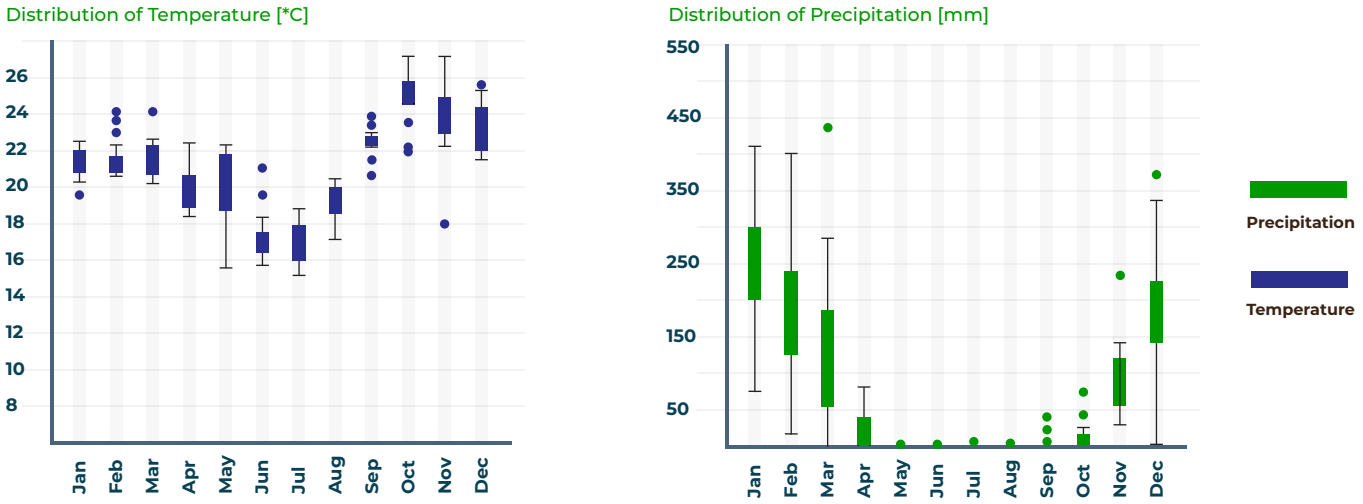
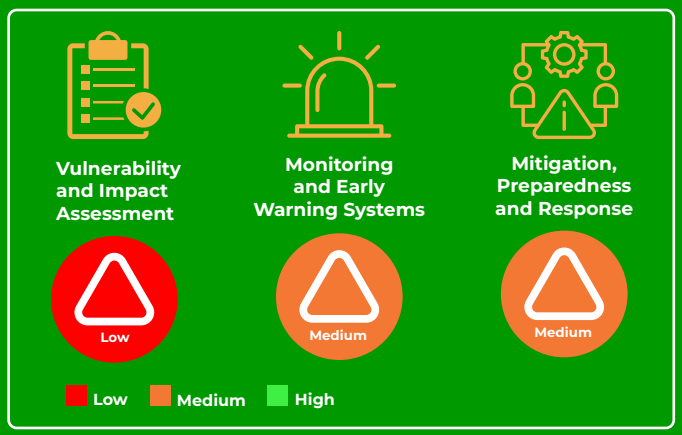
COUNTRY OVERVIEW

Drought is endemic to Zambia, due in part to below-average precipitation, particularly during the seasonal rains. The country has a history of drought years: 1987/88, 1991/92, 1994/95, 1997/98, 2001/03, 2004/05, 2011/12, 2015/16 and 2018/2019. This sequence implies that the country experiences drought every 4 to 5 years, and the frequency is projected to increase in the future due to climate change. Drought brings reduced agricultural production from erratic rains, increased dry spells, water logging and false and late starts. Given that roughly 90% of cultivation in Zambia is rain-fed, small-scale agricultural producers are particularly vulnerable to drought. The severe drought of 2018/2019 affected 2.3 million people, who experienced increased food insecurity, with a sharp rise in food prices from the reduced agricultural production and harvest (FAO, 2019). Livestock production in the grazing areas in the western and southern parts of the country was particularly affected. Low water levels in major rivers and groundwater systems increased water insecurity.

Fig 1. Long-term rainfall and temperature anomaly over Zambia, 1987-2016





The Integrated Drought Risk Management Framework highlights a three-pillar approach centered around interconnected, multi-disciplinary, multi-institutional activities. These are 1) Vulnerability and impact assessment; 2) Monitoring and early warning systems; and 3) Mitigation, preparedness and response. This country Drought Resilience Profile contains drought information based on these three pillars.

This profile provides a review of drought resilience capacity under the three pillars framework in Zambia. The vulnerability and impact assessment capacity of Zambia is assessed to be low as there is not as yet an integrated system for collecting impact data across key sectors and agencies. As with many countries, the economic and social assessment of drought impacts is limited. Moves to support the management system with increased data coordination will help inform key actors and enable evidence-based decision-making to safeguard the most vulnerable during future drought events.

Zambia has an established institutional base for monitoring and forecasting along with ongoing initiatives in existence to expand the monitoring network. It is also in the process of strengthening its monitoring and EWS through internationally funded projects working with the meteorological service. Its capacity is therefore characterized as medium. As the data monitoring systems become operational it will be important to strengthen the dissemination of the data. In terms of mitigation, preparedness and response to drought, the country is similarly classified as medium. Zambia still has to develop a drought management policy or plan, although it has a disaster relief policy. Development and empowerment of a drought action plan linked to monitoring systems will be needed in the coming years to develop a stronger and coordinated response system.

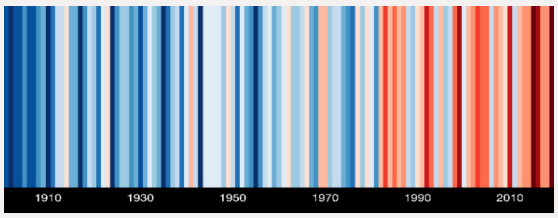
This document provides a brief overview of drought risk issues. The key resources at the end of the document provide more in-depth country and sectoral analyses. The contents of this report do not necessarily reflect the views of the World Bank, CIWA, SADRI, NDMC or IWMI.

Drought: Historical and Future

Historical climate

- As illustrated in the #ShowYourStripes 'warming stripe' graphic for Zambia in Fig. 2, the stripes turn from mainly blue to mainly red in more recent years, illustrating the rise in average temperature since 1901.
- Mean annual temperature is 21.8°C (1901-2016), and has increased by 1.3°C since 1960 at an average rate of 0.29°C per decade.
- The average number of hot days per year in Zambia has increased by 43 (an additional 11.8% of days) between 1960 and 2003.
- The frequency of cold days and nights has decreased since 1960 in all seasons and the average number of cold days per year has decreased by 22 (6% of days) between 1960 and 2003.
- Mean annual rainfall over Zambia has decreased by an average rate of 1.9 mm per month (2.3%) per decade since 1960 (World Bank, 2020).

Fig 2. Temperature change in Zambia, 1901-2019



Source: Berkley Earth/#ShowYourStripes

Future climate

- Mean annual temperature is expected to rise by 2°C between 2040-2059, and a further 1.2-3.4°C by 2060.
- Hot days are expected to increase by 15-29%, while hot nights by 26-54% in the same period.
- Projections of mean rainfall do not indicate large changes in annual rainfall. Seasonally, the range of projections from different models is large, but ensemble indicates decreases in September-November and increases in December-February rainfall respectively.
- The proportion of rainfall from heavy events is expected to increase (World Bank, 2020).

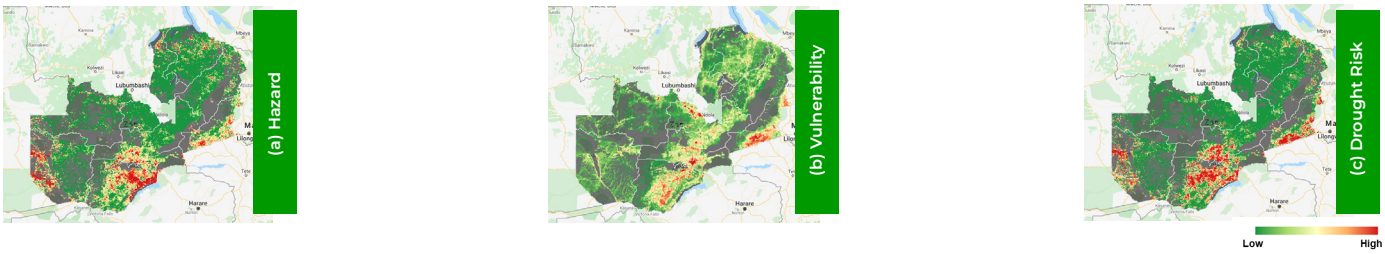
Table 1. Major droughts in Zambia (Source: EM-DAT, 2020)

Year	Location	Affected Population
1981	South, west and central	No data*
1983	South, west and central	No data*
1990	No data*	1,700,000
1995	Southern, Western, Central & Eastern Lusaka Provinces	1,273,204
2005	Southern, Western provinces	1,200,000
2015-16	No data*	No data*

* No data provided from source

Vulnerability and Impact Assessment

Fig 3a-c. Drought hazard, vulnerability and risk maps for Zambia



The above maps (Fig 3a-c) depict drought hazard areas (a), areas of vulnerability (b) and drought risk (c). Drought risk is defined by characterizing hazard and exposure to vulnerability and the lack of adaptive capacity, using multisource information from satellite-derived drought indices and socio-economic conditions. In terms of components, hazard is defined through meteorological and agricultural drought i.e. Integrated Drought Severity Index (IDSI); and exposure and vulnerability expressed through population density, human modification index, water risk, and irrigated systems. Agricultural production (agricultural practices i.e. irrigated area, food production as provided on HarvestChoice) was used to define levels of vulnerability, which were combined with all three components to define levels of drought risk at the country level, referred to as the National Drought Risk Index (NDRI). The drought risk profile is therefore based on the probabilistic estimation of hazard and vulnerability to assess the drought risk in the exposed areas.

Among the drought prone areas in Zambia, the NDRI shows that the western and southern parts of the country are more vulnerable and a higher drought risk (maps generated by IWMI). Zambia has a probability of experiencing serious drought in the two regions indicated above. This is shown by the change of green to red color. However, many regions are still better off in terms of drought vulnerability and drought risk as the red color covers few regions. According to the UNDRR (2020), Zambia has implemented disaster risk reduction education programs from primary school to universities, which help raise the country's preparedness level. But preparedness plans have not been developed for the whole country, only in selected pilot sites. And this does not always sufficiently account for the needs of people with different vulnerabilities, and no regular exercises nor updates are undertaken to keep the population prepared for their efficient execution in case of a disaster. The country could benefit from complete drought hazard, vulnerability and risk mapping at the local scale for the whole territory to identify threats and potential consequences and to consolidate risk information to support preparedness plans (ibid.).

Water resources

Table 2. Water resources availability in Zambia (km3) (Source: Hamududu and Ngoma, 2020)

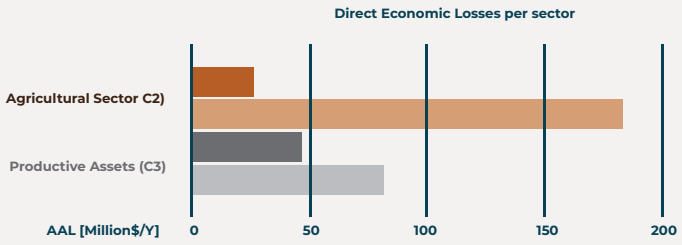
	Zambezi River, Victoria Falls	Zambezi Lower, Kariba	Kafue River, Kasaka	Luangwa River, Road Bridge	Zambezi Lower, Chirundu	Luapula River, Chembe	Chambeshi River, Pontoon	Lufubu River
Current	32.3	6.6	22.3	15	3.5	16.5	5.5	0.4
2030	30.7	6	19.6	13.5	3	16.1	5.5	0.4
2050	29.4	5.8	19.2	12.7	3	15.8	5.4	0.4
2080	28.7	5.4	18.8	12.1	2.8	15.3	5.4	0.4

In 2019, 67% of Zambia's population had access to improved water sources, an improvement from 63.5% in 2018. In terms of water sources, boreholes contributed to 50.6% of use, protected wells made up 11.5%, and piped water at 4.9% of use, with 32% of the population drawing water from unprotected wells (ZVAC, 2019). River basins are all projected to experience reduced rainfall and higher temperatures under climate change, which could increase evaporation and likely reduce river run-off. Moreover, projected high temperatures could result in heavy losses in water stored in reservoirs, further reducing the effectiveness of storage (Hamududu & Ngoma, 2020).

Droughts have adverse effects on GDP

The direct economic losses from the agricultural and productive sectors (hydropower) are estimated to be 75 million USD on average per year, and to increase to 250 million USD under projected climate conditions (projected period 2051 - 2100, considering the IPCC scenario RCP 8.5 which foresees an increase in the global temperature between 1.5°C and 4°C by 2100) (UNDRR and CIMA, 2019). The total Average Annual Loss for the agricultural sector (crops) could rise dramatically under projected climate conditions from 29 to 180 million USD per year, indicating that a substantial part of the annual crop production could be lost due to intensified droughts in the projected climate.

Fig 4. Direct economic losses per sector



Source: UNDRR and CIMA, **2019**

Drought impacts on livestock

The percentage of affected livestock is expected to rise from 39% (4 million livestock units) under present climate conditions to 54% in the future.

Currently livestock in the southern part of Zambia are most affected, however the number of livestock units affected by droughts could increase over the whole country in future (UNDRR and CIMA, 2019).

Fig 5. Annual average number of potentially affected livestock in Zambia

***Livestock is a summation of all livestock animals using FAO factors.**

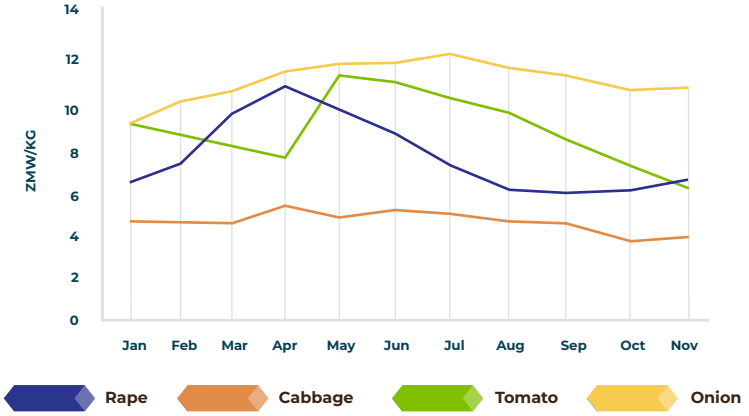
Source: UNDRR and CIMA, **2019**

Droughts drag agricultural growth

Fig. 6 shows retail price trends for rape, tomato, cabbage and onion crops for the period January to November 2019, during the time of the recent drought. The highest retail price for tomatoes was observed in May 2019. The retail price for rape sustained an upward trend from January to April.

The increase was attributed to the increase in the supply of irrigation (Mulenga, Kabisa & Chapoto (2019). Onion and cabbage prices were relatively stable, with onion prices increasing steadily from January through to July before beginning to drop slowly in August.

Fig 6. The average retail price of selected horticultural products in Lusaka in 2019



Source: Mulenga, Kabisa & Chapoto, **2019**

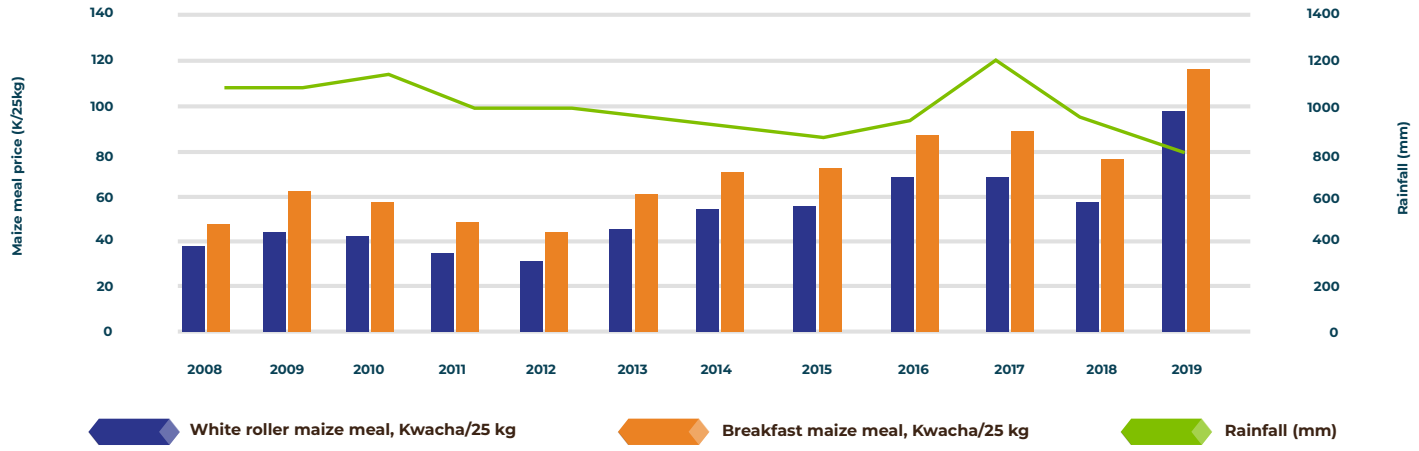
Drought impacts on hydropower

Zambia's energy mix is heavily dominated by hydropower, in the order of 95% of electricity capacity, and this is reflected in the significant pass through impacts of hydropower generation losses on productive sectors as indicated above. Compared to current climate conditions (1979-2018 period), losses in hydropower generation resulting from drought will increase by almost 50% under projected climate conditions (2051-2100) (for Mulungushi, Itezhi-Tezhi, Kafue Gorge and Kariba dams) (UNDRR and CIMA, 2019). Under current climate conditions, on average once every 5 years, a loss of about 80 million USD can be expected. Hydropower losses are estimated to increase under future climate conditions reaching at least 200 million USD losses on average once every 5 years. This is a net result of increased losses in the south (Kariba dam), and reduced losses in the other hydropower stations (ibid).

Droughts have an impact on commodity prices

Zambia has a high dependency on a few staple crops for food security, especially maize. Maize is commonly produced by smallholder farmers under rain-fed conditions which make households vulnerable to weather variability and climate change-related hazards. The prices of white roller maize meal and breakfast maize meal have increased from 2012 to 2017, partly as a result of declining rainfall. The resulting decreases in market supply triggered the increase in prices. It should also be noted that as much as the prices of breakfast maize meal are higher than the price of white roller maize meal, the prices fluctuate throughout the years of analysis.

Fig 7. Commodity prices and rainfall patterns, 2010-2019



Source: Own compilation from FAOSTAT & CHIRPS, **2020**

Vulnerability and impact assessment capacity

Although the availability of data is scarce, there exist several attempts aimed at estimating the impacts of extreme weather on household welfare, most often measured through consumption- (or income-) related variables. The Zambia Vulnerability Assessment Committee (ZVAC), a special unit under the Office of the Vice-President of Zambia and part of the Disaster Management and Mitigation Unit (DMMU), is mandated to report on food insecurity, vulnerability and hazards in a coordinated approach with several government and stakeholder institutions and organizations. ZVAC assesses the impacts arising from extreme weather events by mapping hazards, vulnerabilities and capacities within the target areas. These assessments are used to support the design of appropriate disaster management programs. Various instruments are used to generate the information required in disaster management interventions including the Rapid Vulnerability Assessment; In-depth Vulnerability Assessment; and the Comprehensive Vulnerability Assessment and Analysis (Mwitwa, 2018).

Difficulties reside in the consolidation of information on flood and drought risk, which is somewhat dispersed and therefore not optimal: historical data is not yet used efficiently, the quantification of exposure and vulnerability is not always pursued and the hazard maps that exist remain coarse (UNDRR, 2020). Key national government agencies involved in risk assessment are well identified and coordinated by DMMU. In addition to ZVAC's efforts, the role of non-government organizations in providing vulnerability assessment support is also noteworthy. The Zambia Red Cross Society (ZRCS) is responsible for the training of staff and volunteers in disaster management, conducting vulnerability and capacity assessments, and designing disaster reduction program initiatives for disaster-affected populations. In addition, inter-governmental organizations such as the Food and Agriculture Organization (FAO) have conducted ad hoc (as opposed to on-going) impact assessments on whether and how sustainable land management (SLM) practices and livelihood diversification strategies have helped moderate the impacts of drought, using a specifically designed survey called the El Niño Impact Assessment Survey (ENIAS) (Alfani et al. 2019).

Despite the commendable efforts of ZVAC and partners, there is not as yet an integrated system for collecting impact data across key sectors and agencies. Moreover, the integration of gender and social inclusion aspects in vulnerability and impact assessments has been minimal. Integrated efforts need to take into consideration the different needs of women and men, the inequalities that compound the impacts of climate change for women and the specific knowledge women and men can contribute to solutions for adaptation. There is also limited historical data to support analysis and anomaly data generation, the basis of drought analysis. Finally, multi-disciplinary and cross-sectoral institutional capacity is needed to develop local level analytical frameworks to provide appropriate risk management at the local level (Mwitwa, 2018).

Progress is, however, underway. ZVAC was involved in the 2019 disaster risk profile completed by DMMU, UNDRR and the CIMA Research Foundation, on which this drought resilience profile is heavily based. The exercise was significant in enhancing the existing disaster risk knowledge, providing a uniform understanding of risk in all its components at the national level. This has yet to be coordinated with policy and action plan developments.

Monitoring and early warning systems capacity

Table 3 represents a summarized traffic light checklist to illustrate the state of monitoring and early warning system capacity in Zambia. It summarizes key aspects needed for a strong monitoring and early warning systems framework, most notably, whether there is an official definition of drought used in country; whether drought indicators are used, and if so, which ones; whether there is a drought early warning system (DEWS) in place; and if so how functional it is; and whether the country makes use of seasonal forecasting.

Table 3. Summarized checklist of monitoring and EWS capacity

Official definition of drought	Yes
Drought indicators used	Limited
Existence of a DEWS	Limited
Capacity to tailor EWS messages to end-user needs	Limited
Effective communication of early warnings with built-in feedback mechanisms	Limited
Use of most salient communication channels to reach women/youth/disenfranchised communities	Limited
Use of community relays, extensions services, local media to communicate EWS and reach at risk communities promptly	Limited
Seasonal forecasting	Limited

Yes No Limited

The National Disaster Management Policy of 2005 defines drought as a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.).

Drought monitoring in Zambia is implemented mainly through the Zambia Meteorological Department (ZMD) in the Ministry of Transport and Communication (MTC), and the Water Resources Management Authority (WARMA) under the Ministry of Water Development, Sanitation and Environmental Protection (MWDSEP). ZMD provides monitoring and forecasting on weather and climate extremes, while WARMA is the national regulatory body for the management and development of water resources and provides hydrological monitoring and forecasts. ZMD works together with the above institutions; regional bodies (e.g., Southern Africa Development Community or SADC); international bodies (e.g., World Meteorological Organization or WMO, United Nations Framework Convention on Climate Change or IPCCC); non-governmental and international non-governmental organizations (e.g., Red Cross, Famine Early Warning System Network or FEWSNET) and other civil society organizations (e.g., Zambia National Farmers' Union or ZNFU, Caritas Zambia, Catholic Relief Services or CRS); United Nations System in Zambia (e.g., World Food Program or WFP, United Nations Development Program, UNDP); Academic/Research institutions (e.g., University of Zambia or UNZA, Copperbelt University or CBU, Mulungushi University or MU); Cooperating Partners (e.g., World Bank, African Development Bank, GIZ); and the public.

ZMD, while well-established, is constrained by infrastructural challenges, and has limited operational capabilities to provide monitoring and forecasting on weather- and climate-related occurrences. Through ongoing international partnerships these capabilities will be enhanced in the next two years. Similarly, the hydro-meteorological stations remain insufficient for the entire country, with 126 stations and 86 automatic stations. There are plans, subject to funding, to expand the number of stations in place, which will greatly improve forecasting abilities and the accuracy of early warnings. While hydro-meteorological data is computed with up-to-date technologies and models, hydrological forecasting still requires development for the forecasting of reliable data.

In summary, Zambia has an established institutional base for monitoring and forecasting, and ongoing initiatives in existence to expand the monitoring network. Drought-specific EWS can however be improved. For the dissemination of drought-related warnings, Zambia uses many different types of media, however, that information is not verified whether warnings have reached the target population, and work is required to identify ways of ensuring the greatest coverage. DMMU acts as a coordinator, but there are no standard operating procedures for the uniform codification of warnings, nor for the sharing of information from the national to the local level (UNDRR, 2020).

Using a Combined Drought Indicator (CDI) approach, the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln, in partnership with the World Bank, has developed a Drought Monitor that represents a consolidation of indices and indicators into one comprehensive drought map.

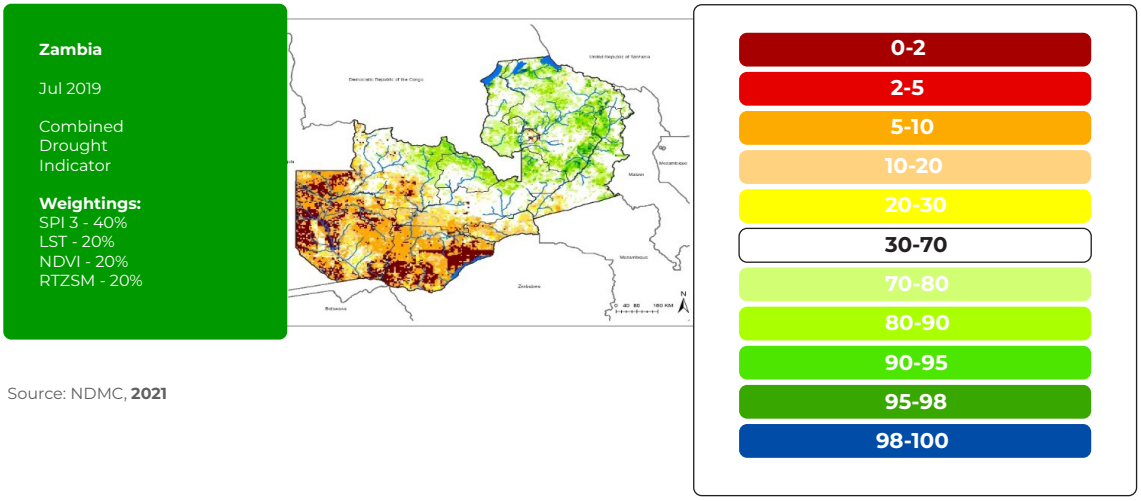
The CDI map for Zambia was created using a weighted combination of four indicators of drought: precipitation, vegetation stress, land-surface temperature and soil moisture. July 2019 was selected to depict the severity of the recent 2018/19 drought. July, being the peak of the dry season when less rain is expected, provides an indication of the drought's magnitude (duration and intensity), spatial extent, probability of occurrence and impacts. The July 2019 CDI map shows much of the country moderately impacted by some degree of drought.

Without an effective drought monitoring and early warning system to deliver timely information for early action, such as the CDI, effective impact assessment procedures, proactive risk management measures, preparedness plans aimed at increasing the coping capacity and effective emergency response programs directed at reducing the impacts of drought, the country will continue to respond to drought in a reactive, crisis management mode.

Monitoring and Early Warning Systems

Combined Drought Indicator (CDI)

Fig 8. Combined Drought Indicator for Zambia, July 2019



Source: NDMC, **2021**

Mitigation, Preparedness and Response

Drought policy framework

Zambia has designed an effective response to drought. However, the country has no drought plan or drought policy, to strategically facilitate drought management in Zambia.

Table 4. Policy interventions and timelines

National Policy on Environment (2009)
National Contingency Plan (2009/10)
Disaster Management Act (2010)
Zambia Climate Change Response strategy (2010)
International Strategy for Disaster Reduction of 2000 (ISDR)
National Disaster Management Policy (2015)
National Climate Change Policy (2016)
National Meteorology Policy
National water policy
International Decade for Natural Disaster Reduction (IDNDR)
The 7th National Development Plan SNDP, 2017-2021

The key policy document, the National Disaster Management Policy of 2015, together with National Disaster Management Act n. 13/2010, reflects a national system aiming for an integrated risk management system that encompasses prevention, preparedness and response all the while taking into account climate change and decentralizing competences in the domain of civil and environmental protection.

The broader institutional structure is made up of the UN, Government, NGOs, both local and international, and Faith Based Organizations (FBOs). It also gives the DMMU, which is the secretariat of this structure, some authority to take to task all institutions that do not comply with the Disaster Risk Reduction (DRR) framework.

The Disaster Management Policy outlines the roles and responsibilities of districts and communities. It is also through this policy that the District Disaster Management Committees (DDMCs) were formed. Zambia's legislation also provides for the performance of some elements of DRR by Councils. This mainly refers to the Fire and Rescue Services. Specific but limited provisions are made in the budget for the delivery of these functions. DMMU also coordinates with all relevant line Ministries and UN agencies to prepare a Contingency Plan that ensures preparedness. This will need to be linked to other operational EWS.

In 2009, the Zambian Cabinet approved a decentralization policy and implementation framework which permits devolution of DRR to Councils and Communities to provide an effective first line of risk reduction and mitigation at the local level. This process involves organizational restricting as well as restructuring of financing systems at a large scale.

Zambia could work towards better articulating drought needs within these DRR frameworks. With the continued increase in the number of incidences and increased vulnerability to drought, greater attention could be placed on reducing risks associated with the occurrence of drought through planning, but also to improve operational capabilities (e.g. climate and water supply monitoring, building institutional capacity) and mitigation measures that are aimed at reducing drought impacts.

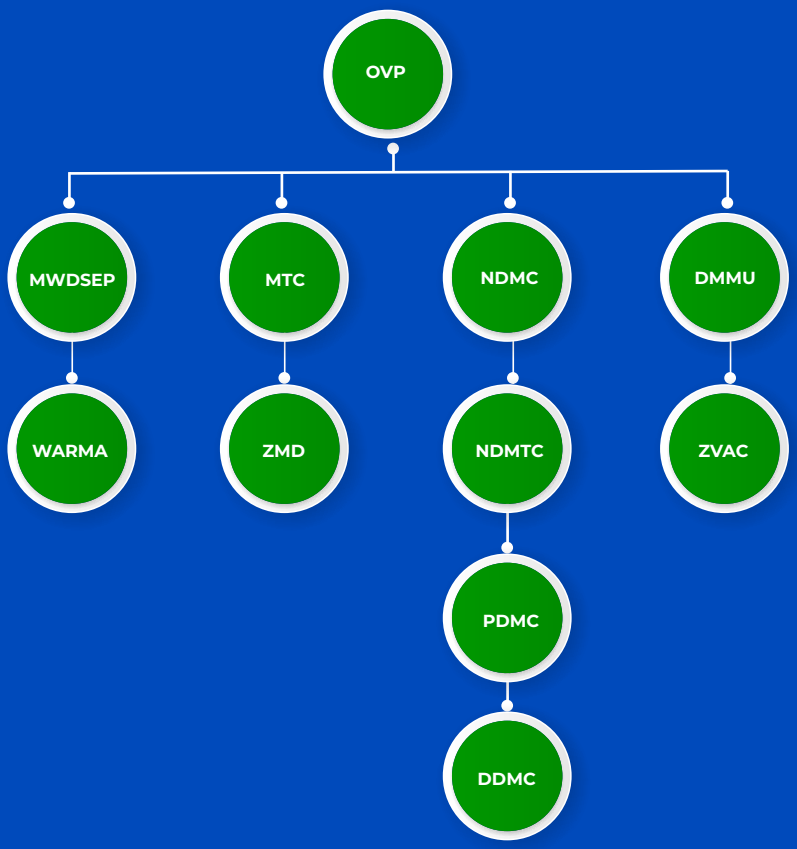
Institutions and coordination

There are three primary organizations in Zambia that concentrate on disaster management including drought mitigation, preparedness and response, namely: the National Disaster Management Council (NDMC), National Disaster Management Technical Committee (NDMTC) and the Disaster Management and Mitigation Unit (DMMU). The NDMC is responsible for policy, the NDMTC for technical advice and the DMMU for the implementation of programs related to climate change. Further, the DMMU provides coordination between the institutions involved in disaster management and key sectoral ministries (Health, Agriculture, Energy and Water) and sits under the Office of the Vice-President.

In addition, there are several sub-national structures that exist to ensure that drought management cascades to other sectors and levels of governance. The NDMTC has several sub-committees (e.g. health, finance, agriculture, security, infrastructure etc.) to assist DMMU with technical inputs in order to improve co-ordination, programme planning and implementation. The Provincial Disaster Management Committee (PDMC) is a forum for disaster prevention, preparedness and mitigation activities in the province and an essential link between national objectives and local priorities.

The District Disaster Management Committee (DDMC) is responsible for dealing with the impact of a disasters and coordinates operations of disaster preparedness, prevention and mitigation at the district level. It is a sub-committee of the District Development Coordinating Committee. Finally, the Satellite Disaster Management Committee (SDMC) is the Officer in Charge of the overall administration of the district which ensures that each village or cluster of villages within each chiefdom has a permanently established Satellite Disaster Management Committee.

Fig 9. Zambia's drought institutional framework



Legend
DDMC- District Disaster Management Committee
DMMU- Disaster Management and Mitigation Unit
MTC - Ministry of Transport and Communication
MWDSEP - Ministry of Water Development, Sanitation
and Environmental Protection
NDMTC- National Disaster Management Technical Committee
OVP - Office of the Vice-President
PDMC- Provincial Disaster Management Committee
WARMA - Water Resources Management Authority
ZMD- Zambia Meteorological Department
ZVAC- Zambia Vulnerability Assessment Committee

Zambia has made significant efforts in drought management by creating response mechanisms to strengthen its mitigation, preparedness, and resilience. In terms of preparedness, the country has created platforms where various sectors such as agriculture, education, health, water and security meet regularly to develop integrated plans that address disaster risk. The ZVAC and the annual forecasting assessments determine the seasonal outlook and put in place appropriate strategies that respond to the anticipated climatic conditions.

The Government is also increasingly exploring and promoting the use of financial instruments such as weather-indexed insurance, carbon instruments and catastrophic bonds to enhance resilience and cover climate-related risks; promoting the adoption of appropriate climate smart agricultural (CSA) technologies for different agro-ecological zones; promoting landscape-based livelihood diversification; promoting monitoring and management of wildlife habitats; establishing and strengthening mechanisms for monitoring networks and information systems for improved utilization of climatic data and information; promoting climate change-related public health plans and interventions; promoting communities' ability to develop physical and social infrastructures that are resilient to the adverse effects of climate change; and promoting the protection of water catchment areas, including the development of environmentally friendly infrastructure for bulk water transfer (water ways) and storage, management and utilization of water resources. These have yet to bring the impact possible and show a way forward.

Institutions and coordination

In terms of response, drought declaration signifies the beginning of Government's response to a drought situation. Drought declaration should be a timely step so that relief assistance and other concessions can be provided to the people affected by drought at the right time. It is worth noting that drought declaration is only explicitly stated in the Water Resources Management Act 2011, Section 146 whereas in the Disaster Management Act, it is covered under 'disasters'. There has been little coordination to date between the two responsible institutions (WARMA through MWDSEP and DMMU under OVP) to harmonize the Acts and to detail the required collaboration leading to the declaration by the President of a national disaster due to general drought or an emergency due to drought by the Minister when it comes to drought in the case of the Water Resources Management Act (Mwitwa, 2018). Moreover, Disaster Management Plans, which are supposed to deliver on response measures, have yet to be developed and implemented successfully (ibid.). Few Disaster Preparedness Plans have been developed in some districts but never fully implemented.

Food distribution is the most common type of assistance provided by the Government of Zambia in times of humanitarian emergencies including droughts. A social cash transfer program also exists which assists the most vulnerable individuals implemented by the Ministry of Community Development. Through these interventions, the Government aims to save the lives of people and improve the food security of those impacted by emergencies and acute hunger. Food distribution helps to meet immediate food needs, and to facilitate recovery of livelihoods of people affected by a disaster.

In terms of the policy framework, Zambia has made efforts to develop a National Drought Plan which is intended to contribute to the protection of Zambia's land from over-use and drought in order to provide the required ecosystem services. This has yet to be operationalized fully and translated into an implementable and resourced Drought Policy and/or Act. Sector-specific policies for water and agriculture, the most impacted sectors, still need to be reviewed and improved, to enable more proactive planning on the part of responsible structures, but also bring the relief and mitigation needed. The Government of Zambia relief packages are still limited by available resources. In this regard, organizations such as the World Bank have supported Government in revising its Food Reserve Strategy, and support the enhancement of climate-smart agricultural investment plans.

As drought-specific legislative development receives greater focus, the readiness of existing bodies to supervise and coordinate the national drought policy development process and implementation is important. The coordination of key stakeholder institutions needs to be enhanced. This coordination role is given to DMMU but could do with further strengthening to coordinate various proactive efforts. For successful implementation of mitigation and disaster risk reduction measures, DMMU will require strengthening in coordinating and harnessing financial and human resources from various stakeholder institutions involved in disaster risk-reduction and mitigation of water related disasters such as drought.

Mitigation efforts are still limited, and local/project based; however, Zambia has developed a multi- hazard national contingency plan (CP). The CP has measures in place for individual sectors which are planned before, during and after the disasters. The country also has some mitigation measures which include provision of drought resistance of tolerant crop varieties for the staple crop, winter cropping, conservation farming and others. These need to be further developed to support the broader nature of drought impacts.

Given the impacts of climate change and variability that include drought, it is, therefore, imperative that Zambia strengthens its capacity to achieve drought resilience at the national level. This drought-resilience capacity should include drought preparedness, national and regional (provincial) efforts to reduce drought vulnerability and risk and boost the resilience of people and ecosystems to drought.

Recent drought resilience efforts by the international community

Table 5. Selected projects focused on drought, or some aspect of it, in Zambia.

World Bank

Accelerating the impact of the CGIAR's climate research in Africa organizations
Budget (USD): 60M
Time Period: 2021-2023

Irrigation Development Support Project - Additional Financing
Budget (USD): 30M
Time Period: 2020-ongoing

Transforming Landscapes for Resilience and Development in Zambia
Budget (USD): 100M
Time Period: 2019-2025

Additional Financing for Zambia Strengthening Climate Resilience (PPCR Phase II)
Budget (USD): 14.6M
Time Period: 2018-2022

European Commission

Humanitarian aid package of €22.8 million to help address emergency food needs and support vulnerable people in Eswatini, Lesotho, Madagascar, Zambia and Zimbabwe.
Budget (USD): 27.7M
Time Period: 2019

SCIAF

SCIAF through Scottish Government-funded programmes targeting 300 000 people with food aid and water source construction to mitigate the impact of the drought
Budget (USD): 70,589
Time Period: 2019

Climate Investment Fund/ World Bank

Strengthening Climate Resilience (PPCR Phase II) Project
Budget (USD): 36M
Time Period: 2013-2019

UNDP

United Nations Joint Program on Climate Change and Disaster Risk Reduction
Budget (USD): 20M
Time Period: 2012-2015

USAID

Famine Early Warning Systems Network – Zambia Program
Budget (USD): Unknown
Time Period: -2017

GIZ

Integrating Climate Change in Water Resources Monitoring and Planning
Budget (USD): 3.3M
Time Period: 2012-2017

Catholic Relief Services

Mawa: Zambia Economic Resilience for Improved Food Security (ZERS)
Budget (USD): 10M
Time Period: 2012-2017

UN OCHA

Central Emergency Response Fund support in 2019-2020
Budget (USD): 8M
Time Period: 2019-2020

References and data sources

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3. Alfani, F., Arslan, A., McCarthy, N., Cavatassi, R. & Sitko, N. (2019). Climate-change vulnerability in rural Zambia: the impact of an El Niño-induced shock on income and productivity. FAO Agricultural Development Economics Working Paper 19-02. Rome, FAO. pp. 41. Licence: CC BY-NC-SA 3.0 IGO.
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11. UNDRR (2020). Road Map for Improving the Availability, Access and Use of Disaster Risk Information for Early Warning and Early Action, including in the Context of Transboundary Risk Management.
12. UNDRR and CIMA (2019). Zambia Disaster Risk Profile. Nairobi: UNDRR and CIMA Research Foundation.
13. World Bank (2020). Zambia. Climate Change Knowledge Portal. https://climateknowledgeportal.worldbank.org/country/zambia/climate-data-historical

Data Sources:
Climate Data: CHIRPS
Drought Risk : International Water Management Institute (IWMI)
CDI: National Drought Mitigation Center at the University of Nebraska-Lincoln
Population Data: WorldPop
Livestock, GDP: FAO, World Bank

About the Southern Africa Drought Resilience Initiative (SADRI)

SADRI is a World Bank initiative supported by the Cooperation in International Waters in Africa Program (CIWA) that integrates across the energy-water-food-environment nexus to help lay the foundations for making southern African countries more resilient to the multi-sectoral impacts of drought. Its main objectives are to generate tools and dialogue for enhancing partnerships and capacity across Member States and to inform future national and regional investments in drought-related activities.