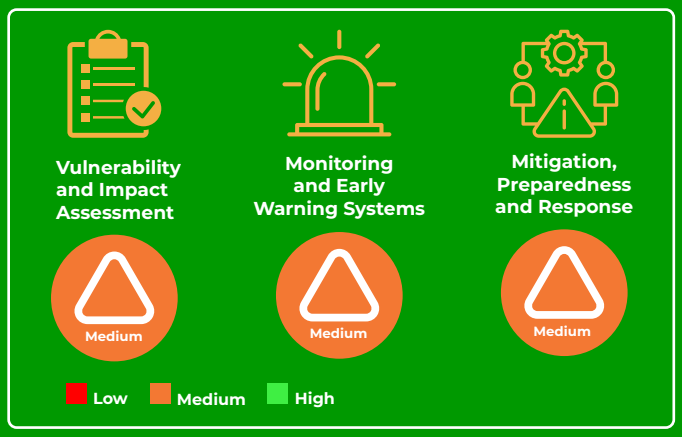
COUNTRY OVERVIEW

Frequent and severe droughts are a regular occurrence in Tanzania, with the country having experienced six major droughts over the past 30 years. Increasingly unpredictable rainfall, shifting agro-ecological zones and increased dry periods could reduce production of certain crops while boosting production of other crops. Overall, a 5°C increase in temperature in East Africa may lead to a production decline of nearly 20% of overall agricultural production. On average, almost 4.8 million people are estimated to be directly affected by drought per year. Some districts in Tabora and Shinyanga regions are a hotspot. The situation could worsen under projected climate conditions, where 12 million people are estimated to be directly affected. Drought risk is also projected to decrease in the western tropical savanna areas, but increase in the northern arid areas and the southern parts of the country. Impacts on water resources are expected to include changes in runoff in river basins, leading to changes in downstream water availability and timing, water pollution and disturbances of stream ecosystems. Hydropower production is projected to decrease, mainly due to increased evaporation, with negative impacts on industry. Average annual economic losses in agriculture due to drought are estimated at around 140 million USD under current climate conditions. These would more than double under projected climate conditions, if no adaptation measures were implemented.



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

This profile provides an overview of Tanzania's drought resilience capacity in the three pillars. Tanzania's vulnerability and impact assessment capacity is similarly characterized as medium. Risk knowledge, in a quantitative sense, is not fully considered in preparedness actions and in the preparation of emergency plans and therefore it is recommended to consider this quantitative aspect when developing emergency plans.

Warning messages are only loosely connected with impact scenario descriptions, which results in actions recommended to the population being too general. A closer connection between the severity of the forecasted event, its impact and the actions recommended at different levels, from the civil protection system to the population should be sought.

Tanzania's monitoring and EWS capacity is categorized as medium. There are well established roles and responsibilities, and a good knowledge of the main weather-related hazards in the country.

Authorities are well trusted and they recognize the crucial value of the 'last-mile connectivity' in warning communication. Warning messages are clearly linked to response actions with increasing detail as they move to local level, but there is need for a more integrated drought monitor and EWS that links with contingency plans (which are also lacking).

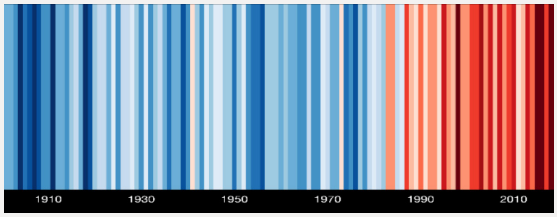
In terms of mitigation, preparedness and response capacity, the country is similarly classified as medium. Initiatives have been established to strengthen the coordination between different institutions involved in drought response and in data exchange during emergencies. However, such initiatives only reached a certain level of implementation and should be continued to consolidate a sustainable result.

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.

Historical climate

- The #ShowYourStripes 'warming stripe' graphic for Tanzania in Fig. 1 turns from blue to red in more recent years, depicting the increase in average temperature since 1901.
- The average annual precipitation for Tanzania is slightly above 1000mm, while the mean number of wet days is 128.
- Average daily temperatures range between 10°C during the cold season (May-August), and 20°C during the hot season (October-March).
- An analysis of climate data from 1970 to 2015 shows an average temperature rise of around 1°C. Trends for precipitation are varied.
- Average annual temperature is 21.56°C (1901-2016) and the mean annual rainfall is 396.19mm (1901-2016) (UNDRR and CIMA, 2018).

Fig 1. Temperature change in Tanzania, 1901-2019



Source: Berkley Earth/#ShowYourStripes

Future climate

- Temperature projections estimate an increase between 2.2°C and 3°C from 2050-2074 and 3°C and 4.5°C from 2071-2095, with the greatest warming likely to take place in the west/southwest.
- Future climate predictions also anticipate an increase in the duration of heat waves (by 7–22 days) and dry spells (by up to 7 days).
- There will also be a likely increase in average annual rainfall (range of -3% to +9%), with the greatest increase in the northeast.
- The impacts of floods with a medium likelihood of occurrence (return period of 50 years) are expected to increase by more than 50% under projected climate conditions (UNDRR and CIMA, 2018).

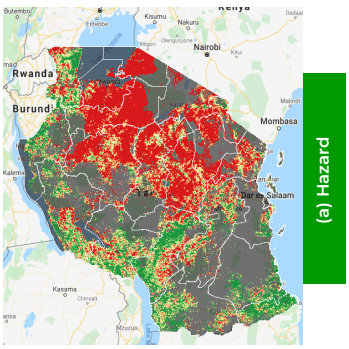
Table 1. Major droughts in Tanzania (Source: EM-DAT, 2020)

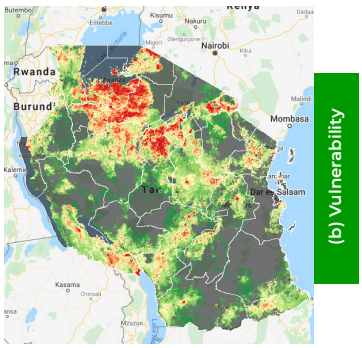
Year	Location	Affected Population
1984	No data*	1.9 million
1988	Lindi region	110,000
1990	Central and Northern regions	800,000
1996	Lake Victoria, North east, Coastal region	3 million
2003	Kaskazini Unguja, Mjini Magharibi, Kusini Unguja, Singida, Dodoma, Shiyanga, Mwanaz, Tabora, Kagera, Kigoma provinces	1.9 million
2004	Arusha, Kilimanjaro, Manyara, Tanga provinces (Northern Highlands region), Pwani, Dar es Salaam provinces (Northern Coast region)	254,000
2006	Arusha, Manyara, Kilimanjaro provinces	3.7 million
2011	Ngorongoro district (Arusha province), Simanjiro district (Manyara province), Same, Rombo, Mwanga districts (Kilimanjaro province)	1 million

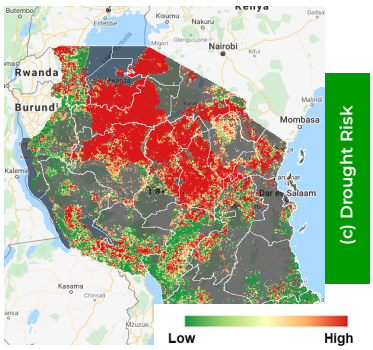
* No data provided from source

Vulnerability and Impact Assessment

Fig 2a-c. Drought hazard, vulnerability and risk maps for Tanzania







Vulnerability and Impact Assessment

The above maps (Fig 2a-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.

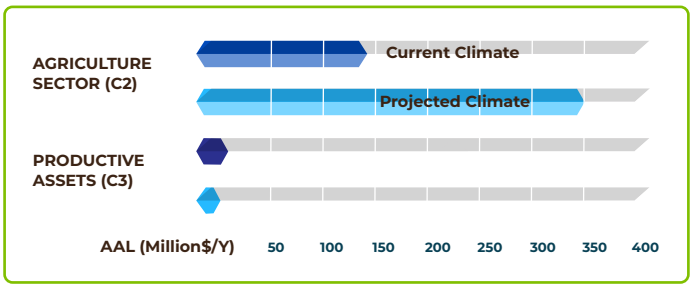
Agricultural production (agricultural practices i.e. irrigated area, food production as provided on HarvestChoice) was used to define levels of vulnerability, which were combined with all three components to define levels of drought risk at the country level, referred to as the National Drought Risk 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 Tanzania, the NDRI indicates that the northern and central portion (Arusha, Manyara, Shinyanga, Simiyu and Dodoma) of the country are more exposed to drought and more at risk (maps generated by IWMI). In addition, Tanzania is likely to experience severe drought, and exposure to the risk of drought, as shown by the change of color from green to red in Fig 3a-c. The red color shows more vulnerable and high drought risk. The probability of severe droughts is expected to increase in areas around Hanang, Bukoba, Babati, Lindi, Misseny and Mpwapwa, while the areas around Kaliua and Kakongo might become less drought-prone. While rainfall will increase with climate change, this increase in drought risk can be assigned to higher temperatures and larger rainfall variability in a projected climate, and to the close link between drought disasters and effective rainfall deficits in Tanzania (UNDRR and CIMA, 2019).

Droughts have adverse on effects population and GDP

In Tanzania, an average of 4.8 million people per year are estimated to be directly affected by drought under current climate conditions (for the period 1979-2018). The number of affected people is expected to increase to 7.8 million 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) (CIMA & UNDRR, 2019). Currently, direct economic crop losses are quite modest in the south of Tanzania (less than 4 million USD per year), moderate in the central part (between 4 and 7 million USD per year), but higher in the north-west and central-east. In these regions' six districts' losses are over 7 million USD per year, which together amount to at least one third of the total loss. As Fig. 3 suggests, under current and projected climate conditions, a significant part of the annual crop production is lost due to droughts. The Average Annual Loss (direct economic loss from crops) is projected to increase from 140 million USD per year to 350 million USD per year. This represents respectively 2.4% and 6% of the average Gross Production Value of the country (UNDRR and CIMA, 2019).

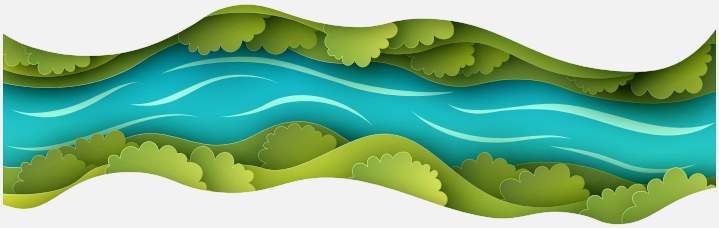
Fig 3. Direct economic losses per sector



Source: UNDRR and CIMA, **2019**

Water resources

Tanzania has relatively abundant water resources (96 km2 per year renewable), but also large areas of arid and semi-arid land (up to 50 % of the country), and relatively high, but seasonal, rainfall. Most households in rural areas rely on groundwater from communal boreholes for water supply, and many piped urban supplies depend on groundwater. Despite its numerous water bodies, Tanzania faces water shortages in many areas, with an uneven distribution of available water.



Increased temperatures, longer dry spells and heavy rainfall events will have an impact on Tanzania's nine major river basins and the continent's three largest lakes (Victoria, Tanganyika and Nyasa) (USAID, 2018). While future river flows will be influenced by non-climate factors such as changes in land use, climate projections indicate increased runoff for the Pangani and Rufiji basins, which will increase the risk of flooding and sedimentation, and decreased runoff for Wami/Ruvu basin, which will increase water stress in Dar es Salaam, Morogoro, Kibaha and Dodoma (affecting 6 million people) (ibid.)

Droughts impact on livestock

The number of drought-affected livestock (i.e. animals living in areas hit by droughts) under current climate conditions, amounts to 11 million units (21 %) (CIMA & UNDRR, 2019). Livestock units are calculated as the sum of all animals in a certain place, weighed by the water and food needs of the animals following FAO conversion factors. Under projected climate conditions, the number of drought-affected livestock in Tanzania is anticipated to increase to more than 38 % of the total livestock population.

Fig 4. Potentially affected livestock

	Current Climate (1979-2018	Projected Climate (2051-2100
Million Unit/Y	11	21.0
%	20.1	38.2

Source: UNDRR and CIMA, **2019**

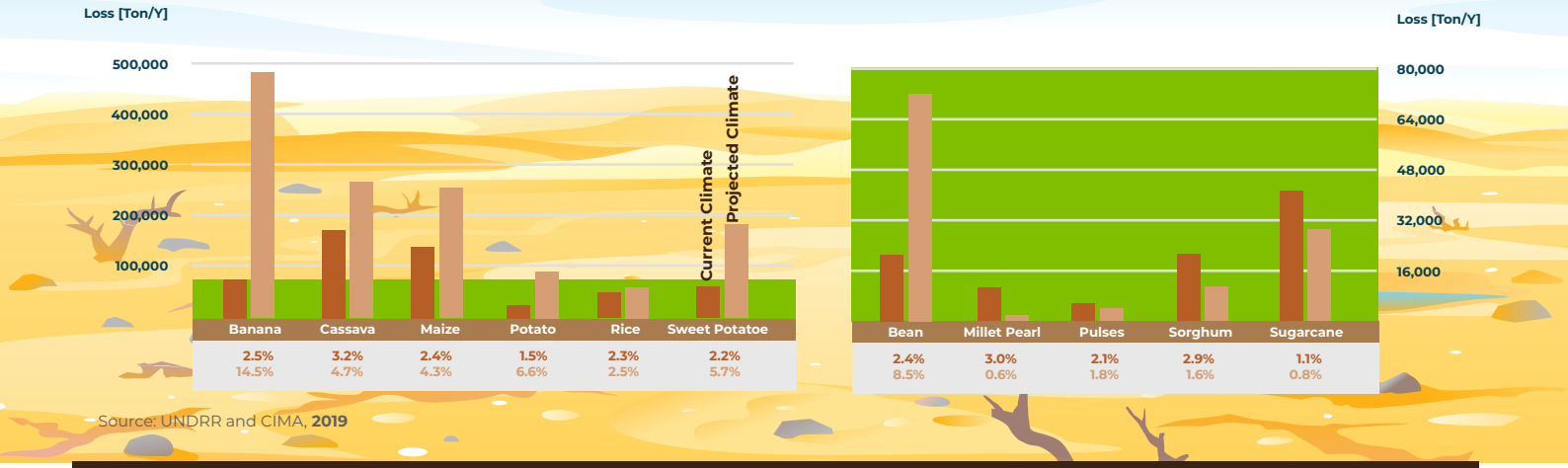
Energy resources

About 40% of Tanzania's limited electricity supply comes from hydropower, which is vulnerable to increasing evaporation, siltation from heavy rainfall events and longer dry spells. A prolonged dry spell in October 2015, for example, led to a near cessation of hydropower production across the country (USAID, 2018). Under current climate conditions, on average once every 5 years, a loss of 15.6 million USD can be expected. However, in future, hydropower losses are projected to decrease as a result of the decrease of annual losses for all dams (UNDRR and CIMA, 2019).

Droughts drag macro-level agricultural growth

The agricultural sector makes up about 25% of GDP and employs 75–80% of Tanzanians. About 80% of agricultural production comes from rain-fed, low-input smallholder farms highly vulnerable to weather variability. One third of crop land (4 million hectares) is devoted to maize, which accounts for 40% of caloric intake nationally (USAID, 2018). Fig 5 illustrates crop production losses induced by drought conditions for eleven different crops in the country. Under projected climate conditions, production losses are estimated to rise for most crops (they are notably large for bananas, cassava, maize, sweet potatoes and beans), due to the intensification of droughts compared to the current climate.

Fig 5. Agricultural production losses



Source: UNDRR and CIMA, **2019**

Vulnerability and impact assessment capacity

Since the 2000s, Tanzania has had a disaster management communications system installed to assist in information collection and dissemination, and a range of basic and applied research has been undertaken over the years at Tanzanian universities to improve understanding of hazards (UNISDR, 2010). A disaster risk and capacity needs assessment report was finalized in 2008 in cooperation with local government authorities and partners, in which capacity gaps were identified and a capacity-building program proposed. Risk assessments for development plans and programs have also been conducted, and different sectors have specific vulnerability assessments available to all partners.

Despite these progressive steps, a few gaps remain that, if addressed, could contribute to the improvement of Tanzania's drought vulnerability and impact assessment capabilities. For example, no formal centralized system for drought data is in place across the country. In addition, in the identification of exposure, vulnerability and capacity, quantitative assessments are not systematic (UNDRR, 2020). The risk information developed by organizations working in the country is also not yet sufficiently consolidated and incorporated into the EWS. The incorporation that does occur is rarely expressed in quantitative terms.

Tanzania has developed a clear identification of roles and responsibilities of different institutions and has established policies mandating risk assessment. Archives of historical data related to flood and droughts, as well as for other hazards, are being updated and plans to incorporate them into risk maps exist. This is clearly reflected in the newly developed national DRR strategy under adoption. The country should also consider completing drought hazard, vulnerability and risk mapping for the whole territory to identify threats and potential consequences, and consolidate risk information to support preparedness plans. The institution responsible for this task is the Disaster Management Department in the Prime Minister's Office (PMO-DMD), which coordinates the disaster management efforts of all other institutions and provides scientific and technical support to the risk assessment process.

Vulnerability and Impact Assessment

Tanzania has also put in place a Climate-Smart Agriculture (CSA) program 2015-2025, which focuses on improving productivity and income by building resilience, integrating value chains, promoting research for development and innovations as well as improving agricultural advisory services. The Tanzania Climate Smart Alliance (TCSAA) represents a promising opportunity for improved coordination, dialogue and information sharing on CSA. However, all this requires financial and technical support for effective implementation (IrishAid, 2018).

The Tanzania National Multi-sectoral Nutrition Action Plan (NMNAP) 2016 -2021 has a focus on addressing drought vulnerability, though the activities are not very explicit. Under the nutrition sensitive outcome results, there is a focus on increasing coverage of nutrition-sensitive interventions from key development sectors. One of the outputs is to ensure vulnerable communities are able to cope with drought and climate change to avoid a shortage of nutritious food during shocks. The plan recommends implementation of concrete adaptation measures to reduce vulnerability of livelihoods and the economy, and developing a nutrition contingency plan to address nutrition needs of affected populations. It should however be noted that updated information on the status of food security and nutrition in Tanzania is scarce, and existing reports rely on data collected in 2003, which is micro-data based on vulnerability assessments. This reiterates the need for strengthening national information systems in order to improve decision-making on targeted economic, development and agricultural investments.

Tanzania has expressed a commitment to reduce the number of people potentially affected by floods and droughts by at least 50% in alignment with the Sendai Framework and the SDG targets. However, to accomplish that target, a solid National DRR Strategy needs to be put in place that enhances the understanding of disaster risk by identifying and mapping areas that have a high exposure, thus enabling the prioritization of DRR investments.

Risk knowledge, in its quantitative aspect, is not fully considered in the preparedness actions and in the preparation of emergency plans and therefore, it is recommended to consider this quantitative aspect when developing emergency plans. Warning messages are only loosely connected with impact scenario descriptions, which results in actions recommended to the population being too general. Finally, a closer connection between the severity of the forecasted event, its impact and the actions recommended at different levels, from the civil protection system, down to the population should be sought. The available risk knowledge is sparse and insufficiently consolidated to support preparedness and warning activities, and its dissemination could be improved.

Monitoring and Early Warning Systems

Monitoring and early warning systems capacity

A summarized traffic light checklist illustrates the state of monitoring and early warning system capacity in Tanzania (Table 2). It summarises 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 2. 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	No
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	Yes

Yes No Limited

After an assessment on the drought condition by the government, in cooperation with partners and NGOs, the government through the President or the office of the Prime Minister will declare drought or a state of emergency as a result of drought.

The Tanzania Meteorological Agency (TMA) is a government agency responsible for the provision of meteorological services: weather forecasts, climate services and warnings and advisories' information for the country. TMA is currently operating under the Ministry of Works (MoW), Transport and Communications. The agency participates in the activities of and receives information from international organizations and programs, in particular the World Meteorological Organization (WMO), World Weather Watch (WWW), International Civil Aviation Organization (ICAO) and the Global Climate Observing System (GCOS), for seasonal El Niño forecasts and climate change projections for coming decades (IrishAid, 2018). TMA issues extreme weather warnings and advisories, and these alerts are issued for the attention of both the general public and/or other key sectors. Short-range weather forecasts covering the next 24 to 48 hours, and medium-range forecasts that extend up to 10 days ahead are also issued. They contain information on temperature, precipitation and wind speeds. These are broadcast through television, radio, the TMA website (www.meteo.go.tz/) and via mobile phone alerts. Users are most familiar with these short- and medium-range forecasts. The bulletins target the agricultural sector with additional interpretation on observed agro-meteorological and hydrological conditions. Much of the information about potential drought risks and impacts comes from targeted research carried out by universities, in particular Sokoine University of Agriculture, and the University of Dar es Salaam (ibid. 2018).

Weather information is disseminated through official channels including the Prime Minister's office, which in turn disseminates it to the regional and district levels. Different sectors have specific uses for this information, such as the energy sector, which requires the forecasts to manage dam releases for optimal hydropower generation. The district governments build the seasonal forecasts into their plans and the agriculture sector uses advisories to provide farmers with information for planning and decision-making on farming activities.

Tanzania's major strengths in EWS are in disaster risk knowledge and in warning communication and dissemination. In this component in particular, the institutional framework is very detailed and well established. Procedures extend down to the very local level, are extremely functional, and are well established, however, more investment is needed to ensure timely warnings are issued that are understandable to diverse communities. Drought monitoring and forecasting, are the areas where the country needs the most investment of resources, but here too, initiatives are underway, such as to increase institutional collaboration in the monitoring network and in forecasting (UNDRR, 2020).

Additionally, Tanzania has several other challenges with regard to EWS and hydro-met capacity: i) insufficient meteorological and hydrological observing stations to adequately and accurately monitor the current state of the climate and hydrology, and a deterioration of existing infrastructure over time due to inadequate financial resources for either appropriate levels of maintenance or for replacement and expansion of the capital stock of equipment; ii) un-coordinated operation, maintenance and use of the hydro-climate monitoring system and information; and iii) policy and institutional weaknesses in the mechanisms governing disaster management. Several projects, including a recently completed UNDP project, attempted to upgrade the hydrological and climate monitoring network, and address earlier challenges in transmitting early warning and long-term climate information to end users.

In terms of the timely dissemination of seasonal forecast information, district governments interviewed by Uncertainty Reduction in Models for Understanding Development (UMFULA), noted that whilst they regard this information as useful, they struggle to include it because they have already prepared their plans and activities for the season. While seasonal forecasts and climate change projections are produced by TMA, they are not distributed automatically – instead they must be requested.

Also, accuracy and reliability is low due to infrastructure and dissemination time lags, which sometimes distorts messages affecting trust from the users. Tanzania comprises eight distinct climate zones, and their differences are currently not well represented in climate models. This introduces a great deal of uncertainty in the results. Since the country does not have many weather stations, the lack of data makes it hard to refine these models. Besides the districts, seasonal forecasts are not spread as widely as the daily and 10-day forecasts.

Related to this, granularity (spatial and temporal) of weather information is crucial, as it becomes an input into key drought resilience and social safety net considerations. This implies that integration of drought risk into decision-making processes should be underpinned by improved hydromet data collection and capacity to deliver relevant drought information services. There is currently limited capacity and resources to collect reliable weather data in the country. In addition, there is a need to fill spatial and temporal gaps in climate data that is needed for verifiable drought scenario modeling at sub-national /community levels. Therefore, a key recommendation is for Tanzania to continue supporting investments for upgrading and providing critically needed new equipment, systems, as well as operator training for data collection and processing for improved hydro-meteorological and agro-meteorological forecasts, in order to ultimately enhance the availability and reliability of data for drought scenario modelling risk analysis and warning systems, and knowledge sharing.

Data quality assurance should be an institutional performance target of the key agencies involved in drought monitoring and management. For example, non-telemetered data need to be examined by office staff for consistency, and telemetered data need to be passed through a checking program to identify potential problems with data or sensors.

Finally, there is a need to move beyond merely sharing drought information and spreading awareness with target communities, and focus on influencing changes in attitudes and promoting specific behavioral practices amongst targeted groups to adopt practical means of coping with drought.

Also, Tanzania is large, with highly remote areas that are difficult to access for a weather service that has logistical and resource challenges. Efforts are in place to install more automatic stations that send the information to a central point, but transporting these into the field and then making them operational, as well as ensuring they are effectively maintained, is expensive.
Another challenge is interpreting information and knowing what it means for planning in the different sectors. Those involved in planning and decision-making in different departments are not used to including long-term climate information in their planning. Finally, more informal EWS exist in terms of communities' knowledge and experience in observing and interpreting changes in the environment. However, there is no institutional support to harness this indigenous knowledge and incorporate it into local level planning and decision-making processes.

Tanzania's monitoring of hydro-meteorological data is good, although the spatial coverage (currently at about 300 stations) can be improved. Likewise, the number of automatic stations, currently 80, can be increased. Appropriate technical equipment is installed in some pilot sites and staff have been trained for its maintenance under the coordination of TMA and MoW. The inter-institutional data exchange is recognized as a priority, but is in its early stages. The new e-government Act, 2019 provides a good framework to speed up the implementation of exchange modalities. Work on interoperability has also begun (UNDRR, 2020). Tanzania should aim to continue improving the monitoring and forecasting services by increasing the use of automated measurement stations (e.g. precipitation, discharge) and initiating advancements in the technological and scientific tools in support of the monitoring and forecast system.

In the case of warning communication and dissemination, Tanzania's system is efficient and detailed. National policies regulate the role of each actor. The responsibilities of warning dissemination and information clearing are well set. The capillarity of the system at the ward level is very good and procedures exist. Points to be improved include the development and formalization of standard operating procedures to ensure the coordination among operators, especially at the local level. Feedback mechanisms are currently informal and steps should be taken to formalize them.

Finally, there is a discrepancy between the clarity and quality of drought warnings when compared to flood warnings. For droughts, warnings are impact-based and highly detailed, but flood warning messages are designed for specialized personnel only, which might be ineffective for fast onset hazards. However, the messages are disseminated at different levels and verification processes exist.

Tanzania has integrated disaster risk reduction education into its education system, helping create more awareness among youth and increasing the country's preparedness for disasters. That being said, most of the population does not have the technical capability to translate and understand warnings messages correctly or react appropriately. Education and awareness campaigns through television and radio programs have tried to rectify this, but it remains an important issue to be addressed. Related to this is the absence of preparedness plans for the majority of district councils. Initiatives have been made in pilot sites to link the severity of the warning issued to appropriate actions, yet these have not been implemented throughout the country.

In essence, the analysis of the existing system in Tanzania highlights well-established roles and responsibilities and a good knowledge of the main weather related hazards in the country. The authorities are well trusted and they recognize the crucial value of the 'last-mile connectivity' in warning communication. Finally, as Tanzania develops its DEWS further, there is a need to link drought monitoring of severities with actions triggered on the ground. Early warnings need to contain clear actionable messages that reach populations at risk, are understood by them and will enable them to act, thereby reducing the impact of a disaster.

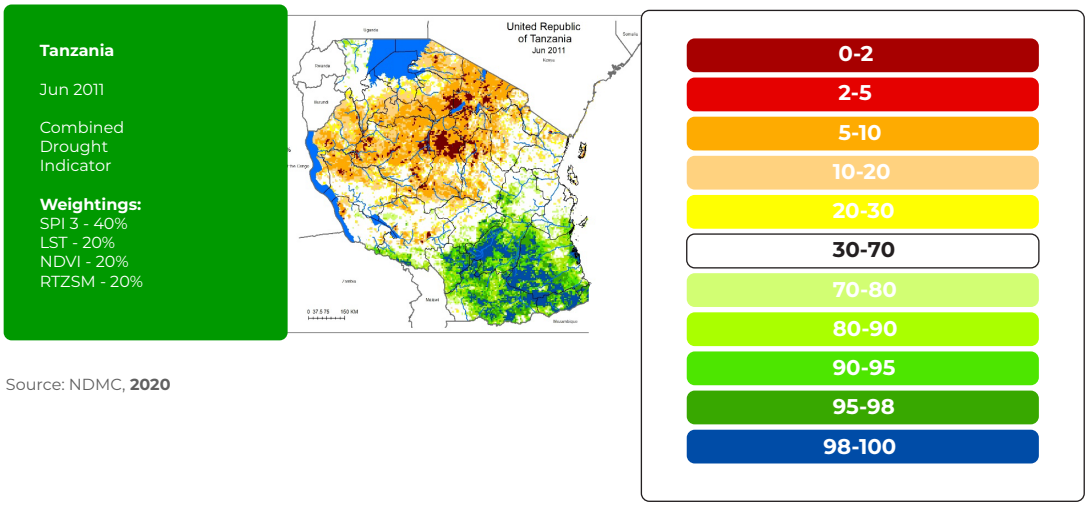
Combined Drought Indicator (CDI)

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 Tanzania was created using a weighted combination of four indicators of drought: precipitation, vegetation stress, land-surface temperature and soil moisture. June 2011 was selected to depict the severity of the 2011 drought. June, being the start 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 June CDI map shows the central and northern parts of the country moderately impacted by some degree of drought.

Without an effective drought monitoring and EWS 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.

Fig 6. Combined Drought Indicator (CDI) for Tanzania, June 2011



Source: NDMC, **2020**

Mitigation, Preparedness and Response

Drought policy framework

Tanzania has been proactively developing its policy and institutional framework for drought management. Drought-relevant policies include: Disaster Management Policy of 2004; Environmental Management Act, approved in 2004; National Operational Guidelines for Disaster Management; Disaster Management Act, No. 2 of 2003 of Zanzibar; Zanzibar Disaster Management Policy; Second National Strategy for Growth and Reduction of Poverty (NSGRP II); National Adaptation Programme of Action (NAPA, 2010); National Climate Change Strategy (2012); Guidelines for Integrating Climate Change Adaptation into National Sectoral Policies, Plans and Programmes of Tanzania; United Nations Development Assistance Plan (UNDAP, July 2011-June 2015); and the Disaster Management Act, 2015.

Mitigation, Preparedness and Response

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The **Disaster Management Act (DMA), 2015, sets out a comprehensive legal framework for disaster risk management in Tanzania**. It provides for the establishment of a national focal point for coordination of disaster risk reduction and management in the country through the Tanzania Disaster Management Agency (TDMA), acting as the central planning, coordinating and monitoring institution for the prevention, mitigation, preparedness, response and post disaster recovery, considering all potential disaster risks. Currently this role is covered by the Prime Minister Office (PMO). The Tanzania Disaster Management Council (TADMAC) advises the Minister responsible for disaster risk management or any sector ministry on any disaster-related matter in the country detailed in the act.

In addition to the Act, **disaster risk management in the country is guided by the National Disaster Management Policy and the National Operational Guidelines for Disaster Management**. Other disaster management policy tools in the country include the Tanzania Emergency Preparedness and Response Plan (TEPRP) and Tanzania Disaster Communication Strategy (TDCS). However, these emergency plans, which are also meant to exist at any level, do not show the same level of implementation across the country. Also, between 2011 and 2018 there have been capacity building initiatives in 20 districts which have Emergency Preparedness and Response plans. It is recommended to focus on the completion of the municipal Emergency Plans for all district councils, and incorporate drought response plans into these district plans. Finally, disaster risk management initiatives in Tanzania are supported by a number of sectoral policies, laws, strategies and plans.

The Environmental Management Act of Tanzania was approved in 2004 to establish climate change units at individual sector ministries. Later in 2007, Tanzania presented its National Adaptation Plan of Action (NAPA, 2010), which was informed by the National Development Vision 2025 and focuses on twelve critical natural resource-based sectors.

Institutions and coordination

The analysis of the existing drought mitigation, preparedness and response capacity at the institutional level, well-established roles and responsibilities and a good knowledge of the main weather-related hazards in the country and appropriate response remain important.

The Prime Minister Office (PMO) is the central planning, coordinating and monitoring institution for the prevention, mitigation, preparedness, response and post-disaster recovery, considering all potential disaster risks. The Disaster Management Department (DMD) is the national body for coordinating DRR on the mainland and receives funds from national budget for relief response and recovery after a disaster. The budget received is less than 1 % of the national budget. The Tanzania Disaster Management Council (TADMAC) advises the minister responsible for disaster risk management or any sector ministry on any disaster-related matter in the country detailed in the DMA.

In addition to the TMA, the National Environment Management Council (NEMC) has established a unit called the Drought and Desertification control unit. The NEMC is important in terms of institutional coordination and ensures EWS are in place.

As part of emergency relief and drought response, drought assessments are conducted by the Security Information Team coordinated by the Ministry of Agriculture, Food Security and Cooperatives (MAFC) and the Prime Minister's Office, which identify the area, population and type of emergency relief required. After the assessment, the Tanzania Disaster and Relief Coordination (TANRED) provides short-, mid- and long-term relief such as food and agricultural inputs, like seeds.

An operational emergency operations unit was set up to coordinate EWS emission and DRR activities for the country, based on Standard Operating Procedures (SOPs) for droughts and floods specifying EW codes, communications channels, roles and responsibilities. However, **stakeholders and users of the climate monitoring system could improve their coordination of operations, maintenance, use of the system and information flow.**

The Tanzanian government departments and agencies also work with regional bodies like the AU, SADC and EAC on various issues related to disasters. **Tanzania has been among the member states involved in the process of establishing the EAC sub-regional platforms and sub-regional DRR coordination mechanisms.**

Mitigation, Preparedness and Response

Drought is fully embedded within Tanzania's DRR policy and institutional and operational structure. In addition, drought response is multi-faceted with national and international organizations involved in mitigation, preparedness and response efforts.

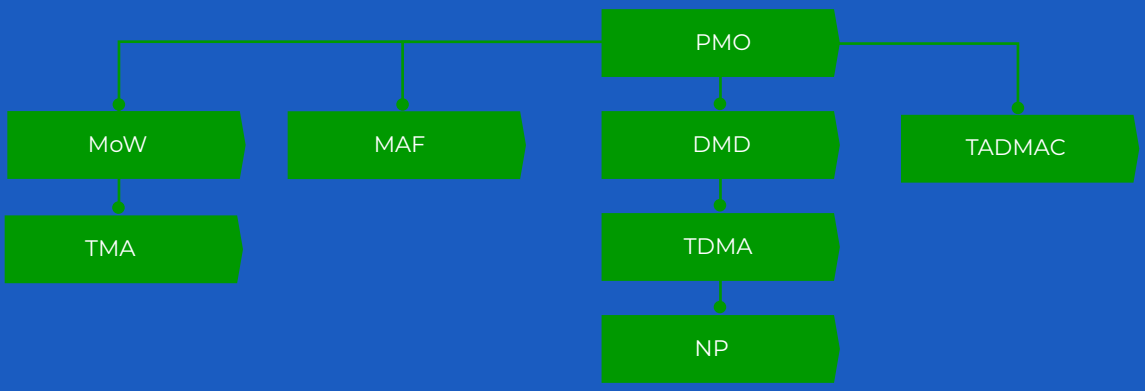
In terms of the involvement of international partners, the CLIVET project, funded by the Danish Development Agency, through Geographical and Geological Survey, and with the help of various institutions in Denmark and Tanzania, is addressing drought issues. Moreover, the Climate Change Impacts, Adaptation and Mitigation project (CCIAM), in collaboration with the Norwegian universities and research institutions in Tanzania, also addresses the issues of drought in Tanzania.

In responding to agricultural drought-related challenges, different government departments allocate budgets for combating army weevil and research and collection of data on food security. The government has established DRR-related units in various ministries such as the Emergency Preparedness and Response Section and Epidemiology Department at the Ministry of Health and Social Welfare, Ministry of Livestock and Fisheries Development, and Food Security Department and Plant Protection Unit at the MAFC, and allocates special budget for its activities annually.

Mitigation, Preparedness and Response

The government of Tanzania in collaboration with other key stakeholders also has to ensure that there is segregation of communities as disaster-prone communities are not homogenous. Communities are disaggregated based on economic status, gender, age and social group within the same community. Community level engagements include men, women, youth, elderly and disabled, and specific approaches are required especially during early warning, education, response and recovery processes. This is to help different groups of people with different needs depending on the nature of the group. There is also increased community participation in DRR and consultation and engagement of the varying and diverse community groups in each decentralized unit. Awareness-raising programs are conducted at the grass roots level, like villages and shehia.

Fig 7. Tanzania's drought institutional framework



Legend
DMD-Disaster Management Department
MAFC-Ministry of Agriculture, Food Security and Cooperatives
MoW-Ministry of Works, Transport and Communications
NP-National Platform
PMO-Prime Minister's Office
TADMAC-Tanzania Disaster Management Council
TDMA-Tanzania Disaster Management Agency
TMA-Tanzania Meteorological Authority

The Prime Minister's Office Disaster Management Department (PMO-DMD) established the National Platform (NP) for Disaster Risk Reduction in 2005, which currently has over 60 members. The National Platform is a multi-sectoral body chaired by Director of Disaster Management Department. It is made up of members from the Government Ministries, Departments and Agencies (MDAs) and LGAs; UN agencies, international and national development partners; academia; private sector; religious/faith groups; NGOs; civil society and the media.

Tanzania also has an EWS as an attempt to safeguard against drought and be able to detect drought at its early stage. However, this system is not well organized, with no wide varieties of pre-positioning of relief items and logistics or distribution plans. Also there is a lack of sustainable enabling environment such as trained and skilled personnel, financial resources and materials to hasten the implementation of the suggested priority actions. More education is needed on DRR to whole community and preparation of Disaster Profile Map to identify opportunities and challenges at grass root level.

Based on the clear assessment of the strengths and weaknesses of the institutions and policy framework as the enabling environment for managing drought in Tanzania, the country may benefit from a dedicated drought policy as well as a review of related agriculture and water-related policies to fill in the gaps and clearly state the management of water for irrigation during drought. In addition, Tanzania could strengthen its national policies on meteorological services in the country.

Initiatives have been established to strengthen the coordination between PMO-DMD, TMA and MoW in data exchange during emergencies. However, such initiatives only reached a certain level of implementation and should be continued to consolidate a sustainable result (UNDRR, 2020). Dissemination and communication of warnings should be improved, under the coordination role of PMO, in order to be able to reach populations with timely, impact-based messages clear enough to trigger reactions. The hierarchical organization in place is the appropriate vehicle for these messages, but improvements are needed in the means used for communication and in the connection between messages, the expected scenario and the related action.

Recent drought resilience efforts by the international community

Table 3. Selected projects focused on drought, or some aspect of it, in Tanzania.

World Bank

Sustainable Rural Water Supply and Sanitation Program
Budget (USD): 740M
Time Period: 2018 -2024

Tanzania Productive Social Safety Net Project II
Budget (USD): 883.3M
Time Period: 2019 -2023

GEF – LDCF

Ecosystem-Based Adaptation for Rural Resilience - to increase resilience to climate change in rural communities of Tanzania by strengthening ecosystem resilience and diversifying livelihoods
Budget (USD): 28.4M
Time Period: 2017 - now

Strengthening Climate Information and Early Warning Systems in Tanzania
Budget (USD): 4M
Time Period: 2012 - now

GEF, UNDP

GEF Small Grants Program
Budget (USD): 10.8M
Time Period: Ongoing

WFP under FtMA

About 7,000 farmers (25 % of them women) engaged by WFP under FtMA accessed credit from banks and input and weather insurance as part of the loan
Budget (USD): 2.3M
Time Period: 2018

WFP

Food purchase: WFP purchased over 160,000 mt of food
Budget (USD): 60M
Time Period: 2018

USAID

Water Resources Integration Development Initiative (WARIDI) in Tanzania
Budget (USD): 48.8M
Time Period: 2016-2020

Planning for Resilience in East Africa Through Policy, Adaptation, Research and Economic Development (PREPARED) (regional)
Budget (USD): 48.8M
Time Period: 2016-2020

EU

Integrated Approaches for Climate Change Adaptation in the East Usambara Mountains
Budget (USD): 1.7M
Time Period: 2015-2019

References and data sources

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9. URT (United Republic of Tanzania) (2014). National progress report on the implementation of the Hyogo Framework for Action (2013-2015).
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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.