



University of Venda

Investigating the performance of a community based approach to solid waste management: A case study of Nkulumane suburb in Bulawayo, Zimbabwe.

By

Sinqobile Helen Mkumbuzi

11616883

A Dissertation submitted in fulfilment of the requirements for the degree of Master of Environmental Sciences to the Department of Ecology and Resource Management, School of Environmental Sciences at the University of Venda

Promoter: Dr. N. I Sinthumule

Co-Promoter: Dr. N. V Mudau

DECLARATION

I Sinqobile Helen Mkumbuzi, hereby declare that this dissertation submitted for the Master of Environmental Science in Ecology and Resource Management at the University of Venda by me has not been previously submitted for any degree at this or any other university. It is my own work in design and execution and all reference material contained therein has been duly acknowledged.

Signature

Date

.....

.....

DEDICATION

To Possenti and Bethia Mkumbuzi for their unwavering support

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I would like to thank community members of Nkulumane suburb for welcoming me in their homes during the survey. My heartfelt gratitude goes to Nonhlanha Mkumbuzi, Thobekile Mkumbuzi, Tadiwa Mkumbuzi, Yeukai Mkumbuzi and Plaxedes Munjoma for the moral support they gave me throughout this study. My heartfelt gratitude also goes to Nyasha Mkumbuzi, Tracy Mkumbuzi and Mai Annamore for accommodating me when I was doing my field work in Bulawayo. My heartfelt gratitude also goes to Grace Chuma and Faith Ramulongo for their emotional support throughout my study. I also acknowledge Michael Bvindi for all the insight he gave me in my study starting from the research proposal up until the whole study was complete. I would also want to thank Mr. Nkosana Khumalo, Mr. Dictor Khumalo and Mr. Patrick Ncube for their assistance when I was seeking for authorization from Bulawayo City Council. Most importantly, my gratitude goes to my supervisor Dr. N.I Sinthumule and Dr. N.V Mudau for their patience and guidance throughout this study as well as their ability to impart knowledge in a comprehensive manner.

ABSTRACT

Solid waste management (SWM) has become an issue of increasing worldwide concern as urban populations continue to rise and consumption patterns change. The health and environmental effects associated with SWM are escalating, predominantly in the perspective of developing countries. The rise in rural-urban migration rates in developing countries has left local authorities overwhelmed and failing to cope with the increase in solid waste. This has led to a shift from conventional systems of solid waste management to contemporary systems such as community based solid waste management (CBSWM). Despite the shift, it seems local authorities in developing countries still fail to manage suburban waste effectively. This study investigated the performance of a CBSWM scheme in Nkulumane, a high-density suburb in Bulawayo. Both quantitative and qualitative data were collected, hence a mixed methods approach employed. The study incorporated systematic sampling and purposive sampling in the selection of research participants. Data was collected through qualitative questionnaires, semi structured interviews and field observations. Thematic content analysis and descriptive statistics from SPSS version 25 were used in data analysis. The study revealed that community members from Nkulumane had sound knowledge on what CBSWM entails, however the community members had negative attitude towards CBSWM and traditional notions on SWM had an influence of their perception of CBSWM concepts. The study also revealed that Bulawayo City Council had managed to create employment for the community through a CBSWM scheme. Furthermore, operating expenses of the city council had decreased over the years. The level of environmental awareness had improved in the study area as well. However, Bulawayo City Council has battled with community participation problems, financial constraints and inter-institutional infighting. This study provides a comprehensive report on the performance of the CBSWM scheme in Nkulumane high density suburb, Bulawayo, Zimbabwe.

Key words: Community-based solid waste management, Developing countries, Environment, Public health, Community participation, Attitudes, Perceptions

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ACRONYMS AND ABBREVIATIONS

CBSWM	Community based waste management
CBSS	Community based street sweepers
CBOs	Community based organisations
CIO	Central Intelligence Organisation
EMA	Environmental Management Agency
ISWM	Integrated solid waste management
LA	Local authority
MMA	Modernized Mixtures Approach
SWM	Solid waste management
PPP	Public Private Participation

CHAPTER ONE

1. INTRODUCTION

1.1 Background to research

Solid waste management (SWM) has become an issue of increasing world-wide concern as urban populations continue to rise and consumption patterns change (Massawe *et al.*, 2014). The concern surrounding solid waste management is rooted on the premise that the generation, handling and disposal of such waste has public health and environmental implications (Zubrugg, 2003). SWM involves the collection, transportation and siting of unwanted solid material in a systematic manner (Reddy, 2011)

Population growth around the globe has been rapid, however it is argued to be more pronounced in developing nations due to the rise in birth rates (Mingwah *et al.*, 2009). Annepu (2013) explain that the population growth demographic phenomenon that has been spreading in developing countries is influencing urban growth. Makopa (2002) explains that urban growth in developing countries is mostly influenced by rural-urban migration as people are constantly in search for jobs. Rural-urban migration continues to be eminent in developing countries exerting pressure on limited resources in urban environs (Mingwah *et al.*, 2009). It is projected that, by 2030 about 61% of the populace in developing countries will be living in urban areas (UNEP, 2007). Such exponential population growth will also have influence on the volume of solid waste generated in urban centers (Sujauddin *et al.*, 2007). Zahra *et al.*, (2012) explain that the increase in urban population tends to create problems for municipal service delivery. This is because population growth exerts pressure on managing the ever-increasing amount of waste. Local authorities usually fail to cope with rapid urbanization especially when rural- urban migration results in the sprout of informal settlements (Sujauddin *et al.*, 2008).

During the colonial era, cities in developing countries were deemed to be clean and waste management posed less challenges (Myers, 2003). There was less population in urban centers as the majority black populace was forcibly concentrated in the rural areas and “reserves”. As a result, the management of solid waste was not a major issue because the population in urban areas during colonial times was small and the land available for the assimilation of wastes was large (Myers, 2003).

Nevertheless, when developing countries attained independence from colonial rule, they adopted environmental infrastructure that had been developed by colonial masters. Such infrastructure adopted from colonial powers included waste management systems (Richardson, 2003). This model of solid waste management adopted from the colonial era has proven to be ineffective, inefficient and unsustainable for developing countries (Madzengere & Chingwenya, 2012). Massaruto *et al.*, (2011) argued that a top-down approach to SWM that was adopted by developing countries is not effective and neither can it be sustained. According to Beede & Bloom (1995), municipalities in developing nations face problems in managing SWM efficiently because they continue to base their models and resources on a “collect, transport and throw away” approach. As a result, this later stirred scholars to lobby for non-conventional methods and approaches towards SWM (Papageorgiu, 2006; Zia & Devads, 2007).

The most commonly lobbied for non-conventional approach to SWM is Community Based Waste Management also known as Participatory Solid Waste Management. Community based solid waste management is a waste management system that views the community as an active participant, efficient enough to manage its own waste given the capacity and know how to do so (Jacobson *et al*, 2009). This approach involves the development of a close-knit relationship between local authorities and its community (Nchito & Myers, 2004; Massawe *et al.*, 2014). According to Richardson (2003), the formation of partnerships amongst the community, local authorities and the private sector is regarded as a more sustainable approach to SWM.

Studies have been conducted to chronicle several community-based systems from around the world that have been deemed as successful in addressing SWM issues (Beede & Bloom, 1995). However, in some instances community based systems though widely lobbied for have short lived success or they fail completely (Nchito & Myers, 2004). Richardson (2003) argues that some community based systems fail due to poor community participation. On the other hand, financial constraints that plague local authorities can also be an impediment to successful community based systems (Shekdar, 2009).

Like in any other developing country, waste management is one of the most pressing environmental problems facing local authorities in Zimbabwe (Makarati & Chikobvu, 2011). Legislation, policies and in some cases, by-laws, for waste management, do exist in Zimbabwe, but the waste management problems continue to grow (Shekdar, 2009).

The Environmental Management Act (CAP 20:27) is the Principal Act for addressing environmental issues in Zimbabwe. The Act also established an Environmental Management Agency (EMA) that is responsible for environmental management in the country. Section 95 of the aforementioned legislation states that; “Every local authority shall prepare an environmental action plan for the area under its jurisdiction in accordance with such directions as the Minister may give. Bulawayo City Council, the governing local authority in Bulawayo, in adherence with EMA (CAP 20:95) developed a Community Based Waste Management scheme with the intention to deal with SWM issues affecting residential areas. In light of the above, this study intends to probe the current state of waste management in Nkulumane suburb following the implementation of a community-based approach to waste management in 2009 by Bulawayo City Council.

1.2 PROBLEM STATEMENT

Developing urban cities tend to face solid waste management problems (Mudzengere & Chingwenya, 2012). It has been argued that waste management problems in developing cities emanated from the inefficiency and subsequent failure of conventional/traditional/centralized management systems (Zahra *et al.*, 2012). It is argued that conventional waste management systems have a one size fits all approach, moreover they fail to account for the fact that each city and its residential areas have unique waste management needs (Zia & Devads, 2007). Conventional systems leave limited room for civilian participation and waste management is perceived to be the sole responsibility of the local authority (Zubugg *et al.*, 2004). Considering the above, a community based approach to waste management has been initiated in several developing cities in a bid to address the limitations of conventional waste management systems (Beede & Bloom, 1995). A community based approach to solid waste management was also adopted by Bulawayo City Council in a bid to reduce the burden associated with managing suburban solid waste (BCC, 2005). The approach was through partnership arrangements with the community and community based organizations. This research intends to investigate the performance of a community based approach to solid waste management initiative in Nkulumane high density suburb in Bulawayo to determine the extent of its success.

1.3 RESEARCH AIM AND SPECIFIC OBJECTIVES

1.3.1 Aim

- To investigate the performance of a community based approach to solid waste management in Nkulumane suburb, Bulawayo, Zimbabwe.

1.3.2 Research objectives

- To determine the knowledge, perceptions and attitudes of the Nkulumane community towards the existing Community Based approach to solid waste management.
- To identify the achievements and struggles that have been faced by the local authority since the introduction of a community based approach to waste management.
- To evaluate the contribution of community participation within the community based waste management scheme.

1.4 RESEARCH QUESTIONS

- What are perceptions and attitudes of the community of Nkulumane, and how do they shape the current state of waste management in the study area?
- What were the prospects of the local authority and what have been their achievements and struggles regarding the community based waste management scheme?
- What is the role of community based organizations in the provision of solid waste management services?

1.5 JUSTIFICATION OF THE STUDY

Manyoncho (2012) argue that in countries that use conventional waste management systems, about 60% of local authorities' budgets in developing countries are spent on SWM. Even though ironically 30-60% of urban refuse is usually uncollected, whilst less than 45% of the populace is served by local authorities, (Manyoncho, 2012). This leaves room for inquiry into the effectiveness of the conventional methods towards SWM. Therefore, this study is imperative as it attempts to assess the effectiveness of community based waste management as a replacement for conventional waste management. Community based waste management was initiated in some developing cities in a bid to lessen SWM problems (Madzengere & Chingwenya, 2012). However, despite the adoption of a new system, activities such as open

dumping, burying and open burning of waste remain the main methods of waste disposal in urban areas within developing nations (Massawe, *et al.*, 2014). This study is of significance as it investigates the community's perceptions and attitudes towards SWM. As such, this can provide insights and an in-depth understanding on how they influence the current state of waste management since the community themselves are the generators of waste. While there is limited documentation on community-based solid waste management systems in the Southern African Development Community, a study done by Makarati & Chikobvu (2011) highlights that there is limited information on community based solid waste management in Zimbabwe. This research can therefore add new and relevant knowledge to the available collection of literature on the subject matter. Furthermore, this research will probably serve as a pioneer study in Zimbabwe regarding CBSWM. In addition, the study fits well with the current international trends of community-based approaches to environmental problems. In addition, the study is significant as the results will inform policy makers and assist in eradicating impediments to effective urban solid waste management.

1.6 Conceptual Research Framework

The conceptual framework that was used to direct this research is the Modernized Mixtures Approach (MMA) that was postulated by (Spaargaren *et al.*, 2005). The Modernized Mixtures Approach denotes to the implementation of medium to large-scale environmental infrastructural systems which are made up from the integration of decentralized and centralized systems (Spaargaren *et al.*, 2005). MMA considers the unique conditions of developing countries when implementing a system (Spaargaren *et al.*, 2005). MMA is referred to as 'mixtures' because it consolidates the best features out of both traditional and modern-day systems. A combination of the best features from decentralized and centralized systems brings forth a contemporary system which is accessible, flexible and can be used sustainably in African cities (Spaargaren *et al.*, 2005). There are two systems that are in place for the provision of solid waste management in developing countries. The first system is a Centralized/Conventional/Traditional waste management system (Makopa, 2006). Traditional systems of waste management were inherited from colonial rule. The traditional waste management systems can be identified by their centralized and large-scale management of waste (Richardson, 2003). The traditional systems are associated with high operational costs and experience constant collapse of infrastructure due to their large-scale nature. The second system is Decentralized/unconventional waste management systems in which community

members manage their own waste. Unconventional waste management systems have decentralized and small-scaled flows of waste. They have flexible systems with vast contribution of end users (Annepu, 2012). Such decentralized systems include informal collection systems, small-scale composting and informal recycling projects (Spaargaren *et al.*, 2005). This research used Modernized Mixtures Approach in-order to determine the capacity of Community Based Organization (CBOs) in the provision of solid waste management services in Nkulumane. Such services include waste collection, transportation, composting and waste disposal. Bulawayo City Council partnership arrangements with CBOs were investigated in-order to identify similarity in features with respect to the centralized and decentralized aspects of MMA. An integration of knowledge from relevant sources of information such as the community of Nkulumane, CBO senior members and city council officials was done to illustrate how MMA fits with the existing local, social and technical conditions in Nkulumane.

1.7 CASE STUDY DESCRIPTION

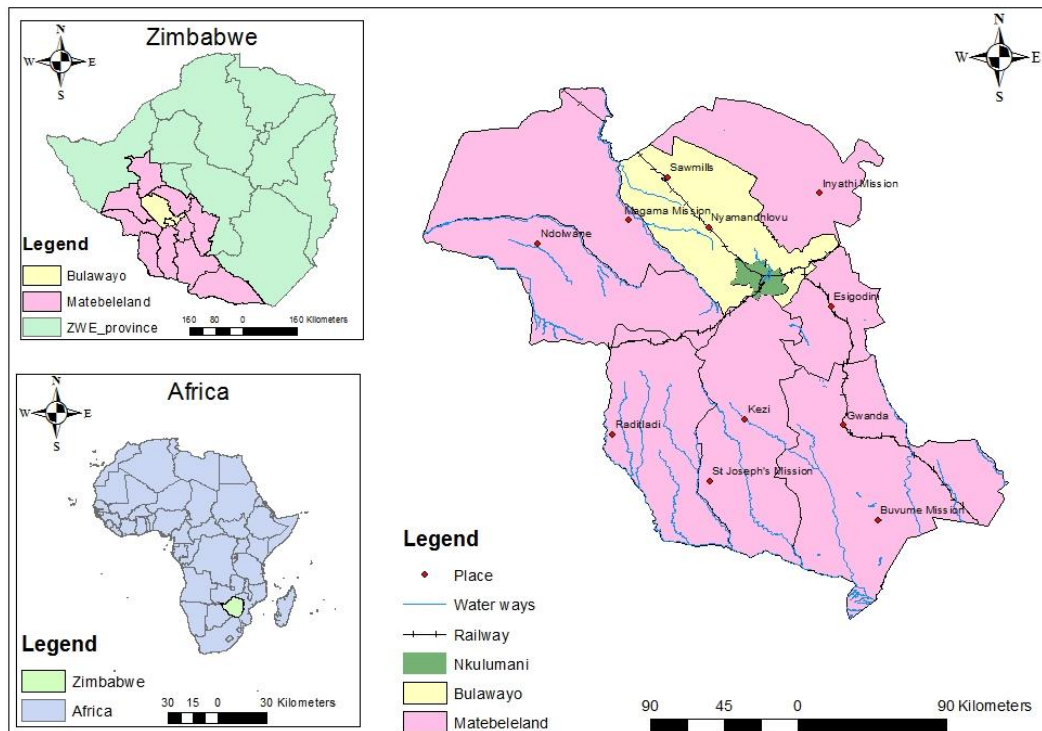


Figure 1.1: Geographical location of Nkulumane. Source (Author)

This study was conducted in Nkulumane, which is located at 28° 37'E and 20° 09'S. Nkulumane is one of the 156 suburbs situated in Bulawayo, the second largest city in Zimbabwe. The city of Bulawayo is located in Matebeleland which is 439km south west of the capital city Harare. However, Bulawayo is now regarded as a separate provincial area from Matebeleland. According to Sithole (2012) 80% of the population in Bulawayo lives in the high-density suburbs whilst the rest live in the city center and low-density suburbs. Nkulumane suburb is estimated to have about 10 993 residents with a total of 2678 household (ZimStats, 2015). Density describes the concentration of population in their respective areas (Sithole, 2012). Nkulumane is a high-density suburb inhabited mostly by a low income earning population. The majority of the populace in the study area is of the Ndebele ethnic and language group followed by the Shona and Kalanga respectively. The study area is under the management of the Bulawayo City Council. Bulawayo City Council is responsible for service delivery such as sewer treatment, water services and waste management.

1.8 Chapter breakdown

The chapters of this dissertation are arranged as follows:

Chapter 1: This Chapter contains the introduction to the study, including the background. The problem statement, aim, objectives and justification of the study are also outlined. The Chapter also discusses the conceptual framework binding the study as well as the description of the study area. Lastly, the Chapter breakdown and definition of terms are supplied.

Chapter 2: This Chapter reviews the literature that relates to the generic perspective of SWM. The different approaches to SWM and the nature of SWM in developing countries. This Chapter also reviews literature on community based solid waste management as well as its prospects. Furthermore, the Chapter discusses the barriers to an effective community approach to solid waste management as well as the solutions to the barriers.

Chapter 3: This Chapter discusses the nature of the study. It goes on to cover the research design that was adopted by the researcher as well as the rationale behind its adoption. The Chapter also discusses the data collection methods that the researcher employed in the study as well as the sampling methods. The Chapter also discusses how the researcher analysed the data that they collect during field work. The Chapter finally tackles issues of ethical consideration as well as the limitations of the study.

Chapter 4: This Chapter presents the findings of the research. The findings of the research are done in line with the objectives of the study. are presented and analysed in this chapter. The Chapter also interprets the findings of the research.

Chapter 5: This Chapter contains a thorough discussion of the findings of the research. The discussions are done in line with the study's research objectives as well as with the existing literature from other studies.

Chapter 6: This Chapter gives a summary of the findings of the study in relation to the research questions. The Chapter serves to give a conclusion to the research project as well as the recommendations of the study. This is followed by the references and appendices

1.9 Operational Definitions.

Local Authorities- Councils charged with provision of services to urban areas. They are classified as City, Municipality, Town and County councils (Hennick *et al.*, 2011).

Waste- Anything that the holder discards intends to discard or is required to be discarded or disposed by the provisions of the Law (Gakunju, 2011).

Solid Waste- Generally defined as hazardous and non-hazardous industrial, commercial and domestic refuse such as organic trash, institutional garbage, street waste, construction rubbles (Ahmed & Ali, 2006).

Stakeholders- Those participating in the decision-making process including those potentially affected by the decision. It also includes those people who have specific concerns or roles to play in the decision of managing waste (Makopa, 2006).

Community based organizations- Non-profit organizations operating within a single community (Colon, 2002.)

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Solid waste management; A generic perspective

Historically, solid waste was a term coined to define human and animal excrete (Memon, 2010). With the dawn of the industrial revolution, the threshold of solid waste was stretched to include waste generated through industrial activities. Later it was also acknowledged that natural phenomenon such as floods, fires and earthquakes also produced debris. Such debris could be categorised as waste which had to be collected, thus the term solid waste evolved further (Memon, 2010).

Presently, solid waste is known as solid material that is generated from commercial, house hold or industrial activities; it is material that is discarded by persons when it is deemed useless and valueless (Marshal & Farahbakhsh, 2013). However, some of what was previously useless and unwanted materials are now processed into different valuable products (Ezugwu, 2015). Eriksson & Bisailon (2011) indicate that depending on the country, the definition of solid waste can include some or all household wastes, toxic wastes, street sweepings, garden wastes and wastes from institutions, commercial establishments, and offices. Solid waste can be categorised according to where it is generated, such as domestic, commercial and industrial. It can also be categorised according to its content for example organic waste; which is derived from once living matter and inorganic derived from non-living matter. Furthermore, waste can be categorised according to its potential to cause harm and is regarded as toxic, non-toxic, flammable, radioactive or infectious (UNEP, 2007).

According to USEPA (2010) the management of solid waste, well known as solid waste management (SWM), refers to all the activities of handling, treating, conditioning, transportation and disposal of solid material. Seadon (2006) assert that SWM involves the collection, transportation and siting of unwanted solid material in a systematic manner. According to Nemerow (2009) the primary purposes of SWM strategies are to address the health, environmental, and economic concerns associated with the improper disposal of waste. It is argued that, the efficient management of solid waste deters undesirable impacts on the environment and human health which subsequently supports economic development and a quality of life that is ideal (Mader, 2011).

2.2 Approaches to SWM

Ezugwu (2015) identifies two approaches to SWM, which are; centralised management systems, also known as conventional or traditional waste management systems approach and decentralised waste management system, popularly known as integrated waste management systems.

2.2.1 Conventional waste management

Conventional waste management systems are centrally managed by local government departments and the costs of waste removal is also denoted by the government (Reddy, 2011). In developing countries, conventional waste management was inherited from colonial rule and the main aim of such a system was centred on the collection and disposal of waste (Chakrabati, 2008). Shekdar (2009) argued that conventional solid waste management techniques aimed simply to remove waste from the proximity of human settlement areas so as to maintain public health. It is worth noting that communities had low involvement in a conventional waste management system. Zubrugg *et al* (2004) explains that centralised systems leave limited room for civilian participation. According to Okot-Okumu & Nyenje, (2011), this approach does not foster co-operation between the community and the local authorities, instead; ‘We dump – They collect’ is the general attitude that conventional waste management fosters among the residents. Waste management is seen as the sole responsibility of the local authority. Conventional waste management is controlled by local government departments leaving no space for competitors and this result in poor service delivery (Annepu, 2012). The system is regarded to be capital intensive as it involves high costs of maintaining its refuse collection fleet, including the wages of the waste collectors. Furthermore, the system is considered to be land intensive as vast tracts of land are required to cater for waste dumps and landfills (Tukahirwa *et al.*, 2010). Conventional waste management systems have been criticised for their “one size fits all approach” because they do not account for the fact that each city and its neighbourhoods have unique waste management needs (Eriksson & Bisailon, 2011). Furthermore, conventional systems are discredited for the fact that they lack the ability of solving waste management problems because they allegedly transfer “*the problem*” from the source of waste generation to waste disposal sites.

2.2.2 Integrated waste management systems (ISWM)

The U.S. Environmental Protection Agency (EPA) defines ISWM as a complete waste reduction, collection, composting, recycling, and disposal system (US EPA, 2010). According to Shekdar (2009) ISWM represents a modern-day and methodical tactic to solid waste management. ISWM favours approaches to SWM that combine elements of privatisation and entrepreneurship with public sector partnerships; specifically, to counter the obvious inadequacies of state-controlled waste management systems (Burgess et al., 1997). The system adopts an approach where the planning is done at grass roots level ensuring that stakeholders assume an active role in all of the proceedings (Massaruto *et al.*, 2011). In addition, Annepu, (2012) cites that ISWM is characterised by having separate, small scale flows of waste and flexible management systems with high involvement of stakeholders. ISWM has been credited for how it takes into account unique conditions and needs that prevail in different environments. It is also credited for how it applies solid waste management activities that are compatible with a given area (US EPA, 2010; Marshall, 2013). Shekdar (2009) states that approach to solid waste management must be compatible with the nature of a given society.

Unlike conventional waste management, ISWM is meant for the public, without public participation, the system cannot be run efficiently. Hence, it is important to make the public aware of ISWM through active participation in the system (Shekdar, 2009). In practice, efficiency of ISWM is gauged by the number of participating citizens, the more the community takes part in waste management activities, the more the system succeeds. Without public participation, it may be difficult to maintain cleanliness in a city, and resource recovery systems may become less effective if wastes are poorly separated at the source (Tukahirwa *et al.*, 2010).

2.3 Solid waste management in developing countries

Cities in developing countries are plagued with poor waste management practices, and the impacts associated with such, remain worrisome. Makarati & Chikobvu (2011) argue that poor waste management systems in developing countries are as a result of poor waste characterisation. Manyoncho (2012) cites that poor waste characterisation inevitably leads to poor waste disposal. Several initiatives that are implemented to address waste characterization in developing cities are short-lived.

Rodic *et al* (2010) assert that ‘Bread and butter’ issues are a priority in developing countries such that waste management issues are barely given due recognition. It is stated that in several

developing countries, the tenacity for survival is such a prime concern, that waste management is not a priority (Richardson, 2003). However, the few incidents when waste management issues are raised, the sole reason would be to get rid of waste from populated areas in a bid to protect public health (UN-Habitat, 2010). Schübeler (2007) also cites that, municipalities in developing countries can only go as far as collecting and removing waste from the proximity of residential areas. The welfare of the environment is not necessarily considered when waste management issues are addressed. This is the reason why open dumping and burning of waste are common waste disposal techniques in developing countries (Beede and Bloom, 2013). The haphazard dumping and burning of wastes have a grave bearing on air, land and water quality and causes an escalation of environmental problems (Colon & Fawcett, 2006). Mader (2011) asserts that in most cases pure recklessness and ignorance of communities has contributed to waste management problems that are encountered in developing countries. However, it is also argued that, a lack of knowledge, institutional structures, disparities in access, social expectations, and cultural values within developing countries trigger SWM problems (Ezugwu, 2015). Richardson (2003) explains that an impediment to effective waste management in developing cities has been the over dependency on local governments in managing waste. Owing to this dependency, there has been temporal success, or complete failure in waste management (Richardson, 2003).

It is argued that in some instances waste management efficiency is hindered by financial constraints that local authorities encounter since the majority operate under a meagre budget (Seadon, 2006). One significant way in which funds are mismanaged in developing countries is by techniques from the “conventional” SWM approach (Chakrabati & Majumder, 2009). It is stated that developing countries that still use conventional SWM import sophisticated equipment for collection, treatment, and disposal of waste which are expensive and difficult to maintain (Zurbrugg, 2003).

The various constraints surrounding SWM are acknowledged, however it is worth noting that developing countries are rich in indigenous expertise and adopting a community based approach to waste management could be useful (Papageorgiu, 2006; Zia & Devads, 2007). Zia & Devads (1997) suggested that developing countries change from traditional solid waste management to partnerships between local authorities and stakeholders and suggested a community based approach to waste management for wider adoption.

2.4 Community based solid waste management.

Community based solid waste management is a waste management system that views the community as an active actor, efficient enough to manage its own waste given the capacity and know how to do so (Minghua *et al.*, 2009). On the other hand, local authorities are only viewed as initiators and facilitators in this system (Massaruto *et al.*, 2011). In a study done by Mader (2011), it was observed that the Thai people were accustomed to receiving solid waste management services from local government almost free of charge. The community would put no effort in being responsible for the waste they generated. However, with the introduction of CBSWM Thailand, community involvement was promoted and the community ceased their reliance on local government for solid waste management services (Mader, 2005). Given enough financial support and awareness, the Thai people could now generate and handle waste responsibly. Chakrabati *et al* (2009) and Richardson (2003) assert that in community based waste management; the community takes a central role in the making of decisions, planning, implementation and management of their waste. Community-based solid waste management schemes are broadly known for their role in supplementing the efforts of local authorities in managing solid waste (Simon, 2008). Nevertheless, Colon & Fawcett (2006) argue that realistically speaking, the role that the community plays in managing their own waste is subject to local context as the whole exercise depends on availability of strong local leaders and a competent local authority.

2.5 The prospects of CBSWM

Consensus since the late 90s has been that waste management systems be engrained at grass roots level (Makarati & Chikobvu, 2011). Thus, community based waste management was initiated to align with worldwide trends of community based approaches to environmental problems (Jacobson *et al.*, 2009). The CBSWM model is rooted on the principle of Kurt Lewin which states that people are likely to modify their own behaviour when they participate in problem analysis and problem solving and are likely to carry out decisions they would have helped make (Massaruto *et al*, 2011). Thus, one of the prospects of CBSWM was to give people control over their urban environment in-order to maintain and improve its aesthetic state. Furthermore, CBSWM aimed to improve environmental knowledge of communities in-order to foster more responsible consumption, and reduced waste generation (Beede & Bloom, 1995). Mader (2010) argues that it is the indigenous community that knows their local environment, furthermore it is their knowledge that should help build sustainable waste management. Thus,

another aim of CBSWM would be to provide common ground between local authorities and the relevant stakeholders in the community, thereby promoting social inclusion, increased environmental awareness; responsiveness about waste and resource recovery (Mader, 2012).

2.6 Role of CBOs and communities in CBSWM

2.6.1 Role of community members in CBSWM

It is the role of community members to practise proper sanitary behaviour. This is achieved by keeping households and surroundings clean and storing waste in a designated bin/container (EMA, 2015). Community members are expected to adhere to any stipulated rules and regulations which bind their local CBSWM initiative. This may include full participation in clean up campaigns, the separation of waste into organic and inorganic then the subsequent composting of organic wastes in backyards (Annepu, 2012). In the recycling projects in Mexico, community members were required to separate their waste and, the organic waste to be processed into bio-fertilizer and the fertilizer given to farmers who grew vegetables. In return the community would receive a discount when they bought vegetables from the farmers. It is also the role of community members to pay a small fee which is dedicated towards running expenses such as paying of wages to waste collectors (Memon, 2012). In addition, the community can also contribute in kind such as lending personal equipment that can make collection of waste easier. The community is also expected to dedicate their personal time and contribute in labour. It is also required that community members attend meetings, elect leaders and representatives who manage waste collection and to give feedback and queries to the local authority (Annepu, 2012). In Bamako, Mali the community formed what are called 'comités des sages' a forum where the community give feedback or complain about the operation of their waste management initiative, they also propose modifications and indicate any new needs. Through this forum, the community also attends weekly meetings and debates concerning waste management situations (Minghua *et al.*, 2009).

2.6.2 Role of CBOs in CBSWM

Mudzengere & Chungwenya (2012) cite that in a bid to solve suburban waste issues, communities are empowered by local authorities through community based organisation (CBOs) to manage refuse in their own neighbourhoods. Memon (2010) explains that CBOs fill the gap that is left by local authorities by rendering solid waste management services that are appropriate for a specific area. CBOs and their communities clean up their environment and at

the same time earn an income through activities such as the sale of recyclables, collection of waste and composting (Annepu, 2012). In a study conducted in Mumbai by Shekdar (2009) it was cited that the community benefitted from its local community based waste management scheme through recycling activities and through the re-use of material such as plastic. Plastic containers were re-used to grow tree seedlings and flowers which were sold to tourists and nurseries. Chitungwiza Polymer Wax, a CBO situated in Harare would collect plastics and recycle it to produce products such as floor polish, candles, shoe polish and paraffin. About 20 litres of floor polish was made from 20 kg of plastic and sold at \$45-\$50 depending on the market. It was reported that, the CBO also produced wax which was used by big floor polish making companies in their manufacturing processes (EMA, 2015)

In Asian cities, CBOs develop neighbourhood waste management service that encourages separation of waste at source, recycling, composting and waste recovery (Colon & Fawcett, 2006). In addition, CBOs in the Middle East clean their suburbs by organising a door-to-door collection service of household waste and sweeping of the streets. This has helped to reduce the rate of indiscriminate waste dumping. This has been achieved by recycling as much waste as possible locally. At the other hand, CBOs in the Middle East employ local waste pickers/scavengers to do the door to door collection which grants them a recognised social status (Chakrabati *et al.*, 2009). In Faisalabad, Pakistan, CBOs would engage in door to door awareness campaigns which made a positive impact on the community's attitudes towards waste management (Zahra *et al.*, 2012). SWM in Dar es Salaam, Tanzania improved because of CBSWM innovations. The city improved from its waste collection rate of 4-5% in 1992 to 43-44% rate by 2003 (Sithole, 2015).

2.7 Barriers to an effective community based approach to waste management

2.7.1 Community participation barriers

According to Simon (2008), community based waste management schemes are mostly initiated in economically disadvantaged social groups. At times such people can prove to be unwilling to participate in community based waste management activities. Apparently, they claim they are better off pre-occupying themselves with so called 'bread and butter issues' as they are subject to poverty (Makarati & Chikobvu, 2015). A CBSWM initiative in Lusaka, Zambia formally known as the Sustainable Lusaka Project (SLP) managed to stay afloat for only four years. In its four years of formal existence, the SLP's main objective was the initiation of a participatory and community-based system of solid waste management for Lusaka's numerous

unplanned settlements. Amongst other factors, the initiative unfortunately failed mainly due to lack of community participation (Nchito & Myers, 2004). The urban poor in Lusaka had inadequate shelter, with no idea whatsoever where their next meal would come from and they were succumbing to the ravages of hyper-inflation, thus they couldn't be bothered to participate in CBSWM initiatives (Nchito & Myers, 2004).

Makarati & Chikobvu (2011) highlight that issues of animosity between Community Based Organizations (CBOs) and the general community at times derail CBSWM initiatives. Tukahirwa *et al.*, (2010) in a study done in Karachi, Pakistan observed that the local authorities selected the educated to become members of CBOs. This was treated with suspicion by the uneducated public who felt patronized whenever CBOs began operational activities within the community. In most cases members of the CBOs were alienated and labelled as “know it all” and such friction destabilized waste activities (Tukahirwa *et al.*, 2010).

Makarati & Chikobvu (2011) argue that some community members are reluctant to participate in community based waste initiatives because they strongly maintain the general perception that waste management is the sole responsibility of municipalities. In a study done in Mumbai, India CBOs faced lack of co-operation from the community members, this is because the community felt it was the responsibility of their local authority to clean after them. In some cases, other residents cheated and stuffed their waste into neighbours' rubbish bags at night in order to evade paying waste collectors (Richardson, 2003). In another study, community members were reluctant to participate in waste separation because, “separation of waste was deemed to be unusual in Indonesia” (Zubrugg, 2003).

It is argued that if waste management is not a felt need by the community, then such an attitude could have a negative bearing on the level of community participation. In a study done by Zia & Devads (2007), it was argued that a ‘felt need’ is a requirement that determines the success in initiating a community-based solid waste management system. In Minh Khai, Vietnam, 3% of the population were reluctant to participate in CBSWM because they argued that they could manage their own waste individually. Others were reluctant to join waste management activities and resonated that they could incorporate their daily waste into livestock feed. Hanafie (1995) alleged that communities in Indonesia and Ivory Coast argued that they did not need waste management services and thus were reluctant to contribute monthly fees for collection of waste by CBOs. This had a negative bearing in that the waste management schemes in both countries faced financial difficulty (Hanafie, 1995).

At times community members can show total disregard for rules and regulations that bind community based waste management schemes. In Panaj, India and Srilanka residents were required to take their sorted waste to a centre or wait for waste collectors by the roadside respectively. However, the residents would not adhere to rules and regulations but would just leave the waste on the street or dump it in nearby streams (Reddy, 2011). As such the dumped waste would then be spread around the village by stray animals and at times children would be seen playing with the waste. It is however worth noting that such disregard for rules and regulations though not condoned, emanates from frustration especially when waste recycling and collection centres are located far from households (Reddy, 2011).

2.7.2 Solutions for participation barriers

Rathi (2006) argued that community participation could be boosted if incentives were given to community members. For instance, in Yala, Thailand in-order to motivate the community to join in waste management activities, they introduced what was termed (“Garbage for Eggs”). This exercise encouraged residents to bring recyclable material to exchange for eggs, eggs form an important component of most diets in Yala (Minghua *et al*, 2009). In Curitiba, Brazil some remarkable solutions were put in place to encourage low-income households to participate in solid waste collection. The solution involved the exchange of garbage for free bus tickets and food parcels (Myers, 2003) Another solution to low participation in Brazil included the “Green exchange” project where-in the co-ordinators accepted only recyclable garbage in exchange for food bags. This exchange took place at supermarkets, schools, factories and through neighborhood associations (Mongkolnchaiarunya, 2005). In a research conducted by Papageorgious, (2006) in Nepal, a CBSWM initiative faced constraints because of the community’s low willingness to participate in the project. However, a local women’s club convinced people through lectures of the need for proper solid waste handling. However, the community became more willing to participate when the women’s club held a competition for the cleanest household. The competition motivated the community to be more involved in the CBSWM initiative (Richardson, 2003). Sujauddin *et al* (2008) studied community participation in an organized collection and recycling program and it was concluded that 70% of the people were opposed to separation of household waste because it was perceived as inconvenient. However, Sujauddin *et al* (2008) came up with a solution to encourage communities to separate and recycle waste. The proceeds from the sale of recycled material were given back to households as an incentive which motivated them to participate in the separation of wastes at source.

2.7.3 Institutional barriers

Mader (2004) argue that the lack of proper co-ordination between the public and private domains can act as a barrier to effective community based approach to waste management. Sithole (2012) speculates that the lack of proper co-ordination can arise from the differences that exist within the modes of operation between the public and the private sector. The public domain which is represented by the local government tends to take more of an autocratic route. In addition, the public domain has been critiqued for its lack of transparency, accountability and its overbearing controlling nature especially in societies that are not so democratic (Reddy 2011). On the other hand, the private domain represented by NGOs and private corporations are quite democratic in their operations (Simon, 2008). Sujauddin *et al.* (2008) stated that the dominant attitude among local authority officials toward NGO enterprises is mostly negative. In a study done by Rodic & Wilson (2010) in Khulna, Bangladeshi it was observed that the municipality staffs typically failed to appreciate the benefits and opportunities that partnerships with NGOs offered. Municipality officials were always paranoid that NGOs would spread opposition propaganda which could cost them in the oncoming local government elections. Such paranoia and lack of trust towards NGOs by municipality staff was identified as a barrier to community based waste management in Khulna, Bangladeshi by Chakrabati & Majunder (2009) as well. With that said, it is worth noting that community based initiatives can operate efficiently if stronger relations between the public and private sector are cultivated.

2.7.4 Political barriers

In some cases, community based waste management systems have short-lived success or are a total failure if activities are vulnerable to political interference (Richardson, 2003). Makarati and Chikobvu (2011) note that the political systems in some states obstructs donor and lobby groups who may want to assist with financial and technical support to help local authorities to deal with community based solid waste management projects. Some governments succumb to paranoia. Thus, they view donors and lobby groups as agents of regime change bend on destabilising their sovereign states by exposing their failures (Makarati & Chikobvu, 2011).

Tribalism can also be cited as an impediment to successful community based waste management. In a study done in Ivory Coast, there was unequal ethnic representation in CBOs. Only people of the same tribal background were proposed as candidates for CBO membership. This compromised the social cohesion in the community which compromised waste management activities (Schubeler, 2007). In Egypt, a similar problem arose because a CBO

called Gameyya in Cairo only consisted of Zabbaleen people. Consequently, non-Zabbaleen people then exhibited ill-feelings towards the CBOs and they boycotted activities such as waste sorting. Furthermore, this fuelled tension on tribal grounds.

2.8 Conclusion

In light of the discussion that has been done in this review of literature, management of solid waste has to be seen as a way of protecting human life as well as the natural environment. This is done through the promotion of clean, aesthetic conditions in the built environment (Mudzengere & Chingwenya, 2012). The conventional SWM approaches that are still in use in Africa and some parts of Asia are obsolete as they have been used and abandoned in the early 1970s by more economically developed countries (Mader, 2011). Thus, it is mandatory that developing countries adopt contemporary and methodical tactics to solid waste management. In the words of a major solid waste expert, Christine Furedy: "In general, self-help efforts have been more successful in producing a specific object than in maintaining services in a routine way" (Furedy, 1989). With that said, self-help efforts which translate to community participation in managing waste could be the next best thing especially for developing cities. It is however worth noting that community participation in solid waste management can only be successful in the long run if the organizations involved are credible, reliable and have legitimacy (Richardson, 2003). A common culture that exists in developing countries is that of women being responsible for keeping the household and its surroundings clean. So, handling of waste is one of the daily tasks of women. This role of women makes them ideal beneficiaries of solid waste management projects, but unfortunately their voice is seldom heard and their participation in community decision-making is minimal because they live in men-driven societies. Thus, it should be noted that the co-operation of women is essential for the success of any community based initiative especially waste management (Annepu, 2012).

CHAPTER THREE

3. RESEARCH METHODOLOGY

This section illustrates the methods and steps that were taken during collection and analysis of data in the study area. This Chapter also tackles issues such as research ethics. Finally, the Chapter will highlight some of the challenges that were encountered by the researcher during data collection.

3.1 Research design.

A research design is an overall strategy that is utilized in research to in-corporate the diverse components of a study in a comprehensive and logical manner in order to address the research questions guiding the study (Campbell & Stanely, 1969). Vogt *et al.*, (2012) identify six common designs in academic research. These include a survey research design. A survey research design is intended for research questions that seek brief answers to structured questions. Another design is an interview research design. An interview research design is appropriate for research questions that require in-depth answers from informants. An experimental research design is also identified, and it is used for research questions which include variables that can be manipulated as such allowing control and experimental groups. Vogt *et al.*, (2012) also identify an archival research design. An archival research design is appropriate for research questions which can be answered by analyzing archives of data. Another research design that Vogt *et al.*, (2012) identify is a naturalistic/observational design. A naturalistic/observational research design is one that seeks to describe and explore phenomenon as they happen in real time. Finally, Vogt *et al* (2012) identify a combined design. A combined research design is one that incorporates two or more of the designs that the researcher has outlined above. Vogt *et al.*, (2012) define a Combined Research design as a design were two or more research designs are consolidated in-order to answer research questions that are complex or have multiple facets. For the purposes of this study, the researcher consolidated an Interview research design, a Questionnaire research design and an Observational research design. As such this study followed a Combined Research design.

The rationale behind the researcher adopting a Combined Research design was that, using a single research design could not have adequately provided data that this researcher needed to answer research questions. In this study, the researcher used direct observations to make verifications on the questionnaire responses that the researcher got from the community of Nkulumane. For example, the researcher asked respondents whether they separate waste into

organic and inorganic fractions as they are expected to. So, in-order to verify their responses the researcher would observe the area where they dispose of their household waste. According to Vogt *et al* (2012) the approach of combining several research designs has proven to tell the full story, has a high degree of positive corroboration and has a positive influence on the validity of results as well (Vogt *et al.*, 2012). According to (Maree *et al.*, 2010) a combined research design is appropriate when one wants to use one research design to inform another research design and to verify findings from other research designs.

3.1.1 Mixed research methods

This study followed mixed research methods. Mixed research is a method of doing research and it is also a methodology that consolidates elements of qualitative and quantitative approaches to research (Creswell & Clark, 2007). The advantages of combining qualitative and quantitative research is that it allows one to have a better understanding of a research problem than when only one method is used. Using mixed research methods means one will be collecting both qualitative and quantitative data. Furthermore, it means one will use both quantitative analysis and qualitative analysis in their study. Examples of quantitative analysis involves the use of statistics in-order to make sense of variables (Maree *et al.*, 2010). On the other hand, qualitative analysis would involve the use of texts and images in-order to make sense of codes that are merged into themes (Hay, 2010). In this study the researcher used quantitative analysis to analyse data collected through questionnaires. In addition to that, qualitative analysis was used in-order to analyse data collected through interviews.

3.2 DATA COLLECTION METHODS.

3.2.1 Interviews

An interview is a data gathering method where-in the interviewer asks informants questions to elicit data and to gain knowledge about informants' ideas, beliefs, views, opinions and behavior patterns, (Maree *et al.*, 2010). Furthermore, Maree *et al* (2010) state that interviews give researchers an opportunity to view phenomenon through the lens of informants and are valuable sources of information provided they are administered correctly. Interviews can be administered in three different forms. The following are the three different forms; structured interviews, semi-structured interviews and unstructured interviews (Hay, 2010). Structured interviews are also known as standardized interviews, they are administered with the use of an

interview schedule that comprises of a list of carefully worded questions. When administering standardized interviews, the exact same line of questioning is maintained with all informants. The reason why all respondents are to be given the exact same line of questioning is to aggregate informant responses and probably to test a certain hypothesis. Semi structured interviews are non-standardized interviews and even though they follow some degree of pre-determined order, they give room for the interview to exercise a level of flexibility when they are asking questions (Hay, 2010). When one is undertaking structured interviews, an interview guide is used. An interview guide helps in giving the interview a sense of order and direction. Semi structured interviews give room for a level of flexibility in that, the questions that are asked are derived from the interview guide even though additional questions that are not in the interview guide can be asked if the interviewer sees it fit to do further probing (Maree *et al.*, 2010). In contrast, unstructured or in-depth interviews are informant focused; their purpose is to elicit information on personal perceptions and personal histories. The questions that are asked in unstructured interviews are entirely determined by the informants' responses (Hay, 2010). The interviews are not rigid and are equivalent to having a normal conversational interaction and give the informant some scope to direct the interview.

For the purposes of this study, semi structured interviews were utilized to collect data from local authority officials from Bulawayo City Council and the chairperson of CBOs that operate in Nkulumane. Interview sessions were held from the 10th of January 2018 to the 16th of January 2018. The local authority officials that the researcher interviewed were those who were responsible for spear heading the community based waste management scheme in Nkulumane. The researcher interviewed one senior official from the Department of Amenities, two senior officials from the Department of Environmental Health and one senior official from the Department of Public Housing. In total, the researcher interviewed 5 personnel. The researcher interviewed local authority officials in-order to find out what influenced Bulawayo City Council to abandon conventional waste management in favor of a community based approach to solid waste management. Furthermore, the researcher interviewed local authority officials to determine the prospects that Bulawayo City Council had regarding community based solid waste management. The researcher also interviewed local authority officials in-order to find out what Bulawayo City Council has achieved by implementing community based solid waste management in Nkulumane. Moreover, the researcher interviewed the chairperson of CBOs operating in Nkulumane to determine the role of CBOs in community based solid waste management.

The researcher appreciates the busy schedule in which local authority officials find themselves in. As such, using semi structured interviews to elicit data from local authority officials ensured that the researcher acquired all the data they needed whilst being conscious of consuming too much of the officials' limited time. Maree *et al.*, (2010) assert that, semi structured interviews seldom span a long period of time. This is because they are based on a line of enquiry pre-planned by the researcher in advance of the interview. Nevertheless, even though semi structured interviews make use of an interview schedule with pre-planned questions, adopting semi-structured interviews allowed the researcher to probe further when there was need for further clarification on any matter in discussion. The researcher opted to interview informants' face to face in-order to capitalize on non-verbal cues that informants would radiate. Non-verbal cues are certain physical gestures or expressions that people make when they are communicating with each other, (Kothari & Gorg, 2014). Observing the interviewees non-verbal cues helped the researcher to grasp the magnitude of what the interviewees were trying to express. Furthermore, face to face interviews helped the researcher to connect with the interviewees. The researcher also saw it fit to interview informants at their place of work. This enabled interviewees to be more relaxed and free to express opinions as they were in a setting they are familiar with. Furthermore, being in a setting the interviewees are familiar with helped to eliminate any chances of them feeling out of place or feeling awkward.

3.2.2 Questionnaires

A questionnaire is a research instrument which takes the form of various questions and other prompts for gathering data from respondents (Munn & Drever, 2004). There are three types of questionnaires that Kothari & Gorg (2014) identify. These are, closed ended, open ended and mixed questionnaires. Closed ended questionnaires are those that have questions which have a variety of options as responses. Closed ended questionnaires allow informants to choose one option from the variety of options given on the questionnaire. Hay (2006) articulate that closed ended questionnaires are appropriate when one is undertaking preliminary analysis. Moreover, since a fixed answer set is given, closed ended questionnaires are ideal for the calculation of statistical information such as percentages various phenomenon. Open ended questionnaires are not based on a pre-determined set of responses. They give room for informants to voice their feelings and opinions freely. Finally, mixed questionnaires are those that consist of closed ended questions as well as open ended questions. The researcher decided to use open ended questionnaires for the purposes of this study. This is because, in a preliminary study that the

researcher did, a questionnaire in closed-ended format was used and respondents were just ticking responses without even reading the questions. As such, the researcher resonated that they were not going to acquire the correct information from the responses. This led to the researcher using an open-ended format, this helped the researcher to connect with informants and to get opinions and explanations on why they handled waste the way they did. Moreover, they were appropriate for thoroughly addressing the question of how the knowledge, perceptions and attitudes of community members influenced the state of waste management in the study area. Kothari & Gorg (2014) assert that, when informants are granted an opportunity to express themselves they often provide real, perceptual and at times startling proposals. Open-ended questionnaires tend to draw accurate feedback and suggestions from respondents as well.

The researcher distributed 375 questionnaires to community members with the help of three research assistants from the 21st of December 2017 to the 8th of January 2018. The researcher would ask questions from the questionnaire to informants and then jot down the informants' responses on the space that was provided on the questionnaire. The questionnaires were distributed in-order to address the question of what knowledge, perception and attitudes the community had regarding community based waste management scheme. Moreover, questionnaires were distributed to address the question of how community knowledge, perception and attitudes influenced the current state of solid waste management in Nkulumane.

3.2.3 Field Observations

Field observations involves making careful, objective notes about what one sees, recording all accounts and observations as field notes (Given, 2008). Makarati & Chikobvu (2011) assert that, rather than depending on data elicited from respondents, observations could give one a clear picture of phenomenon. From the 21st of December to the 8th of January the researcher observed how the community was handling waste in their households. With the informants' permission, the researcher observed whether waste was being separated into inorganic and organic fractions as expected. Furthermore, the researcher did observations to check whether the community was composting organic waste as expected. The researcher also went around Nkulumane to determine the availability and distribution of outdoor bins. Moreover, the researcher did field observations to determine the extent of littering and illegal dumping in Nkulumane. Field observations assisted the researcher to capture events as they unfolded and

to make verifications on some responses that were being given by the local authority and community members (Makarati & Chikobvu, 2011).

3.3 Sample size

The equation below was used to derive a sample size of 375 households which was representative of the total households in the study area.

$$N = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \frac{[z^2 \times p(1-p)]}{e^2}}$$

Where: N = sample size

p = population size

e = margin of error

z = z score

Population size: The total number of people or units in one's study. In this case the total household units in Nkulumane is 2678.

Margin of error: A percentage that describes how closely the answer your sample gave is to the "true value" in your population. The smaller the margin of error is, the closer you are to having the exact answer at a given confidence level. The researcher opted to use a margin of error of 5%.

Confidence level: A measure of how certain you are that your sample accurately reflects the population, within its margin of error. Common standards used by researchers are 90%, 95%, and 99%. In this case, the researcher opted to use a confidence level of 95%.

The z-score: Is the number of standard deviations a given proportion is away from the mean. Table 3.1 shows the z -scores values in relation to the confidence level adopted from *Maree et al.*, (2011) that was used to determine the sample size.

Table 3.1 z-scores determining sample size

Desired confidence level	z-Scores
80%	1.28
85%	1.44
90%	1.65
95%	1.96
99%	2.58

3.3.1 Sampling method

Sampling is the process of selecting the sample from a population in order to acquire data with regards to a phenomenon in such a way that represents the population of interest (Given, 2008). Various sampling techniques exist. Random sampling involves the selection of a random sample from the overall population. Hay (2006) state that simple random sampling gives any member of the population an equivalent chance of being drawn. It requires the use of statistical tables and determination of the percentage of the population that is to be selected. However, it is considered uneconomical to achieve and is not possible to use without a complete list of population members. Furthermore, there is a probability that it may leave out sections of the population that could yield better results. Another sampling method is stratified random sampling, it subjects the researcher into creating strata of the population. Strata according to Hay (2006) are subdivisions of the population based on a distinct criterion. It is similar to simple random sampling though it increases representativeness. However, its limitation is that it possesses some form of subjectivity when stratifying particularly where there is no clarity on the differences in matter under study. Systematic sampling is also used in sampling population for research purposes, the method is mostly adopted when the researcher has prior knowledge of intensity as well as location of the matter under study. Hay (2006) is of the opinion that it is a quicker method of choosing samples from a target population which still maintains the element of randomness. However, its demerit is influenced by the fact that the researcher is forced to assume that the area in question is uniform and this leads to unreliable and invalid data. Another sampling method is cluster sampling, this a method that is mostly applied where the area under study is large and the population is dispersed. Sampling is done by creating

clusters and investigating each and every individual in each cluster. In addition, purposive sampling is a method of sample selection that is done through the conscious handpicking of subjects on the basis of desired specific characteristics (Given, 2008). This sampling method takes into account only areas or groups that are most likely to give the researcher the desired information.

For the purposes of this research, purposive sampling and systematic sampling were incorporated. Systematic sampling was used by the researcher to select the population that questionnaires were administered to. According to Hay (2006) Systematic random sampling is the random sampling method that requires selecting samples based on a system of intervals in a numbered population. The researcher compiled a list of households from house number 1 to house number 2678 into Microsoft excel. The next step was to determine the interval at which sample units were to be selected. The equation below was used to come up with an interval.

$$\text{interval} = \frac{\text{total population}}{\text{sample size}}$$

The researcher went on to select a random household where she initiated the questionnaire administration. The next house the researcher visited was the 11th household after the initial household. As such, the researcher visited every 11th household within the sample frame until 375 households were covered. The researcher administered one questionnaire per household. The researcher chose to use systematic sampling because, Hay (2006) was of the opinion that it is a quicker method of choosing samples from a target population whilst still maintaining the element of randomness. Furthermore, the rationale behind using systemic random sample was to reduce the potential for human bias in the selection of cases to be included in the sample. As a result, systematic random sampling provided the researcher with a sample that was highly representative of the population being studied (Hay, 2006). Since the units selected for inclusion within the sample were chosen using probabilistic methods, systemic random sampling allowed the researcher to make statistical conclusions from the data that was collected.

The researcher used purposive sampling to select local authority officials to be interviewed. In this study, the researcher interviewed officials from Bulawayo City Council. However, the researcher only interviewed officials from Bulawayo City Council who are spearheading the

community based solid waste management scheme (CBSWM) in Nkulumane. According to Given (2008) purposive sampling takes into account only areas or groups that are most likely to give the researcher the desired information. The researcher chose not to interview any other personnel within Bulawayo City Council because they did not necessarily have the information that would have assisted the researcher to answer their research problem. Given (2008) argues that, with purposive sampling, sample selection is done through the conscious handpicking of subjects on the basis of desired specific characteristics (Given, 2008).

3.4 DATA ANALYSIS

3.4.1 Analysis of interviews

For this research, data obtained from interviewing local authority officials was analyzed through Thematic Content Analysis. Thematic content analysis is a qualitative analytic method for identifying, analyzing, and reporting *patterns or themes* within data (Stirling, 2001). Furthermore, it minimally describes data sets in rich detail (Braun and Clarke, 2006). Thematic analysis systematically makes sense of large amounts of content from data. With the permission of interviewees, the researcher recorded the interviews electronically using a voice recorder. After the interviews, the researcher prepared the data for analysis by transcribing it from verbatim to written form. The researcher then re-read the transcribed data in-order to gain familiarity. The next step the researcher took was to develop codes from the transcripts. According to (Hennick *et al.*, 2011) coding is the process of labeling and indexing all the data. This was done by highlighting and listing repetitive words, phrases and expressions from the transcripts. According to (Stirling, 2001) one might regard parts of raw data to be considered as a code if; it is mentioned repeatedly in the transcripts, it surprises the researcher, the interviewee explicitly states that it is important, if the researcher has read about it in scientific articles or it reminds the researcher of a theory or concept relevant to their study. The next step the researcher did was to merge codes that were similar in nature in-order to form *Themes*. According to Braun & Clarke (2006) a *theme* captures something important about the data that relates to the research questions. The themes that were identified from the transcripts were then discussed in relation to the study's research questions and existing literature. This was done in-order to develop a theory that ultimately answered the research questions whilst filling any gaps in literature.

3.4.2 Analysis of household questionnaires

The data to be collected through the questionnaires was analyzed using the Statistical Package for Social Science (SPSS version 25). After the administration of all the questionnaires was done, the researcher first performed data preparation. Since the questionnaires were qualitative/open ended, in-order to input the responses into SPSS, the researcher had to generate codes from the responses. The codes were generated by grouping similar responses from the questionnaires into one category. The codes were then logged into the SPSS. Within the SPSS, the researcher went on to use the Descriptive Statistics tool in-order to analyze the codes that were generated from the questionnaires. According to Stirling (2011), in a research study one may have a lot that needs to be measured. Or an individual's study may require one to measure a large number of people on any measure. As such, Descriptive Statistics help one to simplify large amounts of data in a sensible way. For example, in this specific study, the researcher collected data from more than 300 subjects, which is quite a large number. So, descriptive analysis, with the aid of graphs, pie charts and tables assists the researchers to analyze questionnaire data such that patterns and frequencies will emerge.

The Descriptive Statistics tool was used in-order to generate Cross-tabulations. Cross-tabulations in SPSS is a procedure that generates information about bivariate relationships. Cross-tabulations display the relationship between two variables. In this study the researcher used the descriptive statistics tool to cross-tabulate the relationship between the level of education of respondents and the knowledge of respondents on community based solid waste management (CBSWM) concepts. The researcher also used the descriptive statistics tool in-order to generate frequencies from the questionnaire responses. The frequencies were then displayed in the form of graphs, pie charts and tables.

3.5 Ethical considerations

The ethical issues that were noted with regards to this research include acquiring a permit from relevant authorities were-in the research was undertaken. Permission was sought from Bulawayo City Council. This was to ascertain that the researcher only gathered data which is none other than for academic purposes. Furthermore, this was to ascertain that no sensitive information was to be dispersed and that there would be no intrusion onto private property thereby invading privacy of any individuals. Participants were only included in the study upon signing a consent form that provided substantial written explanation of the study, including risk and that they had the right to withdraw from the study at any time without stating a reason. All

the information collected during the study was de-personalized and stored in a password protected and access controlled computer and was kept confidential and was only used for academic purposes.

3.6 Limitations of the study

The major limitation of the study was the delay the researcher encountered whilst seeking permission from Bulawayo City Council to undertake data collection in the study area. The researcher had to go through a series of interviews in-order to satisfy responsible authorities that the research was academic. Due to the political atmosphere present during the time the researcher wanted to collect data, the researcher had to be vetted to ensure they were not a foreign journalist disguised as an academic researcher. Another limitation was, the response rate of questionnaires was very low when the researcher did a preliminary survey. The researcher left questionnaires in 15 households and upon requesting them back, only 3 households had attempted to fill the questionnaire. The others claimed they forgot to fill the questionnaires whilst others claimed they could not find time or could not understand the questionnaire. The researcher also noted that those who had filled the questionnaire did not read some of the questions but they were only ticking responses just to get it over with. In-order to overcome the limitation, the researcher had to call out the questions from the questionnaires to the respondents whilst the researcher filled in the responses for the respondents. The last limitation of the study was that some respondents were scared that the researcher was an officer from the Central Intelligence Organization (CIO). It is worth noting that CIO is a Zimbabwean state security organization. Other respondents also feared that the researcher was an officer from the Environmental Management Agency (EMA). To overcome the limitation the researcher had to explain that she was purely collecting data for academic purposes and that their responses were confidential. The researcher had to go an extra mile in showing untrusting respondents the researcher's student card and an authorization letter given by Bulawayo City Council.

3.7 Conclusion

This Chapter tackled the various types of research design and gave rationale as to why the researcher chose a combined research design over the other designs. Moreover, this chapter discussed the various kinds of sampling, interviews and questionnaire formats known to research. Finally, this Chapter addressed issues of data collection, data analysis, ethical

considerations and the limitation of the study. The next Chapter seeks to present the findings of the study as well as the interpretation of the results.

CHAPTER FOUR

4. FINDINGS OF THE STUDY

4.1 Introduction

The main aim of this chapter is to present the findings of the study. The Chapter illustrates the knowledge that the community has about CBSWM in the study area and explains how the community perceives certain aspects affecting CBSWM and the attitudes that community members have towards some elements of CBSWM. This Chapter also unravels what influenced the local authority to adopt a community approach to solid waste management. Furthermore, it reveals what the local authority has achieved since they started CBSWM in the study area. The Chapter also outlines some of the challenges that the local authority encounter in trying to keep CBSWM afloat.

4.2 SOCIO-DEMOGRAPHIC PATTERNS OF INFORMANTS

4.2.1 Age group of respondents

Figure 4.1 shows that 52% of the informants fell between the age groups of 20-29 years and they formed most respondents. 25.1% of the respondents were between the ages of 30-39 years followed by age groups between 40-49 years that made up 18.9% of the respondents. Finally, the minority of the informants were from the age of more than 50, these made up 4% of the sample frame. The reason why most of the respondents were of the ages 20-29 could have something to do with the state of Zimbabwe's economy. The ages of 20-29 should be at college /university or in their early working stages (UNEP, 2007). However, most of the persons who fall in that age group are stuck at home because the bad economy causes them to be unemployed and at the same time some do not have money to proceed to college.

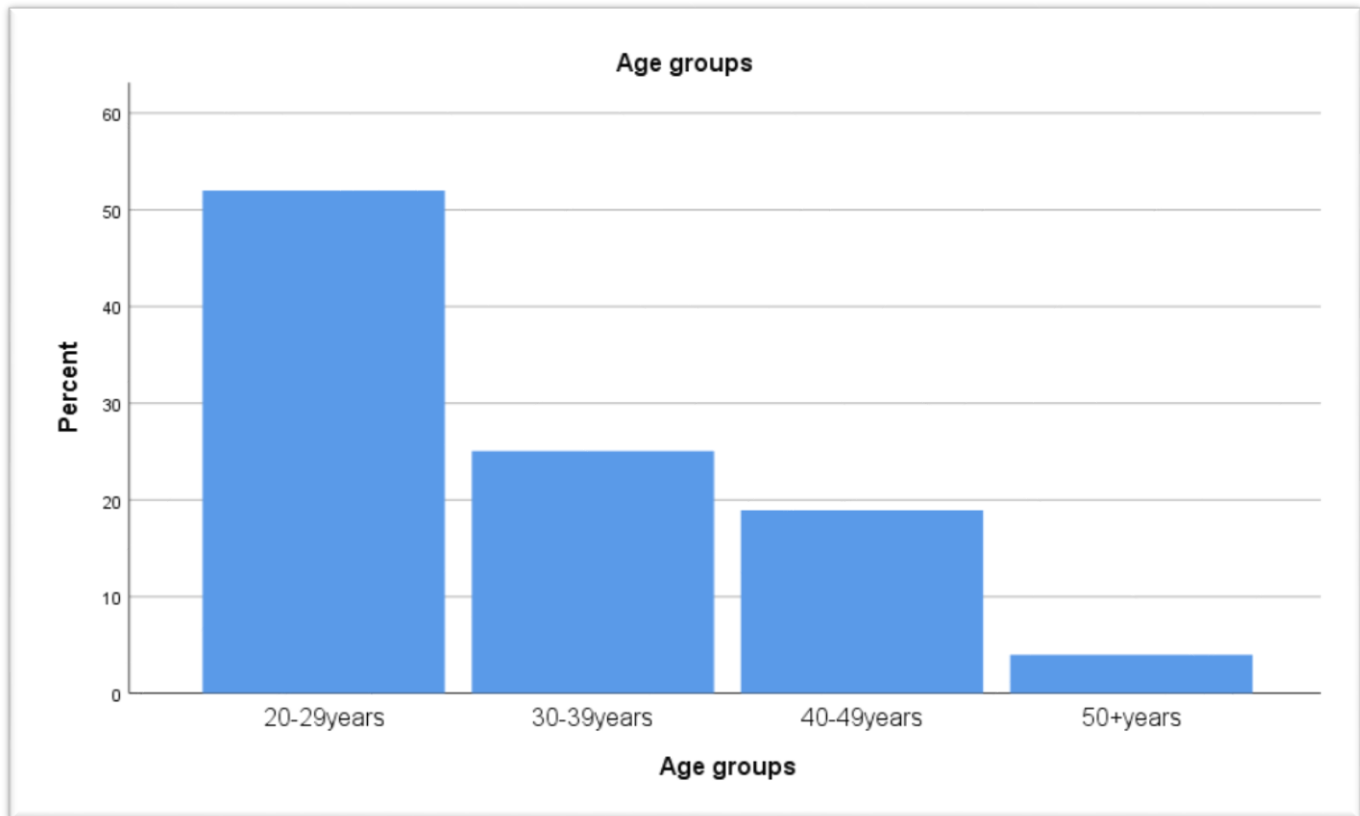


Figure 4.1 Age groups of informants

4.2.2 Gender classification of respondents

Figure 4.2 illustrates that, of the 375 respondents that took part in the survey, 54,4% were females whereas 45,6% were males. The reason why a larger fraction of respondents were females could be because most of the males were out working. In addition to that, Zimbabwe generally has more females than males (ZimStats, 2017).

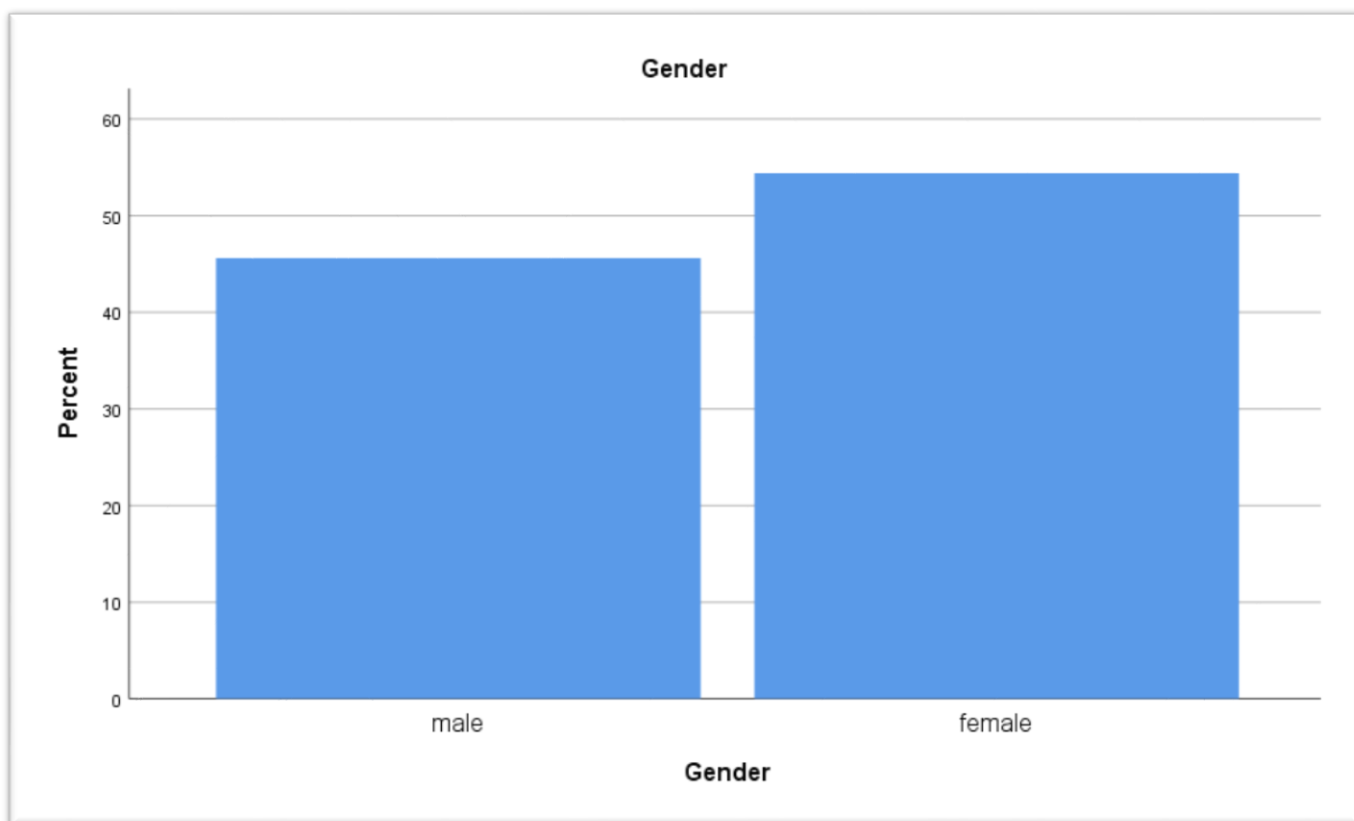


Figure 4.2 Gender characteristics of informants

4.2.3 Employment status of respondents

Figure 4.5 illustrates that, 50.7% of the respondents were self-employed. About 22.7% respondents were unemployed whilst 21.1% were formally employed. Finally, 5.9% of the populace were retired and all of them were of the ages 50 and above. The survey revealed that most of the informants were employed within the informal sector or were self-employed. Most of the informants that were informally employment revealed that they were vendors or hawkers. The reason why most of the respondents were self-employed could be because of the prevailing unemployment rate. Zimbabwe currently sits on a 90% unemployment rate which is speculated to be the highest in the world (ZCTU, 2017). The city of Bulawayo was once the industrial hub of Zimbabwe, however when the economy failed, so did most industries close. As such, it is hard to find formal employment so people resort to informal means of employment.

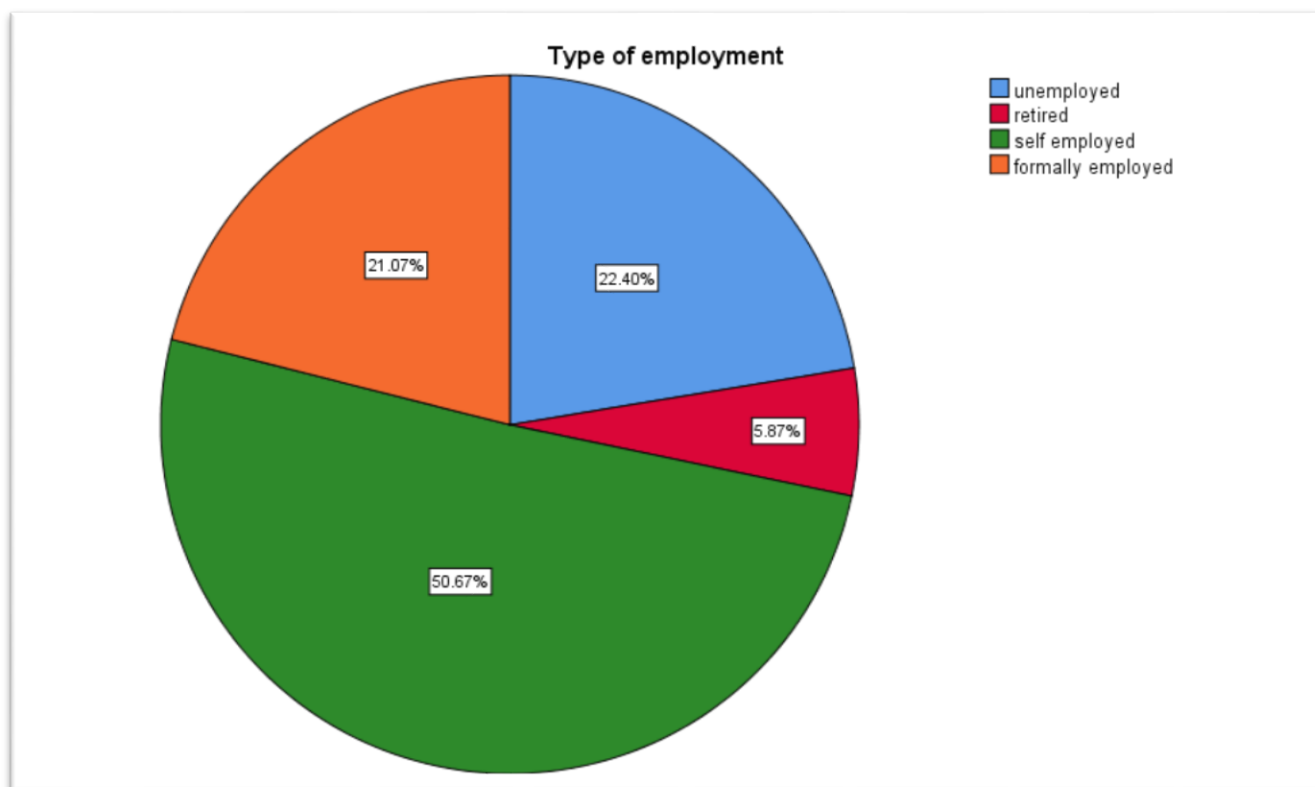


Figure 4.3 Employment status of respondents

4.2.4 Level of education

The survey revealed that 0.8% of the participants had only gone up to primary level in terms of education. About 13.1% had at least secondary school qualifications, which is Ordinary Level, whilst 60% of the informants had high school qualifications, which is Advanced Level. Finally, 26.1% of the informants had tertiary qualifications such as diploma and a general degree.

Table 4.1 Level of education

	Frequency	Percentage%
Primary school	3	0.8
Secondary school	49	13.1
High school	225	60.0
Tertiary school	98	26.1
Total	375	100

Source: Author

4.3 Findings of the community’s knowledge, perception and attitude towards CBSWM

4.3.1 Knowledge of the community towards CBSWM

The findings revealed that 68.8% of the informants were aware of the existence of a community based approach to SWM. However, 31.2% claimed that they had no knowledge of community based solid waste management.

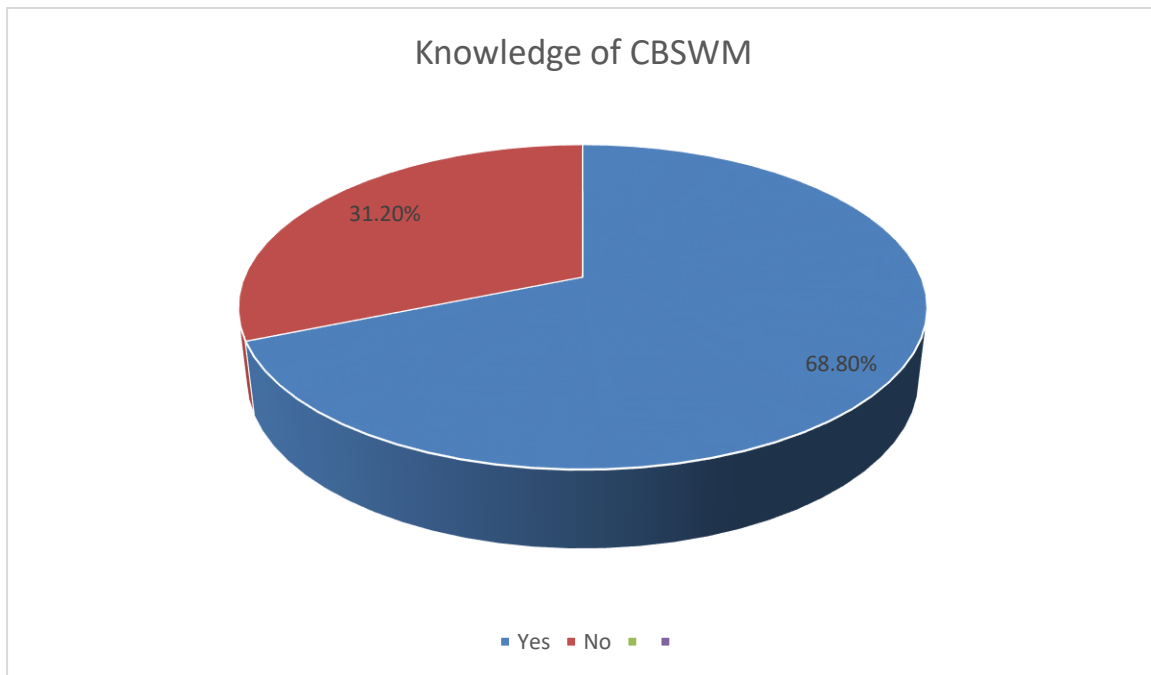


Figure 4.4 Community’s knowledge of CBSWM

The reasons behind the findings above is that participation in awareness campaigns influences an individual’s knowledge of CBSWM. According to the local authority, community members are given awareness on issues concerning CBSWM during community meetings that are conducted by CBOs and at times NGOs. The researcher asked respondents if they attend community meetings. The findings revealed that, 61% of the respondents were indeed attending community meetings whilst only 39% admitted to absconding community meetings. The researcher concludes that, the reason why more than half of the respondents had knowledge of CBSWM was because more than half of the respondents were also attending community meetings were such knowledge is imparted. Furthermore, a lesser fraction of the respondents who have no knowledge of CBSWM corresponds with a lesser fraction of the respondents who admitted to absconding community meetings.

4.3.2 Significance of level of education in knowledge of SWM

A Cross-tabulation of level of education against knowledge of certain concepts in CBSWM was done using descriptive statistics. The cross-tabulation revealed that, of the informants who had no understanding of what CBSWM entailed, 58.4% were those who had gone only as far as primary school. About 26.7% had gone as far as secondary school whilst about 14.5% had gone up to high school. However, only 0.5% of the respondents who had gone up to tertiary level claimed they had no understanding of what CBSWM entailed. As such, the cross-tabulations computed that, the less educated an informant was, the less they articulated regarding CBSWM concepts. The cross-tabulations also showed that of the respondents who had good understanding of CBSWM concepts, only 1% of them were respondents with primary education. About 9.6% had gone as far as secondary school whilst 23.1% had high school education. However, about 66.3% of the respondents who understood CBSWM well were those who had tertiary education. As such, the cross-tabulations compute that the higher the education an informant had, the more advantage they had in articulating what CBSWM entailed. The researcher noted that respondents with the least education were initially not so confident, had difficulties in expressing themselves, and were quite dismissive and evasive when the researcher was talking to them. For example, one informant that the researcher encountered said, *“My sister, I only went as far as grade 7, I am not intelligent, and I do not know anything.”* Another informant who went up to Form 2 (Grade 8) said, *“I do not understand what you are asking, is this a test? I never liked tests when I was at school, I am not sure I can help.”* Therefore, the significance of the level of education of informants was that, it contributed to how an individual easily articulated what CBSWM entailed.

Table 4.2 Cross-tabulation of level of education and knowledge of CBSWM concepts

	NO UNDERSTANDING OF CBSWM CONCEPTS	GOOD UNDERSTANDING OF CBSWM CONCEPTS
LEVEL OF EDUCATION		
PRIMARY SCHOOL	58.4%	1.0%
SECONDARY SCHOOL	26.7%	9.6%
HIGH SCHOOL	14.5%	23.1%
TERTIARY SCHOOL	0.5%	66.3%
Total	100%	100%

4.3.3 Attitudes of the community towards waste separation.

One of the reasons why the local authority moved from traditional ways of SWM to CBSWM was to partner with community members. As such, the local authority hoped that the community would participate actively in managing the waste they generate in residential areas. A city council officer during the interview stated that, *“In this new system of managing waste, we intended the community to rely less on the city council to clean after them but rather for them to be active in cleaning after themselves (Interview, Anonymous, 10/01/2018).”* The researcher found out that in CBSWM, it is the role of the community to at least separate perishable from non-perishable waste. This would require community members to dispose perishable waste in compost heaps whilst the other dry waste is put in refuse bags that are provided by the local authority. The survey revealed that 71.4% of the population does not separate perishable from non-perishable waste but throws all waste in refuse bags. Only 28.6% separate their waste. There-fore, the researcher concludes that, the reason why the majority do not make efforts to separate waste is because the community still hold on to traditional perceptions that it is the duty of the city council to sort waste.

4.3.4 Community perception and waste dumping

In-order to gauge the perceptions that the community held regarding waste, the researcher asked informants whether they had ever dumped waste in undesignated places, within the study

area. About 69.6% of the informants indicated that they did not dump waste in undesignated places because they feared that they would be fined or punished if they were caught by monitors from Environmental Management Agency (EMA). One of the respondents recounted, “*No, I will never dump waste, if the guys from EMA catch you, they will give you a fine of \$25, I don’t have such money.*” Another informant recounted, “*If those guys catch you dumping waste you are in trouble, they will order you to clean up the street as punishment, I will never risk embarrassing myself like that.*” About 16.27% of the respondents admitted to dumping waste in undesignated places and they argued that it was because their bins were full. It was interesting to find out that those who admitted to dumping waste illegally would do it during the night to avoid getting caught by EMA monitors. Lastly, 14.13% of the respondents said that they had never dumped waste illegally because they believed “*it is wrong.*” Perception is defined as a conscious understanding of something, as such, most of the populace avoid waste dumping, not because they perceive it to be wrong and bad for the environment. However, a conscious decision not to dump waste is made because the community fears “*finest and punishment.*” As such, the researcher decodes that the community holds a wrong perception on what CBSWM entails. If the community held the right perception then most them would avoid dumping waste, not because they are afraid of punishment, rather because they understand that it is wrong and that it has negative impacts on their environment.

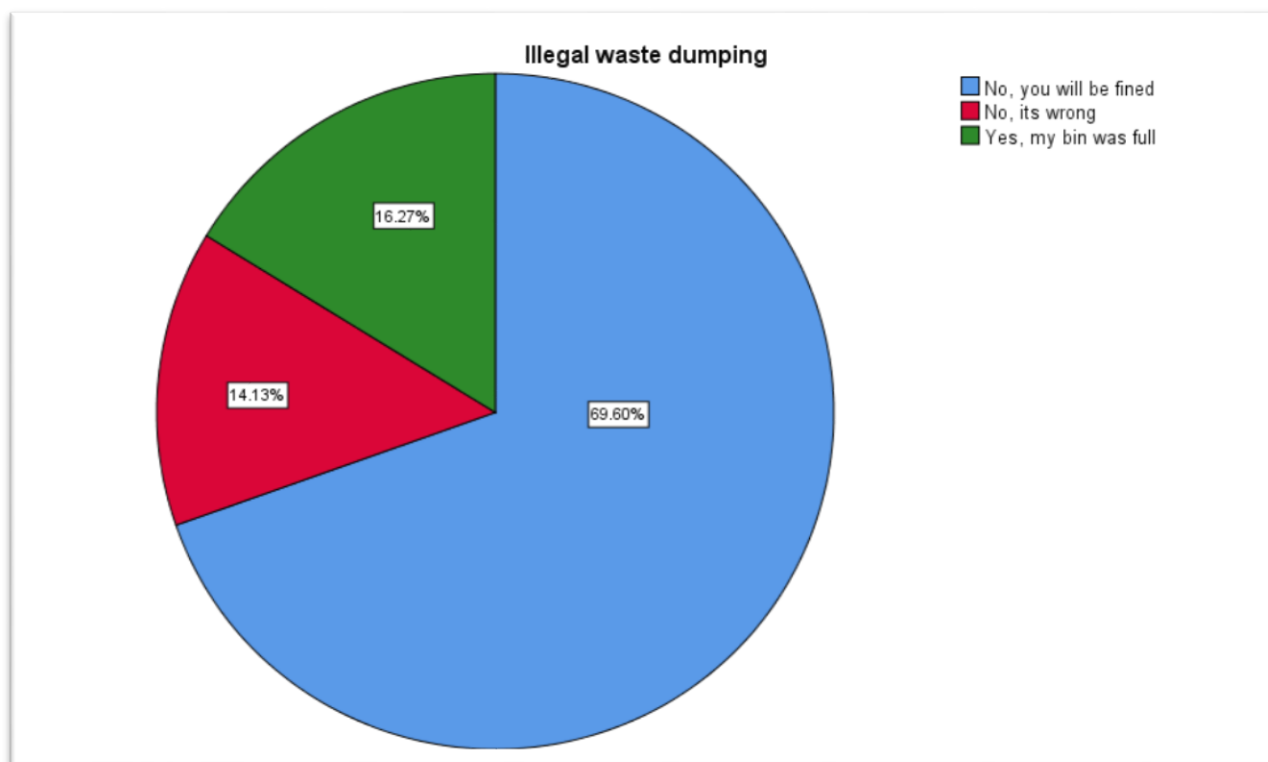


Figure 4.5 Waste dumping in the community



Photograph 4.1 Illegal dumping site in the study area

4.3.5 Attitudes of the community towards community based street sweepers

The researcher found out that the community do not appreciate the role that community based street sweepers (CBSS) play in CBSWM. This is evidenced by the negative attitude that some community members exhibit towards CBSS. It was revealed that there was stigma associated with being a street sweeper. CBSS raised concerns that at times they were shunned and looked down upon by some community members. One informant stated that, *“All sorts of mean names are thrown at us because we work with waste. It makes us uncomfortable and at times we are embarrassed to do our duties in the community streets because people looked down upon us.”* It is common knowledge within the community that those who are selected to be community based street sweepers are usually those who are economically vulnerable. One informant mentioned that, *“My neighbors ridicule me and my children. At times I hear people gossiping that I am a street sweeper because I am very poor. They say they cannot wait to see what will happen to me when my contract expires.”*

4.4 The role of the community in CBSWM

4.4.1 Separation of waste

According to the local authority, the role of the general populace in CBSWM is to ensure that they separate inorganic waste from organic waste in their households. The community is expected to dispose of organic wastes in their backyards in-order to make compost. All the other wastes are supposed to be put in refuse bags and then placed at the road side for collection by community truckers. Photograph 4.3 shows a refuse bin of one informant who separates wastes accordingly by only placing in-organic waste for collection. The researcher asked the community the way they dispose of their household waste. This was done to find out if the community is playing its role. The survey revealed that, only 18.9% of the informants' separate waste accordingly. The survey also revealed that 48.5% throw all their waste in the refuse bags and there is no systematic separation whatsoever. About 20.27% burn their waste, whilst 12.27% stated that they bury and throw waste in their drains.

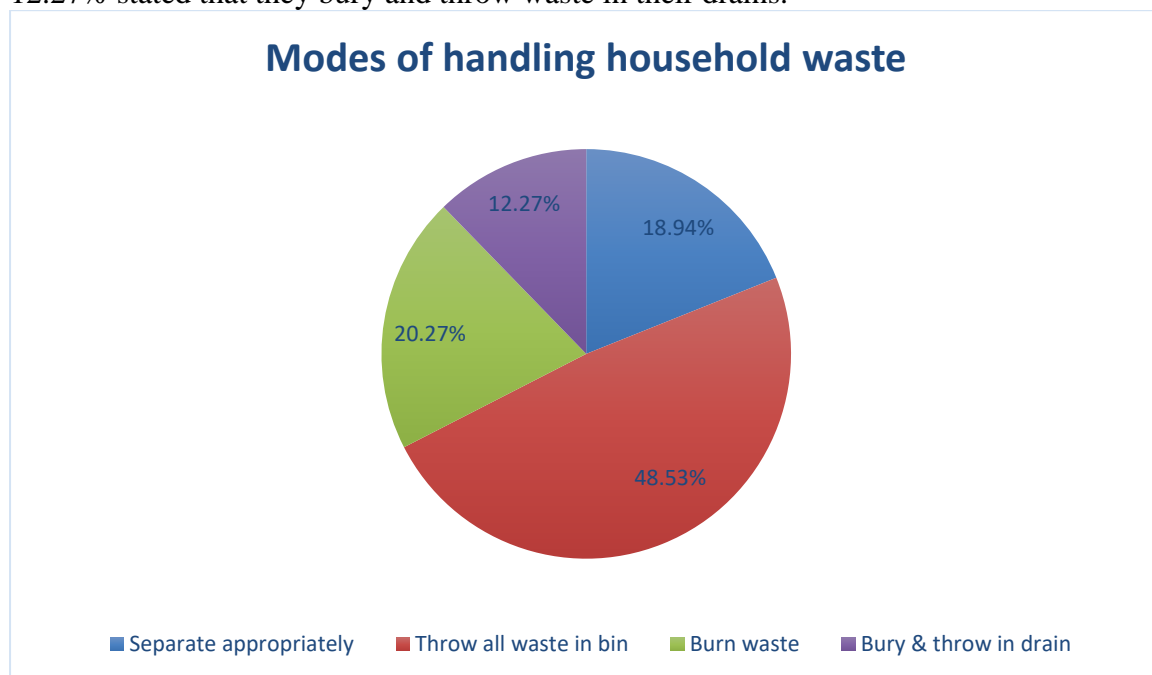


Figure 4.6 How community members handle household waste



Photograph 4.2 Refuse bin of a resident who separates waste as expected

4.4.2 Keeping the streets clean

The city council officials revealed that, it is the role of the community to throw waste in the outdoor bins provided by the municipality. Littering is to be avoided at all costs. Furthermore, it is role of the community members to make use of the refuse bags that the municipality provides for household use. Community members are to avoid the dumping of waste illegally, especially garden and construction waste that they generate in their home. Interviews with CBOs revealed that the community is frequently given awareness on the environmental effects of illegal waste dumping and littering. To find out whether the community is playing its role, the researcher asked the community what they do with waste when they are outdoors. The survey revealed that 67.2% of the respondents do throw litter in the bin when they are outdoors. However, about 32.8% of the informants admitted to throwing litter anywhere convenient especially if there were no refuse bins nearby. The researcher observed that there are a few outdoor refuse bins in the study area and most of the bins are unevenly distributed within the community. So, the researcher decodes that the inadequacy and uneven distribution of outdoor refuse bins influences community members to throw litter anywhere convenient.

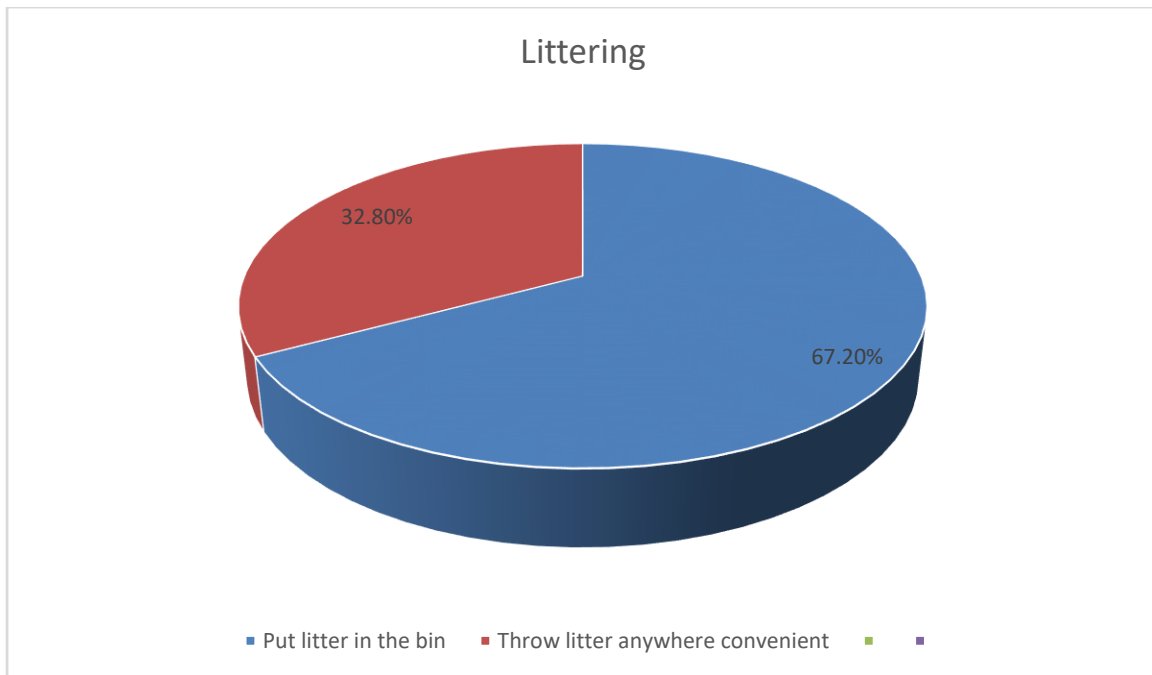


Figure 4.7 Littering in the community



Photograph 4.3 Littering in the study area



Photograph 4.4 More evidence of littering in the study area

4.4.3 Participating in community events

According to the local authority officials, when CBOs give notice of community meetings, it is the role of each community member in the wards to attend such meetings. Furthermore, community members are required to participate in clean-up campaigns that are organized either by NGOs, CBOs and at times political parties. The researcher found out that 61% of the community members were indeed attending community meetings whilst about 39% of community members stated that they were not attending community meetings (see figure 4.8).

4.5 The role of CBOs in CBSWM

The researcher conducted interviews with the chairperson of the CBO operating in the study area. The interviews revealed that the CBSWM system adopted by Bulawayo City Council has two schemes. The first scheme is that of Community Truckers and the second one is of Community Based Street Sweepers.

4.5.1 Community truckers

Community truckers are selected using a tender system. A tender is put out by the local authority stipulating the kind of vehicles that are needed for waste collection. The local authority asks individuals with 5-7 tons trucks to bid for the tender if they are interested in SWM. The trucks are then inspected for qualities such as road worthiness amongst other traits. Individuals with shortlisted trucks are then given contracts that stipulate the rates to be paid. In addition, jurisdictional boundaries that community truckers are required to operate in are also outlined in the contracts. The chairperson of CBOs stated that the waste that is collected by community truckers in the study area is put in bags and the local authority pays 23cents (US\$) equivalent to R2.30 per bag. Waste that is collected from households by community truckers is taken to a station where it is put in compacters then later on transported to the city's landfill by city council vehicles.

4.5.2 Community based street sweepers

Community based street sweepers (CBSS) are selected with the help of ward councilors. The targets are usually those who are struggling economically. Usually 10 community members are selected to operate in each ward as CBSS. They work under contract and earn up to \$200 equivalent to R2300 per month. However, employment contracts are not permanent and as such they expire after 4 months. This is done in-order to ensure that every community member gets their turn and benefits from the scheme. CBSS are responsible for ensuring that the streets in the study area are clean. CBSS are also trained by the local authority to give fellow ward members awareness on SWM issues. Furthermore, CBSS are responsible for monitoring and reporting any form of illegal waste dumping and littering in the study area.

4.6 Findings from interviews with the local authority

4.6.1 Factors influencing adoption of a CBSWM system

Up until 2009, Bulawayo City Council had a 2-tire traditional system of refuse removal. Waste was collected once every week within the Central Business District and in low density suburbs whilst in high density areas waste was collected once in every 2-3 weeks. The local authority claims that they collected waste less frequently in high density residential areas because their

service fleet was overwhelmed. Owing to the aforementioned system, the local authority started having problems with illegal dumping and residents were complaining that service provision was poor. An official interviewed by the researcher stated that, *“As a city we require a certain number of vehicles to be able to manage waste efficiently, since we did not have enough vehicles and we were overwhelmed, we acknowledged there were gaps in our service provision.”* This influenced Bulawayo City Council to decentralize SWM operations by partnering with other stakeholders in the private sector. In addition, the local authority partnered with communities urging them to contribute in managing residential waste especially in high density suburbs.

4.7 Achievements of the local authority

4.7.1 Decreased operational costs

In the past, the few vehicles that Bulawayo City Council owned would run from door to door to collect waste in residential areas. This increased the rate of wear and tear of the refuse fleet especially if the vehicle operated in high density areas. Furthermore, the local authority incurred a lot of expenses in trying to service their fleet and fuel costs were also high. Since community truckers are now transporting waste from the community to a central place using their own vehicles, city council vehicles no longer break down easily like in the past. Furthermore, the local authority spends less in servicing their refuse fleet since it now covers less mileage. According to an official from Department of Public Housing, *“The expenses of maintaining numerous vehicles now rests with tenderers since they use their own trucks to collect waste from the community”*. *“Related costs of loaders and the payment of labour is no longer the burden of the local authority; the responsibility also rests with tenderers as they are responsible for employing their labour and paying them wages.”*

4.7.2 Employment creation

According to an official from Department of Health and Environment, due to the struggling economy, industries remain closed which forces many people out of work (*Interview, Anonymous, 11/01/2018*). CBSWM has since empowered community members. Youths are getting employed as they are the ones that are employed by community truckers as waste loaders. Furthermore, CBSWM creates employment to economically vulnerable community

members for those months they are in contract as Community Based Street Sweepers. Furthermore, the creation of employment in the community allows community members to meet their financial obligations such as paying utility bills, buying food, paying rent and school fees.

4.7.3 Increased community awareness

Officials from Bulawayo City Council explained that all community members that are contracted as Community Based Street Sweepers are first trained before they start operating. In the long run this entails that by the time one's contract has lapsed, they would have gained valuable knowledge on SWM. This ensures that community members take it upon themselves to ensure they value their environment.

4.7.4 Accountability.

It was revealed that, with the traditional system were the local authority employed council workers to collect waste, some of the workers did not execute their duties wholeheartedly. Local authority officials are of the view that, this was because some of the council workers were operating in locations that were not within their area of residence. Furthermore, even if the council workers did not execute their duties properly, they still got their salary at the end of each month whilst residents complained of poor services. An official stated that *“The person is just there on duty, but they are not in any way emotionally involved in their work, probably they don't even reside in the area in which they collect refuse from.”* *“The new system that we adopted is task based, if one does not work they do not get paid. In the new system, we the local authority have achieved accountability.”*

4.8 Local authority struggles

4.8.1 Community attitudes

According to an official from the Department of Amenities, the city council try its level best to put refuse receptacles within the community in-order to control littering and illegal dumping. However, the community continues to litter because they perceive that it is the role of the local authority to clean after them. Another official from the Department of Public Housing

mentioned that Bulawayo City Council provides a service where-in they charge a small fee to collect construction waste and garden waste from households. However, community members would rather dump such wastes illegally than hire the service. The official from the Department of Local Housing stated that, *“Even though we appreciate the financial constraints of the community, such attitudes show that community members do not really value their environment.”* Interviews with the local authority revealed that community members also have negative attitudes towards attending awareness meetings and this was another challenge. However, the survey that was conducted in the community revealed results contrary to what the local authority claimed. In-fact, only 39% of the population admitted to not attending awareness meetings whilst 61% said they were in fact attending awareness meetings religiously (see Figure 4.5). The researcher probed as to why some of the community members where not attending meetings. One of the informants who admitted to not attending awareness campaigns and community meetings argued that, *‘Since we are self-employed, time is money and we cannot afford to spend time doing anything else besides hustling for money’*.

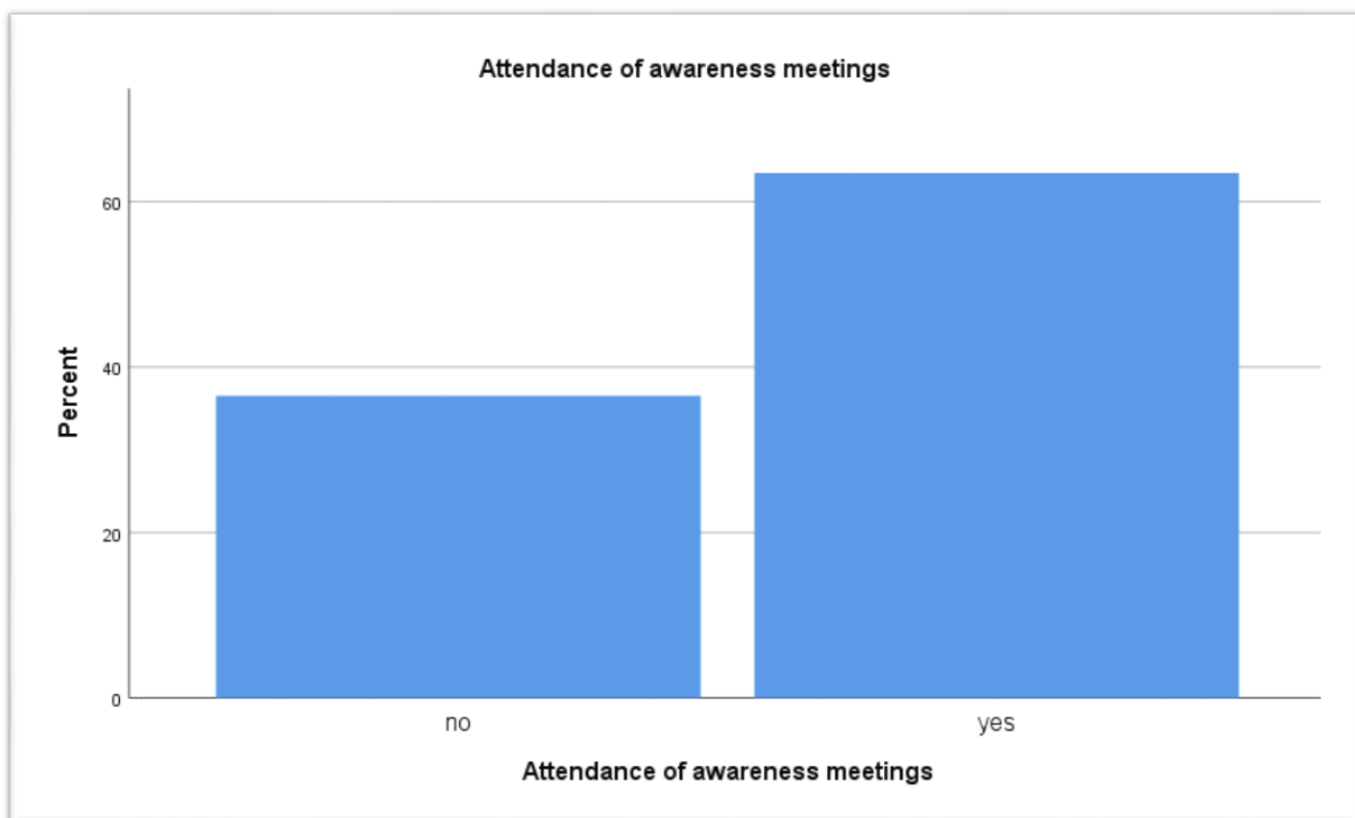


Figure 4.8 Rate of participation of awareness meetings

4.8.2 Financial constraints.

The interviews revealed that at some point, the local authority faces financial difficulties. This has affected their efforts of ensuring that the community separates waste at source. Furthermore, financial constraints have hampered the efforts of the local authority in ensuring the community is active in recycling and re-using waste. An official from the Department of Amenities stated that, *“To assist community members to separate waste at source, we need money to source the proper receptacles that can enable separation of waste. At the moment we don’t have money to do so. As a local authority, we are not yet there.”* Another official from the Department of Amenities stated that, *“In-order to encourage the community to recycle their waste, we need to source the necessary incentives that will attract them to engage in recycling. At the moment we don’t have money to give our communities incentives, the population is too large, we cannot afford to”*. In addition, an official from the Department of Public Housing stated that, *“In high density suburbs there is no systematic separation of waste. At the moment the local authority cannot afford that. However, as a local authority we encourage our residents to at least re-use their waste. At least that is achievable.”*

4.8.3 Institutional challenges

When the researcher probed one official from the Department of Environmental Health on the relationship between the city council and Environmental Management Agency (EMA), it was revealed that *“the relationship is an acid one”*. EMA was described as *“being bullies who were like a law unto themselves”*. The official from the Department of Health mentioned that there was a lot of infighting between the city council and EMA and at times the conflicts hindered the city council from meeting their obligations. It was revealed that, EMA fines the city council if it comes across mass waste dumping and pollution in the community. However, when EMA pockets the fines, the agency does not invest back the fines in-order to rehabilitate the environment. The local authority officials from Bulawayo City Council are of the opinion that, *“someone is lining their pockets at EMA instead of channelling money back to the environment”*. The local authority argues that it is under budget and when EMA fines them, their financial difficulties are made worse. An official stated that, *“It will be better if at least EMA used the money from the fines to finance activities that would help the local authority meet some of its SWM obligations but unfortunately they are a corrupt institution.”*

4.9 Conclusion

CBSWM has given room for interaction between the community and the local authority. CBSWM is also responsible for increasing environmental awareness of people. Besides addressing waste management issues in the study area, CBSWM also addressed social issues such as poverty through the employment of poor community members as CBO members. The success of CBSWM in addressing residential waste issues can only be possible if local authorities have adequate financial support from treasury to support waste management activities. Furthermore, success could be guaranteed if local authorities take into account the perceptions of the community since they influence the attitudes that the community members will have on issues of solid waste management.

CHAPTER FIVE

5. DISCUSSIONS OF RESEARCH FINDINGS

5.1 Introduction

This chapter discusses the findings of the study in relation to existing literature and case studies

5.2 Perceptions and attitude of communities towards CBSWM

5.2.1 Perception of communities towards CBSWM

In this study, the researcher noted that the community held the wrong perception about their obligations within CBSWM. The researcher found out that in CBSWM, it is the role of the community to at least separate perishable from non-perishable waste. This would require community members to dispose perishable waste in compost heaps whilst the other dry waste is placed in refuse bags that are provided by the local authority. The survey revealed that 71.4% of the population does not separate perishable from non-perishable waste but throws all waste in refuse bags. Only 28.6% separate their waste. There-fore, the researcher concluded that, the reason why the majority do not make efforts to separate waste is because the community perceived it as the right thing to do since they still hold on to traditional perceptions that it is the duty of the city council to sort waste. Similar findings were echoed by Saujauddin *et al* (2008) in their study in Mumbai, India. It was revealed that, CBOs faced lack of co-operation from the community members because about 45.3% of the community perceived that it was the responsibility of their local authority to clean after them. As such the community members were reluctant to separate waste as per what they were expected to do (Saujauddin *et al.*, 2008). Shekdar (2009) studied community participation in an organized collection and recycling program and it was concluded that 70% of the people were opposed to separation of household waste because it was perceived as inconvenient. Minghua *et al.*, (2009) noted that 61.4% of community members in Yala, Thailand perceived their littering practice to be the right thing, in that it created employment for someone else. However, in Nkulumane, littering was influenced by the fact that outdoor refuse bins were few and in a dilapidated state, in addition to that, the outdoor bins were unevenly distributed in the area.

5.2.2 Attitude of communities towards CBSWM

In this study, the researcher found out that 61% of respondents in Nkulumane were participating in waste management awareness activities whilst 39% of the respondents were

not participating in waste management awareness activities. As such, the researcher decoded that, the attitude of the community towards CBSWM activities was positive since the majority of the populace in Nkulumane were participating in awareness activities where waste management issues are taught and discussed. However, of the 39% of respondents who were not participating in awareness activities, most claimed they were self-employed, so they could not afford to leave their businesses unattended in-order to attend community meetings. Some of the respondents argued that they were not even aware that there were waste management activities taking place in the community. Similarly, in a CBSWM initiative in Lusaka, most of the community members who had a negative attitude towards participating in CBSWM activities argued that *“they were more concerned with bread and butter issues since at that time the Zambian economy was struggling (Nchito & Myers, 2004).”*

The researcher also noted that community members in Nkulumane had a negative attitude towards community based street sweepers (CBSS). The community members looked down upon CBSS since it was common knowledge that CBSS are selected from the poorest of the community members. Some members of CBSS raised concerns that, they at times feel embarrassed to be seen doing their jobs by other community members especially neighbors because their job is looked down upon. Similarly, in a study done in Karachi, Pakistan, there is a negative attitude towards community waste collectors because dealing with wastes has been an occupation traditionally dedicated to outcast people. As such, community waste collectors have a low social standing because community members do not respect them because they are viewed to be smelly and filthy people (Colon, 2002). In a study done in Karachi, Pakistan, Ahmed & Ali (2006) noted that the local authorities selected the most educated to become members of CBOs. This made the community members to have negative attitude towards CBO members because the residents felt CBO members acted as if they knew everything since they were more educated. However, Bulawayo City Council does not select CBOs based on level of education. Community truckers are selected based on possession of road worthy 7ton trucks whilst community based sweepers are selected from the poorer community members.

5.3 Factors influencing the move to a community based approach to SWM

In this study, Bulawayo City Council abandoned traditional waste management in favor of CBSWM after realizing inadequacies in providing satisfactory SWM services in high density residential areas. Before 2009, Bulawayo City Council was collecting refuse once every week

in the CBD and low-density suburbs. However, in the high-density suburbs refuse was only being collected after every three weeks. The reason why the frequency of waste collection in residential areas was low is because the population was too large, but the city council did not have adequate vehicles to satisfy the refuse collection needs of everyone. The residents in high-density suburbs then started complaining that the service they were receiving was not satisfactory because refuse was not being collected frequently. The city council started having challenges with residents dumping waste illegally. This prompted Bulawayo City Council to come up with a community based solid waste management system. The city council partnered with community members who owned trucks to come on board and collect refuse in residential suburbs as Community Truckers. In addition, the city council partnered with ward councilors to select community members who would work in the community as Community Based Street Sweepers.

A similar study done in Dar es Salaam Tanzania revealed that the Dar es Salaam City Council had acknowledged difficulty in provision of adequate solid waste management services (Simon, 2008). Until the early 1990s the Dar-es-Salaam City Council collected less than 5% of the total refuse generated (Kasseva, 2005). Waste was only being collected in the city center and the wealthier neighborhoods. In poorer areas, refuse was uncollected, and it accumulated at roadsides, was burnt by residents, or was disposed of in illegal dumps (Simon, 2008). The reasons for none collection of waste in poorer areas was due to rapid population growth (Bartone, 1990). The failure by Dar es Salaam City Council to adequately provide solid waste management services in poorer areas gave rise to adoption of community based approaches to solid waste management.

Other studies revealed that the move to CBSWM could be influenced by the realization that traditional waste management was associated with weak governance. So, the involvement of the ordinary citizen in running SWM affairs at community level could overcome issues of governance (Marshal & Farahbakhsh, 2013). In the communities of Bodija, Ayeye and Alesinloye in Nigeria, the rationale behind the adoption of community-based waste management initiatives was to manage market area waste which the local government was failing to handle. Furthermore, a move to CBSWM was made in-order to create jobs for the community (Wahab, 2015).

5.4 Role of CBOs in CBSWM

The researcher found out that as of 2009 CBOs were responsible for the management of waste in the study area. The CBOs were made up of two groups. The first group were Community Truckers who were selected through a tender system by Bulawayo City Council. Community Truckers are members of the community in high density areas who own 5-7ton trucks that are suitable for collection of waste. Community truckers collect waste from households in the study area and transport it to a central station under Bulawayo City Council management. The second group of CBOs is drawn from the community, and it is made up of 10 people who work as community based street sweepers. The responsibility of community based street sweepers is to give the general populace environmental awareness, keeping the community streets clean and monitoring waste management habits of the community.

In Kinondoni municipality, Dar es Salaam a CBO known as Kisutu Women Development Trust (KIDOWET) is responsible for the provision of SWM services at lower costs. The services KIDOWET provides includes waste collection from households (Simon, 2008). However, unlike the CBO in Nkulumane, Bulawayo KIDOWET goes an extra mile in treating household waste and then transporting it to the local landfill. In Nkulumane community truckers do not treat household waste and neither do they transport the waste to the landfill because it is the responsibility of the local authority. In a study done in the city of Chennai in India, Exnora a local CBO is responsible for providing residential waste collection services, as well as implementation of composting and recycling activities (Colon & Fawcett, 2006). In a study done by Ahmed & Ali (2006) in Jarkata, Indonesia, the role of CBOs is to clean the community by providing a door-to-door collection service of household waste, sweeping the streets and recycling as much household waste as possible locally. However, unlike the case study of Jarkata, CBOs in Nkulumane do not recycle waste because Bulawayo City Council argues that they currently do not have financial capacity to sustain recycling of household waste.

5.5 Role of general populace in CBSWM

This researcher found out that, the Nkulumane community is expected to ensure that they separate inorganic waste from organic waste in their households. The community is expected to dispose of organic wastes in their backyards in-order to make compost. All the other wastes are supposed to be put in refuse bags and then placed at the road side for collection by community truckers. The community is also expected to throw waste in the outdoor bins

provided by the municipality. Littering is to be avoided at all costs. Furthermore, it is expected of the community members to avoid dumping of household waste illegally.

The researcher's findings are similar to those of a study done in Hyderabad, India. Rathi (2006) observed that, residents in a CBSWM scheme in Hyderabad were expected to separate their household waste into inorganic and organic fractions. Furthermore, residents of Hyderabad were expected to avoid littering and the illegal dumping of waste. Unlike the situation in Nkulumane and Hyderabad, a study done in Nhan Chinh, Vietnam revealed that, residents brought forth both organic and inorganic waste to waste collectors and there was no systematic separation of waste by household owners (Chakrabati et al., 2008). In a CBSWM scheme in Chennai, India apart from the separation of waste and avoiding littering, the residents were also responsible for financing the scheme (Colon & Fawcett, 2006). The residents finance the scheme through the payment of monthly fees. The monthly fees are used in buying and maintaining tricycles that are used in the collection of waste (Colon & Fawcett, 2006). On the other hand, in Nkulumane, residents do not pay any monthly fees to pay CBOs for their work. Community based street sweepers are paid by the city council whilst community truckers are financed through a tender system. The advantage of residents not paying CBOs monthly fees is that, it accommodates poor members of the community who might be unable to pay for services. Furthermore, there is no risk that members who cannot pay will be excluded from receiving services by CBOs. A study done by Simon (2008) revealed that a CBO in Tanzania does not give waste management services to about 3548 households in low income and slum areas. This is because they are always unable to pay CBOs for service. The CBO only provides services to about 4783 households located in high and medium income areas who are consistent in paying.

5.6 Achievements of local authorities in CBSWM

The researcher found out that ever since CBSWM was introduced in the study area in 2009, the local authority's operational costs had reduced. This was because they no longer had to bear the costs of maintaining numerous refuse collection vehicles. In-fact, it was now the responsibility of community truckers to bear the costs of maintaining the vehicles used to collect waste in wards because they were using their own trucks. In addition to that, Bulawayo City Council no longer bears the burden of paying wages to refuse loaders. This is because community truckers are now responsible for employing and paying the people who load refuse from households.

The study also revealed that, through the CBSWM initiative, Bulawayo City Council had managed to empower at least 360 community members in Nkulumane by contracting them as community based street sweepers where-in they earned R2300 monthly. Correspondingly, the inception of a CBSWM scheme by the municipality of Kinondoni in Tanzania led to the creation of employment for a number of its residents. According to Simon (2008), twelve women are contracted for street sweeping whilst twelve men are contracted for waste collection and are paid R1400 monthly for work done. The municipalities of Bodija, Ayeye, and Alesinloye in Nigeria had also managed to create employment for community members through CBSWM since CBO members were being paid to clean market places (Wahab, 2015). The researcher also found out from Bulawayo City Council that a community based approach to solid waste management had assisted them to raise the level of environmental awareness in community members. It was revealed that, community members who are contracted as Community Based Street Sweepers are first trained before they start operating. In the long run this would entail that by the time one's contract has lapsed, they would have gained valuable knowledge on SWM. Likewise, the municipality in Minh Khai, Vietnam felt that with the initiation of a community waste management project, community knowledge and awareness of local environmental issues such as air, water and soil pollution had increased tremendously (Richardson, 2003). Mader (2011) argued that, the implementation of CBSWM systems in developing areas could help to improve environmental knowledge of communities in-order to foster reduced waste generation and more responsible ways of handling waste.

This study also found out that Bulawayo City Council had managed to decrease the cases of waterborne diseases ever since they introduced CBSWM in the study area. This is because CBOs were working closely with the community to ensure that they were no longer dumping waste in water-logged areas and rivers. Likewise, Mongkolnchaiarunya (2005) observed that since the introduction of CBSWM, the Yala municipality in India had managed to make improvements in community sanitation conditions and decreased incidences of cholera, typhoid and bilharzia. This was because the community were removing almost all recyclables and other waste from water-logged spaces with the guidance of local CBOs.

5.7 Challenges of local authorities in CBSWM

The researcher found out that earlier in 2009 when CBSWM was being introduced in Nkulumane, Bulawayo City Council would come across difficulties in persuading the residents of Nkulumane to work with CBOs in avoiding littering and dumping of waste in undesignated

areas. This was because the community thought that by littering they were creating jobs for someone. The community did not understand that littering had negative implications on the environment. Similarly, when a community based approach to SWM was introduced in Chennai, India, CBOs experienced difficulties in motivating community members to avoid dumping waste in rivers and littering in the streets (Colon & Fawcett, 2006). Community members would argue that littering created jobs because the local authority would have to employ someone to pick the litter. Furthermore, the community of Chennai did not see the point of avoiding dumping of waste because the indiscriminate dumping of waste was something they were accustomed to (Colon & Fawcett, 2006).

The researcher also found out that the other challenge that Bulawayo City Council was facing, was its infighting with Environmental Management Agency (EMA). Bulawayo City Council were of the opinion that the corruption in EMA was impeding in their efforts of a successful CBSWM initiative. It was revealed that, EMA fines the city council if it comes across mass waste dumping and pollution in the community. However, when EMA pockets the fines, the agency does not invest back the fines in-order to rehabilitate the environment. Correspondingly, Colon (2002) argued that the major challenges facing local authorities in CBSWM included corruption, poor relations between different environmental institutions, politics of privatization, and political apathy. Wahab (2015) noted that the major challenge that the municipality of Bodija, Nigeria was facing was poor relations with CBOs. This was because CBOs members did not trust the city council. CBOs were of the opinion that the city council was underpaying them whilst they misused the funds that donor organizations were giving the local authority to pay CBOs (Wahab, 2015). Zurbrugg (2003) cited that, one of the challenges that the Khulna municipality in India was facing was that, a neighboring municipality had no form of organized waste management system. So, many individuals from the neighboring municipality would bring their waste to Khulna which overwhelmed the capacity of local CBOs. This caused a lot of infighting between the Khulna municipality and the neighboring municipality.

5.8 Conclusion

Community is a key factor in overcoming waste management issues because the community itself generates the waste. Since the community are the generators of waste, they should be responsible for its management (Nemerow, 2009). The community's perception on waste affects its behavior in managing waste. Furthermore, knowledge on waste cultivates certain

attitudes and behaviors in managing waste. Positive attitudes towards community-based waste management has positive impact such as improving the state of the environment, community health and eventually contributing positively in the community's economy (Seadon, 2006). However, an improved state of the environment, community health and a thriving economy is only achievable provided there is an availability of strong local leaders and a competent local authority.

CHAPTER SIX

6. SUMMARY OF THE RESEARCH, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter gives a summary of the whole research, conclusions and presents the proposed recommendations to minimize the problems of SWM.

6.2 Summary of the research

The aim of this study was to investigate the performance of a community based approach to solid waste management in Nkulumane suburb, Bulawayo, Zimbabwe. The study was qualitative in nature and it followed a combined research design. Systematic sampling and purposive sampling were incorporated in-order to select participants for the study. Semi-structured interviews were used to elicit data from local authority officials whilst open-ended questionnaires were administered to community members in the study area. Field observation were done in-order to substantiate the responses from interviews and questionnaires. Data from interviews was analyzed using Thematic content analysis. Data from questionnaires was analyzed using the Descriptive Statistics tool from Statistical Package for Social Science (SPSS version 25). The study found out that on the community perceptions on CBSWM issues, the community avoids dumping waste, not because they perceive that it is bad for the environment and their health. However, they do so out of fear of punishment and penalties. The research also revealed that the community looks down upon street sweepers and they view them as lower-class citizens just because they are poorer. The study also found out that Bulawayo City Council has managed to decrease its operational costs in refuse collection. It has managed to create employment for the community of Nkulumane as well as creating awareness on environmental issues. Moreover, Bulawayo City Council has managed to attain a sense of accountability ever since it introduced a CBSWM scheme in Nkulumane. However, Bulawayo City Council has encountered financial constraints, has faced problems with poor in participation in awareness activities. Furthermore, the local authority has faced challenges with its poor relations with other institutions such as the Environmental Management Agency.

6.3 Conclusions

Solid waste management problems in Bulawayo, like most cities in Sub-Saharan Africa, were prominent in poor and high density residential suburbs. For economic and social reasons, high density suburbs like Nkulumane did not have access to adequate waste management services. Waste produced in Nkulumane was at times uncollected or dumped in undesigned areas by community members. As such this motivated Bulawayo City Council to come up with a community based approach to solid waste management. Bulawayo City Council came up with 7 objectives that were meant to address SWM issues within a time frame of 10 years.

The first objective was: To ensure the proper storage and separation of waste at source. This study found out that only 18,9% of the community members are separating waste at source. The second objective was: To ensure there was zero littering. This study found out that 67% of the community admitted that they do litter and field observations verified that littering is taking place. The third objective of Bulawayo City Council was: To ensure the community is given awareness on health, hygiene and environmental issues. This study revealed that 68.8% of the community had been given such awareness. Furthermore, the study revealed that the local authority was giving people awareness through television programs, posters, road shows and radio shows apart from the community meetings. The fourth objective was: To ensure the depreciation of waste per annum. The study found out that, Bulawayo City Council were yet to construct a weigh bridge at the landfill in-order to keep tabs on the amount of waste that was being produced. The fifth objective was: To encourage the recycling and reuse of waste. The study found out that the local authority had not yet figured out the means to kick start recycling activities in the community. The sixth objective was: To abolish illegal waste dumping in the community. The study found out that illegal dumping was a common phenomenon and field observations facilitated the findings. The last objective of Bulawayo City Council was to: To ensure that the community benefits socially and economically from the CBSWM scheme. The study found out that incidences of water-borne diseases had decreased since the inception of CBSWM and the community was benefitting economically from job creations.

From the study, the researcher concludes that the CBSWM scheme has only been successful in ensuring that the community benefits socially and economically from the scheme. Furthermore, the scheme has been successful in raising the level of environmental awareness in the community since 2009. However, the CBSWM scheme has not been successful in addressing issues of littering, illegal waste dumping and the separation of waste at source. Moreover,

nothing has been done yet in terms of recycling of household waste. Similarly, the results from a study done in the Indian cities, Chennai and Hyderabad indicated limited success of an existing CBSWM scheme in saving a significant fraction of the generated waste from being dumped illegally (Colon & Fawcett, 2006). The study done in India by Colon & Fawcett (2006) revealed that the CBSWM scheme had also failed to benefit the poor. However, this study revealed that Bulawayo City Council had achieved its objective of ensuring the CBSWM scheme in Nkulumane benefitted the community economically. Nonetheless, a study done in Vietnam by Richardson (2003) on CBSWM revealed that, besides benefitting the community economically through job creation, the existing CBSWM scheme was also benefitting the community economically through the sale of recyclables. However, this study found out that Bulawayo City Council do not have the capacity to finance recycling in Nkulumane.

6.4. Answers to research questions

This research work presented four research questions in chapter 1. It is therefore important to see if this research work has successfully achieved the research question. Answers to the research question are presented in this section. The first research question is: **What are perceptions and attitudes of the community of Nkulumane, and how do they shape the current state of waste management in the study area?**

6.4.1 Community perceptions on CBSWM issues

Field observations that were undertaken by the researcher to investigate the current state of the environment revealed evidence of illegal waste dumping and littering. Furthermore, a survey done to investigate the state of waste management in the study area revealed that only 18.9% of the population were separating organic from inorganic waste as expected, whereas 81.1% were not separating their waste. The researcher decoded that, the reason why the communities in the study area were not separating waste as expected was because they still held the traditional perception that it was the city council's job to handle waste. The investigation into the current state of waste management in the study area also revealed that about 69.6% of the population avoid illegal waste dumping as expected whilst 30.4% admit to dumping waste. From the community's responses, the researcher decodes that people avoid dumping waste not because they perceive that it is bad for the environment and their health. However, they do so out of fear of punishment and penalties from the Environmental Management Agency inspectors.

6.4.2 Community attitudes on CBSWM issues

The study revealed that the criterion for selecting community based street sweepers was based on economic vulnerability. As such the poorer are given first preferences by the local authority and this is common knowledge in the study area. The fact that community members know that the poorer are given first preference makes them to have a negative attitude towards street sweepers. The community looks down upon street sweepers and they view them as lower-class citizens just because they are poorer. The study also found out that the community had a general negative attitude towards CBSWM. This was revealed through their lack of compliance in fundamentals such as waste separation. Apparently, only 18.9% of the community were separating waste as they were expected to.

The second research question is: What were the prospects of the local authority and what have been their achievements and struggles regarding the community based waste management scheme?

6.4.3 The prospects of the local authority in CBSWM

By introducing a CBSWM scheme in Nkulumane, Bulawayo City Council expected to supplement the shortage that they had of refuse collection vehicles. The shortage of refuse collection vehicles had been addressed through partnerships with community members who were now doing primary collection of solid waste with their own trucks. Bulawayo City Council revealed that, the community was complaining that they were receiving inadequate service from the city council. As such this was forcing the community to dump waste illegally. So, Bulawayo City Council hoped to address the issue of illegal waste dumping in the study area by increasing the frequency of refuse collection from once in three weeks to once every week.

6.4.5 The achievements of the local authority in CBSWM

Since the inception of CBSWM in 2009, Bulawayo City Council has managed to supplement its refuse collection fleet. This was achieved through contracting members of the community who owned trucks to come on board and assist with primary collection of waste in households. As such, the city council's refuse collection vehicles no longer break down as much as they used to do in the past since currently they cover less mileage. Bulawayo City Council has also

decreased costs associated with paying waste loaders, it is now the responsibility of community truckers to employ and pay people who load refuse from the households. In addition to that, since 2009, Bulawayo City Council has managed to empower the community of Nkulumane by employing at least 360 people who have been contracted to work as community sweepers. Furthermore, the employment of the community as street sweepers has given the city council revenue. This is because, employment of people allows them to meet financial obligations such as payment of water and sewer bills. The inception of CBSWM in Nkulumane has also enabled the local authority to instill a sense of environmental awareness in the community through the awareness campaigns and community meetings that are facilitated by CBOs.

6.4.6 The challenges of the local authority in CBSWM

The researcher found out that in the early days when Bulawayo City Council introduced the community to CBSWM, the city council was facing struggles in getting community members to work with CBOs in avoiding littering and illegal dumping. Presently, littering and illegal waste dumping is still a challenge. However, the local authority admits that the current scale of waste dumping has decreased as compared to when CBSWM was introduced. The local authority also recounts that community participation has been one of its challenges. This is because at times the community absconds community meetings and do not attend activities that are arranged by CBOs. The study also revealed that the efforts of the authority are at times hampered by financial constraints. Bulawayo City Council argues that, waste management is not their own obligation as a local authority. So due to the economic situation in Zimbabwe, they are forced to work with a tiny budget from treasury. As such, there are some aspects of waste management that they fail to finance, such as the recycling of waste. Finally, the local authority recounted that the other challenge they are faced with include that they are not receiving any support from the Environmental Management Agency (EMA). Rather, there is a lot of infighting between EMA and Bulawayo City Council over money issues.

The third research question is: **What is the role of the community based organizations in the provision of solid waste management services?**

It was revealed that it is the role of CBOs to provide primary waste collection services in the study area. Members of CBOs known as Community Truckers collect waste from households using their trucks and transport the waste to a central station that is managed by the local authority. The waste is later collected by the local authority's trucks to the city's landfill. CBO members who are known as Community Based Street Sweepers are responsible for cleaning

the community streets, facilitating awareness meetings and activities in the study area as well as monitoring of illegal activities such as waste dumping.

6.5 Recommendations

Increase the availability and distribution of outdoor bins

The researcher observed that outdoor bins are few and are only available at community shopping centers in Nkulumane. Furthermore, the few that exist are in dilapidated state. In addition, some of the community responses revealed that people throw litter anywhere convenient if there is no bin in site. As such, the researcher recommends that Bulawayo city council should not only put bins at shopping centers. The city council should increase the number of outdoor bins around the community to curb littering. At the same time, the city council should ensure that outdoor bins are evenly distributed around the community.

Addressing the negative attitude towards community based street sweepers

The local authority is also advised to address the stigma that is associated with being a community based street sweeper. Community meetings that are held with by CBOs should also educate community members that CBSWM not only addresses SWM issues. Rather, CBSWM also addresses social issues such as poverty. As such, CBOs should hold vigorous campaigns aimed at changing the perceptions of community members. The objective of such campaigns would be to raise awareness that street sweepers are not low-class citizens. In-fact, awareness campaigns should ensure that every individual eagerly anticipates the day when they will be contracted as a street sweeper as it will benefit them economically.

Offering community incentives for participation

The researcher also recommends that the local authority gives community members incentives in-order to encourage participation in community meetings as well as compliance in aspects such as waste separation. Rathi (2006) argued that community participation can be boosted if incentives were given to community members. The researcher resonates that, the Bulawayo City Council could argue that, they have financial constraints, so they might not afford giving the community incentives. The researcher resonates that incentives do not even have to be expensive. The local authority could partner with local chicken and egg producers such as Irvine's in-order to donate eggs that can be given to community members for participating in awareness activities. For instance, in Yala, Thailand the local authority increased community

participation in separation of waste and recycling by simply offering eggs as an incentive (Mongkolnchaiarunya, 2005).

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APPENDIXES

Appendix 1: Household Questionnaire

What are the characteristics of your household waste?

.....
.....

How do you dispose each distinct type of waste? Explain why?

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

Is your household waste collected? By who and how frequent?

.....
.....

When you are outdoors and in possession of solid waste, where do you dispose it and why?

.....
.....

What is your general understanding of CBSWM

.....
.....

Have you been given any awareness on health, hygiene and the environment? If yes how frequent?

.....
.....

Who is responsible for giving the community awareness?

.....
.....

Do you attend all the community meetings and why?

.....
.....

What do you understand about recycling, reuse and reduction of waste?

.....
.....

Do you recycle and reuse your waste?

.....

What kind of waste do you reuse and recycle?

.....

Have you ever dumped any of your waste on in designated waste dumps? Why?

.....

What have been the benefits of being part of a CBSWM initiative?

.....

.....

Appendix 2: Interview guide for city council personnel.

1. What motivated the move from conventional waste management to CBSWM?
2. What measures have you put in place to ensure;
 - i. proper storage of waste
 - ii. Waste is separated at source
 - iii. Waste is recycled, reused and reduced
 - iv. Zero littering
 - v. no illegal dumping of waste
3. How does the local authority ensure that the community is given awareness on health, hygiene and the environment?
 - i. What is the frequency and coverage of environmental awareness campaigns?
4. What is the criterion for selecting CBO members?
 - i. What is the perceived role of CBOs in the provision of SWM services?
5. What are the perceived socio-economic benefits of the CBSWM scheme?
6. What were the challenges associated with initiating and spearheading the CBSWM scheme?
7. What have been your achievements as the local authority?

Appendix 3: Interview guide for CBOs

What waste management services do you provide?

What was the criterion for the selection of organisation members?

How do you relate with the general community?

What are the benefits of being part of the organisation?

What is the final destination of waste?

Appendix 4 Letter of authorization



City of Bulawayo

All Communications
To be addressed to the
Town Clerk

Town Clerk's Office
Municipal Buildings
Fife Street
P.O.Box 591
Bulawayo

Tel: (263-9) 75011
Fax: (263-9) 69701
Email: tedept@citybyo.co.zw
Website: www.citybyo.co.zw
Facebook: The City of Bulawayo
Twitter: @CityofBulawayo
Call Centre: 08084700 (Econet,
08004700 (Telone) (09) 71290

REF: JBM/MZ.74-00-00

20 December 2017

Miss Sinqobile Helen Mkumbuzi
University of Venda
Private Bag X5050
Thohoyandou 0950 Limpompo
South Africa

Dear Miss Sinqobile, H. Mkumbuzi

RE: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH ON COUNCIL PREMISES: INVESTIGATING THE PERFORMANCE OF A COMMUNITY BASED APPROACH TO SOLID WASTE MANAGEMENT: A CASE STUDY OF NKULUMANE SUBURB BULAWAYO.

Your letter on the above matter refers.

Please be informed that Council acceded to your request to carry out research within Bulawayo City Council premises subject to the following conditions:

- a) You should submit a copy of your research findings after completing the research exercise.
- b) Council is to be indemnified against any accident/mishaps, which may occur during the conduct of the research.

Accordingly you may approach any of Council's Service Departments as appropriate for assistance.

Yours faithfully


TOWN CLERK

