheme) and macro-insurance schemes (e.g. African Risk Capacity in Kenya and Djibouti, ARC 2020) are concluded with organisations or nation states and have several advantages including detailed risk modelling and early action planning (Jarzabkowski et al. 2019).

3.4 Discuss possible options/pathways to increase the resilience and minimise the risk from droughts (now and in the future)?

The countries in the IGAD region, as far as this limited study could analyse, seem to be on the right path from a reactive to a pro-active risk management of drought. There seems to be, at least on paper, a consensus on a multi-pronged approach to resilience building: Most focus and activities are (rightly) on agriculture, livestock, and natural resources including forests and wildlife (particularly where tourism is concerned). Natural resource measures have to be adapted to the local conditions. ASAL and non-ASAL areas may be a first rough distinction, with agriculture and pastoralism as the main activities. However, in reality the situations are much more complex, the needs (population increase, loss of herds, increasing irrigation options, lifestyle choice of younger generations, ...) and the options for combining activities from these domains are now more than before evident and necessary. Water management obviously plays a dominant role. Beyond these classical intervention areas, social protection measures get increasing attention, as well as income diversification, (food) market development, general infrastructure and human capacity development to give people more choices and better skills.

All these intervention areas have to be integrated into a drought cycle management system which means that they must be pursued in non-drought times to build up resilience as well as during droughts, but in different ways that protect the achievements and build back infrastructure and systems better, diligently using the emergency funding which is still significant in the region. Brüntrup (2019) has assembled many of the options in a simple table (

Policy domain	Non-drought period	Drought period
Water/landscape	• Landscape/watershed management, water harvesting and conservation on- and off-farm • Water storage • (Water-saving) irrigation • Water contingency planning • Communal forestry including bioenergy • Groundwater exploitation	• Contingency execution (drinking and livestock first) • Protection of forests against emergency charcoal production • Attention to not overexploiting groundwater
Agriculture	• Drought resilience breeding • Cropping system adjustment (new crops) • Fostering livestock markets • Seed (emergency) stocks • Managing pastoralism and crop/livestock integration • Agroforestry	• Irrigation or stop according to drought severity and outlook • Livestock vaccination (as early as possible) and reduction • Protecting key animals, recovery • Seed distribution (recovery)
Finance	• Crop and livestock (weather) insurance • Savings • Cash transfer facilities • Resilient financial institutions	• Ease disbursements • Use for emergency cash transfers (private and public)
Social protection	• Establishing social protection systems	• Scaling up social protection to drought-affected populations, cash or in kind
Food markets	• Fostering food crop markets (integration, commercial linkages, …) • Establishing food price monitoring systems • Local food storage systems (reserves)	• Facilitating commercial food inflows • Situation-sensitive regional food aid • Responsible handling of food reserves
General economic development	• Income diversification • Migration as income diversification measure • Infrastructure (transport, storage, telecommunication, etc.) • Contingency planning	• Infrastructure-building as part of emergency aid and reconstruction (cash/food for work)

Energy	• Electricity diversification • Sustainable bioenergy production (woodlots, agroforestry, forestry, energy crops)	• Coordination of water use for energy and other needs, food security priority • Protection of irreversible damage to trees and forests from emergency charcoal

Table 9). It must be acknowledged that the actual succession of the cycle management, and the transitions from development to emergency and back, can be much more sophisticated that this simple dichotomy.

Policy domain	Non-drought period	Drought period
Water/landscape	• Landscape/watershed management, water harvesting and conservation on- and off-farm • Water storage • (Water-saving) irrigation • Water contingency planning • Communal forestry including bioenergy • Groundwater exploitation	• Contingency execution (drinking and livestock first) • Protection of forests against emergency charcoal production • Attention to not overexploiting groundwater
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Energy	• Electricity diversification • Sustainable bioenergy production (woodlots, agroforestry, forestry, energy crops)	• Coordination of water use for energy and other needs, food security priority • Protection of irreversible damage to trees and forests from emergency charcoal

Table 9 Role of key policy domains/sectors for building up food-security enhancing drought resilience during drought and non-drought times.

Source: adapted from Brüntrup / Tsegai (2017)

In addition to these sectoral measures, challenges and respective recommendations can be identified and made on a more general level to embed these measures into sector policies and coordinate them. Again, we draw on Brüntrup (2019) for a 9-point list of recommendations:

1. **The understanding of what constitutes drought resilience** and priorities between long-term and short-term measures is still not uniform across all stakeholders, with some important negative repercussions. A guiding principle is needed where resilience is initiated at the lowest possible level (the household) and is progressively opened to resource mobilisation at higher-level structures (community, district, region, nation) when increasingly severe drought surpasses individual households' and communities' capacities to withstand drought impacts. This approach respects human dignity, acknowledges individual options and potentials, better protects longer-term development capabilities and provides more independence from ruthless strategic regime opinions (and their changes). It avoids an overreliance on social protection, which risks leading to a reduction in households' own capacities and efforts by state actors to support local resilience. On the other hand, too strong an expectation of what can be achieved by self-reliance of poor households and local communities against heavy droughts should not lead to the neglect of top-down emergency readiness. Common understanding can be achieved by learning from the further development of the international frameworks, exchange of the experiences of more advanced economies, frank learning from one's own and from regional experiences, and a clearer exchange between public institutions, the private sector, civil society, and academia. Public awareness campaigns through mass media, schools, informal networks, sectoral education programmes etc. are needed too.
2. Based on the need to search for more individual, adapted solutions, it follows that **vulnerability assessments should be refined** to include the possibility of adapting continuously to local conditions, specific groups, and changing conditions. One way is through differentiating between sub-groups of vulnerable groups (gender, landless youth, people with disabilities, farmers, and (agro-)pastoralists of different sizes to ensure that the right interventions benefit those in need, and by using participatory approaches. It must be further recognised that those in ASALs (pastoralists, in particular) face specific threats and options. Kenya's experience with combining bottom-up early warning with current vulnerability assessment is a good choice.

3. It is vital to further promote the **integration of drought-risk management approaches into long-term development measures**, especially “no-regret” solutions that prevent and mitigate the impacts of drought, prepare for crises, and respond to them. Many natural-resource and livestock management practices, social-protection schemes, and measures to increase income and diversification comply with such a double purpose. But trade-offs should also be clearly addressed, for instance in terms of scarce capacities of administrations, costs of stabilisation and risk mitigation versus average income maximisation and wealth accumulation, etc. Some drought mitigation measures can have problematic consequences, particularly if not well managed, such as described for large dams, groundwater extraction, excessive irrigation, genetic modified organisms for drought tolerance. Even seemingly no-regret measures can have negative side-effects, for instance social protection can lower the will for self-help, drought tolerant crops and varieties may show weaknesses in rainy years, or afforestation can deplete water resources. Public and project decisions on the best (mix of) options should be made transparent and revisable. In addition, humanitarian and drought-risk management interventions (development measures) should be linked in a way that mutually reinforces the efficiency and effectiveness of each, again while also clearly identifying and negotiating trade-offs. This means, in particular, that humanitarian measures should be planned early on and integrated into development plans; for instance, location, long-term institutional responsibility and maintenance of local infrastructure created through food or cash for emergency work programmes.
4. For **efficient and properly functioning drought early warning systems**, effective communication among all relevant stakeholders is critical for vulnerability assessment, preparedness planning, better targeting and proactive action for emerging droughts. This will require the establishment of a credible, independent, regional/national platform that consolidates the early warning information from multiple sources. This can be in the form of a consortium of various governments, NGOs and research institutions with high-profile expertise and reputations. Improved transparency and the provisioning of access to data for all relevant stakeholders would facilitate the process.
5. A **strong and comprehensive connecting institution** is indispensable to allow for multi-sectoral and multi-stakeholder communication and coordination, for creating mutual accountability and facilitate inter-institutional and multi-actor learning. For this, a coordination unit with a solid authority, clear accountability and sufficient capacities to carry out its responsibilities should be created, at a very high level within the government hierarchy.
6. Drought knows no geographical or sectoral boundaries, particularly in the IGAD region with old transboundary linkages and more or less open, uncontrolled and uncontrollable borders. Drought episodes thus call for strengthened **collaboration between African countries, regional and sub-regional institutes**, and international organisations in the implementation of drought-risk management and implementation plans. IGAD is the right level of regional cooperation, but also other neighbours and other African regional organisations must be involved where it makes sense (e.g. Egypt and the Nile Basin Initative). IGAD and other African regional organisations should prioritise and help mobilise resources for cross-border initiatives that enhance cooperation, and member states must show more engagement to regional measures.

7. **Monitoring and evaluation and knowledge management** is vital for effective follow-up, reporting and documentation of drought-resilience efforts and achievements. Therefore, independent, strong monitoring and evaluation systems should be established, ideally under the above proposed central coordination unit, which would be responsible for monitoring and evaluation, identifying strengths and weaknesses, and ensuring scale-up of good practices. In addition, mutual accountability among government, non-government stakeholders and development partners should be strengthened through reporting, possibly under common standards. Again, regional organisations could play an important role here.
8. **Emergency funding** is short-term and costly, and becomes more so the later it is initiated. Therefore, development partners and governments should increase funding for anticipatory drought resilience building as opposed to emergency funding. The use of **contingency funding** should be enhanced to link relief and development, and provide easy and quick funding for early action.
9. **Expertise is a critical resource in building drought resilience** within individuals, institutions and organisations. In poor countries in particular, it is essential to exploit readily available internal expertise and enhance efforts to reduce labour turnover at the regional and national level, but also with a special focus on the subnational level.

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