

**IMPACT OF THE PARTNERSHIP IN THE WATER PROVISION IN KWAMWENA
VALLEY IN CHONGWE DISTRICT: THE CASE OF LUSAKA WATER AND
SEWARAGE COMPANY AND THE MILLENIUM CHALLENGE ACCOUNT**

BY

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requirements for the degree of master of Public Administration (MPA).**

UNIVERSITY OF ZAMBIA

LUSAKA

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DECLARATION

I, PETER BWALE, holder of computer number 2018262319, hereby declare that this dissertation, which is submitted for the degree in Master of Public Administration (MPA), has not been submitted for a degree in this or any other University and that it is a result of my own work.

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CERTIFICATE OF APPROVAL

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Examiner 2	Signature	Date

Name.....
Examiner 3	Signature	Date

DEDICATION

To the late Mr. Joseph Bwale and Mrs. Rhodah Phiri.

Even though I walk through the valley of the shadow of death, I will fear no evil, for you are with me, your rod and staff they comfort me. Psalm 23: 4

I will, forever, love and cherish you!

(R.I.P)

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ABSTRACT

Cooperating partners are important in the implementation of social service programs such as provision of water. These partners can generally help to supplement government effort to achieve its goal for making water available and accessible to the population. However, there is little research done on accessing the role of cooperating partners in urban, semi-urban and rural areas like the case with new residential areas, such as Kwamwena Valley in Chongwe District, Lusaka Province in Zambia.

The study objectives were: to find out whether the accessibility to clean and safe water has improved as result of the partnership in the provision of water in Kwamwena valley in Chongwe district; to examine the effect of collaboration of partners in the provision of water in Kwamwena valley in Chongwe district; and to establish the challenges that partners face in the provision of water in Kwamwena Valley in Chongwe district.

To achieve the set objectives, the study used both quantitative and qualitative approaches. Questionnaires and interviews were used to collect data. The research had a population sample of one hundred and fifty respondents. Survey questionnaires were administered to one hundred respondents, nine participated in the Focus Group Discussion, while two were each interviewed as Key Informants.

The study findings show that there was improvement in access to clean and safe water as a result of the water supply project. Before the project, residents relied on water that was sourced either from boreholes or open wells. However, the water from either of the two sources was not always fit for human consumption due to contamination. Moreover, even child labour had declined, whereas prior to the water project's completion, they would go on errands to fetch water from the single borehole which was serving our water needs. The project also provided resources to the LWSC which enabled it to extend the service of water in the area, although a lot still needs to be done to extend water service coverage to the residents even further.

The study recommendations are that There is need for consented efforts by LWSC to scale up surveillance and maintenance measure to ensure the safety of water supplied to the residents on Kwamwena Valley;

i. Currently, in spite of their being adequate water supply in Kwamwena valley, not everyone was connected to water system therefore, there is need for LWSC to carry out community sensitisation on health benefits of connecting to piped water supply network; ii. LWSC should also engage the community and encourage behavioural change in the way they interact with water infrastructure, because vandalism issues were rampant in the area. The community should also adopt to the water infrastructure, protect it and also pay for the water services; and iii. LWSC should setup a satellite office in Kwamwena valley to facilitate efficient operational logistics.

ACRONYMNS AND ABBREVIATIONS

MDGs	:	Millennium Development Goals
IWA	:	International Water Association
CSO	:	Central Statistical Office
DANIDA	:	Danish International Development Agency
WSUP	:	Water and Sanitation for the Urban Poor
FGD	:	Focus Group Discussion
CBOs	:	Community Based Organizations
GDP	:	Gross Domestic Product
PPP	:	Public Private Partnerships
USAID	:	United States Agency for International Development
IMF	:	International Monetary Fund
NGO	:	Non-Governmental Organization
SPSS	:	Statistical Package for the Social Sciences
LWSC	:	Lusaka Water and Sewerage Company
UNDP	:	United Nation Development Programme
MCA	:	Millennium Challenge Account
SNDP	:	Sixth National Development Plan
SAG	:	Sector Advisory Group
ZEMA	:	Zambia Environmental Management Agency
WARMA	:	Water Resource Management
NWASCO	:	National Water and Sanitation Council
ODA	:	Official Development Assistance
WOP	:	Water Operators Partnership
VEI	:	Vitens Evides International
AIM	:	Amsterdam Initiative against Malnutrition
GAIN	:	Global Alliance for Improved Nutrition

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DEFINITION OF KEY TERMS

The key concepts in this research are:

Partnership: An agreement between two or more people to oversee business and share its profits and liabilities (<https://www.investopedia.com>).

Water provision: The obtaining of water for and its distribution to a town or city, as far as possible in sufficient quantity and of satisfactory quantity (<https://www.wordnik.com>).

Impact: A powerful effect that something, especially something new, has on someone or something (<https://dictionary.cambridge.org>).

Assessment: The action or an instance of making a judgement about something (<https://www.merriam-webster.com>).

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.1 Introduction

This dissertation assessed the impact of the partnership in the water provision in Kwamwena Valley in Chongwe District: The case of Lusaka Water and Sewerage Company and Millennium Challenge Account.

The aforementioned partnership was a work relationship between the Lusaka Water and Sewerage Company, which was the implementing entity and Millennium Challenge Account for Cooperation funds (American-financing entity) in water provision to Kwamwena Valley. Kwamwena residential area is located in Lusaka Province, off Great East road, about 4km in the Northern direction from Munali Roundabout. It was previously, part of a large farm (Galunia farms) which was sub-divided into residential plots by Meanwood Properties Limited.

The following document layout has been adopted: the report presents the background of the problem. This is followed by the statement of the problem. The objectives of the research are highlighted, followed by the research questions and later the significance of the research, then the chapter proceeds to look at the definition of key terms and the conceptual framework. In chapter two, the report presents the literature review on the subject of partnership in water provision to residential areas related projects. The literature is focused on the global level, the African region and Zambia as a case for the current study. Chapter three highlights the research methodology with focus on type of research, research design, sources of data, sample size, sampling methods, reliability of data, validity of data, data analysis techniques, ethics applied when conducting the research and the limitation of the research. Chapters four and five, present the findings of the study. Chapter six presents the discussion of the findings and chapter seven presents the conclusion and policy recommendations and areas of future research. The appendices are provided at the end to present the data collection tools used.

1.2 Background

The Millennium Challenge Act of 2003 of the United States of America, as amended (the Act) (22 U.S.C. 7707(d)(1)), authorizes the provision of assistance to countries that enter into compacts with the United States to support policies and programs that advance the progress of such countries in achieving lasting poverty reduction through economic growth, and are in furtherance of the Act. (MCA, 2021)

Consequently, the Millennium Challenge Corporation (MCC), was established in 2004 to act as a counterparty to compacts on behalf of the United States Government. It seeks to provide foreign assistance through:

- *a competitive process that rewards countries for past actions measured by objective performance indicators;*
- *a pledge to insulate the funds from U.S. strategic foreign policy objectives that often strongly influence where U.S. aid is spent;*
- *a mission to seek poverty reduction through economic growth, not encumbered with multiple sector objectives;*
- *a requirement to solicit program proposals developed primarily by qualifying countries with broad-based civil society involvement;*
- *the responsibility of recipient countries to implement their own MCC-funded programs, known as compacts;*
- *a compact duration limited to five years, with funding committed up front;*
- *continuous data collection before, during, and long after a compact to quantify and assess project impact; and*
- *an emphasis on public transparency in every aspect of agency operations.*

(Brown, 2019)

The selection criteria include, identification of countries that are “candidate countries” for assistance for fiscal year (FY) 2021 based on their per-capita income levels and their eligibility to receive assistance under U.S. law. (MCA, 2021)

MCC’s first engagement with the Zambia Government began in 2004, when the Board of Directors selected the country for a threshold program. Throughout that three-year program, the trajectory of the country’s scorecard performance improved, leading the Board to select Zambia as eligible for a compact in 2008. The Government of the Republic of Zambia consulted with the

private sector and civil society of Zambia to determine the priorities for the use of MCC assistance. A proposal for such assistance to achieve lasting economic growth and poverty reduction was developed and submitted to MCC. In 2012, MCC signed a \$354.8 million compact with the Government of the Republic of Zambia (GOZ). (WWW.MCC.GOV/STAR-ZAMBIA)

This led to the implementation of Lusaka Water, Sanitation and Drainage Project, whose objective was to expand access to, and improve the reliability of, water supply and sanitation, and improve drainage services in select urban and peri-urban areas of the city of Lusaka in order to decrease the incidence of water-borne and water-related diseases, generate time savings for households and businesses and reduce non-revenue water in the water supply network. (www.mcc.gov)

The Zambia Compact was designed to address these issues in a single project, the Lusaka Water Supply, Sanitation, and Drainage Project. The project supported large-scale infrastructure investments and institutional strengthening and reform of Lusaka's water sector. Through these activities, the project expanded access to, and improved the reliability of, water supply and sanitation, as well as improved drainage services and related solid waste management in select urban and peri-urban areas of the capital. The project aimed to decrease the incidence of water-related diseases, generate time savings for households and businesses, and reduce non-revenue water at the utility. The key players in Lusaka's water sector—Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC)—were natural partners to complete and maintain the planned water, sanitation, and drainage investments; these bodies therefore served as the compact's two implementing entities. (Zambia Star Report, 2020)

Access to safe and affordable drinking water is a basic need for every human being. However, with Lusaka Province being the fastest growing province in Zambia, it is evident that the rapid development of upcoming residential areas, as well as illegal settlements in the outskirts of the city, have outpaced the installation of water supply system by the water utility company. (*Lombanya and Chileshe, 2020*)

Zambia depends on groundwater: 60-70 percent of all water used in the country comes from this source. Even though the country is richly endowed with a lot of water in the form of rivers, lakes and swamps, its agriculture is mostly rain fed. At the same time, Zambia's electricity sector is heavily reliant on hydropower (over 95%). The country's citizens and industries rely on the valuable resource for daily life and operations. Access to water is a basic human right

which is often threatened when the resource is not properly managed and not available in adequate quantities and/or quality. Water, as an economic good, contributes to the prosperity of a nation. Water-related conflicts and disputes in Zambia are already apparent due to competing uses, namely domestic, the environment, commercial agriculture, hydropower and mining. Therefore, water has to be managed by a neutral authority to ensure equitable access for all user groups and prevent and mitigate further conflicts (WARMA, 2018).

Water Utilities such as Lusaka Water and Sewerage Company, are mandated to provide water supply and sanitation services in the urban and peri-urban areas. They are also responsible for the development and maintenance of water supply and sanitation infrastructure. The following are the Water Utilities in the Country (MWDSEP, 2019).

Lusaka Water and Sewerage Company (LWSC) is a quasi-government institution established out of the water and sewerage department of Lusaka City Council (LCC) but operating as a commercial water utility company, providing water and sanitation services to Lusaka province. Although the company was established in 1988 under the Companies Act, it commenced its operations in 1990.

From the time of its inception until 2008, LWSC was wholly owned by Lusaka City Council. The Company became a Provincial Utility in February 2008 with the objective of “Providing quality Water and Sanitation services to customers in Lusaka province at commercially and environmentally sustainable levels.” The current shareholding structure is as follows: Lusaka City Council-40%, Kafue District Council- 15%, Chongwe District Council-7.5%, Chilanga District Council-7.5%, Luangwa District Council-7.5%, Chirundu District Council-7.5%, Rufunsa District Council-7.5% and Shibuyunji District Council-7.5% (LWSC, 2018).

The Water Supply and Sanitation Act No. 28 of 1997 stipulates the company’s mandate to provide water and sanitation services to the Lusaka Province in both urban and Peri-urban areas (The Laws of Zambia, 1997).

Water supply to the province comes from two types of sources, namely surface water and ground water, representing (43%) and (57%) respectively. The average daily production for the province is 247 million litres (as at 3rd quarter 2017) (LWSC, 2018).

Water utility companies are faced with challenges such as:

- massive electricity load shedding which results in reduced quantity of water produced
- Billing revenue. In some cases, culminate into reduced willingness to pay due to low water supply hours;
- Unstable macro-economic factors such as exchange rate, inflation and interest rates affecting mainly the:
 - cost of inputs;
 - Ring-fencing of funds meant for metering and sanitation was not adhered to fully due to alleged financial
 - constraints mainly arising from delayed settlement of bills;
 - pollution of both surface and groundwater raw water sources continued, particularly Copper-belt Province making the treatment costs high, thereby impacting negatively on the water and sewerage tariffs.
 - generally poor state of infrastructure coupled with poor asset and project management;
 - inadequate business acumen in the provision of water and sanitation services;
 - drying of raw water sources mainly attributed to climate change, affecting water production;
 - high water losses; and
 - Encroachment on water supply and sanitation facilities

(NWASCO, 2019).

1.3 Statement of the problem

The Government of Republic of Zambia partnered with Millennium Challenge Corporation in the Lusaka Water Supply, Sanitation, and Drainage Project to rehabilitate and extend infrastructure and strengthen the institutional capacity of the Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC). Direct beneficiaries of the project included Kwamwena Valley, which for example, received investment in water infrastructure. This aim behind this investment was to improve water service delivery, prevent flooding, generate time-savings for households, and reduce water-related diseases. (CDC, 2015; www.mcc.gov)

Bearing in mind the project, it is still uncertain as to whether the project aim was realised in Kwamwena valley. The impact on community access to water services as a result of partnerships between the Zambian Government and private institutions such as MCC has not been studied adequately.

1.4 Research Objectives

1.4.1 General Objective

To assess the impact of partnership in terms of water services coverage to Kwamwena Valley in Chongwe District of Lusaka Province.

1.4.2 Specific Objectives

- i. To find out whether the accessibility to clean and safe water has improved as result of the partnership in the provision of water in Kwamwena valley in Chongwe district.
- ii. To examine the effect of collaboration of partners in the provision of water in Kwamwena valley in Chongwe district.
- iii. To establish the challenges that partners face in the provision of water in Kwamwena Valley in Chongwe district.

1.5 Research Questions

1.5.1 General Research Question

What impact has there been in the provision of water and sanitation services in Kwamwena Valley in Chongwe District after the formation of the partnership between the Lusaka Water and Sewerage Company and the Millennium Challenge Account?

1.5.2 Specific Research Questions

- i Has there been the improvement in the accessibility of clean and safe water as a result of partnership in the provision of water in Kwamwena valley in Chongwe district?
- ii What was the effect of collaboration of partners in the provision of water in Kwamwena Valley in Chongwe District
- iii What challenges did partners face in the provision of water in Kwamwena Valley in Chongwe district?

1.6 Significance of the Study

This study was of great use to the various stakeholders in the water sector, as outcomes of the study were used as a lesson to measure weather there is improvement or not in the provision of water services by cooperating partners in communities. The experience would be shared and be used by future researchers who would appreciate the role of cooperating partners. This

would further assist in providing a direction on how to satisfy the needs of the communities through the understanding of challenges in the provision of water and management, as well as public space configurations in Zambia. In addition, the study would add to the existing core of knowledge in the provision of water and understanding the importance of water to the economy of the country, and it will further offer recommendations for proper management of water and appreciating the roles of other stakeholders.

1.7 Conceptual Framework

According to Mugenda and Mugenda (2003), a conceptual framework shows the relationship between variables in the study. In this study, the conceptual framework is developed to illustrate the roles of cooperating partners in the provision of water. This research, therefore, constructs a conceptual framework that includes various roles played by stakeholders in the process of water provision. These roles included: funding, regulation, and community engagement. See Figure 1.1.

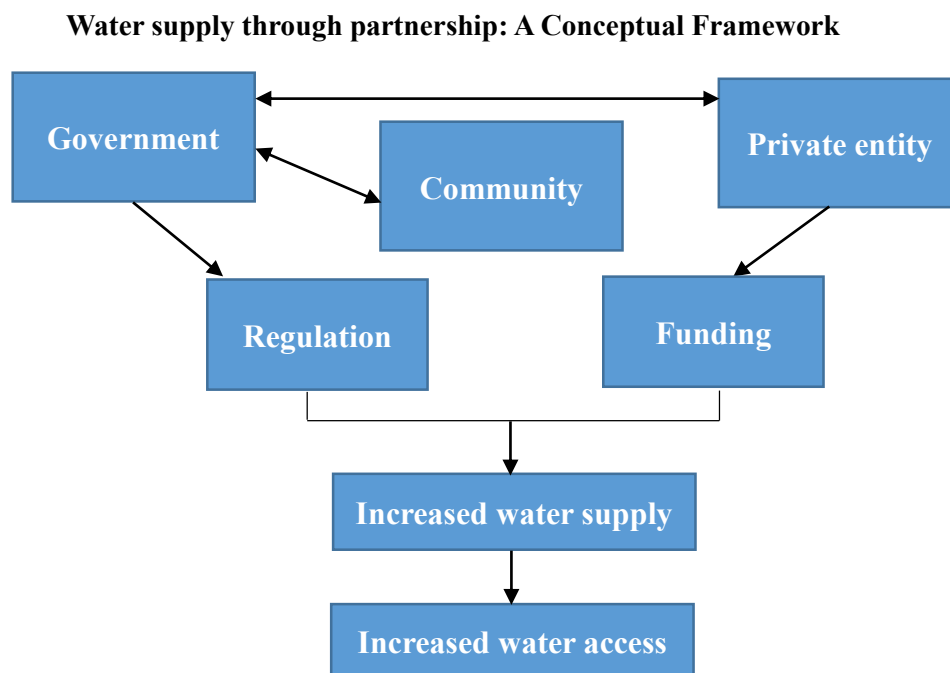


Figure 2.1: Conceptual Framework

Government

The Government in consultation with the private sector and civil society of Zambia determines the priority areas of development in the water management and supply sector, and then solicits for technical and financial assistance from donors, and other development-orientated corporate partners.

Further, the Government has principal responsibility for overseeing and managing the implementation of the Program Project and its Activities, allocating resources and managing procurements. (www.mcc.gov)

The government also formulates and implements water policies, governing water development and water supply in the country through relevant ministries. Further the government engages the civil society, local communities and any other interest party on policy dialogue, and offers support for comprehensive information, education and communication campaigns.

Private entity

Public Private Partnerships

Public private partnerships (PPPs) refer to a legal and/or contractual relationship between a government and a private business venture that is aimed at delivering basic amenities and public services. (Khatleli et al, 2020)

There are different types of PPPs designed to address specific societal needs. The SADC Institutional Framework identifies the following:

Traditional PPPs: In a traditional PPP agreement, the public component of the partnership acts as a contracting officer. It looks for funding and has overall control of the project and its assets. Almost any partnership between a private contractor and a government entity can be considered a PPP, but some of the most common examples are public road projects, maintenance of parks, and construction of schools and other public buildings.

Operation and maintenance PPPs: With an operation and maintenance PPP, the private component of the partnership operates and maintains the project, while the public agency acts as the owner of the project. Examples of these contracts include bridges and toll-ways. Ongoing maintenance may provide revenue for the private party through tolls or other fees paid through public use.

Design-built PPPs: A design-build PPP is similar to a client-contractor arrangement. The private partner designs and builds the facility, while the public partner provides the funds for the project. The public partner retains ownership of the project and any assets generated through its use.

Design-Build-Operate PPPs: Design-build-operate PPPs are similar to design-build P3s but include ongoing operation and maintenance of the property facility or project by the private party. The public partner acts as the owner of the installation and provides the funds for construction and operation. If the private partner operates the project only for a limited time before the facility is transferred to the public partner, the arrangement is known as a design-build-operate-transfer agreement.

Design-Build-Finance-Operate PPPs: A variation of the design-build-operate P3 includes the component of general financing supplied by the private contractor. With a design-build-finance-operate arrangement, the private party provides financing and design, then builds, possesses, and operates the facility. The public partner provides funding only while the project is being used or is active.

Build-Own-Operate PPPs: Under a build-transfer-operate PPP, the private partner builds the facility and transfers it to the public partner. The public partner then leases operation of the facility to the private party under a long-

term lease agreement

Build-Own-Operate-Transfer PPPs. Under a build-own-operate contract, the private contractor builds, possesses, and operates the facility and also has control over profits and losses generated by the facility.

Lease PPPs: A lease PPP involves the public owner leasing a facility to a private firm. The private company must operate and provide maintenance for the facility per specified terms, including additions or a re-modelling process.

Concession PPPs: With a concession PPP, the private agency operates and maintains the facility for a specific period of time. The public partner has power over the ownership, but the private partner possesses owner rights over any addition incurred while the facility is being operated under its domain. (Khatleli et al, 2019)

In PPPs, most of the project risk (technical, financial and operational) is usually transferred to the private party. The public sector pays for a full set of services, including new infrastructure, maintenance and facilities management, through monthly or annual payments. In the infrastructure sector, more complex arrangements and contracts that guarantee and ensure secure cash flow make PPP projects key candidates for project financing. PPPs are aimed at delivering public service relating to infrastructure, water supply, housing, transport, health, education, energy and defence. (Khatleli et al, 2020)

Private entities such as Millennium Challenge Corporation, provide financial and technical assistance to government entities such as National Water and Sanitation Council (NWASCO), Lusaka Water and Sewerage Company, and Lusaka City Council for better management of Lusaka's water and sanitation assets, and for the provision of water and sanitation services. (www.mcc.gov)

Community

For purposes of this report, community refers to Non-Governmental Organisations, local people in their capacity as beneficiaries of water services, and the civil society in general. In this regard, the community's role would be to participate through policy dialogue by way of sharing experiences, thereby shaping the direction of decision making processes. Evidence also shows that cooperating partners can help establish intermediaries such as business associations or chambers of commerce that facilitate dialogue between policymakers and the private sector, and encourage multi-stakeholder dialogues that include civil society and unions, and local people.

Funding

Funding empowers water utility companies to scale up services to meet increasing demand as well to expand the reach to households not previously connected to the supply network. Capital investment, aids water supply companies to improve in their operations and maintenance. As NWASCO (2016), reported “inadequate investment in infrastructure which is dilapidated and inadequate greatly contribute to Non-Revenue water at an estimated 52% of wasted water.”

Furthermore, maintaining an affordable tariff and keeping overall risk levels acceptable for the private sector are equally necessary as this can improve the sustainability of systems, strengthen financial viability (UNECE, 2018).

Regulation

The government through the Ministry of Water Development, Sanitation and Environmental Protection, implements Water Policies, Water supply and sanitation, and water resources management and development. The Ministry has oversight over National Water Supply and Sanitation Council (NWASCO), which in turn is an oversight agency for the regulation of water supply and sanitation for both urban and rural contexts in Zambia. NWASCO regulates the provision of water supply and sanitation (WSS) services by means of its Minimum Service Level (MSL) guidelines for efficiency and sustainability.

MSLs are standards which define the acceptable minimum level of service which providers must achieve over a specified timeframe. As a license condition issued under the WSS Act No. 28 of 1997, all water and sanitation service providers are required to formulate and maintain SLGs and SLAs which NWASCO monitors. (NWASCO, 2016)

Increased water supply

The expectation is that with the availability of the necessary technical support, and capital investment, the operation capacity of a water utility company such as LWSC, would be enhanced. This entails that the water utility firm would be enabled to effectively manage its operation costs, maintain water supply related equipment and infrastructure, and also have the capacity to extend its water distribution network to, for example, new settlements.

Increased water access

Investment in new water supply equipment and infrastructure, as well as effective maintenance of old water supply installations would greatly improve households' access to water services.

The duration of water supply would be extended and sustained, and the quality of the water supply services would be enhanced. More connections to the piped water supply network would be added, thereby increasing households with access to water services.

1.8 Conclusion

This chapter provided, background information related to this research, the statement of the problem, research objectives, research questions, significance of the study, and the conceptual framework.

CHAPTER TWO

LITERATURE REVIEW

2.1. Reviews

This chapter presents relevant materials with regard to the literature review in relation to the role of stakeholders in development in general, and water provision in particular. This review of literature is intended to highlight the other studies that have been undertaken in this field.

2.2 Water reticulation

Almost half of the total global population without access to improved drinking water is in Sub-Saharan Africa. Between 1990 and 2015, the region registered an increase of 20 percent in the use of improved sources of drinking water. Yet, access to an improved water source does not always guarantee adequate and affordable provision. (Nganyanuka, 2017).

In 2015, the World Bank Group, projected that by the year 2020, the demand for water sourced from Kafue River Catchment, for domestic consumption to be 258 MCM per annum. A large proportion of this increase in demand will have to be satisfied by Lusaka Water and Sewerage Company. Currently the water utility company abstracts from Kafue River at Lolanda Water Works about 40MCM per annum. This implies that LWSC will have to increase to seven times the current abstraction (FCFA, 2015). As demand outstrips supply, water utilities may resort to rationing water supply.

2.3 Review of related literature

Ellis et al (2018): In a study tracing the influence of decades long global water initiatives on urban water-policy reforms in the Sub-Saharan Africa in light of partnership models. It was suggested that improving urban water supply in Sub-Saharan Africa requires innovative governance and institutional arrangements that blend the strengths of public, private and community-based water supply models.

Lombanya, and Chileshe (2020) assessed Lusaka Water and Sewerage Company's competitive priorities in its endeavor to provide safe and affordable water services in Lusaka's upcoming

residential areas. The research employed a non-intervention approach which employed structured questionnaires and interviews for data collection. 30 household questionnaires were administered to households in Libala, Chalala and Obama residential areas respectively. However, with Lusaka Province being the fastest growing province in Zambia, it is evident that the rapid development of upcoming residential areas as well as illegal settlements in the outskirts of the city has outpaced the installation of water supply system by the water utility company. From the overall findings, the main operational core competency identified was the water quality. As a result, for LWSC to extend water supply to the upcoming residential areas in Lusaka, it was recommended that LWSC formulates a well-documented operations strategy that will focus on the cost of the service and time of service delivery. These can be achieved through a well thought out and implementable capacity strategy and asset management. Capacity strategy will involve decisions on the sizing, timing, type and location of real assets or resources. The residents in Libala were also generally satisfied with the water supply services, but had concerns over the high water tariffs, the late response to water problems.

Water supply which is inadequate due to a number of reasons including: the increasing number of unplanned new developments in the city; leakages and pipe bursts within the existing distribution system due to its age and insufficient maintenance; and illegal connections contributing to the high percentage of Non-Revenue Water (NRW) (Ingenieure, 2013).

Zyl (2014), suggested the following measures that could help water utilities improve on water distribution to consumers:

- ❖ Active leakage control, which encompasses various methods to actively find and repair leaks in the system.
- ❖ Pressure management, which refers to the practice of maintaining pressures in the system as close as possible to the minimum required levels. Some of the advantages of pressure management include longer pipe service lives, lower water losses and wastage, and lower failure rates.
- ❖ Speed and quality of repairs to ensure that leaks are stopped as quickly as possible and do not reoccur.
- ❖ Pipeline renewal, which is the process of refurbishing or replacing pipes that present the greatest risk to disrupting service or increasing losses

A study by Asgedom (2012) assessed the causes and challenges of Urban Water Supply in Mekelle City. This study found that the challenge of water reticulation resulted from; Shortage of water at the sources, operator's lack of technical skill, and rapid urbanization. It is one thing to have a water reticulation system and it is another to sustain the system. Having sustainable water supply seems to be a challenge.

In retrospect, the percentage of households with an improved source of drinking water increased over time, from 63% in 1992 to 72% in 2018. Improved sources of drinking water include piped water, public taps, standpipes, tube wells, boreholes, protected dug wells and springs, rainwater, water delivered via a tanker truck or a cart with a small tank, and bottled water (Central Statistical Office (CSO) [Zambia] et al., 2019).

In Zambia, the Water Sector Performance Improvement Project (WSPIP) objectives were: (i) the improvement of access to, and sustainability of, the water supply and sanitation services for consumers in Lusaka; and (ii) development of a comprehensive institutional structure supporting a coordinated approach to water supply and sanitation investments. In 2009, Additional Financing was approved, and the objectives were revised to (i) improve the technical efficiency and financial sustainability of Lusaka Water and Sanitation Company and improve access to water supply and sanitation services for urban consumers in Lusaka, Kafue, Chongwe, and Luangwa districts, and (ii) strengthen the effectiveness of national water supply and sanitation planning. (World Bank Group, 2016).

The stated objectives of the National Urban Water Supply and Sanitation Program (NUWSSP) are to increase access to safe and reliable water supply and sanitation services in rural and urban areas, respectively. (World Bank Group, 2020).

The NUWSSP access targets for urban water supply were 80 percent by 2015 and 100 percent by 2030, and the targets for urban sanitation were 77 percent by 2015 and 90 percent by 2030. However, access to water supply has remained almost stagnant since 2011. Analysis shows that the program is not structured to efficiently deliver on the service outcomes that the government seeks. (World Bank Group, 2020).

A mixed methods case study of Kwamwena Valley by Chipuwa (2019), aimed at analysing the nature of challenges faced in the provision of water and sanitation services in newly planned residential areas in Lusaka, whereas the current study assessed the impact of water partnership

in water and sanitation provision in Kwamwena Valley. Attention was directed towards challenges faced by the residents in accessing water as well as the challenges faced by the residents in accessing sanitation services in the area. In contrast, the current study considers the challenges faced by Lusaka water and Sewerage Company, and Millennium Challenge Account partners in the Kwamwena water project. Questionnaires were utilized to collect data from 120 households conveniently sampled and supplemented by seven key informants purposively selected from institutions with a stake in water and sanitation. The study showed that there was on-site provision of water and sanitation in Kwamwena valley. Further it was reported that main sources of water for the residents are private boreholes with elevated tanks and submersible pumps (58.3 percent), hand pumps (20 percent), communal taps (3.3 percent) and shallow wells (3.3 percent) while others did not have onsite water (13.6 percent).

The study also noted the constraint, in the provision of water and sanitation on the part of LWSC, vis-à-vis population increase, and growth of new settlements leads to on-site provision of water and sanitation by residents. This is however unsustainable and may cause both environmental and health problems due to the increase in the number of boreholes drilled and septic tanks built. As such there is need to come up with a more sustainable way of providing these service to residents as areas are planned.

Mwalukanga, B., Nchito, W., & Siame, G. (2019), studied decision-making processes on the Kafue Bulk Water Project. The study used qualitative methods, deployed interviews to obtain data and information from all public institutions that had a direct interest in the project. The Bulk Water Project for the development of a water pipeline from the Kafue River to Lusaka aimed to improve access to water for residents and businesses in the city of Lusaka. It was an infrastructure project that was funded using a loan from the Africa Development Bank (ADB), the World Bank (WB), the German Development Agency (GIZ), European Investment Bank and the Government of Zambia. Despite considerable investment in increased water provision, service coverage and quality have not changed much because most of the capital has gone into large bulk water production projects. (World Bank Group, 2020). Rehabilitation and expansion of aging water distribution networks, especially in small towns and periurban areas, have not received the same level of attention. Consequently, most of the increased production is lost in leaky networks, thus undermining the ability to expand coverage. More emphasis remains on the creation of infrastructure rather than strengthening the capacity for service provision. (World Bank Group, 2020).

Mwalukanga, B., Nchito, W., & Siame, G. (2019), also found that consultation and engagement of stakeholders had not occurred at a city level as well as with grass roots representatives until a much later time – around implementation stage. The findings in the study also show that decisions in the project were made based on the consultant's recommendations, the project framing and management system and structure were pre-determined. Anything out of this scope was not valued as much as the financial capacity of the project. The project was largely driven by Lusaka Water and Sewerage Company with significant external input by consultants. This approach to decision-making in the project pushed out other local actors leading to visible and established misgivings on the actual benefits of the project.

Notably, one of the project's components was the laying of a pipeline from Kafue to Lusaka and connecting several households on the already existing grid. This meant that new connections were of a limited number. (Mwalukanga, B., Nchito, W., & Siame, G., 2019).

In a journal article, Chitonge and Horman (2011), reviewed the outcomes of implementing these reforms in Zambia, over a period of 10 years. The review indicated that the country had made progress in areas related to management and operation performance, while little success was recorded in core areas such as expanding the network, service coverage, hours of service, and reducing the affordability burden, especially among lower-income households. The article, highlights as the key challenge for the water services sector, that of finding a workable infrastructural development funding formula that will make it possible to sustain and build on the foundation laid over the past decade. This study is significant to the current one as it focused on examining the outcomes of water reforms, which encompasses Partnerships in water supply. Further, it identifies some of the challenges related to water supply in Zambia, adding to the significance of the present study.

A case study by Kayaga and Mwanamwambwa (2013), of Kanyama Compound in Lusaka, showed that, compared to services delivered by Lusaka Water and Sewerage Company, the Water Trust System was delivering water services of better quality and in a cost-effective manner. The study further brought out the need to be done on the optimum institutional arrangement to ensure that communities served by the Water Trust fully benefit from the regulatory regime currently taking a firm grip in Zambia. This finding underscores one of the potential benefits to partnerships in water supply.

Nya *et al* (2021), The intermittent water supply model in Lusaka and its continuation are issues of governance, and natural and technical problems. Thus, interdisciplinary approaches to exploring the interplays between these factors are recommended when developing solutions to

supply intermittence in Zambia. The emphasis should be on identifying specific aspects that require human capacity development. This is critical as ignorance of the real problems could be a tragedy.

In a doctoral dissertation, Chan (2014), observed that “community investments driven by business logic results in an uneven distribution of social infrastructure, for example in the field of tap water. While partnerships are set up to service the poor, they are used to break down state responsibility for equitable development. After a partnership ends its activities, the state has faded away and instead of promised power sharing, the poor end up with even graver dispossession.”

A doctoral study employing mixed method study by Ananga (2015), attempted to determine the tenability of Community Participation (CP) theory in explicating Water Production and Management dynamics in Urban Informal Settlements. Four water schemes established by Sustainable Aid in Africa International in partnership with different communities in the informal neighborhoods of Kisumu Kenya were used as empirical referent. Logistic Regression and Chi-square Tests were employed to analyze the quantitative data. In the qualitative phase, Focus group Discussions, Observation, Transect Walks and Photographic evidence was used to collect data analyzed through Constant Comparison Analytic technique. The logistic regression results indicate that five participatory variables are significantly associated with beneficiary satisfaction with the work of the water management committees. These are provision of paid or unpaid labor to the water schemes, household willingness to intervene against pipe vandalism, meeting attendance, willingness to contribute money or time to the community water scheme and whether a household has ever made a complaint about water supply/quality issues. The study also found that following factors are identified to be either aiding and/or impeding the success of the schemes; networking and collaboration, continuous community engagement/participation, the formation of water consumer groups, coordination and organizational management, extent of institutional formalization, provision of dividends to the community, clannism, population increase, and poverty.

Scheumann and Phiri (2018), in a discussion paper, reported that Zambia's Water resources infrastructure is poorly developed and maintained, and that the rate of urbanization exceeds infrastructure developments. There is low access to safe and adequate water supply and sanitation.

Siyeni (2008), asserted that “service provision in PUAs can not be achieved without the involvement of all the stakeholders especially the community who are also the users and whose

major role is paying for the service to enhance sustainability. The collaboration between utility with its competence in water supply, technical installations, water quality testing and SSWP with theirs in community involvement, cost recovery, effective operation and maintenance and demand driven water schemes have to be merged to achieve the intended goal and it is also an indication that the two can complement each other. Utility should therefore consider opening investment accounts for all the areas so as to detach PUAs needs from the general plan and eventually budget as they would be self sustaining and enhance willingness to pay for the users. The SSWP should therefore be viewed as partners by all and licensing should be considered by the government for the benefit of the urban poor.”

In January 1992, an International Conference on Water and the Environment advocated for what came to be known as the Dublin Principles, which recognize among other issues that:

Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels (Principles No. 2). (Olugboye, 2017)

Water supply challenges

A qualitative Masters study by Chilala, N. (2019), used questionnaire survey technique to gather preliminary data from 28 respondents. The study sought to find out the main challenges in the implementation process and to offer possible solutions. To achieve the objectives, the researcher used both the qualitative and quantitative approaches, comprising of a detailed literature review, semi- structured interview and questionnaire survey. The study identified three leading challenges: (1) non-financial viability of the concessions due to low traffic volume (70.6%); (2) lack of time, resources and knowledge in the implementing agencies (64.7%); and, (3) inconsistent and unclear PPP Policy (61.8%). Based on this research, possible solutions were: (i) implementing agencies to categorize the non-economically and economically viable toll roads and incentivize the former as part of the long-term solution; and, (ii) build capacity in all implementing agencies and/or create specialized ‘swat teams’ to work with implementing agencies on specific transactions as ‘quick wins’. Based on these results, two corresponding PPP Models were recommended to encourage investment in the road sector in Zambia: (i) the Design Finance Build and Transfer Model for non-economically viable projects and (ii) the Design Finance Finance Build Operate and Transfer Model for economically viable projects.

One of the challenges faced by water utilities in providing water to the communities is operational inefficiencies. The sources of commercial utility (CU) inefficiencies are well known. These are technical inefficiencies (that is, physical water losses caused by leaking pipes), commercial inefficiencies (that is, revenue losses caused by meter inaccuracies, illegal use, unmetered consumers, and nonpayers), and organizational inefficiencies (caused by overstaffing, costly, and outdated human resources policies). **(World Bank Group, 2020).**

Project-specific guidelines developed to assist implementation are often based on international norms or design standards (for example, 250 users per water point) and do not reflect surveys of actual practice in Zambia. The program plans are general, as necessary, with the demand-driven approach and with implementation done by others. (World Bank Group, 2020).

In other words, they provide an implementation framework for local authorities (LAs), commercial utilities (CUs), cooperating partners (CPs), and nongovernmental organizations (NGOs) to operate within and do not allow the program units in the Ministry of Water Development, Sanitation, and Environmental Protection (MWDSEP) much scope for driving and managing the programs. (World Bank Group, 2020).

Deliberate strategies by Zambian Government to use public finance to incentivize efficiency improvements of water services providers linking financing to verifiable improvement in operational efficiency are lacking. **(World Bank Group, 2020).** High levels of losses and operational inefficiencies are preventing water utilities from accessing private capital. The solutions to the efficiency challenge are known and can be prioritized based on payback period or financial parameters. **(World Bank Group, 2020).**

Furthermore, the design does not consider changing and evolving externalities that may influence the sector and programs at large. For example, urbanization, population growth and patterns, climate change, and intersections with other sectors (for example, health and education) have effects on the required focus of the programs yet are given limited attention in program design. (World Bank Group, 2020).

Moreover, our analysis shows that Zambia's chronically inefficient water utilities are creating a fiscal burden and making it harder for the government to finance the sector. During 2001–17, Zambia's CUs lost an estimated US\$858 million from high levels of NRW and low bill collection efficiency (see appendix A for details). Most of the losses (US\$554 million) occurred during 2011–17 and was equivalent to about 20 percent of the total capital so far invested in the NUWSSP. There is evidence that CUs are compensating by reducing investment in

maintaining their assets. They also delay or forgo essential maintenance and repairs—actions that trigger a downward spiral of significant deterioration in assets, declining service quality and increasing cost for each unit of service provided. (World Bank Group, 2020).

Sustainable provision of water supply services in the face of growing population and demand requires active coordination between the authorities responsible for long-term water resource planning, and service providers. In Zambia, the growing urban and rural population and recurrent droughts have strained surface and ground water resources. A study in Masvingo municipality by Mapfumo and Madesha (2014) identified other factors alongside population growth that impact on water reticulation. The study identified population growth, poor infrastructure, economic challenges and climate change as the major challenges affecting efficient water delivery in Masvingo city. This study presupposes that population increase is not so much of a problem rather poor infrastructure, economic challenges and climate change compound the problem of water reticulation. If infrastructure is in a good state, population growth is not a problem. There are still many other factors apart from these alongside population growth.

An assessment of the challenges of Sustainable Water Supply was conducted by Shemelash (2013) where it was found that the provision of potable water in Gondar town was inefficient. The situation was getting worse due to the population growth and spatial expansion of the town which outstripped its ability to supply sufficient water for its inhabitants. In this study another factor apart from the population factor was introduced and this is the spatial expansion of the town. There seems to be an inherent problem in the way urban areas are developed in Africa that poses problems in water reticulation.

Challenges faced by MCC in partnerships

MCC actively addresses dimensions of sustainability throughout its body of project documentation, but lacks a central document dedicated exclusively to treatment of sustainability. Standardizing the creation of these plans would encourage the MCAs to engage with stakeholder agencies and focus attention on risks to sustainability early in the project life cycle.

The unique restrictions on disbursing funds after the conclusion of a compact, however, leave MCC largely powerless to address post-compact decay and other threats to sustainability. There is need

to safeguard critical funding to complement at times unreliable host country resources necessary to sustain project benefits.

MCC addresses donor coordination broadly in compact agreements, but lacks more formalized coordination with other development actors, and the adoption of joint frameworks to streamline partnerships. (Ensuring the Long-Run **Sustainability** of MCC Country Compacts)

Inadequately conducted due diligence on selected program activities before funding decisions were made has been problematic. For example, the Tanzania Water Supply Project faced significant delays in both Dar es Salaam and Morogoro, with the completion of works in each city delayed for more than one year past the original estimated completion dates. Designs that were originally thought to be “shovel-ready”, turned out to be only preliminary designs or concepts that required considerable additional time for preparation of detailed designs and, in some cases, redesign.

There have been challenges inherent in coordinating multiple stakeholders from different countries (funders, implementers, contractors) each without a comprehensive working knowledge of the others’ systems, processes, and approaches. (Olga Rostapshova, Danae Roumis, Jeff Alwang, Charles Pendley, 2015).

At MCA-Zambia, one infrastructure director was assigned to manage both infrastructure and institutional strengthening activities. Managing infrastructure occupied a significant portion of the director’s attention, while insufficient time was allocated to working closely with the implementing entities to ensure successful implementation and ownership of the institutional strengthening technical assistance. (Zambia Star Report, 2020).

MCC’s project design and due diligence process would have benefited from an *incidence analysis study* linking water and sanitation sector expenditures with associated physical outputs and levels of service and access enjoyed by different classes of consumers. Such work could highlight inequalities across the population and serve to inform strategies for selecting potential beneficiaries. This analysis could inform estimates of likely levels of subsidy needed to defray the costs of initial connections to the water and sewerage networks. An extension of such work, moreover, could include an examination of institutional capacity and operational effectiveness to increase MCC’s understanding of planning, budgeting, and spending (for both capital investments and O&M expenditures) and the association of these factors with key sectoral performance metrics. (Zambia Star Report, 2020).

MCC’s inclination to support work that will advance private sector development and

involvement in the power sector leads to a heavy focus on financial management and sustainability. However, operational management should not be neglected— utilities need to expand their network, invest in maintenance, improve operational processes, tools, and procedures, etc. And these areas may be more difficult to achieve and sustain impact in compared with financial issues due to their decentralized nature and because of the need for change management. Financial health may be closely tied up with operational performance, and sufficient focus is needed for both. Pacing, again, is important. If the utility starts improving revenues (e.g., through tariff reform, loss reduction) but cannot spend the money effectively because of operational problems with procurement processes, a new negative cycle may begin. Moreover, if excess cash builds up on the balance sheet, regulators may feel less inclined to provide tariff increases that may be needed to achieve cost-reflectivity. (www.mcc.gov)

The Jordanian Compact reinforced sustainability through multiple improvements to the water utility and its staff, policy changes, personnel training, equipment modernization and infrastructure improvements. These efforts were expected to enhance the operating structure and efficiency of the utility making it more cost effective and sustainable. If MCC pursues a similar arrangement in the future, it should anticipate the need to allow flexibility in the compact development timeline. For instance, after awarding the wastewater contracts, it became clear that some of the technical designs were incorrect and needed to be revised. As there was no time to re-tender for new designs. (www.mcc.gov)

Challenges faced by the community

Lack of, or poor engagement of communities by project implementers. As Kanyanga (2017) observed, while information was given to the community about the project, the community did not fully participate. It is important for project implementers to engage the community more and embrace their ideas if there is to be ownership of development projects. Bottom-up approach to communication and participation is necessary for the success of the project.

Resources provided for development of IEC materials and execution of outreach campaigns during implementation were not adequate. preparing household-level water and sanitation connection outreach during compact development. There has been a lack of emphasis on the importance of implementation actors' sensitization for better coordination and integration of work planning by responsible for outreach and connection activities so that works and outreach may be coordinated through integrated work planning. (Zambia Star Report, 2020).

In unplanned and rapidly changing urban environments, it is difficult to identify the people who will be affected by the project until detailed designs are complete and the project impact area has been physically identified and marked. At the beginning of the Zambia Compact, the resettlement budget was roughly \$6.7 million, and it was estimated that there would be 1,600 project-affected people. By the end of the compact, the budget increased to \$26.3 million with 5,167 project-affected people. The difference was due to changes in construction design, rapid growth in Lusaka, and a two-year lag between the original resettlement plans and construction implementation, illustrating how work in a dense, dynamic urban environment requires a more nimble and adaptive approach to estimating costs and planning budgets. (Zambia Star Report, 2020).

Challenges faced by LWSC

The compact did not include all relevant regulators. In Zambia, the water regulator was not part of the compact. It should have been included as an implementing entity to help provide the right incentive structure given their role in ensuring technical and financial performance to LWSC;

Design a better balance between investments in technical solutions on the one hand and social policies and behavior change on the other, as the latter are critical to the risk management and sustainability of the former. To ensure connections, service uptake, and behavior change, implementing entities such as LWSC and LCC need to (a) develop structures, policies, and procedures that will enhance their ability to provide appropriate, affordable, and sustainable services for the poor; (b) identify information, education, and communications (IEC) needs for water and sanitation, and solid waste management and drainage, respectively, and (c) develop and manage IEC systems that promote behavior change. While substantial work on these policies and programs was undertaken, and initial monitoring and evaluation reports indicate their successful adoption by the implementing entities, this work was under-resourced relative to the scale of response required by LWSC and LCC to meet the service needs of the targeted communities and to ensure sustainability of infrastructure. (Zambia Star Report, 2020).

Unstable macro-economic factors such as exchange rate, inflation and interest rates affecting mainly the cost of inputs. Generally poor state of infrastructure coupled with poor asset and project management. Encroachment on water supply and sanitation facilities. (NWASCO, 2019).

Water Resource Management in Context

In April 1992, the United Nation Conference on Environment and Development called forth effective Implementation and Coordination Mechanism to promote integrated Water Resources Management (IWRM) based on public participation. (www.group.org)

The Integrated Water Resources Management has four objectives:

- a. *To promote a dynamic, interactive and multi-sectoral approach to water resources management, including the identification and protection of potential sources of freshwater supply that integrates technological, social-economic, environmental and human health considerations;*
- c. *To design, implement and evaluate projects and programmes that are both economically efficient and socially appropriate within clearly defined strategies, based on an approach of full public participation, including that of women, youth, indigenous people and local communities in water management policy-making and decision-making (UN, 1992)*

in van dar Zaag and Savenije, 2014)

Global estimates reported by the United Nations, indicated that there is “unfinished business” of extending services to 844 million people who still lack even a basic water accessible on premises, available when needed and free from contamination (safely managed drinking water). (www.unwater.org). Evans et al, (2013) reported that reliable at-home water supply results in higher volumes of water consumed, greater practice of key hygiene behavior, a reduction in musculo-skeletal impacts associated with carrying water from outside the home and improved water quality.

Where water supply in piped water networks is unavailable, people mostly rely on wells or community water supply systems (e.g. water delivery through kiosks and vendors, trucking water) to access water. In the latter case, they generally pay prices several times higher per litre of water compared to individuals or communities serviced by water pipe systems. (www.unwater.org)

In the 2015 launch, the United Nations Sustainable Development Goals (SDGs), with targets such as Target 6.1, emphasized increased universal access to water. Consequently, global efforts

to address the role of water and energy resources in a coordinated manner through research and policy for sustainable development have increased steadily. (Pauline et al, 2020)

There has been a growing appreciation of partnerships for sustainable development through multi-stakeholder initiatives voluntarily undertaken by Governments, intergovernmental organizations, major groups and other stakeholders, whose efforts are contributing to the implementation of inter-governmentally agreed development goals and commitments. (United Nation, 2020)

The past 15 years have seen a rise in collaboration between donor agencies and companies. The Germany Federal Ministry for Economic Cooperation and Development (BMZ) now has a portfolio of 1,400 development partnership projects with the private sector, the United States Agency for International Development (USAID) has forged over 100 alliances with 3,000 individual partners, and Denmark's DANIDA and struck 300 partnerships by 800. In these partnerships, access to water and sanitation has also not been left behind, as there has been evidence to show cooperating partners who have been working with governments to improve the access to water among citizens.

To address the need to improve the coverage of Water Supply Services governments and development oriented cooperating partners have sought means to access and allocate finance, such as the utilization of compact. A compact is a form of blended finance, broadly understood to be "a large portfolio of potential, instruments such as instruments provided by Development Finance Institutions to leverage private finance, traditional public private partnerships" and structured public-private funds and wide range of stakeholders. ((United Nation,2014,p.37) in Jomo, 2016)

2.4 Developed countries

Developed countries also face challenges related to water supply. Examples include findings by Delia (2019), that "equitable access to water and sanitation is still a challenge for Europe. 48 million people do not have piped water at home."

In 2015, a Drinking Water Infrastructure Needs Survey and Assessment found that U.S. water systems need \$472.6 billion of investment by 2035 to continue providing clean safe drinking water. Each year, 250,000 to 300,000 main breaks occur in the U.S., disrupting supply and risking contamination of drinking water. (Centre for sustainable systems, 2018)

In Japan, around 3.7 million people use their own wells or unregulated small scale water supply services without access to tap water supply businesses regulated by the Act. Also, there are gaps between urban areas and rural areas. Unlike the high coverage in cities (98%), the coverage in towns and villages are relatively low (91% and 88% respectively). (www.mhlw)

Despite achieving impressive development of water infrastructure and management in recent decades, Korea faces a number of threats to water security, now and in the future. An ageing population and recent slow-down in economic growth limit available public funding for responding to them. (www.oecd.org)

2.5 Developing countries

A study was conducted by Wright-Contreras et.al (2020) to analyse the main outcomes and success factors of the water operators' partnership (WOP) between the Dutch water operators' organization, VEI (formerly Vitens Evides International), and the Vietnamese water utility, Da Nang Water Supply Joint Stock Company (Dawaco), which took place from 2007 to 2010.

Wright-Contreras et.al (2020), further provides evidence that operators' partnerships have positive effects on coverage and water quality. For example, there is evidence that in study area, the trend of increased coverage continued, including two peaks in percentage of change in 2011, and another time in 2014, reaching 74% and 87%, respectively. In 2017, coverage reached 93%. (Wright-Contreras et.al, 2020). Similarly, records for water quality showed that between 2006 and 2010 the percentage of tests which passed the quality standards for residual chlorine rose from 72% to 83% respectively.

Furthermore, Wright-Contreras et.al (2020) attributes successful implementation of partnerships on water provision in Da Nang to the political support as well as availability of funds from the Netherlands Ministry of Foreign Affairs provided by the RNE in Hanoi. Additionally, there were also what are termed as internal factors which basically imply the motivation and commitment of Dawaco's management staff to implement changes in the utility, as well as the openness of both VEI and Dawaco to communicate the utility's needs and transfer expertise. (Wright-Contreras et.al, 2020)

According to the World Bank Group (2011), in small piped systems, there is a strong correlation between PPPs and increases in connections and collection efficiency. Primarily, these PPPs allow an affordable average tariff to be maintained for households.

2.6 Africa

Evidence across the globe shows that there has been consistent engagement of government with cooperating partners to provide water. For example, in partnership for healthy cities Water and Sanitation for the Urban Poor (WSUP) is a tri-sector partnership among the private sector, civil society, and academic focus on addressing the increasing global problem of inadequate access to Water and Sanitation for the Urban Poor and aimed at attaining the SDG's water and sanitation targets. WSUP members include Unilever, Halcrow, Borealis and Borouge, CARE International, World Aid, Graneld University and International Water Association (IWA). Private Sector expertise from WSUP members' feeds into the design and implementation of performance-based improvement programs in partnership with local communities and service providers. WSUP's academic member serves as a guarantor of rigor in program design and implementation, and plays a pivotal role in program monitoring, evaluation, and the injection of new approaches and techniques. This approach and partnership ensures that more can be accomplished than each partner could have achieved alone, and allows the program to aim at achievements on the appropriate scale. In Madagascar, WSUP has improved water services for 106, 000 poor urban city dwellers and sanitation for 15,000 members of this population, demonstrating models replicable for the city's 600,000 low-income consumers.

Of the 844 million people currently lacking basic drinking water services, 263 million people (4% of the population) spend over 30 minutes in round trips collecting water from an improved source, while 159 million people collect drinking water directly from surface water sources. Nearly 60% of the latter group lives in Sub-Saharan Africa. (UNECE 2018)

In the face of the aforementioned challenge of water access, PPPs have been formed on the African continent. One such partnership was the Senegal Affermage where the access ratio went up from 58% to 76% and is now considered as a model of public-private partnerships in Sub-Saharan Africa. (UNECE 2018)

In Niger, a similar type of PPP has led to improved operational efficiency where access to safe supply of piped water was inadequate, intermittent and of poor quality. The private sector's financing of new connections and its contribution to repair and maintenance investments was key in decreasing the levels of unaccounted for water and improving revenue collection. (World Bank Group, 2014)

A World Bank Group review of Uganda's 10-year experience, WBG (2011), reported that in small town water PPPs connections have almost tripled since PPPs' introduction in 2002. Over 1.5 million people are now served through PPPs in small towns, and tariffs have risen by less than inflation.

In 2007, Lesotho allocated \$164-million over five years for investment in improved water supplies and sanitation facilities for rural and urban domestic, commercial, and industrial users. When the Compact ended in September 2013, 175 water systems (70% of the target) and 29,352 VIP latrines had been installed. (MCC, 2017)

According to MCC (2014),

“The MCC compact with Mozambique approved a five-year investment (2008-2013) program of \$506.9 million in four project areas. Of this budget amount, excluding administration and monitoring and evaluation costs, a total of \$447.1 million of compact funds was disbursed in the following project areas by the September 23, 2013 compact end date: 1) Water Supply and Sanitation (\$200.2m), 2)

Rehabilitation/Construction of Roads (\$136.8m), 3) Land Tenure Services (\$39.5m), and 4) Farmer Income Support (\$18.9m).

The Water Supply and Sanitation Project included four major activities: technical assistance and capacity building (\$11.4m), rehabilitation and expansion of urban water supply systems (\$113.5m), rehabilitation and expansion of six municipal sanitation and storm water drainage systems (62.4m), and rural water supply (\$12.9m).

The Rural Water Supply Activity consisted of two components: (i) construction/reconstruction of 600 improved water points in rural communities, and (ii) the mobilization of water committees to maintain water point infrastructure and provide community-based training in improved sanitation and hygiene practices.”

2.7 Zambia

Starting in the mid-1990s, Zambia had begun to address the mismanagement of its water sector. The GOZ introduced a series of reforms, including the 1997 Water Supply and Sanitation Act, establishing a legal and regulatory structure for water in keeping with international standards.

An independent regulator, the National Water and Sanitation Council (NWASCO), came into being in 2000; it is responsible for licensing, establishing standards, and approving rates. Lusaka's water utility was re-created as an independent, government-owned corporation operating on a commercial basis. With the support of a Water Sector Performance Improvement Project funded by the World Bank, it turned a financial surplus for the first time in 2009. These young institutions were still struggling to catch up after decades of underinvestment in the water sector, but their growing capacity and positive trajectory represented an opportunity for partnership to support infrastructure investments in the water sector for sustained improvements in health and prosperity. (Zambia Star Report, 2020).

In Zambia, the Ministry of Water Development, Sanitation and Environmental Protection, is mandated by the Gazette Notice Number 836 of 2016, among other responsibilities, with the implementation of Water Policy, Water supply and sanitation, and water resources management and development. The Ministry has oversight over National Water Supply and Sanitation Council (NWASCO), Water Resources Management Authority (WARMA), Zambia Environmental Management Agency (ZEMA), and Water Utility Companies (CUs). (MWDSEP, 2019)

The key legislation governing sanitation in Zambia is the National Water Supply and Sanitation Act No. 28 of 1997. The Act established NWASCO as the oversight agency for the regulation of water supply and sanitation for both urban and rural contexts in Zambia. Its main mandate is to regulate the provision of water supply and sanitation (WSS) services for efficiency and sustainability. During the year under review, NWASCO regulated 16 licensed water supply and sanitation providers which were 11 commercial utilities and six private schemes across the country. Commercial Utilities are companies established by Local Authorities while private schemes are companies that primarily provide WSS services to their employees as a fringe benefit. (NWASCO, 2019)

Lusaka Water and Sewerage Company Limited (LWSC) is one of 11 aforementioned water utility companies. It was established in 1988 and commenced its operations in 1990. The Company became a Provincial Utility in February 2008 and the current shareholding structure is as follows: Lusaka City Council-40%, Kafue District Council- 15%, Chongwe District Council-7.5%, Chilanga District Council-7.5%, Luangwa District Council-7.5%, Chirundu

District Council-7.5%, Rufunsa District Council-7.5% and Shibuyunji District Council-7.5%. (LWSC, 2018)

Information based on MCC (2020), indicates that;

LWSC ratified an asset management policy, created an asset management department, trained hundreds of staff, and established a steering committee to ensure all of the company's divisions improve their asset management practices. LWSC also rolled out a new, centralized electronic maintenance management system that tracks all maintenance tasks and promotes staff accountability. Six months after compact close, the system was fully operational for reactive maintenance tasks all across Lusaka province. The company's new focus on preventive and reactive maintenance activities should contribute to more effective financial planning, ultimately bolstering LWSC's financial stability, but it is too soon to judge the impact of these initiatives. LWSC installed more than 8,000 new postpaid meters. Based on temporal changes in the bills of customers who received new meters, the activity increased bills by around \$4.30 per customer per month, which translates to \$29,777 in revenue (about 2 percent of monthly LWSC revenue). LWSC could have increased billing even more by prioritizing previously unmetered customers. The project also conducted a census of all structures in Lusaka to enable LWSC to update more than 165,000 records in their database, though the vast majority had no effect on billing. The activity led to a net increase in billing of \$4.60 per updated customer account per month, or \$15,923 in revenue (about 1 percent of monthly LWSC revenue).

About 70% of the population reside in peri - urban areas which are high density unplanned settlements. Water supply to the province comes from two types of sources, namely surface water and ground water representing (43%) and (57%) respectively. The average daily production for the province is 247 million litres (as at 3rd quarter 2017). (LWSC, 2018)

WARMA is part of a wider structure established by the Water Resources Management Act No. 21 of 2011. Over the years, Zambia's water sector has undergone reforms. The two phases of water sector reforms in Zambia commenced in the late 1980s and early 1990s respectively. This led to the development of the National Water Policy of 1994, which provided guidelines for reorganising the sector into two sub-sectors, namely;

- The Water Supply and Sanitation Sub-sector
- The Water Resources Development and Management Sub-sector. (WARMA, 2018)

The National Water Policy was later revised in 2010. This was then followed by the second phase which was the enactment of a new Water Resources Management Act No. 21 of 2011, which replaced and repealed the Water Act of 1949 which offered a very limited approach to

water resources management. The emerging focus in WRM has prioritized decentralization using the catchment as a management unit in recognition of the unity of the hydrological cycle. This approach will also help to manage water directly where it is located and needed. The Water Resources Management Authority (WARMA) was established under the Water Resources Management Act No. 21 of 2011. Its main purpose is to serve as the regulatory body for the management and development of water resources in the whole country and ensure equitable access to water for the various stakeholders. (WARMA, 2018)

Zambia Environmental Management Agency (ZEMA) is an environmental regulator and a coordinating agency established through an Act of Parliament, the Environmental Management Act no 12 of 2011. It is mandated to protect the environment and control pollution to provide for the health and welfare of persons, animals, plants, and the environment. (MWDSEP, 2019)

The Government of the Republic of Zambia (GRZ), through the provisions of the Water Act No. 28 of 1997, issued Statutory Instrument (SI) No. 50 of 2001 to establish the Devolution Trust Fund through NWASCO. The DTF is a basket financing instrument with the aim to assist the commercial water supply and sewerage utilities (CUs) to extend their services to the urban poor. The DTF mainly promotes the extension of public water distribution systems and onsite sanitation in low-income areas. (www.nwasco.org.zm)

In the water and sanitation sub-sector for example, Government works with cooperating partners under the Sixth National Development Plan to provide support to investment programmes whose goal is to increase access to safe, adequate water supply to 80 percent for the urban and peri-urban population by 2010, and proper sanitation systems to 70 percent for the urban and peri-urban population by 2010. This program is being carried over into the SNDP. (Ministry of National Development Planning, 2017)

Millennium Challenge Account (\$354); The Millennium Challenge Corporation's \$354 million Zambia Compact (2013-2018) funded the Lusaka Water Supply, Sanitation, and Drainage Project to rehabilitate and extend infrastructure and strengthen the institutional capacity of the Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC). This investment was expected to improve LWSC's financial sustainability and the LCC drain maintenance unit, thereby improving service delivery, preventing flooding, generating time-savings for households, and reducing water-related diseases. These outcomes would then

raise household incomes and reduce property damage and business losses due to flooding. Millennium Challenge Account Zambia was responsible for funding the project. (MCA, 2016)

The LWSSD Compact was also expected to reduce poverty through economic growth in Zambia. The Compact objectives were to expand access to and improve the reliability of the municipal water supply, to extend the sewerage network and provide access to household sanitation, and to improve drainage systems in select urban and peri-urban areas in Lusaka to decrease the incidence of water-borne and water-related diseases, generate time and cost savings for households and businesses, and reduce non-revenue water in the water supply network. (CDC, 2015)

The compact had the following major components:

Contract Packages 1 and 2 (CP1 and CP2) involving the rehabilitation of Lolanda Water Treatment Plant, Transmission Main, Distribution Centres and the construction of the Primary Backbone Network contracted at the sum of USD45.9Million in December 2015. Contract Package 3 (CP3) involving the Construction and Rehabilitation of Water and Sewer Reticulation in the Kamanga, Mtendere, Kaunda Square and Chelston Areas amounting to USD22.4Million.

Contract Package Four (CP4) amounting to USD10Million was signed on 28th September 2015 with a contract duration of 24 months. It involves rehabilitation and expansion of Kaunda Square Waste Stabilization Ponds. The overall progress of works is at 33%.

Contract Package 5 (CP5) involving the Construction of water distribution network in Ndeke/Vorna Valley, Kwamwena, SOS Village, Chipata and Ng'ombe. This contract is expected to be implemented over a period of 24 months.

Contract Package six (CP6) amounting to USD29.96Million was signed on 6th January 2016 with a contract duration of 24 months. This is a Non-revenue water reduction project targeting 14 Demand Management Areas (DMAs). (www.mwdsep.gov.zm)

According to the Ministry of National Development Planning (2020),

“in Zambia, 72 percent of households have access to an improved water source, although access is more predominant in urban (92 percent) than rural (58 percent) households. The most common sources of drinking water in urban households are piped water into their dwelling, yard, or plot (41 percent); water from a public tap or standpipe (16 percent); and piped water shared with a neighbour (15 percent). Rural households obtain their drinking water mainly from tube wells or boreholes (36 percent), followed by protected dug out wells (14 percent). Slightly less than half (42 percent) of rural households obtain their drinking water from an unimproved water source, as compared with 8 percent of urban households.”

Other recent investments in water and sanitation infrastructure

Over the years, LWSC has been engaged in projects aimed at improving the coverage of Water and Sanitation services.

Kafue Bulk Water Project (US\$150); The Government of the Republic of Zambia mobilized funds amounting to US\$150 Million from the Exim Bank of China for the implementation of phase I of the Kafue Bulk Water Supply Project. This was done through Contractor Procurement Construction (EPC) Contract where the contractor secures financing, designs, build and hand over to the client. The project involved the construction of an intake structure, treatment plant, booster station and transmission lines to deliver a total of 50,000m³/day of water into the existing Stuart Park storage facilities in Lusaka. The contractor started execution of the civil works at the Iolanda Intake on Kafue River in October 2016. The project was to be implemented over a period of two years up to April 2018 and is expected to improve the water supply in Lusaka. (www.mwdsep.gov.zm)

Chongwe Water Supply System Project (K23m); The project is divided into two (2) lots and being executed by Zambezi Drilling Limited and SAWA Group Limited. On completion, it was projected that the project would result in improved water supply to Chongwe District by about 3,450m³/day. (www.lwsc.com.zm)

Water Supply Project in Chikankata (K1.4m) The Ministry implemented a water supply project in Chikankata at a cost of K1.4 Million intended to benefit 2,400 households. The project involved drilling, equipping of boreholes, construction of water supply network and elevated tank. (MWDSEP, 2018)

Kaoma Emergency Works - Water Supply Project (K1.3 Million); The Kaoma Water Supply Project was implemented at the cost of K1.3 Million. The project aimed at improving water supply in Kaoma whose scope involved drilling and equipping four (04) boreholes. It had a target of providing over 3,774 people with access to clean and safe water supply. (MWDSEP, 2018)

Nkana Water Supply and Sanitation Project Phase II (US\$ 200 million); The Government mobilized funds amounting to US\$ 200 million for the implementation of the Phase II of Nkana Water Supply and Sanitation Project. The project, commenced in 2016, and was scheduled to be completed after four years. The project involved the rehabilitation and the project improved water supply and sanitation services to Kitwe, Kalulushi and Chambishi, through expansion of the water supply and sanitation infrastructure. (www.nwsc.com.zm)

Danida Mixed Credit Facility Project (US\$104 Million); The Government mobilized funds amounting to USD 104 Million from the Danish Government to improve water supply in Ndola, Luanshya and Masaiti. The project involved the rehabilitation of water supply and sanitation facilities in Ndola, Luanshya and Masaiti towns. The project was aimed at restoring the initial capacity of the various water supply and sewerage infrastructure in the above towns. (GRZ, 2017)

Kafulafuta Water Supply System Project (US\$449 Million); The Government mobilized funds from the Chinese Government amounting to US\$449 Million for the implementation of the Kafulafuta Water Supply Project. The project was aimed at improving water and sanitation services in Ndola, Luanshya, Masaiti and Mpongwe. (MWDSEP, 2018)

Nakonde Water Supply Project (K33.9 million); The Nakonde Water Supply Project was at a projected total cost of K33.9 million. The project was funded by the Government of the Republic of Zambia. This project will improve hours of water supply from the previous 11 hours to 20 hours and was expected to result in more than 13,000 people having access to safe and clean water supply. (MWDSEP, 2019)

Construction and Rehabilitation of Water Supply Project in Chinsali-(K51.1 million); The Ministry implemented the Chinsali Water Supply Project amounting to K40.8 million, which was fully funded by the Government of the Republic of Zambia. The project involved the construction of transmission mains into the, construction of water storage reservoirs and new water network and installation of water meters. It was projected that once completed, the project would improve the hours of water supply from the current 8hours to 24hours resulting in 15,000 people having access to safe and clean water supply. (MWDSEP, 2013)

Six Towns Water Supply Project (US\$12.4 Million)-Phase II; The Government mobilized funds amounting to USD 12.4 million from the Arab Bank for African Economic Development (BADEA) to finance phase II of the Six Towns Water Supply Project. The project involved the rehabilitation of intake, water treatment plant, construction of water storage reservoirs, water intakes and networks in Mpika, Mbala and Kasama. (MWDSEP, 2019)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This dissertation assessed the impact in terms of access to water services by households in view of Lusaka Water and Sewerage Company and Millennium Challenge Account partnership in the water provision in Kwamwena Valley. The present chapter of this research, highlights the methodology that was used for this research. The chapter specifically looks at the type of research, the study site of the research, the research design, the sources of data, the sample size, the sampling methods, methods of data collection, the reliability of data, the validity of data, the data analysis techniques, and the chapter ends with the ethics that was applied when conducting the research.

MCC's first engagement with the Zambia Government began in 2004, when the Board of Directors selected the country for a threshold program. Throughout that three-year program, the trajectory of the country's scorecard performance improved, leading the Board to select Zambia as eligible for a compact in 2008. The Government of the Republic of Zambia consulted with the private sector and civil society of Zambia to determine the priorities for the use of MCC assistance. A proposal for such assistance to achieve lasting economic growth and poverty reduction was, developed and submitted to MCC. In 2012, MCC signed a \$354.8 million compact with the Government of the Republic of Zambia (GOZ). (WWW.MCC.GOV/STAR-ZAMBIA)

This led to the implementation of Lusaka Water, Sanitation and Drainage Project, whose objective was to expand access to, and improve the reliability of, water supply and sanitation, and improve drainage services in select urban and peri-urban areas of the city of Lusaka in order to decrease the incidence of water-borne and water-related diseases, generate time savings for households and businesses and reduce non-revenue water in the water supply network. (www.mcc.gov)

In 2010, only about 30 percent of Lusaka residents had household-level connections to the municipal water supply. An additional 40 percent could draw water from the municipal supply at a community water point, bringing the level of service to approximately 70 percent.¹⁹ However, these community water points were poorly designed and maintained, frequently vandalized, and generally without clear ownership. (Zambia Star Report, 2020).

Prior to the partnership between Lusaka Water and Sewerage Company, and Millennium

Challenge, finding a workable infrastructural development funding formula proved to be a key challenge. Zambia had made little progress in areas related to expanding the network, service coverage, hours of service, and reducing the affordability burden, especially among lower-income households. Chitonge and Horman (2011)

Furthermore, the municipal water utility (LWSC) pumped an insufficient volume of water into the system each day when compared to demand. If the water system had been functioning well, it could have met about 85 percent of the demand; however, LWSC was unable to account for roughly half of the water it produced. These enormous losses known as non-revenue water seriously undermined the utility's financial viability and exacerbated continuity of service problems, leaving Lusaka residents without water periodically throughout the day. In addition to an insufficient and intermittent water supply, the quality of water delivered to customers was inconsistent. (Zambia Star Report, 2020).

Although LWSC treated the municipal drinking water supply, treatment was not always reliable or sufficient to maintain adequate water quality throughout the entire network. Water quality was an even bigger problem for those residents who lacked easy access to municipally-supplied water and relied on a variety of formal and informal water sources. Water from these sources was rarely treated, therefore carrying a higher risk for waterborne disease. Lusaka's rapid peri-urban growth includes high-density neighborhoods, many of which are also low-income areas. Unplanned growth combined with the difficulty of laying water pipes in tight confines had prevented expansion of the water supply network into many of these low-income neighborhoods. Throughout the city, residents often resorted to using shallow wells for drinking water, but these were at a high risk of contamination. (Zambia Star Report, 2020).

Lusaka's climate and geology amplifies these water supply and sanitation challenges. The aquifer beneath the city is as little as two meters below the land surface, making shallow wells an accessible water source. But this same accessibility renders the aquifer extremely vulnerable to contamination. In addition, the ground underneath the city is highly permeable due to the rocky limestone/marble bedrock with numerous fissures, sinkholes, and underground flow paths (a geology known as "karst"). This means that ubiquitous, unlined pit latrines, leaking sewers, and even drainage ditches impact the city's groundwater with fecal contaminants and nitrates from human waste. (Zambia Star Report, 2020).

Water services delivered by Lusaka Water and Sewerage Company, for example in Kanyama Compound of Lusaka, were found to be of poor quality, and at unsustainable operation costs.

Mwanamwambwa (2013).

In 2018, it was observed that Zambia's Water resources infrastructure is poorly developed and maintained, and that the rate of urbanization exceeds infrastructure developments. Low access to safe and adequate water supply and sanitation still remains a pertinent matter. (Sheumann and Phiri, 2018),

After the conclusion of the Lusaka Water and Sewerage Company, and Millennium Challenge Account partnership, intermittent water supply still persists. The intermittent water supply mode in Lusaka and its continuation are issues of governance, and natural and technical problems. There is still need for the identification of specific aspects that require human capacity development. (Nya *et al* ,2021)

While partnerships are set up to service the poor, they are used to break down state responsibility for equitable development. There is a risk that after a partnership ends its activities, the state fades away and instead of the promised benefits, the poor end up with even graver dispossession. (Chan, 2014).

Key findings from reviewed literature are recounted below.

Ellis *et al* (2018), traced the influence of decades long global water initiatives on urban water-policy reforms in the Sub-Saharan Africa in light of partnership models. They maintained that for urban water supply in Sub-Saharan Africa to improve, innovative governance and institutional arrangements that blend the strengths of public, private and community-based water supply models are required.

Lombanya, and Chileshe (2020), assessed Lusaka Water and Sewerage Company's competitive priorities in its endeavor to provide safe and affordable water services in Lusaka's upcoming residential areas. The study called for the formulation a well-documented operations strategy that will focus on the cost of the service and time of service delivery. These can be achieved through a well thought out and implementable capacity strategy and asset management.

Chipuwa (2019), analysed the nature of challenges faced in the provision of water and sanitation services in newly planned residential areas in Lusaka. The study showed that population growth, and growth of new settlements were significant contributors towards onsite water provision.

Mwalukanga, Nchito, & Siame (2019), studied decision-making processes on the Kafue Bulk Water Project. The study reported that despite considerable investment in increased water provision, but service coverage and quality have not changed much.

A number of concerns in water supply partnerships were also reviewed, and these include the following.

MCC actively addresses dimensions of sustainability throughout its body of project documentation, but lacks a central document dedicated exclusively to treatment of sustainability. Standardizing the creation of these plans would encourage the MCAs to engage with stakeholder agencies and focus attention on risks to sustainability early in the project life cycle.

The unique restrictions on disbursing funds after the conclusion of a compact, however, leave MCC largely powerless to address post-compact decay and other threats to sustainability. There is need to safeguard critical funding to complement at times unreliable host country resources necessary to sustain project benefits.

MCC addresses donor coordination broadly in compact agreements, but lacks more formalized coordination with other development actors, and the adoption of joint frameworks to streamline partnerships. (Ensuring the Long-Run **Sustainability** of MCC Country Compacts)

At MCA-Zambia, one infrastructure director was assigned to manage both infrastructure and institutional strengthening activities. Managing infrastructure occupied a significant portion of the director's attention, while insufficient time was allocated to working closely with the implementing entities to ensure successful implementation and ownership of the institutional strengthening technical assistance. (Zambia Star Report, 2020).

The research questions of this study were:

- i Has there been the improvement in the accessibility of clean and safe water as a result of partnership in the provision of water in Kwamwena valley in Chongwe district?
- ii What challenges did partners face in the provision of water in Kwamwena Valley in Chongwe district?

Type of research

The type of research conducted was based on the purpose of the research, which is an evaluation research. An evaluation research is a research carried out to assess the impact of social interventions hence determining their merit, worth or significance. An evaluation research intends to see whether or not the programme or project is meeting or has met its objectives (Palton, 1996). Evaluation research was selected because it provides a mechanism

to monitor, correct, reverse or maintain an activity or project. The purpose of this research, thus was to assess the impact of the partnership of the water providers to residential area in Kwamwena Valley in Chongwe district.

3.3. Scope of the research/Study site

Kwamwena Valley residential area is located in Lusaka Province. It was, previously, part of a large farm (Galunia farms) which was sub-divided into residential plots by Meanwood Properties Limited.

This study's scope was limited to three specific groups, that is, water utility firms, cooperating partners and the community of Kwamwena Valley, which is one of the fastest growing areas in Chongwe District. Which has attracted many people from urban areas to migrate there in search of land to build houses and other business ventures. This means that there is high demand of water to the residents.

Google Earth map showing the location of Kwamwena Valley

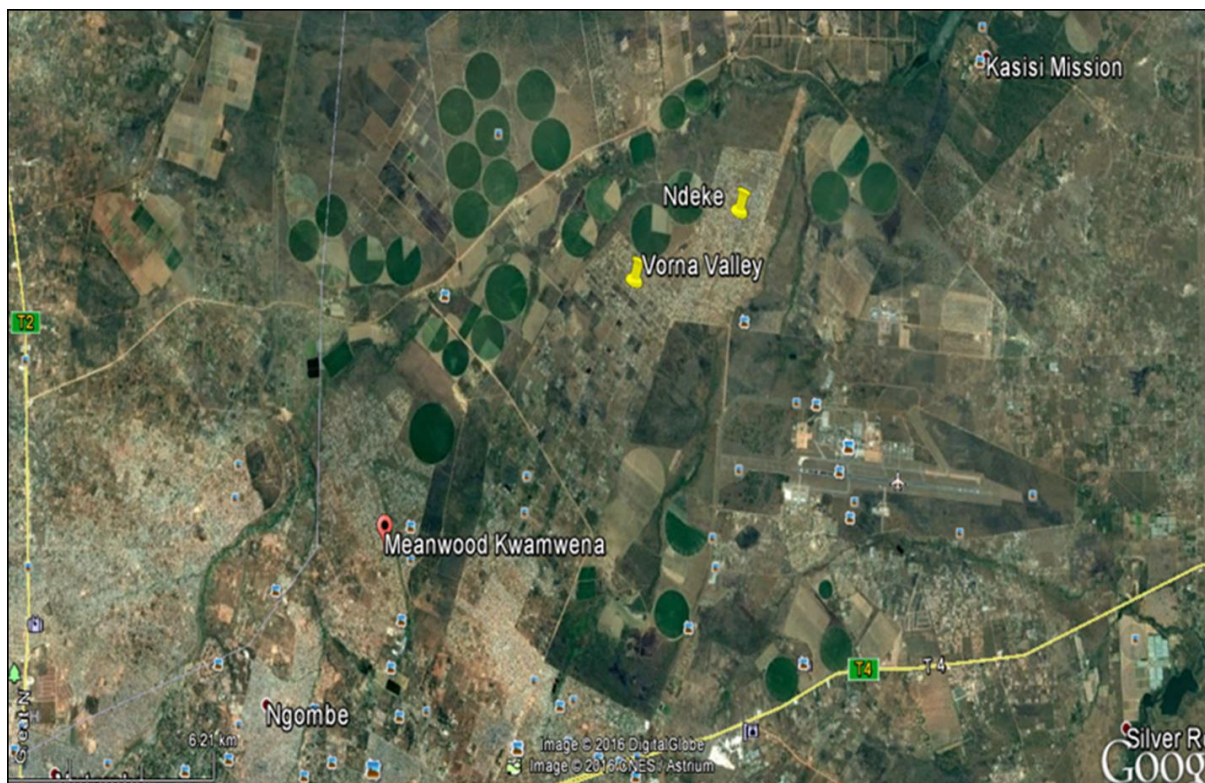


Figure 3:1: Location of study area

Source: MCA, 2016

3.4. Research design

Research Design refers to the arrangement of conditions collecting and analysing data in a manner that aims to combine relevance to the research purpose with economy and procedure within which research is conducted (Kothari, 2004). This research used a mixed methods design, comprising qualitative and quantitative approaches (Creswell, 2014). This type of design method combines elements of qualitative and quantitative data because of the following reasons: 1) it enables researchers to simultaneously address confirmatory and explanatory research questions and, therefore, evaluate and generate theory at the same time; 2) it enables researchers to provide stronger inferences than a single method or worldview; and 3) it provides an opportunity for researchers to produce a greater assortment of divergent and/or complementary views (Venkatesh et al., 2013). Thus, as used in this research, the combination of quantitative and qualitative methods complements each other and allow for a more robust analysis of the role of cooperating partners in water provision in the study area.

3.5. Sources of data

This research made use of both primary and secondary sources of data. Primary data is data which is undocumented and is collected for the first time by the researcher (Surbhi, 2016). Primary data in this research included both qualitative and quantitative data. Qualitative data was collected through in depth interviews from Key Informants who are Officials from Lusaka Water and Sewerage Company and Officials from Millennium Challenge Account. An interview was preferred because of its flexibility and quick collection of required relevant information. This was complemented with 1 Focus Group Discussion (FDG) constituting a set of 4 women and 5 men to solicit deeper insights.

Secondary data is data that has already been collected and reported by others (Surbhi 2016). This is the data already collected and is found in various sources such as books, media among others in line with the research topic. The secondary sources of data included published and unpublished documents such as research reports, books, journal articles, periodicals, newspapers, dissertations, theses and national documents among others. These documents were accessed from libraries, individuals, organisations and the internet.

3.6. Sample size

Sample size can be taken to mean “the number of items to be selected from the universe to constitute a sample” (Kothari, 2014). To determine representative sample size, the assumption was made that the population in Kwamwena Valley is more than 10,000 and the variability with

respect to beneficiaries remains unknown, hence $p=.5$ (maximum variability) was adopted. In this study, the researcher desires a 95% confidence level and 10% precision level. The sample size was determined using Cochran (1963:75) formula shown below.

$$N = \frac{z^2 pq}{e^2}$$

Where:

N = size of sample randomly selected from the population

P = estimated proportion of factor in the population (50% as it gives the largest sample size)

e = Precision (i.e. maximum acceptable difference between sample and population) (10%)

Z = confidence level (1.960 for 95% confidence level)

$$Q = 1 - p = 1 - 0.5 = 0.5$$

$$N = \frac{1.96^2 * 0.5 * 0.5}{0.1 * 0.1}$$

$$N = 96$$

Therefore, the sample size will be = 96

Accounting for non-responses we increased the sample by 4% = 3.84 = (4)

We add 4% to 96 to get 100.

3.7. Qualitative sample size

The qualitative data was collected from the sample size of 11. This constituted a Focus Group Discussions (FDGs) with 9 residents, in particular 4 women and 5 men, who were not among the respondents administered with research survey questionnaires. Further, 2 Key Informants; one from Lusaka Water and Sewerage Company (LWSCO) and the other one from Millennium Challenge Account (MCA) were engaged. The rationale for key informant interviews (KII) is to discuss in detail project interventions. These will help in gathering information of best practices and project success. The KII will also help in examining the extent to which the project activities have established and built institutional capacity for continuation of project outcomes beyond the project lifespan (Table 3.1).

Table 3.2: Sample for qualitative interviews

Qualitative data type	Description	Number of people	Total
Focus Group Discussion	This involved 9 community members from the study area. A FGD involving four women and five men.	(5males)&(4females)	9*1=9
Key Informant I Interviews	LWSCO	1	1
	Millennium Challenge Account	1	1
Total		11	11

3.8. Sampling methods

Sampling is understood as a process of selecting a subset of the population of interest so as to make observations and statistical inferences about that population (Bhattacharjee, 2012). To arrive at the sample size, purposive sampling was used to select both officials at Lusaka Water and Sewerage Company and Millennium Challenge Account. Officials at Lusaka Water and Sewerage Company in charge of Water and Sewerage were purposively selected. Similarly, Official at Millennium Challenge Account in charge of the funding the water project were purposively selected. Purposive sampling is sampling that is based on the researcher judgement about the characteristics of a representative sample (Bless and Anchola 1988). This method was used as it makes it possible for respondents to give in-depth information about the topic under study.

A simple random sampling was used to select the respondents from Kwamwena Valley. Simple random sampling means that the researcher selects every member of the sample in such a way that all members of the population have the equal chance of being selected (Sidhu, 2006). Based on the available sampling frame, each household in Kwamwena Valley had an equal and non-zero chance of being included in the sample. At each selected household, the researcher purposively sought the participation of one representative, with preference to the household head or any reasonable adult in case of the absence of the household head.

3.9. Data collection methods

Qualitative data was collected using semi structured interviews that were conducted with key informants. A semi-structured interview is a data collection tool in which the researcher asks informants a series of predetermined but open-ended questions (Given, 2008). Semi-structured

interviews are preferred as they enable one to get detailed information while having control over the topics of the interview as compared to unstructured interviews. The rationale for Key Informant Interviews (KII) is to discuss in detail their intervention in provision of water to residential areas. These helped in gathering data of the best practice and research success. These KII were also helped in examining the extent to which project activities have established and built institutional capacity for continuation of the project outcomes beyond the project life span.

Quantitative data was collected using a questionnaire that was administered to respondents (Residents of Kwamwena Valley). Questionnaires are a method used to collect standardised data from large members of people. They are used to collect data in a statistical form. They were chosen for this research because they facilitated the collection of quantifiable data from a large number of people within a short period of time.

Secondary data was collected through desk research from published and unpublished documents like journals, newspapers and newsletters. This was done by reading and analysing documents on impact of the cooperating partners in the provision of water to residential areas. This method was chosen for this research as it provides insights about what has been written on the role of cooperating partners in the provision of water to residential areas. While using these two methods of data collection, this paper recognises that the methods employed have their limitations and their strengths (Johnson & Turner, 2003). Therefore, strengths of one method will be used to overcome the weaknesses of another method by using both in a research study (Johnson & Onwuegbuzie, 2004).

3.10. Data Analysis Technique

Data Analysis is defined as a way of processing data so that what has been learnt can be disseminated to others. Generally, it involves the search for meaning (Hatch, 2002). This research adopted both Qualitative and Quantitative data analysis techniques.

For quantitative data, a computer programme called the Statistical Package for Social Sciences (SPSS) was used. This programme helped to generate figures, tables and graphs for various variables that were under analysis. For this study, Cross-tabulations were performed using SPSS software package. The Cross-tabulations provided useful insights of the responses from the survey. Statistical significance was also ascertained by considering critical values generated, in this case p-values.

Qualitative data, the interviews were recorded digitally and later transcribed verbatim. Data analysis followed thematic analysis which is a method for identifying, analysing and reporting patterns (themes) within data. This method minimally organizes and describes data set in (rich) detail and goes further to interpret various aspects of the research topic (Creswell, 2014). Finally, the themes were cross-checked with the interview transcripts in order to ensure that they applied to relevant responses found within and across the interviews. The focus was placed on identifying, summarising, and retaining the patterns and similarities, differences, and new emerging themes.

3.11. Reliability of data

Reliability refers to the extent to which a particular measuring procedure gives equivalent result over a number of repeated trials (Bless and Achola, 1988). This research used internal consistency to measure the reliability of data. Internal consistency is a measure of reliability that is used to evaluate the degree to which different test items that probe the same construct produce similar results (Phelan and Wren, 2006). To ensure internal consistency, this research asked logically related questions and answers were checked for their logical relationship to answer corresponding questions. Only responses that were found to be logically related to the corresponding question were considered to be reliable for presentation in this research. The responses that were contradictory to the corresponding questions were taken to be unreliable hence discarded from this research.

3.12. Validity of data

Validity refers to the extent to which empirical measures of a concept accurately represent the concept. Content validity was used to ensure validity of the data in this research. This involved the use of a research instrument which represented the full content of the subject under investigation (Bless and Achola, 1988). The research instruments were structured in a way that they covered all aspects of the phenomena under investigation. That is taking into account the components of LWSCO in partnership with the Millennium Challenge Account during construction and installation, financing and managing of the water project.

3.13. Research Ethics

Field and Morse (1992) defines research ethics as moral principles that are adhered to in conducting a research. This study adhered to the necessary research of honesty, objectivity, carefulness, openness, respect for intellectual property, confidentiality, responsible publication,

non-discriminatory, competence, legality, and above human subject protection. In this case, permission to collect data was sought from Lusaka Water and Sewerage Company and Millennium Challenge Account. Secondly, informed consent was employed where participants had to be agreeable to participate in the research meaning that participants voluntarily took part. Other than that participants were told about the research and were allowed to ask questions about the research as long as they needed clarity about the research. The participants were further assured of their rights to decline to answer questions which they felt uncomfortable in the process of data collection. Confidentiality was highly considered and participant's identities were kept anonymous.

3.14. Study Limitations

One of the major limitations associated to this study was the Covid 19 pandemic. The researcher was collecting data at the time when Covid 19 had reached its highest level worldwide and Lusaka in particular. This affected the collection of data from individual respondents and the organization of the Focus Group Discussion since close contact was not encouraged and even fear of this pandemic had overwhelmed everyone. The partial lock down of Lusaka as an epic Centre put the study on hold thus consumed a lot of time. However, the researcher decided to proceed with research despite the situation as measures of safety were taken into consideration and still collected reliable data.

3.14 Conclusion

The purpose of this chapter, was to provide information regarding study type, scope of the research, research design, sources of data, sample size, and sample size calculation. Further, the research instruments, sampling methods, data collection methods, data analysis technique, reliability of data, validity of data, and ethical considerations relating to research have been addressed.

CHAPTER FOUR

PRESENTATION OF FINDINGS: ACCESS TO WATER

4.1 Introduction

This chapter provides the empirical findings from the collected data. It provides demographic information of the respondents, their views on access to water services, and the statistical analysis of the information collected from them.

4.2. Presentation of Findings

This Chapter is a presentation of the data that was collected from Kwamwena valley communities of Meanwood in Chongwe district using the questionnaire (see appendix1). The data was analyzed using the SPSS software as it was quantitative data. A total number of 100 questionnaires were administered, and 100 were returned fully answered. The reason for all of them to be fully answered and returned was that the researcher and his research Assistant, physically administered the questionnaire and collected them immediately.

4.2.1 Gender of respondents

From the surveyed respondents, about 62 respondents (62%) were female and 38 respondents (38%) were male. This indicates that female representation in the study was more than 22 per cent greater than that of males. See Figure 4.1 below.

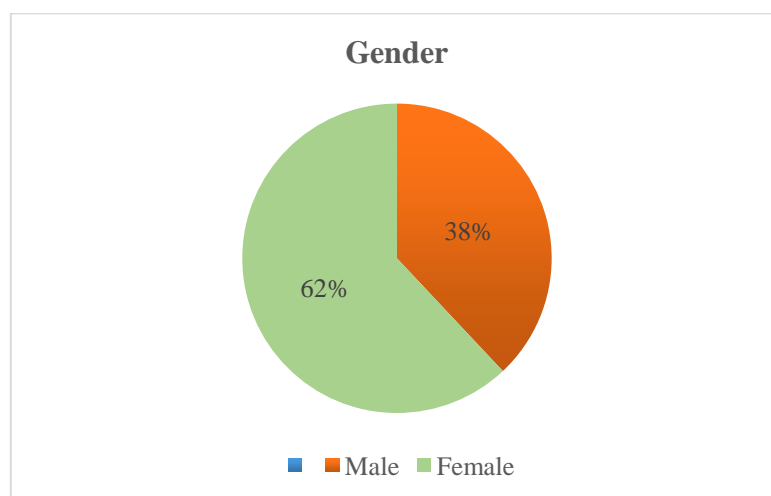


Figure 4.1: Distribution by gender of respondents

Source: Field data (2021.)

4.2.2 Age of respondents

Figure 3 below shows that in the age range of 0-25 years were 16 percent (16%) of respondents. The age category 26-30 had 18 percent (18%), 31-36 had 12 percent (12%), 37-42 had 18 percent (18%) and those above 42 years were 36 percent (36%), of the respondents.

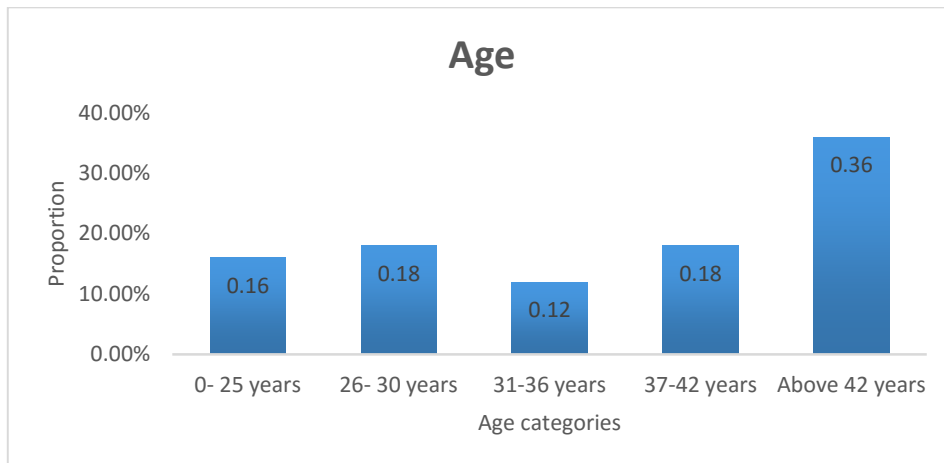


Figure 3.2: Distribution by age of respondents

Source: Field Data (2021)

4.2.3 Marital Status

Figure 4 displays the marital status of the respondents. The single respondents were 23 (23%) of the respondents, married respondents were 67(67%), 5(5%) were on separation, and 5(5%) were widowed.

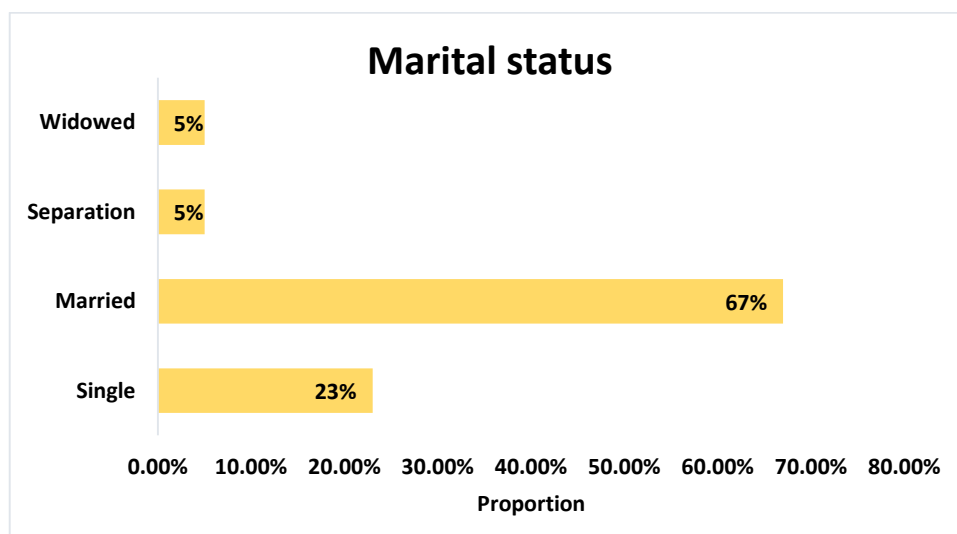


Figure 4.3: Distribution by marital status

Source: Field Data (2021)

4.2.4 Highest level of education attained

Table 2 shows the frequency and percentage distribution of respondents' level of education. Most (45.45%) of the respondents had attained tertiary education. This was followed by those who only had Primary education, accounting for about 17.17%. About 13.13% of respondents had attained Senior Secondary education. The lowest proportions correspond to respondents who did not attain Primary level of education, the respondents who had Pre-Junior secondary education, and Pre-Tertiary education.

Table 4.1: Highest level of education attained

Highest level of education attained	Count	Proportion
Pre-primary	4	4.04%
Primary	17	17.17%
Pre- Junior	4	4.04%
Junior	7	7.07%
Pre-Senior	5	5.05%
Senior	13	13.13%
Pre- Tertiary	4	4.04%
Tertiary	45	45.45%

Source Field Data (2021)

4.2.5 Household Size

The family sizes of the respondents were as follows: those less than 5 accounted for 54%, 45% belonged to households which had between 6 and 10 members, and 1% belonged to households whose size was between 11 and 16. See Figure 4.4 below.

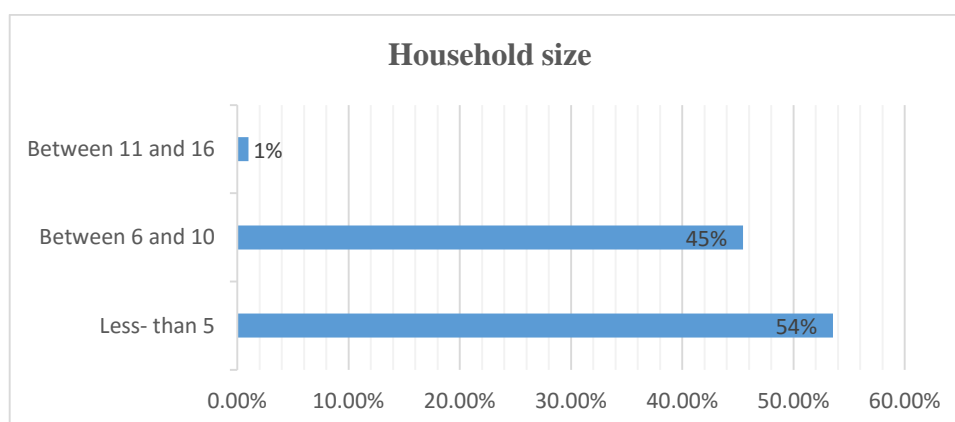


Figure 4.4: Distribution by household size

Source: Field Data (2021)

4.2.6 Occupation

The respondents had this to say on what they do for a living in their communities. 1 respondent which represents 1 percent was a farmer, 25 respondents representing 25 percent were in business, 46 respondents were employed which present 46 percent and 27 respondents were doing other things such as being house wives. See Figure 4.5 below.



Figure 4.5: Distribution by occupation

Source: Field Data (2021)

4.2.7 Length of stay in Meanwood Kwamwena Valley

Figure 7 shows the distribution of respondents based on how long they have stayed in Kwamwena Valley in Meanwood of Chongwe district, 57 respondents which represent 57 percent were less than 5 years, 37 respondents which represent 37 percent between 6 to 10 years while 6 respondents representing 6 percent More than 10 years as residents.

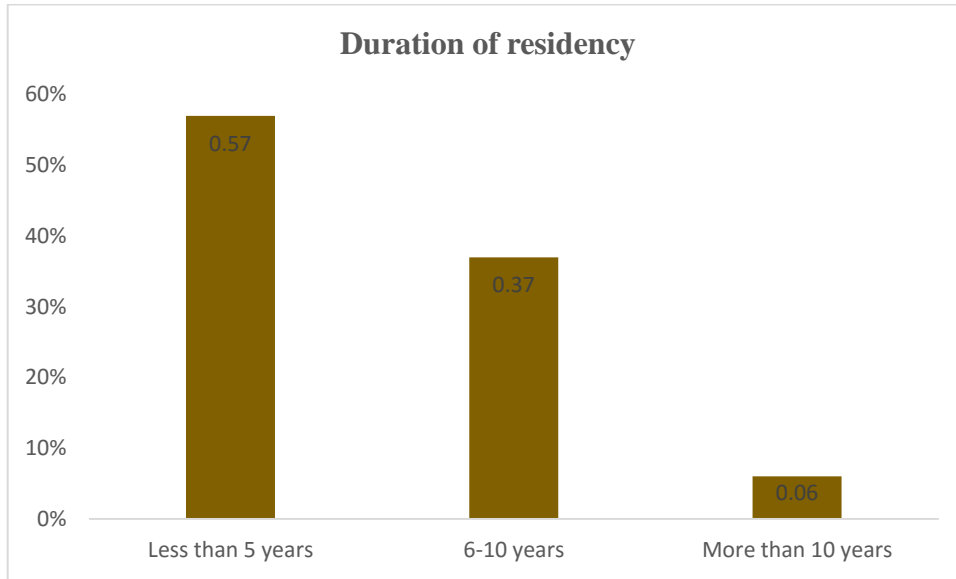


Figure 4.6: Distribution by duration of residency

Source: Field Data (2021.)

4.2.8 Household water service utilization

The study solicited views from the respondents on the sources of water for their households and the responses were as presented below.

Lusaka Water and Sanitation services (LWSC) supplied water to 66(66.00%) households of the surveyed respondents, privately owned boreholes were the source of water for 29(29%) of the respondents' households, 1 respondent sourced water from an open well, and alarmingly, 4(4%) of the respondents professed ignorance claiming that they did not know who supplies them with water. See Figure 4.7 below

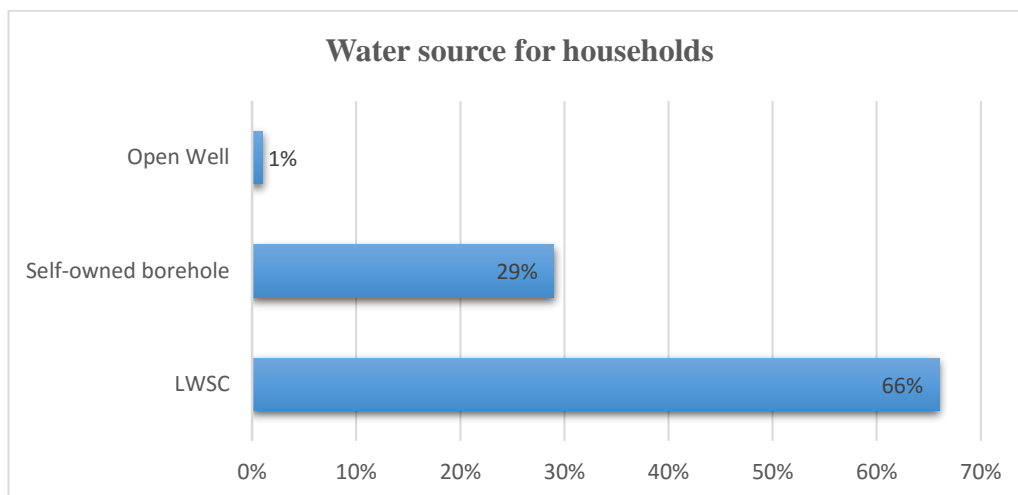


Figure 4.7: Source of water for households

Further respondents were requested to provide information on the distance from their respective households to the source of water. Of the respondents, 86(86%) suggested that their houses were within 20 meters of the water source, 12 (12%) indicated that their houses were between 20meters and 50 meters away from their water source, 1(1%) was at a distance between 50 meters and 100 meters from the source of water, and lastly 1(1%) was in the range 200 meters to 500 meters to the source. See Figure 4.8 below

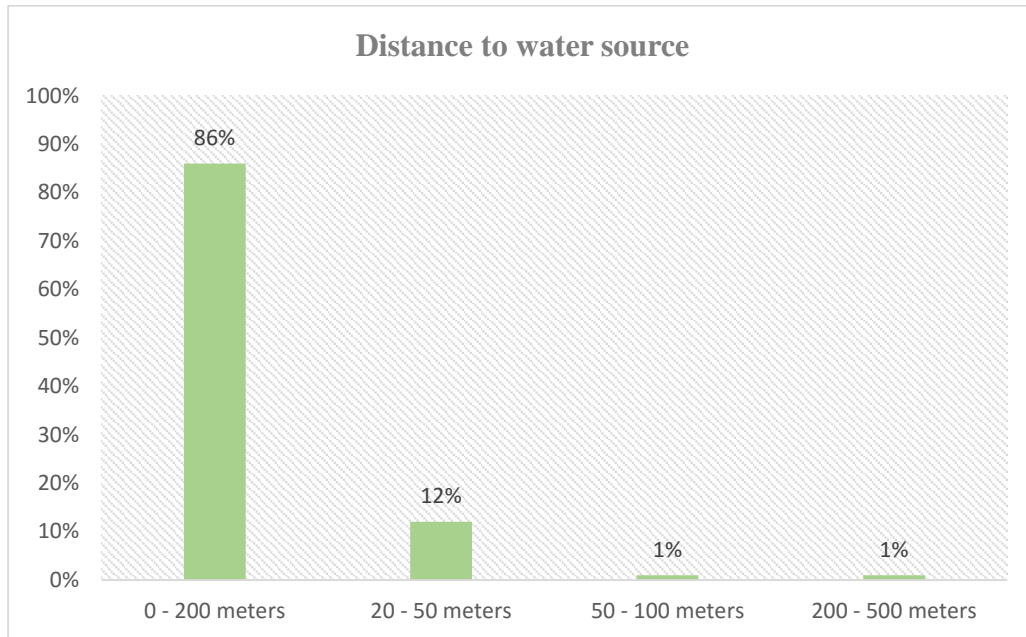


Figure 4.8: Distance to water source

The respondents reported varying amounts of water which they use on a daily basis. The lowest was reported by 4(4%) of the respondents who use between 10 – 20 liters of water per day. Slightly more than this was used by 11(11%) of respondents who indicated that their households consume from 20 liters to 50 liters of water per day. The next in rank were 21(21%) of the respondents use between 50- 100 liters a day, followed by 2(2%) of the respondents who were using between 100-150 liters of water a day. There were 8(8%) of the respondents whose houses were utilizing between 150-200 liters of water per day. Another 5(5%) of the respondents reported that they were using between 200-500 liter of water per day in their houses. The majority 49(49%) of the respondents were daily using unlimited liters of water household purposes. See Figure 4.9.

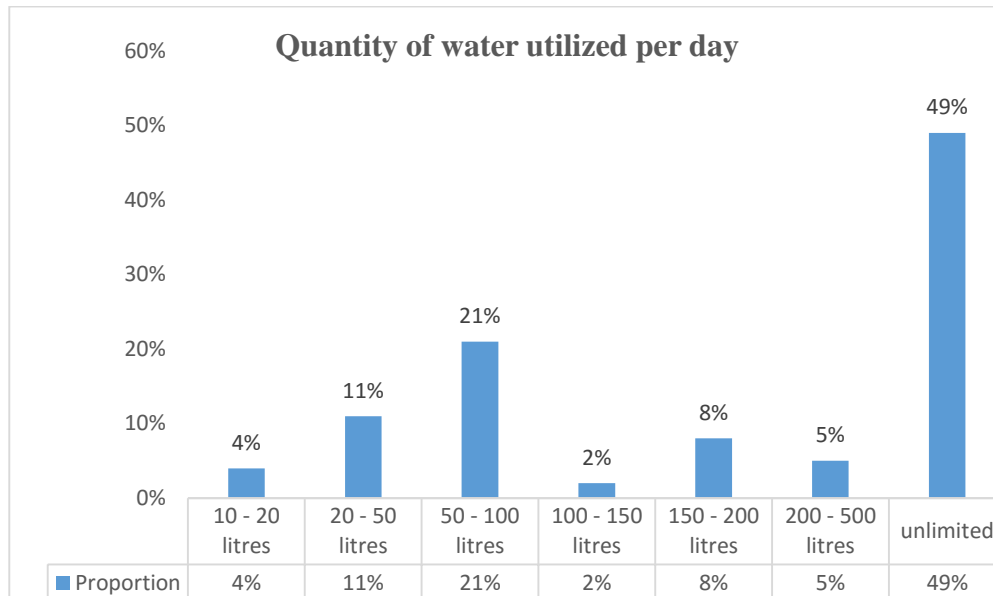


Figure 4.9: Quantity of water utilized per day by households

As to whether there was still need to improve water access by households in the area, nearly half, 53(53%) of the respondents expressed the need to improve the water situation in the area. In contrast, 47 (47%) of the remaining respondents held that there was no need to improve water situation as community had enough water. See Figure 4.10 below.

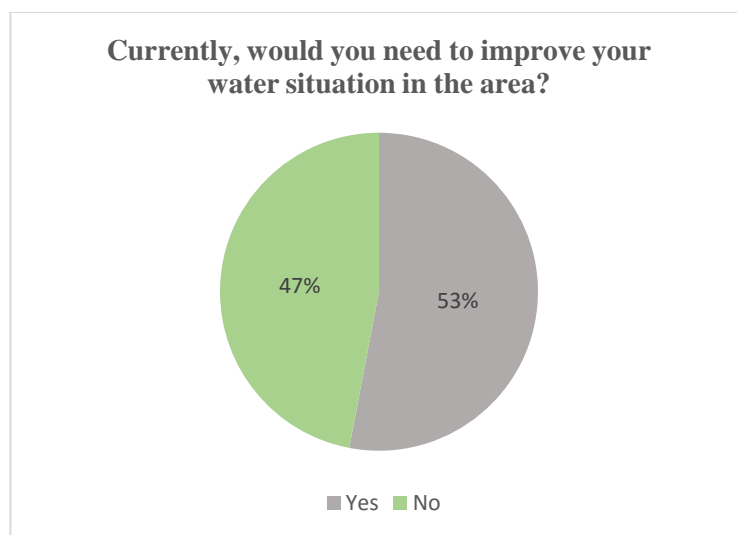


Figure 4.10: Currently, would you need to improve your water situation in the area?

Source: Field Data (2021.)

There were conspicuously 52(52%) of the respondents who indicated that they were not paying any water bills. See Figure 4.11 below.

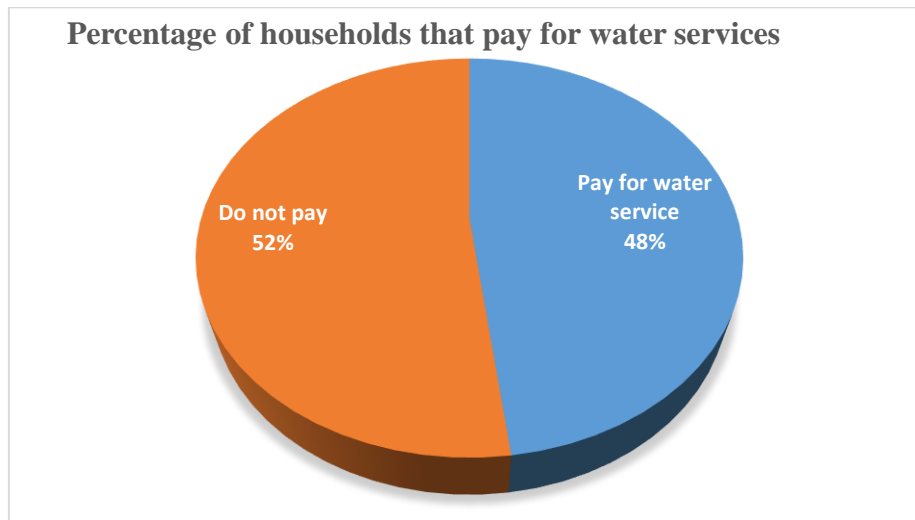


Figure 4.11: Percentage of households that pay for water services

There is undoubtedly a cost incurred by households attached to water usage of which the Kwamwena Valley residents are not exempt. The surveyed respondents reported that they were paying monthly water bills ranging from less than K100 to more than K700 per household. Seventeen (17) percent of the respondents were paying less than K100 per month, 38% were paying between K100- K200 for water per month, and 8% were paying between K200- K300 to water per month. Another (27%) of the respondents were paying between K300-K500 to water per month. Four (4) percent of the respondents were paying between K500- K700 for water per month. Six percent of the respondents were paying above K700, to access water per month. See Figure 4.12.

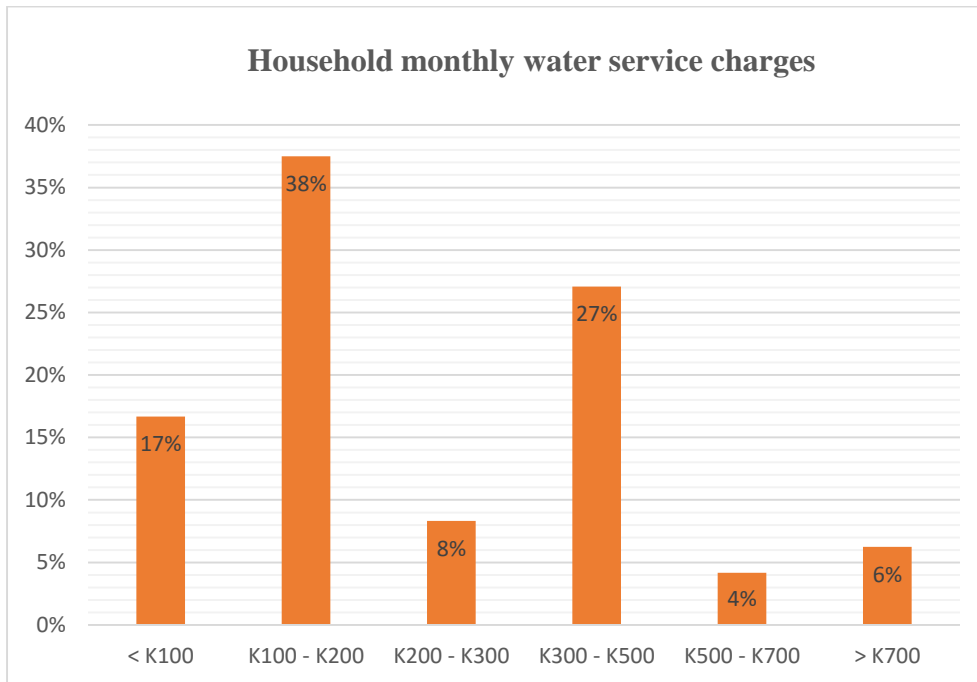


Figure 4.12: Household monthly water service charges

There were households which had piped water connection but were not paying monthly water bills.

“LWSC had 80 percent of water meters billing but the payments were not all forthcoming.”

Production Manager LWSC

It was also noted that,

“some people in our community do not pay anything for water, they draw water from their neighbours for free.”

FGD participant

Generally, the participants expressed concerns that the costs for water services were too high.

“water bills are too high making water expensive even when we experience erratic supply and do not using a lot of water.”

FGD participant

Not all were in agreement however, some participants maintained that the connection fees and water bills were affordable for the community. Supporting this view, one participant further stated that

“all that is needed is K1000 water connection fee and then you start paying water bills which are affordable, typically K150 per month.”

Others were for the idea that the water bills were okay because they depended on consumption and family size somehow.

4.3 Common problems with drinking water

The respondents reported some concerns with regards to the water their households were consuming. Four (4%) of the respondents had problem with erratic water supply, 9(9%) had the problem of having calcium in the water, one respondent (1%) had a problem with foul smell water and water pollution due to leakages from septic tanks, 8(8%) of the respondents had a problem with high cost of water bills, 9(9%) of the respondents were impelled to be buying bottled water for drinking, from the shops. Four (4%) of the respondents complained of blown dirt color of water, 3(3%) of the respondents still were not accessing piped water and were instead drawing drinking water from the open wells. In contrast, 62(62%) of the respondents had no problems with drinking water at all. See Figure 4.13.

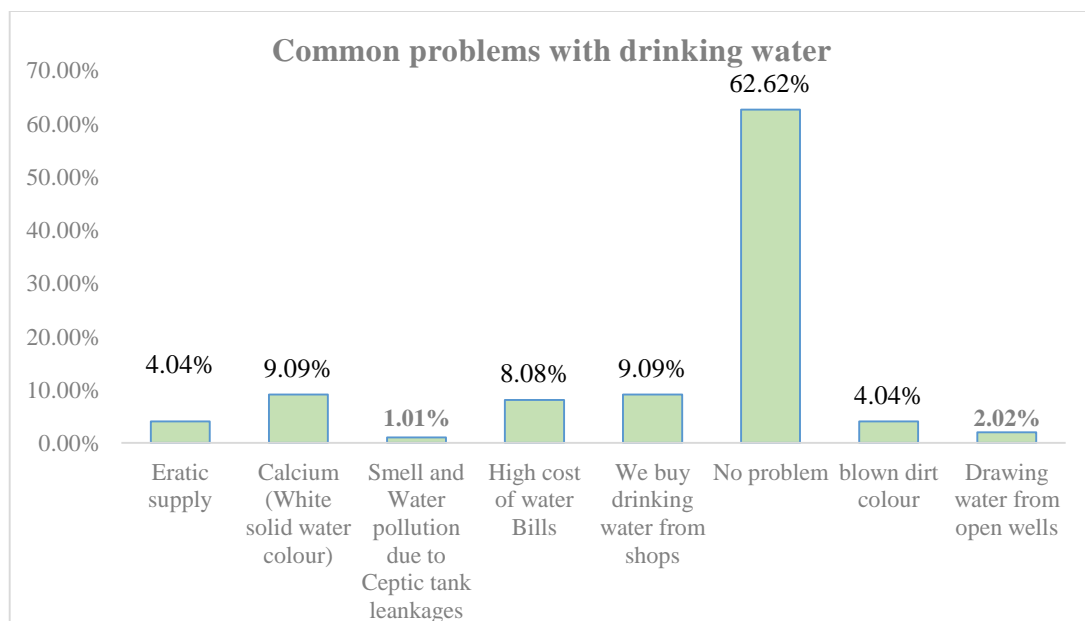


Figure 4.13: Common problems with drinking water
Source: Field Data (2021.)

The key informant from LWSC had this to say on the issue, *“there is running water in almost every home in the area; the community now has access to safe and clean drinking water after project completion. Further, laboratory service machinery was purchased for measuring water quality from water samples to promote compliance of water quality.”* **Production Manager LWSC**

4.3.1 Water related diseases

The responses on whether the respondents had suffered from water borne diseases prior to the survey were sought, and are now presented. Eight (8%) of the respondents reported that they had suffered from diarrhea while the majority, 92(92%) of the respondents indicated that they did not suffer from any waterborne diseases. See Figure 4.14 for details.

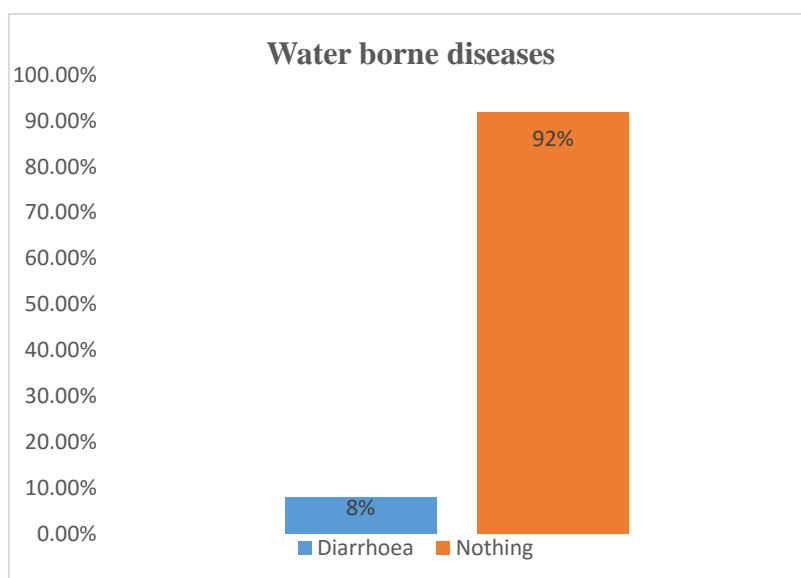


Figure 4.14: Water borne diseases
Source: Field Data. (2021.)

“LWSC’s interest and priority is to supply quality, safe and clean water to the community of Lusaka province and the surrounding districts.”
Production Manager LWSC

Apart from water borne diseases, other common problems related to access of water services were reported to be erratic water supply 4(4.00%), Calcium (White solid water colour) 9(9.00%), smell and water pollution due to septic tank leakages 1(1.00%), and Brown dirty colour 4(4.00%). See Table 4.2.

Table 4.2: Common problems with drinking water by Household size

Descriptor	Less- than 5	Between 6 and 10	Between 11 and 16	Total N(%)
Erratic water supply	2(2.00%)	2(2.00%)	0(0.00%)	4(4.00%)
Calcium (white solid water colour)	6(6.10%)	3(3.00%)	0(0.00%)	9(9.00%)
Smell and water pollution due to septic tank leakages	0(0.00%)	1(1.00%)	0(0.00%)	1(1.00%)
Brown dirty colour	2(2.00%)	1(1.00%)	1(1.00%)	4(4.00%)

Figures presented are in Count (percentage) format. $p = 0.010$.

To further gain insights into the respondents' attitude to water articulation service, cross-tabulations were performed by considering household daily water usage. All the cross-tabulated responses had a p-value of 0.006, demonstrating statistical significance, as they satisfy the required condition ($P\text{-value} < 0.05$).

In general, the highest proportions of the respondents who had access to unlimited quantities of water, 24(24.00%), 4(4.00%), 6(6%), 8(8%) of the respective respondents and so forth. The exception to this trend is observed with regards to 5(5.00%) of the respondents who had reported to access 50 – 100 litres and expressed a desire for the water utility to Improve on erratic water supply. See Table 4.3.

Table 4.3: Comparison of residents' views based on daily quantity of water usage

Descriptor	10-20li- tres	20 - 50 li- tres	50 -100 li- tres	200 - 500 litres	unlimited
We are happy and thank them for adequate supply of water	2(2.00%)	5(5.00%)	6(6.00%)	2(2.00%)	24(24.00%)
To stop borehole water it is dirt and contaminated	0(0.00%)	1(1.00%)	1(1.00%)	0(0.00%)	1(1.00%)
Improve on erratic water supply	1(1.00%)	0(0.00%)	5(5.00%)	1(1.00%)	3(3.00%)
Need for sewer system provision to avoid water contamination by septic tanks flooding	0(0.00%)	1(1.00%)	1(1.00%)	0(0.00%)	4(4.00%)

Need for more water provision many people still have no safe water	1(1.00%)	1(1.00%)	4(4.00%)	1(1.00%)	6(6.00%)
Pipe water is dirty need to improve it	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Nothing	0(0.00%)	2(2.00%)	2(2.00%)	1(1.00%)	8(8.00%)
Bills too high resulting into high cost of water	0(0.00%)	1(1.00%)	2(2.00%)	0(0.00%)	2(2.00%)
Need to make our water more clean and safe for use	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	1(1.00%)

The Chi-square tests yielded a P-value =.006. Figures presented are in Count(percentage) format.

4.4 Benefits

Before the project, people used to drink water from boreholes and open wells, but now most of the people are accessing safe and clean water from the taps. Further, improved access to water has reduced child labour. Prior to completion of the water project, people used to send children to fetch water from the single borehole which was serving our water needs. The project also provided resources to the LWSC which enabled it to extend the service of water in the area.

Under the project, the piped water network was extended into new residential neighborhoods that are still being developed. Many residents have connected to the water network in these neighborhoods, but roughly equally many have not. (MCC, 2020)

One of the participants, a white man affirmatively said that,

“before the project, people used to drink water from boreholes and open wells, but now most of the people were accessing safe and clean water from the taps”. Another male participant in agreement said that “the benefits can be seen in most households that are connected to piped water, before this most of the people had difficulties to access safe and clean drinking water because some were using boreholes and open wells whose safety was doubted.”

The other participants said that the water situation has improved, as the area had critical shortage of water considering that it is a new place and attributed this improvement to partners who came on board in this project

“We have high pressure of water from the tap with stable supply.”

Male FGD participant

Another male participant in still supporting the motion that there were benefits from the partnership said that,

“Kwamwena community used to fetch water from one borehole, but because of the project most people have access to water in their homes.”

He further explained that,

“improved access to water has reduced child labour. Before the water project finished, people used to send children to fetch water from the single borehole which was serving our water needs.”

4.4 Conclusion

This chapter provides the empirical findings from the collected data. It provides demographic information of the respondents, their views on access to water services, and the statistical analysis of the information collected from them.

The majority of respondents were female, of whom the largest proportion were above 42 years of age. More than half of the respondents were married and those who were either widowed or no separated were in the minority. The respondents who had attained tertiary level education were predominant. However, there was a small proportion who did attend formal schooling. The largest family size was reported to have between 11 and 16 members, whereas the smallest had fewer than 5 members. It was also revealed that the employed respondents accounted for highest proportion, followed by those who were neither engaged in business nor in formal employment. There were others who were in business, and in farming. With regard to duration of residency in Kwamwena Valley, the largest percentage of the respondents had lived in the area for less than 5 years, this was followed by those who had spent between 6 and 10 years as residents. Those who had lived in the community for more 10 years were in the minority.

Nearly 70 percent of the respondents depended on Lusaka Water and Sanitation services (LWSC) for water services. Some sourced their water from their own boreholes, others had recourse to wells. There were however, some residents who relied on drawing for their domestic needs, water from their neighbors at no cost to themselves.

It was also reported that the majority of the respondents had access to water within 20 meters of their households, close to 10 percent were within 20 to 50 meters of their water source. Further, most of respondents utilized unlimited quantities of water per day, implying a stable source of water. The least quantity of water accessed by respondents was reported to be

between 100 and 150 liters per day.

Before the project, people used to drink water from boreholes and open wells, but now most of the people are accessing safe and clean water from the taps. Further, improved access to water has reduced child labour. Prior to completion of the water project, people used to send children to fetch water from the single borehole which was serving our water needs. The project also provided resources to the LWSC which enabled it to extend the service of water in the area.

Under the project, the piped water network was extended into new residential neighborhoods that are still being developed.

The findings also brought out problems which concerned the residents with regard to the water they were accessing. There was the problem of erratic water supply which the LWSC key informant maintained was due to power outages.

The respondents also reported some concerns with regards to the water their households were consuming. There were problems with, erratic water supply, calcium in the water, foul smell water and water pollution due to leakages from septic tanks and, high cost of water bills. Lastly, findings revealed that, many house owners in the area were not connected to LWSC water system despite installation of pipes and meters in their premises.

CHAPTER FIVE

IMPACT OF THE COLLABORATION BETWEEN LWSC AND MCA

5.1 Introduction

This chapter provides the empirical findings from both primary and secondary data. It provides information of collaboration between LWSC and MCA, and the impact thereof.

5.2 Zambia Compact

The Zambia Compact was designed to address these issues in a single project, the Lusaka Water Supply, Sanitation, and Drainage Project. The project supported large-scale infrastructure investments and institutional strengthening and reform of Lusaka's water sector. Through these activities, the project expanded access to, and improved the reliability of, water supply and sanitation, as well as improved drainage services and related solid waste management in select urban and peri-urban areas of the capital. The project aimed to decrease the incidence of water-related diseases, generate time savings for households and businesses, and reduce non-revenue water at the utility. Approximately 1.2 million people in Lusaka are expected to benefit from the project over twenty years. (Zambia Star Report, 2020).

The key players in Lusaka's water sector—Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC)—were natural partners to complete and maintain the planned water, sanitation, and drainage investments; these bodies therefore served as the compact's two implementing entities. (Zambia Star Report, 2020).

The Millennium Challenge Corporation through the Millennium Challenge Account Zambia was responsible for funding the project. Funding was provided for the Lusaka Water Supply, Sanitation, and Drainage Project to rehabilitate and extend infrastructure and strengthen the institutional capacity of the Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC). (MCC, 2020)

“MCA Zambia was implementing a \$355 million project through the government of the United States of America to the government of the Republic of Zambia aid for development funds in the water project.” **Director Communications and outreach MCA**

The project consisted of two activities, infrastructure improvement and institutional strengthening. Infrastructure improvement activities included investment in infrastructure development and rehabilitation, including interventions to rehabilitate the core water supply network, rehabilitate and expand select water supply and sewage networks to peri-urban areas, and improve select drainage infrastructure. On the other hand, institutional strengthening activities, were focused on strengthening the service delivery and operational capacities of the LWSC, the institution with jurisdiction over the water infrastructure investments of the project. (Zambia Star Report, 2020).

“the donor provided capacity building to our staff before exit on asset management through consultants to assist the company to look at the whole asset cycle”

Manager LWSC

Production

“it also brought in capacity building to most of the workers on works related to water maintenance, repairs and operations as one benefit.” **Director Communications and outreach MCA**

Support included asset management assistance to reduce non-revenue water at LWSC, assistance to the water utility in developing inclusive policies and structures to improve the reach and quality of service delivery to the poor and to increase uptake and maintenance of water and sewer services and infrastructure. Parallel efforts developed information, education and communications campaigns and built in-house capacity at LWSC to promote behavior change and service uptake. (Zambia Star Report, 2020).

“LWSC was an implementing entity for water and sanitation services as a technical operation entity, while Lusaka City Council was implementing entity for drainages and burying of open water wells as part of sanitation legal resettlement.” **Director Communications and outreach MCA**

During the development of the compact, MCC supported the GOZ in building out a long-term strategy for water and sanitation, aimed at ensuring that MCC’s investment would fit into a lasting and comprehensive program of improvement. This planning initiative resulted in a water supply investment master plan, Water Supply Investment Master Plan, charting a 25-year, three-phase strategy for more than \$2.7 billion in investments to meet the needs of a Lusaka population projected to reach 4.9 million by 2035. The Water Supply Investment Master Plan

mapped out eleven projects in Lusaka at an estimated cost of \$772 million, prioritized across three phases to achieve 100 percent access to safe water by 2035 with 80 percent of households connected to the municipal water supply. (Zambia Star Report, 2020). Not only did these master plans help the GOZ prioritize where to target the compact’s investments, they also added significant value and promoted the sustainability of MCC’s infrastructure projects by clearly outlining funding needs to the private sector and donor community.

The infrastructure projects ultimately selected for the compact were expected to expand water and sanitation networks to select peri-urban neighborhoods, rehabilitate core water infrastructure, bolster water supply, and improve service delivery across the utility’s entire customer base. They would also improve the technical and financial position of the water utility by aiming to reduce non-revenue water losses from 57 percent to an estimated 34 percent. (Zambia Star Report, 2020).

Newly constructed water supply infrastructure



Figure 5.1: Newly constructed water supply infrastructure

Source: MCA, 2016

Access to water supply was extended, and 16,790 new household connections were added to the water network by the end of the Compact. Improved quality of service delivery, Continuity

of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours, whereas it was 24 hours at its completion. (MCA, 2016)

Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project. (MCA, 2016)

Improved water service coverage: Access to water supply was extended, and 16,790 new household connections were added to the water network by the end of the Compact. Improved quality of service delivery. Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours whereas it was 24 hours at its completion. Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. A total of 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project. (MCA, 2016). See Table 5.1.

Table 5.1: Impact of the Compact on water service to communities

Result	Indicator	Definition	Base-line Value	End of Compact
Water Supply Infrastructure Rehabilitation and Expansion				
Improved water service coverage	Access to water supply	Number of new household connections to the water network made possible through the Compact	0	16,790
Improved quality of service delivery	Continuity of service	Average hours of service per day for water supply	17	24
	Volume of water produced	Total volume of water produced in cubic meters per day for the service area	225,000	240,000
Reduced water losses	Non-revenue water	The difference between water supplied and water sold (i.e. volume of water "lost") expressed as a percentage of water supplied.	48%	25%
Time savings for households	Time spent fetching water	Average time spent by household members to fetch water in the past week (hours) (disaggregated by sex)	16	9.5
Improved water supply infrastructure	Length of water distribution network (km)	Total length of the distribution network in km	1,372	1,547
	Water points constructed	The number of non-networked, stand-alone water supply systems constructed (kiosks)	532	596

Source: Millennium Challenge Compact, 2020

It was further revealed that:

“in view of the resource constraints, the water project partnership basically facilitated infrastructure development aiding LWSC in its quest to extend the coverage of water services to the people of Kwamwena Valley.”

Production Manager LWSC

“providing better sanitation and safe clean water services, will, in the long run reduce incidences of water borne diseases like cholera, diarrhea, dysentery and many others associated with lack of clean and safe drinking water.”

Director Communications and outreach MCA

5.3 Was coordination of partners to improve water provision adequate?

The surveyed residents shared their experiences pertaining to the project. The majority of the respondents, 63(63%) affirmed that there was adequate coordination and harmony among partners in the implementation of the project. This view was contradicted by 15(15%) of the respondents, who maintained that coordination and harmony among the project partners were lacking. Twenty-two (22%) of the respondents could not tell as to whether there was adequate coordination and harmony among partners in the implementation of the project. See Figure 5.2.

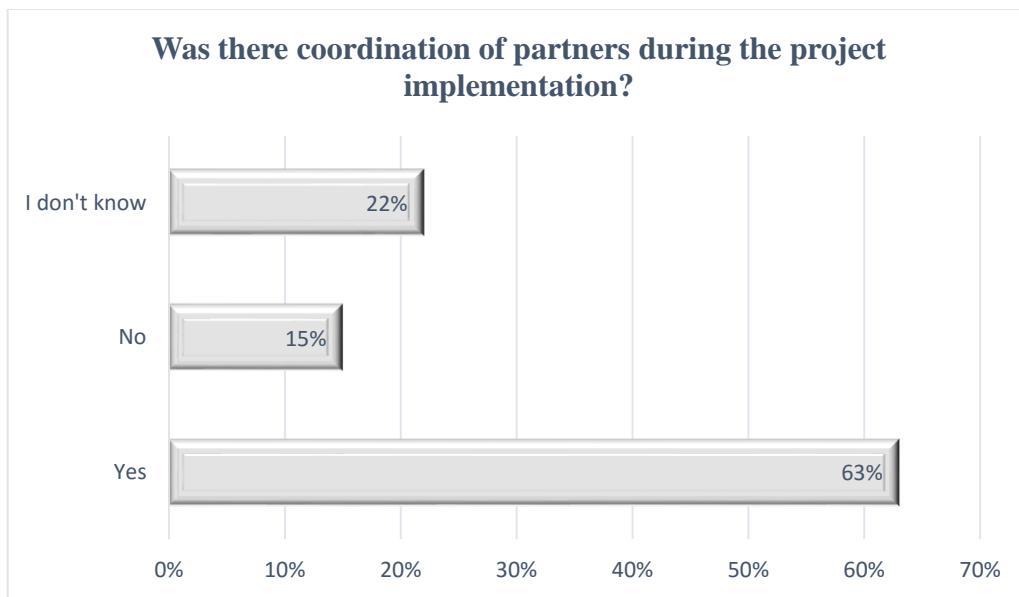


Figure 5.2: Project partnership coordination and objectives

Source: Field Data (2021.)

Similarly, on whether the project partner coordination was adequate and harmonious, 61(61%) of the respondents were in agreement, 36(36%) disagreed, and there were 3(3%) who were undecided. See Figure 5.3.

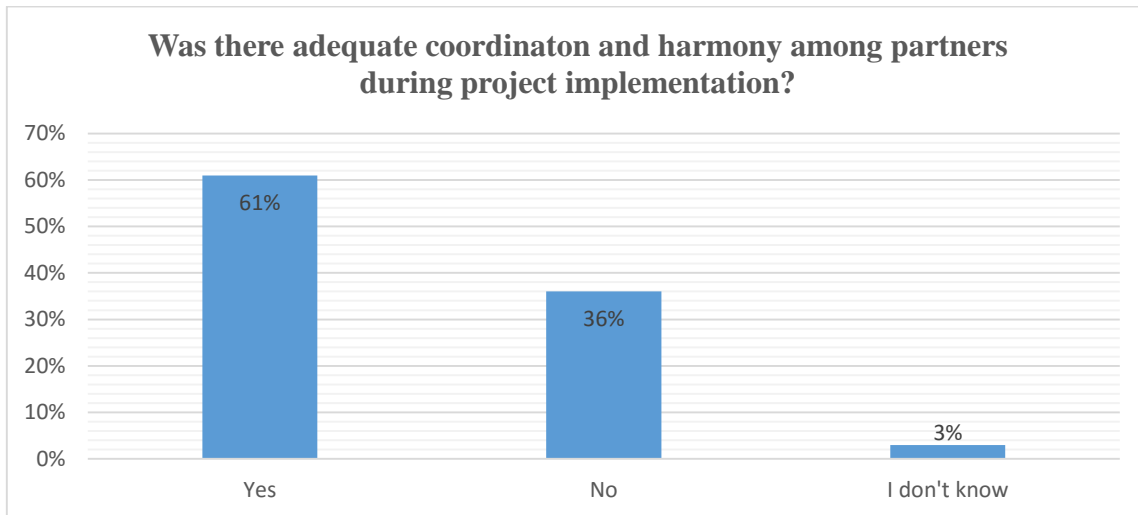


Figure 5.2: Was coordination and harmony among project partners adequate?

The in-depth interview highlighted issues which were at play amongst the partners during the implementation of the project.

“On an institutional level, some partners had multi projects with different priorities which brought in lack of coordination as an operational challenge and there was also coordination as a problem for the project because of different interests and priorities of some partners though all worked well.”

Director Communications and outreach MCA

Additionally, water, sewer, and drainage work is disruptive; it involves digging up streets and laying pipes. Coordination between roads, water, sewer, and electric authorities helps infrastructure work to progress efficiently, but Lusaka’s independent authorities had little experience working in concert. Many of the construction sites were in crowded markets or in dense, growing, informal residential neighborhoods. Beyond the technical challenges of maneuvering heavy equipment in confined spaces, conditions like these demand extra focus on community engagement, safety and access, with special attention to managing heavy vehicle and pedestrian traffic. Although some of the water and sewer work took place within established utility rights of way, the project required acquiring land and other assets, causing involuntary resettlement. (Zambia Star Report, 2020).

The key informant explained that,

“laying of water pipes in some plots was difficult and demanded pulling down structures such as wall fences, drainages and roads.”

Production Manager LWSC

MCC requires those whose livelihoods will be affected by the project, including those who have no recognizable legal right or claim to the land that they are occupying, to be compensated fairly, transparently, and in a manner that seeks to improve their livelihood to pre-displacement levels. By the compact's end date of November 2018, the project resulted in 5,167 project-affected people (46 percent were men, 42 percent were women, and 12 percent were institutions). While most of these impacts were relatively minor (e.g., loss of plants on property, temporary business disturbance, loss of wall/fence/other structure) one percent was significant, meaning that people lost land, their residence, and/or income sources as a direct result of the infrastructure project. In particular, 132 people lost gardens that were their primary source of income or subsistence. These individuals received compact-funded special training intended to restore their livelihoods and provide skills for weathering future shocks, as well as funds to start and grow new businesses. (Zambia Star Report, 2020). In spite of proactive measures to reduce displacement, the number of people affected and the cost of managing their displacement increased.

5.4 Community engagement in the water supply improvement project

The community of Kwamwena Valley, being the project beneficiaries, it was important that their involvement was encouraged for the successful implementation of the undertaking. However, only 37(37%) of the respondents had been involved in the planning and implementation whereas the majority of the respondents 63 (63%), had not been accorded the opportunity. See Table 5.2.

Table 5.2: Community engagement

Descriptor	Count(#)
Do you feel that you were involved enough in the planning of water improvement programmes in your area?	
Yes	37(37.00%)
No	63(63.00%)
How in particular have you participated in planning for water improvement in your area?	
Not participated as we only saw them carrying out works.	60(60.00%)
The community was Consulted over the project	6(6.00%)
Paying the bills and connection fee on time	12(12.00%)
By considering responsible use of water	8(8.00%)
Through community leadership meetings and Government	10(10.00%)
Provided required materials for connections	2(2.00%)
Through reporting water situation in the area	2(2.00%)

Figures presented are in Count (percentage) format.

“At first, the community thought it was free water which later the community received the project with mixed feelings until such a time when they were sensitized.”

Director Communications and outreach MCA

MCC and the MCA engaged the community to garner buy-in and support of the project. The public consultation process initiated during the development of the compact continued throughout the construction phase. MCA designed and implemented consultations in the areas directly impacted by the Infrastructure Activity, which allowed stakeholders an opportunity to express their concerns and learn more about the benefits of the project. These efforts helped garner support for the project, facilitated construction, mitigated community frustrations when delays and errors occurred, and created community buy-in. Moreover, MCA’s contractors were encouraged to make efforts to hire from the local community to work on the construction sites, providing temporary skilled and unskilled jobs. These efforts included setting a 30 percent voluntary target³⁴ for contractors under the Infrastructure Activity to employ women in construction jobs, which ultimately achieved a rate of 22 percent female employment (well in excess of the global rate of 10 percent). (Zambia Star Report, 2020).

Responses from the in-depth interviews and the focus group discussion were that:

“the community was involved in the design phase of the project.”

Director Communications and outreach MCA

“residents were added on the WhatsApp social media platform through which discussions were held, and recommendations were made to partners suggestions pertaining to water project.” **FGD participant**

“Kwamwena residents were engaged in the project expectations and what they were supposed to do once the project finished, how they supposed to manage water meters, and why they needed to connect to the new system that was connected in the area.” **Production Manager LWSC**

The divergence of views was also evident from the discussion and the interviews.

“No one from the community was involved, we just saw Chinese workers digging trenches for water pipes, and constructing big tanks and boreholes.”

Female FGD participant

Another participant countered this claim by declaring that,

“People attended the partnership organized sensitization meetings where we agreed allowed partners to enter into our premises and if need arose to demolish structures” **last discussant FGD**

This claim was echoed by the key informant who asserted that, the residents concerted to

“give the contractor access to their premises when doing the water installations and yet this, notably, when they were not even customers of LWSC, care for water meters installed, making application payments for new water connections, and have some wall fences where need arose to pulled down for the construction of water system.” **Production Manager LWSC**

“Consultations and awareness meetings were held and involved the community at all levels for the purpose of creating a community feel of ownership of the project.” **Director Communications and outreach MCA**

Community engagement also served another purpose, which was

“to find out their willingness to pay for the water services through a collaborative approach to instill community confidence in the project.”

Director Communications and outreach MCA

MCA commenced IEC and sanitation marketing in Mtendere in 2016, and LWSC’s office in Mtendere was expanded to enable the utility to connect households to the network and to

LWSC's billing system once residents had constructed toilets. Through the broader Innovation Grants Program as part of the Institutional Strengthening Activity (see below), a grant was awarded to an organization that established a revolving loan fund to make toilets more affordable for approximately 800 households initially. But ultimately, the poor performance of a construction contractor caused infrastructure timelines to shift, thus delaying the opportunity for households to hook into the system and for the grant to be executed. Community fatigue began to set in, and MCA and LWSC were obliged to adapt their messaging, which included introducing a replacement contractor. Overall, implementation of the SCAP required more engagement and support from both MCC and MCA than originally anticipated. MCA has laid the groundwork with LWSC to continue implementing the SCAP post-compact utilizing existing government financing. (Zambia Star Report, 2020).

In particular, the social inclusion and gender mainstreaming assistance aimed to develop new approaches for LWSC that would make connections and payment for services easier for lower-income customers. At the same time, information, education, and communication (IEC) and sanitation marketing campaigns took information out to the communities in the SCAP footprint about connecting, building toilets, managing water and bills, and hygiene. (Zambia Star Report, 2020).

Roles of Compact partners

More than half (60%) of the respondents, claimed that MCA dug trenches, boreholes and water tanks while LWSC installed meters, water pipes and connected water in community houses, thereby confounding the roles of MCA, the project financier with those of LWSC. One (1) respondent, representing 1 percent said that the landlord provided a borehole. Thirty-six (36) respondents, representing 36 percent didn't know the duties and responsibilities of different partners in the water improvement project. The remaining 3 respondents, representing thought Japanese International Cooperation (JICA). See Table 5.3.

Table 5.3: Duties and responsibilities of the different partners

Partners	Duties and responsibilities of the different partners	Proportion
LWSC	Installed main water pipes , meters and supplied water	95.24%
MCA	Constructed reservoir tanks and drilled boreholes	
JICA	Worked on drainage system	4.76%

Source: Field (2021.)

“LWSC dug trenches for pipe lines, connected meters, main water pipes and water to houses, rehabilitated the surface water treatment plant in Kafue and also provided necessary information to Millennium Account Zambia on Lusaka waters and requirement ... we also monitored the contractor’s work to ensured that things were up to the required standards.”

Production Manager LWSC

It was further revealed that:

“LWSCC is accountable and responsible for all the repairs and maintenance works as the implementing water entity to which all the project infrastructure was handed over to by the donor.” **Production Manager LWSC**

All compact investments were ultimately aimed at improving service delivery. LWSC provides intermittent water supply to its customers, which is reflected in the *Continuity of service* indicator. The reported value is an average across all districts of Lusaka, and is calculated by LWSC on a quarterly basis. The city-wide average was 18 hours of water service per day at baseline, but some neighborhoods had as little as 4 hours of service daily, while others had continuous 24-hour service. The indicator was intended to capture how reduction in physical losses would be expected to increase the available water supply and therefore lengthen service hours. However, as described above, other factors including the under-performance of a works contractor hampered physical NRW reductions. Furthermore, compact investments to connect new neighborhoods (without a corresponding increase in the available water supply) would be expected to decrease the average daily hours of supply city-wide. (Zambia Star Report, 2020).

From the large pipeline that transmits treated drinking water from Iolanda to Lusaka, the Infrastructure Activity turned its attention to the city's distribution network. The distribution network is a maze of pipes, pumps, valves, reservoirs, and water towers that store treated drinking water and move it to water consumers throughout the city. (Zambia Star Report, 2020).

Compact-funded water supply investments included repair, replacement and/or installation of pipes that allow businesses and households in targeted areas throughout the city to connect to the water supply. The activity fixed leaks and breaks, and replaced degraded pipes and inefficient connections, all of which are key to reducing water losses that the utility can ill-afford. These physical losses of water cannot be billed, so they undermine utility revenues that could otherwise fund the operations, maintenance, and expansion of the water supply. In the context of a city where demand exceeds supply, it is important that every available drop be delivered, so activities also included training and supplies to help the utility conduct ongoing leak detection and repair. (Zambia Star Report, 2020).

Elsewhere in the distribution system, the project built and rehabilitated five reservoirs for storage of treated drinking water, upgraded pumps and valves that move the water through the city, and extended water supply pipes into previously unserved neighborhoods. The peri-urban areas expected to benefit from water distribution line investments include Chipata/SOS East, Ng'ombe, Mtendere, Kamanga, Ndeke/Vorna Valley, and Kwamwena. At the level where Lusaka residents gain household access to city water, the Infrastructure Activity laid smaller "lateral" connection pipes that branched off the water main and ran to individual properties to facilitate household-level connections for the first time.³⁸ In addition, the activity installed or rehabilitated community water kiosks where residents who lack a household connection can go to collect treated drinking water. (Zambia Star Report, 2020).

Installing water meters for both residential and bulk (large-volume) water customers was another key aspect of efforts to help the utility reduce non-revenue water, in this case by making it possible to bill customers for their actual usage. Overall, non-revenue water reduction is also important for affordability, because losses (whether through leaks or unbilled water usage) ultimately translate to a higher cost of water per liter delivered to the consumer. (Zambia Star Report, 2020).

Of note, the poor performance and ultimate termination of one of MCA's contractors caused significant delays in the construction of the water supply and sewer networks in the Mtendere community and the replacement of water pipes and household meters to reduce non-revenue water losses throughout the system. These sub-activities were approximately 30 percent

complete by the compact's end date. Recognizing the importance of completing the Mtendere network to protect city groundwater reserves in the area and improve community health, the Government re-procured the work through a different contractor and has committed to provide \$28 million to complete all outstanding infrastructure works.

“Some people also had financial challenges to connect water though it was later subsidized.” **Director Communications and outreach MCA**

In Lusaka's peri-urban areas, where 47.2 percent of households live in extreme poverty,⁵⁵ there was a significant risk that low-income populations would not connect or be able to afford water and sewer services. And yet, expanding water and sewer coverage to peri-urban populations was critical to securing the health benefits of the compact. The affordability of the water and sanitation services was thus a significant risk to the sustainability of MCC's investments. Furthermore, the infrastructure that delivers water and sanitation services must remain in good working condition in order to continue delivering expected benefits. As noted above, the water utility (LWSC) is responsible for delivering water and sewer services in Lusaka and nearby cities, while the city council (LCC) is responsible for delivering drainage services in Lusaka. They own the respective infrastructure that was upgraded and rehabilitated through MCC's compact investments, and the responsibility of operating and maintaining these networks falls to them. (Zambia Star Report, 2020).

To mitigate risks associated with the affordability of services for the population, as well as the challenges of operations and maintenance of water, sanitation and drainage infrastructure, the compact invested in improving the institutional capacity of LWSC and LCC. The Institutional Strengthening Activity funded technical assistance to improve asset management, strategic planning, environmental management and maintenance. It supported both LWSC and LCC in developing policies and structures to provide appropriate, affordable, and sustainable services to poor and underserved populations. It also sought to help LWSC and LCC promote behavior change to encourage connections, service uptake, and custodianship of the infrastructure throughout the city (prevention of vandalism, water theft, illegal dumping, etc.). The Institutional Strengthening Activity included support for the design and implementation of IEC and sanitation marketing campaigns and provided capacity building for LWSC and LCC to con-

tinue messaging to residents who benefit from (and pay for) their services. Finally, the Institutional Strengthening Activity included a \$6 million grant program to support innovation in water, sanitation, solid waste and drainage-related activities. (Zambia Star Report, 2020).

Findings in context

Expansion of Piped Water Supply to New Customers in Peri-Urban Areas

Compact investments aimed to bring piped water to new customers in peri-urban areas who had never had a household connection before. The indicator *Length of water distribution network constructed* tracks the water pipes that move water to customers in three peri-urban areas: Mtendere (93 km), and Kwamwena and Ndeke/Vorna Valley (242 km). Progress on work in Mtendere was reported by the underperforming works contractor that was subsequently terminated, and there are early indications that the pipes laid by that contractor may need to be redone. Therefore, no work from Mtendere is being counted towards the completion of the target. Furthermore, the incomplete work meant that residents of Mtendere could not be connected to the piped water supply before the end of the compact. The indicator *Number of new connections (Water)* includes 8,637 new metered connections in Ndeke Vona Valley, Kwamwena, Ng'ombe, Chipata and SOS East Village (32 percent of target). (Zambia Star Report, 2020).

New water kiosks were constructed and are reported via the indicator *Number of water kiosks constructed*. The definition of the indicator does not expect the kiosks to be operational and progress on the operability front was mixed as of April 2019. Two kiosks were descoped in Chiapata compound. One of these kiosks had been planned to be in a market, but the market holders did not want it. The other was to be located on private property, but the owner rescinded permission to build on the land. These two kiosks were never officially removed from activity planning documents, so the target was not revised down from 37 to 35. (Zambia Star Report, 2020).

Institutional Strengthening Activity

The mere availability of infrastructure does not guarantee that people will connect to the network, properly use and maintain facilities, pay their bills, or manage water and human waste safely to prevent contamination and disease. Nor does it guarantee that utilities and service providers will offer services and billing options that meet the needs and income flows of their

customer base. Technical solutions for the provision of water, sanitation, and solid waste management services are not sufficient in isolation; social and institutional approaches are essential to ensure that targeted populations actually benefit from infrastructure investments. (Zambia Star Report, 2020).

Just as Lusaka's physical environment posed challenges for MCC's infrastructure investments, the institutional environment proved a challenging context for the compact's investment in local capacity development. Staffing issues limited the capacity of LWSC and LCC to absorb technical assistance and strengthen the institutions. LCC employed rotational staffing strategies that were a legacy of the model imposed by the British Civil Service prior to independence.⁵⁶ Originally designed to limit opportunities for corruption, rotational staffing makes it hard to build effective teams, departments, and functional units. Employees may not stay in a position long enough to build up expertise, and frequent transfers shift staff members without regard to the continuity of any training that has been provided. LWSC underwent several changes of senior leadership and board members over the course of the compact, as well as a reduction in the status of its units responsible for non-revenue water and asset management. (Zambia Star Report, 2020).

Assistance to Lusaka Water and Sewerage Company (LWSC)

When the compact was signed, LWSC had recently completed a financial turnaround, resulting in a financial surplus in 2009. Long-standing support from the World Bank for institutional reform had brought commercialization of services with significant improvements in service delivery. The utility held little debt, and it had undertaken operational measures to improve cash flow. However, its water and sewer assets were in a dire state, requiring large-scale rehabilitation and expansion to meet the needs of Lusaka's growing population. To support MCC investments in improving the infrastructure, the compact funded tools and trainings for LWSC staff to reduce maintenance costs and extend the useful working life of the water and sewer systems. (Zambia Star Report, 2020).

Only after the compact started did it become clear that the apparent financial turnaround was more a matter of accounting than of structural change. LWSC's definition for operating cost coverage had reflected a substantial underestimation of the true maintenance costs, and the utility operated in the red for much of the compact's five-year timeline. The wide gap between true full-cost recovery and actual costs suggested a large degree of deferred maintenance. This

financial situation was likely exacerbated by external factors—like drought and power reliability—that affected the amount of water LWSC could sell. The overall effect limited the efficacy of the technical assistance provided through the compact. (Zambia Star Report, 2020).

Compact-funded assistance to LWSC comprised of technical training and improvements in four key areas: asset management, environmental management and monitoring capabilities, reduction of non-revenue water, and social inclusion and gender mainstreaming.

Although LWSC had a basic awareness of the importance of asset management, that awareness had little influence or impact on actual practices. The asset management team sat low in the utility's hierarchy and was not consulted as a routine advisor in LWSC's business processes. The degraded state of the water and sewer infrastructure made managing these assets even more complex: it was difficult for LWSC to (1) know where their pipes were and what condition they were in; (2) identify needed expansion, maintenance, and repair projects and prioritize between them; and (3) allocate limited resources strategically (staff, funding, materials). (Zambia Star Report, 2020).

A technical assistance contract funded through the Institutional Strengthening Activity helped LWSC rethink their asset management practices, take an inventory of their assets, install diagnostic equipment and ultrasonic monitoring devices throughout the water distribution system, set up a computerized register to track assets, and link all this information to a decision support system. This comprehensive, integrated approach was designed to allow LWSC to plan maintenance, asset renewal and capital programs in an affordable and systematic manner. It was intended to enable better service in terms of water pressure, water quality, and customer service, as well as improved transparency and ability to meet regulatory and reporting requirements. The technical assistance also helped LWSC analyze various maintenance options—doing the work in-house, hiring a third party via a performance-based contract, or a combination of the two—to determine which would be the most effective. (Zambia Star Report, 2020).

Improved governance of the water sector had brought environmental policies and regulations that LWSC struggled to comply with given the degraded state of its sewers and sewage treatment assets. The result was an administrative burden, requiring LWSC to apply for exceptions, exemptions, temporary waivers, and undergo frequent reviews - none of which would have been necessary if the utility was functioning properly. Accordingly, the compact invested in strengthening LWSC's environmental management and monitoring capabilities, specifically

for treated sewage and water quality. The compact funded the provision of environmental monitoring laboratory equipment and technologies as well as complementary training for operationalizing the laboratory. It also helped introduce an environmental information management system for LWSC and integrated it into the utility's corporate culture and business systems. Reducing non-revenue water was critical to the sustainability of LWSC's business model. (Zambia Star Report, 2020). The Infrastructure Activity, discussed above, undertook efforts to reduce physical losses; the Institutional Strengthening Activity took on the challenge of commercial losses. The overall objective was to reduce non-revenue water by 23 percentage points,⁵⁷ ultimately improving the financial position of the utility. The compact funded a customer database clean-up exercise, which was expected to yield the largest non-revenue water reduction by correcting billing and administrative records to give LWSC more accurate information about their customers. For example, among commercial customers alone, more than 160,000 discrepancies were identified between the records on file and the updated information collected via survey. For the most part, the outdated records meant the commercial customers were being under-billed for their water usage. LWSC worked to correct these "variances," but progress was slow due to lack of staff support and coordination. By the compact's end date, approximately 60,000 records were updated. The database clean-up of all incorrect records that had been identified prior to and after the end of the compact was completed mid-August 2019. (Zambia Star Report, 2020).

Specifically, a total of 181,067 records were updated and LWSC is developing a strategy for continuing the NRW and database clean-up activities as part of its regular operations to ensure sustainability of the compact investments. LWSC's largest debtor was the Government of Zambia, whose unpaid water bills were a significant contribution to non-revenue water. Resolving this issue was a key to improving LWSC's financial situation. It was addressed through a condition precedent that required the GOZ to pay the water utility \$11 million to clear their outstanding arrears—a debt accumulated as of 2013 from unpaid water bills of Government institutions, including the University Teaching Hospital (Lusaka's largest hospital), police barracks, and national GOZ offices. (Zambia Star Report, 2020).

Over the course of the compact, MCC and MCA investigated the complex problems behind these unpaid bills, arriving at a variety of solutions that included installing individual water meters at GOZ institutions, fixing the leaky pipes that were driving extremely high water bills, and even seeking approval from NWASCO⁵⁸ for an extraordinary rate increase if these issues

were not being addressed appropriately by the GOZ. The rate increase was never requested during the compact, as MCC determined that government-funded efforts to address the underlying problems were adequate. Over the five-year compact period, GOZ payments of arrears to the water utility totaled nearly \$22 million,⁵⁹ and as of 2018 LWSC was legally empowered to collect arrears directly from the GOZ institutions incurring those bills. At the compact's completion, outstanding arrears stood at approximately \$5.1 million. (Zambia Star Report, 2020).

Improving LWSC's abilities to provide better and targeted services to the poor and to promote behavior change is central to ensuring that customers connect to the network and stay connected. Widespread inability or unwillingness to pay for improved services threatens the connection rates required to realize health, time, and income benefits or to ensure proper functioning of the infrastructure. A technical assistance package for social inclusion and gender mainstreaming and for IEC capacity in LWSC supported the utility to develop the structures, policies, capacities, and procedures needed to provide appropriate, affordable and sustainable services that are aligned with the income flows of the poor and underserved populations present in the peri-urban areas. This package included support for LWSC to develop a Social and Gender Policy and a revised Peri-Urban Policy setting out utility priorities for extending and maintaining services in peri-urban areas. It supported the establishment of new customer engagement approaches for frontline staff, the development of Customer Engagement Guidelines, and a revised Credit Control and Debt Management Policy clarifying the utility's pro-poor approaches to bill payment and debtor management. The work also supported LWSC to develop flexible payment mechanisms, extending payment plans for debtors and allowing billing systems to receive micro-payments electronically (e.g., mobile money), an approach well-suited for households that rely on daily wage payments. (Zambia Star Report, 2020).

Other priority measures include text messaging for bill-payment reminders and outreach to customers at risk of disconnection, shifting away from disconnection as the default solution to customer debts. The technical assistance consultant also worked with LWSC to build capacity on designing and implementing IEC and sanitation marketing materials and campaigns. Compact-funded technical assistance emphasized capacity building and participatory approaches aimed at building strong ownership and leadership by LWSC staff. By the end of the compact, LWSC had developed workplans, formulated an implementation strategy extending three years

beyond the end of the compact, appointed staff, and integrated social inclusion, gender mainstreaming and IEC and sanitation marketing priorities in the 2019 budget process in order to sustain these initiatives going forward. LWSC staff also gained training, some hands-on experience, and a portfolio of IEC and sanitation marketing materials to promote the utility's water and sanitation services. As of closure in November 2018, the compact had supported LWSC in reaching approximately 248,000 people with messaging on water and bill management, toilet maintenance, sanitation, and hygiene. (Zambia Star Report, 2020).

While the social inclusion and gender mainstreaming and IEC efforts resulted in new policies and extensive outreach, limited investment in these actions prevented the work from reaching its full potential. The lack of funding for formative research led MCA to rely on work donated by another organization (Water and Sanitation for the Urban Poor, WSUP) to inform the design of IEC and sanitation marketing messages. This partnership filled a key gap, but it also translated to delays and shortcuts in message design and pre-testing. In particular, WSUP's research did not cover the four Ps—place, price, product, promotion—that are a core part of effective sanitation marketing campaigns, and messaging was unable to adequately cover this content. In sum, the original budget for this work was inadequate, and therefore MCC and MCA expended considerable effort trying to cover the resource gap. (Zambia Star Report, 2020).

The social inclusion and gender mainstreaming and IEC technical assistance to LWSC was further hampered in the first year by contractor under-performance. By the compact's end, the work achieved the results noted above, but the technical assistance consultant lacked sufficient time to support LWSC in piloting many of the new policies. LWSC successfully rolled out the flexible e-payment and micro-payment mechanisms, and was keen to take over IEC implementation and other pilots under the technical assistance consultant's oversight, but the consultant did not have the budget to support this. Despite these missed opportunities for institutional learning, LWSC appeared eager to continue the work: the utility passed the aforementioned 2019 budget funding the implementation strategy that will allow it to continue operationalizing the new policies and practices developed under the compact. (Zambia Star Report, 2020).

Furthermore, 64(64%) of the respondents were of the view that the project objectives were met as opposed to the 35(35%) who reported that the objectives were not met. See Figure 5.4

“As LWSC we are happy and satisfied in the way the project worked out with other partners... the work was successful” **Production Manager LWSC**

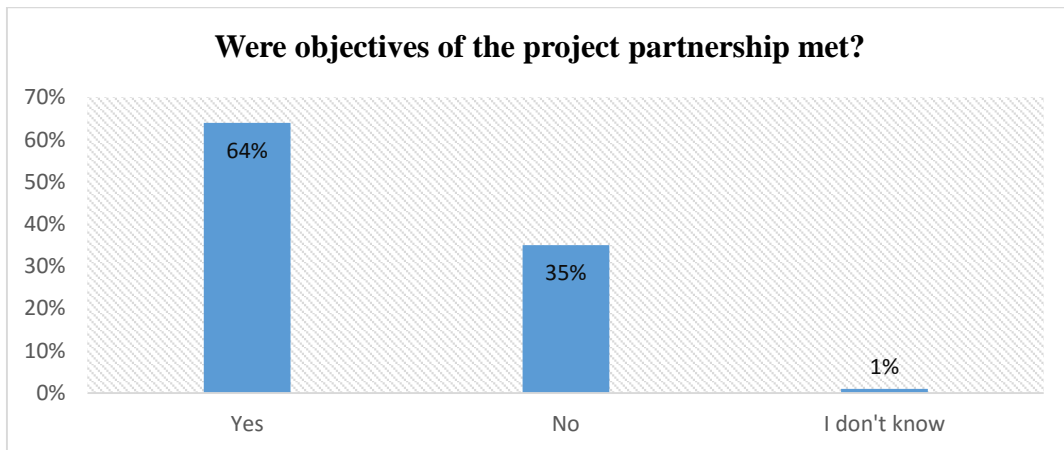


Figure 5.4: Responses as to whether the objectives of the project partnership were met.

5.5 Challenges faced by partners in improving Kwamwena valley’s water provision

The project had its own share of challenges as reported by the surveyed residents of Kwamwena Valley.

Challenges faced by MCC in partnerships

LWSC moved in late to commence the implementation of the project in the community. Most of the community members in the area had already constructed boreholes for drinking water. The planning of roads, houses and wall fences was already done. This made it difficult to set up the new water system and convince people to migrate from using available water from their bore holes to LWSC piped water.

The matter was not helped by encroachment issues

“on some project designated site, people were already settled in the area.”

Director Communications and outreach MCA

“There was vandalism of assets in the area and theft of public infrastructure.”

Director Communications and outreach MCA

MCC actively addresses dimensions of sustainability throughout its body of project documentation, but lacks a central document dedicated exclusively to treatment of sustainability. Standardizing the creation of these plans would encourage the MCAs to engage with stakeholder agencies and focus attention on risks to sustainability early in the project life cycle.

The unique restrictions on disbursing funds after the conclusion of a compact, however, leave MCC largely powerless to address post-compact decay and other threats to sustainability. There is need to safeguard critical funding to complement at times unreliable host country resources necessary to sustain project benefits.

MCC addresses donor coordination broadly in compact agreements, but lacks more formalized coordination with other development actors, and the adoption of joint frameworks to streamline partnerships. (Ensuring the Long-Run **Sustainability** of MCC Country Compacts)

Inadequately conducted due diligence on selected program activities before funding decisions were made has been problematic. For example, the Tanzania Water Supply Project faced significant delays in both Dar es Salaam and Morogoro, with the completion of works in each city delayed for more than one year past the original estimated completion dates. Designs that were originally thought to be “shovel-ready”, turned out to be only preliminary designs or concepts that required considerable additional time for preparation of detailed designs and, in some cases, redesign.

There have been challenges inherent in coordinating multiple stakeholders from different countries (funders, implementers, contractors) each without a comprehensive working knowledge of the others’ systems, processes, and approaches. (Olga Rostapshova, Danae Roumis, Jeff Alwang, Charles Pendley, 2015).

At MCA-Zambia, one infrastructure director was assigned to manage both infrastructure and institutional strengthening activities. Managing infrastructure occupied a significant portion of the director’s attention, while insufficient time was allocated to working closely with the implementing entities to ensure successful implementation and ownership of the institutional strengthening technical assistance. (Zambia Star Report, 2020)

MCC’s project design and due diligence process would have benefited from an *incidence analysis study* linking water and sanitation sector expenditures with associated physical outputs and levels of service and access enjoyed by different classes of consumers. Such work could highlight inequalities across the population and serve to inform strategies for selecting potential beneficiaries. This analysis could inform estimates of likely levels of subsidy needed to defray the costs of initial connections to the water and sewerage networks. An extension of such work, moreover, could include an examination of institutional capacity and operational effectiveness to increase MCC’s understanding of planning, budgeting, and spending (for both capital

investments and O&M expenditures) and the association of these factors with key sectoral performance metrics. (Zambia Star Report, 2020)

MCC's inclination to support work that will advance private sector development and involvement in the power sector leads to a heavy focus on financial management and sustainability. However, operational management should not be neglected— utilities need to expand their network, invest in maintenance, improve operational processes, tools, and procedures, etc. And these areas may be more difficult to achieve and sustain impact in compared with financial issues due to their decentralized nature and because of the need for change management. Financial health may be closely tied up with operational performance, and sufficient focus is needed for both. Pacing, again, is important. If the utility starts improving revenues (e.g., through tariff reform, loss reduction) but cannot spend the money effectively because of operational problems with procurement processes, a new negative cycle may begin. Moreover, if excess cash builds up on the balance sheet, regulators may feel less inclined to provide tariff increases that may be needed to achieve cost-reflectivity. (www.mcc.gov)

The Jordanian Compact reinforced sustainability through multiple improvements to the water utility and its staff, policy changes, personnel training, equipment modernization and infrastructure improvements. These efforts were expected to enhance the operating structure and efficiency of the utility making it more cost effective and sustainable. If MCC pursues a similar arrangement in the future, it should anticipate the need to allow flexibility in the compact development timeline. For instance, after awarding the wastewater contracts, it became clear that some of the technical designs were incorrect and needed to be revised. As there was no time to re-tender for new designs. (www.mcc.gov)

Documentary review also revealed that at MCA-Zambia, one infrastructure director was assigned to manage both infrastructure and institutional strengthening activities. This placed a heavy workload on a one person. Managing infrastructure occupied a significant portion of the director's attention, while insufficient time was allocated to working closely with the implementing entities to ensure successful implementation and ownership of the institutional strengthening technical assistance. (Zambia Star Report, 2020)

Challenges faced by the community

The information from data collected for this study indicates that 4.40% of respondents indicated that they witnessed water flooding as a result of open trenches, 8.70% of the

respondents mentioned that some water pipes burst which resulted into lack of water supply, while 8.70% of the respondents said they had to fetch water from distance places, 26.10% mentioned that they were exposed to dust during construction, the remaining 39.10% reported that they had difficulties of mobility because the roads were blocked and trenches were being dug at the time. See Figure 5.5.

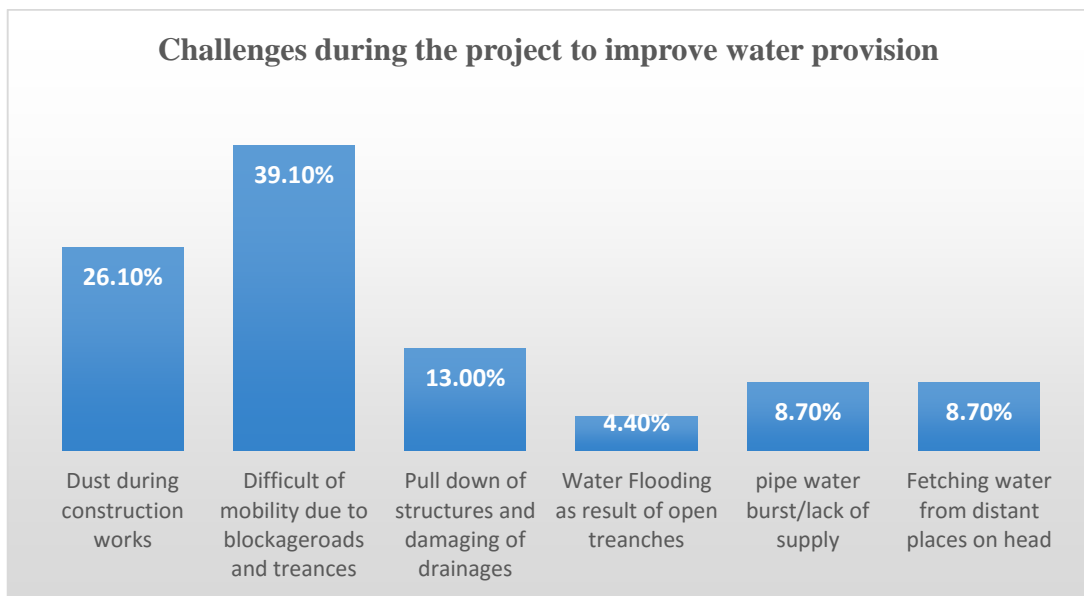


Figure 5.5: Challenges during the project to improve water provision

Source: Field Data (2021.)

The Focus Group respondents and the Key Informants also shared their views.

“...sometimes we are without water for days... we did not benefit much, people were just stopped from drinking from the open wells.” **Female discussant FGD**

Meanwhile the key informant held that *“power outages resulted in erratic water supply in most houses leading to rationing of water to the community.”*

Production Manager LWSC

Lack of, or poor engagement of communities by project implementers. As Ruth Namatama Kanyanga (2017) observed, while information was given to the community about the project, the community did not fully participate. It is important for project implementers to engage the community more and embrace their ideas if there is to be ownership of development projects. Bottom-up approach to communication and participation is necessary for the success of the project.

Resources provided for development of IEC materials and execution of outreach campaigns during implementation were not adequate. preparing household-level water and sanitation connection outreach

during compact development. There has been a lack of emphasis on the importance of implementation actors' sensitization for better coordination and integration of work planning by responsible for outreach and connection activities so that works and outreach may be coordinated through integrated work planning. (Zambia Star Report, 2020).

“LWSC should have offices here in Kwamwena because reporting water related issues and maintenance to their office in Chongwe town which is far is not easy.” **Female FGD respondent**

“infrastructure maintenance after projects end is a challenge...there was a big water pipe leakage in May 2021 which took three days for LWSC to repair.” **Female FGD respondent**

According to the fourth female participant,

“bringing pipe lines was a good idea except that by the time the project initiative was implemented, I had already drilled a borehole ... we just make sure to boil water for drinking ... my house is not connected to LWSC water network system

In unplanned and rapidly changing urban environments, it is difficult to identify the people who will be affected by the project until detailed designs are complete and the project impact area has been physically identified and marked. At the beginning of the Zambia Compact, the resettlement budget was roughly \$6.7 million, and it was estimated that there would be 1,600 project-affected people. By the end of the compact, the budget increased to \$26.3 million with 5,167 project-affected people. The difference was due to changes in construction design, rapid growth in Lusaka, and a two-year lag between the original resettlement plans and construction implementation, illustrating how work in a dense, dynamic urban environment requires a more nimble and adaptive approach to estimating costs and planning budgets. (Zambia Star Report, 2020).

Further, the community was subjected to dust during the construction phase of the project. Six (6%) of the respondents said that they were subjected to a lot of dust during construction works. Nine (9%) of the respondents lamented the difficulty of mobility due to blocked roads and trenches, 3(3%) of the respondents expressed concern over damage done to drainages brought about by pulling down of structures to pave way for water infrastructure installations, 69(69%) of the respondents, said that there were no challenges at all, 7(7%) of the respondents had no idea of the challenges the community faced.

There respondents were subjected to considerable quantities of dust during construction works. They encountered difficulties in terms of mobility due to blocked roads and trenches. Some structures were pulled down and led to damaging drainages. The community experienced water flooding as a result of open trenches. In some areas, disorderly demobilization by the bankrupt contractor left mounds of dirt, contributing to continued flooding.

Under the project, fences were built along the drains, but vandals have broken apart concrete posts to steal the materials. The absence of fencing along both completed and incomplete sections of the drain represents a major danger to residents, who could fall in (MCC, 2020), some water pipes burst which resulted into lack of water supply, in consequence of which people had been constrained to fetch water from distance places. In such situations, the burden of collecting water in these settings falls disproportionately on women and girls as they are deemed for collecting water (UNESCO, 2019)

Some members of the community still depend on water from their own boreholes, which gets more contaminated with fecal matters especially during the rainy season as septic tanks get flooded. Water supply was also erratic due to pipe leakages, vandalism of water equipment and power outages. Lusaka Water Sewerage Company has been experiencing challenges in water production and distribution in the wake of the power deficit in the country. This has seen the level of water production for Lusaka city reduced from an average of 258,000 cubic metres per day in 2014, to a little over 190,000 cubic metres per day in 2016, representing over 25 per cent reduction in water production, mainly on account of power load shedding on the 125 ground water sources spread around the city. To fully meet the demand for Lusaka, the company needed to produce an estimated average of about 410,000 cubic metres per day (LWSC, 2018).

Challenges faced by government agencies

The compact did not include all relevant regulators. In Zambia, the water regulator was not part of the compact. It should have been included as an implementing entity to help provide the right incentive structure given their role in ensuring technical and financial performance to LWSC.

There is an imbalance between investments in technical solutions on the one hand and social policies and behavior change on the other, as the latter are critical to the risk management and sustainability of the former. To ensure connections, service uptake, and behavior change,

implementing entities such as LWSC need to (a) develop structures, policies, and procedures that will enhance its ability to provide appropriate, affordable, and sustainable services for the poor; (b) identify information, education, and communications (IEC) needs for water and sanitation, and solid waste management and drainage, respectively, and (c) develop and manage IEC systems that promote behavior change. (Zambia Star Report, 2020).

It is not surprisingly then to realize that,

“LWSC moved in a bit late. We found that most of the community in the area already constructed boreholes for drinking water ... even the planning of roads, houses and wall fences was already done. This made it difficult to put the new water system on.”

Production Manager LWSC

While substantial work on these policies and programs was undertaken, and initial monitoring and evaluation reports indicate their successful adoption by the implementing entities, this work was under-resourced relative to the scale of response required by LWSC to meet the service needs of the targeted communities and to ensure sustainability of infrastructure. (Zambia Star Report, 2020).

Further, due to the delay, there was time pressure for project implementation as the donor wanted work to be done in 5 years and delaying would have meant loss of an opportunity for money by LWSC.

“There was limited time for project implementation as the donor wanted work to be done in 5 years and delaying would have meant loss of an opportunity for money by LWSC. This made LWSC to put up water meters and lines to customers on undeveloped premises and houses who had no capacity to connect water.” **Production Manager LWSC**

Delays and disruptions related to construction of the water and sewer extensions in peri-urban neighborhoods frustrated many residents. Perceptions of poor service quality from LWSC discouraged many households from connecting to new sections of the piped water network. (MCC, 2020)

“There were encroachment issues on private properties as the project found people already settled in the area.” **Director Communications and outreach MCA**

5.6 ERR of the compact

In MCC's early days, ERR calculations for infrastructure investments assumed optimal maintenance of MCC-financed assets. MCC has found, however, that suboptimal maintenance is often the root cause of problems which its investments in new or rehabilitated infrastructure aim to solve. This realization has led, in turn, to more conservative expectations and assumptions concerning future maintenance spending by partner countries in MCC's economic analysis. In Zambia, for instance, the original ERR calculations made somewhat optimistic assumptions regarding the maintenance of assets installed by MCC and the corresponding trajectory of benefits over time. In the closeout ERR, in contrast, the magnitude of the ERR varies depending on assumptions about the adequacy of maintenance to sustain benefits over time. (Zambia Star Report, 2020).

At the time of signing and at Entry into Force, MCC calculated one ERR encompassing the compact's two activities, the Infrastructure Activity and the Institutional Strengthening Activity. MCC's initial economic model accounted for the benefits of reduced exposure to waterborne diseases from contaminated drinking water and flood waters, reduced flooding damages, lower costs of providing water when non-revenue water is reduced, and the impact on women and children of reduced time spent collecting water. (Zambia Star Report, 2020).

The August 2013 ERR version reflected refinements in MCC's methodology regarding the opportunity cost of time and incorporated newer data sources. Incorporating newer data sources also increased the estimate of overall benefits; on net, these changes increased the ERR from 13.7 to 17 percent. (Zambia Star Report, 2020).

In March 2019, based on implementation experience to date, MCC introduced more moderate projections of adoption rates, reducing these from 100 percent to 80 percent. This revised figure was viewed as ambitious but still achievable. That change, coupled with higher costs associated with investments in improved drainage, caused the ERR to decrease to 13.7 percent. (Zambia Star Report, 2020).

Finally, the closeout ERR incorporated a number of revisions and refinements:

Due to widespread contamination of the water supply that was not discovered until implementation, all health-related benefits were zeroed out, leaving only time savings benefits. (Zambia Star Report, 2020).

Two benefit streams in the original ERR relating to improvements in the central pumping system and pipe network were omitted from the closeout ERR due to newly-emergent measurement or data collection problems: Estimated benefits from increased supply due to reductions in non-revenue water. (Zambia Star Report, 2020).

Finally, MCC first computed an ERR for the Institutional Strengthening Activity at closeout since data had newly become available to support a corresponding ERR calculation. Under the (conservative) assumption that the Institutional Strengthening Activity would bring about only small increases in asset lifetimes, Time savings associated with overall improvement in reliability of water supply. (Zambia Star Report, 2020).

Compact Sustainability

The long-term financial and institutional health of LWSC is critical to realizing and sustaining the improved water and sewer services that underpin the inclusive economic benefits the compact aimed to provide. The Government had engaged in a Water Sector Performance Improvement Project with the World Bank (2007-2013) that bolstered the financial performance of LWSC. MCC built on that engagement by leveraging an agreement developed between the Government and LWSC as part of the World Bank project. This agreement—the LWSC Sustainability Agreement—set forth operational and financial performance milestones for LWSC and the sector. MCC required the GOZ and LWSC to finalize and enter into that agreement as a condition for the start of the compact. The continued effectiveness of, and compliance with, the LWSC Sustainability Agreement, including satisfaction of the applicable performance milestones, was also a condition precedent to the disbursement of MCC funding each quarter. (Zambia Star Report, 2020).

Improved financial health allows a utility to sustain and improve the services it provides by funding maintenance, asset renewal, and expansion, thus ensuring the continued benefits of previous investments. The compact incorporated conditions requiring LWSC to devote a minimum of 50 percent of its annual retained earnings to asset renewal and capital expansion and to devote an “appropriate amount” of funding for the repair and maintenance of water supply and sanitation infrastructure. But earnings must first be realized before they can be put to use. The compact-funded technical assistance to strengthen asset management and reduce non-revenue water was therefore designed to further develop the financial and institutional capacity of LWSC, thus promoting the sustainability of MCC’s infrastructure investments. As previously discussed, LWSC’s financial situation was weaker than originally thought,

underscoring the importance of the institutional strengthening activity to compact sustainability. (Zambia Star Report, 2020).

The time horizon and strategic nature of the various master plans developed with MCC support also serve to promote the sustainability of compact investments in Lusaka's water sector infrastructure. In particular, the master plans for water supply investments and sanitation investments are tools to guide the sector's development in a way that fully integrates and complements the MCC-funded project. By identifying priority projects and mapping out an investment strategy, the master plans coordinate future investments. Indeed at compact closure these plans had already attracted approximately \$500 million in additional investments from the donor community (see more details in the *Coordination and Partnerships* section of this report). (Zambia Star Report, 2020).

Ironically, strong donor interest and well-developed master plans that outline more than \$2.7 billion in water and sanitation investments may in some ways threaten the sustainability of Lusaka's water sector. Should these projects be realized rapidly with donor money, there is a risk that LWSC and the GOZ could be left with more infrastructure than they have the capacity to manage. While there is no corresponding investment master plan for institutional strengthening, LWSC's Strategic Plan for 2018–2022 includes reducing water losses, strengthening operations and maintenance as part of asset management and organizational efficiency, improving human resource productivity, and attaining financial viability as part of business sustainability. (Zambia Star Report, 2020).

Water tariffs are the utility's primary means of cost recovery. Zambia's water tariffs, however, were set below cost recovery levels, likely in order to subsidize poor users. While the Zambia Compact did not include water tariff reforms, the program's structure provided opportunities other than tariff subsidization to provide targeted assistance to the poor. For instance, the compact offered financial assistance to poor customers who faced one-time fees to connect to the newly constructed water supply and sewerage infrastructure. Although subsidizing connections may be more effective than subsidizing tariffs in addressing affordability for the poor, MCC nonetheless encountered some difficulties in implementation of this approach. For example, the subsidy for sewerage connections was based on an engineering estimate of connection costs plus (for houses lacking a toilet) the costs of building a toilet. Toilet designs can vary, however, from a simple hole in the ground to elaborate finished water closets. The cost estimates received for toilets were for a very expensive option, such that the total subsidy required to cover all

new connections exceeded the available budget. In the future, instructing cost engineers charged with estimating required subsidies to work within available budgets will be key. (Zambia Star Report, 2020).

Policy and Legal Dimensions

LWSC and LCC received technical assistance to develop and implement policies and procedures that will help them more effectively maintain and deliver inclusive services. In addition, LWSC can exercise its newly granted legal authority to collect arrears directly from government agencies. The implications of this legal change for the utility's balance sheet, its ability to make new investments, and the sustainability of assets illustrate linkages between different dimensions of sustainability. Although there was no clear "champion" within the GOZ for the sustainability of the compact or Lusaka's water sector more generally, MCC enjoyed excellent access to GOZ partners. Finally, GOZ contributions to the compact totaling \$52 million provide further evidence of political will. (Zambia Star Report, 2020).

Social and Behavioral Dimensions

Several social and behavioral components are essential to achieving lasting health and economic benefits from the compact-funded infrastructure. To avoid waterborne disease, people need to choose the treated municipal drinking water supply (whether from a kiosk or a household connection) over untreated and potentially contaminated sources like shallow wells or the informal water sector. To safeguard Lusaka's vulnerable groundwater and reduce unsanitary overflows during the rainy season, the city needs a wholesale shift away from unlined pit latrines and towards sewer connections.⁶⁷ And to keep the drains clear of blockages so that they can evacuate stormwater and reduce flooding during the rainy season, residents throughout the city—especially in peri-urban areas—need to have and actually take advantage of appropriate solid waste management options. In short, uptake of water, sanitation, and solid waste services is critical to realizing benefits and therefore to the sustainability of the MCC's investments. Furthermore, uptake of services and an increase in the number of connections will support the financial sustainability of the utility. (Zambia Star Report, 2020).

Compact Changes

August 2014: Under the drainage component of the Infrastructure Activity, MCC completed an Environmental and Social Impact Assessment prior to beginning construction. That study

highlighted the need to further investigate the impacts of upstream drainage improvements on the downstream community of Mazyopa. Further environmental and social analysis was completed, as well as a detailed hydraulic analysis, which confirmed that the drainage improvement would result in increased stormwater discharge in the downstream channels drastically increasing the flood risk to a settlement of over 3,700 people and 748 structures. MCC and MCA responded to this risk by extending the drain through the Mazyopa community, as well as supporting the rehabilitation and construction of two bridges used by the neighboring community. To fund this approximately \$15 million drainage extension through Mazyopa, MCC removed the construction of the Lumumba Drain from the compact's activities. This reduced the ERR from 17 percent to 16.5 percent due to a lower beneficiary count by about 57,000, or 3 percent of the total compact. (Zambia Star Report, 2020).

February 2015: Resettlement programs in rapidly evolving urban environments require flexibility. The original Resettlement Action Plan, completed in 2013, estimated 1,600 project-affected persons. However, by the compact end date there were 5,167 project-affected persons. This is due to two main reasons: (1) there were significant changes in construction design after the Resettlement Action Plan was completed; and (2) Lusaka continued to experience rapid population growth and development in the two years between the development of the Resettlement Action Plan and beginning of construction. Given these reasons, in January 2015 the resettlement budget increased from \$6,732,499 to \$26,285,081 by reallocating contingency funds under the Infrastructure Activity. The ERR was not affected since the ERR was developed at the project level and the overall budget of the project did not change. Likewise, there was no change to the number of beneficiaries. (Zambia Star Report, 2020).

February 2016: MCC reduced the SCAP connection target rate from 100 percent to 80 percent based on experiences from similar projects and to ensure efficiency of the system. While a number of different interventions were put in place to support households to connect, in view of other experiences with low household connection rates in Lusaka, the team determined that 80 percent was a more realistic number. This reduced the ERR from 16.5 percent to 14.7 percent and the number of compact beneficiaries from 1,230,413 to 1,199,962. (Zambia Star Report, 2020).

November 2016: In November 2016, MCC and MCA identified a budget shortfall of \$22 million due to unforeseen circumstances that resulted in cost escalations, especially on the drainage activity. These unforeseeable circumstances included but were not limited to the

following:

Substantial underground rock formations not detected during preparatory works;

Change in the number of project-affected persons and increased in-kind replacement of structures built leading to increased resettlement costs;

Underground utility relocations that had not been geo-referenced by utility companies that must be moved during construction works at a cost;

(Zambia Star Report, 2020).

5.7 Conclusion

The Lusaka Water Supply, Sanitation, and Drainage Project supported large-scale infrastructure investments and institutional strengthening and reform of Lusaka’s water sector. Through these activities, the project expanded access to, and improved the reliability of, water supply and sanitation, as well as improved drainage services and related solid waste management in select urban and peri-urban areas of the capital. The project aimed to decrease the incidence of water-related diseases, generate time savings for households and businesses, and reduce non-revenue water at the utility. The key players in Lusaka’s water sector—Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC)—were natural partners to complete and maintain the planned water, sanitation, and drainage investments; these bodies therefore served as the compact’s two implementing entities.

The project consisted of two activities, infrastructure improvement and institutional strengthening. Infrastructure improvement activities included investment in infrastructure development and rehabilitation, including interventions to rehabilitate the core water supply network, rehabilitate and expand select water supply and sewage networks to peri-urban areas, and improve select drainage infrastructure. On the other hand, institutional strengthening activities, were focused on strengthening the service delivery and operational capacities of the LWSC, the institution with jurisdiction over the water infrastructure investments of the project.

Support included asset management assistance to reduce non-revenue water at LWSC, assistance to the water utility in developing inclusive policies and structures to improve the reach and quality of service delivery to the poor and to increase uptake and maintenance of water and sewer services and infrastructure. Parallel efforts developed information, education and communications campaigns and built in-house capacity at LWSC to promote behavior

change and service uptake. “LWSC was an implementing entity for water and sanitation services as a technical operation entity, while Lusaka City Council was implementing entity for drainages and burying of open water wells as part of sanitation legal resettlement.”

During the development of the compact, MCC supported the GOZ in building out a long-term strategy for water and sanitation, aimed at ensuring that MCC’s investment would fit into a lasting and comprehensive program of improvement. This planning initiative resulted in a water supply investment master plan, Water Supply Investment Master Plan, charting a 25-year, three-phase strategy for more than \$2.7 billion in investments to meet the needs of a Lusaka population projected to reach 4.9 million by 2035. The Water Supply Investment Master Plan mapped out eleven projects in Lusaka at an estimated cost of \$772 million, prioritized across three phases to achieve 100 percent access to safe water by 2035 with 80 percent of households connected to the municipal water supply.

Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project.

Improved water service coverage: Access to water supply was extended, and 16,790 new household connections were added to the water network by the end of the Compact. Improved quality of service delivery. Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours whereas it was 24 hours at its completion. Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. A total of 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project.

On an institutional level, some partners had multi projects with different priorities which brought in lack of coordination as an operational challenge and there was also coordination as a problem for the project because of different interests and priorities of some partners though all worked well.

All compact investments were ultimately aimed at improving service delivery. LWSC provides intermittent water supply to its customers, which is reflected in the Continuity of service indicator. The reported value is an average across all districts of Lusaka, and is calculated by LWSC on a quarterly basis. The city-wide average was 18 hours of water service per day at baseline, but some neighborhoods had as little as 4 hours of service daily, while others had continuous 24-hour service. The indicator was intended to capture how reduction in physical losses would be expected to increase the available water supply and therefore lengthen service hours. However, as described above, other factors including the under-performance of a works contractor hampered physical NRW reductions. Furthermore, compact investments to connect new neighborhoods (without a corresponding increase in the available water supply) would be expected to decrease the average daily hours of supply city-wide

CHAPTER SIX

DISCUSSION OF FINDINGS

6.1 Introduction

This dissertation assessed the impact in terms of access to water services by households in view of Lusaka Water and Sewerage Company and Millennium Challenge Account partnership in the water provision in Kwamwena Valley. The study was a mixed methods case study of the Lusaka Water and Sewerage Company and Millennium Challenge Account partnership in the water provision in Kwamwena Valley in Chongwe District. Primary data, were collected from selected residents of Kwamwena Valley, and from officials, from both Lusaka Water and Sewerage Company, and Millennium Challenge Account. Secondary data were collected published and unpublished documents such as research reports, books, journal articles, periodicals, newspapers, dissertations, theses and national documents among others.

This study is an evaluation research, carried out to assess the impact of to assess the impact of the partnership of the water providers to residential area in Kwamwena Valley in Chongwe district. The research intended to see whether or not the of Lusaka Water and Sewerage Company and Millennium Challenge Account partnership in the water provision in Kwamwena Valley met its objectives of extending coverage of water and sanitation services to the residents of the study area.

Simple random sampling was used to select the respondents from Kwamwena Valley. Quantitative data was collected using a questionnaire that was administered to respondents (Residents of Kwamwena Valley). Qualitative data was collected using semi structured interviews that were conducted with key informants.

6.2 Summary of study findings

The majority of respondents were female, of whom the largest proportion were above 42 years of age. More than half of the respondents were married and those who were either widowed or no separated were in the minority. The respondents who had attained tertiary level education were predominant. However, there was a small proportion who did attend formal schooling. The largest family size was reported to have between 11 and 16 members, whereas the smallest

had fewer than 5 members. It was also revealed that the employed respondents accounted for highest proportion, followed by those who were neither engaged in business nor in formal employment. There were others who were in business, and in farming. With regard to duration of residency in Kwamwena Valley, the largest percentage of the respondents had lived in the area for less than 5 years, this was followed by those who had spent between 6 and 10 years as residents. Those who had lived in the community for more 10 years were in the minority.

Lusaka Water and Sanitation services (LWSC) supplied water to more than half of the households of the surveyed respondents, privately owned boreholes were the source of water for 29(29%) of the respondents' households, 1 respondent sourced water from an open well, and alarmingly, 4(4%) of the respondents professed ignorance claiming that they did not know who supplies them with water.

Of the respondents, 86(86%) suggested that their houses were within 20 meters of the water source, 12 (12%) indicated that their houses were between 20 meters and 50 meters away from their water source, 1(1%) was at a distance between 50 meters and 100 meters from the source of water, and lastly 1(1%) was in the range 200 meters to 500 meters to the source.

The lowest quantity of water used on a daily basis was reported by 4(4%) of the respondents to be between 10 – 20 liters of water per day. Slightly more than this was used by 11(11%) of respondents who indicated that their households consume from 20 liters to 50 liters of water per day. The next in rank were 21(21%) of the respondents use between 50- 100 liters a day, followed by 2(2%) of the respondents who were using between 100-150 liters of water a day. There were 8(8%) of the respondents whose houses were utilizing between 150-200 liters of water per day. Another 5(5%) of the respondents reported that they were using between 200- 500 liter of water per day in their houses. The majority 49(49%) of the respondents were daily using unlimited liters of water household purposes.

Nearly half, 53(53%) of the respondents expressed the need to improve the water situation in the area.

The surveyed respondents reported that they were paying monthly water bills ranging from less than K100 to more than K700 per household. Seventeen (17) percent of the respondents were paying less than K100 per month, 38% were paying between K100- K200 for water per month, and 8% were paying between K200- K300 to water per month. Another (27%) of the respondents were paying between K300-K500 to water per month. Four (4) percent of the respondents were paying between K500- K700 for water per month. Six percent of the

respondents were paying above K700, to access water per month. Generally, the participants expressed concerns that the costs for water services were too high.

Four (4%) of the respondents had problem with erratic water supply, 9(9%) had the problem of having calcium in the water, one respondent (1%) had a problem with foul smell water and water pollution due to leakages from septic tanks, 8(8%) of the respondents had a problem with high cost of water bills, 9(9%) of the respondents were impelled to be buying bottled water for drinking, from the shops. Four (4%) of the respondents complained of blown dirt color of water, 3(3%) of the respondents still were not accessing piped water and were instead drawing drinking water from the open wells. In contrast, 62(62%) of the respondents had no problems with drinking water at all.

The key informant from LWSC had this to say on the issue, “there is running water in almost every home in the area; the community now has access to safe and clean drinking water after project completion. Further, laboratory service machinery was purchased for measuring water quality from water samples to promote compliance of water quality.”

The responses on whether the respondents had suffered from water borne diseases prior to the survey were sought, and are now presented. Eight (8%) of the respondents reported that they had suffered from diarrhea while the majority, 92(92%) of the respondents indicated that they did not suffer from any waterborne diseases. *“LWSC’s interest and priority is to supply quality, safe and clean water to the community of Lusaka province and the surrounding districts.”*

erratic water supply 4(4.00%), Calcium (White solid water colour) 9(9.00%), smell and water pollution due to septic tank leakages 1(1.00%), and Brown dirty colour 4(4.00%).

The majority of the respondents, 63(63%) affirmed that there was adequate coordination and harmony among partners in the implementation of the project. This view was contradicted by 15(15%) of the respondents, who maintained that coordination and harmony among the project partners were lacking. Twenty-two (22%) of the respondents could not tell as to whether there was adequate coordination and harmony among partners in the implementation of the project.

Furthermore, 64(64%) of the respondents were of the view that the project objectives were met as opposed to the 35(35%) who reported that the objectives were not met.

It is evident from the study findings that there was some level of community engagement, although only 37(37%) of the respondents had been involved in the planning and implementation whereas the majority of the respondents 63 (63%), had not been accorded the opportunity.

The project had its own share of challenges as reported by the surveyed residents of Kwamwena Valley.

LWSC delayed to move to the project site. It found that most of the community in the area already constructed boreholes for drinking water, and even the planning of roads, houses and wall fences was already done. This made it difficult to put the new water system on.

Furthermore, community perceptions of poor service quality from LWSC discouraged many households from connecting to new sections of the piped water network.

Access to water supply was extended, and new household connections were added to the water network by the end of the Compact. Improved quality of service delivery, Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours, whereas it was 24 hours at its completion.

Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%.

6.3 Discussion of findings in relation to the conceptual framework

A combination of factors contributed to the inadequacy of the water supply in Lusaka, including growing water demand from an increasing number of unplanned new developments within the city, as well as water lost through leakages and pipe bursts within the distribution system. Such physical losses of water are particularly problematic. Leakage means there is less water left to meet demand, as well as representing lost revenue for the utility, which incurs the cost of treating all the water but can bill only for the volume that actually reaches consumers. (Zambia Star Report, 2020).

The water supply in peri-urban Lusaka was particularly insufficient compared to the growing population in those areas. Prior to 1954, Lusaka's water supply came from relatively small-diameter borehole³⁶ wells. Over several decades, larger boreholes were installed in various parts of the city to boost water production. However, as demand for water increased (due to both population and economic growth), hydrological studies revealed the limits of the groundwater resource. In response, the city turned to the Kafue River located 30 miles southwest of Lusaka to supplement its water supply. At the start of the compact, water production stood at approximately 225 million liters per day (ML/d), about 40 percent of which came from the Kafue river (surface water) and 60 percent from groundwater. A large fraction

of this water was being lost due to leaks in the system. Demand for water stood at approximately 260 ML/d³⁷. Lusaka was already exploiting the groundwater resource at close to the maximum feasible level, and the groundwater was increasingly polluted or at risk of pollution. Given that LWSC could meet less than half of existing demand, the utility desperately needed increased investment in water supply infrastructure, essential for the city's economic growth, and for the well-being and health of its citizens. The water supply component of the Infrastructure Activity sought to address these issues through key improvements to the supply of water from the source to the end user. Specifically, it included investments in water treatment and in the network of pipes that deliver water from the source to end users. MCC estimates that the system-wide improvements to the water supply will benefit 860,000 people in Lusaka. (Zambia Star Report, 2020).

As mentioned previously, the utility pumps groundwater from wells throughout the city, as well as surface water from the Kafue River about 30 miles to the southwest. The river water is intended to go through a standard treatment process at the Iolanda Water Treatment Plant, the final step of which is chlorination to kill pathogens and prevent waterborne disease. However, several critical components of the water treatment plant were not functional at the beginning of the compact. In contrast, the groundwater from wells throughout the city does not undergo this level of treatment; the groundwater is intended to be chlorinated at the well and then pumped directly into the city's water distribution network. There are just over 125 boreholes in the city that supply water into the network. However, the boreholes do not all have functional or reliably stocked chlorine dispensers. (Zambia Star Report, 2020).

At the source, the Infrastructure Activity invested in a major rehabilitation and upgrade of the Lolanda Water Treatment Plant. These efforts included replacing water intake structures and powerful pumps; restoring the tanks, valves, pipes, and filters where the water is treated; reestablishing effective chlorination; and generally addressing the degraded condition of the plant infrastructure. These efforts aimed to restore Iolanda to its originally designed capacity in terms of both the quantity of water it can treat and the quality of the resulting drinking water. Other source improvements included drilling and equipping several new borehole wells to pump groundwater into the city supply. (Zambia Star Report, 2020).

In 2015, the World Bank Group, projected that by the year 2020, the demand for water sourced from Kafue River Catchment, for domestic consumption to be 258 MCM per annum. A large proportion of this increase in demand will have to be satisfied by Lusaka Water and Sewerage Company. Currently the water utility company abstracts from Kafue River at Lolanda Water

Works about 40MCM per annum. This implies that LWSC will have to increase to seven times the current abstraction (FCFA, 2015). As demand outstrips supply, water utilities may resort to rationing water supply.

From the Iolanda plant, the treated drinking water is then pumped through a pipeline to distribution centers in Lusaka, where it is temporarily stored in large tanks before flowing out to customers through the distribution network. Refurbishing this critical pipeline was an important part of the Infrastructure Activity. By the compact's close, these investments to the Iolanda plant and the pipe refurbishment were over 93 percent completed; the totality of the Iolanda works was more extensive than anticipated due to required structural changes discovered during the refurbishment process. As per the terms of the compact the Government was responsible for completing the remaining work, which was finished in March 2019. (Zambia Star Report, 2020).

The Millennium Challenge Corporation through the Millennium Challenge Account Zambia was responsible for funding the project. \$355 million funding from the government of the United States of America through MCA Zambia, was provided, to the government of the Republic of Zambia, as aid for development funds in the water project. This funding was provided for the Lusaka Water Supply, Sanitation, and Drainage Project to rehabilitate and extend infrastructure and strengthen the institutional capacity of the Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC). (MCC, 2020)

Lusaka Water and Sewerage Company was an implementing entity for water and sanitation services as a technical operation entity, while Lusaka City Council was implementing entity for drainages and burying of open water wells as part of sanitation legal resettlement.

Government

Under the Zambia Compact, the Government had principal responsibility for overseeing and managing the implementation of the Program Project and its Activities, allocating resources and managing procurements. The Government of the Republic of Zambia, met key conditions required to release compact funds, and passed legislation to support the sustainability of compact benefits. The GOZ committed itself to provide funding to complete all compact activities that remained unfinished at the conclusion of the compact. As of February 2020, the GOZ had

achieved 96 percent completion of the infrastructure works that remained at the end of the compact. (www.mcc.gov)

Millennium Challenge Corporation

During the development of the compact, MCC through Millennium Challenge Account Zambia (MCA), supported the Zambian government in building out a long-term strategy for water and sanitation, aimed at ensuring that MCC's investment would fit into a lasting and comprehensive program of improvement. This planning initiative resulted in a water supply investment master plan, Water Supply Investment Master Plan, charting a 25-year, three-phase strategy for more than \$2.7 billion in investments to meet the needs of a Lusaka population projected to reach 4.9 million by 2035. The Water Supply Investment Master Plan mapped out eleven projects in Lusaka at an estimated cost of \$772 million, prioritized across three phases to achieve 100 percent access to safe water by 2035 with 80 percent of households connected to the municipal water supply. (Zambia Star Report, 2020).

Not only did these master plans help the GOZ prioritize where to target the compact's investments, they also added significant value and promoted the sustainability of MCC's infrastructure projects by clearly outlining funding needs to the private sector and donor community.

The infrastructure projects ultimately selected for the compact were expected to expand water and sanitation networks to select peri-urban neighborhoods, rehabilitate core water infrastructure, bolster water supply, and improve service delivery across the utility's entire customer base. They would also improve the technical and financial position of the water utility by aiming to reduce non-revenue water losses from 57 percent to an estimated 34 percent. (Zambia Star Report, 2020).

Community

For purposes of this report, community refers to Non-Governmental Organisations, local people in their capacity as beneficiaries of water services, and the civil society in general. In this regard, the community's role would be to participate through policy dialogue by way of sharing experiences, thereby shaping the direction of decision making processes. Evidence also shows that cooperating partners can help establish intermediaries such as business associations or chambers of commerce that facilitate dialogue between policymakers and the private sector, and encourage multi-stakeholder dialogues that include civil society and unions, and local people.

It is evident from the study findings that there was some level of community engagement, although only 37(37%) of the respondents had been involved in the planning and implementation whereas the majority of the respondents 63 (63%), had not been accorded the opportunity. This finding is in agreement with Kanyanga's (2017) observation that, while information was given to the community about the project, the community did not fully participate. It is important for project implementers to engage the community more and embrace their ideas if there is to be ownership of development projects. Bottom-up approach to communication and participation is necessary for the success of the project.

Resources provided for development of IEC materials and execution of outreach campaigns during implementation were not adequate to prepare household-level water and sanitation connection outreach during compact development. There was lack of emphasis on the importance of implementation actors' sensitization for better coordination and integration of work planning by responsible for outreach and connection activities so that works and outreach may be coordinated through integrated work planning. (Star Report Zambia, 2020).

Funding

The Zambian government contributed \$50 million of its own resources towards the compact. Furthermore, the government committed itself to investing \$28 million to complete all compact activities that remained unfinished at the conclusion of the compact, in addition to \$22 million already provided to address a budget shortfall identified in 2016 related to construction activities. (Zambia Star Report, 2020)

MCC the principle funder disbursed approximately \$332.1 million (93.6 percent) of the compact. It is projected that MCC's support for improvements to Lusaka's water sector is expected to benefit 1.2 million people over 20 years. (Zambia Star Report, 2020)

The Compact also funded technical assistance in general administration, management of assets, and reduction of the quantity of treated water that is produced but is unpaid for (whether due to leaks, water theft, or billing errors) were key issues at LWSC at the start of the compact. (Zambia Star Report, 2020)

Regulation

It is of concern to consider that NWASCO, the regulator of water utilities was not in the compact and its related activities. The partnership might have been benefited by the regulator,

through for instance through support to provide the right incentive structure given their role in ensuring technical and financial performance to LWSC. (Zambia Star Report, 2020)

However, the government through the Ministry of Water Development, Sanitation and Environmental Protection, implements Water Policies, Water supply and sanitation, and water resources management and development. The Ministry has oversight over National Water Supply and Sanitation Council (NWASCO), which in turn is an oversight agency for the regulation of water supply and sanitation for both urban and rural contexts in Zambia. NWASCO regulates the provision of water supply and sanitation (WSS) services by means of its Minimum Service Level (MSL) guidelines for efficiency and sustainability.

MSLs are standards which define the acceptable minimum level of service which providers must achieve over a specified timeframe. As a license condition issued under the WSS Act No. 28 of 1997, all water and sanitation service providers are required to formulate and maintain SLGs and SLAs which NWASCO monitors. (NWASCO, 2016)

Increased water supply

Prior to the Lusaka Water Supply and Sanitation Project, LWSC's was supplying between 210,000 cubic meters (m³) /day to 230,000 m³/day of water. Coverage of water and sanitation services increased from 64 percent for either in 2007 to 87 percent and 71 percent respectively in 2013. Water supply duration increased in the peri-urban areas from 15 hours/day in 2007 to 20 hours in 2013. There was a distinct improvement in important technical and financial efficiency parameters of LWSC by project completion, but these indicators have deteriorated somewhat since then. (World Bank Group, 2016).

In view of the resource constraints, the water project partnership basically facilitated infrastructure development aiding LWSC in its quest to extend the coverage of water services to the people of Kwamwena Valley. LWSC ratified an asset management policy, created an asset management department, trained hundreds of staff, and established a steering committee to ensure all of the company's divisions improve their asset management practices. LWSC also rolled out a new, centralized electronic maintenance management system that tracks all maintenance tasks and promotes staff accountability. (MCC, 2020).

By 2016 several of these indicators were showing a downward trend. Non-revenue water losses increased from 41 percent at closing in 2013 to 47 percent in 2015. The water service coverage dropped from 87 percent in 2013 to 82.9 percent in 2015, and hours of water supply from 20 to 17 over the same period. Staff cost in relation to billing and collection increased from 0.48

percent to 0.63 percent, and operation and maintenance costs coverage by collection dropped from 123 percent to 88 percent over the same two-year period. There are major issues with the power supply for its plants and distribution system due to the country-wide problems with load shedding.

LWSC was facing major issues with the installed pre-paid meters while it has not come-up with a technical solutions that would address this problem. LWSC is slow in repairing the installed pre-paid meters and the water kiosks that have been closed due to low water pressure. Urban customers served by LWSC find that the utility pays little attention to sanitation. Customer complained about blocked flush toilets or sewers that take LWSC a long time to repair. (World Bank Group, 2016).

However, at the end of the Lusaka Water Supply and Sanitation project, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. More water points were constructed. 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project. (MCC, 2020).

The mere availability of infrastructure does not guarantee that people will connect to the network, properly use and maintain facilities, pay their bills, or manage water and human waste safely to prevent contamination and disease. Nor does it guarantee that utilities and service providers will offer services and billing options that meet the needs and income flows of their customer base. Technical solutions for the provision of water, sanitation, and solid waste management services are not sufficient in isolation; social and institutional approaches are essential to ensure that targeted populations actually benefit from infrastructure investments. (Zambia Star Report, 2020).

Increased water access

Before the project, people used to drink water from boreholes and open wells, but now most of the people are accessing safe and clean water from the taps. Further, improved access to water has reduced child labour. Prior to completion of the water project, people used to send children to fetch water from the single borehole which was serving the community's water needs. In such situations, the burden of collecting water in these settings falls disproportionately on women and girls as they are deemed for collecting water (UNESCO, 2019; MCC, 2020)

Nearly 70 percent of the respondents depended on Lusaka Water and Sanitation services

(LWSC) for water services. Some sourced their water from their own boreholes, others had recourse to wells. There were however, some residents who relied on drawing for their domestic needs, water from their neighbors at no cost to themselves. The project provided resources to the LWSC which enabled it to extend the service of water in the area. However, the intended impact was not realized to the fullest extent because the water utility company delayed to commence works on the site. Subsequently, some households resorted to have their own boreholes, thereby reducing the number of new connections to the piped water supply network.

It was also reported that the majority of the respondents had access to water within 20 meters of their households, close to 10 percent were within 20 to 50 meters of their water source. Further, most of respondents utilized unlimited quantities of water per day, implying a stable source of water. The least quantity of water accessed by respondents was reported to be between 100 and 150 liters per day.

Access to water supply was extended, and 16,790 new household connections were added to the water network by the end of the Compact. Improved quality of service delivery. Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours whereas it was 24 hours at its completion. Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. A total of 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project.

Under the project, the piped water network was extended into new residential neighborhoods that are still being developed. Many residents have connected to the water network in these neighborhoods, but roughly equally many have not. (MCC, 2020).

Nearly half, of the respondents expressed the need to improve the water situation in the area. A similar proportion of the remaining respondents were content with the project outcomes and did need improvement to the water situation as community had enough water. Nearly 50 percent of the respondents were daily using unlimited liters of water household purposes. Furthermore, 64 percent of the respondents were of the view that the project objectives were

met. Access to an improved water source does not always guarantee adequate and affordable provision. (Nganyanuka, 2017).

In Kwamwena Valley, access to water supply was extended, and new household connections were added to the water network by the end of the Compact. Improved quality of service delivery, continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours, whereas it was 24 hours at its completion.

The percentage of households with an improved source of drinking water increased over time, from 63% in 1992 to 72% in 2018. Improved sources of drinking water include piped water, public taps, standpipes, tube wells, boreholes, protected dug wells and springs, rainwater, water delivered via a tanker truck or a cart with a small tank, and bottled water (Central Statistical Office (CSO) [Zambia] et al., 2019).

The aforementioned statement is contradicted by maintaining that, as of 2017, about 67 percent of Zambians had access to an improved water source. However, there are disparities between rural and urban. Access to improved water in rural areas is at 51 percent, whereas urban is 89 percent. Zambia is one of the countries that missed the Millennium Development Goals (MDGs) on access to water and sanitation and is on track to miss the more ambitious Sustainable Development Goals (SDGs). Access rates have remained almost stagnant over the past 15 years. Even where there is access, the quality of service is poor, especially in small rural towns and peri urban areas. Households receive an average of 16 hours of water supply per day, 6 percent of water samples in urban areas fail bacteriological tests, and sanitation and sewer collection and treatment remain poor. (World Bank Group, 2020). For instance, the stated objectives of the National Urban Water Supply and Sanitation Program (NUWSSP) access targets for urban water supply were 80 percent by 2015 and 100 percent by 2030. However, access to water supply has remained almost stagnant since 2011. The program is not structured to efficiently deliver on the service outcomes that the government seeks. (World Bank Group, 2020).

This seeming contradiction could be harmonized by bearing in mind that, with Lusaka Province being the fastest growing province in Zambia, the rapid development of upcoming residential areas as well as illegal settlements in the outskirts of the city has outpaced the installation of water supply system by the water utility company. (Lombanya, & Chileshe, 2020). This also helps in understanding why for example, given that The NUWSSP access targets for urban water supply were 80 percent by 2015 and 100 percent by 2030, and the targets for urban

sanitation were 77 percent by 2015 and 90 percent by 2030, access to water supply has remained almost stagnant since 2011. Analysis shows that the program is not structured to efficiently deliver on the service outcomes that the government seeks. (World Bank Group, 2020).

Zambia's Water resources infrastructure is poorly developed and maintained, and that the rate of urbanization exceeds infrastructure developments. There is low access to safe and adequate water supply and sanitation. (Scheumann & Phiri, 2018).

Poor development and maintenance of water infrastructure has a bearing on operation inefficiencies of water utilities. These are technical inefficiencies (that is, physical water losses caused by leaking pipes), commercial inefficiencies (that is, revenue losses caused by meter inaccuracies, illegal use, unmetered consumers, and nonpayers), and organizational inefficiencies (caused by overstaffing, costly, and outdated human resources policies). (World Bank Group, 2020).

It will be noted that during the Water sector improvement project for example, significant delays in project implementation and shortcomings in administrative and operational efficiency. The project took three years to prepare. However, because the investment component was a late addition to the project, technical specifications, cost estimates and preparations for works contracts were not adequately prepared at the time of project effectiveness. Poor project management by LWSC resulted in contract lapses and failure by consultants and contractors to adhere fully to contract provisions, including deployment of staff and equipment specified in the contract. These problems caused implementation delays, several changes orders and addendum to implementation contracts and several standoffs between the consultant and the contractors. Other inefficiencies were related to the high turnover of senior staff assigned to the MLGH project component which affected timely decision making. MLGH also lacked adequate capacity for procurement and contract management. Related delays led to only partial completion of the consultancy for development of a National WSS Policy. (World Bank Group, 2016).

NWASCO collects performance information from each Commercial Utility, publishes annual reports of comparative performance, and approves any proposed tariff increases put forward by CUs. A key focus in recent years is to promote the reduction of nonrevenue water, but this has had little effect in practice, and NWASCO seems to have scope for applying relatively limited incentives through imposing conditions on tariff increases. Tariffs approvals are to specific improvements (for example, make 1,000 new connections), not overall performance.

NWASCO's annual reports' main power is in "naming and shaming" poor performers. (World Bank Group, 2020).

A major issue is that implementation has focused substantially on new water resource development. Rehabilitation and expansion of aging water distribution networks, especially in small towns and periurban areas, has not received the same level of attention. Consequently, most of the increased production is lost in leaky networks, thus undermining the ability to expand coverage. Although the NUWSSP is on target to deliver the planned capital expenditure, the urban water supply coverage has not increased at all since the program was conceived in 2011. (World Bank Group, 2020).

During 2001–17, Zambia's CUs lost an estimated US\$858 million from high levels of NRW and low bill collection efficiency (see appendix A for details). Most of the losses (US\$554 million) occurred during 2011–17 and was equivalent to about 20 percent of the total capital so far invested in the NUWSSP. From a public finance perspective, the inefficiencies have resulted in hidden costs or unintentional implicit subsidies to the CUs that can be considered an illegitimate claim on public resources. Unlike direct subsidies, which are formally allocated and recorded on the utilities' books, hidden costs are accumulated by utilities yet go unrecorded, thereby creating a fiscal burden on the government. There is evidence that CUs are compensating by reducing investment in maintaining their assets. They also delay or forgo essential maintenance and repairs—actions that trigger a downward spiral of significant deterioration in assets, declining service quality and increasing cost for each unit of service provided. (World Bank Group, 2020).

Reducing non-revenue water (NRW) is critical to improving utility function and subsequent service delivery to customers. The indicator *Length of pipes replaced* measures progress on work to reduce the physical water loss component of non-revenue water by replacing pipes in 35 District Metering Areas in Lusaka. This work suffered due to the under-performance and ultimate termination of a works contractor: low completion of the target is attributed to poor execution by the problematic contractor. (Zambia Star Report, 2020).

However, physical water losses are only half the story; commercial losses also contribute to non-revenue water. To reduce commercial non-revenue water, the compact included efforts to make volumetric billing of customers' water usage more accurate, as well as an intensive cleanup and update of the utility's customer database. Fifty-six thousand water meters were purchased but, due to delays from the under-performing works contractor, only 15,458 of them were installed (as measured by the indicator *Number of water meters installed/replaced*).

(Zambia Star Report, 2020). A subset of the meters installed were for new customers receiving piped water for the first time (measured through the indicator *Number of new connections—Water*). The *Metering ratio* indicator measures the number of metered customers in the utility’s billing database divided by the total number of customers. Information received from contractor progress reports at compact closure demonstrates that approximately 16,500 previously un-recorded customers were added to the utility database and properly registered as billable accounts. Although these customers had previously been accessing water services for free, a substantial fraction had unmetered connections (and were not converted to metered connections during the compact). Adding them to the database—a clear business improvement—thus increased the denominator in this indicator and lowered the metering ratio. The effect of the customer database update on the utility’s revenue has yet to be independently verified. The underperforming contractor further affected the *Metering ratio* results, because the low meter installation numbers are reflected in the numerator of the ratio. Additionally, some of the contractor’s efforts went towards replacing existing meters with new ones rather than adding meters to unmetered connections. Together, these factors explain why the metering ratio decreased from the baseline rather than increasing towards the target. (Zambia Star Report, 2020).

The above-mentioned measures of compact investments in physical and commercial non-revenue water reduction do not paint an optimistic picture of the utility’s overall NRW reduction during the compact. LWSC reported 52 percent achievement for the *Non-revenue water* indicator: over the course of the compact, NRW fell only about half as much as expected. Although data quality remains an issue for this indicator, LWSC did use the same approach for calculating NRW both at baseline and at compact-end, thus avoiding methodological inconsistencies. The observed improvement in NRW may be attributed to the technical assistance provided to LWSC in updating the customer database (reduction of commercial losses). The target was not met because the physical NRW reduction was not completed due to termination of a poorly performing contractor. (Zambia Star Report, 2020).

When this happens, losses increase substantially, and more investment is required to carry out repairs. This vicious cycle, which begins with hidden costs and proceeds to asset deterioration, means that when the government finally absorbs the costs, it does so only by adding to the national debt or reducing funding for other programs. (World Bank Group, 2020). For urban water supply, the GRZ should have a deliberate strategy to use public finance to incentivize efficiency improvements in CUs by linking financing to verifiable improvement in operational

efficiency. This would improve financial performance and enable CUs to contribute to capital investments through increased cash flows. Data from the National Water Supply and Sanitation Council (NWASCO) show that average tariffs for CUs in Zambia are well above average operations and maintenance (O&M) costs and can cover some financial costs. However, high levels of losses and operational inefficiencies are preventing CUs from accessing private capital. The solutions to the efficiency challenge are known and can be prioritized based on payback period or financial parameters. Therefore, any future capital injection by the GRZ in the NUWSSP must consider interventions to improve the efficiency of CUs, which would make them more creditworthy and thus increase their chances of mobilizing private capital. In short, this analysis provides overwhelming evidence to support a shift in the focus of the NUWSSP toward efficiency improvement. (World Bank Group, 2020).

6.4 Coordination of project partners

There was coordination among partners in the implementation of the project. However, as the findings indicated, on an institutional level, some partners had multi projects with different priorities which brought in lack of coordination as an operational challenge and there was also coordination as a problem for the project because of different interests and priorities of some partners though all worked well.

For instance, water, sewer, and drainage work is disruptive; it involves digging up streets and laying pipes. Coordination between roads, water, sewer, and electric authorities helps infrastructure work to progress efficiently, but Lusaka's independent authorities had little experience working in concert. Many of the construction sites were in crowded markets or in dense, growing, informal residential neighborhoods. Beyond the technical challenges of maneuvering heavy equipment in confined spaces, conditions like these demand extra focus on community engagement, safety and access, with special attention to managing heavy vehicle and pedestrian traffic. Although some of the water and sewer work took place within established utility rights of way, the project required acquiring land and other assets, causing involuntary resettlement. (Zambia Star Report, 2020).

6.5 Roles of project partnership

To mitigate risks associated with the affordability of services for the population, as well as the challenges of operations and maintenance of water, sanitation and drainage infrastructure, the

compact invested in improving the institutional capacity of LWSC. The Institutional Strengthening Activity funded technical assistance to improve asset management, strategic planning, environmental management and maintenance. It supported both LWSC in developing policies and structures to provide appropriate, affordable, and sustainable services to poor and underserved populations. It also sought to help LWSC promote behavior change to encourage connections, service uptake, and custodianship of the infrastructure throughout the city (prevention of vandalism, water theft, illegal dumping, etc.). The Institutional Strengthening Activity included support for the design and implementation of IEC and sanitation marketing campaigns and provided capacity building for LWSC to continue messaging to residents who benefit from (and pay for) their services. Finally, the Institutional Strengthening Activity included a \$6 million grant program to support innovation in water, sanitation. (Zambia Star Report, 2020).

Lusaka Water and Sewerage Company dug trenches for pipe lines, connected meters, main water pipes and water to houses, rehabilitated the surface water treatment plant in Kafue and also provided necessary information to Millennium Account Zambia on Lusaka waters and requirement. Installing water meters for both residential and bulk (large-volume) water customers was another key aspect of efforts to help the utility reduce non-revenue water, in this case by making it possible to bill customers for their actual usage. Overall, non-revenue water reduction is also important for affordability, because losses (whether through leaks or unbilled water usage) ultimately translate to a higher cost of water per liter delivered to the consumer. (Zambia Star Report, 2020).

The Water utility also monitored the contractor's work to ensure that things were up to the required standards. Further, LWSCC is accountable and responsible for all the repairs and maintenance works as the implementing water entity to which all the project infrastructure was handed over to by the donor.

The residents, the water service beneficiaries, had a part to play, though somewhat limited in scope. These were to connect to the new water system that was connected in the area, report on water related matters to the water service company, and to provide the contractor access to their premises during the construction phase of the project. Kwamwena residents were engaged through the social media platform, WhatsApp was utilized to inform groups, and residents on project expectations and what they were supposed to do once the project was completed, and how they supposed to manage water meters. This finding agrees with that of Ott (2014), who reported that the community's primary contribution in the project was to do cleaning tasks.

Water development and management should be based on a participatory approach, involving users, planners, policy-makers at all levels and that women play a central part in the provision, management and safeguarding of water. This calls for a sharing and balance between stakeholders (both top down and bottom up) in their planning and management. It has also been recognized that service provision functions should be delegated to the “lowest appropriate level” at which stakeholders involved in management need to be identified, resourced and mobilized. (Water Partnership Program, 2008)

The compact should have included all relevant regulators. Water is a subject in which everyone is a stakeholder. Participation requires that stakeholders at all levels of the social structure have an impact on decisions at different levels of water management (www.gwp.org). The water regulator in Zambia, was not part of the compact. It should have been included as an implementing entity to help provide the right incentive structure given their role in ensuring technical and financial performance to LWSC. (MCC, 2020)

6.6 Challenges that partners face in water provision in Kwamwena valley

A number of challenges related to water supply were reported by the respondents and they are presented below:

The largest proportion of the respondents were not paying for water services possibly because they had boreholes at their premises or that they drew water from their neighbours at no cost. The most quoted monthly water bills by the respondents were between K100 to K 700. It was noted that LWSC had 80 percent of water meters billing but the water service users were not making payments for their accrued bills. The levels of basic service that low-income residents have access to are often far from satisfactory, and available at a much higher cost than for residents from other areas of the same city. (UN, 2019)

One of the challenges faced by water utilities in providing water to the communities is operational inefficiencies. The sources of commercial utility (CU) inefficiencies are well known. These are technical inefficiencies (that is, physical water losses caused by leaking pipes), commercial inefficiencies (that is, revenue losses caused by meter inaccuracies, illegal use, unmetered consumers, and nonpayers), and organizational inefficiencies (caused by overstaffing, costly, and outdated human resources policies). (World Bank Group, 2020).

Moreover, Zambia’s chronically inefficient water utilities are creating a fiscal burden and making it harder for the government to finance the sector. During 2001–17, Zambia’s CUs lost

an estimated US\$858 million from high levels of NRW and low bill collection efficiency (see appendix A for details). Most of the losses (US\$554 million) occurred during 2011–17 and was equivalent to about 20 percent of the total capital so far invested in the NUWSSP. There is evidence that CUs are compensating by reducing investment in maintaining their assets. They also delay or forgo essential maintenance and repairs—actions that trigger a downward spiral of significant deterioration in assets, declining service quality and increasing cost for each unit of service provided. (World Bank Group, 2020).

This concern is not unique to Kwamwena, as a study by Cheruiyot (2016) in Nyangores Sub-catchment, Kenya reported increasing incidence of non-payment of water bills per month. This can be explained in part by considering that LWSC installed water meters and lines to customers on undeveloped premises and houses who had no capacity to connect water because of the constraints of the conditions attached to the project. As (Carney (2014) in Byiers et al (2016)) pointed out, development agents have a duty to promote social justice through efforts towards poverty reduction and the prioritisation of need of the poor over the need of the rich. MCC's project design and due diligence process would have benefited from an *incidence analysis study* linking water and sanitation sector expenditures with associated physical outputs and levels of service and access enjoyed by different classes of consumers. Such work could highlight inequalities across the population and serve to inform strategies for selecting potential beneficiaries. This analysis could inform estimates of likely levels of subsidy needed to defray the costs of initial connections to the water and sewerage networks. An extension of such work, moreover, could include an examination of institutional capacity and operational effectiveness to increase MCC's understanding of planning, budgeting, and spending (for both capital investments and O&M expenditures) and the association of these factors with key sectoral performance metrics. (Star Report Zambia, 2020).

It is unsurprising that donors wanted the work of connecting households to be concluded within the project timeline without much regard to the social economic dynamics of the Kwamwena community. Besides this, some users found the costs of water supply prohibitively high. CRIDF (2016), highlighted concerns regarding ability to pay for higher costs especially if tariffs factor capital redemption costs. An important consideration to bear in mind that charging for water is applying an economic instrument to affect behaviour towards conservation and efficient water usage, to provide incentives for demand management, ensure cost recovery, and to signal consumers' willingness to pay for additional investments in water services. (www.gwp.org)

The findings also brought out problems which concerned the residents with regard to the water they were accessing. There was the problem of erratic water supply which the LWSC key informants maintained was due to power outages. Furthermore, as the MCA key informant observed, vandalism of water installations could be another cause. Complaints over the smell and pollution of water were pointed out. The other concern had to do with dirty coloured water, which led some residents start buying for purposes of drinking, bottled water from store. Water pollution problems should be addressed as a priority to improve lifestyles and minimize sanitation related health problems. (CRIDF, 2016)

The utility company indicated that measures had been instituted to remedy this, by such means as the purchase of a laboratory service machinery for the purpose measuring water quality from water samples to promote compliance of water quality.

The water utility company was reported to delay in responding to water queries. Inadequate response from LWSC in repairing these problems is of concern. (World Bank Group, 2016).

The need for LWSC to set up a satellite office in the area was suggested, as a way to foster operational logistics with the view to improve service delivery.

Furthermore, many house owners in the area were not connected to LWSC water system despite installation of pipes and meters in their premises. This is because by the time the project was initiated, most of the community in the area had already constructed boreholes for drinking water.

It was further reported that some residents' financial challenges were such that they could not afford to connect to water supply network even though it was later subsidized. Subsidies will continue playing a key role, so they should be well designed, transparent and targeted. Subsidies are a subset of funding flows between governments, utilities and customers. National governments provide fiscal transfers (in the form of budgetary allocations) to subnational government entities (e.g. states, counties, parastatal organizations) that play either a direct or an indirect role in water and sanitation service delivery (Fonseca and Pories, 2017).

The partnership of co-operating partners in the water provision project has not yielded the much-desired benefits because of intermittent water supply, they sometimes went without water for days. Delays and disruptions related to construction of the water and sewer extensions

in peri-urban neighborhoods frustrated many residents. Perceptions of poor service quality from LWSC discouraged many households from connecting to new sections of the piped water network (MCC, 2020). In a related study conducted in George, Chawama compounds, Vonk (2021), also noted that the residents experienced erratic water supply in the community. Power outages resulted in erratic water supply in most houses leading to rationing of water to the community. There was vandalism of assets in the area and theft of public infrastructure.

Some members of the community still depend on water from their own boreholes, which are at risk of contamination from fecal matter especially during the rainy season as septic tanks get flooded. Water supply was also erratic due to pipe leakages, vandalism of water equipment and power outages (LWSC, 2018). This is in part because LWSC moved in late to commence the implementation of the project in the community. Most of the community members in the area had already constructed boreholes for drinking water. This made it difficult to set up the new water system and convince people to migrate from using available water from their bore holes to LWSC piped water. The matter was not helped by encroachment issues on some project designated site, people were already settled in the area.

Challenges faced by MCC in partnership

MCC actively addresses dimensions of sustainability throughout its body of project documentation, but lacks a central document dedicated exclusively to treatment of sustainability. Standardizing the creation of these plans would encourage the MCAs to engage with stakeholder agencies and focus attention on risks to sustainability early in the project life cycle. The unique restrictions on disbursing funds after the conclusion of a compact, however, leave MCC largely powerless to address post-compact decay and other threats to sustainability. There is need to safeguard critical funding to complement at times unreliable host country resources necessary to sustain project benefits. MCC addresses donor coordination broadly in compact agreements, but lacks more formalized coordination with other development actors, and the adoption of joint frameworks to streamline partnerships. (Nayha et al, 2017)

Inadequately conducted due diligence on selected program activities before funding decisions were made has been problematic. For example, the Tanzania Water Supply Project faced significant delays in both Dar es Salaam and Morogoro, with the completion of works in each city delayed for more than one year past the original estimated completion dates. Designs that were originally thought to be “shovel-ready”, turned out to be only preliminary designs or concepts that required considerable additional time for preparation of detailed designs and, in

some cases, redesign.

There have been challenges inherent in coordinating multiple stakeholders from different countries (funders, implementers, contractors) each without a comprehensive working knowledge of the others' systems, processes, and approaches. (Olga Rostapshova, Danae Roumis, Jeff Alwang, Charles Pendley, 2015).

MCC's project design and due diligence process would have benefited from an *incidence analysis study* linking water and sanitation sector expenditures with associated physical outputs and levels of service and access enjoyed by different classes of consumers. Such work could highlight inequalities across the population and serve to inform strategies for selecting potential beneficiaries. This analysis could inform estimates of likely levels of subsidy needed to defray the costs of initial connections to the water and sewerage networks. An extension of such work, moreover, could include an examination of institutional capacity and operational effectiveness to increase MCC's understanding of planning, budgeting, and spending (for both capital investments and O&M expenditures) and the association of these factors with key sectoral performance metrics. (Zambia Star Report, 2020).

Furthermore, the unique restrictions on disbursing funds after the conclusion of a compact, however, leave MCC largely powerless to address post-compact decay and other threats to sustainability. To fill this gap, we suggest MCC leverage host-country contributions to establish a "*post-compact sustainability fund*" through a two-stage commitment process. In the first stage, the host country would make regular contributions to the fund during the life of the compact. The second stage involves ensuring that the accumulated funds are spent on the sustainability of MCC projects post-compact through administration by USG agencies, other donors, or the host country itself. Although these options involve legal and practical challenges unique to the context of each partner country, the proposal would safeguard critical funding to complement at times unreliable host country resources necessary to sustain project benefits.

Nayha et al (2017), observed that, MCC's inclination to support work that will advance private sector development and involvement in the power sector leads to a heavy focus on financial management and sustainability. However, operational management should not be neglected—utilities need to expand their network, invest in maintenance, improve operational processes, tools, and procedures, etc. And these areas may be more difficult to achieve and sustain impact in compared with financial issues due to their decentralized nature and because of the need for

change management. Financial health may be closely tied up with operational performance, and sufficient focus is needed for both. Pacing, again, is important. If the utility starts improving revenues (e.g., through tariff reform, loss reduction) but cannot spend the money effectively because of operational problems with procurement processes, a new negative cycle may begin. Moreover, if excess cash builds up on the balance sheet, regulators may feel less inclined to provide tariff increases that may be needed to achieve cost-reflectivity. (www.mcc.gov)

The Jordanian Compact reinforced sustainability through multiple improvements to the water utility and its staff, policy changes, personnel training, equipment modernization and infrastructure improvements. These efforts were expected to enhance the operating structure and efficiency of the utility making it more cost effective and sustainable. If MCC pursues a similar arrangement in the future, it should anticipate the need to allow flexibility in the compact development timeline. For instance, after awarding the wastewater contracts, it became clear that some of the technical designs were incorrect and needed to be revised. As there was no time to re-tender for new designs. (www.mcc.gov)

Challenges faced by the community

Some of the members of society face financial constraints, making it difficult for them to access safe water services. Improving LWSC's abilities to provide better and targeted services to the poor and to promote behavior change is central to ensuring that customers connect to the network and stay connected. Widespread inability or unwillingness to pay for improved services threatens the connection rates required to realize health, time, and income benefits or to ensure proper functioning of the infrastructure. A technical assistance package for social inclusion and gender mainstreaming and for IEC capacity in LWSC supported the utility to develop the structures, policies, capacities, and procedures needed to provide appropriate, affordable and sustainable services that are aligned with the income flows of the poor and underserved populations present in the peri-urban areas. This package included support for LWSC to develop a Social and Gender Policy and a revised Peri-Urban Policy setting out utility priorities for extending and maintaining services in peri-urban areas. It supported the establishment of new customer engagement approaches for frontline staff, the development of Customer Engagement Guidelines, and a revised Credit Control and Debt Management Policy clarifying the utility's pro-poor approaches to bill payment and debtor management. The work also supported

LWSC to develop flexible payment mechanisms, extending payment plans for debtors and allowing billing systems to receive micro-payments electronically (e.g., mobile money), an approach well-suited for households that rely on daily wage payments. (Zambia Star Report, 2020).

Lack of, or poor engagement of communities by project implementers. As Kanyanga (2017) observed, while information was given to the community about the project, the community did not fully participate. It is important for project implementers to engage the community more and embrace their ideas if there is to be ownership of development projects. Bottom-up approach to communication and participation is necessary for the success of the project.

Resources provided for development of Information, Education and Communication materials and execution of outreach campaigns during implementation were not adequate. preparing household-level water and sanitation connection outreach during compact development. There has been a lack of emphasis on the importance of implementation actors' sensitization for better coordination and integration of work planning by responsible for outreach and connection activities so that works and outreach may be coordinated through integrated work planning.

Recognition of the difficulties of writing actionable plans capable of responding to an evolving political and economic context, a more structured approach to sustainability planning would offer a forward-looking analysis of sustainability challenges and goals, identified through a survey of relevant actors, institutions, and resources is yet to be manifestation. Nayha et al (2017)

In unplanned and rapidly changing urban environments, it is difficult to identify the people who will be affected by the project until detailed designs are complete and the project impact area has been physically identified and marked. At the beginning of the Zambia Compact, the resettlement budget was roughly \$6.7 million, and it was estimated that there would be 1,600 project-affected people. By the end of the compact, the budget increased to \$26.3 million with 5,167 project-affected people. The difference was due to changes in construction design, rapid growth in Lusaka, and a two-year lag between the original resettlement plans and construction implementation, illustrating how work in a dense, dynamic urban environment requires a more nimble and adaptive approach to estimating costs and planning budgets. (Zambia Star Report, 2020).

As Kanyanga (2017) observed, while information was given to the community about the project, the community did not fully participate. It is important for project implementers to engage the community more and embrace their ideas if there is to be ownership of development projects. Bottom-up approach to communication and participation is necessary for the success of the project.

Another challenge which was reported is that respondents of Kwamwena were subjected to considerable quantities of dust during construction works. They encountered difficulties in terms of mobility due to blocked roads and trenches. Some structures were pulled down and led to damaging drainages. The community experienced water flooding as a result of open trenches. In some areas, disorderly demobilization by the bankrupt contractor left mounds of dirt, contributing to continued flooding.

The findings also revealed that LWSC delayed to move onto the project site. This led time pressure for project implementation as the donor did not accommodate time extensions, and work had to be done in 5 years. Further, any delays would have meant loss of an opportunity for money by LWSC. This made LWSC to put up water meters and lines to customers on undeveloped premises and houses who had no capacity to connect water.

Delays and disruptions related to construction of the water and sewer extensions in peri-urban neighborhoods frustrated many residents. Perceptions of poor service quality from LWSC discouraged many households from connecting to new sections of the piped water network. (MCC, 2020)

Challenges faced by Lusaka Water and Sewerage Company

Water supply was also erratic due to pipe leakages, vandalism of water equipment and power outages. Lusaka Water Sewerage Company has been experiencing challenges in water production and distribution in the wake of the power deficit in the country. This has seen the level of water production for Lusaka city reduced from an average of 258,000 cubic metres per day in 2014, to a little over 190,000 cubic metres per day in 2016, representing over 25 per cent reduction in water production, mainly on account of power load shedding on the 125 ground water sources spread around the city. To fully meet the demand for Lusaka, the company needed to produce an estimated average of about 410,000 cubic metres per day (LWSC, 2018).

The compact did not include all relevant regulators. The National Water and Sanitation Council, the water regulator was not part of the compact. It should have been included as an

implementing entity to help provide the right incentive structure given their role in ensuring technical and financial performance to LWSC.

Additionally, When the compact was signed, LWSC had recently completed a financial turnaround, resulting in a financial surplus in 2009. Long-standing support from the World Bank for institutional reform had brought commercialization of services with significant improvements in service delivery. The utility held little debt, and it had undertaken operational measures to improve cash flow. However, its water and sewer assets were in a dire state, requiring large-scale rehabilitation and expansion to meet the needs of Lusaka's growing population. To support MCC investments in improving the infrastructure, the compact funded tools and trainings for LWSC staff to reduce maintenance costs and extend the useful working life of the water and sewer systems. (Zambia Star Report, 2020).

Only after the compact started did it become clear that the apparent financial turnaround was more a matter of accounting than of structural change. LWSC's definition for operating cost coverage had reflected a substantial underestimation of the true maintenance costs, and the utility operated in the red for much of the compact's five-year timeline. The wide gap between true full-cost recovery and actual costs suggested a large degree of deferred maintenance. This financial situation was likely exacerbated by external factors—like drought and power reliability—that affected the amount of water LWSC could sell. The overall effect limited the efficacy of the technical assistance provided through the compact. (Zambia Star Report, 2020).

This called for designing a better balance between investments in technical solutions on the one hand and social policies and behavior change on the other, as the latter are critical to the risk management and sustainability of the former. To ensure connections, service uptake, and behavior change, implementing entities such as LWSC and LCC need to (a) develop structures, policies, and procedures that will enhance their ability to provide appropriate, affordable, and sustainable services for the poor; (b) identify information, education, and communications (IEC) needs for water and sanitation, and solid waste management and drainage, respectively, and (c) develop and manage IEC systems that promote behavior change. While substantial work on these policies and programs was undertaken, and initial monitoring and evaluation reports indicate their successful adoption by the implementing entities, this work was under-resourced relative to the scale of response required by LWSC and LCC to meet the service

needs of the targeted communities and to ensure sustainability of infrastructure. (Zambia Star Report, 2020).

Unstable macro-economic factors such as exchange rate, inflation and interest rates affecting mainly the cost of inputs. Generally poor state of infrastructure coupled with poor asset and project management. Encroachment on water supply and sanitation facilities. (NWASCO, 2019).

Another challenge was that Lusaka Water and Sewerage Company delayed to move to the project site, and found that most of the community in the area already constructed boreholes for drinking water. Furthermore, even the planning of roads, houses and wall fences was already done. This made it difficult to put the new water system on. This helps to put into perspective, the high proportion of residents not connected to the utility's water pipe network. Some members of the community still depend on water from their own boreholes, which gets more contaminated with fecal matters especially during the rainy season as septic tanks get flooded. More so, because Lusaka's climate and geology amplifies these water supply and sanitation challenges. The aquifer beneath the city is as little as two meters below the land surface, making shallow wells an accessible water source. But this same accessibility renders the aquifer extremely vulnerable to contamination. In addition, the ground underneath the city is highly permeable due to the rocky limestone/marble bedrock with numerous fissures, sinkholes, and underground flow paths (a geology known as "karst"). This means that ubiquitous, unlined pit latrines, leaking sewers, and even drainage ditches impact the city's groundwater with fecal contaminants and nitrates from human waste. (Zambia Star Report, 2020).

6.7 Project Benefits

LWSC ratified an asset management policy, created an asset management department, trained hundreds of staff, and established a steering committee to ensure all of the company's divisions improve their asset management practices.

LWSC also rolled out a new, centralized electronic maintenance management system that tracks all maintenance tasks and promotes staff accountability. Six months after compact close, the system was fully operational for reactive maintenance tasks all across Lusaka province. The company's new focus on preventive and reactive maintenance activities should contribute to more effective financial planning, ultimately bolstering LWSC's financial stability, but it is too soon to judge the impact of these initiatives.

LWSC installed more than 8,000 new postpaid meters. Based on temporal changes in the bills of customers who received new meters, the activity increased bills by around \$4.30 per customer per month, which translates to \$29,777 in revenue (about 2 percent of monthly LWSC revenue). LWSC could have increased billing even more by prioritizing previously unmetered customers.

The project also conducted a census of all structures in Lusaka to enable LWSC to update more than 165,000 records in their database, though the vast majority had no effect on billing. The activity led to a net increase in billing of \$4.60 per updated customer account per month, or \$15,923 in revenue (about 1 percent of monthly LWSC revenue). (MCC, 2020)

Improved water service coverage

Before the project, people used to drink water from boreholes and open wells, but now most of the people were accessing safe and clean water from the taps. Further improved access to water has reduced child labour. Prior to completion of the water project, people used to send children to fetch water from the single borehole which was serving our water needs. The project also provided resources to the LWSC which enabled it to extend the service of water in the area.

Under the project, the piped water network was extended into new residential neighborhoods that are still being developed. Many residents have connected to the water network in these neighborhoods, but roughly equally many have not. (MCC, 2020)

Access to water supply was extended, and 16,790 new household connections were added to the water network by the end of the Compact. Improved quality of service delivery, Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours whereas it was 24 hours at its completion.

Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project.

Improved water service coverage: Access to water supply was extended, and 16,790 new

household connections were added to the water network by the end of the Compact. Improved quality of service delivery. Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours whereas it was 24 hours at its completion. Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. A total of 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project.

Nayha et al (2017) maintained that, “the most important element of sustainability is that the project continues to produce the increases in welfare for program beneficiaries that motivated it in the first place. While these benefits are directly reflected in the outputs of the program, they should also take into account the changes in the operating costs of the program (through ongoing cost-benefit analysis), as well as the full environmental and social impact the program may have in terms of its implications for natural resources and local populations.”

Although the percentage of households with an improved source of drinking water increased over time, from 63% in 1992 to 72% in 2018. Improved sources of drinking water include piped water, public taps, standpipes, tube wells, boreholes, protected dug wells and springs, rainwater, water delivered via a tanker truck or a cart with a small tank, and bottled water (Central Statistical Office (CSO) [Zambia] et al., 2019), the concern of sustainability still remains.

In MCC’s early days, ERR calculations for infrastructure investments assumed optimal maintenance of MCC-financed assets. MCC has found, however, that suboptimal maintenance is often the root cause of problems which its investments in new or rehabilitated infrastructure aim to solve. This realization has led, in turn, to more conservative expectations and assumptions concerning future maintenance spending by partner countries in MCC’s economic analysis. In Zambia, for instance, the original ERR calculations made somewhat optimistic assumptions regarding the maintenance of assets installed by MCC and the corresponding trajectory of benefits over time. In the closeout ERR, in contrast, the magnitude of the ERR

varies depending on assumptions about the adequacy of maintenance to sustain benefits over time. (Zambia Star Report, 2020).

The surest way to promote the sustainability of MCC-funded projects is for partner countries to engage in careful, systematic analysis of the risks to a project's sustainability early in project development and develop a risk mitigation strategy on the basis of that analysis. MCC and the MCA currently describe some dimensions of sustainability across a variety of project documents, but there is no consistent format that constructs an organized, cohesive approach to sustainability throughout the project life cycle. Recognizing the difficulties of writing actionable plans that are relevant in the context of a changing political and economic environment, MCC should require each MCA to create and own a consistent Sustainability Action Plan ("Plan") that details the constituent elements of project sustainability both during and after the compact period, including the key actors, activities, and resources involved. The completion of the Plan should be a CP for the disbursement of funding. Nayha et al (2017),

6.8 Conclusion

This dissertation assessed the impact in terms of access to water services by households in view of Lusaka Water and Sewerage Company and Millennium Challenge Account partnership in the water provision in Kwamwena Valley.

The majority of respondents were female, of whom the largest proportion were above 42 years of age. More than half of the respondents were married and those who were either widowed or not separated were in the minority. The respondents who had attained tertiary level education were predominant. Lusaka Water and Sanitation services (LWSC) supplies piped water to the Kwamwena community, although there are residents who depend on privately owned boreholes, and still others whose source of water are open wells.

Nearly the ninetieth percentile of the respondents, had access to water sources within 20 meters to the residences. The reported lowest quantity of water consumed daily was between 10 – 20 liters of water, whereas the largest volumes consumed were stated to be unlimited liters.

The most common monthly water bills paid by the respondents, were reported to be between K100-K200, and between K300-K500.

The study further revealed that while project partners coordinated, there were setbacks, and shortcomings such as inadequate allocation of resources for Information, Education, and

Communication targeted at the community. There was also the challenge of the water utility's delayed deployment to the project site, leading to project implementation timeline pressure.

A combination of factors contributed to the inadequacy of the water supply in Lusaka, including growing water demand from an increasing number of unplanned new developments within the city, as well as water lost through leakages and pipe bursts within the distribution system. Such physical losses of water are particularly problematic. Leakage means there is less water left to meet demand, as well as representing lost revenue for the utility, which incurs the cost of treating all the water but can bill only for the volume that actually reaches consumers.

Water supply was also erratic due to pipe leakages, vandalism of water equipment and power outages. Lusaka Water Sewerage Company has been experiencing challenges in water production and distribution in the wake of the power deficit in the country. This has seen the level of water production for Lusaka city reduced from an average of 258,000 cubic metres per day in 2014, to a little over 190,000 cubic metres per day in 2016, representing over 25 per cent reduction in water production, mainly on account of power load shedding on the 125 ground water sources spread around the city. To fully meet the demand for Lusaka, the company needed to produce an estimated average of about 410,000 cubic metres per day.

The project scored success, in that access to water supply was extended, and new household connections were added to the water network by the end of the Compact. Improved quality of service delivery, Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours, whereas it was 24 hours at its completion. Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. However, these positive outcomes have to be considered in its proper context given the impact of rapid population growth, which is likely to lead to demand outstripping supply.

One other positive development is that Millennium Challenge Corporation contributed towards building capacity of Lusaka Water and Sewerage Company. This included for designing a better balance between investments in technical solutions on the one hand and social policies and behavior change on the other, as the latter are critical to the risk management and sustainability of the former. To ensure connections, service uptake, and behavior change, implementing entities such as LWSC and LCC need to (a) develop structures, policies, and procedures that will enhance their ability to provide appropriate, affordable, and sustainable services for the

poor; (b) identify information, education, and communications (IEC) needs for water and sanitation, and solid waste management and drainage, respectively, and (c) develop and manage IEC systems that promote behavior change. While substantial work on these policies and programs was undertaken, and initial monitoring and evaluation reports indicate their successful adoption by the implementing entities, this work was under-resourced relative to the scale of response required by LWSC and LCC to meet the service needs of the targeted communities and to ensure sustainability of infrastructure.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This chapter presents the conclusion and the recommendations of the dissertation. In order to achieve its purpose, the chapter begins with a presentation of the conclusion and then recommendations are given therein.

7.2 Conclusion

It is evident that the partnership of the Lusaka Water and Sewerage Company and the Millennium Challenge Account played an important role in the water provision project in Kwamwena Valley in Chongwe District. These cooperating partners can generally help to supplement government effort to achieve its goal for making water available and accessible to the population.

This dissertation assessed the impact of the partnership in the water provision in Kwamwena Valley in Chongwe District: The case of Lusaka Water and Sewerage Company and Millennium Challenge Account.

The study used both quantitative and qualitative approaches. Questionnaires and interviews were used to collect data. The research had a population sample of one hundred and fifty respondents. Survey questionnaires were administered to one hundred respondents, nine participated in the Focus Group Discussion, while two were each interviewed as Key Informants.

The Government of Republic of Zambia partnered with Millennium Challenge Corporation in the Lusaka Water Supply, Sanitation, and Drainage Project to rehabilitate and extend infrastructure and strengthen the institutional capacity of the Lusaka Water and Sewerage Company (LWSC) and Lusaka City Council (LCC). Direct beneficiaries of the project included Kwamwena Valley, which for example, received investment in water infrastructure. This aim behind this investment was to improve water service delivery, prevent flooding, generate time-savings for households, and reduce water-related diseases.

The Government had principal responsibility for overseeing and managing the implementation of the Program Project and its Activities, allocating resources and managing

procurements. The Government of the Republic of Zambia, met key conditions required to release compact funds, and passed legislation to support the sustainability of compact benefits.

The study findings show that there was improvement in access to clean and safe water as a result of the water supply project. Before the project, residents relied on water that was sourced either from boreholes or open wells. However, the water from either of the two sources was not always fit for human consumption due to contamination. Moreover, even child labour had declined, whereas prior to the water project's completion, they would go on errands to fetch water from the single borehole which was serving our water needs. The project also provided resources to the LWSC which enabled it to extend the service of water in the area, although a lot still needs to be done to extend water service coverage to the residents even further.

The study recommendations are that: LWSC should setup a satellite office in Kwamwena Valley Meanwood to facilitate operation logistics. LWSC to invest in palliative measures to cushion the impact of erratic water supply. There is need for more water provision, as many people still have no safe water. LWSC to facilitate the construction of the sewer line in the area as the whole community depends on septic tanks which over flow in the rainy season.

The majority of respondents were female, of whom the largest proportion were above 42 years of age. More than half of the respondents were married and those who were either widowed or no separated were in the minority. The respondents who had attained tertiary level education were predominant. Lusaka Water and Sanitation services (LWSC) supplies piped water to the Kwamwena community, although there are residents who depend on privately owned boreholes, and still others whose source of water are open wells.

Nearly the ninetieth percentile of the respondents, had access to water sources within 20 meters to the residences. The reported lowest quantity of water consumed daily was between 10 – 20 liters of water, whereas the largest volumes consumed were stated to be unlimited liters.

The most common monthly water bills paid by the respondents, were reported to be between K100- K200, and between K300-K500.

Nearly 70 percent of the respondents depended on Lusaka Water and Sanitation services (LWSC) for water services. Some sourced their water from their own boreholes, others had

recourse to wells. There were however, some residents who relied on drawing for their domestic needs, water from their neighbors at no cost to themselves. The project provided resources to the LWSC which enabled it to extend the service of water in the area. However, the intended impact was not realized to the fullest extent because the water utility company delayed to commence works on the site. Subsequently, some households resorted to have their own boreholes, thereby reducing the number of new connections to the piped water supply network.

Access to water supply was extended, and 16,790 new household connections were added to the water network by the end of the Compact. Improved quality of service delivery. Continuity of service at the commencement of the project, the average hours of service per day for water supply was estimated at 17 hours whereas it was 24 hours at its completion. Further, the volume of water produced increased from an estimated 225,000 to 240,000 total volume of water produced in cubic meters per day for the service area. Non-revenue water was reduced from 48% to 25%. There was significant reduction in the weekly average amount of time spent by households fetching water members to fetch water from 16 hours to 9.5 hours. The water distribution network infrastructure was extended from a total length of 1,372 km to 1,547 km. More water points were constructed. A total of 64 new non-networked, stand-alone water supply systems were constructed (kiosks) by the end of the project.

During the compact. LWSC reported 52 percent achievement for the *Non-revenue water* indicator: over the course of the compact, NRW fell only about half as much as expected.

With regard to coordination among partners in the implementation of the project, study findings indicated, on an institutional level, that some partners had multi projects with different priorities which brought in lack of coordination. Further, NWASCO, the water regulator in Zambia, was not part of the compact. It should have been included as an implementing entity to help provide the right incentive structure given their role in ensuring technical and financial performance to LWSC.

The study further revealed that while project partners coordinated, there were setbacks, and shortcomings such as inadequate allocation of resources for Information, Education, and Communication targeted at the community. There was also the challenge of the water utility's delayed deployment to the project site, leading to project implementation timeline pressure.

Furthermore, many house owners in the area were not connected to LWSC water system despite installation of pipes and meters in their premises. This is because by the time the project was initiated, most of the community in the area had already constructed boreholes for drinking water.

It was further reported that some residents' financial challenges were such that they could not afford to connect to water supply network even though it was later subsidized. In addition, the partnership of co-operating partners in the water provision project has not yielded the much desired benefits because of intermittent water supply, they sometimes went without water for days. Delays and disruptions related to construction of the water and sewer extensions in peri-urban neighborhoods frustrated many residents. Perceptions of poor service quality from LWSC discouraged many households from connecting to new sections of the piped water network.

Another challenge was that Lusaka Water and Sewerage Company delayed to move to the project site, and found that most of the community in the area already constructed boreholes for drinking water. Furthermore, even the planning of roads, houses and wall fences was already done.

LWSC installed more than 8,000 new postpaid meters. Based on temporal changes in the bills of customers who received new meters, the activity increased bills by around \$4.30 per customer per month, which translates to \$29,777 in revenue (about 2 percent of monthly LWSC revenue). LWSC could have increased billing even more by prioritizing previously unmetered customers.

The project also conducted a census of all structures in Lusaka to enable LWSC to update more than 165,000 records in their database, though the vast majority had no effect on billing. The activity led to a net increase in billing of \$4.60 per updated customer account per month, or \$15,923 in revenue (about 1 percent of monthly LWSC revenue).

Before the project, people used to drink water from boreholes and open wells, but now most of the people were accessing safe and clean water from the taps. Further improved access to water has reduced child labour. Prior to completion of the water project, people used to send children to fetch water from the single borehole which was serving our water needs. The project also provided resources to the LWSC which enabled it to extend the service of water in the area.

Under the project, the piped water network was extended into new residential neighborhoods that are still being developed. Many residents have connected to the water network in these neighborhoods, but roughly equally many have not. To promote sustainability, the project should continue to produce the increases in welfare for program beneficiaries that motivated it in the first place.

In MCC's early days, ERR calculations for infrastructure investments assumed optimal maintenance of MCC-financed assets. MCC has found, however, that suboptimal maintenance is often the root cause of problems which its investments in new or rehabilitated infrastructure aim to solve. This realization has led, in turn, to more conservative expectations and assumptions concerning future maintenance spending by partner countries in MCC's economic analysis. In Zambia, for instance, the original ERR calculations made somewhat optimistic assumptions regarding the maintenance of assets installed by MCC and the corresponding trajectory of benefits over time. In the closeout ERR, in contrast, the magnitude of the ERR varies depending on assumptions about the adequacy of maintenance to sustain benefits over time. The surest way to promote the sustainability of MCC-funded projects is for partner countries to engage in careful, systematic analysis of the risks to a project's sustainability early in project development and develop a risk mitigation strategy on the basis of that analysis. MCC and the MCA currently describe some dimensions of sustainability across a variety of project documents, but there is no consistent format that constructs an organized, cohesive approach to sustainability throughout the project life cycle. Recognizing the difficulties of writing actionable plans that are relevant in the context of a changing political and economic environment, MCC should require each MCA to create and own a consistent Sustainability Action Plan ("Plan") that details the constituent elements of project sustainability both during and after the compact period, including the key actors, activities, and resources involved. The completion of the Plan should be a CP for the disbursement of funding.

Overall, the assessment findings show that there was improvement in access to clean and safe water as a result of the water supply project. Before the project, residents relied on water that was sourced either from boreholes or open wells. However, the water from either of the two sources was not always fit for human consumption due to contamination. Moreover, even child labour had declined, whereas prior to the water project's completion, they would go on errands to fetch water from the single borehole which was serving their water needs.

The project also provided resources to the LWSC which enabled it to extend the service of water in the area, which is certainly a welcome development. More still needs to be done to extend water service coverage to the residents even further. A substantial proportion of residents is still exposed to potentially health hazardous water sources because the water rates are too high or because a sewer line has not been setup.

A number of challenges identified include erratic water supply. This was attributed to power outages, vandalism and water pipe leakages. No doubt the inconvenience can be lessened by LWSC improving on time taken to respond to faults related to water supply installation. In this regards a satellite office could be setup within the vicinity of Kwamwena Valley to facilitate operations logistics. Sewer line must be set up to connect the whole Kwamwena Community. The MCC Zambia Compact is projected to have 1,199,962 beneficiaries in Compact Year 20, of whom nearly three-fourths are poor. The average beneficiary benefits by \$169 in present value terms over an estimated 20-year economic life of the compact's Lusaka Water Supply, Sanitation and Drainage Project.

Areas of impact resulting from partnership in water provision

- a. Reduced erratic supply
- b. Improved water quality
- c. Provision of water supply infrastructure
- d. Acquisition of skills in water management
- e. Improved relations between the Zambian Government and governments of countries that provide aid.

7.3 Policy Recommendations

Based on the findings of the present study, the following recommendations are advanced:

- There is need for consented efforts by LWSC to scale up surveillance and maintenance measure to ensure the safety of water supplied to the residents on Kwamwena Valley;
- Currently, in spite of their being adequate water supply in Kwamwena valley, not everyone was connected to water system therefore, there is need for LWSC to carry out community sensitisation on health benefits of connecting to piped water supply network;

- LWSC should also engage the community and encourage behavioural change in the way they interact with water infrastructure, because vandalism issues were rampant in the area. The community should also adopt to the water infrastructure, protect it and also pay for the water services; and
- LWSC should setup a satellite office in Kwamwena valley to facilitate efficient operational logistics.

7.4 Areas for Future Research

Although this research provides valuable insights on the assessment of the impact of Cooperating partners in water provision to residential areas, this study was confined to partnership between Lusaka Water Sewerage Company and the Millennium Challenge Account leaving experiences in other sectors. Therefore, other studies can be conducted to find out the impact of cooperating partners in other sectors like infrastructure development.

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APPENDICES

APPENDIX I

Survey Questionnaire

My name is Peter Bwale, a student at the University of Zambia. I am conducting a research on an assessment of the role of cooperating partners in the provision of water to residential areas: a case of Kwamwena Valley in Chongwe District. This is to enable me to partially fulfil the requirements of the degree of master of Public Administration (MPA).

You have been selected as a respondent and I will be very thankful if you can spare a few minutes of your time to answer a few questions. The information you are going to give will be confidential and is entirely for the purpose of my MPA dissertation. Please be as open and as honest as possible in answering the questions.

Instructions: Tick in the space provided or fill in the blank spaces

PART 1. BACKGROUND INFORMATION

5 Sex of the resident

6 Male ()

7 Female ()

8 Age group

1 11-20 years ()

2 21-30 years ()

3 31 and above ()

9 Marital status

1. Married ()

2. Not married ()

3. Never married ()

4. Widow ()

5. Widower ()

10 Highest level of education

11 Never been to school ()

12 Primary school level ()

13 Junior secondary school ()

14 Senior secondary school ()

15 Tertiary education ()

16 Occupation

(a) Farming ()

(b) Business ()

(c) Labour ()

(d) Not employed ()

17 The period you have lived in Kwamwena

(A) Less than 5 years ()

(B) 6- 10 years ()

(C) More than 10 years ()

PART 2. WATER SUPPLY

Where do you get your water from?

Household tap, water from private well/borehole

Household tap, public water service

Communal tap Distance from the house.....m

Open well Distance from the house..... m

Other, what:

How much water do you use (litres/day) and how much do you pay for it?

Who is responsible for water supply to your home?

Have you or your family members had any of the following diseases during past 12 months:

Cholera How many times

Diarrhoea How many times

Intestinal worms How many times

Other waterborne related diseases How many times

What common problems do you have with drinking water?

.....
.....
.....

Explain how you think different partners worked together to improve water provision in your area.

.....
.....

What were the duties and responsibilities of the different partners in the water improvement in your area?

.....
.....
.....

Do you feel that you are involved enough in the planning of water improvement programmes in your area? Yes No

How have you participated in planning for water improvement in your area?

.....
.....

What were some of the challenges that you faced in water improvement in your area?

.....
.....
.....

Currently, would you need to improve your water situation? Yes No

What else you want to say about water in your area? Free word

.....
.....
.....

End of Interview

Thank you for your time

APENDIX II

PROMPT LIST FOR FGDs

1. The partnership benefits in terms of Kwamwena community with regard accessibility and proximity to clean and safe water.
2. The costs involved in accessing clean and safe water
3. Community participation and involvement in the partners' provision of water
4. Project sustainability-What happens after donor exit?
5. Roles of partners in the provision of water
6. Coordination of activities among partners in making water available
7. Skills transfer/capacity building e.g. Repair and maintenance
8. Challenges the community faced as the water project was being implemented.
9. Suggestions to improve the water provision

APPENDIX III

IN-DEPTH INTERVIEW

1. What are your roles/obligations in this partnership?
2. What are the roles of the other partners in this partnership?
3. What are the objectives of this partnership?
4. What benefits has the partnership brought to you as a partner?
5. Do you think this partnership has delivered to the beneficiaries?
6. What were some of the challenges in this partnership?
7. What role does the community play to participate in the provision of water services by cooperating partners in your area?
8. Who does the repairs and replacement of water and sewer line?
9. Were the communities trained in repair and maintenance of the water facilities installed?
10. As a partner are you satisfied with the way you were worked together with other partners in improvement of water in this area?
11. What was the exit strategy like?
12. What should be done partners to improve water provision in the Community?
13. How do the community sustain the water provision project after phasing out of donor funds?