

**COPING STRATEGIES AND HEALTH IMPLICATIONS OF THE URBAN POOR
IN THE FACE OF LIMITED WATER AND SANITATION SERVICES: THE CASE
OF CALEDONIA IN HARARE ZIMBABWE**

By

Ambrose Samhokore

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Supervisor: Prof Busani Mpofu

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DECLARATION

I declare that *Coping Strategies and Health Implications of the Urban Poor in The Face of Limited Water and Sanitation Services: The Case of Caledonia in Harare Zimbabwe* is my own work and that all the resources that I have used or quoted have been indicated and acknowledged by means of complete references.

Name: Ambrose Samhokore

Student number: 60860847

Date: 28 June 2022

Signature:



ABSTRACT

The 21st century has seen increased urbanisation the world over. In many of these countries, urbanisation has not been followed with adequate service provision. This qualitative study sought to investigate the state, impact and coping means to water, sanitation and hygiene (WASH) services in Caledonia informal settlement found in Harare, Zimbabwe. Data were collected using interviews, document review and group discussions with conveniently and purposively sampled key informants and residents. Analysing data using the Public Service Improvement theory, the enabling approach and thematic approach, the study noted limited access to WASH services due to the absence of a functional governance structure, political interference, absence of water reservoir and financial constraints. Amid these WASH challenges, residents resorted to water harvesting and purchasing, borehole drilling, digging and pit latrines, burning and dumping of waste in undesignated areas. While a relief to residents, the measures have detrimental effect on social and economic welfare of residents. Thus, the study recommends establishment, resourcing and capacitation of a well-coordinated and functional local authority to run the affairs of Caledonia.

KEY TERMS:

Coping mechanisms; Public health; Health implications; Informal settlements; Urban poor; Water and sanitation; Hygiene; Local authority; Service delivery; Waste disposal; Sewer system; Water borne diseases.

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ACRONYMS AND ABBREVIATIONS

DAPP: Development Aid from People to People

FCDO: Foreign, Commonwealth and Development Office

EHT: Environmental health technician

GBV: Gender-Based Violence

MDGs: Millennium Development Goals

MOHCC: Ministry of Health and Child Care

MoLGPWNH: Ministry of Local Government, Public Works and National Housing

NGO: Non-Governmental Organisation

WASH: Water, Sanitation and Hygiene

WHO: World Health Organisation

UN: United Nations

UNGA: United Nations General Assembly

UNESCO: United Nations Educational, Scientific and Cultural Organisation

UNHCR: United Nations High Commission for Refugees

UNICEF: United Nations Children`s Fund

USAID: United States Agency for International Development

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CHAPTER ONE: INTRODUCTION

1.1 Introduction and Background to the Study

Water, sanitation and hygiene (WASH) remains an important and necessary resource for life and wellbeing of humans. According to World Health Organisation (WHO)'s Water, Sanitation and Hygiene Strategy 2018-2025, safe drinking water, sanitation and hygiene are important to people's health and wellbeing and also improves the human development index (WHO, 2018). Safe WASH is not only a cornerstone to health, but contributes to livelihoods, economic activities, dignity and creation of resilient communities. As such, the Sustainable Development Goals (SDGs) target to improve water quality by reducing pollution, eliminating dumping and release of hazardous materials and chemicals, halving the proportion of untreated waste water and substantially increasing recycling and safe use globally by 2030 (Inter-Agency and Expert Group on Sustainable Development Goal Indicators, 2016).

Even with this importance attached to WASH services, some people in developing nations remain without water and sanitation services. The Millennium Development Goals (MDGs) Report (2012) noted that 11% of the global population remain without access to improved and safe WASH services. The implications of lack of WASH services are widespread and Sub – Saharan Africa (SSA) is worst affected by this crisis. In many instances, access to WASH services is largely pronounced in rural, peri-urban areas, and informal settlements. The absence of WASH services in such areas has been with challenges. In the absence of WASH services, children often die from dehydration and malnutrition, results of suffering from diarrheal illnesses that could be prevented by clean water and hygiene.

In SSA, poor urban planning and mismanagement by governments, conflicts and civil wars among others are contributing factors to lack of water and sanitation access for the poor and vulnerable populations (Kubanza and Simatele, 2016). Internally displaced people and refugees normally settle in informal settlements, where there is no infrastructure and these places are breeding grounds for water borne diseases which affects their health and economic potential due to sickness (Adeyeye et al, 2021). In some instances, informal settlements are born out of urban population growth, which comes with increased demand for housing (Shirgaokar, 2018). Some people migrate to look for better opportunities in urban areas but the main challenge is access to land, housing and water sanitation services (Mahabir, Croitoru and Agouris, 2016). In many of these informal settlements, residents lack WASH services. Consequently, this results in the spreading of diseases like diarrhoea and typhoid. Untreated human excreta

contaminate ground and surface waters used for drinking, bathing, gardening and this creates a burden on social, economic and health aspects in these communities.

In Zimbabwe, there is Caledonia informal settlement which is found in the capital city of Harare. The area was developed as a result of the government policy which permitted anyone to develop land. According to Africa Research Institute (2017), in 2004, the government of Zimbabwe enacted a policy which permitted anyone with sufficient capital to develop land. This led to the development of informal settlements on the fringes of rural governments' areas and on the borders of existing urban areas. However, the development of informal settlements in rural areas compelled residents to pay rent to rural councils but receiving no infrastructure in form of roads, piped water systems, better housing and WASH services in return (Africa Research Institute, 2017). This led the birth of Caledonia informal settlements in Caledonia farm to the east of Harare which has a population of more than 100 000 (Munhede, 2021). Although it was enumerated as part of the Goromonzi district in 2012 census, it was transferred to Harare City Council's management in early 2017 by the then president Mugabe in an attempt to speed up its development (Munhede, 2021). As postulated above, due to the government's permission for anyone with capital to develop the Caledonian land, many of those unemployed and low paid people in urban areas utilised this opportunity.

Irrespective of its benefit as an alternative and viable form of housing to the unemployed and lowly paid, Caledonian settlement presents extreme challenges to public health and livelihoods of the residents due to absence of WASH services (Chara, 2021 and Munhede, 2021). This is mainly because the Harare city council is failing to play its role of providing with basic WASH infrastructure to the settlement (Munhede, 2021).

Peri-urban informal settlements such as Caledonia have direct linkages with their nearest urban areas. These linkages are intertwined with economic, social and political activities which have a direct effect on their daily livelihoods. Their water supply and sanitation situation (and general welfare) impacts on the welfare of the nearby urban areas, yet this tends to be neglected.

Nonetheless, there is a dearth of literature which addresses the public health and livelihoods impacts of this informal settlement. Only a few newspapers have tried to address the challenges emanating in the area (Munhede, 2021, and Chara, 2021). As such, there lacks proper research of the existing challenges, coping strategies to the existing challenges and how they can be addressed by the municipal authorities. Therefore, it is this literature gap that exists which this

study was addressing through assessing the barriers in accessing water and sanitation services and public health implications on Caledonia's water supply and sanitation challenges.

1.2 Water and Sanitation Challenges in Harare, Zimbabwe

Access to clean water is a basic right that is important for the survival of humanity yet it can be one of the hardest resources to attain in Zimbabwe's major cities, particularly in informal settlements. The water and sanitation crisis in Zimbabwe's capital-Harare places millions of residents at risk of waterborne diseases (Human Rights Watch Report, 2013). The Human Rights Watch Report (2013) further describes how residents have little access to potable water and sanitation services, and often resorts to drinking water from shallow, unprotected wells that are contaminated with sewage. More so, many people are resorting to defecating in the bush as the only option replacing the normal and dignified toilet (Environmental Africa, 2003). The conditions violate residents' constitutional right to water, sanitation, and health.

Harare's water and sanitation system is dysfunctional and the government is doing little to fix the problem. In many communities there is no water for drinking or bathing, there is sewage in the streets, there are diarrhoea and typhoid outbreaks and the threat of cholera epidemic. According to the Human Rights Watch Report (2013), corruption and mismanagement at the local and national levels of government exacerbate the situation. The city budget guidelines specify that most of the revenue from water must be ploughed back into the system for maintenance and improvement, but even government officials acknowledge that money is diverted for other uses. As a result, key parts of the service delivery system, like purchasing water treatment chemicals, are not adequately funded, leading the city to produce less potable water.

The piped infrastructure for water and sewerage has not been maintained (Ndunguru and Hoko, 2016). The result of deterioration of the system combined with a significant increase in the population is that the water now runs only sporadically and is often contaminated and poses health risk to the residential areas in the high density suburbs of Harare. The government's inability to maintain the water system and its practice of disconnecting those unable to pay for services leaves the poor with no option but to resort to consumption of water from contaminated taps or unprotected wells. The Harare Mayor in 2019 explained that the water rationing will continue despite receiving US\$150 000 for water purification chemicals from the Reserve Bank of Zimbabwe (The Herald, 2019). The Mayor noted that the money was not enough to procure the needed chemicals for water purification. As a result, the Council drafted a water

rationing schedule in an effort to equally distribute clean water to all residents using the limited resources at its disposal. The capital city has been subjected to severe water rationing schedule with some suburbs enduring weeks with no running water. The WASH challenges in Harare are more pronounced in informal settlements such as Caledonia in Harare. Resultantly, informal settlers often resort to unprotected wells and contaminated streams as their sources of water thereby posing a high health risk to communities (Tsiko and Togarepi, 2012).

The informal settlement of Caledonia in Harare has become a typical shanty town, lacking proper sanitation, safe water supply, electricity, hygiene streets and other basic human necessities (Daily News, 2017). The population is ever growing and residents are resorting to using septic tanks which are only 2 metres deep. When these tanks are full, they do not drain them but dig new ones. The practice has become a breeding ground for mosquitoes and flies; hence the outbreaks of cholera and typhoid are inevitable. The situation is made worse by the fact that the Ministry of Health and Child Care is not even providing chemicals such as chlorine so that people can treat their drinking water. In addition to what has been said above, it can be argued that considering the poor economic status of this community, poor planning and mismanagement by the local authorities, political and economic problems being faced by the country in the last decade to date; there is no hope for the people of Caledonia in terms of accessing quality adequate water and sanitation services. This eventually has negative impact on the lifestyle, economic, health and wellbeing of this community and the most affected people are children, women and young girls who do most of the work at household level.

1.3 Problem Statement

Despite the substantial contribution of informal settlements to the provision of housing to the poor, the absence WASH services pose a great challenge to public health and livelihoods. According to Chirisa, Matamanda and Mukarwi (2019), the situation in most informal settlements like Caledonia has the potential to cause negative public health impacts. The ways in which people invade areas and build unplanned houses contributes to the reason why there are water and sanitation challenges. Informal settlements are synonymous with limited WASH services (SHARE, 2014; Nguyen et al 2021; Jones, 2017; StatsSA, 2016 and UN-Habitat, 2020). These challenges exacerbate the occurrence of health hazards to the public. Despite the presence of literature suggesting the massive existence of WASH challenges and the subsequent health challenges, the same is not known for Caledonia informal settlement. The

2000 Fast Track Land Reform Programme in Zimbabwe led to the migration of people into white owned farms and plots. The majority of these people were the poor who just erected unplanned structures especially in peri-urban areas (Chatiza, 2013). Therefore, like other informal settlements, Caledonia lacks proper water, sanitation and hygiene services. As such, a possibility exist that this creates challenges to health and livelihoods to the inhabitants. Specifically, this study thus seeks to explore the health implications and the coping strategies of the urban poor in the face of limited water, sanitation and hygiene services in Caledonia resettlement area.

1.4 Research Objectives

The main objective of this study is to explore the coping strategies and health implications caused by the lack of water, sanitation and hygiene in Caledonia.

Other objectives include the following:

- To investigate reasons for the lack of water and sanitation services in Caledonia
- To explore the role of the council in the administration of water and sanitation services at Caledonia
- To establish the impact of lack of water and sanitation services in this community
- To establish mechanisms used by the community to mitigate the challenges caused by the lack of water and sanitation services.
- To recommend some of the strategies that can be used to mitigate the challenges caused by the shortage of water and sanitation services.

1.5 Research Questions

- What are the reasons for the lack of water and sanitation services in Caledonia?
- What is the role of the council in the provision of water and sanitation services in Caledonia?
- What is the impact of lack of water and sanitation services on the community of Caledonia?
- What are some of the mechanisms used by the Caledonia community to mitigate the challenges caused by the lack of water and sanitation services?
- Which strategies can be used to improve the provision of water and sanitation services in Caledonia?

1.6 Scope of the Study

The study site for this research is Caledonia informal settlement situated to the east of Harare, Zimbabwe. The reason for focusing on this area only was to get in-depth knowledge about the reasons for lack of service delivery, particularly WASH. It was also in the interest of the researcher to analyse the impact on the life style of this community as a result of limited WASH services. This area was neglected by town planners to the extent that it does not have water pipes, sewer system and proper road network (Human Rights Watch Report, 2013).

In this study, the research targeted residents of Caledonia informal settlements. This study area is found in Goromonzi Rural District. It consists of 700 households and a population of 800 000 people. The chosen sample for this study comprised of 40 Caledonia residents and 10 Key informants. Situating the study in this field allowed for the exploration of social reality of sanitation for the poor, as this interconnect with political and public factors in the case of Zimbabwe. The researcher had focus group interviews with some residents living in this informal settlement and also some in depth interviews with officials from the local municipality using a semi structured questionnaire guide. The reason for targeting these participants was to get first-hand knowledge from the community affected and also to gather more information from the service provider in order to fully understand the causes of barriers to the provision of water and sanitation services in Caledonia.

1.7 Limitations of the Study

According to Acocella (2012) every study has a set of limitations, potential weaknesses or problems within the study chosen by the researcher. Some community members for the households selected for interviews were not available when the researcher was doing interviews during data collection. The researcher did not interview all households in this community due to lack of human resources to interview everyone. Furthermore, there were also budgetary constraints in order to plan all the logistics and carryout fieldwork on data collection. All these factors may have an influence on the research findings. Desktop review restricts the obtainment of optimum recent data about the study topic; some research journals maybe out-dated and may have a potential to reduce the study validity. These reservations arise due to the fact that the researcher had budgetary constraints to carry out comprehensive field work in order to obtain a good sample size. Participation in the study only focused on people who reside in Caledonia, not to other residents from water scarce communities close to Caledonia.

1.8 Importance of the study

This study will benefit other researchers with information and knowledge on issues concerning WASH challenges in Caledonia. To the governmental and Non-Governmental Organisations (NGOs), findings of this study will help find ways of improving water service delivery in Caledonia. The findings will also recommend ways of improving water management systems and can also be used as a role model of conducting similar research in other communities. Furthermore, results of the analysis and recommendations on policy prioritisation and implementation will be discussed in order to find a lasting solution to deliver water and sanitation services. The outcome of this research will contribute on how to effectively streamline policy implementation and monitoring and evaluating the outcomes in order to guarantee the wellbeing of communities through the provision of adequate water and sanitation services.

1.9 Clarification of key terms

Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta and sewage (WHO and UNICEF, 2017).

Coping strategies refer to the specific efforts, both behavioural and psychological, that people employ to master, tolerate, reduce, or minimize stressful events (WHO and UNICEF, 2017); in relation to this study, the community of Caledonia resort to digging wells and septic tanks as a way of solving the problem of accessing water and sanitation.

Public health implications refer to negative effects towards the community of Caledonia as a result of limited water and sanitation services; which include vulnerability of spread of diseases such as typhoid, cholera, diarrhoea and malaria which compromise life-long health promotion and disease prevention.

1.10 Structure of the Dissertation

Chapter one presents the introduction and background of the study. Chapter two reviews literature including a discussion of theoretical frameworks that underpin this study. Chapter 3 presents the methodology adopted by the researcher in answering the research questions of the study. Chapter 4 presents the findings and make a discussion of the findings in relation to findings made in similar studies. The chapter also present findings to the theoretical foundations the study was premised on. The last chapter five presents the summary, conclusions and recommendations based on the foregoing findings of the study.

1.11 CONCLUSION

In this chapter the researcher introduced the research topic pertaining to the coping strategies and the health implications of the urban poor in the face of limited WASH services. The chapter highlighted the background to the study, objectives of the study, research questions, problem statement, scope of the study, importance of the study, limitations of the study, clarification of key terms and dissertation structure. The researcher highlighted the coping strategies and the health implications in face of limited WASH services from a global perspective narrowing down to Zimbabwe's scenario. The following chapter presents the theoretical framework utilised by the study and literature related to the study.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter presents a critical review of relevant literature and the theoretical framework employed for this study. This chapter is subdivided into four sections. The first section presents the causes of informal settlements, narrowing down to Zimbabwe. The second section presents the water, sanitation and hygiene challenges of informal settlements whilst section three presents the public health and livelihood challenges emanating from the water, sanitation and hygiene problems. In all these sections, the role of the municipal authorities in informal settlements is fused in. Lastly, the chapter presents the theories that have been utilised by this study and how they are applicable.

2.2 Causes of informal settlements

In order to fully comprehend informal settlements, there is need for one to know what they are and how they emanate. Groenewald (2013) defined informal settlements as residential units in unplanned and planned areas without formal approval from responsible authorities. These illegal settlements present massive WASH challenges. Municipalities in the least developed countries do not have the carrying capacity to meet the WASH demands created by the urban growth and mushrooming informal sectors (Aijaz, 2016). Various reasons have caused and exacerbated the establishment of informal settlements differing from country to country.

Informal mining is caused by rapid population growth and rural-urban migration as well as illegal international migration (Potts, 2016). The rapid urbanisation and population growth consequently overwhelm the municipalities who may not have the capacity to meet the urban demands. This has been the case in developing countries like Brazil, South Africa, Indonesia, Haiti and Chile (Potts, 2016; Awumbila, Owusu and Teye, 2014). In Zanzibar, urbanisation has been singled out as the leading cause of informal settlements as it instigated a surge of population from 27 000 in 1948 to 204774 in 1988 and 391519 by 2002 outpacing the availability of formal accommodation choices (Msindo, Gutsa and Choguya, 2013). Similarly, in Dehli, half or more of the population live in informal settlements as the consequence of rapid urbanisation and population growth (Msindo et al, 2013). In developed countries like United States of America, illegal migrants who cannot access formal housing are the ones that opt for informal settlements (Holder, 2012). Most of these are Mexican migrants flooding the USA cities, thereby staying in informal settlements.

Most residents in informal settlements migrate from rural areas to urban areas in an effort to escape poverty, and pursue greener pastures seemingly offered by urban areas (Lombard,

2014). In South Africa, migrants are attracted to urban areas by the available socio-economic conditions instead of collectivisation in rural areas (Magubane, 2016). Therefore, the pull factors of better access to socio-economic opportunities have contributed to the establishment of informal settlements in South Africa. Similarly, in Brazil, the situation is the same as rapid urbanisation is occurring with people opting to stay in informal settlements in cities like Rio De Janeiro and Sao Paulo (Kelman, 2015). As such, rapid urbanisation and subsequent population growth overwhelm the municipality which is responsible for provision of safe housing. In turn, people tend to create their own form of informal housing as has been the case in the above named countries.

Kikwasi and Mbuya (2019), Tacoli (2012), Sandoval and Sarmento (2018) noted that informal settlements are a result of economic vulnerability and underpaid work. Due to vulnerabilities such as unemployment and low income levels, some urban residents fail to pay for decent formal housing rents. In developing countries experiencing economic free-fall, a number of urban dwellers cannot afford to pay rents or build their homes. For instance, rents are beyond reach for the jobless and even some of the civil servants in countries like Zimbabwe with unstable economic conditions. Therefore, those who are not able to pay rents end up living in squatter settlements which are cheap to construct and does not require rents. Consequently, the informal settlements are considered as the most viable form of housing (Kikwasi and Mbuya, 2019). This has been the case with most developing countries particularly in Africa.

Informal settlements may occur due to the displacements of people by natural hazards and wars. Due to natural hazards such as earthquakes, volcanoes, conflicts and climate change, some areas may become inhabitable for human beings. As a result, people may be forced to relocate from such areas without proper planning leading to the establishment of informal settlements. For example, the massive 2010 Haiti earthquake disrupted the formal way of living thereby leaving people leading an informal life as their formal housing was destroyed and their original places become inhabitable (Schuller, 2016). Similarly, in Sudan, natural disasters led to the displacement of 3.1 million by early 2015 (International Displacement Monitoring Centre, 2014). The Syrian conflict contributed greatly to the establishment of informal settlement bolstered by the conflicts in Yemen, Sudan, Somalia, Libya, Afghanistan and Iraq (UN-Habitat, 2020). In Iraq, the estimated total number of displaced people reached approximately four million in 2015 of which all fled to urban centres of Erbil and Bagdad in the Kurdistan region where they established informal settlements (UN-Habitat, 2020). Previous

studies revealed that the global displacements total had reached the record high of 59.9 million by the end of 2014, driven by conflicts in the Arab region (UNHCR, 2015).

In some countries, colonisation and colonial policies birthed informal settlements. For instance, in South Africa majority of the informal settlements came into existence during the Apartheid era. This era was when the Apartheid government enacted laws and regulations that segregated African natives based on race from education, housing and job opportunities (Clark and Worger, 2013). As a consequence, many black citizens left the cities to stay in the surrounding townships informally (Clark and Worger, 2013). Some of the informal settlements that were birthed due to racial segregation still exist even after the existence of the apartheid. Nevertheless, even after the dismantling of the apartheid systems and the introduction of the reformed democratic system, extreme barriers still exist in South Africa (Klotz, 2018). Many cities including the Cape Town still exhibit a clear line between the extreme poor and the wealth. Consequently, Langrung informal settlements among others still exist to this day. Thus, racial segregation during is one of the causes of the development of informal segregation.

In Zimbabwe specifically, informal settlements have a long history which emanate from the era of colonisation. In order to understand the emergence of informal settlements in Zimbabwe, it is important to understand that colonial administrators in Zimbabwe segregated cities by demarcating and separating areas into “European” and “African” areas (Msindo, Gutsa and Choguya, 2013). With Zimbabwe gaining independence in 1980, some of her cities grew spectacularly due to rapid population movements into urban areas as the restrictive colonial laws such as the “pass laws” were removed. For example, between 1982 and 1992, Zimbabwe’s urban population grew twice as that of the rural areas as the urban population grew from just under 2 million to 3.2 million and by 2000 the number was at 4.8 million (Msindo, Gutsa and Choguya, 2013). Just before Zimbabwe’s independence in 1980, the number of people living in the urban areas increased dramatically as the colonial Smith regime failed to stem the influx of people during the latter years of the liberation war. Evidence of this was the unprecedented appearance of large squatter settlements in and around various towns (for example, Chirambahuyo settlement in Chitungwiza which had a population close to 30,000 in 1979). So, high urbanisation which occurred during the heightened period of liberation struggle in the late 1970s in Zimbabwe accelerated the establishment of informal settlements in Cities. Subsequently, this was followed by other massive rural-urban migration to cities since after independence as people went to cities for greener pastures in areas they were not allowed during the colonial Smith regime. As such, the high number of people in urban areas

overwhelmed the carrying capacity of the municipal authorities hence it failed to provide sufficient shelter as per its mandate. This, in conjunction with low income and unemployment led people to opt for another viable form of shelter which became known as informal settlement in townships such as Epworth, Makokoba, Highfields, Mbare and Mkoba (Hungu, 2020).

2.3 WASH challenges in informal settlements

In areas where informal settlements are rampant, water, sanitation and hygiene are a menace. According to SHARE (2014), water and sanitation continues to be of greater concern in informal settlements, which lack proper infrastructure for waste and sewage disposal. In South Africa, more than (68%) two thirds of the households living in informal settlements share toilets whilst approximately 6.8% rely on bucket system (Statistics South Africa, 2016). Similarly, in Brazil, occupants of favelas do not have proper infrastructure for waste disposal (Kruljac, 2012). As a result, they have resorted to the use of unclean shared toilets which present health challenges. This has been the case also in Zanzibar town where informal settlements are a menace (Sakijege, Lupala and Sheuya, 2012). In all these countries, the municipal authorities are the sole providers of quality water (StatsSA, 2016). For example, in South African city of Cape Town, municipality aims at providing one tap water for every 25 families within a radius of 200m, one toilet for every 5 families as well as weekly refuse removal (StatsSA, 2016). According to StatsSA (2016) however, this is not enough and the court of SA has supported this view. This clearly shows how municipalities are failing to provide WASH to informal settlements. As such, health and livelihoods challenges emanate which include among others, diseases such as cholera, diarrhoea, typhoid as well as conflicts as residents fight for the meagre available services.

The acute shortages of water and sanitation services in informal settlements have caused many municipalities to resort to the use of short-term measures in an attempt to provide long--term solutions (Sakijege, Lupala and Sheuya, 2012). In the Arab world however, authorities have instead of adopting a piece meal approach adopted integrated urban planning to enhance efficiency and sustainability of WASH provision (UN-Habitat, 2020). In South Africa, municipalities have resorted to providing access to chemical toilets (a short-term solution, which has become de facto permanent). For example, approximately 25% of the 400,000 people living in informal settlements in the Gauteng province rely on chemical toilets as their primary form of sanitation (Housing Development Agency, 2013). These tanks must be serviced and emptied regularly to remain useable. However, municipalities have struggled to

ensure that these facilities are serviced with the necessary frequency. In the Arab region with countries like Egypt, Tunisia, Algeria and Morocco, slums are upgraded to ensure long term provision of water and sanitation (UN-Habitat, 2020). But with water scarcity, climate change and desert encroachment threatening the Arab region disproportionately, WASH challenges remain a menace in these countries especially in informal settlements. As such, some of the solutions to WASH challenges have led to other new challenges.

In Tanzania, the expansion of informal settlements has been causing rampant pollution to ground water sources mostly in Zanzibar (Msindo, Gutsa and Choguya, 2013). The poor disposal of solid waste and liquid has contaminated water sources causing outbreaks of water borne diseases including dysentery and cholera particularly during the high rain seasons. This challenge is severe in almost every informal settlement around the world. Informal settlements lack established collection points for garbage, causing piles of waste to be scattered everywhere and that leads to environmental and health problems (Schuller, 2016). Kikwasi and Mbuya (2019) revealed that residents opt to burn or bury their waste close to residential areas. Moreover, the absence of centralised sewage system and the disposal of liquid waste including water from laundry, washing, kitchen and other domestic use in a haphazard manner pollute water and the environment causing major water borne diseases.

Zimbabwe in particular is experiencing serious and unceasing water shortages in its urban settlements (Average, 2019). Urban settlements encounter several constraints in the provision of services such as water, sewage and waste management especially in informal settlements. Despite their responsibility as the sole provider of water, sanitation and waste management in urban settlements, municipal authorities are failing to meet with the rising demand emanating from informal settlements. As was posited by Wada et al (2013), as the population multiplies, the amount of water used by the society escalates. Thus, the councils in Zimbabwe have failed to cope with the rising informal settlements which have exceeded their carrying capacity. The failure of municipalities to provide with sufficient WASH conditions is exacerbated by financial constraints, corruption as well as overlapping of sectorial functions (MacNeill and Wozniak, 2018). As such, informal settlements in Zimbabwe are characterised by water shortages, poor sanitation and hygiene which all results in extreme medieval health problems such as cholera, typhoid, dysentery, malaria, diarrhoea, as well as social conflicts as people fight for the insufficient resources. As a result, the informal settlements in Zimbabwe rue the water and sanitation problems.

2.4 The Caledonia situation

Caledonia, originally an informal settlement on the outskirts of Harare was regularised by the government in 2017 (Munhende, 2021). Despite this, 30 000 households in this informal sector are living without access to clean water and sewer system for the past 21 years (ibid). There is no water and people have resorted to digging wells which are not safe as the same stands also have septic tanks. There is no service delivery and the situation is very bad (Munhende, 2021). This is despite the handing over of the settlement to the Harare city management by President Robert Mugabe in 2012. Under this arrangement, the settlement was supposed to be drawing water from Mabvuku-Tafara reservoir which is also failing to provide for its residents. As Munhende (2021) revealed, Caledonia is home to piles of garbage characterised by swarms of flies darting from one place to another. Resultantly, the area is a health ticking bomb awaiting detonation. Adding to these health woes, the crime rate has become rampant with a high rate of break-ins daily (ibid). Prostitution, which is another hazard to health, has become the order of the day whilst rape cases are sky rocketing.

In addition, in Caledonia, storm and wastewater drains are non-existent. In areas where they have them, they are neglected to the extent that they are blocked, wider and deep due to erosion. In the rainy season, a lot of flooding occurs which accommodate a lot of pathogens which cause diseases and the children are at high risk. As mentioned earlier, the absence of health facilities in Caledonia makes it difficult to have disease control. It is also worrisome that there is no health promotion education targeting this community, it only happens when there is an outbreak of diseases. Also, poverty worsens the situation. The majority of people who live in informal settlements live below USD 1 a day poverty line (Mitlin and Satterthwaite, 2012).

According to Muchadenyika (2015) the Harare local municipality institutional and financial arrangements and the way they operate does not suit the socio - cultural context nor the needs and priorities of the urban poor. As a result, essential services do not reach the poor communities such as Caledonia. In addition, most of these households have high illiterate rates especially among women and this is a barrier to accessing economic opportunities. The only option they have is to sub – divide their properties at the backyard so that they can get tenants in order to earn a living. This often results in overcrowding at household level and also having problems sharing resources such as water which becomes strained due to the number of people. On the other hand, sanitation facilities such as pit latrines and septic tanks end up with blockages and this is a threat to the healthy wellbeing for these people.

The Human Rights Watch (2013) argued that informal settlements will never receive services such as water and sanitation because in Zimbabwe, the institutional and legislative arrangements affect the relationship between sanitation agencies and the urban poor. The fact that informal settlements are illegal, it means there is no provision for them to receive any services from the municipality (Muchadenyika, 2015). In most cases, decisions about service delivery come from the top and people are not consulted, in the end there is no service delivery at all and the people who suffer are the urban poor living in conditions which are a threat to public health and livelihoods.

Nonetheless, the WASH challenges that are being experienced in Caledonia are not adequately documented by previous studies. They have been written in bits and pieces by newspaper articles as shown above (Munhende, 2021 and Chara, 2021). Studies that have been done just give an insight of the challenges that exist in Caledonia that might need a proper research. As such, this study is therefore of utmost importance as it unravelled all the WASH challenges emanating in the area of Caledonia where a dearth of literature exist.

2.5 Impacts of WASH challenges in informal settlements

The presence of water and sanitation challenges mostly affects poor people. Since the poor are not sufficiently served by the formal sector, they make their own arrangements, often inadequate to meet basic survival needs whilst other own arrangements lead to the propagation of WASH challenges (Mitlin and Satterthwaite, 2012). These water, sanitation and hygiene challenges propels the occurrence of sicknesses which put severe burdens on health services and also pose a threat to the wellbeing of bread winners which can affect a proper family setup. Human waste poses a tremendous social cost through pollution of rivers and groundwater. Considering the fact that Caledonia does not have running water from the local municipality, the wells they use as source of water are contaminated by the pit latrines and this causes a huge risk for the outbreak of diseases like typhoid and diarrhoea (Human Rights Watch Report, 2013).

In addition to the above, the way informal houses are built aggravate the occurrence of flooding which has its impacts on the health and mortality of people. The haphazard construction of houses in informal settlements blocks natural water ways leading to frequent flooding during rainy seasons (Sakijege, Lupala and Sheuya, 2012). The presence of high density housing, which most informal settlements are characterised by, makes the natural seepage of storm water more difficult due to high share of sealed and compacted land (McGrane, 2016). This

exacerbates flooding which is a major cause of pollution of water sources. As such, the non-existence of drainage systems causes storm water to create big puddles that become breeding places for mosquitoes. As a result, malaria becomes another health challenge that ravages the informal settlers.

MacNeill and Wozniak (2018) noted that inadequate water and sanitation services to the poor increase their living costs, lower their income and make life riskier. Since people in these settlements often walk for long distances fetching water or to relieve themselves, women and girls are the most vulnerable. Some can be sexually abused in the process and the end result may include the transmission of sexually related diseases and unplanned pregnancies which often force young girls to drop out of school and they will be subjected to poverty. In order to correct this, there is a need for proper policies and interventions from government and the private sector to make lasting solutions which will eventually improve the health and wellbeing of people living in peri-urban areas.

In most cases, poor personal hygiene and environmental pollution exacerbate the proliferation of water borne diseases. According to WHO (2019), at least 140 million people in 50 countries are drinking unsafe water (WHO, 2018). Some of the unsafe water in informal settlements is arsenic since it is collected from hand dug wells. A long term exposure to high levels of arsenic water can cause skin lesions and cancer. Adding to this, it has been argued that this can cause cardiovascular diseases and diabetes (WHO, 2019). These health burdens seriously affect the vulnerable groups which comprise the majority of informal settlements' burdens. Diarrhoea accounts for nearly 30 percent of the burden of childhood communicable disease, with an estimated 2.2 million child deaths annually and a much larger number of children (and adults) suffering from illnesses (Msindo et al 2013). Given this background which shows a threat to human life due to limited access to water, there is need for political will and proper planning in order to correct these imbalances. Community involvement in decision making process and rolling out interventions is required in order to save people's lives and the environment as well. The consumption of water from rivers, wells and stagnant water poses a risk to public health. These sources of water are open to contamination and they contribute much to the spread of diseases. In most cases, people living in these communities end up spending most of their time taking care of the sick and this compromises the levels of productivity and getting income.

Furthermore, previous studies revealed that the recurrence of the outbreaks of diseases such as diarrhoea contribute to malnutrition (Chirisa, Matamanda and Mukarwi, 2019 and UNICEF,

2016). Water and Sanitation and hygiene pose greater risk to the occurrence of diarrheal diseases. The interactions are complex, but adequate quantities of water, even low-quality water, are necessary if people are to adopt the hygienic habits needed to break the disease transmission. WHO estimated that 50% of malnutrition is attributed to repeated occurrence of diarrhoea as well as intestinal infections (Schuller, 2016). According to Kikwasi and Mbuya (2019), all human beings require water daily, both the rich and poor need a toilet daily. Therefore, the privileges of clean water and toilets are not known to the inhabitants of informal settlements. In these settlements with such challenges, the impact is felt greatly on family health. Households with private toilets have lower disease transmission rates than households without (WHO, 2018). Such problems propel the occurrence of communicable diseases which eventually leads to malnutrition (ibid). Children are the most affected by this and new diseases emerge such as kwashiorkor and marasmus.

In addition, the physical improvements of water and sanitation services influence health outcomes and have a positive impact on life expectancy. The provision of hygiene education, in addition to the physical infrastructure, helps ensure that waste is safely disposed, hand washing is done properly, and water is stored safely. From a point of view, the adequacy of drainage plays a large role in health outcomes (MacNeill and Wozniak, 2018). Where drains do not exist, or are blocked, and wastewater pollutes the streets, those exposed may experience long term health complications which subsequently lessen their life expectancy. Stagnant water may also serve to host other disease vectors, such as mosquitoes transmitting malaria and other diseases. In light of this, it can be safely argued that limited access to water and sanitation services force people to make other alternatives but eventually they will be vulnerable to diseases. The government as the service provider for the poor therefore needs to prioritise delivery in order to prevent loss of life.

Furthermore, lack of water and sanitation has a negative impact on the social well-being of people. According to WHO (2019), safe WASH contributes to social and economic well-being. Safe water at home decreases the time spent in collecting water allowing time for livelihoods. However, informal settlements experience WASH challenges which disrupt the social well-being. The absence of safe water reduces dignity, privacy, especially for adolescent girls and women. Moreover, diarrheal diseases impact many people worldwide and are a barrier for achieving health goals as outlined by various organisations (Dadonaite, Ritchie and Roser, 2018) including the (WHO). Social factors such as behaviour, health and culture needs to be taken into consideration because the links are intertwined when it comes to water and sanitation

provision and people`s livelihoods. Some scholars argued that there is need to involve communities in the design, implementation and evaluation of these programmes (Africa Research Institute, 2017).

Extreme water, sanitation and hygiene challenges mostly affect the vulnerable groups. According to Peterman, Potts, O'Donnell, Thompson, Shah, Oertelt-Prigione and Van Gelder, (2020), challenges emanating from WASH impacts affected certain vulnerable groups such as those with disabilities, young teenage girls, elderly, chronically ill, women and children. Violence against women has been on the rise due to the WASH challenges as their male partners shift the blame on them (Peterman et al, 2020). It has been argued by UNGA (Mitra, Posarac and Vick, 2013) that people with disabilities are affected mostly by the lack of water and sanitation around the globe especially in poor communities of developing countries. In addition, Joanna argued that disability is both a cause and a consequence of poverty (Joanna and Oliver, 2016). Nevertheless, there is still gap of literature concerning to the impacts of WASH problems on vulnerable groups such as young girls with disabilities, people with mental disabilities and the elderly. Therefore, this study explores these challenges in Caledonia in an effort to address the challenges that lack sufficient publishing.

Another aspect of life which is affected by lack of water and sanitation is school attendance (WHO, 2019). In most developing countries, this is a big problem and the community of Caledonia is not spared of this challenge. School children are normally absent and end up dropping out of school due to sickness related to water borne diseases. It was estimated that 194 million school days would be gained due to less diarrhoeal disease if MDG targets for sanitation were met (Peter and Umar, 2018). Moreover, the incessant water problems compel people to travel for long distances to fetch water (Kikwasi and Mbuya 2019). School children have to fetch water in the morning before going to school. As such, they end up being late at school whilst their studying time is also affected (WHO, 2012; WHO, 2019). A study by Davis (2004) revealed that most schools in informal settlements experience low pass rates because learners' time is spent while fetching water. Therefore, health problems in conjunction with time lost while fetching water affect the school attendance of the children living in informal settlements.

One study in 25 countries in sub-Saharan Africa estimated that, collectively, children spent 4 million hours per day collecting water, which made them unable to attend school (Musavengane, Siakwah and Leonard, 2020). In informal settlements, most families live below the poverty line to the extent that they cannot afford to pay someone who can dig a well for

them (ibid). Children end up taking the task of fetching water making several trips so that they have enough to use for everyone in that household; in this process, a lot of children end up missing classes and some eventually dropping out of school.

Furthermore, lack of water and sanitation lead to increased mortality rate. According to Kikwasi and Mbuya (2019) the diseases associated with WASH problems can subsequently lead to deaths especially in developing countries where the health system is in bad shape. However, the most affected are the children under the age of 5. For example, cholera outbreak in Zimbabwe in 2008 left an estimated 4,287 deaths (WHO, 2013). MacNeill and Wozniak (2018) posited that the occurrence and recurrent of infectious diseases is among the major cause of deaths in the world. Informal settlements in developing countries are the worst affected. Zimbabwe has been experiencing recurring cholera problems due to WASH problems. Therefore, this study seeks to address this gap that exists and provide with recommendations to policy makers so that they may see what is on the ground and what need to be addressed urgently.

Sanitation, water and hygiene challenges hinder the economic growth of the informal settlements. The economic potential and prosperity of any community is determined by the availability of water and sanitation (UNICEF, 2016; WHO, 2018). These services open a lot of opportunities and contribute to the wellbeing of households. According to Musavengane, Siakwah and Leonard (2020) the availability of water of acceptable quality is predicted to be the single greatest and most urgent development constraint facing a lot of countries around the globe. In most sub-Saharan African countries, including Zimbabwe and South Africa; urban areas have pressure on resources due to population growth.

In addition, WASH challenges prevent people from accessing other economic activities since they will spend most of their times going far to fetch water. Others will be taking care of the sick people mostly from water, sanitation and hygiene related ailments (Kikwasi and Mbuya, 2019). The sewage spills in informal settlements and the presence of stagnant water due to lack of effective service delivery pose greater health burden (Human Rights Watch, 2013). Diseases such as cholera, dysentery, malaria and typhoid emanate especially the poor sanitation and hygiene practises (Human Rights Watch Report, 2013). This has a negative impact on the economical group and the able bodied. They will end up wasting time at home taking care of the sick especially the young, old age and those with disabilities instead of using that time to do productive work which can improve the wellbeing of their families. Therefore, it can be

argued that lack of water and sanitation prevent people from accessing economic opportunities and these have direct impact on their livelihoods.

Furthermore, the toilet conditions in informal settlements are bad to the extent that the smell and filth as well as the presence of flies, rodents and insects are unhygienic (Mitlin and Satterthwaite, 2012). Faecal sludge and liquid effluents from the residents' on-site systems are often poorly managed. Most of the faecal sludge is buried in the backyards of houses once toilets were filled up. Coupled with these unhygienic conditions, is the lack of lighting at night, making the neighbourhood unsafe and inappropriate for children and the vulnerable to visit the toilet on their own at night (Mitlin and Satterthwaite, 2012).

However, past studies concerning WASH in informal settlements have been conducted in areas outside of Zimbabwe whilst those few carried in Zimbabwe specifically targeting Caledonia were done in bits and pieces. Only few newspapers articles have tried to address the challenges emanating in the area (Munhende, 2021, and Chara, 2021). This is irrespective of the fact that Caledonia might be facing similar challenges that befall other informal settlements. With the existing economic turmoil Zimbabwe is facing, a possibility exist that informal settlement like Caledonia might be home to extreme WASH problems. Nevertheless, there lacks proper research of the existing challenges, coping strategies to the existing challenges and how they can be addressed by the municipal authorities. Therefore, it is this literature gap that exists which this study sought to address.

2.6 Coping strategies in informal settlements

Around the globe, governments and individuals have responded differently in coping with the challenges they face in informal settlements. Some have opted to upgrade informal settlements in all its forms in an effort to deal with the challenges that emanate from their presence. This has been executed in countries such as Egypt, Brazil, South Africa, Tunisia and Morocco (UN-Habitat, 2020). In Egypt, the informal Settlement Development Programme was executed from 1993 until 2004 on about 1, 221 areas (ibid). About 3,183 billion of Egyptian pounds were spent on 352 informal areas. This programme was revised in 2008 and the Settlement Development Fund was established by the presidential decree. This was established for the allocation and execution of funds meant for the development of informal settlements. This programme meant that services such as water supply, sewage and garbage collection were provided in the informal settlements. Also it meant that hygiene and sanitation are improved. This has been the case in South Africa where the Central government made efforts to provide

WASH services although these efforts were futile in areas such Alexandria were the settlements are greatly disorganised (Lethukuthula, 2016).

In Morocco, the government opted to restructure informal settlements to medium and large sized shanty towns that can be integrated into the urban fabric in an effort to cope and ease the challenges emanating in informal settlements (UN-Habitat, 2020). The restructuring made sure that Water, Sanitation and Hygiene is provided in the new restructured shanty towns. The government used an estimated 1.5 million dirhams/ha in the provision of water and sanitation equipment. This serves as clear evidence that countries around the world are coping informal issues in different ways. Some coping strategies are sustainable whereas some fail to serve their purpose. In Morocco for example, restructuring and rehabilitation of informal settlements has led to the improvements of water and sanitation. Pertaining to sanitation and water concerns in informal settlements, 83% of residents now have safe drinking water, and 72% have now access to improved sanitation (UN-Habitat, 2020).

In other countries, demolition of informal settlements has been introduced in an effort to curb the WASH challenges that arise. In Zimbabwe, the government introduced operation Murambatsvina whose sole purpose was to destroy all informal settlements in 2005 (Muwanzi, 2018). In Egypt, after the collapse of the part of the Mokattam Mountain in 2008 which resultantly led to the death of 100 people and exacerbated the already existing WASH challenges, the government demolished about 13 informal settlements. Similarly, in Dakar, Senegal, authorities resorted to the demolishing of informal settlements especially those that have severe impacts to the surrounding environment. This has been the case in Zanzibar where informal settlement is rampant also (Msindo, Gutsa and Choguya, 2013). Therefore, this study thus opts to unravel how individuals or governments are coping to the impacts of informal mining and how successful the coping strategies are, where a paucity of literature exists.

Furthermore, central governments and (NGOs) in some countries have helped with the provision of water, sanitation and hygiene services. This has helped informal settlement habitants to cope with the existing WASH challenges that have been ravaging informal settlements worldwide. For example, the FCDO Malawi's WASH programme provided up to £20m over a period of 3 years (2012-15) to support water, sanitation and hygiene delivery services (FCDO Malawi, n.d; Naomi, 2014). The project was managed by UNICEF and implemented by World Vision International, Concern Universal, GOAL and Development Aid from People to People (DAPP) with WaterAid providing governance and policy support (ibid).

The programmes aimed at improving WASH conditions through establishing and rehabilitating water points as well as strengthening WASH points. All these efforts have been done to help residents cope with informal settlement challenges. Nonetheless, literature is still scarce to address the effectiveness of this coping strategy in addressing the WASH challenges hence this study seeks to do so.

In other countries around the world such as Bangladesh, Haiti, Cambodia and Guatemala, sharing of toilets and open defecation has become the coping strategy to water and toilet shortages. In Bangladesh for example, people have resorted to open defecation where they use bushes since there are toilet shortages in the informal settlements (SHARE, 2020). Similar cases have been experienced in other informal settlements especially those in developing countries (Nkambule, 2012). This has been used mostly when people are traveling in the informal settlements away from home or other non-routine situations outside home (ibid). Nevertheless, even though this has been helpful as people relieve themselves from the call of nature, a possibility exists that this coping strategy might pose greater risk to health of individuals. Irrespective of this health risk possibility, there is no literature that have explored the exact and magnitude of it to the communities. Therefore, it is the mandate of this study to unravel such coping strategies and their impacts to the informal mining communities already facing massive WASH challenges.

Furthermore, informal settlements residents have resorted to painful coping strategies such as delaying relief, drinking less and eating less. A study carried out in Bangladesh found that informal settlements residents where WASH challenges were rampant had resorted to delaying relief (SHARE, 2020). This is to save water which is in limited supply. Others had resorted to drinking less in effort to save water which is scarce (ibid). As if that is not enough, others have resorted to eating less in an effort to avoid going to the toilet frequently at the same time saving water. This is despite knowing the health problems emanating from these adopted coping strategies.

The digging of back door wells and boreholes is another strategy being implemented by informal settlements residents as they try to cope with water shortages (Graham, Desai and McFarlane, 2013). It has been revealed by previous scholars that individuals in developing countries facing the wrath of WASH problems have opted for back door wells. Whilst those with money have resorted to borehole drilling, the poor have resorted to hand dug wells (Mugumbate, Maushe and Nyoni, 2013). All this has been done to cope with massive

challenges. For example, in Bangladesh, majority of residents in informal settlements are surviving on hand dug wells. This is despite the harmful impact of arsenic found in natural water from wells. For example, arsenic and fluoride substance (present naturally in many ground waters) found in water has affected many people around the world causing skin lesions and cancer (WHO, 2019).

More to this, the use of river and stagnant water for domestic use has been another strategy being implemented in informal settlements as a coping strategy to WASH challenges. Most of the informal settlements especially those in the least developing countries experience enormous water shortages (Sakijege, Lupala and Sheuya, 2012). In Zanzibar, water shortage is extreme in the informal settlements and is exacerbated by the ignorance of the responsible authorities to provide this needed service. In some instances, the informal settlements are beyond the municipal operational areas. Therefore, the absence of clean water supply forces residents to resort to collection of water in nearby rivers and pits for domestic purposes. However, this has exacerbated the frequency of water borne diseases like cholera, typhoid and dysentery (WHO, 2019).

Nonetheless, most of the coping strategies employed at individual level to deal with WASH challenges pose great challenges to the already existing challenges. Despite knowing the health impacts of the strategies such as use of stagnant water, consumption of water from wells as well as defecation, residents have no other option hence they continue doing so. WHO (2019) revealed that most participants were aware of the health risks posed by their coping strategies. Irrespective of such negative impacts of coping strategies, very few studies have researched on the matter. Many studies have focused mainly on the impacts of WASH on the livelihoods and health of residents.

In the field of informal settlements, there still lies a gap of literature pertaining to how residents at individual level cope with the WASH challenges. Some studies (UN-Habitant, 2020) have mainly focused on how governments have responded to these challenges neglecting how individuals are coping. Also, studies have mainly focused on the WASH challenges in informal settlements at the expense of the coping strategies. As such, this study ought to address the coping strategies by informal settlers to the WASH challenges where a dearth of literature exists.

Also, even the studies that have focused on WASH challenges on informal settlers have mainly focused on informal settlements of South Africa, Brazil, Dakar and Brazil at the expense of

Zimbabwe (Satterthwaite, 2017). In Zimbabwe, only one study was carried in Epworth revealing the consequences of informal settlements in general (Msindo, 2013). This study lacked much emphasis on the impacts on public health and livelihoods which this study seeks to do. Therefore, this study is of outmost importance since it unravelled the impacts of informal settlements specifically on Zimbabwe with much emphasis on Caledonia informal settlement where a paucity of literature exists.

2.7 Theoretical Framework

Denhardt and Denhardt (2000); Stoker (2006) and Osborne (2006) pointed out pillars of effective service delivery giving examples; “new public service”, public value management and new public governance as heralding the next chapter in the history of public management reform. Considering the objectives of the research, it can be argued that policy makers should consider recommendations from this practical way of implementing effective service delivery to improve all the promises and enhance public welfare. With this in mind, ensuring provision of water and sanitation services to Caledonia relies on the local authorities to rollout well thought and practical plans of actions in order to effectively deal with the problem which is being scrutinised by this study.

2.7.1 Public Service Improvement Theory

The public service improvement theory versus what people on the ground experience is the basis for the research. Boyne describes it as ‘a closer correspondence between perceptions of actual and desired standards of public services’ (Boyne 2003a, p. 223). The outcome or ‘goal attainment model’ is premised on the assumption that all public services might reasonably be expected to fulfil policy goals of one form or another (Amirkhanyan, Kim, and Lambright 2008, p. 328). Given this explanation, it can be argued that policy implementation is crucial so as to achieve goals and objectives of public service delivery in providing essential services such as water and sanitation as outlined in the public service improvement theory.

How a theory of public service improvement looks like?

The Public Service Improvement Theory (PSI) explains shifts in service standards over time and also explains why some organisations provide better services than others (Boyne, 2003). According to the PSI theory, there are various aspects which enable governments and local municipalities to effect public service improvement such as organizational culture, leadership, or strategy processes which in turn produce a change in service performance. Other aspects which have a direct bearing on public service improvement are behaviours and actions of

important factors such as policy makers, service delivery managers and politicians who have influence on allocation of resources and financial budgets for the effective provision of social services. The PSI theory also postulate that rational planning by the responsible authorities have an impact on performance. Likewise, the behaviour and motives of the responsible actors such as managers, policy makers and service customer makes a difference to service performance. As such, rational planning and behaviours of responsible authorities lead to a shift in the standards of service delivery. As a consequence, some organisations provide better services than others. In addition, looking at the problem which this study is focusing on, it can be argued that there is need for robust public service improvement culture by the authorities responsible for service delivery in order to provide social services such as water and sanitation even in informal settlements such as Caledonia so that all citizens can have healthy and dignified livelihoods. Therefore, this study utilised this theory to determine if the government and the local municipalities are providing organizational culture, leadership, or strategy processes in Caledonia for the improvement of services. Furthermore, the theory was utilised to evaluate the behaviours and actions of important factors such as policy makers, service delivery managers and politicians who have influence on allocation of resources and financial budgets for the effective provision of social services in Caledonia.

2.7.2 The enabling approach

Umoh (2009:13) posited that the enabling approach to housing has its origins in the Neoliberal movement which began in the UK and USA in the 1970s. It is characterised by the change in policies advocated by international institutions like the international Monetary Fund (IMF) and the World Bank. They shifted from promoting the “development project” (supporting “inward-looking” and “static” strategies launched between 1945 and 1955) to promotion of neoliberal agenda that stressed decreased government intervention in most sectors of the economy (Arrighi et al., 2009).

The approach was introduced by the Global Report on Human Settlements of 1986 as an improvement on the project-based approach to settlements. It aimed to decrease the ring-fenced impacts of previous projects and allow everyone to enjoy better housing conditions. The World Bank (1993) stated that the enabling approach does not just address projects, but the housing system. Thus, it is not government’s job to provide housing, but to set up an environment which enables the housing market to work effectively. Therefore, this study utilised the approach to understand whether the government of Zimbabwe contributed to the establishment of

Caledonia settlement or it just created an enabling environment that led to the propagation of this settlement,

The Global Report on Human Settlements (2005) revealed that there was an inevitable need to scale up activities to address the large number of people living in poverty. The approach regards urban and housing development as a multi-sectorial issue. The Enabling approach calls for a housing policy that controls and oversees the development of housing. In this sense, the government should not be the direct supplier of housing but rather leave delivery and construction to the housing market (Global Report on Human Settlements, 2005). Moreover, Hassan (2011) states that government intervention can be effective by enabling the housing markets to set up the regulatory framework needed and reform government institutions, focusing them on different goals and retooling them accordingly. This approach was therefore used to evaluate the role of the government in the establishment and construction of Caledonia informal settlement.

2.8 CONCLUSION

In this chapter, the theory of Public Service Improvement and the Enabling approach was presented. Also, literature related to coping strategies and health implications of the urban poor in the face of limited WASH services was reviewed. Numerous studies have been conducted pertaining to WASH challenges in informal settlements (SHARE, 2020; Lethukuthula, 2016; Kikwasi and Mbuya, 2019; MacNeill and Wozniak, 2018; Graham, Desai and McFarlane, 2013). Nevertheless, majority of these studies were carried out in areas outside Zimbabwe including South Africa, Brazil, Dakar and Brazil (Satterthwaite, 2017). In Zimbabwe, only one study was carried in Epworth revealing the consequences of informal settlements in general (Msindo, 2013). However, this study lacked much emphasis on the impacts on public health and livelihoods which this study seeks to do. Consequently, WASH challenges that are being experienced in Caledonia are not adequately documented by previous studies. They have been written in bits and pieces by newspaper articles (Munhende, 2021 and Chara, 2021). Studies that have been done just give an insight of the challenges that exist in Caledonia that might need a proper research. As such, this study is therefore of outmost importance as it unravelled all the WASH challenges emanating in the area of Caledonia where a dearth of literature exist.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology followed in this study. It takes a look into the area under study as well as the methodology that was used in this study. The specific aspects to be looked into in this chapter include the research design, research approach, data collection methods and tools, target population, sampling and sampling procedures, data presentation and analysis as well as the ethical considerations.

3.2 Research Approach

This study used the qualitative approach to investigate causes for the lack of water and sanitation services in Caledonia. Wertz, Charmaz, Josselson, Rosemarie and McSpadden (2011:2) describe qualitative as an approach that involves understanding of the context, the consequences and even the significance of the phenomena being explored in the larger world. Lune and Berg (2017:15) pointed out that qualitative research seeks to discover answers to questions through the application of systematic procedures and by examining various social settings and the groups or individuals inhabiting these settings. The qualitative approach allowed the researcher to assess the implications of lack of water and sanitation on public health and livelihoods of people in Caledonia.

The interpretivist paradigm was used for the purpose of this study. Pacho (2015) explain that the interpretivist paradigm seek to describe the lived experiences of individuals from their own viewpoints and to comprehend how people interpret their experiences. The interpretivist paradigm allowed the researcher to obtain in-depth information on water and sanitation services from people utilising such services.

3.3 Research Design

The investigation used the case study design. Lune and Berg (2017) explain that a case study guides the research by focussing on a single phenomenon, individual, community or institution. The case study design guided the researcher to draw parameters on where to conduct the study. Saldana (2011) pointed out that a case study focuses on a single unit of analysis and that it can be deliberately chosen by the researcher based on its unique characteristics that allow the research to focus on a particular study. Pacho (2015) are of the view that a case study involves an in-depth investigation of a single person, community or group. This study focused on water and sanitation services in Caledonia. The case study seeks to explore the barriers to accessing

water and sanitation services at Caledonia. The public health and livelihoods of Caledonia residents as a result of the lack of water and sanitation were also explored in this case study.

3.4 Population and sampling

Target population

Gagnier et al (2013) defines a target population as a complete aggregation of research participants that meet the selected set of criteria. In this study, the research targeted residents of Caledonia informal settlements. This study area is found in Goromonzi Rural District. The area consists of 700 households and a population of 800 000 people.

3.5 Sample and Sampling Procedure

Etikan, Musa and Alkassim (2016) defined sampling as the collection of data from representatives selected from a population and using it as research information. According to Makoni (2016), statisticians have demonstrated that "...a sample size of 30 people or more usually result in a sampling distribution for the mean that is very close to normal distribution". As a result, scholars like Makoni (2016) and Saunders (2009) gave a recommendation that a minimum number of 30 samples must be made about a population in order to get adequate statistical analyses and inferences. It is therefore against this background that the researcher used his own judgement and personal experience to come up with a sample of 50 people who are above the minimum of 30. The chosen sample comprised of 40 Caledonia residents and 10 Key informants. Caledonia residents were included in the study considering that they are the ones who experience the casualty of the absence of WASH services. As such, they have knowledge concerning the phenomenon under study. The key informants were included because they are the representatives of institutions with known expertise pertaining to WASH services and the consequences of its absence in the settlement.

This study utilised purposive sampling and convenience sampling to reach out to participants. According to Creswell (2013), purposive sampling refers to the selection of participants basing on the objective of the study and population characteristics. Kalof, Dan and Dietz (2008) assert that purposive sampling involves selection of participants within an organisation who have in-depth knowledge on the topic or subject being investigated. Purposive sampling was used by the research to select 10 key informants which include Council CEO, Council Engineer, Environmental Health Technician, Ward Councillor, Community Leaders for women, Youth Leader, Village Health workers, employee from the Ministry of Health and Child Care as well as community leaders. The inclusion of these key informants were of outmost importance since

some of them are the ones that deal with WASH services hence they have full knowledge pertaining to the WASH challenges and the consequent impacts.

Convenience sampling was used by the researcher to select 40 participants from Caledonia residence. Cohen, Manion and Morrison (Dziva, 2018) suggest that convenience sampling involves the selection individuals who are easily accessible and willing to be part of the study. The residents are individuals that form part of Caledonia whose livelihoods are impacted by the lack of water and proper sanitation services. The researcher enlisted the help of the council through its Community Engagement Office to select participants from the residents of Caledonia.

3.6 Data-gathering instruments

Semi-structured interviews and focus group interviews were used as data collection tools. Data were collected from May to July 2021.

Semi-structured interviews

Data was collected from 10 key informants using semi-structured interviews. Kothati (2004) explained that semi-structured interviews are flexible and allows the interviewer to ask supplementary questions without deviating from the main research questions. Semi-structured interviews were conducted by the Council CEO, Council Engineer, Environmental Health Technician, Ward Councillor, Community Leaders for women, Youth Leader, Village Health workers, employee from the Ministry of Health and Child Care as well as community leaders. The researcher conducted interviews with one person at a time. An interview guide was used during interviews (see Appendix C). Interviews were carried out at the participant's office or place of residence upon arrangement with the interviewees. Each session took 15-20 minutes. During interviews, questions were asked in Shona language which was familiar to majority of participants and was then translated into English by the researcher. The researcher used a voice recorder and was writing notes in the notebook also during the course of the interview.

These key informants were targeted by the researcher to shed light on issues pertaining to water and sanitation services in Caledonia. Semi-structured interviews allowed for these participants to be focused on the answers they provide. It is the flexibility of this approach that allow for the discovery and elaboration of information relevant to this study. This also allowed the researcher to employ follow up or probing questions such as, 'may you kindly clarify a bit more

pertaining to that' (DeJonckheere and Vaughn (2019). It is therefore against this background that the researcher opted for semi-structured interviews with key informants for this research.

Focus Group Discussions

Focus Group Discussions were used to collect in-depth information from Caledonia residents. Denzin & Lincoln (2018) assert that focus group interviews facilitate the emergence of participants' opinions and at the same time focus on the dialogue, allowing the participants to exhaustively divulge more about the topic. The researcher divided the 40 selected residents into 5 focus groups. The 5 groups comprised of 8 participants. The participants were notified of the FGDs prior using emails and cell phone calls. During the course of the interview, the researcher was the moderator. The moderator was responsible for the facilitation, review and guidance of the FGDs and its related interactions. The moderator was guided by an interview guide during focus group sessions (see Appendix C). He was also responsible for asking questions and enforcing the rules of the discussion forum. The researcher further employed a rapporteur. Prior to FGDs, the researcher debriefed the rapporteur about the objectives of the study and how he was expected to capture participant's voices. The rapporteur was responsible for writing notes in the notebook during the interviews with group members. Furthermore, the rapporteur made use of an audio recorder to avoid missing any point. The FGDs took 20-30 minutes and were carried out at certain participants' place of residence in Caledonia settlement.

Focus Group Discussions with Caledonia residents were conducted to seek information to do with Water, Hygiene and Sanitation situation in Caledonia. Residents were asked to shed light on the WASH challenges they were facing as well as the subsequent public health challenges emanating from these challenges. The researcher opted for FGDs since they are an efficient way of obtaining information from various people at the same time. Group members were free to interact and group solidarity allowed for buried issues to be revealed. So if managed well, controversial issues pertaining to this study are revealed (Dziva, 2018).

Document Review

This study further utilised secondary data. Secondary data refers to data collected for a different purpose and used again for another research question (Draper and Swift, 2011). Literature was undertaken in order to fulfil the objectives of this study. Literature was reviewed from a newspaper article. Secondary data was used to get a deep understanding of the research questions as well as extending the views of the topic under study through conclusions made by

others. It provided data pertaining to the water, sanitation and hygiene and its impacts to public health. The researcher opted for secondary data because it is very accessible and cheap way of collecting information.

3.7 Data-analysis strategies

Data analysis was manually done. Thematic approach was utilised to analyse data collected through interviews and FGDs and presented in form of themes. This process entails coding of data from interviews to make meaning from data. Firstly, the researcher made himself familiar with data through data analysis process involving the process called ‘data immersion’ (Musengi, 2006). This process involved thorough reading of interview excerpts to become fully conversant with interview data. The audio-recorded interviews were transcribed verbatim. The codes driven from interviews were further grouped to form categories through a process of data categorisation. Creswell (2013) defined the process of data coding and categorisation as a process which involves systematic way where extensive data sets are condensed into smaller units which are analysable through creation of concepts and categories derived from data. As such, responses from participants were analysed to identify where they fit in the established categories. The categories emerging from the excerpts were grouped further and analysed under the themes that were derived from the research questions (Creswell, 2013). With thematic analysis approach, the researcher managed to rigorously explores subjective social cognitions and experiences pertaining to coping strategies and health implications of the urban poor in the face of limited WASH services.

3.8 Ways to ensure validity and reliability

Researchers should ensure that their studies are rational, reasonable and trustworthy. Validity and reliability involve providing findings that can be reproduced and are constant. To increase validity, pilot testing was done to sharpen research instruments. This was done on a sample comparable to the study population. Recommendations from the test were used to perfect the instruments. This ensures credibility, dependability, conformability and transferability of the study. Transferability, for example, refers to “the extent to which the findings can be applied in the other context or with other participants” (Babbie & Mouton 2001: 277).

3.9 Ethical Considerations

Since this research involved human beings, some ethical considerations were mainstreamed in this study. One of the issues mainstreamed was seeking approval to carry out research from the Ethics Research Committee. Consequently, permission to carry out the research was granted

by the College of Human Sciences Research Ethics Review Committee. The ethics reference number is 60860847_CRECHS_2021 (see Appendix D). In addition, the researcher mainstreamed the issue of informed consent. According to Lune and Berg (2017), informed consent means the knowing of individuals to participate as an exercise of their choice, free from every element of fraud, deceit, duress and manipulation. The purpose of the research was given to the participants in writing and further explained. The researcher asked for permission to record audios from participants. Furthermore, the researcher outlined the participants' rights and asked participants to read and sign informed consent forms before the interview (see Appendix A). The issue of informed consent allowed the participants to participate voluntarily in this study (Creswell, 2013).

The researcher also observed the ethics of no harm to the participants. The researcher did not expect any discomfort or harm that may arise from conducting interviews with the participants. Saldana (2017) suggest that the researcher should obtain permission from the organisation and institution before commencement of the research. In this study, the researcher ensured no harm to the participants by following the guidelines as outlined in the application for ethical clearance. The researcher did not embark on data collection before approval from the institution's ethics committee.

The ethics of confidentiality and anonymity were observed by the researcher. Participants were told that their identity will not be released but remain confidential. Resultantly, participants were not expected to reveal their identity. Furthermore, Zimmer (2020) suggest for the removal of all identifying information about the individual participants from the research records. The information collected from the participants was used for the purpose of the study. The details of the participants remain anonymous. This information was outlined in the consent forms. To guarantee anonymity and confidentiality, data from participants was kept in a very safe place which was only known and accessible by the researcher (Creswell, 2012). This was also done to guarantee safe storage of data. It was kept securely in a locked cabinet.

3.10 CONCLUSION

This chapter highlighted the research methodology utilised by this study. The chapter presents the chosen research approach, research design, sampling and sampling procedures adopted by this study. Furthermore, the chapter presents and explains the data collection tools and processes for the study. In the last sections the chapter explains data analysis and presentation,

ways to ensure reliability and validity and the various ethics that were mainstreamed in this study. The next chapter presents the empirical findings and discussion of results of the study.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents fieldwork research results related to the water, sanitation and hygiene issues in Caledonia informal settlement. Firstly, the chapter presents the introduction followed by the depiction of the socio-demographic data of the participants. Thereafter, there is a presentation and discussion of the causes for lack of WASH services in Caledonia followed by the public health implications emanating from the existing WASH challenges. Lastly, the chapter presents and discusses the coping strategies being implemented by the residents to deal with the existing challenges.

4.2 Socio-Demographic characteristics of focus group participants

Age	18-30 years	31-40 years	41-50 years	51+
% (n)	(22.5%) 9	(35%) 14	(27.5%) 11	(15%) 6
Gender				
	Male		Female	
% (n)	(43%) 17		(57%) 23	
Level of Education				
	Never been to school	Primary	Secondary	Tertiary
% (n)	(2.5%) 1	(27.5%) 11	(50%) 20	(20%) 8
Marital status				
	Single	Married	Divorced	Widowed
% (n)	(25%) 10	(40%) 16	(17.5%) 7	(17.5%) 7
Employment Category				
	Formal employed	Informally employed	Income Generating Activities	None
% (n)	(15%) 6	(42.5%) 17	(37.5%) 15	(5%) 2
Source of water				
	Water Tap	Borehole	Backyard well	River/Dam
% (n)	(0%) 0	(65%) 26	(22.5%) 9	(12.5%) 5

Type of waste disposal	Dumping in streets/bushes	Dumping in nearby water bodies	Burning	Collection by the Municipal
(%) n	(45%) 18	(22.5%) 9	(32.5%) 13	(0%) 0

Table 4.1 Socio-Demographic characteristics of participants

In this study, the majority of participants (50%) were aged between 31-40 years followed by the age group of 41-50 years which consisted 27.5%. Other categories included 18-30 years (22.5%) and those aged 51 and above (15%). More females than males participated in this study with 57% to 43% males. The majority of the participants had secondary education qualifications (50%). Informal occupation was the main form of employment in the area. Following were other livelihoods activities whilst formal employment was the least form of employment. In addition, dumping of waste in undesignated areas such as streets corners or bushes is the most prevalent waste disposal option practised by the majority of residents whilst some have resorted to burning and dumping in water bodies.

4.3 Socio-demographic characteristics of key informants

Designation/Position	Sex	Level of Education	Years in Service	Sector	Age
MoLGPWH Employee	Male	Master of Science in Local Governance	7	Municipality	39
Employee from Engineering Department	Male	Degree in Engineering	9	Municipality	41
Youth leader	Female	'O' level	5	Politics	27
Traditional Leader	Male	Standard 8	12	Local governance	57
Councillor	Male	Diploma Secondary education	3	Local development	46
MoHCC employee	Female	Diploma in Nursing; first aid certificate	2	Health	31
Community Leader for Women	Female	Degree in Gender Studies	7	Women Rights	36
Village health worker	Female	'O' Level	8	Community health	42

EHT	Female	Diploma in Environmental health	6	Community health	29
Employee from Water and Waste Management division	Male	Degree in Geography and Environmental Science	8	Municipality	37

Table 4.2: Socio-Demographic characteristics of key informants

The above table (4.2) shows the designation/position of the key informants as well as their gender, years of service, sector and level of education. The majority of these key informants are key position holders in their respective organisations whilst some are leaders in the community. Many of these recruited for this study have an expertise in issues pertaining to water, sanitation and hygiene issues since they work within sectors responsible for that. Some like the Women leader in the community advocate for the provision of WASH services to all. As shown by the above table, the majority of these key informants have been in their positions for more than 6 years. This has equipped them with knowledge and experience on issues pertaining to WASH in Caledonia.

4.4 The Local Governance Structure in Caledonia

It emerged from this study that there have been constant changes in Caledonia pertaining to authorities responsible for its governance. In the year 2012, it was under Goromonzi Rural District Council. Then in 2017, it was transferred to the city of Harare by the then president Robert Mugabe before it was transferred back to Goromonzi RDC. In 2020, a Joint Commission was created by the Ministry of Local Government, Public Works and National Housing under the City of Harare, Ruwa Local Board and Goromonzi Rural District Council. The staff members of this Commission are from the government and three Councils of Ruwa, Harare and Goromonzi. However, this Joint Commission has not yet done any progress in terms of WASH provision (Chidhakwa, 2020). The experienced constant changes that have been happening time and again have left the area without WASH service provision. These constant changes have been slowing down development. As a result, to date, the settlement has no piped water system, sewer reticulation facilities as well as refuse collection system. Thus, this has heightened the water, sanitation and hygiene in the area. Below narrations from FGDs and key informant interview bear reference:

Caledonia settlement has been transferred time and again from one municipality to another during President Mugabe's era. For instance, it was once under Goromonzi

RDC in 2012 and was later transferred to Harare in 2017 and back again to Caledonia. It was in 2020 that a Joint Commission was created by the Ministry of Local Government, Public Works and Housing. The Commission was gazetted in terms of the Urban Councils Act. The staff members of this commission are from the government and three Councils of Ruwa, Harare and Goromonzi. However, these constant changes in the governance of the settlement have slowed down the provision of services. Thus, the area has become a haven for water, hygiene and sanitation challenges [Harare Council Employee, 2021].

Another participant noted that:

This issue of Caledonia is very complicated. The area has been witnessing constant transfers especially from Harare City and Goromonzi RDC and vice versa. Recently, we have heard that we are now under a Joint Commission created by Minister July Moyo...but we have not seen any development in terms of water and sanitation provision. Even other services like electricity and roads have not been developed yet. So we are yet to see what this Joint Commission is going to offer. Overall I believe this issue of transferring this settlement is hindering its development [Resident, 2021].

Thus, results from FGD and Key Informant interviews agree that the Councils that have been responsible for service provision in Caledonia have failed to play their role. Even the present Joint Commission has not done any progress to date. This is despite the presence of legislations such as Section 77 (a) enshrined in the Zimbabwean Constitution that advocates for the right to safe, clean and portable water. Even though the section compels the state to take reasonable legislative and other measures to achieve the realisations of this right, it is not playing such role in Caledonia. These results are in line with what was posited by the Public Service Improvement Theory that behaviours and motives of responsible authorities have an impact on service provision. In this study, the behaviours of the Councils and Joint Commission have made little or no progress in terms of service delivery.

4.5 Reasons for the lack of water and sanitation services in Caledonia

4.5.1 Poor Governance

It emerged from this study that WASH challenges in Caledonia are due to poor governance. The settlement is experiencing challenges when it comes to which municipality is responsible for its services. As noted above, the settlement was once under Goromonzi district since 2012 and was later transferred to Harare City council by the then President Mugabe in 2017. Later

in 2020, the Minister of Local Governance directed that a caretaker local authority consisting Harare, Ruwa and Goromonzi be created to provide service in this settlement. During the tenure when the settlement was under Harare City's jurisdiction, the council denied responsibility for the provision of services claiming insufficient resources since the settlement was not under its annual budget. Moreover, the setting up of a caretaker local authority has not yet yielded results since the settlement is still experiencing WASH problems. Therefore, despite it being an urban like settlement, there is no piped water system, proper sewer reticulation system and proper waste disposal services. All these are attributed to poor governance and poor coordination among authorities especially on managing and servicing the informal settlements. Below is a narration by a certain resident during an FGD discussion explaining how governance issues have affected service provision:

We are alone in this precarious situation where water and sanitation are a problem just because of poor governance. We have been transferred repeatedly from one local authority to another. Since 2012 we were under Goromonzi Rural district...but in 2017 the then President Mugabe transferred us to Harare City. However, the city of Harare Council abandoned us claiming that we belong to Goromonzi Rural District. Then recently a Joint Commission was created to speed up the provision of services...however, nothing has been done [Resident, 2021].

Almost similar sentiments were echoed by another resident during a FGD who claimed that:

The WASH challenges in this area emanate from the confusion arising from who is responsible for the provision of services. During the 2012, we were enumerated under Goromonzi district but then transferred to the City of Harare by the then President Robert Mugabe. During his address (Mugabe), he reiterated that he had done this in effort to speed the provision of services in the settlement. However, after some time the city of Harare claimed that they are not responsible for the settlement which they said was under Goromonzi RDC. Then recently we were told that a caretaker local authority had been created to cater for service provision...but honestly we have not seen any progress. As such, we are not getting services we are supposed to be getting due to this confusion [Resident, 2021].

The results of this study are in line with what was postulated by Sunkari, Korboe, Abu, Kizildeniz (2021) and Aiyetan and Das (2021) that challenges to the provision of water and sanitation emanate mostly from poor governance especially in Africa. However, these results

differ from the Enabling Approach that the government with its responsible ministries must create an enabling environment for development projects to work effectively. Instead, in Caledonia, the government is causing much confusion due to the inconsistencies.

4.5.2 Lack of a water reservoir

It was also found by this study that lack of a water reservoir is one of the reasons for the WASH challenges in Caledonia. The majority of FGDs participants attributed water and sanitation challenges to the lack of a water source in the area. Beside that the area is home to an estimated 600 000 people, it does not have a single water source to provide water for the settlement. Participants revealed that the only water reservoir is the one in the nearby location of Mabvuku-Tafara which itself struggles to provide sufficient water to its residents. This therefore has been the main cause to water challenges and has consequently exacerbated the sanitation and hygiene problems to an area already characterised with such. Below are interview narrations with residents who took part in FGDs explaining the lack of water source as the root to WASH challenges;

Since the area is not getting water from Harare city council, it has become extremely difficult for the residents since the area does not have a reservoir to get raw water. The only close by reservoir is found in Mabvuku-Tafara but the problem is that it is not even sufficient for its residents. As such we have water scarcity in the area (Resident, 2021).

Another participant noted that:

In this area water is a problem due to various reasons though I think the absence of a water source is the leading one. This absence of water sources to provide with raw water has led to water shortages in the area which is very bad to this location already home to sanitation and hygiene challenges (Resident, 2021).

This was echoed by another resident who posited that:

I think the main reason for the existing WASH challenges in our settlement is the absence of water reservoirs. Can you imagine there is no single water source where people can fetch water? The only reservoirs are those gullies which fill up during the rainy season. However, they are not sustainable since they only keep water for a short period of time and also water from these gullies cannot be used for public consumption (Resident, 2021).

As such, lack of water reservoirs become a key challenge in the area and has exacerbated sanitation and hygiene problems. These results concur with what was found by The Zimbabwean (2016) peer review report that lack of water sources for raw water has been become the main cause to shortage of water supply, solid waste management and sanitation. Also, these results augur well with what was found by Vallino, Ridolfi and Laio (2020) that numerous areas around the world suffer from both economic and physical water scarcity.

4.5.3 Resource Constraints

It also emerged from this study that resource constraint is the other reason for lack of water, sanitation and hygiene services in Caledonia. It was revealed during interviews that the general underperformance of the country due the economic turmoil has impacted negatively to the provision of WASH services in the area. The research further found that the majority of participants owe the absence of water and sanitation services in Caledonia to lack of adequate resources by responsible authorities to service and develop the area. In the same vein, document review revealed that the city of Harare was cash strapped to the extent that it was failing to cater for Harare main and therefore could not attend to Caledonia' water crisis (Munhende, 2021). During a presentation in parliamentary committee, the then Mayor Bernard Manyenyeni highlighted that “The state of our preparedness to service Caledonia is not going to be pleasant because we are currently failing to supply Harare main due to insufficient resources” [*Former Harare Mayor*].

These sentiments were echoed by a municipal worker during an interview when he reiterated that;

Currently the city lacks sufficient resources to pay for extended residential areas especially the informal ones like Caledonia. Currently the city is facing financial constraints which I assume emanate from the economic quagmire the country is facing. It's not the only place facing such challenges but some like Epworth experience the same fate [Council employee, 2021].

As evidenced by the narrations above, financial constraint is another cause for the lack of WASH services. Indeed, the Municipal authorities face an uphill task which is near impossible to accomplish due to resource insufficiency beyond their control but rather nationwide. These results augers well with the sentiments posited by previous scholars that insufficient funds and limited resources make it difficult to invest in the development of WASH services and in most cases resulting in developing countries failing to keep up with the needs of the growing

population (Kikwasi and Mbuya, 2019; Tacoli, 2012). Also, this is buttressed by a study which asserted that financial shortages have become the common cry within the Zimbabwean municipalities (Mabika, 2015). Therefore, this hinders the ability to provide the needed WASH services (Weber et al, 2018). Results of this study augur well with the PSI theory that when authorities fail to provide resources and financial budgets, there won't be effective provision of social services. Indeed, that is the case with Caledonia informal settlement. However, there exists a fundamental difference between this study and what was posited by the Enabling Approach. The government of Zimbabwe is not providing an enabling environment where finance is abundant in order for WASH services to be developed. This opposes what was put forward by the Enabling approach that governments must ensure that they set up an environment which enables development.

4.5.4 Political Interference

Politics has been found to be playing a centre stage to the causes of lack of WASH services in Caledonia. It was found that political interference in the operation of local governance units has a negative impact when it comes especially to the provision of water and sanitation services. In Zimbabwe, the interference of political parties in the operation of local authorities has compromised the provision of services. During interviews, it came to light that political interference has led to confusion as to which local authority should be responsible for the provision of services in Caledonia. The informal settlement since used to be under Goromonzi rural district council but was later transferred by the then President Mugabe to city of Harare putting much strain to the council which was already failing to provide services to the settlements under its responsibility. This is supported by what was said by the then Mayor Manyenyeni that president Mugabe had put them in a very tight situation. An interview with a municipal worker revealed that these political interferences were making it hard for the settlement to develop since they sometimes disturb the ongoing projects or programs aimed at developing the area;

The political interferences have played a big role in disturbing the development of Caledonia settlement. For instance, a president can just transfer the settlement from a certain municipality to another during a rally. This is done without putting into consideration the projects or programs that might be in place aiming at developing WASH services in the area. As such, this therefore put these projects at halt. So how can the area develop? I urge political parties to stop interfering and just let the

responsible authorities to take the necessary measures for the betterment of the area [Youth Leader, 2021].

Therefore, it can be concluded from the above sentiment that political interference is very bad as it most of the times affects the normal and expected regular WASH services. This study is in line with what was posited by Mngomezulu (2020) that political interference affects the provision of services. However, whilst this study found that political interference has a bearing to lack of WASH provision, other previous studies by Makande and Gelles (2015) revealed that municipalities exhibit lack of political will to deal with informal settlements. Furthermore, results of this study concurs with the Public Service Improvement Theory that politicians have much influence on the provision and delivery of services. Thus, while this study found that political inference is bad for service provision, some studies revealed that its absence is equally bad for the provision of services. Therefore, it still remains debatable as to whether political interference is a good or a bad idea when it comes to service provision. Perhaps it differs from country to country.

4.6 Health implications emanating from WASH challenges

4.6.1 Prevalence of water borne diseases

Results of this study revealed that inadequate WASH services in Caledonia have left residents prone to contraction of water borne diseases. In most cases, water challenges, poor personal hygiene and environmental pollution in Caledonia lead to the proliferation of water borne diseases. All interviewed residents confirmed that they are in constant fear of contracting water borne diseases associated poor WASH services. Diseases such as typhoid, cholera, diarrhoea and dysentery were reported to be the main ones ravaging the settlement. Majority of participants further revealed that they had once experienced these water borne diseases with diarrhoea being the most prevalent one. Cases of malaria and typhoid were reported to be few and happened once in a while. This study further noticed that children are the most affected group by water borne diseases like diarrhoea. The excess WASH disease burden in Caledonia falls to the children whose immune system is weak. All these diseases emanate from the unsanitary conditions that happen mostly due to water shortages, absence of sewer system and poor waste disposal. This was shared by a Caledonia resident who noted that:

The absence of sewer systems as well as proper waste disposal has led to rampant lack of hygiene in the area. This has resulted to the birth of diseases especially diarrhoea [Resident, 2021].

This was echoed by a key informant from the MoHCC who reiterated how the absence of water and sanitation has impacted negatively on health;

Due to the shortage of toilets, people end up relieving themselves in the fields and bushes. As if this is not enough, the absence of garbage collection has left many people with no options but rather throw waste everywhere and this has left the area infested with flies. However, the results have been constant diarrheal cases [MoHCC employee, 2021].

Therefore, results from FGDs resonates results from key interviews that WASH challenges lead to the birth of diarrhoea cases. Consequently, results of this study resonate with previous studies that poor sanitation and unsafe water are the primary causal factors leading to the proliferation of water borne diseases around the globe especially in developed countries (Adeyeye et al, 2021 and WHO, 2019). Same sentiments were echoed by Snyderand and Merson, (2012) that an estimated 875 million cases of diarrhoea in Africa, Asia and Latin America emanate from the absence of WASH services. In addition, that most of the excess disease burden in low developed countries falls on the young children under 5 years relate to what was found by this study (Brown, Cairncross and Ensink 2013).

4.6.2 Malnutrition

In many instances, the persistent contraction of diarrhoea contributes to malnutrition especially in young children. It was found by this study that WASH challenges lead to complex and chain health complications in Caledonia. Interviews revealed that children in Caledonia who have been frequently contracting diarrhoea end up experiencing malnutrition problems. Diarrhoea contributes to malnutrition through the reduction of food intake, decrease in absorption of nutrients, and the increase in catabolism of nutrient reserves. This sometimes results in nutrition related diseases such as kwashiorkor, marasmus, stunted growth or even death among the children. The following quotes from a village health worker and MoHCC worker reveal this;

The water and sanitation problems have been perennial in our area causing extreme health challenges especially to the children and those people with weakened immune system. Most of the children in the area are facing malnutrition challenges and its resultant health complications such as kwashiorkor and marasmus. At first we were not aware that constant diarrhoea contraction can be that bad to the children but health practitioners informed us that it was diarrhoea that was causing undernourishment and the resultant kwashiorkor in our children [Village Health Worker, 2021].

We have recorded numerous cases of malnutrition among children in Caledonia informal settlement. Adding to poor diets among the poor members of the community, consistent cases of diarrhoea have heightened the number of malnutrition cases in the area. What happens is consistent diarrhoea contributes to malnutrition through the reduction of food intake, decrease in absorption of nutrients, and the increase in catabolism of nutrient reserves which sometimes results in nutrition related diseases such as kwashiorkor, marasmus, stunted growth (Resident, 2021).

This confirms what was postulated by previous studies that 50% of malnutrition around the world results from the repeated occurrence of diarrhoea as well as intestinal infections (WHO, 2019). Also, the studies by Guerrant, DeBoer, Moore, Scharf and Lima (2013); Maja (2016); Shandra, Shandra and London (2011); Pemunta and Fubah (2015); Chandra et al. (2010) and Lori (2013) resonate with this study that unabated water and sanitation problems can lead to diarrheal diseases that consequently lead to malnutrition especially among the children.

4.6.3 Depression and Stress

In addition to what was postulated above, this study found that the WASH challenges experienced in Caledonia leads to depression and psychological stress especially to girls and women. Since women are at the forefront of carrying out domestic chores, they are responsible for water availability in majority of households in Caledonia. With the limited water availability in the location, they are therefore responsible for fetching water. In some instances, they travel for long distances where they are subjected to long queues. They are made to wait for long hours before fetching water. Also, they may sometimes fail to get water due to pressure from other members. It is in this process that they may be subjected to harassment by other community members. As a result of all these mentioned challenges which befall women, it was found that some end up depressed. Some get stressed because they are left with no option but to spend a day without water. The entire burden will be on their shoulders hence they stress too much and end up being depressed. The quotations below bear reference;

The truth is many women in this community are subjected to hardships which are not good for their mental health. Women bear all the burden of water fetching in this area. As such, they spend majority of their time travelling to water collection points or waiting in long queues. Imagine how it is to wait in long queues for a long time in this scorching heat. But without another option one is bound to wait and that may lead to stress. People get stressed too much because of too much pressure on their shoulders

and that is not good for the overall health as it might cause other health problems like stroke [Resident, 2021].

Another participant noted that:

Depression has been a silent health challenge people in this area face especially women due to WASH challenges. Besides the stress associated with water shortages, people are exposed to unhealthy scenarios like filthy open dumps. Also, when in long queues some people are subjected to harassment which may be in form of vulgar language or touching on some body parts without consent as some people take advantage of pressure. But without another option, one is bound to come back and exposed to such unpleasant scenarios. However, in some instances, some end up getting stressed and depression becomes the order of the day. I myself have been a victim although there is nothing I can do. Perhaps I will get used to it someday [Resident, 2021].

This echoed what was posited by Baker et al (2017) and Paterson, Wright and Harris (2018) that water, sanitation and hygiene challenges can exacerbate the occurrence of health problems such as psychological stress and depression. Indeed, this study found WASH challenges to be a factor behind mental challenges in Caledonia.

4.6.4 Sexual and Reproductive Health challenges

The study further noted that WASH challenges in Caledonia presents great problems to sexual and reproductive health. It was noted that the inadequate WASH services including safe, private and accessible toilets equipped with soap and water, where individuals can change and clean or dispose of their menstrual hygiene products is a challenge in the community. The availability of these is very essential for girls and women to manage menstruation safely. As a result of WASH challenges existing in this area, women end up using some unhygienic measures which are detrimental to their overall health. As was revealed by interviews, some end up resorting to the use of unsafe water which can cause vaginal infections. Below is a quotation from an interviewee explaining her ordeal:

The absence of safe and clean water as well as private and accessible toilets equipped with soap and water presents sexual and reproductive health challenges to the majority of us who are poverty stricken. We end up resorting to other unsafe means such as using of unclean and safe water to clean ourselves during our periods. As a result, some end

up getting vaginal infections and other long term health complications [Resident, 2021].

These results resonate with previous studies that highlight that inadequate WASH services present a great challenge to the Sexual Reproductive and Health Rights (Zielinski, 2019). Also, a study by UNESCO echoes results of this study that lack of access to clean water can have significant impacts on girl's and women's rights, including their reproductive health (UNESCO, 2021).

4.6.5 Injuries from sexual and gender-based violence

This study found that inadequate WASH services lead to increased vulnerabilities to violence of varying forms. Sexual and Gender - Based Violence, which in some instances lead to injuries or death of victims has been reported to be on the rise in Caledonia. Since most parts of Zimbabwe are subject to patriarchy, Caledonia is no exception. This study found that women carry the burden of water collection in most households of Caledonia. They often leave home before dawn and travel for long distances in the dark to get to the water points early. However, travelling alone in the dark especially in Caledonia where drug addicts, exposes them to sexual assaults. It was found that women are subjected to health problems emanating from sexual assaults. In extreme cases, some victims of sexual assaults end up contracting Sexually Transmitted Infections (STIs) such as Human Immuno-Virus (HIV). As if this is not enough, gender based violence in households was found to be on the rise due to water challenges as some husbands beat up their wives for what they say is failing to do their duties i.e. collection of water. Interview excerpts below support what was discussed above:

Sexual and gender-based violence is now order of the day although it presents with numerous health challenges such as injuries and STIs. There are reports of women who have been victims of sexual assaults during the time they will be travelling to water collection points. Due to pressure at collection points, most people have decided that they wake up early before dawn before many people arrive. However, during these travels which often happen at night, some perpetrators take advantage of these vulnerable women exposing them to sexual diseases [Community Women Leader, 2021].

Another participant noted that:

The WASH burden experienced in this community put women in a very precarious situation. They are expected to make sure that water is available in homes. But due to other commitments including household chores and taking care of children, they may fail to keep up with the pressure. So some husbands don't understand hence they label their wives as lazy who must be given a thorough beating. It is during such violence that some may develop injuries and long term health problems [MoHCC Employee, 2021].

As this study noted, lack of water and sanitation increases women and girls' vulnerability to violence which is detrimental to their health. This confirms the findings by (UNESCO, 2021; Zielinski, 2019) which are of the same view.

4.7 Impacts on Livelihoods

It was found by this study that inadequate WASH services in Caledonia lead to the disruption of the social and economic life for the majority of residents. Most participants revealed that poor provision of water; sanitation and hygiene services greatly affect their survival strategies such as formal and informal vending. Due to the unavailability of safe water accessible by every household at a small distance, most residents have to walk for longer distances to community boreholes and to other households with back yard wells. It was revealed that some residents especially women and girls spend up to five hours per day dealing with water issues. As such, WASH issues consume most of the time when they are supposed to be doing activities for their economic survival such as vending which is the main form of survival in the location. The time spent on collection of water becomes a double burden as it reduces the people's time on other productive activities. Resultantly, they end up being subjected to abject poverty since their income generating activities are affected. The narration below reveals how WASH inadequacy creates a menace to livelihoods in Caledonia;

Actually, the inadequate WASH services greatly consume the time when we are supposed to be doing our activities for economic survival such as vending which is practised by many. The absence of water provision in the area has forced many to travel for some distance to boreholes and wells to fetch water especially mothers and young girls. Irrespective of the fact that they spend most of their time travelling, they are also subjected to standing in long queues for long hours. This reduces time available for other productive activities (Resident, 2021).

Other water and sanitation studies posited that women and young girls are the majority of those involved in water fetching therefore they are the ones who bear the burden of carrying water from long distances in areas with service inadequacy (Majuru et al, 2016 and Nhapi, 2015). Also, Nyaruwabvu (2017) revealed that it is well known that people living in water scarce areas spend most of their time on fetching water which reduces their time for other productive activities. Therefore, results of this study echoes what was found by previous studies. Indeed, WASH challenges greatly affect the livelihoods of many in Caledonia settlement.

Furthermore, this study found out that water challenges in Caledonia are affecting those whose businesses rely on water. As was revealed by majority of participants, some residents of Caledonia are engaged in small income generating projects such as small canteens or restaurants. These canteens require a lot of water in order to operate normally. There is need for water to cook, clean and consumption by customers. However, due to the inadequate water availability, owners are forced to close early when customers are still abundant. Also, owners sometimes spend a lot of their time looking for water from local boreholes. As a result, their businesses are greatly affected. They end up operating for a short space of time which is not sustainable and profitable. It was further found by this study that some canteen owners resort to water buying which is costly. Their small profits end up going for water buying which is expensive as each bucket cost half a dollar (USD). Therefore, their businesses may remain operational but with very little or no profits. Below are excerpts by residents of Caledonia who are Canteen owners revealing what was postulated above;

I need a lot of water to run my Canteen. As you all know, we need water for cooking, we need water for cleaning our utensils, and we need water to give to our customers since most of them would require water to drink after taking a meal. But due to water shortages we are having, I am losing a lot of income because most of the time I am forced to close early irrespective of the presence of customers [Vendor, 2021].

Another participant noted that:

Truly speaking if it was not because of the water challenges we would have been making too much profits from our restaurants. Water shortages force us to sometimes buy water since boreholes are too far from here...but this is not sustainable since buying is expensive. The same amount charged per bucket is the same amount we charge per plate. So we end up using all the profits to buying water...so I can say my

livelihood is greatly affected by this challenge of water we are experiencing [Vendor, 2021].

Results of this study are in line with what was found by previous studies that informal forms of living are negatively affected by water inadequacy (Nyaruwabvu, 2017). Also, estimates by Khalifa and Bidaisee (2018) support results of this study that about 40 billion of working hours are lost to water fetching each year in Africa. This has been the scenario in Caledonia as canteen owners spend most of their time away from their businesses as they go for water fetching to nearby boreholes.

4.8 Mechanisms used by the community to mitigate the challenges caused by the lack of water and sanitation services.

4.8.1 Drilling boreholes and Backyard wells

It emerged from this study that the residents of Caledonia informal settlement have resorted to borehole drinking and digging of back yard wells to curb water shortages. Majority of the participants revealed that they cannot afford borehole drinking since it was too expensive hence they had to dig shallow wells which are a cheaper. The absence of water services has forced people to come up with these new strategies. Chief among the most done coping strategies is drilling of back yard wells. This strategy was revealed to be the most sustainable one irrespective of the other challenges that emanate from it. The following quote explains this;

This settlement has seen a number of residents resorting to digging of back yard wells to curb water shortages. Although those a bit richer are drilling boreholes, majority cannot afford these boreholes hence they have opted for the cheaper backyard wells which they can even dig themselves. This has saved many in this dire situation we are experiencing [Resident, 2021].

However, these coping strategies illustrate the inequalities among families since some afford to drill boreholes which are safe whilst the poor resort to wells which do not provide safe drinking water. Results of this study are in line with what was postulated by Hove and Tirimboi (2011) that unreliable water supplies force residents to drill back yard wells especially in the high density suburbs. It also augers well with what was put forward by Nyaruwabvu (2017) that digging of back yard wells and drilling of boreholes to draw water has become very common in most suburbs especially in informal settlements.

4.8.2 Water Harvesting

Furthermore, this study noted that residents in Caledonia have resorted to water harvesting in an effort to curb water challenges they are experiencing. Residents fetch water from nearby boreholes and store it in large containers so that they can use it for a long time before they go back to fetch again. Some participants revealed that rain water harvesting into capacity tanks and also smaller vessels such as drums and buckets have become a common practise in Caledonia. However, this is only done during the rainy season. Those staying in Caledonia but close to Mabvuku-Tafara suburbs revealed that they also utilise water harvesting equipment installed by American NGOs (US Aid) to harvest water which they use in future. Below are narrations by certain residents explaining their coping strategies to WASH challenges:

It has been easy for us who stay near to Mabvuku Tafara as we also utilise what was installed by US Aid there to harvest water. This water will then be utilised in future hence we can be able to endure a number of days without going to fetch water. This has helped us in this place faced with water crisis [Resident, 2021].

Another participant noted that:

What we do is to collect water from boreholes and store it in large containers. We just give ourselves a certain day where we fetch water to fill our containers which then help us for future purposes. Also, things are easy for us especially during the rainy season where we harvest rain water and put it in our capacity tanks, buckets and drums [Resident, 2021].

This has been useful though not sustainable in the long run. This confirms findings by Chaminuka and Nyatsanza (2013) and Dube who posited that in Zimbabwe individual families have now adopted rainwater harvesting and store it into large containers.

4.8.3 Water purchasing

In this study, it was found out that Caledonia residents have in some occasions forced to purchase water from neighbours with wells and boreholes. Majority of participants revealed that water purchasing had become common among the informal settlement residents. However, it was further revealed that this is expensive and it drains the poor residents of their meagre incomes. Despite that, it is the only option for some residents who have done it for years. Participants reiterated that even though this was expensive to them, they had no option since

water challenges are extreme in the area. Community members who have resorted to water purchasing revealed that:

The water challenges in our areas have forced us to resort to water purchasing. Although it is expensive to us the unemployed with no source of income, we have no option but rather use the little we have to buy this precious thing [Resident, 2021].

A number of people in this settlement survive by water purchasing from those with boreholes and protected wells. We are now used to this trend because we have been doing it for some time and we don't have any other option besides that (Resident, 2021).

This resonates with a study by Mukuhlani and Mandlenkosi (2014) in Bulawayo city which found that residents were forced to buy water from other residents with private wells due to unreliable water supply in Mpopoma Township. Although this is helping, the poor are finding it hard since their meagre income is further drained.

4.8.4 Illegal waste dumping on undesignated sights

Furthermore, findings of this study revealed that residents always resort to dumping of waste everywhere. Due to the absence of refuse collection, FGDs participants revealed that they do not have an option but rather dump the waste in fields, street corners, roadsides, forests or even in water sources. It was further revealed during interviews that open waste dumping was rampant at Gazebo Shopping centre, the heart and soul of Caledonia. The shopping centre is always strewn with garbage all over, with swarms darting from one place to another. This trend of illegal open waste dumping has been on the rise in Caledonia. Below are interview narrations by a health technician and a resident supporting what was discussed above:

Due to the absence of refuse collection in the area, residents have resorted to their own way of waste disposal. These include dumping into water bodies, fields, roadsides, street corners and forests. This is done on a daily basis and has become the order of the day. If you go at Gazebo shopping centre you can see what I am talking about...waste is strewn everywhere with flies darting all over. Nevertheless, even though people have no other option, this kind of waste disposal is problematic since it causes other problems to the environment and human beings [EHT, 2021].

People in this settlement including myself have no other way of disposing waste except dumping on open spaces and bushes. What can we do? There is no garbage collection in this area. Unlike other communities which have a refuse collection system every

week, the Caledonia residents are on their own. As such, they have resorted to dumping on undesignated sights. However, there are some who are very problematic who dump even in roads or near homes of others (Resident, 2021).

Results from FGDs concur with what was found by key informant interviews that residents dump waste on undesignated dumping sights. This unhygienic waste disposal poses serious consequences to the settlement and environment. It hinders the objective of keeping the environment clean and can have serious impacts on wildlife and habitat. Also, this can lead to the outbreak of communicable diseases like cholera and diarrhoea. Irrespective of knowing these challenges, residents of Caledonia have no other alternative since there is no refuse collection in the area. Also, there are no other sustainable and environmental friendly waste disposal measures put in place in the area. Results of this study confirms what was found by previous studies that in areas with irregular refuse collection, dumping of waste in undesignated spaces becomes order of the day (Majuru et al 2016 and Nyaruwabvu, 2017). Also, that illegal waste dumping is detrimental to the environment, wildlife and human beings concurs with what was postulated by (Nyaruwabvu, 2017).

4.8.5 Open waste burning

Due to the absence of refuse collection, people in Caledonia have resorted to deliberate waste burning. It was found by this study that the practise is a widespread, spurred by lack of refuse collection in the area. It is done at small or remote dumpsites and at individual households. This is done by residents to clear waste in their homesteads or at illegal dumping sites. Majority of FGDs participants revealed that they continue burning waste because other disposal methods are not readily available. There is no refuse collection and there are also no other sustainable waste disposal methods that are hygienic. Nonetheless, this has some consequences especially to the environment and human beings. Interviews revealed that black carbon emissions from waste burning contribute to climate change whilst other cancer-causing compounds and other toxic substances from waste burning are very detrimental to human health. Interview narrations below bear reference;

Open waste burning is one of the most prevalent waste disposal methods in this settlement. Since there are no other alternatives of hygienic waste disposal, residents either burn the waste in their homes or in remote dumpsites. However, its diffuse nature-occurring at small or remote dumpsites and individual households makes it a complex problem to address [EHT, 2021].

Another participant noted that:

This settlement has witnessed heightened refuse burning since there are no other alternatives. This is despite its impacts to the environment and human beings. Waste burning is a significant source of dangerous carcinogens like dioxins and furans, and black carbon. Whilst some of these are very harmful to public health, some are detrimental to the environment as they may accelerate climate change as well destruction of flora and fauna species [EHT, 2021].

This was also echoed by a resident during a focus group discussion:

Besides dumping waste on illegal dumpsites, we have also resorted to waste burning since there is no garbage collection in the area. People sometimes burn waste in their backyards at night or they just find an area where they put the heaps of waste and burn it. In addition, people also sometimes burn the waste hips on the illegal dumping sights. When the illegal dumpsites are full people burn them so that they accommodate new garbage (Resident, 2021).

Results of this study are in line with what was put forward by (Nhapi, 2015) that in communities with inadequate waste management systems, waste might be deliberately burned to free up space at dumpsites. Also, results of this study concur with past studies that burning of waste may be very detrimental to the environment and human beings (Makande and Gellas, 2015). Waste burning can lead to the emission of methane and black carbon which are very harmful to human health.

4.9 CONCLUSION

This chapter focussed on the presentation and discussion of the results related to demographic data of participants, the local governance structure in Caledonia, reasons for poor WASH services, the coping strategies and health implications of the urban poor in the face of limited WASH services. It was found by the study that Caledonia is home to a myriad of WASH challenges. The study revealed that poor governance, lack of water reservoir, resource constraints, and political interferences are the reasons for poor WASH services in Caledonia. Consequently, the settlement is suffering from numerous health implications which are rampant due to the absence of adequate WASH services.

There is high incidence of water borne disease such as typhoid and diarrhoea in Caledonia due to absence of inadequate WASH services. Moreover, the study revealed that residents of the settlement are experiencing malnutrition cases, depression and stress, sexual and reproductive health challenges. The absence of WASH services have also negatively affected the livelihoods of community members especially women.

Nevertheless, the residents of Caledonia informal settlement have come up with the coping strategies to the challenges befalling them due to absence of WASH services. The rich families resorted to borehole drilling in their homes whilst the poor dug backyard wells. The chapter further revealed other mechanisms used by the community to mitigate challenges emanating from lack of WASH services such as water harvesting, purchasing, illegal waste dumping on undesignated areas and open waste burning. However, some of the coping mechanisms create other challenges to the community. Consequently, there is need for the acceleration of the provision of adequate WASH services in the area. The next chapter presents the conclusion and recommendations.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter presents the summary of the findings of the preceding chapters and make conclusions from the findings. Lastly the chapter proffers recommendations on what needs to be done to ensure that the noticed challenges can be alleviated.

5.2 SUMMARY

The research looked at the water, sanitation and hygiene challenges existing in Caledonia and the health implications emanating from these challenges. The strategies adopted by residents to cope up with WASH challenges were also unravelled by this study. In the first chapter, there is a presentation of the background to the study and the problem statement which brought out the problem of the area being studied. Also, the chapter highlighted the objectives of the study, research questions, scope of the study, limitations of the study and the clarification of key terms.

The literature review was the basis upon which this study was carried out. It addressed the theoretical framework applicable to this study. It reviewed the history of informal settlements from the global perspective down to the Zimbabwean situation while at the same time addressing the responsibilities of municipal authorities in the provision of WASH services. Moreover, stemming from objectives of the study, the literature reviewed the water, sanitation and hygiene challenges facing informal settlements, their subsequent impacts to health and livelihoods as well as the coping strategies employed by residents to deal with these challenges.

Chapter three which looked on the research methodology provided for the research methods that were utilised by this study. This study employed case study research design to tackle the main objective of this study which is water, sanitation and hygiene challenges in Caledonia settlement. Qualitative approach was utilised by this study in gathering data since it allowed for the in-depth collection of data. The research targeted residents of Caledonia and a sample of 50 people including 40 residents and 10 key informants were used. Purposive and convenience sampling techniques were employed to select participants of this study. The study further utilised semi-structured interviews, focus group discussions and document review to get a nuanced understanding of the WASH challenges existing in the settlement. The chapter further looked at the data analysis and presentation techniques which involved the thematic approach, content analysis and data categorisation.

The research findings were presented in form of themes. The results revealed that Caledonia informal settlement is a haven of water, sanitation and hygiene challenges. The area is home to excessive water challenges and poor waste disposal. These are being caused by poor governance, political interference, financial constraints as well as the unavailability of a water reservoir close to the residential area. This has impacted negatively to the health of many people from individual to household level. Water borne diseases such as diarrhoea, cholera, typhoid, dysentery and malaria have become order of the day. From these challenges emanate other severe health challenges especially to children such as malnutrition. Depression, stress, gender-based violence and unstable livelihoods are also experienced due to WASH challenges. However, this study found out that people have responded in different in an effort to cope up with WASH challenges. While the rich have resorted to borehole drilling, the poor have responded by digging back yard shallow wells. Others have seen water harvesting as a better option whilst some are into water buying. Another section opts to travel to the nearby location of Mabvuku-Tafara to fetch water.

5.3 CONCLUSION

The informal settlement of Caledonia is home to water, sanitation and hygiene challenges. Due to the absence of an intact and permanent local body, the settlement has suffered the resultant consequences. Other factors that have caused the WASH challenges in the area include poor governance, political interference, absence of a water source as well as financial constraints. All these have left the area without water supply system, sewer reticulation system and proper waste disposal or collection system which has resultantly led to a number of public health and livelihood challenges among the inhabitants of the area.

The WASH challenges in the area have wider effects including sexual and reproductive health challenges, waterborne diseases, depression, stress, gender-based violence induced injuries as well as malnutrition especially among young children. Nevertheless, the challenges mostly affect the very poor who are the majority of the residents in the area. Those who are better off have some options to deal with the challenges whilst the poor rue these excruciating challenges.

In dealing with this existential threat of WASH implications, residents have reacted differently due to their backgrounds. Some who are better off have resorted to borehole drilling. The digging of backdoor wells has been adopted also by another section of the community although this is only sustainable during the rainy season. Also water harvesting have become order of the day as some put water in large tanks for future use while others have resorted to purchasing. In terms of waste disposal, residents have resorted to burning as well as disposal on undesignated areas. However, these copying strategies have their weaknesses since some exacerbate health problems. Despite that, residents have no option but to continue engaging in health threatening coping strategies. Therefore, the settlement is hived to multiple challenges as one problem lead to another. Perhaps is because the settlement is not formal and legal hence it is difficult to control by relevant authorities.

5.4 RECOMMENDATIONS

This study noticed that Caledonia is an informal settlement which has become a den to a host of water, health and sanitation challenges. These WASH challenges present a plethora of health and livelihood problems to the whole community. As such, it is vital that recommendations be made for these challenges to be addressed in order to promote public health. In this regard, this study proposed the following recommendations in order to help the government (especially policy makers), municipality and residents to improve and address the water, sanitation and hygiene challenges. That way, public health will be preserved.

- The Ministry of Local Government, Public Works and National Housing (MoLGPWNH) must establish a stand-alone local board for Caledonia informal settlement responsible for the efficient provision of services such as water, sewer reticulation system as well as refuse collection.
- The established local board must secure resources through public partnerships from private sector to fund projects that aid with the provision of sanitation and water services.
- The Government through the MoLGPWNH must make sure that this informal settlement is regularised and ensure that there is enforcement of development control regulations which will bring sanity in this informal settlement. When regularised, it will be easy for the authorities to promote and regulate the supply of WASH services. Residents will be obligated to pay rates and follow ups will be easy to carry when the settlement is legalized.
- The responsible authorities must prioritise investing in more temporary water infrastructures. There is need for the acceleration of borehole drilling, solar powered water pumps and water delivery through bowsers in the settlement so as to cater for water shortages.
- The caretaker local board of Caledonia must at least procure receptacles and also set up a revolving fund which will help with ensuring proper waste management at household level. This will help to prevent the sprouting of illegal dumpsites which have become a menace in the settlement.
- The NGOs must promote the provision of hygiene education and low cost sanitary facilities in order to promote hygiene at household level and beyond.
- The Central Government through responsible authorities must financially support the local authority with capital to enhance the ability to provide sufficient WASH service provision. As was noticed by the study that sometimes responsible local authorities may be cash strapped to provide all locations with the needed services, the central government must cheap in to help.
- The local authorities must ensure that new houses to be built must be planned and conform to set standards. This will make it easier for the proper provision of water, sanitation and hygiene services in the area. The local authorities will just offer stands with a system they know will be easy to provide with services unlike following the haphazard informal construction.

- There is also need for the adoption of inclusive and people centred policies, monitoring and evaluation of systems to continually record the progress that may be required to buttress the already available systems.
- The NGOs must engage in regular awareness campaigns and education to inform and equip residents with the importance of good sanitation and hygienic practises as well as drinking from safe water sources. This will help with the reduction in the incidence of WASH related problems which have been recorded to be high in Caledonia settlement.
- The MoHCC must make sure that they provide Health Care Services in the settlement in order to cater for the incessant health challenges such as diarrhoea and malnutrition emanating from the absence of WASH services.
- The NGOs in conjunction with the government must provide with water treatment chemicals during the rainy season when water harvesting is rampant. This is considering that water harvesting is done during the rainy season and in some instances it might need to be treated in order to be safe for consumption.
- Lastly, this study recommends for the adoption of more gender inclusive policies in order to empower women. It emerged from this study that women are subject to violence because of the gender roles established by the communities. Therefore, it is imperative that local authorities create platforms that promote their independence and equip them with the knowledge pertaining to their rights. This way, women can be able to report gender based violence as well as terminating abusive relationships.

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APPENDICES

APPENDIX A: CONSENT FORM

CONSENT TO PARTICIPATE IN THIS STUDY

_____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

Have read (or had explained to me) and understood the study as explained in the information sheet.

Have had sufficient opportunity to ask questions and am prepared to participate in the study.

Understand that participation is voluntary and that I am free to withdraw at any time without penalty.

Have been made aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential.

I agree to take part and be interviewed and audio recorded by the researcher.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname.....

Participant Signature.....Date.....

Researcher's Name & Surname.....

Researcher's signature.....Date.....

APPENDIX B: LETTER OF INTRODUCTION TO SUBJECTS

PARTICIPANT INFORMATION SHEET

20 May 2021

Title: Coping Strategies and Health Implications of the Urban Poor in The Face Of Limited Water and Sanitation Services: The Case of Caledonia in Harare Zimbabwe.

Dear Prospective Participant

My name is Ambrose Samhokore and I am doing research with Dr Busani Mpofu, a senior lecturer in the Department of Development Studies towards a Master's degree at the University of South Africa. We are inviting you to participate in a study entitled Coping Strategies and Health Implications of the Urban Poor in The Face Of Limited Water and Sanitation Services: The Case of Caledonia in Harare Zimbabwe.

WHAT IS THE PURPOSE OF THE STUDY?

I am conducting this research to find out the causes for lack of water and sanitation services in Caledonia, Harare. It will also focus on highlighting the impact of this problem on the health, economic and social wellbeing of the people in Caledonia and seeks to contribute knowledge towards policy formulation and improvement on service delivery.

WHY AM I BEING INVITED TO PARTICIPATE?

As a member of the community residing in Caledonia, you were chosen to take part in the study so that the researcher can have accurate information from the residents experiencing the problem of lack of water and sanitation services. It will also be an opportunity for the

researcher to have an in depth analysis of what the residents think are the cause of the problem and how it can be fixed. As an official working for Harare Water and Waste Management Services, you are being invited to participate in the study so that the researcher can get more informed information on what the challenges are from the service provider and what they think can be done to come up with a lasting solution in order to provide enough quality water and sanitation services to Caledonia. At community level, the interview sample size is 40 participants. At the Municipal level, from Harare water, the sample size is 10 participants.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves focus group interviews and in depth interviews using a semi-structured interview guide. The interviewer will be asking some questions, recording, taking some notes and the participants will be providing some answers. The participants will be asked a combination of closed and open ended questions. Issues to be discussed will be on the cause of the lack of water and sanitation services in Caledonia, coping mechanisms, impact on health, economic, social wellbeing and potential solutions to the problem. The interview will take approximately take 35 minutes.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time if you wish to do so.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

It is important to take part in this study because it will be an opportunity for the community to voice concerns and suggest possible solutions to the problem of water and sanitation in Caledonia. Findings and recommendations will be shared with the Harare Water and Waste Management department so that they can incorporate ideas which came from the affected community in order to solve the water crisis.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

Some inconvenience in terms time might affect some participants. The researcher will set appointments with participants so that they will agree on the day and time which will be suitable for them.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

Your name will not be recorded anywhere and no one, apart from the researcher and members of the research team, will know about your involvement in this research. No one will be able to connect you to the answers you give. Your answers will be given a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings, this will be done to ensure confidentiality.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet in Pretoria. The information will be capture on an electronic information database which will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded and electronic copies will be permanently deleted from the hard drive of the computer.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No payment or incentive will be provided to participants.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Research Ethics Review Committee of the Department of Development studies, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Ambrose Samhokore on +27834192045 or asamhokore@gmail.com. Should you require any further

information or want to contact the researcher about any aspect of this study, please contact Ambrose Samhokore.

Should you have concerns about the way in which the research has been conducted, you may contact Dr B Mpofu, mpofub@unisa.ac.za, +27124296653.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.



Ambrose Samhokore

APPENDIX C: QUESTIONNAIRE

FOCUS GROUP DISCUSSION GUIDE

This focus group interview guide will be used to interview participants who reside in Caledonia, Harare the study site. Ask the participants all questions, audio record and take some notes. The interview will take 45 minutes.

Section A

1. How old are you? Years
2. What is your gender? Male or Female
3. Are you a resident of Caledonia?
4. How long have you been staying here?
5. Are you formally employed? Yes or No

Section B

Provision of Water

6. Can you share about the water situation in Caledonia.
7. Let's discuss the ways you use to get water for household use.
8. Let's talk about the role of the municipality and water provision.
9. How is your experience sourcing water for domestic use?
10. What do you think are the causes of lack of water supply in Caledonia?
11. What is the impact of lack of water supply in your daily lives?
12. How is the Municipality responding to your current situation?
13. What steps are you taking to ensure you have water for home use.

14. Can you suggest solutions to this problem?

Section C

Sanitation Services

15. Let's discuss on the type of toilets do you have in this community?

16. Do you have Municipality sewer connection in Caledonia.

17. Is the toilet inside or outside your house?

18. Do you have problems with sanitation at your house? Explain

19. What you think the Municipality should do to help you?

Section D

Impact on Health outcomes

20. Let's discuss about any disease outbreaks as a result of lack of water in Caledonia.

21. Do you think lack of water and sanitation services in your community is a risk to the health of people?

22. How long does it take for you to reach the nearest clinic?

23. Does the clinic have running water and sanitation services?

Section E

Socioeconomic impact

24. What do you do for a living?

25. How is the lack of water and sanitation affecting the lives of your family and the community?

26. Does the lack of water and sanitation affect your economic activities?

27. Does the lack of water and sanitation affect school children from attending school?

28. Is there any formal engagement with the Municipality about solving the problems of water and sanitation in Caledonia?

29. Do you like to highlight other issues related to lack of water and sanitation in Caledonia, which I might not have asked you?

Thank you all for your time.

KEY INFORMANT INTERVIEW GUIDE

This semi structured interview guide will be used to interview participants who work at the Municipality of Harare at the Water and Waste Management division. Ask the participants all questions, audio record and take some notes. The interview will take 35 minutes.

Section A

1. How old are you? Years
2. What is your gender? Male or Female
3. Which division are you working for? Harare Water or Waste Management
4. How long have you been working here?
5. What is your job title?

Section B

Provision of Water

6. Can you explain Harare Water operations in Caledonia?
7. Can you highlight the major services you provide in this area?
8. Do you have water infrastructure in Caledonia?
9. What challenges do you have which make it difficult to provide water to Caledonia?
10. What challenges do you face supplying water to Caledonia?
11. Can you describe the plan to provide water to Caledonia?
12. Is the Municipality doing something about water and sanitation issues in Caledonia?
13. Are you getting enough support from the Municipality to solve water problems in Caledonia?
14. What do you think are the solutions to water issues in Caledonia?

Section C

Sanitation Services

15. Do you have sewer pipes connected in Caledonia?
16. Do you have any idea about the types of toilets they use?
17. Do you think sanitation services are a problem in Caledonia? Explain
18. What you think the Municipality should do to provide sanitation services to Caledonia?

Section D

Equipment and Infrastructure

19. Do you have enough tools, machinery and vehicles in order to do your work effectively?
20. Do you have water and sewer pipes connected in Caledonia?
21. Do you think you attend to burst pipes or some water leakages problems on time?
22. Do you think your department is well equipped to do the work effectively?

Section E

Human Resources, Finance and Management

23. What qualifications do you have?
24. Can you explain your skills related to your job?
25. Do you receive in service training?
26. Do you think you have enough staff in your department?
27. Do you think your department have enough finance to discharge your duties effectively?
28. Is the management supporting you in order to effectively provide water and sanitation services in Harare?
29. Are you getting support from the National Government? Explain
30. Do you like to highlight other issues related to lack of water and sanitation in Caledonia, which I might not have asked you?

Thank you for your time.

APPENDIC D: ETHICAL CLEARANCE CERTIFICATE



COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

21 May 2021

Dear Ambrose Samhokore

Decision:
Ethics Approval from 21 May 2021
to 21 May 2024

NHREC Registration # :
Rec-240816-052
CREC Reference # :
60860847_CREC_CHS_2021

Researcher(s): Name: Ambrose Samhokore
Contact details: 60860847@mylife.unisa.ac.za
Supervisor(s): Name: Dr. B Mpofu
Contact details: Mpofub@unisa.ac.za

Title: Coping Strategies and Health Implications of the Urban Poor In The Face Of Limited Water and Sanitation Services: The Case of Caledonia in Harare Zimbabwe.

Degree Purpose: Masters

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for three year.

The low risk application was reviewed by College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the



University of South Africa
Pretorius Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4130
www.unisa.ac.za

confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date (21 May 2024). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 60860847_CREC_CHS_2021 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Yours sincerely,

Signature : 

Prof. KB Khan
CHS Research Ethics Committee Chairperson
Email: khankb@unisa.ac.za
Tel: (012) 429 8210

Signature : PP 

Prof. K. Masemola
Executive Dean : CHS
E-mail: masemk@unisa.ac.za
Tel: (012) 429 2298



University of South Africa
Pretorius Street, Muckleneuk Ridge, City of Tshwane
PO Box 390 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za