POLICY BRIEF | LUSAKA

LUSAKA CITY FACED WITH SEVERE CONSEQUENCES OF DECLINING GROUNDWATER LEVELS

As a member of the United Nations, Zambia recognises water as a basic need and fundamental human right, necessary for the "full enjoyment of life and all human rights" as affirmed by the UN resolution A/RES/64/292 of 2010[1].

FRACTAL

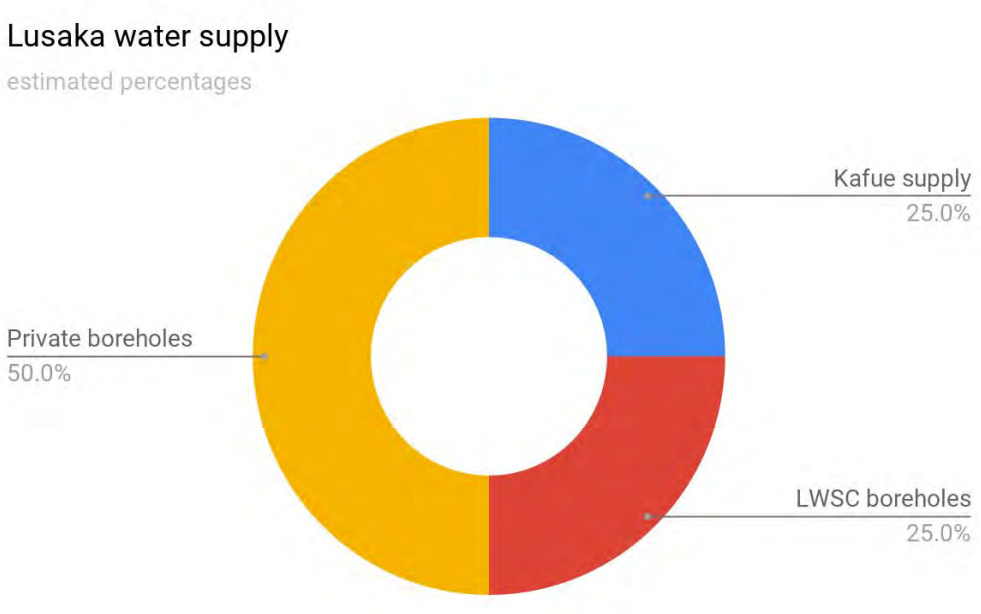
FUTURE RESILIENCE FOR AFRICAN CITIES AND LANDS

The city of Lusaka and Lusaka Water and Sewerage Company (LWSC) has increasingly relied on groundwater abstraction in order to supply the public and businesses with water. Currently around 50% of the formal water supply to Lusaka is groundwater with the other 50% sourced from the Kafue River via the Iolanda out take and treatment plant. However, it is estimated that the formal supply accounts for only 50% of the total water requirements of the city with the remainder largely supplied through private groundwater abstraction. This means that closer to 75% of Lusaka's water supply, formal and informal, is dependent on groundwater.

This dependence is impacting groundwater levels with declining groundwater being reported for a number of boreholes. Added to this are the increasing risks of reduced rainfall due to climate change that could reduce groundwater recharge in the future, and continued population growth and water demand. New water supplies from the Kafue address some of the bulk water needs but without substantial expansion of household level water distribution infrastructure, dependence on groundwater will continue to grow.

THE EVIDENCE

Currently the demand for water in Lusaka stands at over 420,000 cubic metres per day (21 million twenty litre containers). Lusaka Water and Sewerage Company are only able to supply 220,000 cubic metres per day (11 million twenty litre containers or 52% of water demand), of which approximately 145,000 cubic metres per day (7 million twenty litre containers) is from groundwater[3]. This leaves a deficit of 200,000 cubic metres per day (10 million twenty litre containers or 48% of water demand).



The Ngwerere and Chunga rivers - Lusaka's two closest streams - carry under-treated wastewater (including sewage) rendering their water unfit for domestic use. Therefore, people and businesses with little or no access to the supply from Lusaka Water and Sewerage Company (LWSC) draw their water from private wells and boreholes. Grönwall, Mulenga & McGranahan (2010)[2] have suggested that the private water supply from boreholes ranges from 80,000 cubic metres per day (4 million twenty litre containers) to as high as 350,000 cubic metres per day (18 million twenty litre containers). This private water abstraction - combined with the public water supply abstracted by LWSC from the groundwater resource - accounts for, on average, over 345,000 cubic metres per day (17 million

twenty litre containers), or over 79% of water demand. All this abstraction occurs within the city, meaning that, although the average annual groundwater abstraction rate is well below the average annual recharge rate over the entire groundwater reservoir[4], the groundwater within the city is under severe pressure, especially during periods of drought.

> In 2014/15 more than 25 boreholes dried up and the remaining 100 boreholes operated at less than 50% of their original capacity[5].

Other factors that worsen the situation include:

- Periodic droughts potentially becoming more frequent due to climate change
- Lack of effective collaboration amongst mandate holders, such as those responsible for the water sector, development planning and land administration as well as for industry and community empowerment
- Weak and under-resourced institutions responsible for developing and enforcing groundwater regulations, and weak systems of accountability

If no action is taken, the over-exploitation of groundwater and the resultant decrease in groundwater levels will worsen the water shortages in the city. In this scenario, MLGH, LCC, & JICA (2009, p.4-38)[6] predict a future for the city characterised by "deterioration of sustainable living environment by exploitation of groundwater and destruction of recharge areas." This will feed into a vicious cycle of decreasing public water supply, increasing self-supply from wells and boreholes and further depletion of groundwater every year. Increasing water shortages and associated water rationing will increase water related diseases, increase the cost of healthcare for both the individual and health system and negatively impact on gender relationships in communities. Women and children will be the most affected as they bear the biggest burden of fetching water and taking care of sick family members. Children (especially girls) will spend more time at water queues and less time in school accessing their right to education.

Businesses and industries will also be negatively impacted. Inadequate water supply will result in a high cost of self-supply, high cost of production and low productivity for industry generally. The government and Lusaka Water and Sewerage Company may suffer reduced revenue, loss of public confidence and increasing risks of lawsuits. In general, the business environment will become unattractive, products will become expensive and businesses unprofitable. This situation, in addition to the possibility of some water dependent industries relocating from the city, could result in loss of employment, high cost of living, loss of government revenue and low economic growth for the city.

References

[1] UN Resolution: A/RES/64/292: *"1. Recognizes the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights;"*

[2] Grönwall, J. T. Mulenga, M. and McGranahan, G. (2010) **Groundwater, self-supply and poor urban dwellers: A review with case studies of Bangalore and Lusaka.** London, International Institute for Environment and Development (IIED)

[3] Bäumle, R. and Kang'omba, S. (2013) **Development of a Groundwater Information & Management Program for the Lusaka Groundwater Systems: Key Recommendations and Findings.** Lusaka, GRZ and BGR

[4] Bäumle, R., Nick, A., Shamboko-Mbale, B., Siwale C., & Kang'omba, S. (2012) **Groundwater Resources of the Mwembeshi and Chongwe Catchments including the Lusaka Region: A Brief Description of Physiography, Geology, Climate, Hydrology and Groundwater Systems of the Area.** Lusaka, GRZ and BGR

[5] Times of Zambia, 8 November 2014. **How Lusaka is Drying Up [Online].** Available at: <http://www.times.co.zm/?p=41999> [Accessed 31 October 2017]

[6] MLGH, LCC, and JICA (2009) **The study on comprehensive urban development plan for the city of Lusaka in The Republic of Zambia. Final Report, Volume I: Comprehensive Urban Development Plan.** Lusaka, Japan International Cooperation Agency

KEY MESSAGES AND RECOMMENDATIONS

1. Regulation and monitoring of private and commercial groundwater abstraction is critical. The new statutory instrument is an important response to this.
   Recommendation: The positive benefits to the public, both in terms of quality testing and consumer protection, as well as the greater benefit of well managed and monitored ground water resources, need to be actively promoted in order to encourage positive engagement and compliance.
2. There is strong evidence of a general decline in groundwater levels, which is an important concern for the city.
   Recommendation: Protection of recharge areas should be prioritised as these areas play a critical role in groundwater recharge. Protection requires town planning that respects the recharge areas as well as encouraging and incentivising planned developments that avoid excessive hard surfaces and limit the infiltration of water.
3. The new Kafue water pipeline projects are important and extremely valuable investments to ensure future water supply to Lusaka. However, with only a small fraction of the population serviced with piped water supplies this new bulk water will not relieve the pressure on groundwater levels.
   Recommendation: Extensive investment in water distribution infrastructure is needed to relieve the pressure on groundwater.
4. The Water User Associations are key institutions that enable and encourage collaborative management of groundwater in communities.
   Recommendation: Water User Associations should be put in place as rapidly as possible in the Lusaka region and the role of local institutions clarified.

CROSS CUTTING

1. Quantifying the economic and social costs of ongoing poor water supply and water quality provides strong evidence to encourage prioritisation and funding of infrastructure.
2. Comprehensive monitoring of groundwater levels and quality will contribute significantly to better understanding of groundwater and will enable early identification of changes and looming crisis.

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