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GOOD GOVERNANCE AFRICA

Addressing Zambia's Water Security Challenges

By Leleti Maluleke

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Executive Summary

This policy briefing outlines the scale of Zambia's current water crisis and examines its impact on agriculture, the environment, and the economy. Based on this analysis, it recommends a multifaceted approach to improve water management and distribution. Key recommendations include enhancing governance frameworks, investing in infrastructure, promoting sustainable agricultural practices, and addressing gender inequalities in water access.

Recommendations

- **Establish a National Water Resources Authority:** Develop a comprehensive framework for managing both surface water and groundwater.
- **Improve Infrastructure Maintenance:** Optimise critical infrastructure like pump stations and water treatment plants.
- **Invest in Irrigation and Drainage Systems:** Offset productivity losses in rain-fed farming and implement climate-smart agricultural techniques.
- **Protect Natural Water Systems:** Enhance biodiversity conservation efforts and address capacity gaps, law enforcement failures, and funding deficiencies in the conservation sector.
- **Implement Environmental Governance in Mining:** Ensure future mining projects consider water scarcity issues and adopt the "polluter pays" principle.
- **Revise Water Legislation:** Address shortcomings in managing shared watercourses and groundwater, and bridge data gaps through more efficient investment allocation and skills development.
- **Address Gender Inequalities:** Acknowledge the disproportionate impacts of water scarcity on women and integrate these considerations into water management strategies.

By implementing these strategies, Zambia can improve water security, boost agricultural productivity, protect its environment, and foster economic growth while ensuring equitable water access for all citizens.

Introduction

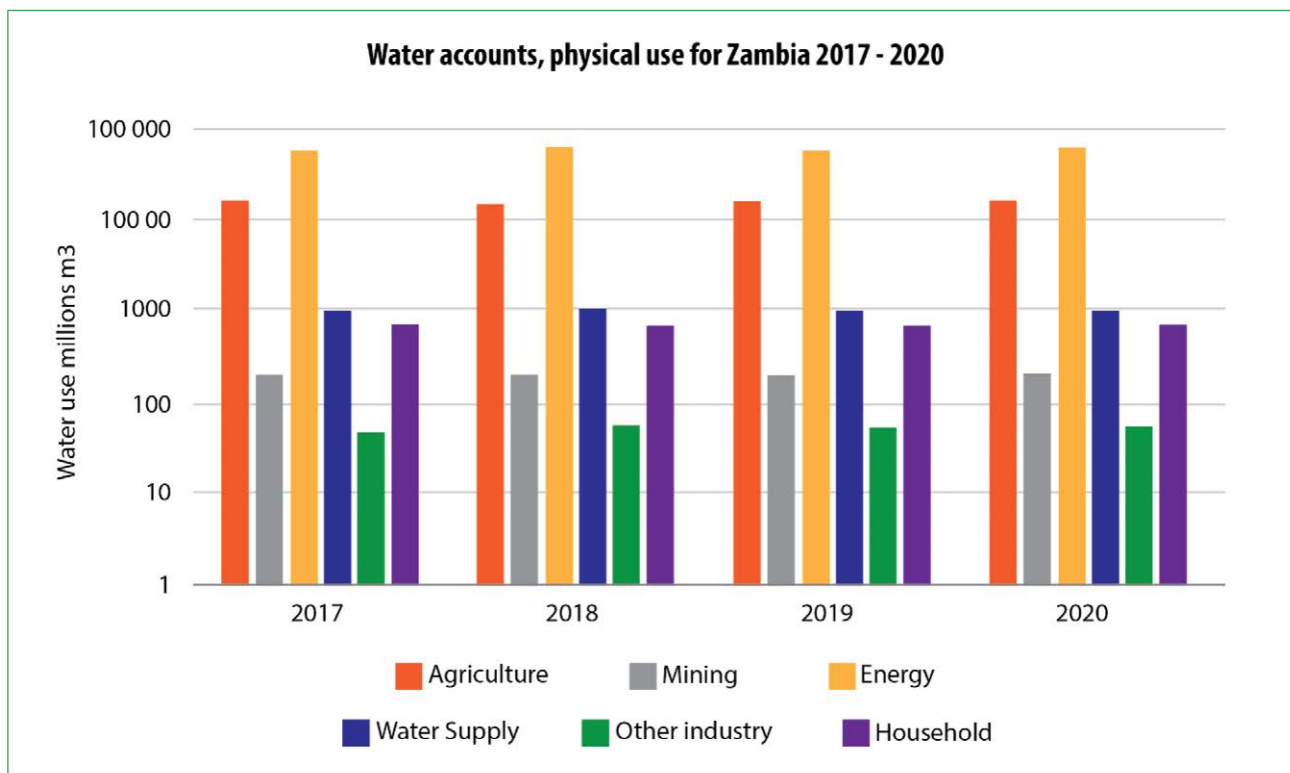
Zambia is endowed with vast freshwater resources. Two of the Zambezi River’s main tributaries flow through the country. Lake Bangweulu, situated in the upper Congo River basin, forms part of one of Africa’s great wetland systems, while the country also shares parts of Lake Mweru with the Democratic Republic of Congo (DRC), and Lake Tanganyika with Tanzania. Zambia experiences moderate precipitation levels, with the south averaging around 600mm and the north around 1335.9mm annually, leading to an overall average of 967.3mm per year.¹

Despite this abundance, climate change, population growth, infrastructure challenges, and related governance issues, Zambia faces increasing water security challenges.² Addressing these through good governance, innovative thinking, and concerted political will is key to unlocking Zambia’s true development potential and ensuring water equality for her citizens.

The scale of the problem

According to the World Bank, only two-thirds of Zambians have adequate access to clean water, a situation that worsens significantly in rural areas where infrastructure for water supply is often lacking or insufficient.³ These infrastructure deficits are primarily due to a lack of funding allocated to the sector in addition to irregular or poor maintenance protocols.⁴ Zambia has five major dams, and around 1,000 small dams that are vital in storing water for agriculture, livestock, and domestic use. Despite Zambia having water sector framework documents in place, the condition of the dams remains uncertain due to lack of data and information available. This hinders strategic water resource planning and undermines both efforts to regulate water usage and potential future investments in the development of multi-purpose dams.

Zambia’s energy sector accounts for the largest share of water usage per year (see figure below). The sector



Source: Republic of Zambia Natural Capital Accounts of Water, 2017 - 2020 Technical Report

1 GroundWater Management Institute. (2019). "Policy, Legal and Institutional Development for Groundwater Management in the SADC Member States (GMI-PLI)". <https://sadc-gmi.org/wp-content/uploads/2023/02/Zambia.pdf>

2 Maluleke, L. (2024). "Water, water everywhere but Zambia is water insecure" Available <https://gga.org/water-water-everywhere-but-zambia-is-water-insecure/>

3 World Bank. (2020). "Zambia Water Supply and Sanitation Sector Diagnostic: Narrowing the Gap between Policy and Practice." World Bank, Washington, DC <https://openknowledge.worldbank.org/server/api/core/bitstreams/6f0f8a16-d355-50f0-a6b8-37d0284fd140/content>

4 World Vision Zambia. (2022). "Capacity Statement – Water, Sanitation and Hygiene (WASH) Technical Programme" <https://www.wvi.org/sites/default/files/2022-11/Capacity%20Statement%20-%20Water%2C%20Sanitation%20and%20Hygiene%20%28WASH%29%20Technical%20Programme.pdf>

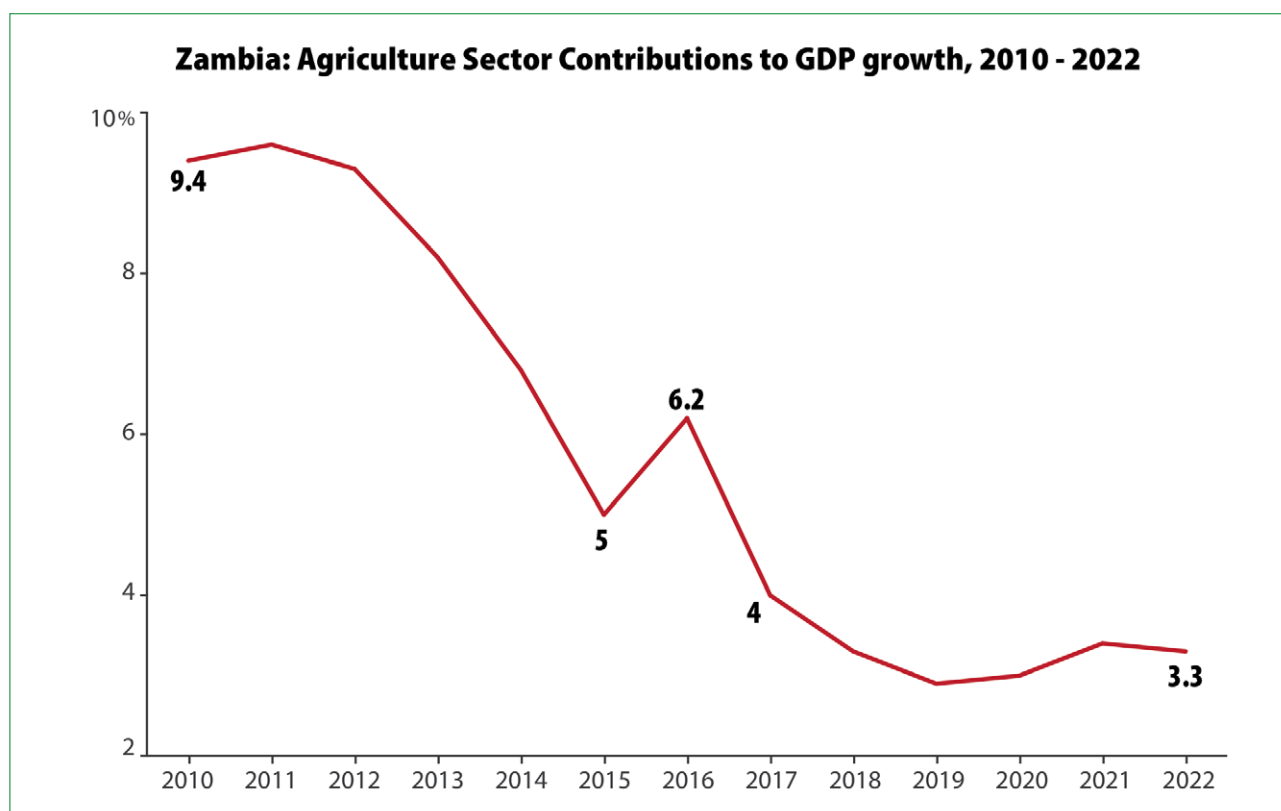
uses around 60 000 billion cubic meters (or 60,000 million cubic metres) (mm³). However, much of this is non-consumptive. Rain-fed agriculture usage is roughly 12,000 mm³, while irrigated agriculture accounts for approximately 3,300 mm³ per annum. The household sector is the third largest user of water, however, the number of households relying on self-sourced water has increased due to population growth and limited infrastructure.⁵

This unequal distribution of water resources exacerbates the water crisis across regions, with far-reaching impacts on health, education, and commerce. Women and girls bear the brunt of these impacts as they are primarily responsible for household water collection in rural areas. These often-long journeys to collect water not only come at the cost of spending time away from school or work, but also present a personal safety risk.

The impact of inadequate access to clean water can also be seen on the health of Zambia's citizenry. Contaminated water is the third largest cause of under-five mortality.⁶ Diseases originating from contaminated water and lack of sanitation in Zambia include cholera, dysentery, and typhoid. Since 2023, Zambia has recorded almost 20,000 cholera infections and approximately 700 deaths, making the country an epicenter of the 2024 Southern Africa cholera outbreak.⁷

Impact on Agriculture

Zambia's agriculture sector plays a crucial role in the country's economy. Between 2010 to 2015, the sector contributed 9.2% to the GDP and employed nearly 60% of the labour force.⁸ However, agriculture's contribution to GDP has shrunk to between 2018 and 2022 by 3.3% (see graph below). The sector faces challenges due to



Source: IMF Country Report No. 23/257, 2023

5 Government of the Republic of Zambia (GRZ) (Ministry of Water Development and Sanitation, Ministry of Finance and National Planning, Zambia Statistical Agency). (2022). Natural Capital Accounts for Water, 2017 – 2020. Preliminary results and additional steps <https://www.wavespartnership.org/sites/waves/files/kc/WATER%20TECHNICAL%20REPORT-%202022.pdf>

6 Hamooya,B; Masenga, S; Halwiindi, H. (2020). "Predictors of diarrhoea episodes and treatment-seeking behavior in under-five children: a longitudinal study from rural communities in Zambia" The Pan African Medical Journal. doi: 10.11604/pamj.2020.36.115.20180

7 700 deaths and 20,000 infections ofm cholera outbreak

8 Kaczan, D; Arslan, A; Lipper, L. (2013). "Climate-Smart Agriculture? A review of current practice of agroforestry and conservation agriculture in Malawi and Zambia" Food and Agriculture Organization of the United Nations <https://www.fao.org/4/ar715e/ar715e.pdf>

water-related issues that undermine its productivity, among other issues.⁹ Despite abundant water reserves and approximately 523,000 hectares of land suitable for irrigation, accessing water for irrigation purposes remains problematic, particularly in areas where surface water is not readily available for on-farm distribution.¹⁰ Although the government promotes agricultural development, the increasing demand for water for irrigation has surpassed initial estimates. Consequently, the costs associated with installing infrastructure to capture and distribute bulk water are often prohibitively high, posing a significant barrier to the implementation of commercial greenfield projects in the agricultural sector.¹¹

Inconsistent access to water for irrigation due to irregular rainfall patterns and inadequate infrastructure also limits agricultural productivity. According to the Food and Agriculture Organization (FAO), only about 4% of Zambia's arable land is irrigated, highlighting the heavy reliance on rain-fed agriculture.¹² This reliance makes crops vulnerable to droughts and water shortages, leading to decreased crop yields. Staple crops such as maize, rice, and wheat, are particularly affected, with insufficient water availability during critical growth stages hindering plant development and reducing overall harvests. These water security challenges underscore the importance of sustainable water management practices and investments in irrigation infrastructure to enhance agricultural resilience and ensure food security in Zambia.

Should Zambia fully exploit its water resources for irrigation and drainage, the impact of unpredictable rainfall might be mitigated, as irrigated agriculture could at least offset the decreased output from rain-fed farming, at the very least. Nonetheless, despite the presence of various agricultural water management projects in certain districts of Zambia, significant portions of the country still possess underdeveloped water resources.¹³ Ensuring a consistent water supply for agricultural purposes will consequently

safeguard the production of food and other agricultural goods. Given that the agricultural sector employs a substantial portion of the population, this measure will also secure livelihoods for many.

Impact on Environment

Zambia's water crisis has significantly damaged the local environment and biodiversity. Since 2018, severe droughts have drastically reduced crop productivity, forcing farmers to shift towards charcoal production as a means of livelihood.¹⁴ This shift has caused rapid deforestation, particularly in hardwood forests and protected reserves, which has become a major driver of biodiversity loss. The situation is exacerbated by weak law enforcement, insufficient funding, and a lack of institutional capacity in the forestry, fisheries, and wildlife sectors, making it difficult to effectively manage and protect these vital natural resources.

In addition to these challenges, mining operations have posed a severe threat to Zambia's water security. Pollution from these activities has contaminated both ground and surface water sources, notably affecting the Kafue River and the Mushishima Stream in the Chingola District.¹⁵ As a result, residents face severe water shortages and environmental degradation. The once clear waters of the Kafue River have turned a murky green due to pollution. This pollution not only affects the water's appearance but also leads to indigenous fish, emitting unpleasant odours and indicating the presence of harmful substances. The local biodiversity is under threat from toxic discharges by mining operations, as well as from paper mills and fertilizer factories, further endangering the ecosystems that rely on these water bodies.

The pollution of water sources is expected to continue as the demand for critical minerals like copper and cobalt drives the establishment of new mines.¹⁶ As mining

9 African Development Bank Group (2024) "Zambia Economic Outlook" <https://www.afdb.org/en/countries-southern-africa-republic-zambia/zambia-economic-outlook>

10 Mendes, D; Paglietti, L; Jackson, D; Chizhuka, F. (2014) "Zambia: Irrigation Market Brief" <https://openknowledge.fao.org/server/api/core/bitstreams/164426ec-f328-4850-921d-33c67dd62a68/content>

11 Akayombokwa, I; Van Koppen, B; Matete, M. (2015). "Trends and Outlook: Agricultural Water Management in Southern Africa: Country Report Zambia". https://www.iwmi.cgiar.org/Publications/Other/Reports/PDF/country_report_zambia.pdf

12 Akayombokwa, I; Van Koppen, B; Matete, M. *ibid*

13 Ngoma, H; Hamududu, B; Hangoma, P; Samboko, P; Hichaambwa, M; Kabaghe, C. (2017). "Irrigation Development for Climate Resilience in Zambia: The Known Knowns and Known Unknowns." https://www.researchgate.net/publication/322436256_Irrigation_Development_for_Climate_Resilience_in_Zambia_The_Known_Knowns_and_Known_Unknowns/citation/download

14 The African Climate Foundation. (2023). "From Climate Risk to Resilience: Unpacking the Economic Impacts of Climate Change in Zambia". <https://africanclimatefoundation.org/wp-content/uploads/2023/11/800835-ACF-Zambia-country-note-04.pdf>

15 Pure Earth Organisation. "Zambia - Containment of the Kafue River Basin". <https://www.pureearth.org/project/kafue-river-basin-cleanup/>

16 Obsie-Orlu, V. (2023). "A Strategy to Future-Proof Zambia's Mining Industry". Available: <https://www.gga.org/strategy-to-future-proof-zambias-mining-industry/>



Photo: Guillem Sartorio / AFP

activities expand, the risk of further environmental harm and water contamination increases. This makes it imperative to address these issues urgently.

To tackle these challenges, it is crucial to raise awareness about environmental and social governance issues. Companies must establish and adhere to guidelines that address these concerns, ensuring that their operations do not harm the environment. The Zambian Cabinet's endorsement of the "Mineral Regulations Commission Bill, 2023" is a significant step towards addressing these challenges. This bill aims to establish the Minerals Regulation Commission, which will strengthen regulation, monitor compliance, and enforce rules within the mining sector. By doing so, the commission seeks to tackle issues such as environmental degradation and illegal mining practices.

Through improved governance, enhanced regulation, and increased awareness, Zambia can begin to mitigate the impact of its water crisis on the environment and biodiversity. These efforts are essential to safeguarding the country's natural resources and ensuring a sustainable future for its ecosystems and communities.

Economic Implications

The agricultural sector plays a crucial role in driving the country's GDP and providing employment, making water scarcity a significant hurdle for economic growth in Zambia.¹⁷ The impact of water shortages is particularly severe during prolonged droughts, which reduce agricultural productivity and set off a chain reaction that stifles economic growth across multiple sectors.¹⁸ As agricultural output declines, exports and foreign exchange revenues diminish, which further strain the national economy.

Water scarcity also leads to decreased food availability, causing food prices to rise. This inflation disproportionately affects vulnerable households, as they struggle to afford basic necessities. The financial strain on these families becomes even more pronounced as employment opportunities in rural farming communities diminish. With fewer jobs available, poverty levels rise, undermining economic resilience and stalling progress toward development goals.

Moreover, limited access to water can ignite local resource conflicts. Efforts to improve water availability, such as the

17 Mainza, I. (2024) "Understanding the Impact of Droughts on the Zambian Economy: A Critical Analysis" Pulse <https://www.linkedin.com/pulse/understanding-impact-droughts-zambian-economy-critical-ishmael-mainza-nzeyf/>

18 ACAPS (2024) "Zambia Drought Briefing Note" https://www.acaps.org/fileadmin/Data_Product/Main_media/20240315_ACAPS_briefing_note_drought_in_Zambia.pdf

installation of public boreholes and pumps, sometimes inadvertently disrupt existing power dynamics. These interventions can create new tensions within and between communities as individuals and groups vie for control over these resources. The situation is particularly evident in regions like the Namwala district, where the Competing for Water Programme has observed that access to water often depends more on local power relations than on actual need.¹⁹ This inequitable distribution of water benefits exacerbates social tensions and fuels conflict, highlighting the urgent need for fair and effective water management policies.

To address these challenges, Zambia must prioritise the development of sustainable water management strategies that ensure equitable distribution and access. By investing in infrastructure improvements and community engagement, the country can alleviate the economic pressures caused by water scarcity, fostering a more resilient and prosperous future for all its citizens.

Governing Institutional Frameworks

In 1994, the Government of Zambia introduced the National Water Policy, marking a pivotal moment in the country's water sector.²⁰ This policy overhaul aimed to address emerging challenges and adopt modern approaches to water management. Subsequently, recognising the need for ongoing adaptation, the National Water Policy underwent revision in 2010, aiming to establish a comprehensive framework for the sustainable development, management, and utilisation of water resources.²¹

Within the water sector, two distinct sub-sectors emerged: Water Resources Management and Development (WRMD) and Water Supply and Sanitation (WSS). The WRMD division focuses on the sustainable management and development of water resources to ensure the provision of quality water meets Zambia's socio-economic needs.²² Meanwhile, the WSS sector is tasked with delivering services for human consumption, domestic, and industrial use, as well as maintaining adequate supply

infrastructure.²³ Through these strategic divisions and policy revisions, Zambia seeks to navigate the complexities of water management while meeting the evolving needs of its population and economy.

The Water Act 198, while pivotal in its role of overseeing water rights, operates within restrictive boundaries, focusing solely on the consideration, issuance, and monitoring of such rights.²⁴ However, its limitations have significantly impeded the effective utilization of water resources, adversely affecting their control, quality, and availability. Notably, the Act fails to address critical issues such as shared watercourses and groundwater management, leading to unregulated exploitation of groundwater resources, which are often considered privately owned.²⁵ This oversight has perpetuated a lack of monitoring and regulation in groundwater usage, hindering the identification of potential areas suitable for agricultural and industrial development.

The effective management of water resources is hindered by several factors and not only by deficiencies in the institutional and legal structures governing water management. Insufficient data and lack of information systems concerning water resources also present a significant obstacle to effective monitoring efforts.²⁶ Without comprehensive and accurate data on water availability, usage patterns, quality, and environmental impact, it becomes challenging to assess the state of water resources accurately.

Conclusion

Zambia faces significant water security challenges that require a coordinated and comprehensive approach. By strengthening governance frameworks, investing in infrastructure, and promoting sustainable practices, Zambia can enhance water security and support its citizens' health, economic stability, and environmental sustainability. Addressing these challenges will unlock the country's development potential and ensure a prosperous future for all Zambians.

19 Funder, M; Mweemba, C; Nyambe, I; Van Koppen, B; Ravnborg, H (2010) "Understanding local water conflict and cooperation: The Case of Namwala District, Zambia". *Physics and Chemistry of the Earth, Parts A/B/C*, Volume 35, Issues 13-14

20 Minister of Energy and Water Development (2010) National Water Policy

21 Minister of Energy and Water Development (2010) National Water Policy Revision

22 Minister of Energy and Water Development (2011) Water Resources Management and Development

23 Government of Zambia (2005) Water Supply and Sanitation Act No.10 of 2005

24 Government of Zambia, The Water Act 198

25 Government of Zambia (2008). "Integrated Water Resources Management and Water Efficiency Implementation Plan" Main Report (2007-2030) <https://www.gwp.org/globalassets/global/toolbox/about/iwrm/africa/zambia-iwrm-action-plan.pdf>

26 Nussbaumer, D., Sutton, I., & Parker, A. (2016). Groundwater Data Management by Water Service Providers in Peri-Urban Areas of Lusaka. *Water*, 8(4), 135. <https://doi.org/10.3390/w8040135>



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