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# The Impact of Drought on Africa

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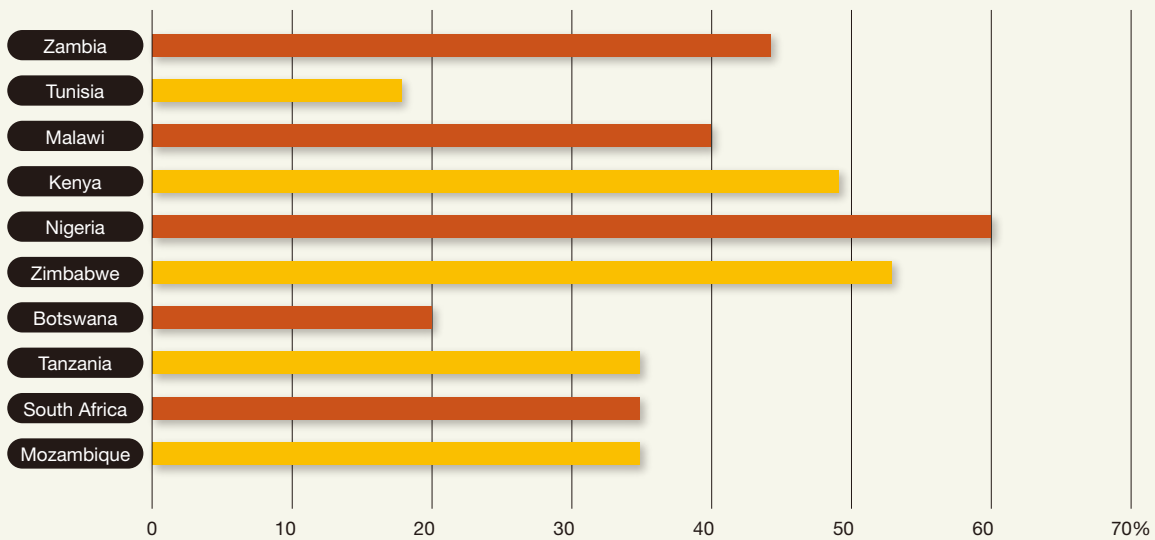
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## **1 | Introduction**

Water shortages are a major threat globally but their impact is more severe in Africa in general and in Sub-Saharan Africa in particular. A recent Southern African Development Community (SADC) report suggests that by mid-2017 four countries will have to declare national drought disasters, namely, the Kingdom of Lesotho, the Republic of Malawi, the Kingdom of Swaziland, and the Republic of Zimbabwe. Countries in Southern Africa such as the Republic of Mozambique and the Republic of South Africa have declared partial drought emergencies. The

**Figure 1 | Bar Chart Showing Percentages of Non-revenue Water Loss in Various African Countries**



\*Note: Data are not available for some African countries.

three months from October to December 2015 were the driest months on record in the past 35 years, while December 2015 was one of the hottest months experienced in recent times. Across the region, food shortages and cholera outbreaks were rampant due to the lack of potable water.

The SADC Situation Update for 2015/2016 indicated that metrological forecasts predicted poor rainfall and high temperatures for the 2015/2016 rainy season. Governments across the South African region implemented measures to mitigate the impact of the drought. Programs were implemented such as increased stockpiling of food, water restrictions, and water conservation campaigns. However, the impacts of the drought made clear that the situation was overwhelming<sup>[1]</sup>.

Some major reasons for the shortcoming in combatting the drought were factors such as the region’s aging and inadequate infrastructure for water retention and distribution. The existing water retention infrastructure such as dams was built in the 1960s or 1970s with no new development accompanying the rapid population increases across the continent at the turn of the century. This may be attributable to a lack of adequate funds for most of the national governments. In South Africa, however, new developments are in the pipeline, including the

new Inkomazi Dam in KwaZulu-Natal\*<sup>1</sup> and the Umzimvubu Dam in the Eastern Cape.

Aging infrastructure such as old pipe networks also contributed to massive loss of water that could have been retained in the system. Non-revenue water loss, which is the difference between water input into the water distribution system and the amount of water billed to end users, is about 35% in South Africa, 40% in Malawi, 20% in the Republic of Botswana, and above 53% in Zimbabwe. Similar trends are observed in other parts of Africa (see [Figure 1](#))<sup>[2]</sup>.

Africa as a continent still faces a huge shortfall in infrastructure development; this is an additional reason why the impact of the drought was severe in some countries. Access to potable water is a challenge when there is adequate rainfall, but when there is a drought, getting water is practically impossible. In the Federal Republic of Somalia, Lesotho, rural Zimbabwe, Malawi, the Republic of South Sudan, and other African countries with inadequate water, damaged or non-existent water infrastructure led to the impacts of the drought being more pronounced (see [Figure 2](#)).

According to the national outlook of the United Nations International Decade for Action “Water

\*1 The decision is still pending in this case.



**Figure 2 | A Damaged and Abandoned Water Dam in the Republic of the Sudan**



for Life 2005-2015,” access to drinking water was in a critical state even before the drought in the affected countries<sup>[3]</sup>.

The overdependence of African countries on fresh water sources was an added disadvantage during the drought. This was highlighted by the reduced rainfall over the continent leading to reduced recharge of rivers. Consequently, it became difficult to abstract water to be treated for use as potable water or to be used for agricultural irrigation because of very low river levels. In cases of abstraction, water treatment to the target quality level became more expensive, for example, in the case of the Lilongwe Water Board in Malawi, where chemical oxygen demand increased due to the low river level, necessitating higher expenses for purchasing chemicals.

It is a certainty that Africa needs to look beyond river water abstraction and find new sources of water to meet the increasing water demand of its population. This must involve the use of advanced technologies that can ensure suitable water quality targets.

## 2 | Drought Interventions and Preparedness

Several interventions were implemented by various governments across Africa, from the national level to the local or municipal level.

In South Africa, the government’s approach was to start a campaign to educate the populace to use water wisely. This educational campaign was rolled out across the tiers of government

and water agencies in the country. In addition, efforts to reduce water leakages and losses were increased at the three tiers of government through an approach to maintain existing infrastructure and facilitate the conservation of water in the system<sup>[4]</sup>.

In countries like the Republic of Namibia, a program has been rolled out called integrated water resources management, which focuses on existing plans and future development. The program aims for ways to sustain existing water sources where the impacts of the drought have been very severe and to address the issues surrounding water demand management, such as ensuring nationwide water conservation campaigns<sup>[5]</sup>.

In the Federal Democratic Republic of Ethiopia in East Africa, the government launched several coordinated programs aimed at securing the water supply of drought-affected rural communities for basic usage. Water supply points have been established in different rural areas in the country using mobile sources to bring water to people. However, due to the severity of the drought, agriculture has been severely affected, leading the government to request emergency assistance from the international community for food and medical supplies<sup>[6]</sup>.

In South Sudan, which is one of the youngest country in the world, internal challenges have been an obstacle to a coordinated response to the drought. Nevertheless, many non-governmental organizations are active in the country to assist the people in getting access to water<sup>[7]</sup>.

## 3 | Direct Drought Impacts on the Populace

Droughts are cyclical events around the world. The current drought has had a severe impact on water levels in dam reservoirs, causing some to run dry. The Hazelmere Dam in KwaZulu-Natal as at October 2015 was at 29% capacity—an all-time low—while the Kamuzu dams in Lilongwe, Malawi, were at less than 40% capacity in May 2016 at the peak of the drought (see [Figure 3](#)).

The resulting low dam levels led to water restrictions being imposed on users across several countries in Southern Africa.

Additional impacts of the drought are death of livestock and poor crop yields due to poor or no rainfall making water unavailable for irrigation. Primarily attributed to El Niño\*<sup>2</sup>, the drought has led to increased food prices and the United Nations estimates that 11 million children are at risk of starvation and inadequate water supplies in East and Southern Africa.

Areas in the Free State and North West provinces of South Africa that are known for corn farming are currently unable to grow enough corn due to the drought. In response, the government has declared about five provinces in the country to be disaster areas.

In Botswana, it was reported by the magazine *African Business* that the water level in the Okavango Delta was at its lowest in years at the peak of the drought. The Okavango Delta is the end point of rainwater that flows into the area each year from the highlands of the Republic of Angola. However, the scarce rainfall because of drought has made it practically impossible for houseboats and tour boats to navigate the waterways on tourist routes; it was only possible using *makorro* (dugout canoes).

The impact of the drought in South Africa has been most strongly felt in increased food prices. For example, the prices of meat and poultry, which are popular protein sources, are quite high, making it difficult for low-income households to purchase them. The government has resorted to importing food and poultry to augment local food production.

High-end homes located in suburban areas face local water restrictions that prohibit them from watering gardens and lawns and washing cars. These water restrictions are enforced simply by charging higher prices to users who exceed the allowed volume per day, and those

**Figure 3 | The Kamuzu II Dam on the Outskirts of Lilongwe, Malawi, during the Drought in May 2016**



who are found washing their car with clean tap water may face a stiffer penalty in some municipalities.

Countries such as Namibia, South Africa, and Botswana have experienced high cross-border migration due to the drought. Namibia has reported migration from Angola due to lack of rain in the Angolan border area, and Botswana has experienced an influx from Zimbabwe. South Africa has seen a huge influx from Zimbabwe, Malawi, Lesotho, Mozambique, and other neighboring countries because the drought has destabilized farming, which is the mainstay of economies in rural Africa.

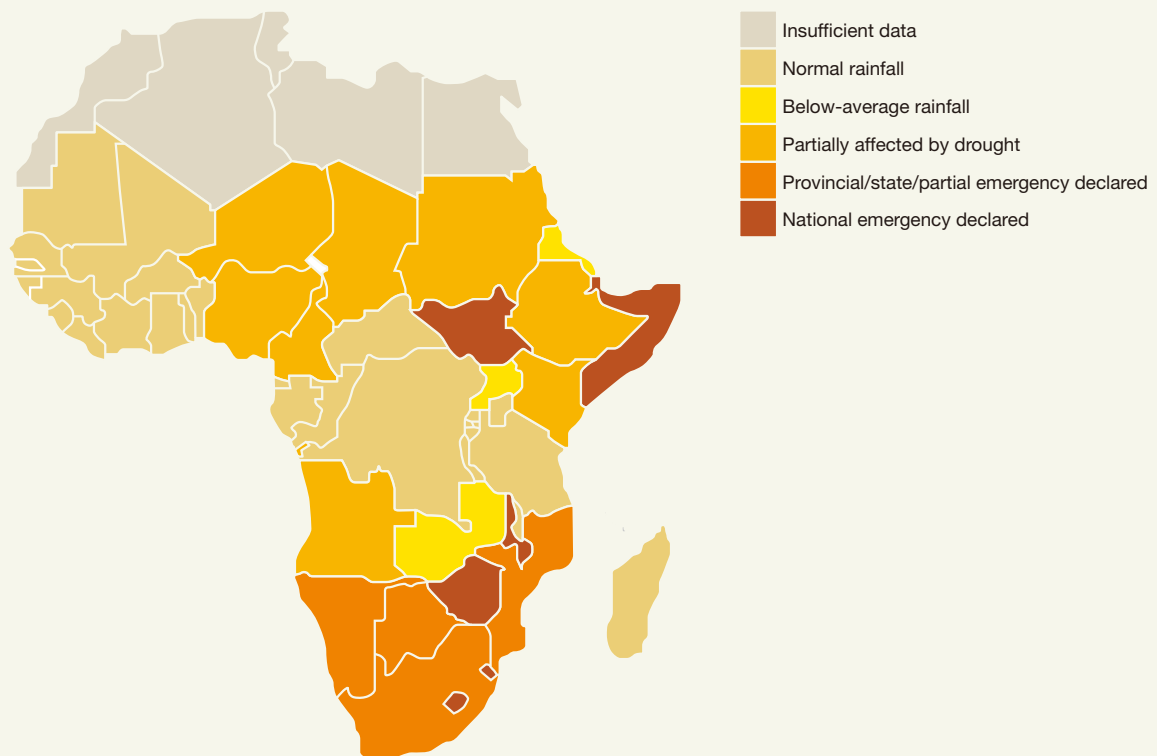
In countries such as Angola, outbreaks of yellow fever and cholera have been reported since the onset of the drought. South Sudan, a young country with minimal basic infrastructure, has faced a huge challenge in water provision and has experienced an unprecedented level of cholera outbreaks due to unhygienic sources of drinking water. Local water suppliers have become desperate to supply water from any source because of the high demand for water despite the shrinking sources. As a result, the cost of selling water has increased due to the principles of supply and demand.

In Somalia and some parts of the Republic of Kenya, the cost of buying staple foods has increased while the cost of purchasing protein sources has dropped. Citizens in these parts are more concerned about just eating food rather

\*<sup>2</sup> El Niño is an extreme weather pattern comprising the warm part of the El Niño–Southern Oscillation and disrupts the natural atmospheric circulation that brings rain to Africa. El Niño is often associated with high temperatures and heat waves.



**Figure 4 | Map of Africa Showing the Situation of the Drought in Affected Countries**



than having a balanced diet in view of the crisis on the continent. Competition for arable land has also increased notably in West African countries such as the Federal Republic of Nigeria, the Republic of Cameroon, and the Republic of Niger, with seasonal fights reported between crop farmers and migrant pastoral grazers.

Figure 4 shows the situation of the drought in countries across Africa.

#### 4 | Water Policy and Security in Africa

Former President of South Africa Nelson Mandela said, "Access to water is a common goal. It is central in the social, economic and political affairs of the country, African continent and the world. It should be a lead sector of cooperation for world development."

The future of water, agriculture, and energy has to be shaped in the present for future generations. Several African governments are drafting policies and master plans in order to guarantee water resources for the future. Countries such as South Africa, Namibia, Ethiopia, Nigeria, and

Lesotho are taking essential steps in this direction. Cross-border infrastructure developments are being considered. At the African Union, Agenda 2063 has been extensively discussed to ensure that services are delivered across all of Africa with ease of access for all its citizens.

Previous strategic discussions have included the United Nations Africa Water Vision for 2025, which addressed the equitable and sustainable utilization of water in Africa, socioeconomic development, and growth. The threats and challenges faced, as well as the current governance structures and systems for resolving the existing bottlenecks, were discussed. A practical approach to facilitate development of water infrastructure was suggested to ensure the provision of potable water to the whole continent.

With the aim of ensuring water security to sprawling urban populations, water security is being considered. These discussions are centered on finding alternative water sources that are not dependent on natural rainfall. Large- and small-scale seawater desalination is now a topic of discussion among decision makers and policy



makers across all tiers of government in Africa. The mindset of the decision makers has shifted, and water security is now viewed as a pressing concern for the future. Discussions and talk alone are no longer enough, and there are calls for action and implementation across Africa.

In addition, reuse of treated wastewater was once considered taboo by many African citizens, but is openly discussed at conferences. There are discussions of reuse for industrial, agricultural, and domestic use. Movement in this direction offers a ray of hope to countries such as Namibia, where the City of Windhoek is acting as a pacesetter and providing an encouraging example by having successfully implemented reuse of treated wastewater for the past 40 years. An informative and educational approach is required for the spread of wastewater reuse. A look in this direction indicates there may be light at the end of the tunnel for Africa to reach its targeted growth and development goals.

## **5 | Politics of the Drought and Water Provision**

The involvement of different governments in finding solutions to the drought and water problems was highlighted during a visit to South Africa by the Prime Minister of India, Narendra Modi. One item on the agenda was how to assist South Africa in resolving its water challenges. Indian companies such as Ion Exchange (India) Ltd. signed partnership agreement with Stefanutti Stocks Holdings Limited to work together on water-related projects. The government of the Islamic Republic of Iran also signed bilateral agreements with the South African Government to jointly investigate the feasibility of seawater desalination in South Africa.

The drought has brought opportunities for various governments to work bilaterally on how to advance and secure water provision in their countries. In the quest to find solutions for the provision of water in Africa, the international relations and politics of water are moving forward. The New Energy and Industrial Technology

Development Organization of Japan recently signed a memorandum of understanding with the eThekweni Metropolitan Municipality in South Africa in order to ensure that energy-saving and environmentally conscious desalination led by Hitachi, Ltd. is piloted in Durban in order to resolve the municipality's water challenges.

## **6 | Managing the Future: Financial and Technological Demands**

Companies such as Veolia Environnement S.A. are very active in the water sector in Africa, providing solutions for solving water and wastewater challenges. They provide competitive conventional and advanced water and wastewater technologies. A viable example is the Durban Water Recycling Project, a flagship public-private partnership (PPP) project for promoting water reuse. The agreement includes the major water users in eThekweni around the Bluff industrial area. The Veolia plant currently treats about 45 million liters per day (MLD) of domestic sewage effluent to graywater quality for reuse in the surrounding petrochemical refinery and paper and pulp mills. After about 20 years of operating the plant, the water purchase and water supply agreements are currently being renegotiated by the eThekweni Metropolitan Municipality with old and new stakeholders interested in becoming part of the PPP arrangement.

A PPP program is in place to ensure the project becomes a reality. In light of the dire situation brought about by the drought, African governments are looking at new funding models for emerging water sources and the introduction of advance technology that can handle the required complexities and demands. One such example is the Port Nolloth Desalination Plant in South Africa, a small-scale plant that treats about 2.5 MLD, for which the government is providing about 80% of the funding and the successful implementing partner provides about 20% of the funding and executes a build-operate-transfer scheme. The implementing partner will operate the plant for three years and sell water to the



municipality based on a water purchase agreement. In Port Elizabeth in South Africa's Eastern Cape Province, a PPP for a 60-MLD desalination plant has been proposed by the government, which will guarantee the project. There is currently a strong drive by African governments interested in advanced water treatment processes to transfer the core responsibilities of funding, implementation, and operation to the private sector with an effective water purchase agreement. In view of these unfolding possibilities, it is important for international companies that have the capacity to provide solutions based on advanced technology, funding for mega projects, and execution to internally position themselves for such opportunities.

In conclusion, it is envisaged that as African countries strategically evolve in finding solutions for the essential service of water provision, bureaucratic red tape will be removed in order to accelerate development.

## 7 | Conclusion

In view of the unfolding opportunities in the midst of the drought, Hitachi has the proven technology, capacity, and experience to provide solutions that are relevant to Africa. Hitachi has the in-house strengths and ability to provide total support for infrastructure projects from the conceptual phase to implementation. Hitachi has a strong understanding of the water and wastewater value chain and cutting-edge expertise on information technology and extensive experience in applying it in the engineering of water solutions.

The experience of Hitachi's human resources in the installation, operation, and maintenance of various water and wastewater plants globally positions the company to seize market opportunities in Africa.

## References

- 1) SADC, "Regional Situation Update on El Niño-induced Drought," (May 2016).
- 2) J. Bhagwan et al., "Benchmarking of Non-revenue Water: Experiences from South Africa," (2013).
- 3) United Nations Water, "Water for Life Decade," (May 2014).
- 4) South African Government, "Minister Nomvula Mokonyane Announces Water Master Plan," <http://www.gov.za/af/speeches/minister-nomvula-mokonyane-announces-water-master-plan-2-dec-2015-0000>
- 5) New Era Newspaper, "Ministry of Agriculture, Water and Forestry Interview," (Oct. 2016).
- 6) United Nations News Centre, "As New Drought Hits Ethiopia, UN Urges Support for Government's Remarkable Efforts," (Jan. 2017).
- 7) Food and Agriculture Organization of the United Nations, "Horn of Africa Cross-border Drought Action Plan 2017," (Apr. 2017).
- 8) South African Government, "National Water Security," <http://www.gov.za/about-government/government-programmes/national-water-security-2015>
- 9) United Nations Water, "The Africa Water Vision for 2025," (2005).



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