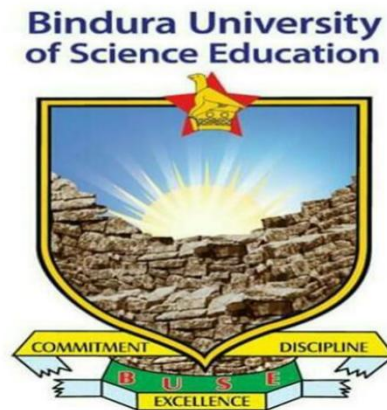


BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

SCHOOL OF GEOGRAPHY

SUSTAINABLE DEVELOPMENT DEPARTMENT



THE IMPACT OF POOR WASTE MANAGEMENT ON COMMUNITY HEALTH:

INSIGHTS FROM GLEN NORAH SURBURBS, ZIMBABWE

A RESEARCH

BY

VINCENT T NGARIVHUME

B1853441

**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF SUSTAINABLE
DEVELOPMENT, FACULTY OF SCIENCE AND ENGINEERING AT BINDURA
UNIVERSITY OF SCIENCE EDUCATION IN PARTIAL FULLFILMENT OF
THEREQUIREMENTS OF THE BACHELOR OF SCIENCE HONORS DEGREE IN
DEVELOPMENT AND GEOSCIENCES**

SUPERVISOR DR MUKWENYI

SUBMITTED JUNE 2025

APPROVAL FORM

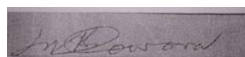
The undersigned confirm that they have read and recommended the project titled: **The impact of poor waste management on community health: lessons from Glen Norah Suburbs, Zimbabwe.** This is a partial fulfilment of the Bachelor of Science Honours Degree in Development and Geosciences. The project was submitted by **Ngarivhume Vincent** student number **B1853441**



23/06/2025

Dr Mukwenyi (Supervisor) Signature

Date



23/06/2025

Chairman's Signature

Date

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.../.../.....

External Examiner's Signature

Date

DECLARATION

I, Vincent T Ngarivhume registration number B185344, do hereby declare the originality of this piece of work.



Signature

23/ 06 /2025

Date

DEDICATION

This dissertation is dedicated to my parents Mr. and Mrs. Ngarivhume for the unconditional love and support they have given me throughout this academic journey. I would also like to dedicate this to my valued siblings and friends who have been my crucial source of inspiration.

ACKNOLEDGEMENTS

Most importantly, I would like to thank the Lord Almighty for leading my way. I am also grateful to my family for their unconditional love and support. Their prayers, encouragement and support kept me going throughout my academic journey. I am also grateful to Bindura University of Science Education together with the sustainable development department for their contribution and support to me during my academic period. My sincere gratitude goes to my supervisor Dr. Mukwenyi, his mentorship, made this research achievable and I am grateful for that. Lastly, I would like to thank the Harare Municipality for granting me the permission to carry out my research together with all the respondents that provided valuable information for my research.

ABSTRACT

Poor waste management creates a significant threat to public health mainly in the high density urban areas where urbanization is outpacing service delivery. There is notable underrepresentation of community perspective and limited empirical data, despite the visible degradation of the environment together with frequent disease outbreaks. The study analyses the reasons behind and the impacts of poor waste management in Glen Norah, evaluating the existing policies and also exploring sustainable strategies for improvement. Through the use of a mixed method approach, the study combines local health data together with qualitative insights from health workers, residents and municipal officials. The results highlighted that irregular waste collection, inadequate infrastructure low public awareness and weak policy enforcement acts as the main contributors to poor waste management. These factors created increased cases of respiratory infections, cholera, and diarrhea particularly among the vulnerable groups. The policy review highlighted that while frameworks for waste management exist, their implementation is mostly hampered by inadequate resources and minimal community involvement. Residents expressed a very strong willingness to participate in these localized waste solutions if adequately supported. The study provided recommendations like enhancement of public health education, investments in community based waste programs, improvement of infrastructure and the effective enforcement of regulations. By addressing both the institutional shortcomings and integrating local knowledge, the findings presents practical implications for urban planners, policy makers and public health practitioners. This research contributes to filling crucial data gaps and supports the design of inclusive, data based interventions that improves waste management and mitigate health risks in Glen Norah and some similar urban communities.

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ACRONYMS

EMA	Environmental Management Act
NEPS	National Environmental Policy and Strategy
PHA.....	Public Health Act
EIA.....	Environmental Impact Assessment
LEAPS.....	Local Environmental Plans
DFEE.....	Department of Forestry Fisheries and Environment
NEMA.....	National Environmental Management Act
EPA.....	Enforcement Protection Agency
CPCB.....	Central Pollution Control Board
NEMC.....	National Environmental Council
EEAA.....	Egyptian Environmental Affairs Agency
WMRA.....	Waste Management Regulatory Authority
PETCO.....	PET Recycling Company
GIS.....	Geographical Information System
FDG.....	Focus Group Discussion

CHAPTER ONE: THE RESEARCH PROBLEM

1.1 Introduction

During this modern era, as urbanization hastens and population swells, challenges of waste management has emerged to be a critical concern for all communities around the world. Improper waste management and disposal not only stir significant environmental risks but stir profound threats on public health as well. During the grappling of cities with increasing amounts of waste, the reciprocity between waste management activities and community health has become a key area of investigation as most developing countries have waste disposal sites in the vicinity of urban areas thus being the source of infection due to the incubation and reproduction of flies, mosquitoes and rodents.

Improper disposal of waste usually presents significant dangers to community health, economic development and environmental sustainability. In some low and middle income countries, poor waste disposal systems result in the accumulation of waste around public spaces thus contaminating water sources, air and soil. This subsequently increases the risk of vector borne diseases, water borne diseases and respiratory problems among other health implications. In Zimbabwe, poor waste management remains a problem particularly in areas like Glen Norah Suburbs where uncollected waste and illegal dumpsites are common sights thus contributing to pollution and disease outbreaks.

This research project consists of five chapters. After this introductory chapter, Chapter 2 reviews the related literature whilst in Chapter 3 there are methods for gathering and organizing research data and they will be explained and justified. Chapter 4 is for the data presentation together with its analysis and lastly in Chapter 5, all the findings are then summarized. Recommendations and conclusions are also presented in this last chapter. All of these chapters are under the need to understand the effects of poor waste management on community health.

1.2 Background of the study

Waste management has a critical aspect affecting public health environmental quality and globally. As population growth accelerate together with industrialization and urbanization worldwide, waste generation continues to rise exponentially. According to the World Bank (2018), municipal solid waste produce reaches over 2 billion tonnes each year, with around 33% of this left unmanaged in a manner that is safe for human health or the environment. Poor waste management has been the main driver to quite a number of health challenges that

includes respiratory infections, vector-borne illnesses and gastrointestinal diseases, together with some chronic conditions that are caused by the continuous exposure to toxic waste.

In Africa, the situation is worsening at an alarming rate. The continuous growth of cities across African countries is now outgrowing the waste management systems thus creating problems. As a result of this, institutions like the African Union made waste management a priority aspect due to its negative impacts on human health and the environment as well. Quite a number of countries in Africa continues to use open dumping and incineration thus leading to soil, air and water pollution. The continuous use of these practices does not only bring danger to the environment, but also bring high burden of disease around communities.

Within some African Countries, cities like Harare, Lusaka and Gaborone have similar systems of waste mismanagement. Weak institutional capacity, and Limited financial resources have created challenges in waste management around urban areas. In some cases, waste collection services are not to rely on as they are mostly absent around informal settlements thus exposing communities to health risks that can be easily be preventable.

In our country Zimbabwe, waste management has grown to be a public concern especially in Harare. The city has been experiencing population growth together with the expansion of informal settlements thus straining the available waste management infrastructure. The Harare City Council together with some environmental stakeholders tried to intervene even though, uncollected waste, illegal dumping and open burning are still prevalent. Suburbs such as Glen Norah, Glen View, Mbare and Epworth are mainly affected, with communities often being exposed to various poor hygiene conditions that increase the risk of communicable diseases like cholera and typhoid fever. The 2018 and 2023 cholera outbreaks in Harare resulted in many deaths thus exposing the grave dangers of poor waste disposal.

Despite the general linkage between poor waste management and poor health outcomes being widely recognized, limited empirical evidence is still a concern mostly in Zimbabwe and Harare, on the detailed aspects through which waste mismanagement do affect community health. Furthermore, less data is available on behavioural responses and community perceptions to various waste-related risks, and the confirmed effectiveness of the existing waste management systems in alleviating health impacts. These kind of knowledge gaps hinder the implementation of evidence-based public health interventions.

Addressing this issue is very important as poor waste management not only fuels inequalities on health outcomes but also tends to undermine the achievement of global and national

sustainable development goals, especially those related to sanitation, health and urban development. Under the context of Zimbabwe's existing struggling healthcare system, the reduction of disease outbreaks that are linked to poor waste management can reduce pressure on medical services whilst improving the quality of life for urban communities. The main purpose of this study is to investigate the impact of poor waste management on community health in Glen Norah, Zimbabwe. Mainly, the study tries to assess the health outcomes that are associated with exposure to poorly managed waste, explore community awareness together with their coping strategies and to evaluate the effectiveness of the initial waste management systems. As a result of this research, evidence-based recommendations are anticipated so as to promote healthier and cleaner environments and also to inform policy formulation.

1.3. Problem statement

In ideal urban settings, proper waste management is an important aspect of sustainable development and community health. Proper collection, treatment and disposal of waste prevents outbreaks of diseases like cholera, malaria and some respiratory diseases like asthma whilst preserving environmental quality and enhancing the quality of life for residents. The municipality is always expected to maintain clean environments through regular collecting of waste and ensuring that both liquid and solid waste are managed in accordance with the environmental standards. This ideal situation contributes to clean, healthy and safe communities where contamination risks and the related diseases are minimized.

However, the reality in some urban developing settlements like Glen Norah suburbs in Zimbabwe strongly contrasts with the above ideal. Glen Norah has been facing challenges in waste management due to factors like limited municipal capacity, inadequate infrastructure, poor community awareness and lack of enforcement of the environmental regulations. Uncollected waste accumulates in open spaces and drainage systems are clogged with waste thus fueling the widespread of illegal dumping. These poor waste management system expose residents to various diseases like typhoid, cholera and dysentery which mostly survive in unsanitary conditions.

If the problem persists, the results will be undesirable. Continuous exposure to the contaminated sites increases the chances of recurrent diseases thus putting pressure on the local health systems. Environmental degradation can become irreversible thus affecting air quality, water sources together with the community aesthetic. Furthermore, the existence of poor waste

management deteriorates the socio-economic potential of communities thus undermining the wellbeing and the dignity of residents.

This dissertation intends to seek the extent to which poor waste management affects community health in Glen Norah. Through the use of qualitative and quantitative methods, the study will gather insights from local authorities, residents and health professionals with the aim of identifying the key challenges, understanding community perceptions and recommending sustainable waste management practices directed to the specific context of Glen Norah. Ultimately, this research also seeks to influence policy and encourage some collaborative efforts between communities, the government and environmental organizations so as to create healthier, clean and resilient communities.

1.4 Research objectives

- To examine the major causes of poor waste management in Glen Norah Suburbs
- To assess the health implications of poor waste management on residents
- To assess the existing waste management policies and their effectiveness
- To propose strategies for improving waste management and reducing health risks in Glen Norah Suburbs

1.5. Research questions

- What are the major causes of poor waste management in Glen Norah Suburbs?
- How does poor waste management impact the health of residents in Glen Norah?
- What are the existing waste management policies and their effectiveness in addressing waste related health risks?
- What strategies can be implemented to improve waste management and mitigate health risks in Glen Norah Suburbs?

1.6. Significance of the study

This research is important as it will provide academic knowledge through providing evidence-based and localized insights on the relationship between poor waste management and community health. Whilst some global studies have tried to establish a general link between mismanagement of waste and the negative health outcomes, there is still lack of specific research within the urban communities of Zimbabwe. This study is going help in trying to bridge this gap by exploring how exactly waste-related health problems are seen among communities and identifying the exact factors that are contributing to this.

Practical recommendations will also be provided from this research so as to improve waste management strategies in Glen Norah. Through doing assessments of the effectiveness of the existing waste management systems and examining responses of the community to related health risks, this research will point out both the strengths and shortcomings of the existing interventions. This helps in providing targeted interventions that are better aligned with the realities on the ground.

Finally, empowerment to communities is provided through highlighting people's everyday experiences together with coping mechanisms including community voices in waste management aspects that promotes a more inclusive decision-making system so as to encourage public participation in the maintaining of clean and healthy environments.

1.7. Limitations of the study

Despite its focus, the study has a restricted geographical coverage since it is confined to Glen Norah suburbs in Harare. Whilst it gives room for deep understanding of the context, it limits the extent to which the results can be applied to outside cities in Zimbabwe where waste management practices and health dynamics may differ. Another limitation is reliability and availability of data. There are incomplete and outdated health records in Glen Norah and this could affect the accuracy of quantitative analysis. Additionally, some residents may be unwilling to participate due to mistrust and fear of reprisal mainly when discussing government services. This tends to affect the depth of qualitative insights obtained through focus groups and interviews.

To overcome these limitations, the research adopts a mixed method approach that uses both qualitative and quantitative investigations. Quantitative methods like analysis of health statistics and household surveys gives measurable data on waste volumes, prevalence of diseases and service coverage thus helping ground the study in observable evidence. Qualitative methods like focus group discussions and interviews provides deeper insights into the lived experiences, perceptions together with coping strategies thus helping in contextualizing the numerical data and highlighting some social dynamics.

1.8. Delimitation of the study

This study is geographically delimited to only Glen Norah, a high density suburb in Harare, Zimbabwe. The study will specifically focus on Glen Norah A and B excluding other suburbs and districts in Harare. Thematically, the research is limited to examining the relationship between poor waste management and community health. It will ignore other environmental

issues like climate change, air pollution and deforestation unless they are directly related to waste management practices. Also, the study will primarily focus on solid waste management as well (illegal dumping and household waste) with less attention on liquid waste unless it intersects with the wider health concerns in the community.

By narrowing the research's focus in this way, it will aim to provide a deep understanding of how poor waste management affects community health in Glen Norah, whilst recognizing that the results may not be directly generalizable to outside settings without further comparative research.

1.9. Definition of key terms

Waste management

Involves processes like collection, transportation, disposal and recycling of garbage and various waste products (Bhuiyan, 2024)

Waste

Unused possessions that no longer have value to people who were using them first (Bhuiyan, 2024)

Community health

It is a field of public health that put focus on studying, protecting and improving health among communities within a geographical location. (Ballard et al, 2023)

Community

Oxford dictionary explained it as a form of social and spatial organization that is centered on common interests. (Grama, 2022)

Health

According to World Health Organization (2006), it is a state of complete physical, social and mental well-being and not merely the absence of diseases.

Health impacts

Changes in health that are a result of exposure to something. (World Health Organization, 2006)

Pollution

Undesirable modification of the soil, water and atmosphere by toxic substances. Webster, 2010)

Environmental sustainability

The careful and responsible management of all natural resources to cater for current needs without jeopardizing the ability of future generations' needs. (Ramsey, 2015)

1.10 Summary of the chapter

An overview of the study has been provided in this chapter, introducing critical issues of poor waste management and the devastating implications on community health, mainly in urban settlements like Glen Norah, Harare. The chapter started at the global perspective narrowing down to the local context of waste management challenges, showing how exactly limited infrastructure, urbanization and poor governance are fueling the growing health burden linked to mismanagement of waste. The background of the study gave the known aspects of this problem, the likes of health risks linked to exposure to undisposed waste whilst at the same time pointing out some knowledge gaps. However, the significance of the study stressed out the importance of providing evidence that guide public health interventions and improve hygiene practices among communities.

Finally, the aim of the study has also been provided which is the impact of poor waste management on community health in Glen Norah, Harare and provided the foundation for the subsequent chapter which will be looking into the literature review.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

Effective and sound waste management serves as a cornerstone for sustainable living in urban areas and it has direct implications for environmental sustainability and public health. During this time of rapid urbanization particularly in urban settlements, challenges of managing waste are now complex. Characteristics of these urban settlements fuel these complexities and they include limited financial support, strained infrastructure and poor policy implementation. In Zimbabwe, urban settlements are facing escalating waste mismanagement crises, fueled by informal settlements, population growth together with poor municipal services. Glen Norah exemplifies the above situations. This literature review will explore the existing researches on waste management and its effects on public health mainly in urban settlements of Africa. It will also examine the significance and principles of waste management, assess some documented health outcomes of waste mismanagement and identifying some key gaps in literature that is related to Zimbabwe's urban settlements. Through this review, there will be establishment of a strong empirical and theoretical foundation that analyzes the health implications of mismanagement of waste in Zimbabwe.

2.2. Theoretical Framework

Theoretical framework acts as a foundational analysis of various existing theories that serves as a direction for arguments that are to be used in a research. Also can be a collection of a number of interrelated themes based on studies attempting to simplify why things are the way they are (Larsen and Adu, 2021). These interrelated ideas identify the major variables that influence a case and explains how these variables might differ.

2.2.1 Environmental Health Model

This model posits that human health is strongly linked to environmental conditions and factors such as waste management, air and water quality, sanitation and exposure to pollutants significantly impacts health outcomes. In the context of Glen Norah, a high density suburb in Harare Zimbabwe, the model helps to examine how poor waste management practices contributes to negative health outcomes among communities.

This model has been actively used in different studies across Zimbabwe for instance, Ngwenya et al, (2024) carried out a qualitative research in Kwekwe City, Zimbabwe, exploring the community perceptions of some health risks that are associated with chemical pollutants. Their

findings highlight the community's awareness of some environmental hazards and their impact on health, aligning with the Environmental Health Model principle.

Similarly, Ranbeti et al, (2018) investigated on community participation in waste management in Bindura, Zimbabwe. Their findings highlighted the correlation between poor management of waste and prevalence of diseases like typhoid and cholera thus reinforcing the model's assertion that environmental factors are the main determinants of health. This model uses a holistic approach, integrating social, environmental and biological determinants of health. This serves as its strength as it facilitates a comprehensive understanding of how exactly environmental exposures like open dumping and uncollected waste leads to health issues like typhoid, cholera and some respiratory infections like. Moreover, this model supports targeted intervention developments that are aimed at improving environmental conditions.

However, the model also has its limits and they include that it may over simplify some complex health issues through focusing on environmental factors potentially ignoring other determinants like access to healthcare services and individual behaviors. Additionally, the establishment of direct causal relationships the environmental exposure and health outcomes can be difficult due to the multifactorial nature of disease etiology.

Despite these limitations, the Environmental Health Model remains a crucial framework for this study due to its emphasis on the relationship between environmental conditions and health outcomes mainly in Glen Norah where poor waste management is a visible and pressing concern. By using this model, the study aims to explain the pathways through which poor management of waste impact community health and to inform the development of sound and effective interventions.

2.3 Conceptual Framework

For this study, the conceptual is based on the understanding that mismanagement of waste has got both direct and indirect implications on community health mainly in the highly populated urban settlements like Glen Norah in Zimbabwe. The key concepts include waste generation and disposal practices where it explains various sources of waste and how the waste is disposed. This concept is a critical public health and environmental issue which is driven by urbanization, population growth and industrialization. Proper management of waste minimizes pollution and conserves the environment and there are various sources including municipal waste from food waste and household trash (Zikali, et al, 2022), industrial waste from construction and manufacturing industries, medical waste from disposed materials generated from treatments,

diagnosis and health protection (Takunda and Steven, 2023). The disposal methods include landfilling where waste is dumped in designated sites, incineration where the waste is burnt, recycling where the waste is broken down and processed into new different products and composting among others.

The other concept is environmental pollution and it is a critical conceptual framework as it helps in understanding how exactly human activities disturbs natural ecosystems and threatens public health (Shetty et al, 2023). It also examines various pollution sources and their impacts. Pollution is mainly as a result of uncollected waste and some disposal methods like burning. As a result of this, air is polluted due to gases released during burning or even by industrial and vehicle emissions, water is polluted due to production of leachate, the soils is also polluted as a result of chemical spills and some uncollected waste together with other forms of pollution like noise. Numerous contaminants contribute to disease incidences which results in increased mortality (Harshitha, 2023).

Community exposure and health outcomes serves as more principles to be mentioned. Exposure is the contact between a population or an individual and an agent that causes negative health effects (Dahlgren, 2021). Exposure is brought up due to environmental effects like air quality where pollutants creates respiratory diseases like asthma, water quality where contaminated water sources creates gastrointestinal diseases like cholera and lastly housing conditions in which poor housing conditions leads to exposure to pests and mold that creates mental and physical health problems like exacerbating allergies.

2.4. Causes of poor waste management in urban areas

Poor waste management has emerged as a pervasive challenge around the world and the accumulation of unmanaged waste creates serious health, environmental and social threats. Whilst this problem is global in nature, it is mostly severe in the low and middle income countries due to poor infrastructure, governance and limited community engagement. This section explore what causes poor waste management from global tends narrowing down to local areas.

2.4.1 Rapid urbanization and Population growth

Globally, population is growing at an exponential rate. The United Nations (UN) (2018) estimated that 68% of the world's population will be living in rural areas by 2050. This growth is much noticed in African countries where cities are rapidly expanding without the

corresponding development of waste infrastructure. The World Bank (2018) highlighted that every 1% increase in urban population, waste generation increases by more than 1.3%.

In Zimbabwe, cities like Harare have experienced significant population growth as a result of rural to urban migration, with suburbs like Glen Norah becoming increasingly overcrowded. This growth of the population has overwhelmed waste management systems. The result of this is excessive waste generation without adequate infrastructure to manage it thus leading to illegal dumping together with proliferation of waste around open spaces.

2.4.2 Inadequate Waste collection and disposal systems

Globally, around 2 billion people lack access to proper waste collection services (UN-Habitat, 2020). Most cities in the Global South are still relying on outdated waste collection methods with irregular service schedule and insufficient funding for maintenance. Often, this results in a lot of waste being left uncollected for long periods.

In Harare, particularly Glen Norah, waste collection is not reliable due to aging equipment and limited municipal budgets. Households are then forced to dump waste in undesignated areas like street corners, open fields and drains. Additionally, there is lack of formal composting and recycling programs so as to reduce the volume of waste sent to landfills, further straining the waste management capacity of the city.

2.4.3. Policy and governance challenges

Inadequate policy enforcement, poor government structure and limited coordination have contributed to inadequate waste management system globally. In many countries, regulations do exist but there are poor enforcement systems due to factor like political instability, corruption and limited technical capacity (Wilson et al., 2015).

In Zimbabwe, although waste management is regulated under laws like Environmental Management Act [Chapter 20:27], enforcement is mostly weak. The municipal council often lack resources for monitoring and penalizing illegal waste disposal offenders. Also, the Environmental Management Act (EMA) has got limited reach as well thus weakening the existing waste management systems. In Glen Norah, despite the clear environmental risks, illegal waste dumping persists as a result of absent enforcement mechanisms. This leads to more creation of dumpsites around households.

2.4.4. Public attitudes and behaviors towards waste disposal

Individual behaviors and public perception are mostly ignored but they play a vital role in waste management. Globally, where environmental education lacks and civic responsibility is low, people tend to dump waste irresponsibly, particularly during times of unreliable collection services (Singh and Kaur, 2024). Even in the developed countries like the United Kingdom, it has been observed that illegal dumping of waste is prevalent and this creates threats to public health and impacts some environmental factors.

In Glen Norah, most residents have normalized the dumping of waste in open spaces and roadside areas. It is clear that there is limited public education on the health hazards that are associated with poor waste management. Moreover, community participation in activities like clean up campaigns is very low and waste recycling and sorting at household level is nonexistent. This behavioral activity exacerbates the existing fragile system.

2.5. Health Impacts of Poor Waste Management

Poor management of waste results in the spreading of diseases and infections through attraction of rodents, pollution from released chemicals through landfill together with greenhouse gasses, respiratory diseases and plastic waste.

2.5.1. Spread of infections and diseases

With more than two billion tons of waste being produced yearly, it is very important to practice effective and safe disposal methods that minimize harmful outcomes on people's health. This is as a result of high levels of contamination in the water, air and soil consequently affecting both the lives of adults and children. Poor handling of waste can create harmful impacts among communities as there will be contaminations of water sources including blockage of water drains thus initiating vector borne diseases like dengue, malaria and cholera (World Health Organization, 2023). The process of fermentation can also take place as a result of improper disposal of organic waste thus promoting ideal conditions for microbial pathogens to thrive and survive (Kenekar, 2021). This can lead to serious health impacts among communities especially when humans have direct contact with the waste. When waste is left unattended, it accumulates and those areas become breeding grounds for the infestations of mosquitoes, rats and cockroaches. It is widely known that rodents cause food poisoning, malaria and dengue, hence it is very important to properly dispose waste. Municipal workers and rag pickers are also at risk of getting these infectious diseases and it is mostly when these individuals are exposed to pollutants and some toxic substances thus resulting in skin irritations and blood infections.

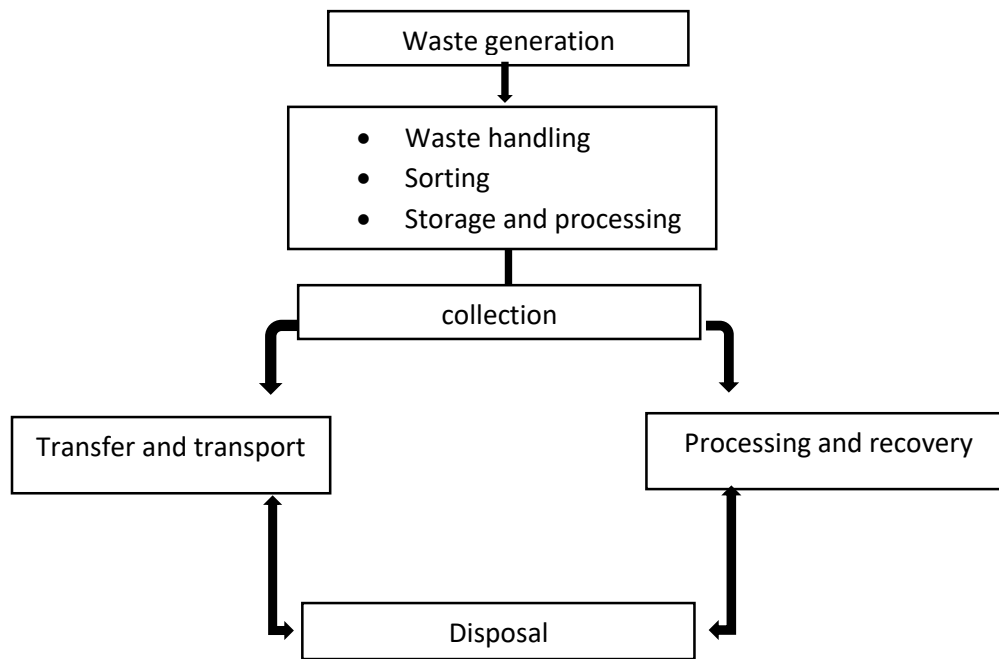


Figure 2.1 Sustainable strategy for waste management facilitation

Fig 2 gives a strategy that facilitates sustainable management of waste. It includes waste generation which is then handled sorted and processed. The waste is then collected processed and transported or recovered and then lastly disposed.

2.5.2. Pollution from chemicals

The use of packaged goods mostly by high earners includes materials like glass, plastics, metals and paper. Hence, waste management is impacted and then reflected through composition discrepancies (Somani, 2023). Some waste is considered hazardous including pesticides, medicine and batteries which are mixed with municipal waste. There is also biomedical waste and it should not be mixed with municipal waste like sanitary products, blood stained clothes and disposable syringes as a result of the risk of contamination and increased rates of infection ((Bhala, 2013). Junkyards have been contributing to the detrimental impacts on community health and the environment (Somani et al., 2021. Anaerobic conditions are usually generated on open dumps thus leading to methane production which is the decomposition of biodegradable waste and this methane gas is a contributing element in fires and explosions together with global warming. (Somani, 2021). The other problem that is contributing poor health challenges is bad odor production and generation of leaches that tends to accumulates within water sources (Srivastava et al., 2014). Respiratory diseases have been recoded and they were as a result of uncontrolled burning of waste with less or no adequate control implementation. This has created the formation of fine particles consequently leading to

respiratory diseases. (Somani et al., 2021). Generally, when hazardous waste is not handled well, it contaminates the soil, air and water affecting community health and endangering wild life and marine life as well. This leads to symptoms like chest pains, cholera and diarrhea.

2.5.3 Emotional Impacts

People who live close to dump sites mainly are affected by stench and social stigma. Under extreme cases, waste is linked to aborted fetuses that may be distressing and can affect the mental state of residents together with those in waste picking. Furthermore, people close to dump sites are disturbed by scavenging animals as they cause psychological and emotional health (Hahad, 2024). There is also heavy poisoning in metals and this has been linked to mental disorders (Poter, 2021).

The aesthetic and psychological impacts can also be seen. Poorly managed waste causes visual pollution which in turn lowers the area's aesthetic value. A neglected and dirty environment diminish overall quality of life as residents may feel powerless to change their surroundings and this is mostly when collective cleanup methods are undermined by the lack of support from the responsible authorities. This feeling can erode motivation, civic pride and community cohesion (Wilson et al., 2015). An explanation for these conditions can be helped by the living conditions in Glen Norah, Harare where poor waste management is a daily reality.

2.5.4 Nutritional challenges due to food contamination

Poor waste management contributes to food contamination which in turn poses serious nutritional challenges mainly in the densely populated areas like Glen Norah, Zimbabwe. Open dumping sites often attracts rats, flies and cockroaches. These pests act as vectors transferring harmful bacteria like salmonella onto food products mainly those sold in informal markets with no proper sanitation measures. A study by Olaimat et al, (2020) highlighted that food that is exposed to unsanitary environments is more likely to have microbial pathogens that cause impair nutrition absorption and illnesses. Glen Norah is known to be one of the suburbs with a lot of informal markets with fruit and vegetables sellers and most of these vendors are around dumping sites. These environments often lack adequate sanitation thus increasing the likelihood of food contamination.

Food contamination doe not only cause short term illness but also contributes to chronic nutritional deficiencies. Frequent diarrheal diseases and gastrointestinal infections reduce the ability of the body to absorb essential nutrients like vitamin and zinc leading to weakened

immunity and increased vulnerability to other infections. According to the World Health Organization (2019), over 600 million cases of foodborne illnesses occur annually and many of these are concentrated in regions with inadequate waste and sanitation systems. In urban settings like Glen Norah, this is exacerbated by the existence of poor infrastructure, overcrowded living conditions and poverty.

2.6. Waste Management Policies and Regulatory Frameworks

Effective waste management is a cornerstone of public health and environment sustainability. In Zimbabwe, several policies and regulatory frameworks have been established to govern waste management, aiming to address issues of pollution, public health and resource use.

2.6.1 The Zimbabwean Context

The constitution of Zimbabwe provides for the environmental rights including ecological degradation prevention, conservation promotion and pollution. It calls for developments in legislative and other measures that protect the environment (Madebwe, 2015). In light of the above, several policies and regulatory frameworks have been established to govern waste management with the aim of addressing issues of pollution, public health and resource use.

There is the (EMA) Environmental Management Act (Chapter 20:27) and it is an environmental legislation administered to provide legal framework for the sustainable management of resources including waste. The act mandates local authorities together with private entities to ensure proper waste disposal and the penalizing of individuals and organizations that practice illegal dumping or pollution. One of its strengths is that it decentralizes waste management responsibly to local councils, allowing for a more tailored service delivery system. At the same time, limitations arise as many councils including Harare face some financial constraints and lack of equipment thus making it difficult to fulfill their mandate (Chikodzi, 2021). This is evidenced by the unreliable waste collection system that Glen Norah faces.

There is also the (PHA) Public Health Act (Chapter 15:09) that links waste management directly to human health. It criminalizes practices that endanger public health such as illegal dumping together with failure to manage sewage and refuse properly. The key objectives under this act include disease control as it establishes measures for controlling infectious diseases and outbreaks through surveillance systems where health departments monitor disease outbreaks through reporting systems that infections like typhoid and cholera. They also use vaccination

campaigns to prevent outbreaks. Environmental health is another objective where waste management and sanitation are prioritized by local councils as they implement waste collection and management programs. The act also has objectives that provides access to health services and community health initiatives through providing clinics and community outreach initiatives to educate people.

Furthermore, there is also the National Environmental Policy and Strategy (NEPS) and it provides a strategic framework for environmental management in Zimbabwe. It highlights the importance of integrating some environmental concerns that includes waste management into the national development planning. According to Chigonda (2020), NEPS was developed as a result of Zimbabwe's growing waste management crisis, deforestation and pollution of water sources. It acts as a blueprint for coordinating environmental efforts across ministries and non-governmental organizations linking closely with other legislations like Environmental Management Act (Chapter 20:27). The policy's emphasis on community participation and local ownerships serves as one of its most important strengths as it encourages stakeholders including civil society and local governments to work together in addressing environmental challenges. In areas like Glen Norah, this theoretically opens the door for community driven waste management initiatives.

Additionally, NEPS has raised awareness about the need for cross sectoral collaboration. It gives acknowledgement on environmental issues like poor waste management stating that they cannot be addressed by the Environmental Agency (EMA) alone but require coordination with ministries of health, education and local government (Zhou and Zvoushe, 2017).

2.6.2 Role of the Environmental Management Agency (EMA)

The Environmental Management Agency (EMA) acts as a principal statutory body that is responsible for coordinating, promoting and monitoring sustainable environmental management in Zimbabwe. It plays an important role in ensuring that environmental resources are managed properly for both current and future generations and its work spans across environmental protection, waste management, pollution control and environmental regulations enforcements.

Part of EMA's functions is to enforce some environmental laws and policies, mainly the provisions of Environmental Management Act. This includes the regulation of waste disposal, issuing environmental licenses, the conduction of Environmental Impact Assessments (EIA)

and prosecutions of violators of environmental standards. According to Chigonda (2020), EMA has been very instrumental in the promotion of regulatory compliance especially in municipalities and industries where pollution is a serious problem.

In urban areas such as Glen Norah, EMA is required to work in unison with the Harare City Council to monitor the illegal dumping of waste and ensure compliance to waste disposal regulations. However, this enforcement has been inconsistent due to limited personnel and some logistical support (Zhou and Zvoushe, 2017).

Another role of EMA is that it plays an educational role, promoting awareness of various environmental problems at both community and institutional levels. Through efforts like workshops, campaigns and school based programs, EMA aims at cultivating a culture of environmental stewardship among communities. As Masocha (2018) highlighted, the public knowledge of waste management responsibilities and rights remains low in the high density suburbs thus making EMA's outreach efforts crucial. In Glen Norah, EMA has conducted several clean up campaigns and has collaborated with local stakeholders to encourage proper waste disposal. However, community participation remains limited thus highlighting the need for more sustained engagement and education.

Environmental planning and monitoring is also another role of the EMA. It is tasked with developing both national and local environmental strategies like maintaining data on pollution levels and monitoring environmental quality. The agency aligns with the creation of Local Environmental Action Plans (LEAPS), which helps communities in identifying and addressing their specific environmental challenges (Mususa and Chirenje, 2022). These plans are important particularly in urban suburbs like Glen Norah where waste and sanitation issues requires local solutions. Through initiatives like these, EMA provides evidence based environmental planning. However, the monitoring capacity of the agency is often disturbed by budget restrictions and outdated technologies (Mapira, 2017).

2.6.3 Comparative analysis

Firstly, there is institutional mandate and policy enforcement. In Zimbabwe, EMA operates under the Environmental Management Act [Chapter 20:27] and it is mandated to regulate, monitor and coordinate all environmental matters. While its mandate is comprehensive, enforcement is weak as a result resource shortage and political interferences (Chigonda, 2020)

In South Africa, there is the Department of Forestry Fisheries and the Environment (DFEE) and it enforces the National Environmental Act (NEMA). It has got more developed infrastructure and a stronger legal enforcement mechanism. Enforcement is decentralized to municipal levels with the environmental courts expediting environmental crimes (Godfrey and Oelofse, 2017).

The comparison here is that despite Zimbabwe's clear mandate, South Africa has a stronger enforcement capacity as a result of availability of stable funding and judicial support thus giving it an advantage in addressing waste violations.

The second one is community engagement and environmental education where Zimbabwe's EMA conducts awareness mainly through partnerships with schools and civil society. However, participation is often low in urban high density areas due to limited outreach (Masocha, 2018).

In Ghana, there is the Enforcement Protection Agency (EPA) that has implemented community based waste management projects and has used local media to promote recycling together with waste disposal. It benefits from some donor funded programs that supports grassroots initiatives (Owusu, 2020).

In India, there is the Central Pollution Control Board (CPCB) that engages in large scale public education campaigns that includes Swachh Baharat (clean India) which successfully mobilized communities nationwide (World Bank, 2019).

The comparison is that Zimbabwe lags behind countries like Ghana in mobilizing community participation and using the media tools for behavior change.

Moving on, there is institutional capacity and funding as another aspect. Zimbabwe's EMA is greatly disturbed by underfunding which leads to limited staff, poor equipment and weak monitoring systems. This cripples its ability to address illegal dumping or support sustainable waste practices (Chikodzi, 2021).

In Botswana, it has the Department of Waste Management and Pollution Control. Despite having a smaller population, Botswana allocates more per capita resources to environmental management and it employs modern GIS based tracking and updates waste database regularly (Taye and Mbongwe, 2016).

The comparison from these countries is that Zimbabwe's EMA operates under severe financial and technical constraints as compared to other regional counterparts. Investment in technology and capacity building remains a critical gap.

2.6.4 Waste management policies from other developing countries

Tanzania

Like any other developing country, Tanzania has growing waste management challenges as a result of rapid urbanization, population growth and industrialization. In response, the government has crafted some policies and legal frameworks aimed at improving waste governance and promoting environmental health.

Legal and Policy Frameworks is the first aspect. The Environmental Management Act (EMA) number 20 of 2004 acts as the cornerstone of Tanzania's waste management policy and it empowers the National Environment Management Council (NEMC) to coordinate and oversee all the environmental protection activities. Some regulations and strategies have been developed under this act including,

The Solid Waste Management Regulations. There is outlining of responsibilities for waste segregation, transportation, treatment, and disposal. They also guide in licensing of service providers together with the development of sanitary landfills.

The National Environmental Policy (1997, revised in 2021) which sets a foundation for sustainable waste management through promoting the polluter pays principle and advocating for community participation.

National Strategy on Sustainable Waste Management (2022–2030). This one as the most recent framework put emphasizes the circular economy, zero waste initiatives together with increased private sector participation.

Institutional Framework and Implementation is the second aspect. There is decentralization in the implementation of waste policies in Tanzania. The Local government authorities, mainly municipal and city councils are the ones responsible for the collection, transportation and disposal of solid waste. However, there is coordination with institutions like the NEMC and the Vice President's Office as well (Environment Division) to ensure that local efforts are in line with the national standards.

Key strategies and innovations as another aspect includes Public-private partnerships. These have helped in bridging some gaps in funding and service delivery especially in all major cities.

Waste to energy initiatives where some local councils have projects aimed at converting organic waste into biogas and electricity.

Community based waste management schemes to involve residents in community clean up campaigns and recycling cooperatives.

Egypt

Egypt has got mounting pressure from the increasing municipal solid waste volumes mainly in the densely populated cities like Alexandria and Cairo. As a result, the government has restructured its system for waste management so as to establish some legal frameworks and institutional mechanisms that are aimed at improving environmental health and sustainability.

Legal and Institutional Framework as the first aspect has got the Waste Management Regulatory Law number 202 of 2020: This one is regarded as the most comprehensive legal framework guiding waste management in Egypt. It establishes all the responsibilities of both national and local entities, enforcing the polluter pays principle and promotes recycling, composting, together with energy recovery from waste (Egyptian Environmental Affairs Agency [EEAA], 2020). The Egyptian Waste Management Regulatory Authority (WMRA) formed under the Ministry of Environment oversees policy implementation, licensing as well as coordination with the local authorities and private companies.

The national strategy of on waste management as the second aspect aligns with its Sustainable Development Strategy of Vision 2030, which put emphasis on environmental sustainability, public health as well as resource efficiency. The waste strategy includes the promoting of integrated solid waste management systems, encouraging waste to energy initiatives, supporting the informal sector that is involved in collection and recycling and establishing sanitary landfills together with the closing of open dumpsites. According to Mekky and Said (2022), this strategy's main focus is on reducing environmental degradation whilst creating green jobs and promoting a circular economy.

Informal sector inclusion and public private partnerships is also another aspect. Egypt greatly relies on public private partnerships in waste collection and disposal, mainly in Cairo. Private companies are the ones contracted to manage collection routes and operate the composting and recycling facilities. At the same time, the government also has initiated steps that integrate

informal waste collectors into the formal system through giving them training, registration, and market access (Wilson et al., 2020).

Angola

Angola also is facing pressing urban environmental challenges as a result of rapid population growth, poor infrastructure and increased consumption. Recently, waste management in Angola is a key area of policy reform as the government is attempting to modernize its systems and enhance environmental health to meet sustainable development targets. Even though Angola's waste management sector is still under development, recent legislative and institutional efforts presents important progress toward sustainable urban governance.

Legal and Institutional Framework includes General Environmental Law (Lei de Bases do Ambiente), Law No. 5/98. This is a foundational law and it sets environmental protection principles including pollution control, waste disposal together with public health protection. It promotes the polluter pays principle as well and provides mechanisms for environmental monitoring (UNECA, 2021).

The Presidential Decree No. 190/12 (2012) on the Regulation of Solid Waste Management. This regulation gives detailed guidelines on waste collection, transportation, storage, treatment, and disposal. It also mandates municipalities to develop plans for waste management and even encourages the participation of the private sector.

National Strategy for Solid Waste Management approved in 2012 is a strategy aimed at improving institutional capacity, establishing sanitary landfills, promoting recycling and formalizing the informal sector. Institutionally, the Ministry of Environment acts as the lead agency that is responsible for implementing national waste policies. The local governments, mainly municipal councils are mostly tasked with service delivery, infrastructure development, and enforcement.

2.6.5 Lessons from successful waste management strategies

Waste management still remains a challenge in many African countries, particularly in urban settings that are mostly characterized by rapid population growth, under resourced municipalities and informal settlements. However, countries like Rwanda and South Africa have made significant strides when it comes to solid waste management. Their experiences offer valuable lessons for countries like Zimbabwe, especially in the improving of urban sanitation, environmental sustainability and public health.

Rwanda

Clear policy direction and strong political commitment is one of Rwanda's most celebrated achievements in waste management. The government banned the use of plastic bags in 2008 under the Law No. 57/2008 and enforced it to the extent of inspecting travellers at borders. The Environment and Climate Change Policy (2019) further promoted a green economy, sustainable handling of waste, and zero-waste ambitions. According to Nsengimana et al. (2020), such high-level leadership has nurtured a culture of accountability and compliance thus setting a positive tone for the governance of waste.

Monthly Community Cleaning (Umuganda)

Rwanda has a monthly community service day Umuganda, a flagship initiative where communities participate in neighbourhood cleaning, waste collection and drainage cleaning. This has been important in nurturing community ownership of waste management and reducing some financial burden on municipalities (World Bank, 2021).

Integrated Waste Planning

The capital city implemented the segregation of waste at source, composting for organic waste and promoting eco-friendly material use. According to UNEP (2020), over 60% of Kigali's waste is biodegradable and successfully composted thus reducing pressure on landfills.

Lesson for Zimbabwe

Law enforcement and political leadership should be considered essential. Glen Norah and similar suburbs can benefit from these communities

based cleaning programs modelled on Umuganda. Limiting or completely banning of plastic usage, together with strict enforcement can significantly reduce waste volumes.

South Africa

South Africa created a well-structured legislative environment that supports waste management and the National Environmental Management: Waste Act (No. 59 of 2008) acts as the cornerstone in emphasizing waste minimization, recycling, as well as extended producer responsibility. The National Waste Management Strategy (2020) is for promoting the circular

economy, supporting all waste pickers and establishing targets for landfill diversion and waste beneficiation (Department of Environment, Forestry and Fisheries, 2020).

Integration of the Informal Sector has been seen as South Africa has taken deliberate steps in recognizing and supporting waste pickers and integrating them into municipal waste systems through registration, training, and partnership programs. According to Viljoen et al. (2021), this greatly improved livelihoods and increased recycling rates particularly in cities like Johannesburg and Cape Town.

Also, Public-Private Partnerships and Extended Producer Responsibility in South Africa schemes pushes manufacturers to take responsibility for their waste products. Organizations like PETCO (Pet Recycling Company) and The Glass Recycling Company have been very instrumental in promoting collection and recycling across the country. These efforts are facilitated through private waste contractors who manage collection, sorting and landfill operations together with local governments.

Lesson for Zimbabwe

The informal sector dominates in collection and recycling of waste and if Zimbabwe formalize it, there can be benefits. The enforcing of producer responsibility laws can even shift some burden from municipalities to businesses thus encouraging packaging redesigns and increased recycling. Public-private partnerships also can improve service delivery in some resource-constrained suburbs like Glen Norah.

2.7. Strategies for improving waste management and community health

2.7.1 Enhancing waste collection and disposal infrastructure

The effective management of waste is heavily dependent on the availability and functionality of physical infrastructure for collection, transportation, treatment, and disposal. In most developing urban settlements like Zimbabwe's Glen Norah suburb, the absence or dysfunction of such infrastructure leads to uncollected waste, open dumping, burning, and disease outbreaks thus enhancing this infrastructure is not only an environmental imperative but also a critical public health measure.

The most immediate improvement can be made through investments in waste collection systems. Expanding fleet capacity provides more vehicles for waste collection and ensuring regular maintenance reduces the backlog of uncollected waste, which often attracts disease

carrying vectors like rats, flies, and mosquitoes that spread diseases (Mwanza & Mbohwa, 2016).

Improved scheduling and routing through geographical information systems (GIS) mapping and digital route planning can enhance efficient collection and reduce fuel costs and emissions (Mwesigye et al., 2019). The supplying of standardized waste containers for households and public spaces encourages proper disposal at source, reducing littering.

Enhancing transportation and transfer facilities is also important as waste needs to be safely transported to various treatment or disposal sites without causing any environmental or public health hazards. This can also be helped by developing local waste transfer facilities that allows for temporary storage and sorting before final disposal. This helps in reducing the distance travelled by collection trucks and optimizes logistics (Hoornweg & Bhada-Tata, 2012).

2.7.2 Community engagement and education programs

Awareness building on health and environmental Risks helps a lot as public education campaigns can help individuals understand the health implications associated with poor waste management. Studies highlighted that communities exposed to consistent messaging about risks like waterborne diseases, respiratory infections, and vector borne diseases are more likely to adopt safe waste disposal habits (Adama, 2020). In Zimbabwe, areas characterized with waste burning and dumping in wetlands are common in low-income areas thus educational outreach can highlight the links between waste practices and the outbreaks of diseases like cholera and typhoid (Taru et al., 2020).

Education programs that put more focus on waste segregation at source can significantly reduce landfill waste and promote recycling. A good example includes communities that are taught to separate organic, recyclable and hazardous waste. They can reduce contamination and support local recycling initiatives. In South Africa, public education has been a key component in supporting formal and informal recycling programs thus helping to reduce municipal waste burdens (Viljoen et al., 2021).

Encouragement of ownership through participatory planning can also be useful as community engagement involves not just informing residents but involving them in decision making processes. When people participate in designing waste management solutions such as siting of bins, organizing clean-up days, or monitoring illegal dumping they are more likely to feel responsible for their environment thus yielding favourable results. Programs like Rwanda's

Umuganda where communities participate in monthly cleaning campaigns have produced remarkable success in fostering civic responsibility and environmental pride (Nsengimana et al., 2020). Glen Norah could benefit from such initiatives that incorporate traditional leadership with community action.

Community participation also includes working with informal waste collectors and resident associations. The training and organizing of these actors into waste management cooperatives can improve service delivery and create livelihood opportunities (Wilson et al., 2015). Therefore, strengthening informal networks and local leaderships can help in yielding good results.

When looking at Glen Norah, engaging local leaders, and waste pickers in joint awareness and planning efforts can help reduce the illegal dumping of waste whilst improving communication between residents and city authorities. Schools and youth programs can be used to create long term changes. Children and youth are the key changing agents in community behaviour thus making School based environmental education and clean up campaigns create positive long term behavioural change and embed environmental values. In Zimbabwe, the Environmental Education Strategy (2019) under the Environmental Management Agency (EMA) already uses school outreach and expanding programs like these in Glen Norah can raise a new generation of environmentally conscious citizens.

2.7.3 Strengthening policy implementation and enforcement

Addressing institutional and capacity Gaps is the first step. Limited capacity of local authorities is a major barrier to effective policy enforcement in Zimbabwe. Municipalities are often facing budgetary constraints, staff shortages, together with outdated equipment which in turn hinder enforcement of waste bylaws and national regulations. According to Masocha (2020), local authorities are lacking institutional coordination and logistical support for them to enforce waste disposal laws effectively. Therefore, to strengthen policy implementation, it requires increased funding, better training and modernization of waste handling tools.

Enhancing Legal Enforcement Mechanisms can also be used to strengthen this agenda. Despite using bylaws and fines for open dumping, enforcement remains weak as a result of corruption, limited public awareness and lack of follow through. Offenders are rarely penalized thus reducing the deterrent effect of the laws. Chagutah et al. (2021) argued that poor legal accountability in environmental offences undermines the rule of law and contributes to

widespread ignorance. Strengthening the enforcement mechanisms such as community environmental watch groups, mobile courts and stiffer penalties can improve compliance.

Waste management policies in Zimbabwe are often fragmented across multiple agencies like city councils, EMA, Ministry of Environment together with local health departments thus creating overlaps and inefficiencies. Strengthening implementation means creating harmonized inter sectoral policy frameworks with clear roles and accountability mechanisms. According to Makwara and Magudu (2017), strong coordination between stakeholders yields more efficient resource use and policy execution mainly at the local level where waste management challenges are most visible. This helps in understanding how important is the promotion of policy coherence and interagency coordination.

2.7.4. Adopting sustainable waste management solutions

The first and most important principle of sustainability in waste management the minimizing of waste generation at source through efficient resource use, better packaging practices and public awareness. According to Kaza et al. (2018), up to 30% solid waste in developing countries can be avoided if better purchasing and production practices are used. Through encouragement of reduced consumption, promotion of reusable items and reducing single use plastics, waste volumes can be significantly lowered. Practical applications can include the introduction of zero waste school campaigns and incentivizing businesses so as to adopt sustainable production.

Recycling is another aspect and is a core component of waste management that contributes to environmental conservation, job creation and reduced landfill pressure. In Africa, most recycling is informal with waste pickers playing a critical role. South Africa has an estimated 60 – 90% of recycling being done by informal collectors (Godfrey et al., 2019). Glen Norah suburb can replicate this success by giving support and formalizing waste picker cooperatives, establishing sorting stations, and providing training and protective gear.

Organic waste including food and garden waste makes up a large portion of urban waste in Zimbabwe. When left rotting in open dumps, it emits methane and attract disease vectors. Composting creates a sustainable solution through converting this waste into nutrient rich fertilizers. As noted by Abarca Guerrero et al. (2015), composting reduces waste volumes and improves soil health thus benefiting urban agriculture. In Glen Norah, community gardens could use compost generated from household waste thus enhancing both food security and

environmental health. This shows how composting of organic waste can be a sustainable waste management solution.

2.8. Research Gaps

Despite the growing global interests in environmental health, there are still significant research gaps in the understanding of how poor waste management affects community health particularly in urban settings of developing countries like Zimbabwe. Many waste and health studies rely on broad correlations rather than empirical and data driven evidence that quantifies certain health effects resulting from inadequate waste management. For instance, while it is public knowledge that poor waste disposal increases the risk of diseases like typhoid, cholera and respiratory infections, few studies in Zimbabwe have provided the quantitative data that shows how changes in waste management can directly affect the incidence of these illnesses at community levels. Without empirical data, policymakers will struggle to justify investments in waste infrastructure as health interventions.

Additionally, another gap is the underrepresentation of community perspectives and solutions in waste management researches. Most of the literature uses top down approaches, focusing on government inefficiencies or technological interventions, whilst ignoring the experiences, knowledge and innovative practices of waste pickers local residents and community leaders.

2.9. Chapter summary

In conclusion, this research on the impact of poor waste management on community health emphasizes its crucial importance in local communities, pointing out the negative results that arise when waste is poorly managed due to some reasons like inadequate infrastructure and poor community awareness and participation. This poor waste management creates direct and indirect health issues like infections and vector borne diseases respectively. Despite awareness of these issues, there are still gaps in linking waste practices to health outcomes and implementing some community driven solutions. Addressing these challenges calls for a combination of improved infrastructure, policy reforms and active community engagement so as to protect public health while enhancing urban living conditions. The following chapter details the methodologies employed in this study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter will provide a framework for the methodology used in data collection which is important to the examining of the poor impact of waste management on community health. This chapter will use a detailed assessment of the design, targeted population, the sampling techniques, sample size, instruments for data collection and presentation. This section will explain more on the research paradigm and approach, showing how they are in line with the goals of the study.

3.2 study area

Glen Norah is a high density residential suburb that is located in the southern part of Harare. The area was originally designed to accommodate a modest population but has been experiencing significant growth lately, resulting in overcrowding and strain of public services. Physically, Glen Norah is characterized by poorly maintained roads, closely packed housing units and inadequate sanitation infrastructure. Waste is often dumped and accumulates in open spaces along roadsides as a result of irregular municipal collection and illegal dumping. The area is divided into sections A, B and C and is home to an estimated population of over 100,000 people many of whom are living below the poverty line. Economic activity in Glen Norah is largely informal with its residents engaged in street vending, cross boarder commerce, backyard mechanics and small scale trading. As a result of limited employment opportunities and poor household income, waste separation and disposal are not prioritized and this worsens environmental health conditions and increases residents' exposure to disease risks.

Figure 3.1 shows the map of the study area (Glen Norah) where the research was focused on. The map was created using GIS with Zimbabwe Shape files which were downloaded on the internet.

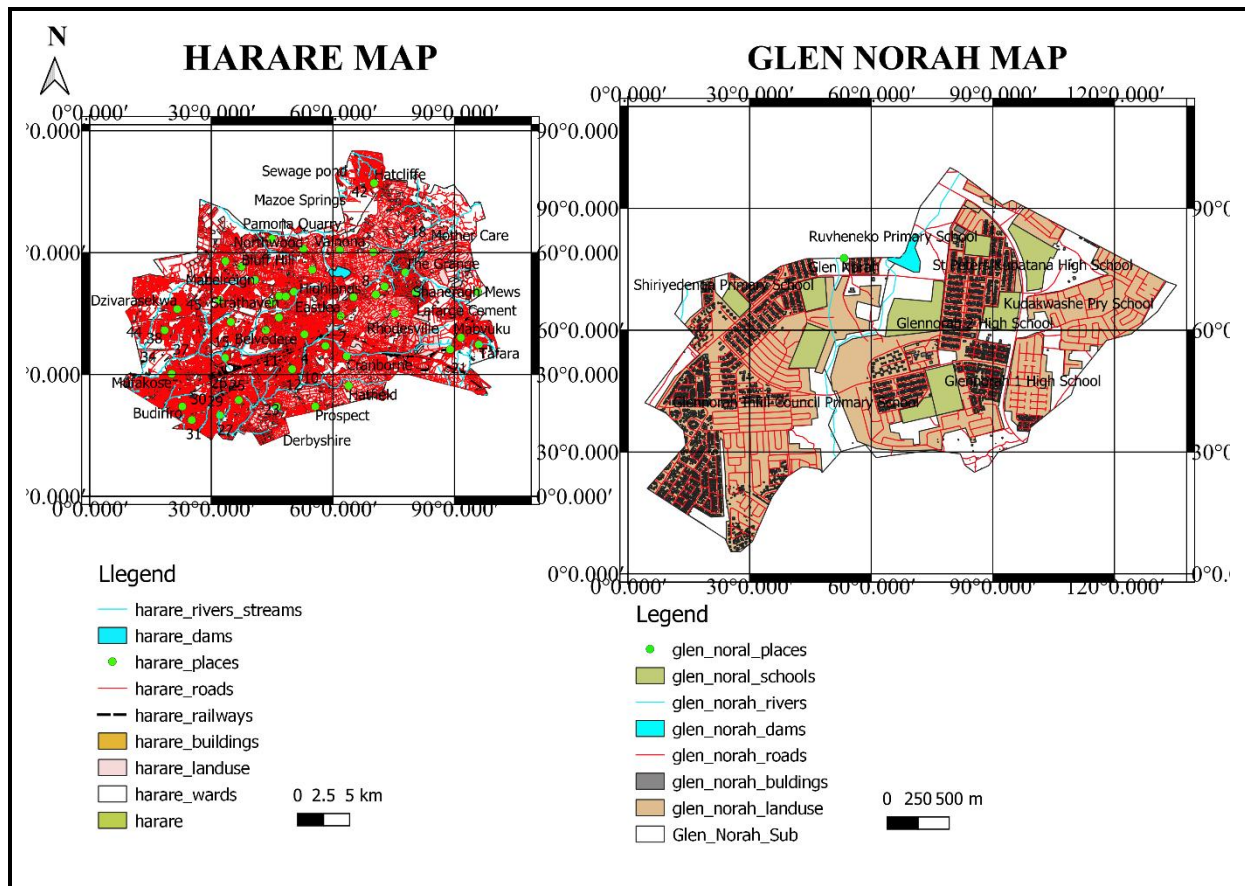


Figure 3.1 Study Area Map (Source: Author)

3.3 Research paradigm

This research is grounded in the pragmatism paradigm which emphasizes on practical solutions to real world problems through the integration of various methods and perspectives. Pragmatism is not bound by strict philosophical positions like positivism or interpretivism but instead, it values most effective approaches in addressing the research problem at hand (Sitter et al, 2022). This then makes it suitable for exploring complex socially embedded issues like waste management and public health.

In the context of this study, pragmatism supports the mixed methods approach that combines both quantitative and qualitative data. This helps in gaining a comprehensive understanding of how exactly poor waste management affects the health of Glen Noah Residents, capturing both the measurable impacts and the lived experiences of the community. The pragmatic paradigm acknowledges that knowledge is both constructed and experienced and thus decision making in waste management should be informed by empirical information as well as community values and local contexts (Lim, 2023). The goal is not only to analyses the relationship between waste management and health but also to identify some practical context specific interventions

that can be implemented by stakeholders like community leaders, local authorities and residents.

By applying this approach, the research remains solution oriented and open to multiple forms of evidence that makes it a powerful framework for addressing the environmental and health issues in Glen Norah.

3.4 Research design

Research design refer to a detailed plan that outlines the overall approach and strategy for study conducting, including the way data will be collected, measured and analyzed (Creswell, 2018). It acts as a blueprint connecting the research questions with the data collection and analysis process. This research used a case study design that is based on mixed methods approach that allows for the consequential application of both quantitative and qualitative methods in the analytical survey so as to understand the impact of poor waste management on community health in Glen Norah suburb. The analytical case survey design is the most suited for this study because the research gathered information, summarized, presented and interpreted for the clarification purpose, deeper understanding and recommending of improvements.

This case study design gives room for both qualitative and quantitative methods to be incorporated in one study. Kothari (2014) added that a good research design makes sure that the evidence obtained helps the researcher in answering the research questions as ambiguously as possible. This minimizes bias, increase accuracy and facilitates logical and efficient procedures.

One of the strengths of the case study design is the adaptability to various types of research questions and to various research settings. Multiple source of evidence use allows the triangulation of findings which according to Yin (2018), acts as a major strength of the case study design. Also, the other advantage of case studies is of the format that makes the research accessible to a wider readership than other designs. This is so because this design is sensitive to context, processes and lived experiences. It even further allows to get closer to what exactly is being studied and aims for the in-depth understanding in doing justice to life complexities. Thus, an analytical research design is used essentially to collect information about people's opinions, attitudes, evaluations and feelings among others in a variety of social issues. Analytical research is very useful in the evaluation of characteristics of large populations for instance elderly, professionals and youths in Glen Noah.

3.5 Target population

Population is defined as group of individuals with one or more characteristics in common that is of interest to researchers (Creswell, 2018). Therefore, this implies that population has a group of people or things that are of interest that a researcher can investigate. The study focused on Glen Norah community who live and face daily challenges in meeting health needs. Glen Norah covers Ward 27, 28, and 29 of Harare Metropolitan Province, which is an urban district. According to ZIMSTAT (2022), Ward 27 has a total population of 33 506 and 9 176 total households, Ward 28 has a total population of 27 934 and 7 231 total households, and Ward 29 has a total population of 11 101 and 2 939 total households. The whole population of this study composed of community members of Glen Norah, local leadership, opinion leaders and other civil society organizations. However, not everyone was included in this study as a result of practicality reasons thus, making the researcher to sample.

3.5.1 Sample Calculation

The sample size was calculated using the Yamane Formula, the study used the household number from ward 27, 28, and 29. The total number of households all together is 27 508. Here is the calculation of the sample size.

Onwuegbuzie and Collins (2007) emphasize that sample selection should balance quantitative representativeness and qualitative depth, while remaining feasible for the researcher. Initially, a sample size of 394 participants was calculated based on ZIMSTAT (2022) population data. However, a revised sample of 100 questionnaire respondents was justified due to methodological considerations. Studies indicated that sampling like purposive and random can yield meaning insights with 100-150 participants ensuring representativeness without excessive redundancy (Lakens, 2022). For the qualitative component, 5 key informant interviews and 3 focus group discussions (each with 8 participants) were selected based on data

saturation, where insights become repetitive beyond a certain threshold. Therefore, the selected safe size for this study was 129 participants.

3.6 Sample and sampling techniques

Sumkus (2022) denote that sampling is the obtaining of information about the whole population by examining a small part of it. This is when elements of a population are used as representatives of the whole population. Hence, a sample is a proportion of the whole population that is selected using some predetermined procedures. The use of a sample is crucial since covering the whole population is usually not practical and is costly in terms of material resources.

Since the study has an analytical approach that is based on mixed methods, both the probability and non-probability sampling has to be used. Sampling methods and justification for each is shown below

(a) Random sampling

The random sampling was crucial in providing each Local Authority leadership, Local school authorities, health personnel and community member a fair chance to participate when selected for the study. This helped in reducing bias in the selection and response type. This sampling was done randomly without looking at who is who from the population.

(b) Purposive sampling

There are cases where there are people who hold the desired information and are known in advance, purposive sampling is applied. For instance, health personnel, Local authority leadership and opinion leaders. The councilor of the area always has crucial information on how the government plans for waste management and health initiatives and as a result, these were purposively selected. However, the selecting of participants purposively may disturb other potential participants thus increasing response bias.

(c) Convenience sampling

Convenience sampling was used especially where almost everyone was aware of the poor waste management issues in the area of study. For instance, the residents of Glen Norah were selected upon basis of convenient availability to participate on focus group discussions. The researcher used this sampling technique after being sure that everyone is aware of the waste practices and its health impacts on community health. However, this type of sampling usher biases as those

conveniently available might lack essential information. The drawback of purposive and convenience sampling was reduced through the use of mixed sampling techniques.

3.7 Data collection instruments

To effectively address the research objectives and questions, the study made use of a combination of interviews, questionnaires and focus group discussions. These instruments were chosen so as to align with the mixed method design and pragmatic paradigm thus enabling the collection of both quantitative and qualitative data for a comprehensive understanding of the research problem.

3.7.1 Interviews

The study required asking of oral questions being helped by an interview guide so as to get the evaluations and views of key informants on the issues of poor waste management on community health. The key informants included municipal officers, health officials, Environmental Management Agency (EMA) personnel and community leaders. Majali (2012) defined interviews as conversations in which there is an interviewer establishing general direction for a conversation and pursuing specific topics raised by informants. Here, key informants are chosen because of their knowledge and are expected to share their expertise on waste management and public health.

The layout (see appendix B) included open-ended questions that were arranged by key themes related to waste practices and health outcomes. Key themes included challenges in waste management service delivery, policy implementation gaps and enforcement issues, observed health outcomes and risks in the community and recommendations for improving waste and health conditions. This enabled rich and contextual understanding of the systematic and administrative issues. It also captured firsthand experiences and expert opinions that are not easily obtained through structured surveys.

The advantage of using interviews is that the researcher gets to acquire the desired information immediately through dialogue. The researcher was in a position to quickly understand the waste disposal issue and its influence on community health in Glen Norah. To add more another advantage is that a dialogue during interviews tend to explain more than what is actually on the paper and also that clarification is immediately given when the questions on paper are not clear to the respondents.

3.7.2 Questionnaires

A questionnaire is a set of well-organized questions that are asked to participants so as to get information about people's behavior and attitude for action with much respect to the topic under study. Questionnaires were used to collect data from the residents of Glen Norah on their waste disposal practices and health experiences. They comprised mainly of close-ended questions (likert scale and multiple choice items) covering demographic access to and satisfaction with municipal waste collection, incidence of health problems like cholera and diarrhea together with types and frequency of waste disposal (see appendix C).

This gave allowance for standardized data collection from large samples and facilitates the statistical analysis to identify trends and relationships like that between waste practices and health outcomes.

The advantage is similar to the one above and it is that immediate information is obtained as the respondent provide their thoughts and feelings. It also helps in saving costs. They even help in keeping anonymity to some respondents.

3.7.3 Focus Group Discussions (FDG)

The focus group discussions were held with residents in order to explore collective experiences and perceptions pertaining waste management and health. Groups were composed of 6-8 participants and discussions were guided by a prepared FDG protocol (see appendix D) that covered attitudes towards waste disposal, community awareness of the health risks linked to waste, challenges in engaging with formal waste systems and suggestions for community based waste management improvements. This tool was most suited for this because it encouraged dialogue and shared insights, revealing the community level dynamics and informal copying strategies. It also was useful in exploring the social norms and behaviors that surveys might miss.

3.7.4 Piloting the instruments

Before the commencement of the full scale data collection process, a pilot survey was done to set and refine the research instruments. Instrument piloting is a crucial preliminary step in any empirical study, particularly when there is use of multiple tools like in this mixed method research. The piloting exercise was done in Glen View, an area that is demographically similar to Glen Norah. The questionnaire was piloted with 10 individuals selected randomly from the pilot area with the aim of assessing the clarity of the questions, the appropriateness of response options and the overall structure of the instruments. During this process, participants were

encouraged to highlight on any areas they found confusing or difficult to answer. It was observed that some technical terms like ‘solid waste’ were not easily understood by all respondents and were simplified with easy words like ‘rubbish’. The likert scale items were also revised for better balance.

The semi structured interviews were piloted with two healthcare workers who were not included in the main sample and two local officials. This helped in testing the flow of questions, the relevance of topics and the ease with which respondents could engage in meaningful discussion. Results were of the need to rephrase certain questions that were too vague and ensure that they were more focused and aligned with the research objectives. Additionally, the sequencing of the questions was a bit modified so as to create a more natural conversational flow.

The FDG guide was also piloted with a small group of six community members that were selected to reflect a mix of ages and gender. The focus group aimed at testing the discussion prompts and observe how participants engage with each other and the facilitator. This section was crucial in identifying complex questions during group discussions as well as ensuring that the moderator’s instructions were clear and conducive to inclusive participation.

3.7.5 Instrument Validity

The research instruments were validated through pilot testing and expert reviews. First, the instruments were reviewed by experts in public health and environmental management to ensure the relevance of the questions and that key areas of the study are covered. Then a pilot study was done with a small group from a neighboring area to test for clarity, consistency and comprehension. Based on the results, unclear technical terms were simplified and question flow was adjusted. Finally, the use of multiple instruments for data collection from different groups helped to confirm the credibility and accuracy of responses, ensuring that the tools effectively captured the intended information.

3.7.6 Instruments reliability

To ensure reliability, the questionnaire structured with standardized and clear questions to reduce variability in interpretation. A pilot test was done with a small sample from a neighboring area to assess whether the same results could be obtained consistently under similar conditions. For the qualitative tools, the same set of guiding questions were used for all

participants so as to maintain consistency. The responses were recorded and later cross checked to ensure accuracy in data capture and interpretation.

3.8 Data collection procedures

These are practical procedures taken into consideration when administering selected instruments and collection of data from subjects in a study (McMillan and Schumacher, 2020). Necessary approvals and permissions were obtained from the various responsible authorities including a letter from the sustainable department (see appendix E) and a letter from Harare Municipality (see appendix F) in order to undertake a research in Glen Norah. The consent form (see appendix A) was also obtained from interested participants. The researcher even gave in depth information about the study together with guarantees of privacy and optional participation.

Quantitative data was collected through the administration of questionnaires to the randomly selected residents across different sections of the study area. The questionnaires were delivered in person with the help of some research assistants who were fluent in both Shona and English. The assistants clarified all the areas that the participants found difficult to understand and they ensured that the forms were completed correctly. Data collection took approximately over a week, with daily reviews of completed questionnaires for completeness and accuracy.

Qualitative data was also gathered through semi structured interviews and focus group discussion (FDGs). Local health officials, municipal waste officers and EMA representatives comprised the key informants for interviews and these interviews were scheduled at convenient times and held in private and quiet places so as to allow open discussions. Each of these sessions was guided by a flexible interview protocol and took between 30 to 45 minutes. With permission from the participants, audios were recorded and supplemented with note taking.

Focus group discussions (FDGs) were also held with residents grouped by gender and age so as to capture diverse community perspectives. Each group had 6 to 8 participants and was moderated by the researcher with the support of a note taker. These FDGs opened the room for dialogue about waste practices and community health concerns together with the possible solutions. Each session took about an hour and again with consent, was audio recorded.

All the collected data was securely stored and anonymized during transcription and analysis. The researcher continued to engage in reflection and validation checks including member checking and peer debriefing to ensure trustworthiness and accuracy of the data. By the integration of quantitative and qualitative procedures, the study provided a holistic

understanding of the complex issues of waste management and health in the Glen Norah community.

3.9 Data analysis Techniques

The quantitative data was analyzed using descriptive and inferential techniques. Descriptive statistic like frequencies and percentages were used to summarize the demographic data, reported health outcomes and waste disposal practices. Relationships between variables such as frequency of waste collection and reported health complaints were analyzed through cross tabulations.

The qualitative data from interviews and focus group discussions were analyzed through the thematic analysis technique. Initial codes were developed based on emerging issues recurring phrases and issues relevant to the research questions. These codes were even organized into broader themes like community perceptions of waste management and health risks linked to waste exposure.

To ensure validity and trustworthiness, triangulation was done by comparing findings across various data sources and methods. For example, resident's responses in questionnaires were compared with insights from the interviews with local officials and discussions in focus groups. Finally, both sets of findings were integrated during interpretation and this enabled the study to present a clear picture of exactly how poor waste management affects community health in Glen Norah by highlighting the lived experiences, perceptions together with suggestions from community members.

3.10 Ethical Principles

Ethical principles are always a crucial component for the conduction and researches, especially those that involves human participation. This study which explores the impact of poor waste management on community health in Glen Norah was guided by key ethical considerations like informed consent. Before data collection, participants were fully informed of the purpose of the study, their role in the study and how the findings will be used. Consent forms were provided and participation was entirely voluntary.

Another key consideration was anonymity and confidentiality. The identities of participants were not recorded on questionnaires or linked to any interview transcripts. Instead, codes were used to ensure that data could not be tracked back to any individual. All the digital and physical data were securely stored and the researcher was the only one with access to them. Also, all identifying information was excluded when reporting so as to preserve anonymity.

Finally, ethical approval for the study was obtained and authorization was sought out from the Harare City Council. This helped in making sure that the research adhered to the local cultural and administrative expectations.

3.11 Chapter summary

In conclusion, the chapter provided the research methodology used on investigating the impact of poor waste management on community health in Glen Norah. It highlighted the adoption of a pragmatism research paradigm and a mixed methods approach that integrated both quantitative and qualitative methods. The chapter described the use of interviews, questionnaires and focus group discussions as the data collection instruments and explained how these tools were piloted, validated and made reliable. Sampling techniques, data collection procedures and data analysis methods were explained in this chapter. Lastly, ethical principles were emphasized, including confidentiality and informed consent. Together, all these methodological choices enabled an inclusive and ethically sound investigation of the research problem. The following chapter will present findings from data collected.

CHAPTER 4: DATA PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter will discuss and analyze the results of the study, exploring the impact of poor waste management on community health in Glen Norah. The data was obtained through

interviews, focus group discussions and questionnaires as outlined in the previous chapters so as to have a clear understanding of the waste practices and their effects on health. The data will be presented in form of pie charts, graphs together with some descriptions for further illustrations. Also, the structure of the presentation will be in accordance with the research goals.

4.2 Response rate

The study targeted 129 participants, comprising 100 questionnaire respondents, 3 focus group discussions each with 8 participants, and 5 interviewees. However, a total of 126 research subjects managed to participate in the study constituting 95% response rate. Among these 126 participants all expected 100 took part in the survey by completing questionnaires. Focus Group Discussion participants were 8 from the first group, 6 from the second, and 7 from the third group. All the 5 expected interviewees took part in the interviews.

The table 4.1 presents information on the number of different categories respondents who participated in the study through three different data gathering methods.

Table 4.1 Participants Response Rate

Data gathering methods	Targeted respondents	Frequency	Percentage
QUESTIONNAIRES	100	100	100%
INTERVIEWS	5	5	100%
FGDs	24	21	86%

Table 4.1 shows a strong engagement from participant with an overall response rate of 95%. This shows that most of the people in Glen Norah participated. A high response rate minimizes the risk of bias and this can also improve the validity of the conclusions drawn from participant responses.

4.3 Demographic profile of respondents

The table below shows the key informants who participated in this study and these key informants included both male and female participants.

Table 4.2 Demographic profile of respondents

Demographic factor	Category	Frequency (n=126)	Percentage (%)

Gender	Male	56	44%
	Female	70	56%
Length of stay in Glen Norah	1-5 years	37	30%
	6-10 years	62	49%
	10+	27	21%

The demographic outline of participants in the study revealed a little higher representation of female participants (56%) compared to male participants (44%). In terms of length of stay in Glen Norah, the majority of participants (49%) have stayed in the area for 6-10, followed by those who have stayed for 1-5 years (30%), and those who have stayed for more 10 years (21%). This distribution suggested a moderate to long-term connection with the area among participants, which could provide valuable insights into the waste management issues in Glen Norah.

4.4 Major Causes of Poor Waste Management in Glen Norah Suburbs

This investigation revealed quite a number of causal factors contributing to poor waste management in Glen Norah suburbs. These factors are explained below.

4.4.1 Inadequate waste management infrastructure

Inadequate waste management infrastructure serves as a crucial agent of poor waste management mainly in the urban settings like Glen Norah. When infrastructure like collection trucks, bins, disposal sites and transfer stations is poorly maintained, waste accumulates in the residential areas, waterways and open spaces. In many low income suburbs, the population does not match with their waste bins and also the collection services are not reliable due to the lack of functional trucks and fuel.

Table 4.3 shows the contribution of several missing waste management infrastructures in Glen Norah. In this table the NO column indicates the percentage of participants who reported a lack of infrastructure, highlighting the extent of the problem. The high percentage in the NO column suggest significant shortages in waste management infrastructure in Glen Norah.

Table 4.3 Availability of Waste Infrastructure in Glen Norah

Type of Infrastructure	Yes	No	Total
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Are there adequate refuse bins in Glen Norah?	10%	90%	100%
Are there sufficient waste collection trucks in Glen Norah?	20%	80%	100%
Is there a proper waste disposal site in Glen Norah?	5%	95%	100%
Are there functional waste transfer stations in Glen Norah?	15%	85%	100%

Table 4.3 shows a significant shortage of waste management infrastructure in Glen Norah, with 90% of participants indicating a lack of adequate refuse bins, 80% reporting insufficient waste collection trucks, 95% citing the absence of a proper waste disposal site, and 85% stating there are no functional waste transfer stations. These gaps in infrastructure contribute to poor waste disposal practices, environmental pollution, and health risks, underscoring the need for investment in waste management to address these pressing issues.

Insights from FGDs supported that inadequate waste management infrastructure is a major driving factor for poor waste management in Glen Norah. One of the respondents had to say:

“...we do not have refuse bins here from the Municipal, we use our own bins, and however, we can go up to a month without our bins being collected”. (Participant 20)

During interviews, Municipal Officer admitted that there is a huge gap in term of waste management infrastructure. Municipal Officer mentioned that:

“...there is shortage of Municipal waste management infrastructure such as bins in the community due to several such as shortage of funds and some residents destroy some of the metal bins through burning of waste, which leads to shortage bins.”

This then pushes residents to resort to the illegal dumping of waste which contributes to environmental pollution and health hazards. Additionally, shortage of properly designed recycling facilities leads to unmanaged waste to be disposed of in areas that are not safe thus exacerbating the risks to community health. Where there is no a strong and sound infrastructure system to support waste handling, even community awareness and well-designed policies are undermined thus making it difficult to achieve sustainable waste management.

4.4.2 Limited Government Support and Capacity

The effectiveness of waste management in Glen Norah is also influenced by the level of government support and capacity. Participants were asked to indicate the extent to which they agree that government support and capacity are adequate.

Table 4.4 illustrates the respondents' perceptions of government support and capacity for waste management in Glen Norah. The NO column indicates respondents who believed that government support or capacity is inadequate, while the YES column indicates those who believe it is adequate.

Table 4.4 Government Support and Capacity for Waste Management

Type of Support/Capacity	Yes	No	Total
Is there any sufficient funding for waste management in Glen Norah?	15%	85%	100%
Are there enough trained personnel for waste management in Glen Norah?	20%	80%	100%
Is there any effective waste management policy enforcement in Glen Norah?	10%	90%	100%
Are there adequate equipment and vehicles for waste collection in Glen Norah?	25%	75%	100%
Is there regular monitoring and evaluation of waste management services in Glen Norah?	5%	95%	100%

Table 4.4 shows that government support and capacity for waste management in Glen Norah are limited. A significant proportion of participants reported inadequate funding (85%), insufficient trained personnel (80%), ineffective policy enforcement (90%), inadequate equipment and vehicles (75%), and lack of regular monitoring and evaluation (95%). These limitations contribute to poor waste management practices observed in Glen Norah, highlighting the need for increased government support and capacity to address these challenges.

Insights from interviews shows that lack of government support and capacity is one of the major causes of poor waste management in Glen Norah. One municipal worker noted:

“...the municipal faces challenges such as shortage of funding to purchase fuels and bins, sometimes there will be no functioning trucks and it's not our fault”.

Waste management Officer mentioned that:

“...there is a limited number of trained personnel who can work collectively to enhance waste management”.

During focus group discussion residents' responses shows that there is a gap that the government has to bridge to improve waste management. One of participants highlighted that:

“...the municipal does not enforce waste management laws, we only know that there are laws but there are no people who had be arrested for improper waste dumping. The City of Harare mentioned that if a person drops litter everywhere has to pay a \$500 find but it seems like it does not affect here in Glen Norah”. (Participant 8)

Without strong institutional capacity, enforcement of regulations becomes weak thus allowing illegal dumping and non-compliance to be unpunished. Also, the absence of modern day waste management technology and infrastructure like sanitary landfills and recycling centers continue to limit the ability of managing waste sustainably. The continued lack of support also hampers engagement programs and public education thus leaving communities uninformed about effective waste disposal practices. As a result of this, waste continues to accumulate in public areas, creating unsafe conditions for residents.

4.4.3 Lack of Public Awareness and Education

Shortage of public awareness and education plays a very big role in causing poor waste management mainly in these urban settings. When residents are not fully educated about the environmental and health risks associated with improper waste disposal, they are most likely to be ignorant and less likely to engage in some responsible behaviors like separating waste and recycling. Most people view waste management as the responsibility of the government, ignoring that their daily actions like littering and open dumping contributes to public health issues.

Table 4.5 shows the participants' perceptions of public awareness and education on waste management in Glen Norah. The NO column indicates respondents who believe that public awareness or education is inadequate, while the YES column indicates those who believe it is adequate.

Table 4.5 Public Awareness and Education on Waster Management

Aspect of Public Awareness and Education	Yes	No	Total
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Do you participate in community waste management programs or initiatives like Cleanup Campaign?	23%	77%	100%
Are you aware of the health risks associated with poor waste management?	42%	58%	100%
Do you the importance of waste segregation?	15%	85%	100%
Have you received education on waste management?	20%	80%	100%
Are you aware of proper waste disposal practices?	44%	56%	100%

Table 4.5 revealed that public awareness and education on waste management in Glen Norah are limited. A fundamental proportion of participants reported being unaware of proper waste disposal practices (56%), not receiving education on waste management (80%), not knowing the importance of waste segregation (85%), being unaware of the risks associated with poor waste management (58%), and not participating in community waste management initiatives (77%). These limitations likely contribute to the poor waste management practices observed in Glen Norah, highlighting the need for increased public awareness and education to address these challenges.

During the interviews, Healthcare Officials highlighted that a certain number of residents are not aware of health risks that associated with poor waste management. Healthcare Official mentioned that:

“...most residents are not aware of the health risks associated with poor waste management because there is a lot of waste near water points which is unhealthy, some of them handle waste with bare hands, and poor handling of sharp objects and waste containers of chemicals”.

Municipal Officers highlighted that:

“...during clean up campaigns most of the resident do not participant, only people who work in the government and NGOs participate during such activities.”

Insights from discussions also shows that there is lack of public awareness and education on waste management in Glen Norah. Of the respondents had to say:

“...we never received any form of education from the municipal about waste management, there are some of things we just heard them but we do not know what is it, like the issue of segregation”.

Additionally, limited awareness disturbs community participation in efforts like clean up campaigns thus hindering the success of local waste programs. Therefore, lack of sustained efforts to involve the public and educate them, waste management systems fail.

4.5 Health Implications of Poor Waste Management on Residents

The second objective assessed the health implications of poor waste management practices among the residents of Glen Norah. The results presents alarming insights on how the existing waste management situation is affecting community health.

4.5.1 Prevalence of vector-borne disease

This section presents findings on the prevalence of vector-borne disease that are associated with poor waste management. Figure 4.1 illustrates the prevalence of vector-borne diseases in Glen Norah, showcasing a concerning trend in community health.

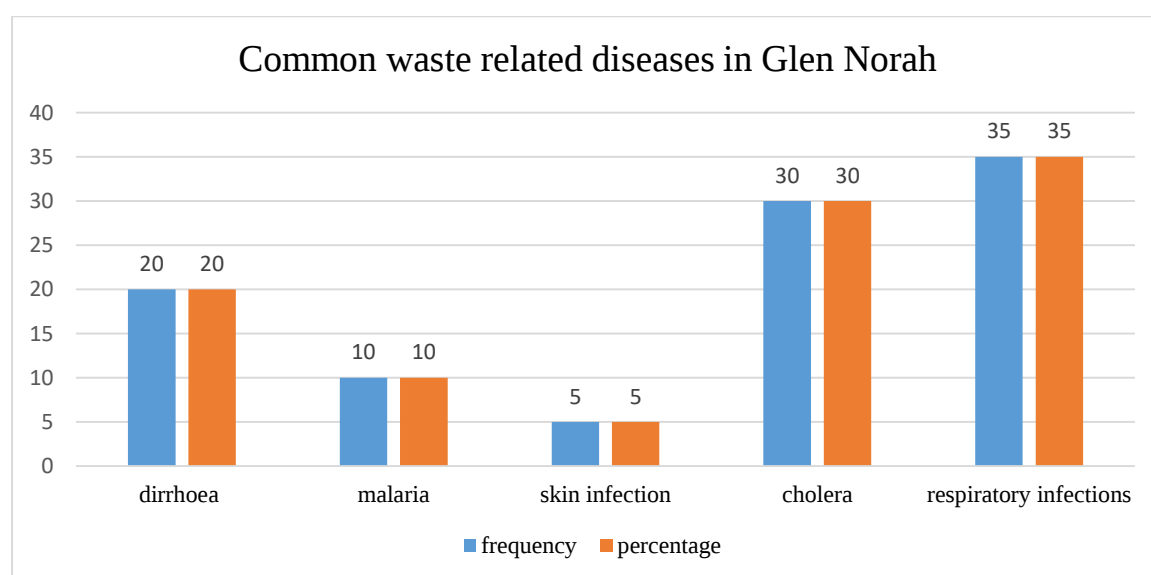


Figure 4.1 Common Waste Related Diseases in Glen Norah

Figure 4.1 shows that respiratory infections and cholera are the common waste-related diseases, with 35% and 30% reported cases respectively. Diarrhoea also poses a significant health risk, with 20% of cases attributed to poor waste management practices. Malaria and skin infections, while less prevalent, still contribute to the overall burden of disease, with 10% and 5% of cases, respectively. The findings suggested a strong link between waste accumulation and the spread of diseases, emphasizing the need for improved waste management practices to mitigate these health risks.

Interviews with some healthcare professionals confirmed this as they noted an increase in cases that are related to waste accumulation. Healthcare Official had to say:

“...there is high reports of illness caused by poor waste management, if uncollected waste continues to be left unmanaged, more reports will continue to come as this waste carries vectors like flies and rats”.

Focus group discussions highlighted the fear among residents concerning some health risks that are associated with poorly managed waste around their neighborhoods. One of the participants mentioned that:

“...When waste is illegally dumped and left uncollected, it creates conducive breeding grounds for disease carrying vectors like flies, mosquitoes and rats”. (Participant 11)

Another participant highlighted that:

“...Stagnant water in blocked drainage systems also creates perfect conditions for mosquitoes that transmit dengue fever and malaria. Also, flies breeding on rotting organic waste can transmit pathogens that cause diarrheal diseases”. (Participant 15)

4.5.2 Psychological Effects

The psychological effects of poor waste management are a critical concern, as they can have an intense impact on the mental health and well-being of individuals living in affected areas. This section presents the findings on the psychological effects of poor waste management, as reported by participants in the questionnaire.

Figure 4.2 shows the distribution of respondents' experiences with the psychological effects of poor waste management.

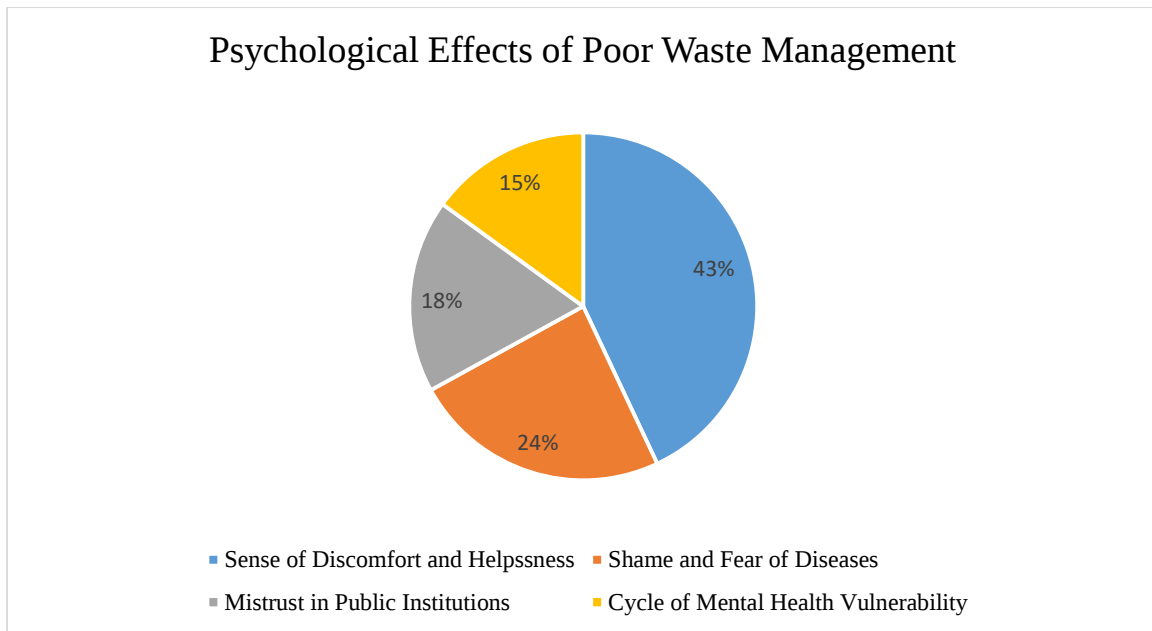


Figure 4.2 Psychological Effects of Poor Waste Management

Figure 4.2 shows that poor waste management has a significant impact on the mental health and well-being of individuals living in affected areas. 43% reported sense of discomfort and helplessness. 24% reported shame and fear of diseases, 18% reported mistrust in public institutions and 15% of the participants reported cycle of mental health vulnerability.

Insights from interviews with municipal officers seconded the notion that poor waste management has a fundamental impact on the mental and well-being of individuals living in affected areas. One municipal official had to say:

“...shortage of resources and infrastructure to manage waste effectively is a major challenge. We are doing our best with the resources we have, but it is not enough. The community is suffering, and it is affecting their mental health and well-being”.

EMA also supported the notion that poor waste management has a significant impact on the mental health and well-being of individuals living in affected areas. One of the team member had to say:

“...we have seen firsthand the impact of poor waste management on the community. The smell, the dirt, the diseases, it is all taking a toll on people’s mental health. We need to do more to address this issue”.

A focus discussion was conducted with participants to gather more insights into the psychological effects of poor waste management. The discussion revealed the following key points:

One participant noted:

“...the waste around here is really getting to me. It is stressful and makes me concerned about my health and my family’s health.” (Participant 17)

Another participant argued that:

“...it is not just about the health risks, it is about how it makes us feel. We are living in a place that is dirty and smelly, and it is affecting our mental health.” (Participant 16)

Another participant seconded that saying:

“...I feel like I am losing my sense of dignity living in this environment. It is like we are not valued as human beings.” (Participant 3)

A different participant added that:

“...I am more worried about my kids. They are always playing on waste, and I am scared they will get sick. It is hard to see them suffer like this.”

4.6 Existing waste management policies and their effectiveness

The Environmental Management Act enforces the environmental act and mandates local authorities to manage the safe disposal of waste, while penalizing illegal dumping and pollution. Despite these regulation’s presence, findings from Glen Norah reveals ongoing waste related problems that include illegal dumping, uncontrolled waste accumulation and frequent burning of waste.

4.6.1 Effectiveness of Existing Policies

This section presents findings on the effectiveness of the existing waste management policies in Glen Norah, highlighting the perspectives of respondents on the impact of these policies on waste management and health risks.

Figure 4.3 shows data on effectiveness of existing waste management policies in Glen Norah. Participants were asked to rate some of the existing policies on a scale of 1 to 5, where 1 represents **not effective**, 2 represents **slightly effective**, 3 represents **neutral**, 4 represents **effective**, and 5 represents **extremely effective**.

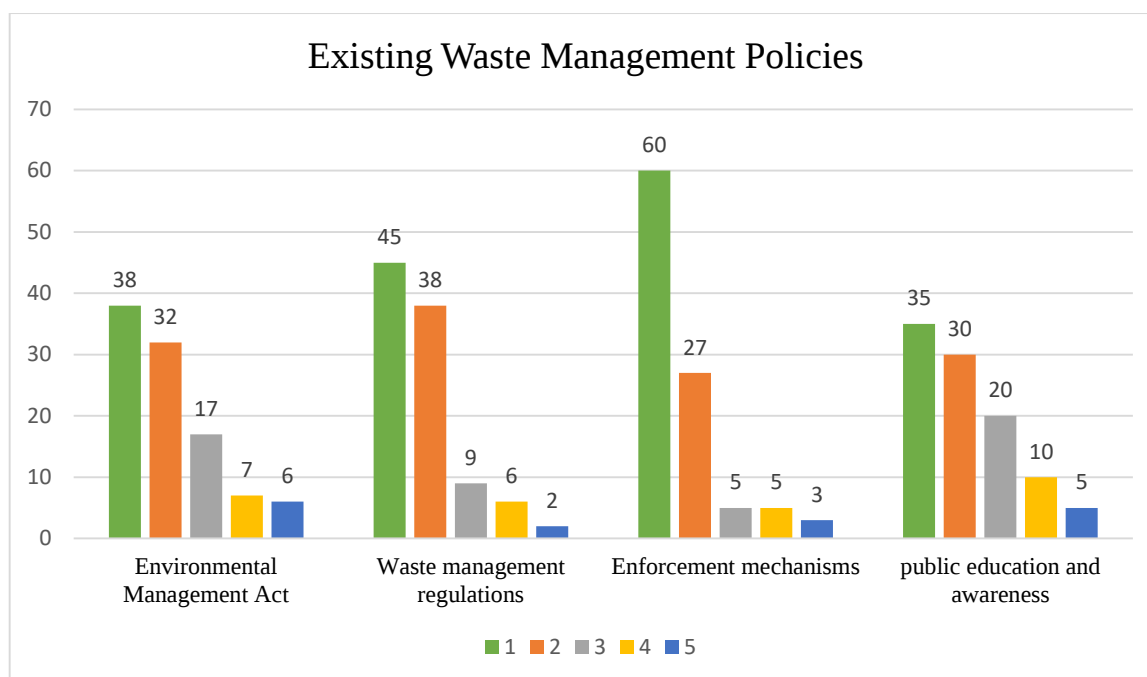


Figure 4.3 Existing Waste Management Policies in Glen Norah

Figure 4.3 shows that the existing waste management policies in Glen Norah are largely ineffective. A large proportion of respondents rated Environmental Management Act (38% rated 1, 32% rated 2), waste management regulation (45% rated 1, 38% rated 2), enforcement mechanisms (60% rated 1, 27% rated 2), and public education and awareness (35% rated 1, 30% rated 2), as not effective or slightly effective. These findings suggested that the existing policies have failed to address the problem of poor waste management and health risks in Glen Norah.

Responses from discussions showcased that the existing waste management policies are not effective, hence poor waste management. One of the respondents had to say:

“...we have EMA and other laws that are there to sue people who practice improper waste disposal, however these laws are not effective and EMA is not enforcing their laws that protects the environment.” (Participant 12)

Another resident added that:

“...there is lack of law enforcement and public awareness which made people to be not aware of the existing policies that are meant to improve waste management in Glen Norah.” (Participant 14)

During interviews representatives from EMA emphasized the issue of poor regulation enforcement as a catalyst of the ineffectiveness of the existing policies. EMA representative mentioned that:

“...there is lack of law enforcement towards waste management due to several factors such as limited number of staff and funds to do initiatives that supports these policies.”

4.7 Strategies for improving waste management and reducing health risks

In light of the findings regarding the causes and health implications of poor waste management practices, interviews and focus group discussions helped in identifying some potential strategies that can improve waste management practices in Glen Norah.

4.7.1 Enhancing infrastructure

This section presents the findings on the perspectives of residents in Glen Norah on enhancing infrastructure as a strategy to improve waste management and reduce health impacts. The residents believed that enhancing infrastructure is important for effective waste management and reducing health risks.

Table 4.6 shows data on the impact of enhancing infrastructure on waste management in Glen Norah, showing the perspectives of respondents on the provision of refuse bins, development of recycling centers, acquisition of functional garbage trucks, and construction of well-managed landfills. The effectiveness of these strategies was rated on a scale of 1 to 5, where 1 represents **not effective**, 2 represents **slightly effective**, 3 represents **neutral**, 4 represents **effective**, and 5 represents **extremely effective**.

Table 4.6 Enhancing Infrastructure

Infrastructure Enhancement	1	2	3	4	5	Total
Provision of more refuse bins	5%	10%	20%	30%	35%	100%
Development of recycling centers	3%	10%	25%	37%	25%	100%
Acquisition of functional garbage trucks	5%	5%	15%	30%	45%	100%
Construction of well-managed landfills	5%	5%	10%	20%	60%	100%

Table 4.6 shows that enhancing infrastructure is important for improving waste management in Glen Norah. A significant proportion of respondents rated the provision of more refuse bins (35% rated 5, 30% rated 4), development of recycling centers (25% rated 5, 37% rated 4,

acquisition of functional garbage trucks (45% rated 5, 30% rated 4), and construction of well-managed landfills (60% rated 5, 20% rated 4) as effective or extremely effective strategies for improving waste management. These infrastructure enhancements can improve the efficiency and reliability of waste collection, transportation, and disposal, ultimately reducing open dumping and pest infestations, and the risk of diseases like respiratory infections, vector-borne diseases like typhoid, and diarrheal illnesses.

During focus group discussions residents shows that there is the need to improve waste management infrastructure in Glen Norah. As noted by one participant:

“...the increase of refuse bins in our community can reduce open dumping and if they can have more trucks can help to collect waste regularly. This can reduce poor waste management.” (Participant 1)

Insights from interviews supported enhancement of infrastructure as a strategy to improve waste management. Municipal Official had to say:

“...the waste department need to work on their landfill sites so that they can have more waste and initiatives like waste recycling need to be taken serious because it is a better way to manage way. However, it need money to pay waste collectors, they also need proper protective gear.”

Additionally, improved infrastructure supports sustainable waste practices such as composting and recycling which reduces the volume of waste being sent to landfills. It even helps municipalities and local authorities to manage and monitor waste more efficiently through designated routes together with organized disposal sites, reducing chances of environmental degradation and the related health risks.

4.7.2 Community education and engagement

This section presents findings on the perspectives of residents in Glen Norah on community education and engagement as a strategy to improve waste management and reduce health impacts. The residents believe that community education and engagement are fundamental for effective waste management and reducing health risks.

Table 4.7 presents data on the impact of community education and engagement on waste management in Glen Norah, highlighting the perspectives of participants on the effectiveness of community education programs. The effectiveness of these initiatives was rated on a scale

of 1 to 5, where 1 represents **not effective**, 2 represents **slightly effective**, 3 represents **neutral**, 4 represents **effective**, and 5 represents **extremely effective**.

Table 4.7 Community Education and Engagement

Community Education and Engagement	1	2	3	4	5	Total
Education on waste separation	5%	2%	3%	40%	50%	100%
Education on recycling	2%	3%	1%	55%	39%	100%
Education on waste management practices	3%	5%	2%	41%	49%	100%
Clean-up campaigns	2%	3%	4%	31%	60%	100%

Table 4.7 shows that community education is vital for improving waste management in Glen Norah. A significant proportion of respondents rated education on waste separation (50% rated 5, 40% rated 4), education of recycling (39% rated 5, 55% rated 4), education on waste management practices (49% rated 5, 41% rated 4), and clean-up campaigns (60% rated 5, 31% rated 4) as effective or extremely effective strategies for improving waste management. These educational programs can empower individuals to make informed decisions and adopt environmentally responsible behaviors in their daily lives, at last reducing the health and environmental impacts of improper waste management.

During the discussions participants emphasized the issue of community education and engagement as one of the important strategies that can improve waste management in Glen Norah. One participant noted that:

“...if we manage to have more knowledge about waste recycling and waste separation, as a community we can improve our waste management” (Participant 2)

Insights from interviews shows that community education and engagement can be a better strategy to improve waste management. Municipal Official mentioned that:

“...as officers we need to educate the community more on proper waste management practices and encourage them to participate in government initiatives like the clean-up campaign.”

Therefore, engaging the community goes beyond education. It involves active participation in decision making and action as residents involved in these activities develop a sense of accountability and ownership thus increasing the chances of long term behavioral change.

4.7.3 Strengthening government policies and support

This section presents findings on the perspectives of residents in Glen Norah on strengthening government policies and support as a strategy to improve waste management and reduce health impacts. The residents believe that strong government policies and support are vital for effective waste management and reducing health risks.

Table 4.11 presents findings on the impact of strengthening government policies and support on waste management in Glen Norah, highlighting the perspectives of respondents on the effectiveness of government initiatives. The effectiveness of these initiatives was rated on a scale of 1 to 5, where 1 represents **not effective**, 2 represents **slightly effective**, 3 represents **neutral**, 4 represents **effective**, and 5 represents **extremely effective**.

Table 4.8 Government Policies and Support

Government Policies and Support	1	2	3	4	5	Total
Clear responsibilities for waste management	2%	4%	1%	53%	40%	100%
Legally binding standards for waste disposal	6%	2%	5%	47%	40%	100%
Adequate budget allocations for waste infrastructure	4%	5%	2%	38%	51%	100%
Effective enforcement mechanisms for waste management	3%	1%	2%	45%	49%	100%

Table 4.8 shows that strengthening government policies and support is important for improving waste management in Glen Norah. A critical proportion of respondents rated clear responsibilities for waste management (40% rated 5, 53% rated 4), legally binding standards for waste disposal (40% rated 5, 47% rated 4), adequate budget allocations for waste infrastructure (51% rated 5, 38% rated 4), and effective enforcement mechanisms for waste management (49% rated 5, 45% rated 4) as effective or extremely effective strategies for improving waste management. These government initiatives can empower local authorities to invest in waste infrastructure, enforce policies effectively, and promote accountability and compliance among residents, ultimately reducing the health and environmental impacts of improper waste disposal.

Insights from focus group discussions with Glen Norah residents shows that government policies and support should be improved and implemented because they are the center of development. One respondent had to say:

“...the government need to improve its policies and support to its people towards waste management, policies are driver of development and they can help to have better waste management initiatives that can improve waste disposal in Glen Norah and other affected areas.” (Participant 19)

During interviews municipal representative emphasized the issue of strengthening government policies and support as an effective strategy to improve waste management and reduce health risks. Municipal Official mentioned that:

“...good and strong policies are in need right now, effective allocation of funds towards waste management is also effective as it will help waste management department to improve their equipment such as refuse bins and trucks.”

4.8 Discussion of findings

The main purpose of this study was to investigate the impact of poor waste management on community health in Glen Norah suburbs. Being guided by the pragmatic research approach, this study sought to develop insights into the different dimensions of waste management issues together with their effects on community health. These findings surfaced critical information that is in line with the objectives of the study. There are actionable ways for improving waste management and reducing the health risks as well and they are explained below.

4.8.1 Discussion for objective 1: Major causes of poor waste management

The findings highlighted that inadequate waste management infrastructure, limited government support and lack of public awareness are the huge drivers of poor waste management. Field observations and interviews with some council workers and local residents in Glen Norah highlighted that refuse trucks are very few and are in a bad condition they are poorly maintained. Makarichi et al, (2018). Noted that the Harare City Council lacks both the technical and the financial capacity to provide reliable waste collection services around all neighborhoods. The absence of designated dumping sites within reasonable distance together with the scarcity of waste bins further exacerbates the problem, forcing residents to resort to illegal dumping. This shortage of waste infrastructure is a real problem.

The study also highlighted limited government support together with policy and governance challenges as central again to the waste management crisis. There was weak enforcement of the existing regulations and institutional fragmentation as themes during interviews with local authorities. According to Nhamo (2017) Zimbabwe has several waste related policies but they are not strongly implemented due to corruption and limited funding. This governance gap has created lack of accountability and inconsistency in service delivery around Glen Norah suburbs. The study also reveals community perceptions of institution's failure to act, mostly on how residents rarely see anyone facing penalties despite some visible illegal dumping.

In addition, lack of public awareness is also to be mentioned. Public attitudes and behaviors in Glen Norah shows lack of awareness of the proper waste disposal methods and the health associated health risks. This finding is in line with Mapira and Mungwini (2020), who argued about the lack of environmental education in many urban areas of Zimbabwe, which leads to widespread littering and very low levels of household waste segregation. Mostly, community members see waste management as the responsibility of the government and this reduces their willingness to participate in community cleanup efforts or even to adopt sustainable waste practices. With around 80% of the participants reporting that they have never received education on waste management, this study reveals some of the reasons behind waste mismanagement and the gap between knowledge rooted behavior.

However, Glen Norah's unique socio economic context and cultural attitudes towards waste sets it apart. When comparing it to other communities with robust waste management systems, the cultural acceptance of the informal practices of waste disposal may exacerbate the situation and lead to greater community health risks.

4.8.2 Discussion for objective 2: Health implications of poor waste management

One of the significant findings was the prevalence of vector borne diseases like typhoid and malaria. Respondents highlighted frequent outbreaks of these diseases mainly during rainy seasons where there is a lot of stagnant water in poorly managed sites. These conditions create ideal breeding grounds for flies and mosquitoes which spreads pathogens around communities. This observation is in line with the research by Mutsau and Chigonda (2021), who argued that the accumulation of waste in urban areas of Zimbabwe is closely linked to the increase of vector activity and disease transmission.

Additionally, many residents also reported respiratory problems which were as a result of the burning of waste which creates harmful smoke. The absence of regular waste collection services forces residents to resort to waste burning, releasing toxic pollutants like carbon monoxide into the air. Vulnerable populace includes children, the elderly and those with preexisting respiratory conditions. Similar findings were shown by Makarichi et al, (2018), who argued about the open burning of waste which contributes to urban pollution and associated respiratory diseases around low income areas.

Spread of water borne diseases is also among implications and is due to the contamination of water sources by the uncollected waste. Uncollected waste often clogs storm drains and sewer systems which leads to overflow and the mixing of human and solid waste into water supplies. Interviews highlighted the increase of diseases like cholera during rainy seasons and this is in line with Chanza and Musakwa (2021) who observed that the unmanaged waste is a major source of bacterial infections in many parts of Harare.

However, whilst health issues are common around many low income urban settings, the context of Glen Norah, with its particular vector population and communal living conditions may have an influence on susceptibility and outcomes. Differences in responses of community health can also come from varying access to healthcare services, showing differences in how various communities might manage health implications stemming from similar issues.

4.8.3 Discussion for objective 3: Existing waste management policies and their effectiveness

The Environmental Management Act administered by the Environmental Management Agency (EMA), mandates local authorities to facilitate safe collection, treatment, and disposal of waste. It also is responsible for giving penalties against pollution and illegal dumping. Despite all this, field data from Glen Norah highlights that the suburb is continuously suffering from uncontrolled accumulation of waste, illegal dumping and frequent burning of waste. Interviews with EMA and local council officials revealed that resource constraints including the lack of vehicles, fuel and manpower hampers policy enforcement. According to Nhamo (2017) Zimbabwe's environmental laws are well intentioned but are disturbed by underfunding and limited political will.

Moreover, the Public Health Act gives power to local health departments to take some preventive action against environmental health threats, including those that are caused by waste mismanagement. In practice, health community health education and health inspection are rare

as a result of insufficient staffing and logistical challenges thus diminishing the law's capacity to prevent the spread of diseases. The Urban Council's Act is also facing budgetary limitations and administrative inefficiencies thus making it difficult for the Harare City Council to give reliable and regular waste collection services. As observed by Makarichi et al (2018), urban councils in Zimbabwe prioritize political visible projects over routine services like waste management, leading to neglect in high density areas.

However, despite these challenges, the policy framework provides opportunities for improvement. For instance, the Environmental Management Act supports decentralized approaches and public private partnerships which can be leveraged to improve waste services in areas like Glen Norah. Also, the inclusion of environmental health in the national development strategies creates a platform to integrate health focused interventions into the waste policy planning.

4.8.4 Discussion for objective 4: Improving waste management and reducing health risks

The strategies proposed for the improvement of waste management and the reduction of health risks included enhancing the waste management infrastructure, reforming local policies, and implementing community education programs and these are in line with the regional and international literature that advocates for integrated approaches.

Reducing health risks and improving waste management in Glen Norah requires a multifaceted approach that involves infrastructure upgrades, stronger policy enforcement, community education and the adoption of sustainable practices together with community based systems. Together, these strategies aim to create a cleaner environment and reduce the outbreaks of diseases caused by poor waste management. A good example includes investing in proper waste collection vehicles, public awareness initiative and some small scale recycling initiatives that can make tangible improvements. Community involvement together with better coordination among institutions such as EMA are very crucial in the ensuring of long term success. This can be linked to Mapira and Mungwini (2020) who emphasized on the role of environmental education in the fostering of behavioral change together with community responsibility.

However, some differences in cultural attitudes towards waste and community engagement in Glen Norah can affect the implementation of the mentioned strategies. For successful adaptation, the proposed initiatives have to be culturally sensitive and tailored to the local

contexts that involves community stakeholders from the beginning. Participatory approaches like these can foster ownership as well as commitment to sustainable waste management practices that ultimately reduce the associated health risks.

4.9 Chapter Summary

This chapter explored the impacts of poor waste management on community health in Glen Norah focusing on the everyday practices of waste disposing practices of people and the associated health impacts. The findings from this study highlighted the need for strengthening community knowledge and use of collective efforts among stakeholders like residents, EMA personnel and healthcare workers together with the government so as to build sound waste management systems that reduces adverse health issues among communities. The following chapter will provide a synthesis of the study and give focus on summary and recommendations.

CHAPTER 5: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMNDATIONS

5.1 Introduction

This chapter is for summarizing the key findings of the pragmatic study exploring the effects of poor waste management on community health in Glen Norah. It explained and discussed the key themes that surfaced from data collection, highlighting insights into the waste practices of people and the associated health effects together with ways of combating these challenges. Through closely reflecting on these findings, this chapter provides conclusions that are related to the research objectives and the questions thereby presenting some actionable recommendations.

5.2 Summary of the study

The study gave more focus on exploring the impacts of poor waste management on community health in Glen Norah Suburbs, addressing the challenges being faced by the community members living in Glen Norah. Main problems that were identifies include increased prevalence of disease outbreak, respiratory and airborne health problems, psychological and mental effects together with environmental contamination.

This study was done particularly to investigate the critical link between poor waste management practices and the health of communities in the high density urban areas using Glen Norah as a case study. Using the pragmatism research method, data was collected through the use of interviews, questionnaires and focus group discussions. Key patterns and themes were identified in the data and were linked to the research objectives and questions thus giving room for a deeper understanding the lived experiences.

Key findings included major causes of poor waste management which are linked to objective 1. Objective 2 was linked to health implications of poor waste management on community health. The discussion of the existing waste management policies and their effectiveness together with improving waste management and reducing health risks follows objective 3 and 4 respectively.

5.3 Conclusions

This study provided a clear understanding of the impacts of poor waste management on community health in Glen Norah, directly addressing both the research questions and objectives.

5.3.1 Research question1: What are the major causes of poor waste management in Glen Norah Suburbs?

The study identified various causes of poor waste management and it is mainly caused by the combination of inadequate infrastructure, rapid population growth and weak policy enforcement. Glen Nora is suffering from irregular waste collection due to shortages of refuse trucks and poor funding whilst the growing population is generating more waste than the system can handle. A lot of residents still lack awareness about the sustainable ways of dealing with waste thus leading to the widespread of illegal waste dumping. Additionally, poor living conditions affect the people's ability to pay for private waste services and the local authorities lack the capacity to manage waste effectively. This has created serious waste problems that threatens community health.

5.3.2 Research question 2: How does poor waste management impact the health of residents in Glen Norah?

The findings of the study also highlighted that poor waste management in Glen Norah created serious health impacts among residents as accumulating garbage provides breeding grounds for rats and mosquitoes which are instrumental in spreading diseases like cholera, typhoid and malaria. Waste dumped in open spaces or drains contaminates water sources thus causing waterborne diseases. The burning of waste on the other hand releases gases like carbon monoxide in the air thus giving a rise to respiratory problems like chronic coughing and asthma.

5.3.3 Research question 3: What are the existing waste management policies and their effectiveness in addressing waste related health risks?

There are several existing waste management policies like the Environmental Management Act (Chapter 20:27), the National Environmental Policy and Local Municipal by-laws. All these have the aim of regulating waste handling and protecting public health. However, studies has proved that their effectiveness especially in an urban setting like Glen Norah is limited as a result of lack of funding, poor enforcement and weak coordination between government agencies and the local authorities. As a result, illegal dumping, uncollected waste and open burning remain common.

5.3.4 Research Question4: What strategies can be implemented to improve waste management and mitigate health risks in Glen Norah?

Improving infrastructure for waste collection by providing reliable refuse trucks, more bins and increasing the frequency of waste collection can help raise awareness about the negative effects of waste mismanagement and promote proper practices of handling waste. Enforcement of waste management laws can also be strengthened and the involvement of residents in clean up campaigns can make a huge difference. Furthermore, supporting the community level based composting and recycling projects can help in reducing the amount of waste.

5.4 Recommendations

According to the conclusions made from the findings, the following recommendations are proposed for community stakeholders and policy makers

- Improving of infrastructure should be prioritized. Investments in refuse trucks and facilities are important towards enhancing service delivery.
- Public awareness campaigns should be done through community education programs together with collaborations with community organizations and health clinics so as to facilitate effective outreach efforts.
- Policy makers should reassess and reform the existing policies of waste management so as to ensure that they incorporate local community needs. Also establishing clear enforcement systems and monitoring mechanisms will help in ensuring compliance with regulations.
- Community participation and empowerment should also be prioritized so as to foster sense of responsibility and ownership. Also, the establishment of community based committees to monitor waste practices can empower people to participate in improving their environment.
- Encouraging partnership with the private sector and non-governmental organization in order to leverage additional expertise and resources as well as innovative waste management practices. Efforts like these can amplify efforts for addressing waste management sustainably.

5.5 Chapter summary

The aim of this chapter was to provide conclusions extracted from the study's findings and to indicate possible solutions and recommendations to the problems of poor waste management on community health.

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APPENDICIES

Appendix A: PARTICIPANT CONSENT LETTER

STUDY TITTLE

THE IMPACT OF POOR WASTE MANAGEMENT ON COMMUNITY HEALTH:
LESSONS FROM GLEN NORAH SUBURBS

Researcher: Vincent T Ngarivhume

Supervisor: Dr Mukwenyi

Study objectives are as follows:

1. To examine the major causes of poor waste management in Glen Norah Suburbs
2. To assess the health impacts of poor waste management on residents
3. To assess the existing waste management policies and their effectiveness
4. To propose strategies for improving waste management and reducing risks in Glen Norah Suburbs

I or (We) the undersigned do hereby confirm that:

- The main aim of the study and my involvement were clearly explained to me. I have understood the importance of my participation and the importance of the study. Therefore, I voluntarily agree to be part of this study.
- I do understand that I can withdraw anytime from participating in this study without any consequences.
- I also agree to audio recordings of the dialogue with the researcher. I understand that this consent form will not be on any of the research instruments so as to ensure the confidentiality of my participation.
- I am well informed that feedback will be availed to my parent ministry on the results upon completion of the research.
- To show my willingness to participate in this study, I therefore undersign and give my essential details

Full Name

Signature

Date

Area/ Ward

Appendix B: SEMI-STRUCTURED INTERVIEW GUIDE

INTRODUCTION AND CONSENT

I am Vincent T Ngarivhume, a Bindura University of Science Education undergraduate student conducting a research on: **THE IMPACTS OF POOR WASTE MANAGEMENT ON COMMUNITY HEALTH: LESSONS FROM GLEN NORAH SUBURBS**. This is in partial fulfilment of the **DEGREE IN DEVELOPMENT AND GEOSCIENCES**. The data to be collected is only for academic purposes and will not be made public. Please note that there will be no follow up benefits for participating in this research, therefore participation is voluntary.

SECTION A: DEMOGRAPHIC PROFILE OF PARTICIPANTS

1. Sex: Male [] Female []
2. Age: [] years
3. What is your occupation/role in community?
4. How long have you been staying in Glen Norah?
5. What is your level of education?

SECTION B: CAUSES OF POOR WASTE MANAGEMENT

1. What do you think are the main causes of poor waste management in Glen Norah?
2. How would you describe the behaviour of residents regarding waste disposal?
3. What role to local authorities and service providers play in this issue?
4. Are there any infrastructural or logistical challenges (e.g. lack of bins, irregular collection)?
5. How does illegal dumping or burning of waste affect your area?

SECTION C: HEALTH IMPACTS OF POOR WASTE MANAGEMENT

1. Have you or others in your household experienced health issues you believe are linked to poor waste disposal?
2. What common diseases do people in your community suffer from that might be related to poor sanitation or waste?
3. Are there groups (e.g. children, elderly, people with chronic illnesses) more affected by poor waste management?

4. How would you describe the awareness of health risks caused by waste in your community?

SECTION D: WASTE MANAGEMENT POLICIES AND THEIR EFFECTIVENESS

1. Do you know any waste management policies or by-laws?
2. Have you seen any efforts by the City Council addressing waste?
3. How effective do you think these policies or programs are in improving waste management?
4. What challenges do you think these policies face in practice?

STRATEGIES TO IMPROVE WASTE MANagements AND REDUCE HEATH RISKS

1. What changes do you suggest to improve waste collection and disposal in Glen Norah?
2. How can residents be more involved in keeping the community clean?
3. What role can schools, churches and local leaders play in improving waste practices?
4. Do you think partnerships with private companies and NGOs or youth groups could help?
5. What kind of support (resource, training, funding) would make a difference?

THANK YOU SO MUCH FOR YOUR COOPERATION IN THIS INTERVIEW.

Appendix C: QUESTIONNAIRE

TITLE: THE IMPACT OF POOR WASTE MANAGEMENT ON COMMUNITY HEALTH: LESSONS FROM GLEN NORAH SUBURBS

OBJECTIVE OF THE QUESTIONNAIRE

To understand the relationship between poor waste management and community health

SECTION A: DEMOGRAPHIC PROFILE OF PARTICIPANTS

1. Age Group

Under 18 [] 18-25 [] 26-35 [] 36-50 [] 51 and above []

2. Gender

Male [] Female [] Prefer not to say []

3. Occupation

Student [] Employed [] Self-employed [] Unemployed [] retired []

4. Level of Education

No formal education [] Primary education [] Secondary education [] Tertiary education []

5. Length of stay in Glen Norah

Less than one year [] 1-5 years [] 6-10 years [] More than 10 years []

SECTION B: CAUSES OF POOR WASTE MANAGEMENT

1. Inadequate waste management infrastructure

Tick in the table if **YES** or **NO**

Type of Infrastructure	Yes	No
Are there adequate refuse bins in Glen Norah?		
Are there sufficient waste collection trucks in Glen Norah?		
Is there a proper waste disposal site in Glen Norah?		
Are there functional waste transfer stations in Glen Norah?		

2. Limited government support and capacity

Type of Support/Capacity	Yes	No
Is there any sufficient funding for waste management in Glen Norah?		
Are there enough trained personnel for waste management in Glen Norah?		
Is there any effective waste management policy enforcement in Glen Norah?		
Are there adequate equipment and vehicles for waste collection in Glen Norah?		
Is there regular monitoring and evaluation of waste management services in Glen Norah?		

3. Lack of public awareness and education

Aspect of Public Awareness and Education	Yes	No
Do you participate in community waste management programs or initiatives like Cleanup Campaign?		
Are you aware of the health risks associated with poor waste management?		
Do you know the importance of waste segregation?		
Have you received education on waste management?		
Are you aware of proper waste disposal practices?		

SECTION C: HEALTHIMPACTS OF POOR WASTE MANAGEMENT

Instructions: Tick the health conditions you or others have experienced in your area.

1. What vector-borne diseases are commonly observed in your area (Select all that apply)

- ☐ Diarrhoea
- ☐ Malaria
- ☐ Skin Infection
- ☐ Respiratory infections
- ☐ Cholera

- ☐ None

1. What are psychological effects that are common in Glen Norah? (select a that apply)

- ☐ Sense of discomfort and helplessness
- ☐ Shame and fear of diseases
- ☐ Mistrust in public institutions
- ☐ Cycle of mental health vulnerability

SECTION D: POLICIES AND THEIR EFFECTIVENESS

1. Are you aware of any waste management policies or programs in Glen Norah?

- ☐ Yes
- ☐ No

2. Effectiveness of the existing waste management policies.

Rate the effectiveness of the following policies using the scale of 1 to 5, where 1 = not effective, 2 = slightly effective, 3 = neutral, 4 = effective, and 5 = extremely effective.

Statement		1	2	3	4	5
1	Environmental Management Act					
2	Waste management regulations					
3	Enforcement mechanisms					
4	Public education and awareness					

SECTION E: STRATEGIES FOR IMPROVEMENT

1. Enhancing infrastructure

Rate the following strategies using the scale of 1 to 5, where 1 = not effective, 2 = slightly effective, 3 = neutral, 4 = effective, and 5 = extremely effective.

Statement		1	2	3	4	5
1	Provision of refuse bins					
2	Development of recycling centres					
3	Acquisition of functional garbage trucks					
4	Construction of well managed landfills					

2. Community education and engagement

Rate the following strategies using the scale of 1 to 5, where 1 = not effective, 2 = slightly effective, 3 = neutral, 4 = effective, and 5 = extremely effective.

Community Education and Engagement	1	2	3	4	5
Education on waste separation					
Education on recycling					
Education on waste management practices					
Clean-up campaigns					

3. Strengthening government policies and support

Rate the following strategies using the scale of 1 to 5, where 1 = not effective, 2 = slightly effective, 3 = neutral, 4 = effective, and 5 = extremely effective.

Government Policies and Support	1	2	3	4	5
Clear responsibilities for waste management					
Legally binding standards for waste disposal					
Adequate budget allocations for waste infrastructure					
Effective enforcement mechanisms for waste management					

Thank you for participating, your insights are valuable.

Appendix D: FOCUS GROUP DISCUSSION GUIDE

THE IMPACT OF POOR WASTE MANAGEMENT ON COMMUNITY HEALTH IN GLEN NORAH

SECTION A: PARTICIPANT DEMOGRAPHIC INFORMATION

1. Age Range

18 [] 18-25 [] 26-35 [] 36-50 [] 51+ []

2. Gender

Male [] Female []

3. Occupation

Student [] Employed [] Unemployed [] Self-employed [] Retired []

4. Length of stay in Glen Norah

1 year [] 1-5 years [] 6-10 years [] 10+ years []

5. Role in community (if any):

(e.g. council member, resident, health worker, youth leader)

SECTION B: CAUSES OF POOR WASTE MANAGEMENT

Objective: To examine major causes of poor waste management in Glen Norah

Lead question

- What do you think are the main causes of poor waste management in Glen Norah?
- How do people usually dispose of their waste in your area?

Follow up questions

- Is rubbish collection reliable?
- Are there enough rubbish bins and dumping areas?
- Do people know the correct ways of managing rubbish?
- What role does the council and environmental services play?

SECTION C: HEALTH IMPACTS OF POOR WASTE MANAGEMENT

Objective: to assess the health impact of poor waste management on residents

Lead question

- What are the common health problems people here face?
- Do you believe rubbish is causing these problems?

Follow up questions

- Are there groups that are mostly affected (children, elderly)?
- Have you seen or experienced any outbreaks (cholera, malaria)?
- What impact does uncollected rubbish have on daily life?

SECTION D: WASTE MANAGEMENT POLICIES AND THEIR EFFECTIVENESS

Objective: To assess existing waste management policies and their effectiveness

Lead questions

- Are you aware of any policies for rubbish collection in Glen Norah?
- What do you think about the effectiveness of these programs?

Follow up questions

- Who is responsible for enforcing these rules?
- Do you see any enforcement or awareness campaigns?
- What is working and what is not?

SECTION E: STRATEGIES TO IMPROVE WASTE MANAGEMENT AND HEALTH OUTCOMES

Objective: To propose strategies for improving waste management and reducing health risks

Lead questions

- What suggestions do you have that improves how rubbish is dealt with?
- How can the community be more involved?

Follow up questions

- Can schools, churches or youth groups play a role?

- Should there be more clean-up campaigns, education or penalties?
- Would you support a local committee for rubbish collection or NGO involvement?

Appendix E: Approval Letter from Bindura University

SCHOOL OF GEOLOGICAL SCIENCES, DISASTER & DEVELOPMENT
SUSTAINABLE DEVELOPMENT DEPARTMENT



BINDURA, ZIMBABWE
WhatsApp : +263773281212
E-mail: jbowora@buse.ac.zw

BINDURA UNIVERSITY OF SCIENCE EDUCATION

CHAIRPERSON'S OFFICE

Thursday 03 April 2025

TO WHO IT MAY CONCERN

Dear Sir or Madam

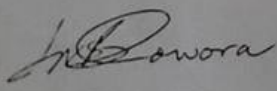
RE: RESEARCH SUPPORT LETTER FOR SUSTAINABLE DEVELOPMENT STUDENT

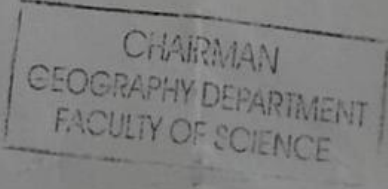
I am writing on behalf of the Sustainable Development Department requesting your collaboration on the research of our fourth-year student, VINCENT NGARIVHUME REGISTRATION NUMBER B1853441.

The student is studying for a 4-year Bachelor of Science (Honours) Degree in Development Studies (HBSc.DG). During the fourth year of study, students are required to do field research which require them to do their data collection for research purposes.

We will be highly obliged to furnish you with additional information about the research project if our request meets your favorable consideration.

Yours faithfully,


Dr. J. Bowora
(Chairperson)



Appendix F: Approval Letter from City of Harare

	CITY OF HARARE	DIRECTOR OF HEALTH SERVICES
Director of Health Services	All correspondence to be addressed to the DIRECTOR OF HEALTH SERVICES	Rowan Martin Building, Civic Centre, Pennefather Avenue, Off Rotten Row, Harare, Zimbabwe
DR PROSPER CHONZI MBChB, MPH, MBA	Ref:.....	P.O. Box 596 Telephone: +263 (242) 753326 753330/1/2 Fax: +263 (242) 752093
	Your Ref:.....	

1/30

19 May 2025

Vincent T. Ngarivhume
9349 Southlands Park
Harare

Dear Vincent T. Ngarivhume

RE: APPLICATION FOR APPROVAL TO CONDUCT A STUDY TITLED: IMPACT OF POOR WASTE MANAGEMENT ON COMMUNITY HEALTH IN GLEN NORAH SUBURBS

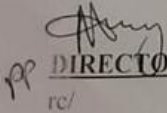
I refer to the above subject matter.

Permission has been granted for you to conduct a research study titled: *Impact of Poor Waste Management On Community Health in Glen Norah Suburbs*.

Please note that you will be expected to share your study findings with the City Health Department through the Director's office.

Do not hesitate to contact the Ethics committee for any assistance you may require.

Yours Faithfully


DIRECTOR OF HEALTH SERVICES
rc/

Appendix G: Plagiarism Report

 B1853441 dissertation 





**10**

Match Overview 

10%



1	Parin Somani. "Health I..." Publication	2%	
2	Felician Andrew Kitole, ... Publication	1%	
3	archpublichealth.biom... Internet Source	1%	
4	ir-library.ku.ac.ke Internet Source	1%	
5	Submitted to Midlands ... Student Paper	<1%	
6	Ojiji, Eta. "Towards Ene..." Publication	<1%	
7	www.coursehero.com Internet Source	<1%	