drought conditions and management strategies in Malawi

S.D.Chabvungma[1], J. Mawenda[2] and G.Kambauwa[3]

[1]Department of Climate Change and Meteorological Services, Lilongwe, Malawi

E-mail: *stanley.chabvunguma@gmail.com*

[2]Environmental Affairs Department, Lilongwe, Malawi

[3] Department of Land Resources Conservation, Lilongwe, Malawi

Background

Highly variable climate in Malawi has a significant influence on the amount, timing, and frequency of rainfall resulting into frequent droughts and floods. Drought has greater effects in the country than floods. Drought is said to occur in the country when seasonal rainfall is lower than 75% of the normal. Dry spells within rainfall season are common in many parts of the country. Usually dry spells which turn into droughts last for 3 to 4 months. Almost all droughts in Malawi are mainly associated with El Nino[1](Pauw et al., 2010). Virtually the whole country is vulnerable to droughts. However, Karonga, Salima, Zomba and Shire Valley (Nsanje and Chikwawa) are drought prone areas (World Bank, 2010). See Figure 1.

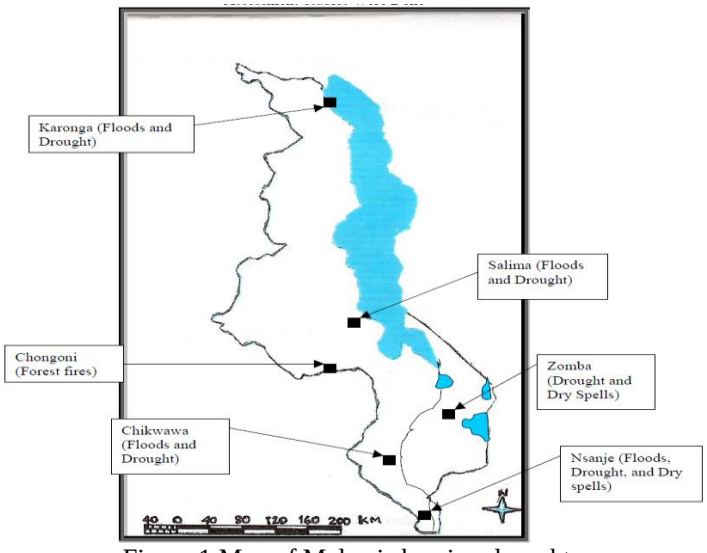

Figure 1 Map of Malawi showing drought prone areas

[1] Warming of the sea surface temperatures of the equatorial Pacific ocean associated with droughts in southern Africa, the opposite is La Nina which is associated with floods in southern Africa

Malawi has been experiencing droughts over the years. However, increased frequency of drought-occurrences has been observed from 1980s due to climate change (Malawi Government, 2006). In the last two decades, Malawi has experienced two notable droughts of 2001/02, and 2004/05 rainy seasons (Nangoma, 2008). The drought of 2001/02 affected 2,829435 people (World Bank, 2010) and maize production alone was approximately 30% short of the estimated domestic amount (Chabvunguma, 2008). The 2004/05 drought plunged the country into one of the most food security crises in more than 60 years (Chabvunguma, 2008). At the peak of the crises 30% of the population needed emergency food assistance and a total of 5,100,000 people mostly farmers, women and children were affected as a result of crop failure, insufficient water-supply and malnutrition. In terms of area coverage 11 out of 21 Rural Development Project areas[2] were affected (World Bank, 2010). According to the World Bank (2010), the cost of 2004/05 drought response in the country was over US$200 million and following the consequences of the drought, Malawi imported between 200,000 and 300,000 tonnes of maize for distribution during the lean months of January-March 2006.

Drought Monitoring and Early warning systems: capacity and adequacy of meteorological and hydrological station network

In Malawi, there are two drought monitoring and early warning systems: scientific based and traditional based (Malawi Government, 2013). Traditional systems use behaviour of plants or animals. Scientific systems are based on indicators derived from variables such as climate, soil moisture and stream-flow. Indicators commonly used to characterize severity of droughts are Water Requirement Satisfactory Index (WRSI), Standard Precipitation Index (SPI), Normalised Difference Vegetation Index (NDVI), and Weather/Seasonal Rainfall Forecasts. Example of drought monitoring product is presented in Figure 2 below.

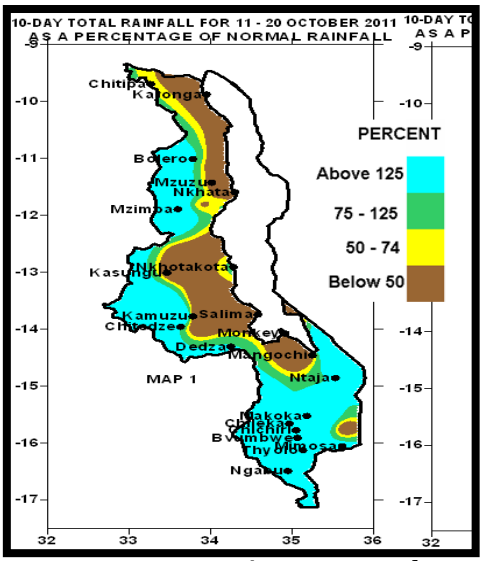

Figure 2: Ten-Day Agrometeorological Malawi Map

[2] Malawi is divided into 21 Rural Development Project areas.

Figure 2 shows rainfall performance for 11- 20 October 2011 against normal rainfall. The map indicates that areas with 50% below normal had experienced dry-spells and if that trend had continued, the areas would have experienced severe drought.

Department of Climate Change and Meteorological Services (DCCMS) is responsible for meteorological stations. Water Resources Department (WRD) is responsible for hydrological stations. The capacity and adequacy of DCCMS and WRD on early warning systems depend on station-network and technical staff.

The reliability of information is based on performance of station-network. Hydro-meteorological stations in Malawi are sparsely and not evenly distributed. The number of stations in the country has been decreasing. During 1970s, there were 800 rainfall-stations[3] and 23 meteorological stations. By 1988, rainfall stations were reduced to 135. Currently, there are 21 meteorological stations.

The role of DCCMS is linked to drought management. DCCMS's functions are geared at improving station-network and its operations, and conducting research to improve understanding and application of climate information. The role of WRD in drought management is to establish and maintain hydrological monitoring systems for identifying, developing, and conserving water resources. These roles are useful in drought mitigation, preparedness, response and recovery.

Some challenges facing DCCMS and WRD include: inadequate maintenance; changes in management; inadequate training; poor remuneration; high operational costs for data collection; lack of comprehensive early warning systems; inadequate qualified personnel and high staff attrition.

Malawi has national and district disaster management committees. Therefore, there is opportunity to directly influence and contribute to development of more effective early warning systems.

Vulnerability assessment

Droughts have negative effects on sectors such as agriculture, water, gender, health and fisheries (Mkanda, et al 1995; Malawi Government, 2006). The most vulnerable sector is agriculture followed by water, gender, health and fisheries. Droughts have more adverse impacts on the country's food security, employment and economy whose major source is rainfed agriculture. For example, the drought of 1991/1992 caused a decline in maize production by 60% accounting for 10% reduction in Gross Domestic Product (GDP) and affected 6.1 million people (Khamis, 2006; Malawi Government, 2006; Clay et al., 2003). Over 90% of Malawi's population relies on rainfed agriculture (Mkanda, et al, 1995). Upon following the failure of agriculture due to drought, the sectors that directly depend on agriculture such as agro-industries are seriously affected as a result of reduced supply of raw materials. Considering that agriculture accounts for a significant share of total

[3] Weather station that measures only rainfall

exports, foreign exchange earnings, food security and employment, it is the most vulnerable sector in the country.

Water is a critical resource for human and industrial use and for the maintenance of ecosystems. Droughts seriously disrupt water availability in quantity and quality. During droughts, much of water is lost through evapotranspiration and little water flows into water bodies resulting into low lake levels and reduced river flows. For example in 1995, Lake Chilwa dried up due to drought (Malawi Government, 2006).

The human health sector is directly affected by drought occurrences, and is especially linked to infant malnutrition and chronic ailments associated with malaria, cholera and diarrhea. The fisheries sector is also affected by droughts and have been responsible for the declining, drying up of water bodies resulting in low fish production and loss of aquatic biodiversity. For instance, droughts have been responsible for drying of Lake Chilwa in 1995 which resulted in total loss of fish stocks.

The most vulnerable groups of the society in Malawi include women, children and subsistence farmers[4]. Women bear most of the burden in activities that are most impacted by droughts, including collection of water, firewood and ensuring daily access to food. The women usually have limited access to resources to cope up with impacts of droughts. The subsistence farmers are more vulnerable than commercial farmers and are usually are poor who may not afford to buy adequate farm inputs such as improved seeds which are resistant to droughts.

Emergency relief and drought response:

Malawi maintains an emergency management program to address her response to the hazards such as droughts which threaten her. In fulfilling its primary role of protecting the lives of its citizens and minimizing damage to property during disasters, Government of Malawi has developed a National Contingency Plan (NCP) that is updated annually to reflect the changing weather patterns. The National Contingency Planning process has the ability of bringing many humanitarian players together and acts as a framework for raising resources for disaster response. The plan acts as a link between local disaster risk reduction measures and international disaster risk reduction efforts through international organisations such as UN agencies (like WFP, UNICEF, and UNFPA) and NGOs.

For instance, during 2005/2006 drought, the incomes of at least 4.2 million people, more than one-third of the population, had been severely reduced as a result of crop failure. Humanitarian support of around 370,000 metric tonnes of maize costing around US$110 million was distributed to maintain nutrition levels. In addition to the immediate humanitarian needs, the crisis had a severe negative impact on domestic investment and production because the exceptional food import requirements constrained imports critical to production, notably petroleum, fertilizer, machinery, and construction materials.

[4] Small scale farmers with gardens less than one hectare and farm for household consumption

Further, the disruption caused by the drought to trade and economic activity risked undermining business confidence and investment. The Government and the development partners agreed on three levels of intervention: (i) provide targeted free food distribution; (ii) scale up existing safety nets through expanded public works programs; and (iii) import and sell maize domestically on commercial terms to ensure adequate supplies in the domestic market.

Practices to alleviate drought impacts

Government of Malawi, and other supporting institutions have put in place measures and practices to alleviate drought impacts prior to or during drought.

Malawi Government with funding from the World Bank is facilitating index-based weather insurance scheme. The scheme helps the government manage financial impact of drought-related national maize production shortfalls. The scheme is designed to provide compensation to farmers when rainfall during a crop growing cycle is insufficient. (Syroka et al., 2010).

Government is encouraging interventions such as green belt initiative and conservation agriculture farming. Conservation agriculture reduces the impact of pending drought during crop growing cycle.

The Government, NGOs and other institutions such as Malawi Red Cross Society disseminate early warnings to communities. In this regards, the Government facilitates the expansion of hydro-meteorological station network.

Government and development partners promote social cash transfer to ultra-poor households. Over 3,200 households have been reached (UNICEF-Malawi, 2008). Social cash transfers have helped vulnerable households to build their resilience against disaster related shocks.

Malawi through Shire River Basin Management Project (SRBMP) has embarked on modernization of water resources monitoring systems (real-time hydrological and meteorological systems) and an operational decision support system. This is to improve integrated hydro-meteorological data visualization, weather/climate forecasting and early warning systems.

Malawi Government is implementing African Monitoring of the Environment for Sustainable Development (AMESD) program involving relevant sectors to improve the use of satellite data for drought monitoring.

The need for knowledge and skills on drought management

Financial institutions in Malawi under crop weather insurance are unwilling to lend money to smallholder-farmers because of risk that they would not pay back their loans if there were a drought. Limited farming households are involved in the scheme. As a result, by 2005, only 50,000 farming households in the country were able to secure credit.

Therefore there is need of more training for weather experts, farmers, insurers and lending institutions on crop weather insurance and contract design.

Malawi has inadequate capacity to forecast reliable and high resolution drought due to drought's distinctive characteristics (i.e. low onset, non-structural impacts, and large spatial extent). Knowledge, skills and tools are urgently required for institutions and individuals involved in drought monitoring and early warning systems.

There is need for an increased awareness and knowledge of tools and methodologies for national planners, policymakers, institutions and stakeholders to develop proactive drought management plans.

Malawi has strategies/ policies which have aspects of drought management such as Disaster Risk Management Policy, National Irrigation and Development Strategy, and National Water Policy. Although these instruments acknowledge the effects of droughts (CEPA, 2012)[5], there is no single policy/strategy that wholly focuses on 'integrated' Drought Management. Therefore there is urgent need of having such a strengthened strategy.

Although Malawi is implementing AMESD program, the use of satellite images need to be enhanced.

[5] Centre for Environmental Policy and Advocacy (CEPA) is non-profitable Non Governmental Organisation

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