Research Report

A Comparative Report on Health and Water, Sanitation and Hygiene in Malawi, Tanzania and Zambia

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Abstract

The United Nations International Children's Emergency Fund's strategy for WASH 2016 to 2030 indicated water, sanitation and hygiene (WASH) as central to the attainment of the Sustainable Development Goals (SDGs) because of its implications for nutrition, health, education, poverty and economic growth, urban services, gender equality, resilience and climate change. At the SDGs initiation, the United Nations pledged to 'leave no one behind', with special consideration to the least developed countries in sub-Saharan Africa who had performed poorly in accomplishing the just ended Millennium Development Goals (MDGs). It is in this regard that this paper highlights the past and current status, performance and policies of three sub-Saharan countries; Malawi, Tanzania and Zambia in reference to WASH. These countries were selected due to their similarities in a bid to uncover trends, best practices, and means for improvement of WASH towards the attainment of SDG 6: universal, sustainable, and equitable access to WASH, and an end to open defecation by 2030. Only Malawi attained its target for citizen access to safe drinking water at MDG level, whilst all three countries failed to meet targets for sanitation and hygiene. Causes for success and failure in the improvement of WASH across the three countries were linked to the implementation and sustainability of WASH policies and programs. These findings highlight the importance for full stakeholder engagement from the government to the individual in all sections of WASH. It also recommends the engagement to take part in all WASH sectors, from construction to maintenance, for the overall creation of workable WASH structures and frameworks.

Keywords: Water, Sanitation and Hygiene (WASH), Millennium Development Goals (MDGs), Sustainable Development Goals (SDGs), policies, Malawi, Tanzania, Zambia

Introduction

The resurgence of planning to tackle the challenges of water and sanitation is both timely and imperative. Principal importance is the recognition that despite the reasonable level of growth during the years of structural reforms, poor water and sanitation remains pervasive. Access to water and sanitation services by all segments of the population and industry is a key component of overall sustainable development and this challenge becomes more important when population growth estimates for 2030 are factored in. Sub-Saharan Africa was given a target to achieve 75% access to water coverage in the period between 1990 and 2015 (United Nations 2015). However, the region remained off-track during the Millennium Development Goals (MDGs) with the highest number of people without access to safe water into the year 2015; only 20 of the 46 countries seemed to be on track (UN-Water 2015). Access to sanitation was even worse due to rapid population increase in urban and peri-urban areas. These problems have often accelerated the prevalence of communicable diseases such as diarrhea and cholera. Consequently, the Africa Infrastructure Country Diagnostic (AICD) was created and commissioned in 2005 at the G8 summit by the Infrastructure Consortium for

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Africa (Banerjee and Morella 2011). The AICD project aimed at monitoring and enforcing infrastructure investments and policy reforms designing in Africa because these were considered the keys to development.

This comparative report will focus on three sub-Saharan countries; Malawi, Tanzania and Zambia respectively (Figure 1). These countries have been selected due to their similarities and the unique differences in their geographical, political, and socioeconomic situations. All three fall in the Great Rift Valley and share fresh water from Lakes Victoria, Tanganyika and Malawi (also known as Nyasa). The three countries are neighbors and former British colonies that gained independence together in the early 1960's. All three countries are also members of the Africa Union and Southern African Development Community (SADC). The countries share similar history, political setup and interests, and their progress is expected to be similar. Water sources and usage, sanitation and hygiene, and water, sanitation and hygiene (WASH) health threats will be discussed in relation to policies and the current Sustainable Development Goals (SDGs). The target for SDG 6 includes achieving universal and equitable access to safe and affordable drinking water, and access to adequate and equitable sanitation and hygiene for all by 2030 (UN-Water 2017). Despite the strong similarities between these countries, their performance in WASH has been very different. This picture corresponds to the views of other researchers that have agreed in the past that there is no single model that guarantees an effective water governance (Rogers and Hall 2003). On the other hand, other researchers suggest that donor aid needs to be increased and believe there is more need for foreign aid to elevate WASH and other problems in Africa (Ndikumana and Pickbourn 2017). However, this report suggests that there is need for more funding, but the most important issue is for the indigenous people to gain knowledge of their situation and take a leading role if development is to be sustainable. The analysis of the three countries and their WASH policies may help to give insight to future research and policies that may effectively help the three and other developing countries to develop their WASH systems and attain the SDGs.

Data referred to in this comparative report has been summarized in three tables: Table 1 gives the countries socioeconomic background; Table 2 summarizes WASH and health statistics from the end of the MDG era to the recent SDGs; and Table 3 gives a summation of national WASH budgets and policies by which these nations are striving for the improvement of national WASH. These tables have been placed at the before the discussion for ease of reference.

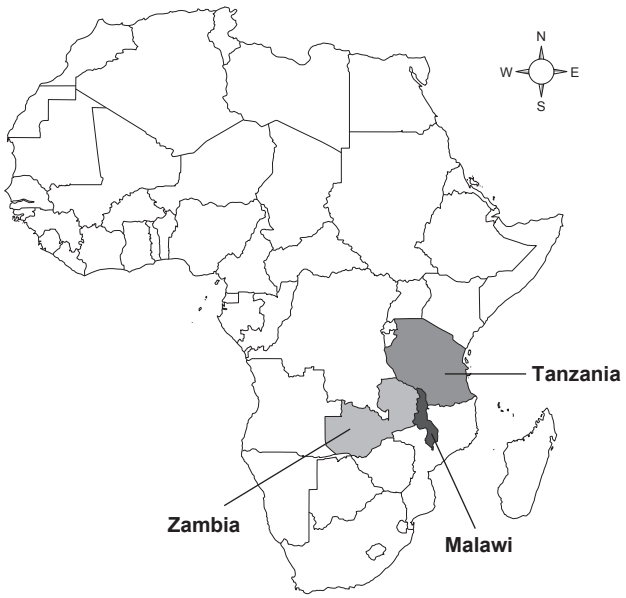

Figure 1. Map of Africa showing Malawi, Tanzania and Zambia.

1. Malawi

1.1. Background

Malawi is a relatively small, landlocked country with a total surface area of 118,480 km^2, and 28,760 km^2 (20%) of the total area is covered by water (Laisi 2009). The total national population was estimated to be over 17.5 million in 2018 (NSO 2018). The population percentage based on religion indicated that, Christians 77% and Muslims 13% were the majority. Total National population was over 17.5 million. The population of northern region had over 2.2million, central region had over 7.5million and southern region had over 7.7million (NSO 2018).

Malawi has several fresh water sources. A network of rivers and lakes are supported by Lake Malawi, the biggest surface water resource in the country. As an agricultural economy, most of Malawi's surface water is used for crops, livestock production and hydroelectricity. The groundwater is mainly used for domestic purposes in both rural and urban areas. Malawi successfully surpassed the MDG's water access target. However, Malawi is considered a water-stressed country, and likely to be water scarce by the year 2025 (Government of Malawi 2008; NSO 2018). Malawi's major challenges range from lack of funds for increased service delivery to rapid population growth in urban and peri-urban areas, poor infrastructure management and drastic climate conditions such as persistent droughts and floods.

Regarding sanitation and hygiene, statistics indicated that people in Malawi had basic sanitation which was estimated at 84% in 2005 and 93% in 2009 (Ministry of Economic Planning and Development 2011). However, the availability and usage of toilets seemed to vary depending on location, intervention and pressure from high population density (Ministry of Irrigation and Water Development 2006). In addition, 80% of the sewage from industries and residential areas was directly flowing into the rivers which were also a common source of water for domestic usage. The Malawi Sanitation Policy of 2006 also indicated that household hygiene practice was low, and households that used hand-washing soap were 45% of the 75% of the households that had soap in the house (Ministry of Irrigation and Water Development 2006).

1.2. Review of Past Performance

The proportion of households with sustainable access to improved water resources was 47% at the beginning of the MDG era. In 2013, the population with access to safe and improved water stood at 86.2%, surpassing the 74% target set by the MDGs and was estimated to reach 92% in 2015 despite the prominent challenges at the time (Ministry of Finance, Economic Planning and Development 2014). The United Nations International Children's Emergency Fund (UNICEF) and World Health Organization (WHO) reported that Malawi's water coverage stood at 90% in 2015 (WHO and UNICEF 2015).

Similarly, the country registered an increase in the proportion of the population with access to basic sanitation from about 72% to 95% between 1990 and 2014 (Ministry of Finance, Economic Planning and Development 2014). This positive impact was mainly attributed to interventions in WASH through construction of sanitation facilities in schools and communities, and sensitization campaigns. Areas where sanitation projects were active in promoting sanitation and hygiene were estimated to get up to 95% sanitation coverage, while those without access to such projects were as low as 40% (Ministry of Irrigation and Water Development 2006).

1.3. Policies and Key Reforms

The Ministry of Irrigation and Water Development (MoIWD) and its subsidiary, the Department of Water Resources Development control and manage the country's water resources. They are guided by the Water Resources Act of 1969 (mainly governing ownership and usage of water resources for farming), Water Works Act of 1995

and National Water Policy of 2005 (Chiluwe and Nkhata 2014). The National Water Policy of 2005 endorsed the Integrated Water Resources Management and Water Efficiency (IWRM/WE) plan which started in 2008 as the basis for sustainable water and sanitation development in Malawi (Ministry of Irrigation and Water Development 2006). The National Water Policy aimed to address water resource management, water resource development, and water service delivery. The policy emphasized four main areas of water management, i.e., water for food, water for people, water for hydro-electric energy, and water for environment. The strategies to compliment the policy were; providing water in sufficient quantities and acceptable qualities to all, promoting water conservation, developing and expanding raw water sources, incorporating local governments and communities in planning, development and management of water supplies and sanitation services, rehabilitating the existing infrastructure and creating an enabling environment for public-private partnerships in water supply and sanitation activities (Ministry of Irrigation and Water Development 2005).

The National Water Policy is an inclusive plan that engages all stakeholders to take responsibility for their water resources and environment. The Malawi Water Board is responsible for providing piped water to the households and public institutions. Boreholes, water kiosks and wells are very common household water sources in peri-urban areas and rural areas of Malawi. An ambitious move promoting taps instead of boreholes has also been adopted with aid from donors and some NGOs to ensure safe and potable water delivery to all citizens (Figure 2). The Water Board has been supported to build multi-purpose dams and groundwater resources and Private Public Partnerships are also being promoted to ensure equitable delivery of water and sanitation services to the growing population (Ministry of Finance, Economic Planning and Development 2014) (Figure 2).

In addition, the government developed a National Sanitation Policy in 2006 to ensure the population without access to sanitation was halved by 2015, and to achieve sanitation for all by 2020. Some of the strategies put in place involved; establishment of a new Directorate for Sanitation within the Ministry of Irrigation and Water Development, establishment of a National Hygiene and Sanitation Coordination Unit (NHSCU), preparation of enabling Legislation to provide for the implementation of the National Sanitation policy, creating institutional linkages to include organizations concerned with civic education, as well as the private sector through the continuation and expansion of the National Sanitation Policy Steering Committee (Ministry of Irrigation and Water Development 2006).

In 2006, Malawi developed the National Sanitation Policy with a team called Sanitation Core Team (SCT). The team was comprised of senior and junior members from about 10 ministries including ministries of Health, Water development, Child Welfare and Community Development (Ministry of Irrigation and Water Development 2006). The SCT and the policy aimed to work with all stakeholders from government departments and NGOs to households and communities. The aim was to achieve the country's MDG commitment to halve the population without access to basic sanitation by 2015 and achieve universal access to improved sanitation by 2020.

A Kiosk: A common source of household water in peri-urban Malawi.

A well: A common source of household water at a village in Tanzania.

A borehole: A common source of water at a village in Zambia.

Figure 2. (a), (b) and (c) show some of the common sources of household water used in Malawi, Tanzania and Zambia respectively. (Photos by the author)

1.4. The Current Situation of WASH

In Malawi, poor WASH contributes to 3,000 deaths of under five children every year (UNICEF Malawi 2018). An estimated 1 million people in Malawi are still practicing open defecation. The recent statistics indicate that 6% of the households nationwide are still practicing open defecation, while stunting in children under the age of five is remarkably high at 37% (USAID 2019). The mortality of children under five years of age is 63 deaths per 1,000 live births and Infant mortality rate is at 42 deaths per 1,000 live births. The number of annual cases of cholera recorded recently were 874 between 2017 and 2018. 27 deaths from cholera were reported during the same period 2017–2018, and case fatality rate (CFR) was 3.1% (NSO 2018). The Malawi government with the aid of UNICEF Malawi has partnered with other NGOs and the private sector to support and promote interventions towards usage of improved sanitation and hygiene services. This is an inclusive program that depends on the Community Led Total Sanitation (CLTS) approach. Malawi joined the Open Defecation Free (ODF) campaign under the Community Led Total Sanitation (CLTS) strategy in 2007, as it was a trend in most developing and middle-income countries. The aim is to improve sanitation and hygiene practices in a community. The focus is on behavior change and increasing the demand for toilets and hand washing facilities for households and public institutions in communities.

Malawi has a small and struggling economy. The country registered an increment in GDP from 3.9% in 2017 to 4% in 2018 (UNICEF Malawi 2019a). In 2018/19 national budget was increased from 1.3 trillion Malawi Kwacha (approximately $1.762 billion USD) in 2017/18 to 1.45 trillion Malawi Kwacha (approximately $1.966 billion USD) (UNICEF Malawi 2019a). Consequently, 23.1 billion Malawi Kwacha (approximately $31.3 million USD) was allocated to the WASH sector in 2018/19 representing a 12.3% increase from the 2017/18 budget representing a 27% reduction (UNICEF Malawi 2019b).

However, many Malawians in rural and peri-urban areas still rely on groundwater for household usage; they are not connected to the piped water supplied by the Water Boards due to limited resources (Ministry of Irrigation and Water Development 2007) (Figure 2). In addition, most shallow wells that were used and studied indicated a high level of fecal contamination (Mkwate et al. 2017). Hand hygiene has been neglected in many areas and recent interventions seem to be helping (Figure 4). Consequently, with annual cholera outbreaks, this water exposes people to high risk of disease due to consumption minus water treatment.

2. Tanzania

2.1. Background

Tanzania is the largest country in east Africa with a total geographical area of 940,000 km^2 and 60,000 km^2 (6%) covered by water (MoHCDGEC et al. 2016). As of 2012, the total national population was estimated at 44.9 million (NBS and OCGS 2013). The population percentage based on religion suggested that there Christians were 61% and Muslim covered 35% of the total population.

Tanzania's massive land surface is rich in minerals and natural resources including freshwater wetlands estimated to cover 10% of the total land surface (Division of Environment 2015). Despite having a profitable mining sector, the Tanzanian economy is still highly driven by agriculture which was estimated to cover one-quarter of the gross domestic product (GDP) and offers employment to nearly 80% of the population (World Bank 2012). Many people in Tanzania depend on wetland resources for agriculture, fishing, livestock production, hydro-power, and most importantly domestic usage (Division of Environment 2006). Tanzania also shares some of its major water bodies with other countries such as Lake Malawi (also known as Lake Nyasa) with Malawi.

Tanzania was among the 63 countries in the world that failed to meet their water MDG targets and had the second worst sanitation coverage (World Bank 2018). Its key WASH targets were to increase national water supply service coverage from 51% in 2000 to 90% in 2015 and from 68% in 2000 to 95% in 2015 in rural areas and urban water supply service coverage respectively (Kessy and Mahali 2017). The 2014 Tanzania MDG report estimated that 59% of the households in the mainland had access to a clean and safe water source. On the other hand, the proportion of population using an improved sanitation facility stood at only 13% during the same period (Ministry of Finance 2014).

2.2. Review of Past Performance

Economically, Tanzania has managed to constantly reduce poverty since 2007, and has registered an annual GDP growth of 6.5% per year for the past 15 years (World Bank 2018). This economic growth rate has propelled Tanzania to be the second largest economy in East Africa. Despite this remarkable progress since the MDGs era, Tanzania was among the 17 countries that could not meet its water targets to halve its "population without access to safe water" between 1990 and 2015 (World Bank 2018).

The Joint Monitoring Program of 2010 estimated the national water coverage at 54% (African Ministers' Council on Water 2011). Some progress was made towards the end of the MDGs period when the country achieved a 64% coverage for improved drinking water and 31% for improved sanitation by the year 2015 (Division of Environment 2015). The progress, however, was not good enough to meet the MDG targets for water and sanitation. In 2018, the World Bank reported that 24% of rural Tanzanians relied on traditional open-dug wells and 18% on surface water while those in urban areas without access to tap or borehole water depended on informal tanker trucks or water vendors (Figure 2).

2.3. Policies and Key Reforms

The little progress in access to WASH made during the MDGs and the coming of the SDGs resulted in various reforms to government policies and priorities. The National Strategy for Growth and Reduction of Poverty (NSGRP) is the biggest reform being revised several times. The National Water Policy and the National Water Sector Development Strategy (NWSDS) were developed and led to the launch of the Water Sector Development Programme (WSDP) in 2007 (Kessy and Mahali 2017). The program was initiated in two phases, from 2007 to 2014 and the second phase was launched in 2014 (WSDP 2014). The following years saw the Water Resources Management Act No. 11 of 2009 and the Water Supply and Sanitation Act No. 12 of 2009 enacted. The program

aimed at strengthening sector institutions for water resources management and improving access to clean and safe water supply and sanitation services (WSDP 2014). The strategies that were put in place in the water strategy of 2006 included; identifying sector needs at all levels and in all organizations in terms of staffing and skills requirements, implementing a human resources development plan for building staff capacities in integrated water resources management at all levels, developing a framework for strengthening human resource capacities in local and catchment water user organizations and developing appropriate training delivery capacity (Ministry of Water and Irrigation 2008).

The Water and Sanitation Act led to the formulation of the Water and Sanitation program (WSP). WSP partnered with the Ministry of Health in 2008 to initiate CLTS to support households to attain access to improved water and sanitation (WSDP 2014). WSDP was revised in 2010 and National Sanitation Campaign (NSC) was included in the program. The campaigns were initiated as pilot programs in some districts to help speed up the progress to achieve the MDGs target of people with access to Sanitation by 2015 (WSDP 2014). Some of the sanitation strategies that were developed were; identifying sector needs at all levels and in all organizations in terms of staffing and skills requirements, implementation of a human resources development plan for building staff capacities and increasing motivation in the provision of water supply, sewerage and sanitation services at all levels, strengthening the capacity of the Regional and Local Government Authorities, and enhance the capacity of the private sector and Non-government Organizations, to operate water supply, sewerage and sanitation schemes (Ministry of Water and Irrigation 2008).

Tanzania has made a few positive strides through campaigns towards sanitation over the years. Rural sanitation has seen some progress in transitioning households to using improved sanitation facilities thereby reducing open defecation. Initiatives such as the 1973 *Mtu Ni Afya* (Health Man) campaign and some latest campaigns like *Choo Bora* (A Good Toilet is Possible!) have achieved some success in pilot districts (World Bank 2018). In 2016, Tanzania developed a manual for assessing Open Defecation Free status and joined the campaign under the Community Led Total Sanitation (CLTS). These strategies have used behavioral change communication and sanitation marketing approaches to emphasize the importance and promote the usage of improved toilets. Despite these approaches, scaling up of improved sanitation remains a challenge. In Tanzania it is required to also note that the Central government, Ministry of water, the Basins water boards and water offices are the main entities responsible for all water governance.

2.4. The Current Situation of WASH

Despite the positive intervention and policies, the government of Tanzania still faces many challenges. Collection of funds from unwilling citizen users of water who do not feel obliged to pay, monitoring of infrastructure, operation and maintenance costs also seem to be a challenge. WSDP had shown positive results and offered promise during the MDGs with the ability to convince donors and accumulate over 950 million dollars in five years (CSO 2015). However, with a growing population the funding is still to little to achieve the SDG water goals.

Tanzania has a stable and the biggest economy in east Africa. Tanzania maintained a stable growth of its economy and the GDP was estimated between 6.5% to 7% (UNICEF Tanzania 2018). The 2017/18 budget was set at 1.087 trillion Tanzania shillings (approximately $468.7 million USD), indicating a 26% increment from the previous year at 841 billion Tanzania Shillings (approximately $302.6 million USD) (UNICEF Tanzania 2018). Approved budget allocation to the water sector declined from 957 billion Tanzania Shillings (approximately $412.6 million USD) in 2016/17, to 702 billion Tanzania Shillings (approximately $302.7 million USD) in 2018 (UNICEF Tanzania 2018).

Tanzania has not shown significant improvement in access to safe and clean water especially in rural areas of the country. The estimated rural households with access to safe and clean water was at 45% in 2004 and 2005 and was recorded to have risen to 57% in 2012. Conversely, statistics for the same period indicated a decline from 79% to 77% in urban areas and household access to basic sanitation also dropped from 93% in 2007 to 88% in 2011 (Kessy and Mahali 2017). However, most recent data show that almost 75% of households in urban areas, 14% in rural, and 31% nationwide have access to improved sanitation. On the other hand, stunting in children remains high at 35% (MoHCDGEC et al. 2016; World Bank 2018) (Figure 3). Mortality of children under five years of age was 74 deaths per 1,000 live births. Infant mortality rate was 68 per 1,000 live births (Ministry of Health and Social Welfare 2008). Recent cholera statistics indicated 4,636 cases and 95 deaths in 2017, and 4,444 cases and 80 deaths were reported in 2018. CFR was 1.7% on average (MoHCDGEC 2018).

WSDP (2014) estimated that poor WASH accounts for about 5,800 annual cases of cholera, and the death of 18,500 children under the age of five every year from diarrhea with about 90% of these deaths caused by poor WASH conditions. In addition, the 2010 Demographic and Health Survey (DHS) through multiple regression analysis highlighted that rural Tanzanian children were stunted in communities with poor human fecal management, portraying a strong link between sanitation and nutrition (WSDP 2014).

A representative of a basic unimproved latrine. Picture taken in Malawi.

A representative of a basic improved pour flush latrine. Picture taken in Tanzania.

A representative of an improved pour flush toilet. Picture taken in Zambia.

A representative of a modern, improved and flush toilet. Picture taken in Malawi.

Figure 3. (a), (b), (c) and (d) show representative toilets that are commonly used in peri-urban Malawi, Tanzania and Zambia. (Photos by the author)

3. Zambia

3.1. Background

Zambia has a total geographical area of 752,612 km^2 About 317,000 km^2 is covered by water. The population census of 2010 estimated that Zambia would have over 17.9 million people in 2020, with Christians taking 95.5% and Muslim taking 2.7% (Office of International Religious Freedom 2019c). Zambia has vast water resources in form of rivers, streams, lakes and groundwater. However, declining rainfall patterns over the years have had a significant adverse impact on the country's water resources. In terms of groundwater, Zambia has favorable geological conditions for accessing groundwater with regard to depth, storage capacity, available yields and exploitation potential. However, water resource management has not succeeded to substantially improve access to water or prevent the pollution of both surface and groundwater (Republic of Zambia 2006).

Target 7.C of the MDGs was to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. Approximately 2 million Zambians had no access to sanitation facilities and open defecation was common (UNDP 2013). In 2015, some 2.4 million people were still using unimproved sanitation facilities, of which a third practiced open defecation; a failure to reach MDG sanitation targets (United Nations 2015).

3.2. Review of Past Performance

Some successes were achieved in the early and late 1990s during the implementation of the drought relief program, upgrading of squatter compounds in peri-urban areas, and the rehabilitation of the urban water supply program, which gave rise to increases in access to safe water supply. The program was targeted at drilling and the rehabilitation of boreholes and wells in drought prone provinces. The rehabilitation of urban water supply systems was concentrated along the rail line, but very little was done for rural district towns.

According to the 2005 MDGs report, halving the proportion without sustainable access to safe drinking water and sanitation was perceived as likely to be achieved by 2015. The proportion of the Zambian population, without access to safe drinking water remained high, estimated at 47%, with rural dwellers being the worst affected. Several deaths each year were attributed to poor WASH. According to UN-Water (2013), WASH factors are responsible for 11.4% of all deaths in Zambia.

3.3. Policies and Key Reforms

In the late 1980s, the government began the formulation of a policy and institutional reform of the water sector which culminated in the development and adoption of the National Water Policy of 1994 which provides the overall framework for the sector (Ministry of Energy and Water Development 2010). It covers water resources management, urban water supply and sanitation, such as water quality and water tariffs, and rural water supply and sanitation. To operationalize water sector policies, strategies were developed. These include: Strategy and Institutional Framework for the Water and Sanitation Sector approved in 1995, National Environmental Sanitation Strategy launched in 1998 and the National Irrigation Plan developed in 2001.

The most significant strategy was the Water, Sanitation and Hygiene Education (WASHE), adopted in 1996 (Ministry of Energy and Water Development 2010). According to the policy, WASHE was to work in the rural areas only with the objective of promoting integrated development of water, sanitation and health education to improve the impact of water supply and sanitation on health and to promote community management so as to ensure sustainability of services through better financial support, operation and maintenance. In 2010 a modern national water policy was developed to include the new principles of water resources management. Some of the strategies were to develop national water resources management plans, water resources regulations and guidelines,

mechanisms for equitable and reasonable allocation of water, a fair and justifiable tariff structure for water use and to develop water allocation plans with the participation of local communities.

The Fifth National Development Plan from 2006 to 2010 explains the plan on Water Supply and Sanitation (WSS), which caters for the provision and maintenance of adequate supply of water for human consumption and domestic use in rural areas (Republic of Zambia 2006). Water supply sources may be from boreholes, shallow water wells or springs. Sanitation aspects include the promotion of hygiene education in rural communities and schools. During the planned period, a new water bill was scheduled to be presented to parliament. The proposed new bill would have provisions for implementation of integrated water resource management. The legal framework for WSS is currently anchored in two main pieces of legislation namely, the Local Government Act No. 22 of 1991 and the WSS Act No. 28 of 1997 (Government of Zambia 1997). Other legislation which has an impact on provision of water includes the Environmental Protection and Pollution Control Act of 1990 whose purpose is protection of the environment and control of pollution, and the Public Health Act of 1995, which has provisions for the management of sanitation and prevention of pollution to water supplies. In 1997 the national environmental sanitation strategy for rural and peri-urban areas in Zambia was developed by the Program Co-ordination Unit. The government realized the need to look at sanitation separately from water. The objective was to meet their MDGs of halving the population without access to sanitation by 2015 and to reduce health risks. Some of the strategies that were put in place were; Identifying and targeting key political and non-political figures, holding national events/workshops at which key figures can contribute and show their support, and which are covered by mass media, to form links to mass media and develop a newsletter to link all those interested in sector progress. Usage of community friendly communication strategies and intersectoral approaches to ensure that the messages being promoted, and how they are promoted, are the same in all sectors of government. In the year 2007 Zambia also joined the Open Defecation Free (ODF) campaign under the Community Led Total Sanitation (CLTS) strategy which was a central part to the sanitation sector wide approach. Community champions such as chiefs took part in monitoring and facilitating behavior change.

3.4. The Current Situation of WASH

According to the 2015 Living Conditions Monitoring Survey (LCMS) Report, analysis by residence shows that 51.6% and 89.2% of households in rural areas and urban areas respectively had access to safe water (CSO 2016). At provincial level however, Lusaka Province had the highest percentage of households with access to safe water at about 96% (CSO 2016). This data shows a significant change in the national access to safe water supply as compared to the situation in 2000 when an estimated 86% of the population in urban areas and 37% of the population in rural areas had safe water access (Figure 2).

In 2015 only, 40% of households in Zambia had access to improved sources of sanitation (CSO 2016); 27% of people in urban areas and 85% in rural areas had no access to improved sources of sanitation. The proportion of households accessing improved sources of drinking water increased from 63% in 2010 to 67.7% in 2015. Households in urban areas had more access to improved sources of drinking water at 89.2% compared to 51.6% of households in rural areas in 2015 (CSO 2016). However, the most recent data in the Zambia country brief reported at the 2019 Sector Ministers' meeting indicated that access to basic drinking water was at 44% in the rural, 86% in the urban, and 61% nationwide (Ministry of Water Development, Sanitation and Environmental Protection 2019). The same report showed the improved access was at 47% in the urban and did not highlight the rural and national figures. The report also highlighted that hand hygiene is even worse with only 5% of the rural households using water and soap for handwashing.

Zambia's economy declined significantly as represented by a GDP of 4% in 2018 to 1.7% in 2019 (World Bank

and IMF 2019). The 2018/19 budget was set at 86.8 billion Zambia Kwacha (approximately $4.8 billion USD) (UNICEF Zambia 2019). The 2017/18 national budget was set at 71.6 billion Zambia Kwacha (approximately $3.9 billion USD). Approved budget allocation to the water and sanitation sector was increased from 628 million Zambia Kwacha (approximately $34.9 million USD) in 2017/18, to 1.9 billion Zambia Kwacha (approximately $105.7 million USD) in 2018/19 (National Assembly of Zambia 2019).

The mortality of children under five years was 61 deaths per 1,000 live births in 2018. Over the same period, infant mortality was estimated at 42 deaths per 1,000 live births (Zambia Statistics Agency et al. 2019). Recent statistics indicated 5,905 cholera cases between 2017 and 2018, and 112 deaths.

A basic latrine at a village in Malawi with a hand washing station (bottle) installed a few metres from the toilet.

An improved toilet and a hand washing station (bottle) at a village in Tanzania.

An improved toilet in Zambia with a hand washing station installed in the toilet room.

A well: A common water source at a village in Malawi.

An improved toilet and a hand washing station (bucket) at a village in Tanzania.

A common hand washing bottle installed near a latrine at a village in Malawi.

A basic latrine with a hand washing station (bottle) at a village school in Malawi.

A common improved pour flush toilet at a peri-urban area in Zambia.

A basic latrine without a hand washing station at a village school in Zambia.

Figure 4. (a), (b), (c), (d), (e), (f), (g), (h) and (i) show pictures of WASH facilities that are commonly used in Malawi, Tanzania and Zambia. (Photos by the author)

Table 1. Summary of history, geogrpahy, population, economy and finance of Malawi, Tanzania and Zambia.

	Malawi	Tanzania	Zambia
Historical Background			
Colonizer	Britain	Britain	Britain
Independence	1964	1961	1964
Geography			
Land Surface (Laisi 2009)			
Location	Southern sub-Saharan Africa	Southern sub-Saharan Africa	Southern sub-Saharan Africa
Total geographical area	118,480 km^2	940,000 km^2	752,612 km^2
Covered by water	28,760 km^2 (20%)	60,000 km^2 (6%)	About 317,000 km^2
Water usage and coverage			
Surface water	Agriculture, hydroelectricity	Domestic use, agriculture, hydroelectricity	Hydroelectricity
Ground water	Domestic use	Domestic use	Domestic use
Total coverage (estimate)	67%	47.9%	61%
Population statistics			
National Population*			
As per last official census	17.5 bn (in 2018)	44.9 bn (in 2012)	13.1 bn (in 2010)
2020 Projection	19.1 bn	57.5 bn	17.9 bn
Religion (Population %)**			
Christian	77.3%	61%	95.5%
Muslim	13.8%	35%	2.7%
Traditional	1.1%	-	-
Others	5.6%	4%	1.8%
Non-religious	2.1%	-	-
Economy & Finance***			
International Membership	African Union, SADC, COMESA	African Union, SADC	African Union, SADC, COMESA
Economy	Agriculture	Mining, agriculture	Mining (Copper)
Currency	Malawi Kwacha: MWK	Tanzania Shilling: TZS	Zambian Kwacha: ZMW
Gross Domestic Product (GDP)	3.9–4% (increment: 2017–2018)	6.5–7% (stable: 2003–2018)	4–1.7% (decline: 2018–2019)
National Budget	MWK 1.3 tn (~USD 1.762 bn) (in 2017/18) MWK 1.45 tn (~USD 1.966 bn) (in 2018/19)	TZS 841 bn (~USD 302.6 bn) (in 2016/17) TZS 1.087 tn (~USD 468.7 bn) (in 2017/18)	ZMW 71.6 bn (~USD 3.9 bn) (in 2017/18) ZMW 86.8 bn (~USD 4.8 bn) (in 2018/19)

World Bank and IMF 2019; UNICEF Malawi 2019a; NSO 2018; UNICEF Zambia 2019

*Last official census: Malawi (NSO 2018; Trading Economics 2020a), Tanzania (NBS and OCGS 2013; Trading Economics 2020b), Zambia (CSO 2012; Trading Economics 2020c)

**International Religious Freedom Report citations: Malawi (Office of International Religious Freedom 2019a), Tanzania (Office of International Religious Freedom 2019b), Zambia (Office of International Religious Freedom 2019c)

***United States Dollar: USD; Trillion: tn; Billion: bn; Million: mn

Table 2. WASH and health statistics of Malawi, Tanzania and Zambia (MDGs to Current SDGs).

	Malawi		Tanzania		Zambia	
Household WASH Statistics: Pre SDGs = MDG (2015)						
Drinking water access	Improved, MDG (2015)	Basic, SDGs	Improved, MDG (2015)	Basic, SDGs	Improved, MDG (2015)	Basic, SDGs
Rural	89.0%	63.0%	46.0%	34.9%	51.0%	44.0%
Urban	96.0%	87.0%	77.0%	79.0%	86.0%	86.0%
Total	90.0%	67.0%	56.0%	47.9%	65.0%	61.0%
MDG target	Target Met	-	Moderate progress	-	Limited or no progress	-
Improved sanitation access	MDG (2015)	SDGs	MDG (2015)	SDGs	MDG (2015)	SDGs
Rural	40.0%	53.0%	8.0%	13.8%	36.0%	18.5%
Urban	47.0%	44.7%	31.0%	74.9%	56.0%	35.0%
Total	41.0%	51.8%	16.0%	31.7%	44.0%	25.4%
MDG target	Moderate progress	-	Limited or no progress	-	Limited or no progress	-
Unimproved sanitation access	MDG (2015)	SDGs	MDG (2015)	SDGs	MDG (2015)	SDGs
Rural	34.0%	41.0%	71.0%	89.3%	34.0%	85.5%
Urban	15.0%	47.0%	36.0%	57.0%	18.0%	65.0%
Total	31.0%	42.0%	60.0%	79.8%	27.0%	74.6%
Open defecation	MDG (2015)	SDGs	MDG (2015)	SDGs	MDG (2015)	SDGs
Rural	5.0%	7.0%	17.0%	13.8%	22.0%	32.0%
Urban	1.0%	1.0%	2.0%	2.5%	1.0%	3.0%
Total	4.0%	6.0%	12.0%	10.5%	14.0%	19.0%
Handwashing station (water & soap)	Pre SDGs (2010)	SDGs	Pre SDGs	SDGs	Pre SDGs (2013–4)	SDGs
Rural	2.0%	8.0%	-	40.9%	5.0%	5.0%
Urban	7.0%	18.0%	-	61.7%	24.0%	26.0%
Total	3.0%	10.0%	-	47.8%	13.0%	14.0%
Health Statistics						
Child Mortality (deaths/1,000 live births)						
Under 5 y.o.	63 (in 2018)		74 (in 2018)		61 (in 2018)	
Infants	42 (in 2018)		68 (in 2018)		42 (in 2018)	
Child Stunting						
Under 5 y.o.	37% (in 2017)		31.8% (in 2018)		40% (2017)	
Annual cholera outbreaks						
Number	874 cases, 27 deaths (in 2017/18)		4,636 cases, 95 deaths (in 2017) 4,444 cases and 80 deaths (in 2018)		5,905 cases, 112 deaths (in 2017/18)	
Case Fatality Rate (CFR)	3.1% (in 2017/18)		1.7% (on average) (in 2017/18)		1.9% (estimate) (in 2017/18)	

Malawi (WHO and UNICEF 2017; NSO 2017; USAID 2018a), Tanzania (MoHCDGEC et al. 2016; World Bank 2018), Zambia (Min. of Water Development, Sanitation and Environmental Protection 2019); WHO and UNICEF 2015

Table 3. Qualitative comparison of WASH policy, governance and strategies of Malawi, Tanzania and Zambia.

	Malawi	Tanzania	Zambia
WASH Policy & Budget Overview*			
WASH Budget	MWK 23.1 bn (~ USD 31.3 mn) (in 2018/19) Budget increase: +12.3% from 2017/18	TZS 957 bn (~ USD 412.6 mn) (in 2016/17) TZS 702 bn (~ USD 302.7 mn) (in 2018) Budget decline.	ZMW 628 mn (~ USD 34.9 mn) (in 2017/18) ZMW 1.9 bn (~ USD 105.7 mn) (in 2018/19) Budget increase.
WASH Budget Allocation	- No clear breakdown of fund - Focus: Water & sanitation. Implementation: Mainly water	- No clear breakdown of fund - Focus: Mainly water rather than sanitation & hygiene	- No clear breakdown of fund - Focus: Mainly water rather than sanitation & hygiene
WASH in policy	Water and sanitation: Clear, separate approach	Water and sanitation: Combined. No clear separation	Water and sanitation: Combined. No clear separation
Water and Sanitation Governance			
Laws governing the water sector			
Policies	- 2005 National Water Policy - 2006 National Sanitation Policy	- 1991 National Water Policy - 2002 National Water Policy	- 1994 National Water Policy - 2010 National Water Policy
Acts	- Water Resources Act of 1969 - Water Resources Act of 2013 (revised) - Waterworks Act 1995	- Water Supply and Sanitation Act No. 12 of 2009 - The Water Utilization Act No. 42 of 1974 - Amendment Act No. 10 of 1981 - Waterworks Act of 1997	- Local govt Act No. 22 of 1990 - Water Supply & Sanitation Act No. 28 of 1997 - Water Resources Management Act of 2011
Responsible party	Water Governance & Management: - Min. of Agriculture, Irrigation & Water Development - Water Resources Board (1969) - Water Boards: water supply services Sanitation: - Local govt - Min. of Health: Sanitation and Hygiene Education - Water Resources Board (1969)	Water Governance & Management: - Min. of Water and Irrigation - Basin Water Boards and Water Offices (1981)	Water Governance & Management: - Min. of Energy and Water Development - Dept. of Water Affairs (since 1972) - Water Board: demand, utilization, allocation of water & rights (since 1949) - National Water Supply & Sanitation Council (since 1997)
National Strategy (Water and Sanitation)			
Strategies & Plans (Water & Sanitation)	- Community Led Total Sanitation (CLTS 2007–2018) - Sanitation Marketing and Hygiene Promotion - ODF strategy - Establish National Hygiene & Sanitation Coordination Unit (NHSCU): Min. Irrigation & Water Development	- National Strategy for Growth and Reduction of Poverty (NSGRP) - National Water Sector Development Strategy (NWSDS) - Water and Sanitation Program (WSP) - National Sanitation Campaign - Community Led Total Sanitation (CLTS 2016) - ODF strategy	- National Irrigation Plan (2001) - Strategy and Institutional Framework for the Water and Sanitation Sector (1995) - Water, Sanitation and Hygiene Education (WASHE) (1996) - National Environmental Sanitation Strategy (1998) - Community Led Total Sanitation (CLTS 2016) - ODF strategy
Governance	Water: - Create enabling environment: WASH PPPs - Rehabilitate infrastructure for sustained services - Incorporate local govt., communities in planning, development, WASH service management Sanitation: - Structural implemenatation: National sanitation policy - Establish new sanitation directorate: Min. Irrigation & Water Development - Institutional linkages: Policy Steering Committee	Water: - Strengthen regional and local govt authority capacities: implemention of roles, responsibilities Sanitation: - Strengthen capacity of regional & local govt. authorities - Enhance private sector and NGO capacity	Water: - Develop: • Water resources regulations and guidelines • Fair and justifiable tariff structure for water use • National water resources management plans
Integrated Water Resource Management (Water)	- Water conservation and catchment protection - Develop, expand raw water sources: sustainable water supply	- Capacity development: trans-boundary water management	- Collaborative development of water allocation plans - Designate protected areas with line ministries - Develop mechanisms for equitable water allocation”
Other	Sanitation - Information dissemination: - Mass media: awareness and information spread - Annual sanitation conference	Water & Sanitation - Human Resource (HR): - Implement human resources development plan - Framework: Strengthen HR capacity in water CBOs - Develop appropriate training delivery capacity - Identify sector staffing and skills needs	Sanitation - Information dissemination: - Develop newsletter (highlight sector progress) - Community friendly communication strategies - National events/workshops: Key figures (political & non-political) & mass media coverage - Form links to mass media

Malawi (Min. of Irrigation and Water Development 2005; NSO 2018; UNICEF Malawi 2019b), Tanzania (Min. of Water and Irrigation 2008), Zambia (Min. of Energy and Water Development 2010; UNICEF Zambia 2019); World Bank and IMF 2019

*Malawi Kwacha: MWK, Tanzania Shilling: TZS, Zambian Kwacha: ZMW, United States Dollar: USD, Billion: bn, Million: mn)

4. Discussion: Qualitative and Quantitative Comparison of Malawi, Tanzania and Zambia

A comparison between the three countries is key to understanding the differences and similarities in their performance and perception of WASH. In this regard, it is very important to quantitatively and qualitatively compare the three countries as they have been highlighted in this paper. Quantitatively, basic population statistics, health statistics, and National economy and WASH budget need to be addressed. On the other hand, Qualitative comparison includes; Water and sanitation governance, National strategy, and results.

4.1. Qualitative comparison

Qualitatively, all three countries seem to have taken similar approaches towards management of WASH sector. Primary governance of Water, Sanitation and Hygiene is given to the ministry responsible for water and ministry of health deals with matters of sanitation and health. In all three countries, system of water governance was adopted from the colonial government which gave full control of water and natural resources to the central government. Similarly, with time and rapid population increase post-independence, all three countries saw the need to decentralize their systems for them to work efficiently. Zambia already had a decentralized system with the Department of Water Affairs and the Water Board which were formed in 1948 and 1949 respectively. Malawi followed in 1969 when water management was shared between the ministry and water resources board. In 1995, the Water Board was established. Similarly, Tanzania's central government established nine basins water boards and water offices in 1981. This difference in time of sector reforms may translate in how the governments have outperformed each other in WASH because those that started earlier would be expected to have a more significant progress. This view arguably corresponds to Tanzania being left behind because the reforms came much later. However, in this regard, Zambia is behind Malawi in access to water and sanitation despite having a decentralized system before Malawi. A possible explanation to this would be that the institutions in place were outdated to cover recent needs in the sector.

The three countries also share similar fundamental policies and laws that govern their WASH sector. The most fundamental policy is the National Water Policy. Malawi established its water policy in 1994, revised in 2005 and 2007, while Tanzania and Zambia created their policies much earlier in 1991, revised in 2002 and the latter 1994, revised in 2010 respectively. Similar conception would be that, those that developed their policies much earlier are expected to be leading in that sector. However, in this case it seems to be the opposite. Developing working policies needs to be supported by implementation to be effective. In this regard, Malawi did better because of planning and implementation. The introduction of separate water boards and institution reforms to the Water Resources Board in 1994 relieved the pressure and gave more power to the local government (Ministry of Irrigation and Water Development 2005). This reform and redistribution was very significant to improving services. On the other hand, Tanzania remained behind because the central government remained the sole investor, implementer and manager of the sector. Reforms only came later in 2002 policy to have an inclusive approach as it was the trend in the region (Ministry of Water and Irrigation 2008). Zambia's slow growth in the water sector was mainly due to poor management of the sector. The 2010 National water policy indicated that 1994 water policy lacked development and implementation strategy, and data assessment of available water resources (Ministry of Energy and Water Development 2010).

All the policies that the three countries have put in place over the years have been cemented and governed by the Water and Sanitation Act, and the Waterworks Act.

In all three countries, water has been granted more attention than Sanitation and hygiene. However, the similarity is that, the water and sanitation Acts aimed at recognizing the importance of addressing water and sanitation as separate entities in order to achieve the MDGs and the future SDGs. This was a positive approach as it ensured that

funds can be split towards water or sanitation projects separately. The water works act also known as the Water resources management Act in Zambia aimed at ensuring power redistribution through institution reforms. The ministries shared power with the local government and water boards. Malawi's water works Act was established early in 1995, and this ensured the national water policy of 1994 could implemented successfully and in time. Tanzania on the other hand developed a national water policy in 1991 and the Waterworks Act came later in 1997. This shows a lack of coordination to effectively guide the reforms. This problem may explain the reason why the policies developed did not work. Zambia's introduction of the Waterworks Act in 2011 indicate the willingness to make positive changes. This gave the water board responsibility to deal with water supplies to entities while the Department of Water Affairs focus on conservation and rights of water resources (Ministry of Energy and Water Development 2010).

In addition, Malawi and Tanzania are very similar in terms of water aspect. This is because both countries depend on agriculture economy which employs over 80% of their population, unlike Zambia which relies mostly on copper mining. This factor may mean that the Ministry of water in Malawi and Tanzania is big and has a robust experience in water governance because they have to strike a balance between agricultural water and domestic water. On the other hand, Zambia's Ministry of water supply would be expected to be better because a lot of effort and funding in their water management has to be directed towards domestic water supply. However, management, policies and implementation are necessary to be successful.

4.2. Strategies

Malawi, Tanzania and Zambia put more effort towards the water development than sanitation and hygiene during the MDGs era. However, in the early 2000, and the fight to attain the MDGs, countries begun to focus on sanitation when they realized the significance. Malawi, Tanzania and Zambia engaged the Open Defecation Free campaign through the Community Led Total Sanitation (CLTS) strategy. The campaign aimed at changing behavior with respect to stopping people defecating in the open or in basic latrines and increasing handwashing with soap behavior. Despite all three countries taking the approach, the approach was different. Malawi and Zambia reports indicate that the campaign and strategy was rolled out around the same time in 2007. Tanzania on the other hand, seem to have started later around 2016. Tanzania produced it's CLTS guidelines for verification of ODF (MoHCDGEC 2016). In this regard, it is arguable to say Tanzania has mostly been behind because of slow management of WASH institutions as compared to Malawi and Zambia.

In addition, Malawi's strategies seemed to focus more on institutional reforms such as; engaging local communities through the Local government, and creation of the water boards and national Water Resources Authority Council (Ministry of Irrigation and Water Development 2006). Tanzania focused more on capacity building rather than institutional reforms. On the other hand, Zambia combined institutional reforms with WASH education. Despite the differences, all three countries are similar because they follow a sector wide approach of engaging all stakeholders, the ministry of water and local government work together, and employ the Community-Led Total Sanitation.

4.3. Quantitative comparison

Quantitative comparison of the three countries display their similarities and differences. Firstly, the total land surface area of the countries is very different. Malawi is a very small country as compared to Zambia, but Tanzania is far much bigger than both Malawi and Zambia. This can be one of the reasons for Malawi and Zambia's better performance in other WASH aspects, such as access to basic drinking water. This is economically understandable because Tanzania would require a huge investment and resources for infrastructure development and maintenance

in order to cover its large area.

Firstly, the most common and perhaps interesting similarity between the three countries is that they were British colonies. The independence that followed, left the countries with western ideologies and systems of governance. This can be evidenced by the presence of laws which were formulated using the British standard and the presence of over reliance of funding from their colonial masters. This turned into a parasitic relationship where the countries depend heavily on colonial funding. This left many countries in Africa helpless when funding was cut or reduced. A good example is that of the fall of Zimbabwe's WASH. When funding was cut off 24% of Zimbabweans were left lacking access to improved water sources, and 32% of the people practicing open defecation (UNICEF Zimbabwe 2018). Conversely, Malawi's strong governance and leadership from 2004 to 2012 emphasized economic independence. This led to the creation of the famous 'zero deficit budget' which was based on what Malawi had and not on donor funds. Malawi's major reforms and achievements came during this period (World Bank 2016).

Secondly, population of the three countries is of great importance to note because it is logical to assert that the bigger the population, the bigger the budget or investment plan. Malawi and Zambia's population are slightly different, with Malawi having a slightly bigger population than Zambia. Malawi and Zambia population can be estimated at around 20 million, while Tanzania's population is over two times the population of Malawi or Zambia. The small difference between the population of Malawi (67% access to drinking water) and Zambia (61% access to drinking water) may explain the reason behind the small difference in access to drinking water (6% difference) and the huge difference between the two countries to Tanzania (47.9% access to drinking water) which has a huge population.

In addition, the population is also a significant factor in a country's economy as the numbers mean there is need for more productivity and circulation of money to sustain a big nation. Tanzania has the strongest economy among the three countries with a stable average GDP of 6.5% to 7% estimated over the past five years (UNICEF Tanzania 2018). Malawi's GDP has not enjoyed such stability and growth as it was estimated at 3.9% in 2017 and 4% in 2018 (UNICEF Malawi 2019a). Similarly, Zambia has faced major hardships in recent years after attainment of middle-income status in 2011 with a GDP of more than 7%. However, Zambia's economy has declined from 4% GDP in 2018, to 1.7% in 2019 (World Bank and IMF 2019). Persistent natural disasters such as floods and cholera, decline of copper industry and heavy debts have been the major causes of this downfall. It is also important to note that the geographical position of these countries also plays an important role in their economies. Malawi is a small, landlocked country, while Tanzania is a big country open to the sea and with a robust tourism industry. Tanzania's access to the sea, possessing the highest mountain (Kilimanjaro) in Africa, and huge game reserves significantly adds value to their economy. Zambia is also naturally endowed, and tourism is also a huge industry with Victoria Falls as a major tourism area.

Thirdly, expenditures in the countries national budget and WASH is significant having evaluated their economic performance. Malawi's national budget was about $1.9 billion USD in 2018/19, and WASH was allocated $31.3 million USD (UNICEF Malawi 2019b). Tanzania had a budget of $468.7 million USD, with $302 million USD allocated to the WASH sector (UNICEF Tanzania 2018). Zambia had a $4.8 billion USD national budget and $34.9 million USD allocated to WASH (National Assembly of Zambia 2019). from the figures indicated, Tanzania shows that it is taking major steps in WASH sector as it is investing much more than the other two countries despite having a low national budget as compared to Malawi and Zambia. However, despite such allocations on paper, Tanzania is still behind of the two countries in access to basic drinking water and total sanitation coverage. This financial breakdown also indicates that Malawi and Zambia can do much better by increasing WASH investments if they are to meet the SDGs by 2030.

An analysis of the countries in relation to WASH also indicate that all three countries are very similar. Access to drinking water is higher in urban areas unlike rural areas in all the three countries. Current access to drinking water is estimated to be at 87% in urban, and 63% in rural Malawi. Similarly, Tanzania's access to drinking water stands at 79% and 34% respectively. Zambia also has higher access to drinking water in the urban area at 86%, while the rural area has 44% coverage. In addition, levels of malnutrition are significantly high in all the three countries. Malawi, Tanzania and Zambia are estimated to have 37%, 35% and 40% stunting of children under the age of five. The trend is the same when it comes to the percentage of people practicing open defecation. The percentage of people practicing open defecation in rural Malawi is at 7% as compared to the 1% in urban settlements. Percentage of open defecation in rural Tanzania is at 13.8% and 2.5% in the urban area. Similarly, in Zambia the figures indicate 32% for rural areas while only 3% for the urban areas.

However, Malawi's rural access to improved sanitation (53%) is higher than urban Malawi (44.7%) and rural Tanzania (13.8%) and Zambia (18.5%). This significant difference is mainly because most (about 50%) urban households in Malawi have shared toilets while most rural households do not share toilets (NSO and ICF 2017).

The 2012 Water and Sanitation Program (WSP) in all three countries indicated a huge number of people with no latrines and many using unsanitary or shared latrines if they were available. In Malawi, 5.2 million people were using unsanitary shared latrines while 1.4 million people had no latrines. Tanzania registered about 26 million people with shared latrines, while Zambia registered 4 million people using shared latrines, while 5.4 million and 2.1 million people had no latrines in both countries respectively (WSP 2012). These figures explain the high infant mortality rate, widespread malnutrition and perennial cholera outbreaks in this region.

Despite these challenges, hand hygiene and usage of soap in urban and rural Tanzania has done better than both Malawi and Zambia. This could be attributed to the high Islamic religion percentage (35% Muslims) in Tanzania (Office of International Religious Freedom 2019b). The Muslim community generally has a high usage of water due to the teachings of their beliefs. For example, they use water to wash themselves after using the toilet while others are content with just using toilet paper. Another reason could be good economic policies which have seen the country at the top of sub-Saharan East Africa GDP, and most people can afford some basic necessities. Campaigns and community sensitization may have also helped, but more study would provide more significant answers.

Finally, the statistics of health output indicate whether progress is being made in relation to WASH. Malawi's under five and infant mortality rate (63 deaths and 42 deaths per 1,000 births respectively) remains to be a problem despite positive improvements through the years (NSO and ICF 2017). Stunting remains to be a big problem for Malawi at 37%. Cholera cases seem to drop but the high Case Fatality Rate (CFR) of 3.9% shows that it is still a big problem. Tanzania health statistics indicate a bigger under five and infant mortality rate. Under five mortality rate was estimated at 74 deaths while infant mortality rate stood at 68 per 1,000 live births (Ministry of Health and Social Welfare 2008). Stunting remains a challenge (35%) for Tanzania, and cholera case also seem to be high but low CFR of 1.7% shows a positive progress. Looking at the same parameters, Zambia is ahead of the two countries in progress with 61 under five and 42 deaths per 1,000 live births (Zambia Statistics Agency et al. 2019). Stunting remains higher (40%) than the other two and cholera cases seem to have been increasing. However, the CFR of 1.9% shows that Zambia is progressing than Malawi in managing cholera response.

4.4. Policies

The most important policy in Malawi is the National Water Policy of 2005 which endorsed the Integrated Water Resources Management and Water. This is a good policy because it recognized the need to equally focus on both water and sanitation independently through the National Water Policy and the National Sanitation Policy in order to achieve the MDGs and the SDGs in an all-inclusive manner. This would eventually help to easily track

accountability, participation and easy execution of tasks because the tasks had been shared and budget divided into water and sanitation respectively. Consequently, it simplified the investment process.

Zambia's most significant strategy was the Water, Sanitation and Hygiene Education (WASHE), adopted in 1996 (Ministry of Energy and Water Development 2010). However, WASHE was to work in the rural areas only with the objective of promoting integrated development of water, sanitation and health education to improve the impact of water supply and sanitation on health and to promote community management to ensure sustainability of services through better financial support, operation and maintenance. This emphasis on education lacked practicality because the government did not invest more on infrastructure development for the communities to exercise the knowledge they were taught, and they also needed to focus more on the growing urban population.

Malawi has seen positive progress due to the reforms in policies coupled with huge investment in infrastructure development and execution. Priority towards water sector development in Malawi is higher than in Tanzania. The budget allocation for water sector development stood at approximately $13.2 million USD in 2017/2018 financial year, and approximately $21.9 million USD for 2018/2019 financial year (JICA 2019). These figures indicate Malawi's water sector development budget allocation increased by 65% in the financial year 2018/2019. This has allowed Malawi to initiate several water developmental projects, such as; Lilongwe Water Supply Resources Efficiency Programme, Mzimba Integrated Urban Water and Sanitation Project, and Lilongwe Water and Sanitation Project (JICA 2019).

On the other hand, Tanzania's failure can be attributed to poor investment in infrastructure and WASH. The approved budget to the water sector has declined over the years. The approved water sector budget indicated that there was a decline from 957 billion Tanzania Shillings ($412,449,997.3 USD) in 2016/2017 fiscal year to 702 billion Tanzania Shillings ($302,586,204.9 USD) in the fiscal year 2017/2018 (ZIPAR and UNICEF 2019). Furthermore, the locally approved allocation was at 690 million Tanzania Shillings ($262,500 USD) in 2016/2017 and 409 million Tanzania Shillings ($176,293 USD) in 2017/2018. In addition, only 32% of the approved allocation was used in 2016/2017.

Zambia has shown slow, but positive progress through scaling up of funds towards the water development sector. Budget allocation was increased by 252% from 564.5 million Zambian Kwacha ($30,947,107 USD) to 1.98 billion Zambian Kwacha ($108,547,868 USD) in 2018 and 2019 respectively (ZIPAR and UNICEF 2019). Zambia's recent increment in budget allocation towards WASH from 564.5 million Zambian Kwacha ($30,947,107 USD) to 1.98 billion Zambian Kwacha ($108,547,868 USD) in 2018 and 2019 is probably a positive response to the persistent cholera outbreaks which claimed over 100 lives between 2017 and 2018. Within the same period Zambia has intensified interventions and WASH education. Projects such as; Lusaka Sanitation project, Kafue Bulk Water Supply and Sanitation project, Kafulafuta Water Supply, and the Nkana Water and Sanitation projects have been initiated as key projects.

Conclusion

Generally, sanitation and hygiene performance have been a huge challenge to all three countries as they seem to have made little or no progress towards their targets. Water, sanitation and hygiene move together and usually budget allocation in all the countries is disbursed as one sum to cover the whole WASH sector. However, more effort has been placed on access to water than sanitation and hygiene.

Many policies and projects that were developed have not been as successful were intended. Moving forward to achieve the SDGs by 2030, some changes need to be made and implemented. Despite upholding the notion that there is no single model that guarantees an effective water governance, this paper has found other factors

that are universal and need to be done. Huge investments in water sector infrastructure development and water governance are very crucial. Malawi's success in water sector development has been achieved due to its high investments in WASH unlike Tanzania and Zambia. However, Zambia's emphasis on WASH education coupled with investments would ensure development and sustainability of the WASH sector. Water governance is of great importance because it ensures good management system of the water sector. However, central to this, is the WASH education which can help people understand WASH as a basic right in which they also need to take their responsibility as a stakeholder. This will ensure inclusiveness in participation, accountability, transparency and good policies because every member of the society will know and play their role.

Besides this, the government and citizens need to take the leading roles in funding and managing their WASH systems for it to be sustainable. Water, sanitation and hygiene funding must be clearly addressed, and task execution must be well promoted. Donor funding is not reliable as it may change or seize as observed from a recent drop of funding in all three countries. Campaigns and interventions need to be encouraged because they have shown that they have been successful in many cases and areas of sanitation in Malawi and Tanzania. Therefore, it is imperative that huge investment plans towards infrastructure development and water governance be made in Malawi, Tanzania and Zambia, and every society in order to achieve the current SDGs by the year 2030.

In addition, a further analysis of the discussion indicate that WASH is a complicated subject that needs strong political will and leadership and inclusive approach. All beneficiaries and institutions always need to be well coordinated and monitored to ensure sustainability. This monitoring involves evaluation and audit of WASH institutions. Cost effective ways of handling sanitation need to be developed to match the economic capacity of the people.

Finally, all three countries are still facing the challenge of providing potable water supply and sanitation. The biggest challenges are lack of investment strategy and management to promote infrastructure development, good maintenance and sustainability.

There's need for further study to understand more about the challenges and differences and why only sub-Saharan countries have performed poorly among the rest of the developing and middle-income countries.

References

African Ministers' Council on Water 2011. *Water Supply and Sanitation in Tanzania: Turning Finance into services for 2015 and beyond*. World Bank, Nairobi.

Banerjee, S. G. and Morella, E. 2011. *Africa's water and sanitation infrastructure: access, affordability, and alternatives*. World Bank, Washington, DC.

Chiluwe, Q. and Nkhata, B. A. 2014. Analysis of Water Governance in Malawi: towards a favorable enabling environment? *Journal of Water, Sanitation and Hygiene for Development* 4(2): 313–323. https://doi.org/10.2166/washdev.2014.087

CSO (Central Statistical Office) 2012. *Zambia 2010 Census of Population and Housing: National Analytical Report*. CSO (Zambia), Lusaka.

——— 2015. *Zambia Demographic and Health Survey 2013–14*. CSO (Zambia), Lusaka.

——— 2016. *2015 Living Conditions Monitoring Survey Report*. CSO (Zambia), Lusaka. Online. https://www.zamstats.gov.zm/phocadownload/Living_Conditions/2015%20Living%20Conditions%20Monitoring%20Survey%20Report.pdf (Accessed November 14, 2019)

Division of Environment 2006. *State of the environment report 2006*. Vice President's Office (Tanzania), Dar es Salaam. Online. http://www.tzdpg.or.tz/fileadmin/_migrated/content_uploads/State_of_Environment_Report_final_

PDF_2006.pdf (Accessed November 14, 2019)

——— 2015. *National Biodiversity Strategy and Action Plan (NBSAP) 2015–2020*. Vice President's Office (Tanzania), Dar es Salaam. Online. https://www.cbd.int/doc/world/tz/tz-nbsap-v2-en.pdf (Accessed November 14, 2019)

Government of Malawi 2008. *Integrated Water Resources Management and Water Efficiency (IWRM/WE) Plan 2008-2012: Abridged version*. Malawi Water Partnership and CIDA, Lilongwe.

——— 2013. *Water Resources Act*. The Office of the President and Cabinet. Malawi.

Government of Zambia 1997. *Water Supply and Sanitation Act*. The National Water Supply and Sanitation council. Zambia.

JICA (Japan International Cooperation Agency) 2019. *Sector Position Paper*. JICA, Malawi Office, Lilongwe. Unpublished. (Accessed November 14, 2019)

Kessy, F. and Mahali, R. 2017. *Water, Sanitation and Hygiene Services in Tanzania: Access, Policy Trends and Financing*. ESRF (Economic and Social Research Foundation), Dar es Salaam.

Laisi, E. 2009. *IWRM Survey and Status Report: Malawi*. CEDRISA (Center for Development Research and Information in Southern Africa), Lilongwe.

Ministry of Economic Planning and Development 2011. *Malawi Growth and Development Strategy II: 2011–2016*. Ministry of Economic Planning and Development (Malawi), Lilongwe.

Ministry of Energy and Water Development 2010. *National Water Policy*. Ministry of Energy and Water Development (Zambia), Lusaka.

Ministry of Finance 2014. *Country Report on the Millennium Development Goals 2014: Entering 2015 with Better MDG Scores*. Ministry of Finance (Tanzania), Dar es salaam.

Ministry of Finance, Economic Planning and Development 2014. *2014 Millennium Development Goal Report for Malawi*. Ministry of Finance, Economic planning and Development (Malawi), Lilongwe. Online. http://www.undp.org/content/dam/malawi/docs/general/Malawi_MDG_Report_2014.pdf (Accessed November 24, 2019)

Ministry of Health and Social Welfare 2008. *The National Road Map Strategic Plan To Accelerate Reduction of Maternal, Newborn and Child Deaths in Tanzania 2008–2015*. Online. https://www.who.int/pmnch/countries/tanzaniamapstrategic.pdf (Accessed November 14, 2019)

Ministry of Irrigation and Water Development 2005. *National Water Policy*. Ministry of Irrigation and Water Development (Malawi), Lilongwe.

——— 2006. *The National Sanitation Policy*. Ministry of irrigation and Water Development (Malawi), Lilongwe.

——— 2007. *National Water Policy*, 2nd ed. Ministry of irrigation and Water Development (Malawi), Lilongwe.

Ministry of Water and Irrigation 2008. *National Water Sector Development Strategy 2006–2015*. Ministry of Water and Irrigation (Tanzania), Dar es Salaam. Online. http://extwprlegs1.fao.org/docs/pdf/tan169532.pdf (Accessed November 16, 2019)

Ministry of Water Development, Sanitation and Environmental Protection 2019. *The Zambia Country Brief* (prepared for the SWA 2019 Sector Ministers' Meeting). Ministry of Water Development, Sanitation and Environmental Protection (Zambia), Lusaka. Online. https://www.sanitationandwaterforall.org/sites/default/files/migrate_default_content_files/Zambia_Country_Brief.pdf (Accessed November 16, 2019)

Mkwate, R. C., Chidya, R. C. G. and Wanda, E. M. M. 2017. Assessment of drinking water quality and rural household water treatment in Balaka district, Malawi. *Physics and Chemistry of the Earth* 100: 353–362. https://doi.org/10.1016/j.pce.2016.10.006

MoHCDGEC (Ministry of Health, Community Development, Gender, Elderly and Children) 2016. *National Guidelines for Verification and Certification of ODF Communities*. Environmental Health and Sanitation Section,

MoHCDGEC. Online. https://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/ODF_VERIFICATION_Tanzania.pdf (Accessed on November 16, 2019)

——— 2018. *Cholera Information Management Action Plan for Tanzania 2019–2021*. Online. https://plateformecholera.info/attachments/article/793/Cholera%20Information%20Management%20Action%20Plan%20for%20Tanzania.pdf (Accessed on November 14, 2019)

MoHCDGEC (Ministry of Health, Community Development, Gender, Elderly and Children) [Tanzania Mainland], MoH (Ministry of Health) [Zanzibar], NBS (National Bureau of Statistics), OCGS (Office of the Chief Government Statistician) and ICF 2016. *Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS) 2015–16*. MoHCDGEC, MoH, NBS, OCGS and ICF, Dar es Salaam and Rockville. Online. https://dhsprogram.com/pubs/pdf/FR319/FR319.pdf (Accessed November 14, 2019)

MoHCDGEC (Ministry of Health, Community Development, Gender, Elderly and Children) [Tanzania Mainland], MoH (Ministry of Health) [Zanzibar], TFNC (Tanzania Food and Nutrition Centre), NBS (National Bureau of Statistics), OCGS (Office of the Chief Government Statistician) [Zanzibar] and UNICEF 2019. *Tanzania National Nutrition Survey using SMART Methodology (TNNS) 2018*. MoHCDGEC, MoH, TFNC, NBS, OCGS and UNICEF, Dar es salaam. Online. https://www.unicef.org/tanzania/media/2141/file/Tanzania%20National%20Nutrition%20Survey%202018.pdf (Accessed November 16, 2019)

National Assembly of Zambia 2019. *Report of the committee on national economy, trade and labour matters for the third session of the twelfth national assembly*. Online. http://www.parliament.gov.zm/sites/default/files/documents/committee_reports/National%20Economy%20Final%20Report%202019.pdf (Accessed November 16, 2019)

NBS (National Bureau of Statistics) and OCGS (Office of Chief Government Statistician) 2013. *Population Distribution by Age and Sex*. United Republic of Tanzania, Dar es Salaam. Online. http://tanzania.countrystat.org/fileadmin/user_upload/countrystat_fenix/congo/docs/Population%20Distribution%20by%20Age%20and%20Sex%20Report-2012PHC.pdf (Accessed November 14, 2019)

Ndikumana, L. and Pickbourn, L. 2017. The impact of foreign aid allocation on access to social services in sub-Saharan Africa: the case of water and sanitation. *World Development* 90: 104–114. https://doi.org/10.1016/j.worlddev.2016.09.001

NSO (National Statistical Office) 2018. *Malawi Population and Housing Census: Be counted, Leave No One Behind*, Preliminary Report. NSO (Malawi), Zomba. Online. http://www.nsomalawi.mw/images/stories/data_on_line/demography/census_2018/2018%20Population%20and%20Housing%20Census%20Preliminary%20Report.pdf (Accessed November 16, 2019)

NSO (National Statistical Office) and ICF 2017. *Malawi Demographic and Health Survey 2015–16*. NSO (Malawi) and ICF, Zomba and Rockville. Online. https://dhsprogram.com/pubs/pdf/FR319/FR319.pdf (Accessed November 16, 2019)

Office of International Religious Freedom 2019a. *Malawi 2019 International Religious Freedom Report*. United States Department of State. Online. https://www.state.gov/wp-content/uploads/2020/06/MALAWI-2019-INTERNATIONAL-RELIGIOUS-FREEDOM-REPORT.pdf (Accessed October 7, 2020)

——— 2019b. *Tanzania 2019 International Religious Freedom Report*. United States Department of State. Online. https://www.state.gov/wp-content/uploads/2020/05/TANZANIA-2019-INTERNATIONAL-RELIGIOUS-FREEDOM-REPORT.pdf (Accessed October 7, 2020)

——— 2019c. *Zambia 2019 International Religious Freedom Report*. United States Department of State. Online. https://www.state.gov/wp-content/uploads/2020/05/ZAMBIA-2019-INTERNATIONAL-RELIGIOUS-FREEDOM-REPORT.pdf (Accessed October 7, 2020)

Republic of Zambia 2006. *Fifth National Development Plan 2006–2010: Broad based wealth and job creation*

through citizenry participation and technological advancement. Republic of Zambia, Lusaka. Online. https://www.thegef.org/sites/default/files/ncsa-documents/ZAMBIA-FNDP.pdf (Accessed December 14 2019)

Rogers, P. and Hall, A. W. 2003. *Effective Water Governance* (TEC Background Papers No. 7). Global Water Partnership, Stockholm. Online. https://www.gwp.org/globalassets/global/toolbox/publications/background-papers/07-effective-water-governance-2003-english.pdf (Accessed November 16, 2019)

Sinyange, N., Brunkard, J. M., Kapata N. et al. 2018. Cholera Epidemic: Lusaka, Zambia, October 2017–May 2018. *Morbidity and Mortality Weekly Report* 67(19): 556–559. https://doi.org/10.15585/mmwr.mm6719a5

Trading Economics 2020a. *Malawi Population*. Online. https://tradingeconomics.com/malawi/population#:~:text=Population%20in%20Malawi%20is%20expected,according%20to%20our%20econometric%20models (Accessed October 2, 2020)

———2020b. *Tanzania Population*. Online. https://tradingeconomics.com/tanzania/population#:~:text=Population%20in%20Tanzania%20is%20expected,according%20to%20our%20econometric%20models (Accessed October 2, 2020)

——— 2020c. *Zambia Population*. Online. https://tradingeconomics.com/zambia/population#:~:text=Population%20in%20Zambia%20is%20expected,according%20to%20our%20econometric%20models (Accessed October 2, 2020)

UNDP (United Nations Development Programme) 2013. *Millennium Development Goals Progress Report Zambia*. UNDP, Lusaka.

United Nations 2015. *The Millennium Development Goals Report 2015*. United Nations, New York. Online. https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf (Accessed November 16, 2019)

UN-Water 2013. *UN-Water Country Brief Zambia*. UN-Water, Geneva.

——— 2015. *Means of Implementation: A focus on Sustainable Development Goals 6 and 17*. UN-Water, Geneva.

——— 2017. *Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation: Targets and Global Indicators*. UN-Water, Geneva. Online. https://www.unwater.org/app/uploads/2017/10/G2_Targets-and-global-indicators_Version-2017-07-14.pdf (Accessed November 16, 2020)

UNICEF (United Nations Children's Fund) 2016. *UNICEF's Strategy for Water, Sanitation and Hygiene 2016–2030 Executive Summary*. UNICEF, Geneva.

UNICEF Malawi 2018. *The Water, Sanitation and Hygiene (WASH) Programme in Malawi*. UNICEF. Online. https://www.unicef.org/malawi/media/636/file/WASH%20Statistics%20Factsheet%202018.pdf (Accessed November 24, 2019)

——— 2019a. *2019/20 National Budget Brief: How Does the Malawi National Budget Respond to the Needs of Children?* UNICEF, Lilongwe.

——— 2019b. 2018/19 *Health Budget Brief: Towards Universal Health Coverage*. UNICEF, Lilongwe.

UNICEF Tanzania 2018. *National Budget Brief 2018 for Zanzibar*. UNICEF, Dar es Salaam.

UNICEF Zambia 2019. *Zambia Health Budget Brief 2019*. UNICEF, Lusaka.

UNICEF Zimbabwe 2018. *Water, Sanitation and Hygiene (WASH) 2018 Budget Brief*. UNICEF, Harare.

USAID (United States Agency for International Development) 2018a. *Malawi: Nutrition Profile*. USAID, Washington, DC.

——— 2018b. *Zambia: Nutrition Profile*. USAID, Washington, DC.

——— 2019. *Malawi: Health, Population, and Nutrition*. USAID, Washington, DC.

WHO (World Health Organization) and UNICEF (United Nations Children's Fund) 2015. *Progress on Sanitation and Drinking Water: 2015 Update and MDG Assessment*. WHO and UNICEF, Geneva.

——— 2017. *Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines*. WHO and UNICEF, Geneva.

World Bank 2012. *Tanzania Economic Update, October 2012: Spreading the Wings*. World Bank, Washington, DC.

——— 2016. *Malawi Economic Monitor, May 2016: Absorbing Shocks, Building Resilience*. World Bank, Lilongwe.

——— 2018. *Reaching for the SDGs: The Untapped Potential, Water Supply, Sanitation, and Hygiene Sector*. World Bank, Washington, DC.

World Bank and IMF (International Monetary Fund) 2019. *Zambia: Joint World Bank-IMF Debt Sustainability Analysis*. World Bank, Washington, DC.

WSDP (Water Sector Development Programme) 2014. *Proceedings for the 9th joint water sector review meeting on 15th–16th October 2014*. Ministry of Water (Tanzania), Dar es Salaam. Online. https://slidelegend.com/ministry-of-water-proceedings-for-the-9th-joint-water-dpg-tanzania_5a32cc211723ddbdbbc64e6c.html (Accessed November 14, 2019)

WSP (Water and Sanitation Program) 2012. *Economic impacts of poor sanitation in Africa: Zambia*. WSP, Washington, DC.

Zambia Statistics Agency, Ministry of Health (MoH) [Zambia] and ICF 2019. *Zambia Demographic and Health Survey 2018*. Zambia Statistics Agency, MoH and ICF, Lusaka and Rockville. Online. https://dhsprogram.com/pubs/pdf/FR361/FR361.pdf (Accessed March 12, 2020)

ZIPAR (Zambia Institute for Policy Analysis and Research) and UNICEF (United Nations Children's Fund) 2019. *Analytical Brief of the 2019 Social Sector Budget: A call for fairness and elimination of wastage*. ZIPAR, Lusaka.