

POLICY BRIEF | LUSAKA

GROUNDWATER POLLUTION: KEY THREAT TO WATER SECURITY & HEALTH

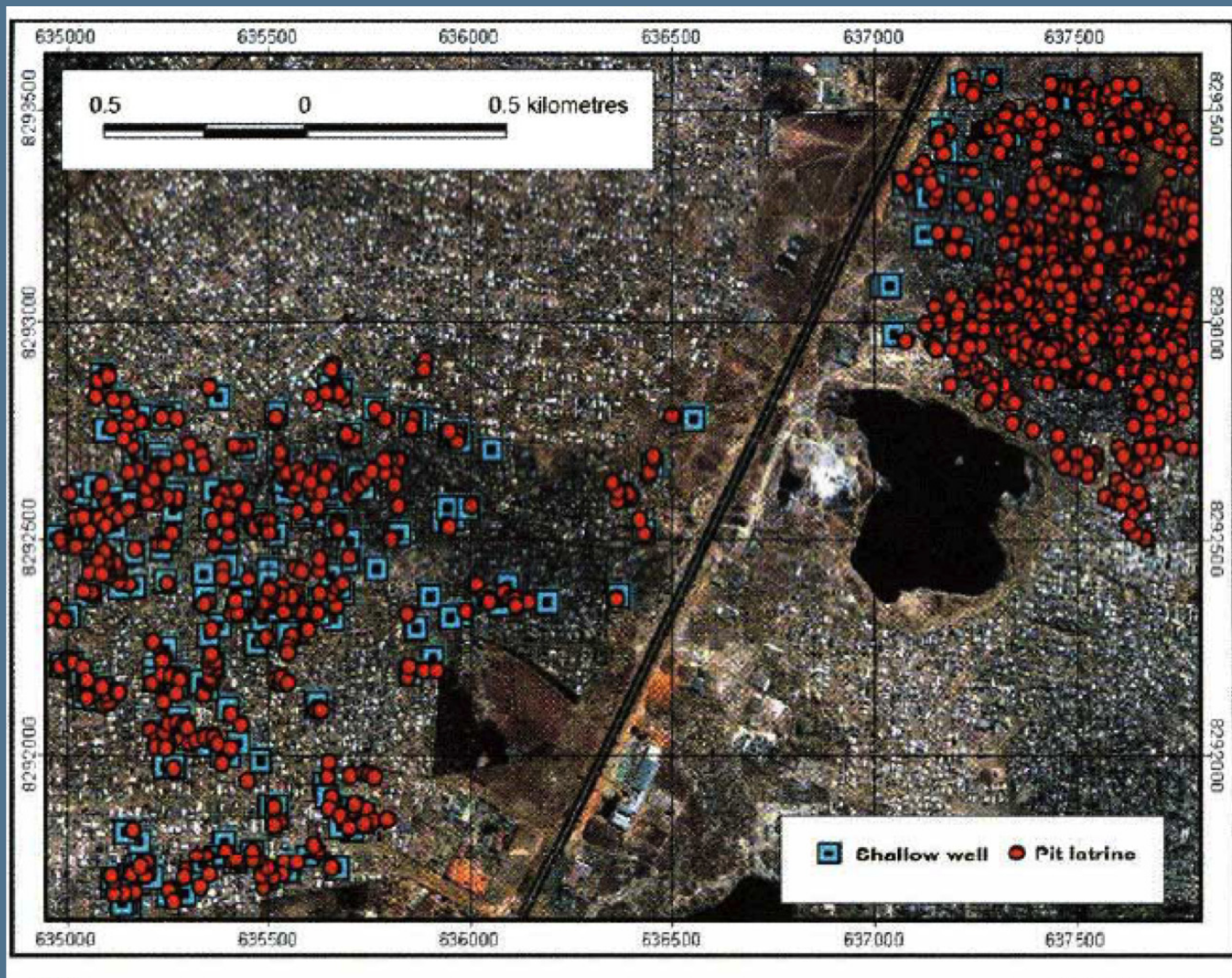


Photo | Nkhuwa 2006

Image | Map showing spatial distribution of pit latrines and shallow wells in Lusaka

WHAT IS THE PROBLEM?

Groundwater pollution poses a direct health threat to much of Lusaka's population who access water from boreholes and shallow wells that can easily be contaminated. The majority of those affected live in informal settlements. These residents account for 70% of the city's population yet occupy only 20% of the land. Groundwater pollution can lead to water-borne diseases. This was seen in the recent cholera epidemic in early 2018. Groundwater pollution is increasingly spreading to new planned settlements such as Chalala and Ibex Extension. Without immediate sustainable corrective measures being put in place, the problem will continue to directly compromise human health and could negatively affect sustainable development.

WHAT ARE THE CAUSES OF GROUNDWATER POLLUTION?

The direct cause of most groundwater pollution in Lusaka is poor sanitation. About 2 million people use pit latrines or septic tanks due to limited coverage of the sewer network in the city. Septic tanks and pit latrines are often located within residential plots and near water points such as boreholes and shallow wells (see Figure 1 and front cover map).



Figure 1 A shallow well in Matero (left); the proximity between the shallow well and toilet in a residential plot (right)

Poor solid waste management (Figure 2) also contributes to groundwater pollution. The indiscriminate disposal of solid waste pollutes surface water, which in turn pollutes groundwater sources. Informal settlements with the highest density of people and number of pit latrines often have poor solid waste management. In these areas, limited access to piped water leads to the digging and use of shallow wells, which are easily contaminated from solid waste and pit latrines located close by (see Figure 3).



Figure 2 An example of indiscriminate dumping of solid waste in Lusaka that can contribute to groundwater pollution

The distances between the pit latrines or septic tanks and water points are often less than the recommended 30 metres. Therefore, contamination of groundwater from faecal matter is a common occurrence (Figure 3). During the rainy season, pit latrines overflow due to flooding, hence contributing to water contamination.

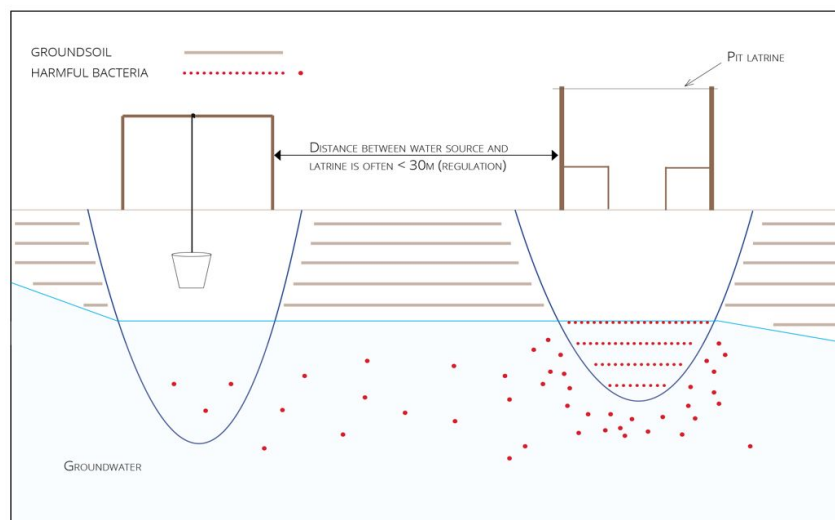


Figure 3 Potential for contamination of water due to proximity between boreholes/shallow wells and pit latrines

Industrial waste also contributes to groundwater pollution in Lusaka. The disposal of industrial waste into the ground by various industries causes chemical pollution of groundwater sources. This reflects the ineffective waste management strategies being used by some industries in Lusaka and poor enforcement of legislation. In instances where industries are located close to residential neighbourhoods, this poses a significant threat to city residents. Building in water catchment areas can also cause problems. Catchment areas that provide sources of groundwater for Lusaka have been developed and built upon – for example in Chalala, MFEZ, Mass-Media and Kamwala. Most of these houses and commercial buildings are not connected to the sewer network. As such, pit latrines and septic tanks are used, leading to groundwater pollution in these important water catchment areas.

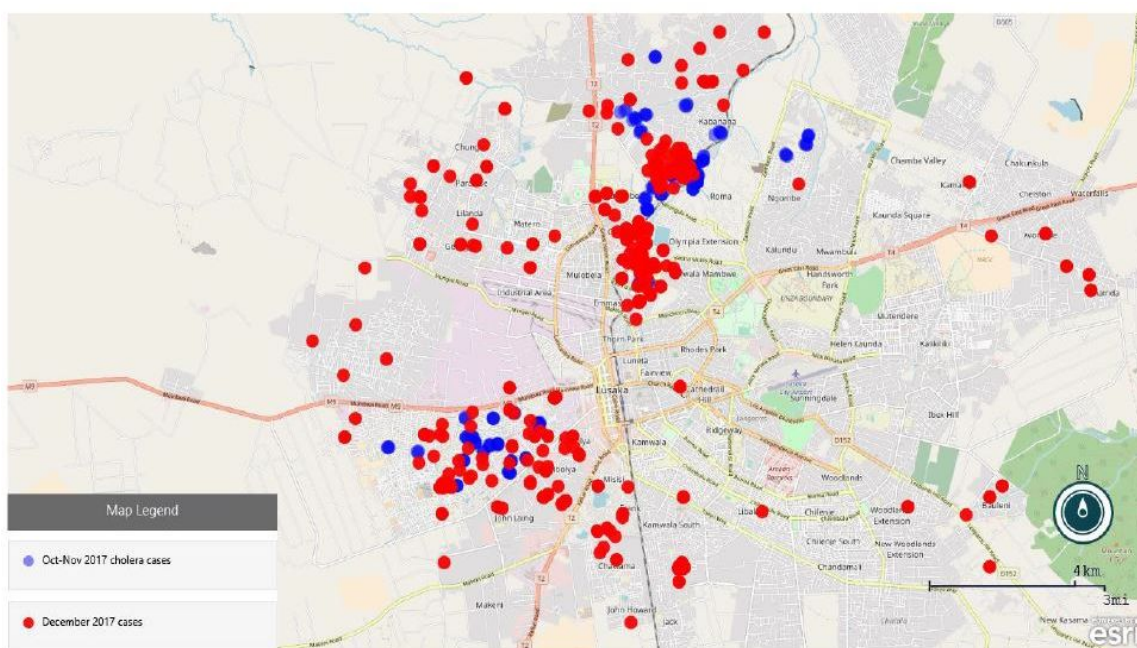
POTENTIAL RISKS

Contaminated water poses a significant health risk to city residents. The urban poor do not have adequate income to purchase home preventive measures such as chlorine for water disinfection and extra bars of soap specifically for hand washing. The handling of contaminated household water storage containers can lead to the spread of waterborne diseases.

The prevalence of waterborne diseases such as cholera, typhoid, dysentery and other diarrhoeal diseases is likely to increase with negative implications for the city's labour force and several sectors of the economy, ranging from education to trade. For local authorities and central government, the increased disease burden will likely divert resources from other essential sectors to the fighting of waterborne diseases. Negative impacts will also be felt at the household and individual level, particularly the urban poor - an increase in these diseases will prevent people from being able to work and high hospital bills will increase household or individual expenditure. In densely populated areas with no access to the water or sewerage network and poor solid waste management practices, the risk of rapid disease spread is high.

CHOLERA THE RISE OF WATERBORNE DISEASES

- Cholera is a major public health issue in Lusaka. Analysis of rainfall and epidemic data in Lusaka shows a strong correlation between the two: cholera outbreaks align with the rainy season from October to May or June¹.
- A major outbreak of cholera was reported in 2016 where 1,079 cases and 20 deaths were recorded in Lusaka's peri-urban areas between February and May². During a cholera outbreak in 2017-18 (Figure 4) 5,414 cases and 98 deaths were recorded in Lusaka between October 2017 and May 2018³. Contaminated water from shallow wells was a key factor resulting in significant economic and social impacts: students were unable to attend school and university, street and market trading was forbidden in certain areas, and curfews were put in place in a number of informal settlements.



Source | <https://cmmb.org/cholera-outbreak-in-lusaka-zambia/>

Figure 4 Map showing hotspots in recent cholera outbreak, Lusaka (cases recorded 6 October - 31 December 2017)

Groundwater pollution poses a huge threat to urban food security in terms of food safety. Groundwater pollution is likely to contaminate agricultural food products from urban and peri-urban areas that are dependent on groundwater for irrigation. Accumulation in the food chain of heavy metals may have detrimental long-term effects on human health. Additionally, this is likely to increase the city's dependence on foods from distant places, which could in turn increase food prices for city residents. This could have adverse health, social and economic consequences. The accumulation of pollutants in Lusaka's water systems will affect the city's ecosystems and natural asset base e.g. rivers, streams, wetlands and dambos. Groundwater pollution could also make the city less attractive for commercial investments and sectors such as tourism.

References

[1] World Health Organization (2011) Cholera Country Profile: Zambia

[2] Matapo B, Chizema E, Hangombe BM et al. (2016) Successful Multi-partner Response to a Cholera Outbreak in Lusaka, Zambia 2016: A Case Control Study Medical Journal of Zambia, Vol. 43 (3): pp 116 - 122

[3] Sinyange N, Brunkard JM, Kapata N, et al. Cholera Epidemic — Lusaka, Zambia, October 2017–May 2018 MMWR Morb Mortal Wkly Rep 2018; 67:556–559. DOI: <http://dx.doi.org/10.15585/mmwr.mm6719a5>

POLICY RECOMMENDATIONS

1. Land must only be opened up for the development of houses or commercial buildings *after* it has been serviced with a **safe sewer network**.
2. **Increase housing project initiatives that use high rise flats and in-built sanitation connected to the main city sewer** to benefit the urban poor in peri-urban areas. This will reduce the number of people constructing their own houses and reduce the number of households that do not follow the 30 metres between water sources and on-site sanitation regulation.
3. Water catchment areas must be declared by way of a Statutory Instrument as **environmentally sensitive areas**. This should compel government and service providers to regulate the use of such areas to avoid creating potential sources of pollution in these important areas.
4. Improve land use planning by **enhancing environmental protection of groundwater resources**.
5. Development control practices must be revisited to put mechanisms in place that ensure **timely and effective regulation of developments**, especially in water catchment areas and development projects that have the potential to increase or contribute to groundwater pollution.
6. **Review solid waste management systems** for the city to adjust approaches and practices to reduce groundwater pollution resulting from indiscriminate solid waste disposal. An operational policy framework on solid waste management that ensures effectiveness in the prevention of groundwater pollution is necessary and must be developed and implemented by all relevant stakeholders.
7. Increase the **monitoring and management of water quality and water and sewerage networks**. Sustainable water and sewerage system monitoring by Lusaka Water and Sewerage Company (LWSC) is needed to more quickly identify broken or leaking pipes as is more regular testing of water quality.
8. Intensify **education and engagement at the household level on health, hygiene and water quality**. Sensitisation at household levels (on a one-to-one basis) on improved hygiene habits, the use of lime or chlorine to treat contaminated water and the proper disposal of solid waste is critical. Those who are most vulnerable e.g. the poor, elderly etc. should be identified and prioritised to assist them in the uptake of improved hygiene practices.

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