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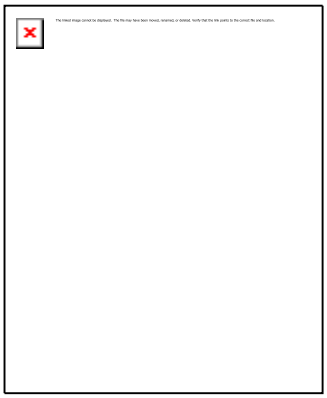

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF DISASTER RISK MANAGEMENT

Assessing Community Participation In Municipal Solid Waste Management In Mbare, Harare, Zimbabwe

BY

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DECLARATION FORM

I, Rutendo Makuridzo, registration umber B202228B declare that this dissertation is the product of my own work and has not been previously submitted to any university other than BUSE. All sources used have been indicated and acknowledged.

DEDICATION

This dissertation is a dedication to my family that is my parents Tanyanyiwa Makuridzo and Nancy Chari. “Thank you for your undying love and support”. My siblings Zvikomborero, Mazvita and Munenyasha Makuridzo for your encouragements and for being my motivations. You have been my pillar and strength, am grateful.

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I, would like to thank the one who has never forsaken me, The Almighty God who has been my strength throughout my life. I also thank Bindura University of Science Education for allowing me be part of its family. My sincere gratitude goes to my supervisor Dr Chanza, for his guidance and constructive criticism in undertaking this study.

This study would not have been successful if not for respondents for their voluntary participation in data collection, “Thank you”. Lastly, I would also like to express my solemn gratitude to my

loving parents for their total support in all aspect of my life. Their support and encouragement have helped me to tackle life head on. Am thankful to them because if it wasn't for them all this would not be possible.

May Almighty God bless you all.

Abstract

Zimbabwe like other countries in Africa has faced rapid urbanization. It has overwhelming local government resources for the provision of municipal solid waste management. Agenda 2030 encourages countries to develop and implement integrated solid waste management systems that prioritize sustainable waste reduction, recycling, and safe disposal, while also addressing the social and economic aspects of waste management. Despite the adoption of such a strategy, solid waste management in a settlements where many of the urban poor live is still critical. This study was conducted in Mbare, Magaba flats. It investigates the dynamics of community participation in municipal solid waste (MSW) management in Mbare, Magaba. The primary objectives are threefold: firstly, to identify the hazards associated with MSW disposal in Magaba; secondly, to analyze the nature and extent of resident participation in MSW management; and thirdly, to evaluate the efficacy of community involvement in mitigating MSW. The research methodology involved systematic random sampling. Questionnaires were distributed, key informant interviews were conducted and observations were made forming research data collection techniques. The study seeks to provide comprehensive insights into the challenges and opportunities for effective waste management at the community level. The findings are expected to contribute to the development of sustainable waste management strategies and policies, thereby fostering cleaner and healthier living environments in urban settings like Mbare, Magaba.

Contents

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Municipal Solid Waste Management (MSWM) is a critical environmental and public health concern globally, particularly in urban areas. Community participation is a crucial element in achieving sustainable MSWM as it enables residents to take ownership of waste management activities and promotes a sense of responsibility and accountability. The purpose of this study is to assess the level of community participation in MSWM in order to develop effective waste management strategies that promote environmental sustainability and community well – being at a more localized setting. The chapter presents the background of the study, problem statement, aim, objectives, research questions, justification and organization of the study. It also contains definitions of key terms.

1.2 Background of study

Municipal Solid Waste (MSW) generation has been increasing rapidly due to population growth, urbanization, and changes in consumption patterns (Zvikaramba, 2008). Globally, MSW generation is expected to exceed 2 billion metric tons annually by 2020 (Hoornweg & Bhada-Tata, 2012). This substantial waste stream poses significant challenges for waste management systems worldwide (Bulkeley & Castán Broto, 2013). In sub-Saharan Africa, rapid urbanization has resulted in a surge in MSW generation, with the composition of waste varying across communities and including household waste, industrial waste, and commercial waste (Mawere et al., 2019).

Community participation in MSW risk reduction has gained attention due to its potential to enhance the effectiveness and sustainability of waste management practices (Mawere et al., 2019). Engaging communities in waste reduction initiatives can lead to improved waste segregation, increased recycling rates, and promotion of responsible waste disposal behaviors (Chigwada, 2021). However, despite the growing emphasis on community participation, there remains a need for a comprehensive analysis of the factors influencing the level and effectiveness of community engagement in MSW risk reduction (Dube, 2017).

Existing literature offers insights into individual case studies and specific aspects of community participation, but a holistic understanding of the underlying drivers, barriers, and outcomes is lacking (Chigubu, 2018). This dissertation aims to bridge this gap by conducting an in-depth examination of community participation in MSW risk reduction in Mbare, Zimbabwe. Zimbabwe, like many other developing countries, faces significant challenges in MSW management, resulting in adverse environmental and health risks (Manyati, 2020). Policy frameworks play a crucial role in promoting community participation in waste management (Dube, 2017). Comprehensive and inclusive waste management policies can empower communities, enhance stakeholder engagement, and provide the necessary support for effective waste reduction initiatives (Muponde, 2023). However, poverty, unemployment, and unequal access to resources hinder community participation and contribute to unsustainable waste management practices (Chigubu, 2018).

This study will contribute to the existing body of knowledge by conducting a comprehensive analysis of community participation in MSW risk reduction. By examining the drivers, barriers, outcomes, and impacts of community involvement, the study aims to provide valuable insights that can inform the development of effective and inclusive waste management strategies (Bulkeley & Castán Broto, 2013). Through its findings and recommendations, this research seeks to empower communities, enhance waste reduction efforts, and contribute to the broader goal of achieving sustainable waste management practices.

1.3 Statement of the problem

The management of municipal solid waste (MSW) remains a significant challenge in many developing countries, including Zimbabwe. In Mbare, a high-density suburb of Harare, the capital city of Zimbabwe, ineffective solid waste management has led to various environmental and public health concerns (Madyauta, 2022). Municipal Solid Waste Management (MSWM) is one of the key responsibilities of the city authorities and one of the effective proxies for good governance. However, where the city authorities fail, it becomes the responsibility of the community. Scholars have focused on community participation at a broader scale that is on suburbs, cities, and countries leaving behind at a localized (scale a certain part of an area) hence the need for this study to be done.

1.4 Research aim

The main aim of the study is to assess the levels of community participation in MSW in risk reduction.

1.5 Objectives of the study

i. To identify the hazards linked to municipal solid waste disposal in Magaba, Mbare.
ii. To determine the nature and level of participation of the residents in municipal solid waste management.
iii. To assess the effectiveness of community participation in reducing municipal solid waste.
iv. To suggest measures aimed at enhancing the participation of residents in MSW management.

1.6 Research questions

i. What are the hazards linked to municipal solid waste management?
ii. Which strategies and programs are in place to support community participation in MSW management?
iii. How effective are these strategies in reducing municipal solid waste?
iv. What are the measures that can be taken to enhance the participation of residents in MSW management?

1.7 Justification of the study

Given that MSW is a potentially serious problem causer to the world at large. An assessment had to be done to find out what the community is doing in helping to reduce the risk caused by MSW. The findings of this research will have significant implications for waste management practitioners, policymakers, and community leaders. They will provide actionable insights and practical recommendations for designing and implementing community engagement strategies that effectively mobilize residents and stakeholders in waste reduction efforts. Ultimately, the goal is to empower communities, foster sustainable waste management practices, and contribute to the broader agenda of achieving a more circular and environmentally sustainable society.

1.8 Scope of the study

The scope of this assessment of community participation in MSW management in Magaba. The study will look at the hazards linked to MSW disposal, the nature and level of participation of the residents in MSW management and the effectiveness. It will also make recommendations aimed at improving community participation in MSW management for environmental sustainability and well-being.

1.9 Definition of key terms

Municipal Solid Waste

According to the United States Environmental Protection Agency (2020), municipal solid waste (MSW) refers to the waste generated by households, businesses, institutions, and other non-industrial sources within a specific area. This type of waste includes everyday items such as food scraps, paper, plastics, glass, metals, textiles, furniture, and appliances.

Municipal Solid Waste Management

Municipal solid waste management (MSWM) is defined as "the process of collecting, transporting, processing (e.g., recycling, composting, energy recovery), and disposing of municipal solid waste in a manner that is environmentally sustainable, socially acceptable, and economically viable, to minimize waste's impact on human health, environment, and natural resources (World Bank, 2018).

Community participation

It means people's involvement in the identification of their felt needs, mobilization of their resources, influencing direction, and executioan of environmental programs and projects (Nebiyou, 2020). Smith, (2010) also defined community participation as a concept that refers to the active involvement of individuals within a community in decision-making processes, problem-solving, and activities that contribute to the well-being of the community as a whole. It involves collaboration, cooperation, and engagement among community members to address common issues, promote social cohesion, and enhance the quality of life within the community (Brown, 2014). Community participation is essential for fostering a sense of ownership, empowerment, and social capital among residents, leading to sustainable development and positive social outcomes (Johnson et al., 2019).

Risk reduction

UNISDR (2008) is defined as the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disaster, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment and improved preparedness for adverse events.

1.10 Organization of the Study

The dissertation is presented as follows, Chapter one contains the background of the study, problem statement, objectives, research questions, the scope of study, and the definition of key terms. Chapter two reviews relevant literature that provides insight into the existing knowledge on community participation in MSW management. Chapter three looks at the methodology that was used for the study. Chapter four analyses the results that were found during the research and chapter five gives the summary of the whole study and provides recommendations that can be done to increase the level of community participation in MSW management.

1.11 Conclusion

In a nutshell, this chapter has provided a background on the issue of community participation in MSW management all over the world particularly in Zimbabwe. It has outlined the key impacts of municipal solid waste that is environmental and health risks. The chapter gave an overview of the research highlighting the main scope of the research project, its objectives, and its aim.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter will act as a general overview of the relevant literature on solid waste management. It will look at the existing literature on the strategies, impacts, opportunities, and challenges faced in trying to reduce the risk of municipal solid waste. Also, look at the theoretical framework relevant to the topic under study.

2.2 Solid Waste Management Life Cycle

Waste management is an important aspect of contemporary civilization that is deeply ingrained in our everyday existence yet is frequently disregarded due to its complexity and importance. A product's path through the waste management lifecycle is shaped by several interconnected processes, decisions, and infrastructure from the time it is conceived to the point of ultimate disposal. In the end, a thorough grasp of the waste management lifecycle is necessary, which is why it is important to examine every phase of the process from the creation of municipal solid waste to its disposal as well as the Solid Waste Management Hierarchy Framework.

2.2.1 Solid Waste Management Hierarchy Framework

SWM Hierarchy is the globally preferred approach used in the management of solid waste. The waste hierarchy refers to an approach to managing waste that prioritizes reduction, recycling, and reuse overtreatment or disposal (Sakanyi, 2022). All components of the hierarchy are necessary to deal with the amount of waste generated in the country. The solid waste management hierarchy is an edited approach to the traditional waste management of the 3 R’s (Pires & Martinho, 2019). According to Yakubu & Zhou, (2018), the most preferred actions are placed at the top of the pyramid. It's critical to remember that the waste management hierarchy serves as a guide to support sustainable waste management practices rather than a strict set of regulations. The intention is to limit reliance on activities lower in the hierarchy, which have a greater environmental impact, and to promote the adoption of practices higher in the hierarchy, which have a lower environmental impact.

Fig 2.1: The Solid Waste Management Hierarchy

According to Yakubu & Zhou, (2018), waste prevention is the first, and best, stage. This entails using techniques like improved manufacturing processes, product design, and customer behavior modifications to cut waste production off at the source. Waste generation can be avoided, which reduces the need for further waste management procedures. Overall waste prevention conserves resources, protects the environment, and prevents the formation of greenhouse gases (Pyakurel & Wright, 2020). Waste minimization or reduction is the next step if waste generation cannot be avoided. This covers methods like recycling, reusing, and waste reduction. Reducing waste entails using less material or locating substitutes that have less of an adverse effect on the environment (Uchida & Nishimoto, 2022). Reuse is the process of giving goods or materials new uses to increase their lifespan. Recycling is the process of breaking down waste materials to recover valuable materials that can be utilized to create new goods.

Waste recovery is the next step if waste cannot be avoided or reduced. This covers the recovery of energy as well as the recovery of valuable materials from waste. Vamvuka & Chatzifotiadis, (2022) stated that the process of turning waste materials into energy through gasification, anaerobic digestion, or incineration is known as energy recovery. Sorting, shredding, and refining are some of the methods that can be used to recover valuable materials from garbage, including metals, glass, and plastics. Waste treatment is the next step if waste cannot be recovered. Waste is treated to lessen its volume or dangerous content. To lessen the impact of trash on the environment, common treatment techniques include physical or chemical processes like incineration or landfill leachate treatment, as well as biological processes like composting or anaerobic digestion, which aid in the breakdown of organic waste Inglezakis et al. (2018). In the hierarchy of waste management, disposal is the last option. The process of disposing of garbage that cannot be avoided, reduced,

reclaimed, or treated is known as disposal. Landfilling is the most popular technique for disposing of waste; rubbish is dumped in specially designed-landfills (Teder, 2019). Additional techniques include the containment and isolation of hazardous waste as well as the deep-well injection of certain waste kinds.

2.2.2 Solid waste generation

Solid waste is typically viewed as an urban problem that is directly related to economic prosperity, living standards, urbanization, and consumption of goods and services, all of which lead to a relative increase in the amount of waste generated (Ara et al., 2021). From 751 million in 1950 to 4.2 billion in 2018, the world's urban population grew quickly, while the number of people living in rural areas declined. It is predicted that by 2050, almost 68% of people will live in urban areas(World Bank, 2018). While 43% of people in Africa live in cities, Asia has a significantly higher rate of urbanization at about 50% of the continent's total population. Nowadays, North America (NA) (82%), Latin America and the Caribbean (81%), Europe (74%), and Oceania (68%) are the landmasses with the highest levels of urbanization. According to estimates, Nigeria, China, and India will comprise 416, 255. Globally, 44% of MSW is made up of organic waste (food and green garbage), with the other 14% being made up of paper and cardboard (17%), plastic (12%), glass (5%), metal (4%), wood (2%), rubber and leather (2%), and other materials (World Bank, 2018).

In 2016, global waste production was around 2422 million metric tons. It is projected to increase to 3800 million metric tons by 2050 (World Bank, 2018). Effective intervention strategies and technologies are urgently needed to minimize waste generation, and environmental impacts, and maximize resource recovery, particularly in low-income countries where waste management infrastructure is often limited (Choguill, 1996; Mawere et al., 2019).

2.2.3 Solid waste collection

According to Sulemana et al,(2020)the process of collecting and removing solid trash from different locations, such as residences, businesses, and industries, for proper disposal or recycling, is known as solid waste collection. Ensuring cleanliness, hygiene, and public health is a crucial service offered by waste management firms or local government. Solid garbage is collected in a variety of containers, including dumpsters, bins, and bags(Vidal, 2019). To make collection simple

and effective, these bins are put in strategic locations, such as curbsides or designated collection places. Rubbish collection is carried out according to a prearranged timetable that details the days and hours when rubbish will be collected from various locations. This consistent routine keeps waste from building up or spilling over.

Solid waste is collected using a variety of techniques, depending on the area and resources available (Salazar-Adams, 2021). These techniques can involve the employment of waste collection vehicles equipped with mechanical arms or compactors, manual collection by waste workers, and in certain places, automated systems. Edwards, (2022)Rubbish transfer stations can be used as intermediary locations in major cities or regions to combine rubbish from several collection routes. With the use of these facilities, waste can be moved from smaller collecting vehicles to larger transport trucks, which subsequently deliver it to recycling or disposal facilities. Transporting collected solid waste to suitable facilities for recycling or disposal is part of the process (Adedara et al., 2023). The use of waste-to-energy facilities, incineration, or landfilling are examples of disposal techniques. Recycling facilities use recyclables to make raw materials or new products.

2.2.4 Waste disposal

In the management of waste, waste disposal is one of the most important aspects. This is whereby waste materials are gotten rid of in an environmentally responsible way. Several ways are used during the disposal of waste which include landfilling, incineration, and composting.

2.2.4.1 Incineration

Incineration has been increasingly utilized due to its benefits, such as occupying minimal land space, providing substantial reduction effects, offering quick treatment times, and having a great potential for generating power (Wang et al., 2023). Incineration is a process that uses high temperatures to destroy waste into chemical components through oxidation (Pheakdey, 2022). The waste is burned in a furnace, which heats the waste to a very high temperature, breaking it down into ash and gases. The ash is then disposed of in a landfill, and the gases are treated to remove any harmful pollutants. Incineration has several advantages, including the ability to destroy a wide range of waste, including hazardous waste (Ghosh et al., 2020), and reducing the volume of waste

by up to 90% (Ghosh et al., 2020). However, incineration also has some disadvantages, such as producing air pollution and requiring a lot of energy to operate the incinerator.

2.2.4.2 Landfilling

Landfilling is a widely used waste disposal method that involves burying waste in a large hole and covering it with soil (Gu et al., 2020). The most common type of landfill is the sanitary landfill, which features a layer of plastic or clay to prevent leachate and groundwater contamination (Gu et al., 2020). Bioreactor landfills are another type, where leachate water and oxygen are added to the waste to accelerate decomposition, producing methane gas as a byproduct (Srivastava et al., 2022). Additionally, mono-fills are designed to handle only one type of waste, such as medical waste, construction, and demolition waste, or household hazardous waste, to facilitate easier processing, and management, and prevent contamination of other waste streams (Hazardous Waste Management, 2020). Furthermore, landfilling can have environmental impacts, such as greenhouse gas emissions and soil pollution, highlighting the need for sustainable waste management practices (IPCC, 2019).

2.2.4.3 Composting

Composting is a natural process that breaks down organic waste into a nutrient-rich material called compost (Asses et al., 2019). This process occurs in nature, but it can also be done on a larger scale in composting facilities (Li et al., 2018). In these facilities, organic waste is placed in piles or bins, where it is kept moist and aerated to encourage the growth of microorganisms that break down the waste (Li et al., 2018). The same scholars assert that the process produces heat, which helps to kill any pathogens in the waste, resulting in a safe and nutrient-rich material. Compost can be used as a soil amendment or mulch, providing nutrients for plants and improving soil quality (Hargreaves et al., 2020). Composting has several benefits, including reducing the amount of waste sent to landfills, reducing the need for chemical fertilizers, improving soil quality, increasing water-holding capacity, and reducing erosion Additionally, composting has environmental benefits, such as reducing methane emissions and helping to sequester carbon (IPCC, 2019).

2.3 Impacts of Municipal Solid Waste

2.3.1 Air pollution

Municipal solid waste (MSW) can lead to air pollution in several ways. Firstly, when MSW is dumped in landfills, it decomposes and releases methane and other greenhouse gases, contributing to climate change this was supported by Margallo *et al*, (2019) when they conducted an assessment on enhancing waste management practices in Latin America. According to Wu et al (2018) Landfills also emit volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) during waste decomposition. Secondly, incinerating MSW can release pollutants such as particulate matter, heavy metals, sulfur dioxide, nitrogen oxides, dioxins, and furans, which can be harmful to both human health and the environment (Yousefi et al., 2024). Thirdly, open burning of waste, whether intentional or accidental, releases toxic gases, particulate matter, and hazardous substances into the air. Additionally, the handling and transportation of MSW can generate dust and particulate matter, which can contain harmful contaminants. Pecorini et al. (2020) insisted that the decomposition of organic waste in landfills or during storage and transport can produce unpleasant odors, although odors themselves are not air pollutants.

2.3.2 Water pollution

Rainwater and other sources of moisture can seep through the solid waste that has been disposed of in landfills, where they can collect, a variety of contaminants, including organic chemicals, pathogens, and heavy metals. Affam (2019) alluded that water contamination can result from this contaminated liquid, known as leachate, seeping into the earth and contaminating groundwater sources or flowing into adjacent surface water bodies. Surface runoff can occur and trash is carried away by wind and rain. Pollutants including plastics, chemicals, and fertilizers may be carried into surface water bodies by this discharge. These contaminants have the potential to destroy aquatic life, impair ecosystems, and lower water quality(Kraus, 2019). Furthermore, hazardous material disposal that is not permitted can directly contaminate water sources. For example, dumping hazardous garbage into rivers, such as chemicals or electronic waste has economic consequences as the clean-up and remediation efforts required to mitigate the pollution can be extremely costly.

2.3.3 Soil pollution

Spreadbury, (2023) alluded that inadequate handling of municipal solid waste can release harmful compounds into the soil, impede plant development, and lower yield. A study by Sharma et al. (2018) indicated that soil from dumpsites has a greater permeability than natural soil showing the potential risk of contaminating lower strata and also a decline in the strength properties of soil. Decomposing waste can damage plant tissues and hinder photosynthesis by releasing toxic gasses and particles into the atmosphere as highlighted by Li et al (2024). According to Li et al., (2024), vegetation may be impacted by contaminated water sources when toxins are absorbed by plants through their roots. In addition to damaging native vegetation and upsetting ecosystems, improper waste disposal can result in the introduction of non-native plant species and the ruin of habitats.

2.3.4 Disease outbreaks and transmission

Uncollected waste creates serious safety, health, and environmental consequences such as supporting breeding and feeding grounds for flies, mosquitoes, rodents, dogs, and cats, which carry diseases to nearby homesteads (World Bank, 2018). Pest infestation and disease transmission are significant concerns associated with improper waste management practices. Dumpsites can create ideal breeding grounds for pests through abundant food, and stagnant water giving room for rodents, flies, cockroaches, and mosquitoes. Allowing them to multiply and infest surrounding areas. These pests act as disease vectors transporting diseases like malaria, typhoid, cholera, and Zika virus (Chigudu, 2019).

2.3.5 Aesthetics

Lastly, according to Saini and Kaur, (2018), improper municipal solid waste disposal such as littering and illegal dumping can negatively impact the aesthetic appeal of communities by creating unsightly heaps of garbage that tarnish the visual appeal of an area. An unsightly environment is created leading to decreased property value and degradation of public spaces. Also, dumpsites and overflowing bins create an eyesore, creating a negative impression on the residents and visitors alike.

2.4 Strategies for Community Participation in Municipal Solid Waste Management

Effective municipal solid waste management is crucial for the health, safety, and well-being of urban communities (United Nations Environment Programme, 2018). To address this challenge,

communities can adopt various strategies, including reusing materials, recycling, composting organic waste, and ensuring proper disposal of hazardous and non-hazardous waste. Additionally, education and awareness campaigns can promote behavioral change. Innovative waste-to-energy technologies can also generate energy from waste, and striving for zero-waste communities can minimize waste generation and maximize recycling and composting. By implementing these strategies, urban communities can reduce waste, conserve resources, mitigate environmental impacts, and create healthier, more sustainable living environments (World Bank, 2020). These strategies are explained in detail below.

2.4.1 Waste to Energy

It is an effective way to manage waste and produce useful energy at the same time. Raza, (2020) alluded that the most popular waste-to-energy processes are pyrolysis, gasification, and anaerobic digestion. By using waste materials, these processes produce heat, electricity, and renewable gasses. Trash-to-energy offers several benefits, such as cutting greenhouse gas emissions, recovering valuable materials, creating renewable energy, and decreasing the amount of trash generated. To lessen environmental harm and allay public worries, it also requires cautious management. The type of rubbish and regulatory framework are key factors in the success of waste-to-energy operations. Integration with current waste management practices, community acceptance, and compliance are all crucial.

2.4.2 Education

Municipalities can conduct instructional programs on efficient municipal solid waste management in partnership with local businesses, community organizations, schools, and trash management organizations. These collaborations can reach a wider audience and increase the impact of outreach initiatives by combining resources and expertise. Municipalities can enable citizens to take an active role in waste reduction initiatives by emphasizing education and outreach as part of a complete waste management strategy (Ugwu et al., 2021). In the end, this may result in a more sustainable future, a cleaner environment, and better public health.

2.4.3 Recycling

Recycling is a useful tactic for lowering the risk that municipal solid waste (MSW) poses to a community. “Changed Paradigm of Municipal Solid Waste Management: Recycling and By-Products to Attain Zero Waste,” (2024) asserted that recycling contributes to resource conservation, energy savings, and a reduction in environmental pollution by keeping garbage out of landfills and incinerators. It makes it possible to salvage priceless resources from trash. Paper fibers, metals, and plastics are examples of resources that can be reused to cut down on the need for mining and processing virgin materials. By conserving natural resources, such as raw materials, energy, and water, resource extraction's negative effects on the environment are lessened. Recycling aids in reducing pollutants that may arise from the extraction, preparation, and production of new materials. Paper recycling, for instance, lessens the need for logging and the resulting degradation of habitat. Likewise, recycling metals lower the mining and refining processes, which demand a lot of energy. Recycling helps to improve the quality of the air and water by lowering pollutants, protecting public health, and lowering the chance of environmental contamination (Illgner, 2022).

2.4.4 Composting

Organic waste, including food scraps, yard trash, and some paper products, can naturally decompose into nutrient-rich compost through the process of composting, which is also sustainable. Enhancement of soil is one of the several advantages of this beneficial waste management technique. Compost helps plants retain moisture in the soil, encourages healthy root growth, and supplies vital nutrients when put into lawns, garden beds, or agricultural areas. It also contributes to sustainable agricultural practices by increasing soil biodiversity and decreasing the need for synthetic fertilizers. Additionally, the addition of compost to soil has enhanced drainage and raised its water-holding capacity, which lowers erosion and runoff as supported by (Wang et al., 2020). In metropolitan places where stormwater management is crucial, this can be extremely advantageous. As a natural filter, compost can help lower the danger of water pollution by absorbing and keeping contaminants in the soil. Making their compost at home is another way that people can save money on soil additions and fertilizers. An organized attempt by a community or group of people to clear trash, debris, and other types of waste from public areas like parks, beaches, streets, or natural areas is called a clean-up campaign, also called a clean-up drive or clean-up event. Ebrahimian,(2020) stated that a clean-up program aims to encourage community

involvement and environmental care while simultaneously making the surroundings more aesthetically pleasing and clean. All they can do is rely on volunteers to pick up and dispose of litter; they don't have any other source of funding. Businesses, government entities, local organizations, school groups, and people of the community can all volunteer thereby giving people the chance to actively participate in improving their surroundings and communities. Participants and the general public can learn from them. The value of recycling, appropriate trash disposal for various waste kinds, and responsible waste management. A sense of pride in the community, cooperation, and a positive mood are frequently fostered by clean-up programs.

2.5 Merits of Community Participation in MSWM

Participating in municipal solid waste (MSW) risk reduction initiatives offers several opportunities for communities. Firstly involving the community in MSW risk reduction programs provides opportunities for community members to learn about the environmental and health risks associated with improper waste management. Through awareness campaigns, workshops, and educational programs communities can gain knowledge about waste segregation, recycling, composting, and proper disposal techniques. This increased awareness empowers individuals to make informed decisions and take actions that contribute to risk reduction. Behavioral changes toward sustainable waste management practices can be attained if communities are engaged in various stages of waste management as supported by (Kaba et al., 2021). By actively engaging in waste segregation, recycling, and composting activities, community members can develop habits that minimize waste generation and maximize resource recovery.

Sallwey et al (2017) stated that community participation in MSW risk reduction can create economic opportunities at the local level. For example, communities can establish recycling centers or cooperatives, generating employment and income through waste picking. By promoting recycling, communities can support the development of local markets for recyclable materials, creating entrepreneurial opportunities. Adding on, it provides a platform for community members to advocate for their needs and concerns. Engaged communities can influence policy development, demand better waste management infrastructure, and hold relevant authorities accountable for addressing MSW risks. By collectively voicing their concerns, communities can drive systemic

change and ensure that their perspectives are considered in decision-making processes. Lastly, active community participation in MSW risk reduction leads to improved health outcomes and a cleaner environment. Proper waste management practices, such as waste segregation and disposal, reduce the risk of disease transmission and exposure to hazardous substances. By minimizing waste pollution and improving air and water quality, community participation contributes to a healthier and more sustainable living environment. It is important to note that these opportunities are contingent on effective community engagement, access to resources and support, and sustained participation. Creating an inclusive and supportive environment that encourages community involvement is crucial for maximizing the opportunities arising from community participation in MSW risk reduction.

2.6 Barriers to community participation in municipal solid waste management

Community participation in municipal solid waste (MSW) risk reduction can face several challenges. One of the primary challenges is the lack of awareness among community members on the risks associated with improper management of MSW (Spoann, 2019). Many people may not be aware of the environmental and health hazards posed by uncontrolled waste disposal such as landfills leaching pollutants into groundwater or open burning of waste releasing harmful chemicals into the air. Communities often face resource constraints, including financial, technical, and human resources (Nzalalemba, 2020). Implementing waste management practices and infrastructure requires adequate funding, skilled personnel, and equipment, which may be lacking in many communities. Another factor that acts as a significant challenge in community participation is resistance to change. People may be accustomed to traditional waste disposal practices or reluctant to adopt new waste management techniques.

Pheakdey et al, (2022) indicated that inadequate waste management infrastructure, such as waste collection systems, recycling facilities, and disposal sites, can hinder community participation efforts. Without proper infrastructure, it becomes challenging to organize and effectively manage waste. More so, limited stakeholder engagement is one of the challenges faced when initiating MSW risk reduction strategies. Engaging stakeholders, including local authorities, non-governmental organizations, and private sector entities, is vital for effective community

participation. However, establishing collaboration and creating a shared vision among diverse stakeholders can be challenging (Phnom Penh Administration, 2021).

2.7 Strategies that can be done to enhance community participation in MSWM

Kubota et al., (2020) highlight that promoting community involvement in municipal solid waste (MSW) management through awareness programs is essential. Educating and informing the public on the value of appropriate waste management techniques, the negative effects improper waste management has on the environment and society, and the part that each citizen can play in strengthening the system as a whole are the main goals of these campaigns. Awareness campaigns should be designed to reach various community segments, such as homes, workplaces, schools, and local institutions (Sharma & Yadav, 2021). Affila et al., (2020) suggested that there is a need to make use of a range of communication channels, including print and digital media, public events, and partnerships with leaders and organizations in the community. The main points should make it obvious and succinct what the advantages of recycling are, the consequences of inappropriate trash disposal, and the accessible waste management options are Infrastructure and services. Interactive and captivating techniques, like practical demonstrations, contests, and community members' testimonies, should be used in awareness campaigns to successfully involve the community. Sustaining the momentum and guaranteeing long-term community involvement in sustainable waste management methods require constant engagement and cooperation with local partners.

A smart way to increase public involvement in municipal solid waste (MSW) management is to form alliances with neighborhood organizations (Ogutu et al, 2021). Municipalities may increase community engagement and support sustainable trash disposal practices by working with neighborhood associations, environmental organizations, and religious institutions. By using these groups' existing networks, resources, and influence, municipalities can effectively interact with the community. Zusevics et al. (2018) state that strong links and trust among the local populace are frequently possessed by community organizations, which facilitates more focused and culturally appropriate outreach and awareness-raising initiatives for MSW management. These collaborations can also help with the execution and oversight of waste management programs, with community organizations helping to distribute instructional materials, plan cleanup days, or

arrange for the gathering of recyclables from locals. Moreover, Sidhi Cahyana et al., (2023) this cooperative strategy might promote a sense of increased community involvement and participation in sustainable waste management initiatives as a result of shared responsibility.

Capacity building serves as a foundational strategy for bolstering community involvement in municipal solid waste (MSW) management (Mwanza, 2019). Through education, training, and resource provision, communities are equipped with the essential knowledge and skills to actively engage in waste management practices (Adekulne, 2020). This includes fostering an understanding of the significance of proper waste disposal methods, promoting waste segregation and recycling, and highlighting available waste management services (Godfrey, 2018). By offering targeted workshops and educational programs, municipalities empower residents to partake in waste segregation and composting, and even establish small-scale waste management enterprises (Kanchebe, 2022). For instance, the "Waste Management Education and Training Program" in Nairobi, Kenya, successfully trained over 500 community members in waste management practices, resulting in a significant increase in waste segregation and recycling rates (Mwanza, 2019). Similarly, the "Community Waste Management Capacity Building Project" in Accra, Ghana, empowered community leaders and stakeholders to coordinate and sustain waste management initiatives, leading to improved waste management outcomes (Owusu-Sekyere, 2021). Ultimately, investing in capacity building cultivates a self-reliant community that collectively contributes to more sustainable and effective MSW management practices.

Enhancing community involvement in municipal solid waste (MSW) management can be achieved through the implementation of incentive programs. Creating a positive reinforcement process that recognizes and honors individuals and organizations for their contributions to efficient waste management is the main goal of these organizations. In 2022, the Accra Metropolitan Assembly in Ghana introduced preferential access to municipal services for residents who demonstrated good waste management practices which resulted in improved waste management outcomes (Accra Metropolitan Assembly, 2022). Financial incentives, on the other hand, can take the shape of cash awards for recycling and composting or reductions on utility bills for example in Kenya in 2020 (Nairobi County Government, 2020). Godfrey, (2018) alludes that municipalities can customize incentive programs for their local environment and track their efficacy over time. This can

successfully inspire locals and companies to take an active role in recycling, composting, and waste segregation activities, which will ultimately increase the MSW management system's overall sustainability and efficiency.

Establishing designated community collection points for municipal solid waste management offers multifaceted benefits to both residents and municipalities (Mwanza, 2019). These strategic locations not only enhance accessibility and convenience for waste disposal but also promote community engagement and awareness (Adekulne, 2020). By placing collection points in easily accessible areas, municipalities remove logistical barriers and encourage consistent waste disposal practices (Kanchebe, 2022). Moreover, these points serve as hubs for education and information dissemination, fostering a culture of responsible waste management (Godfrey, 2018). Additionally, centralized collection facilitates efficient monitoring and data collection, empowering municipalities to make informed decisions and continuously improve their waste management systems (Owusu-Sekyere, 2021). Overall, community collection points play a pivotal role in promoting sustainable waste disposal practices and fostering environmental stewardship within communities (Nyenje, 2022).

2.8 Theoretical framework

Social capital theory is a sociological concept that refers to the resources embedded within social networks and social relationships. It emphasizes the value and benefits that individuals and communities can derive from their social connections. Social capital can be seen as a form of capital that is distinct from economic or physical capital, as it relates to the social and relational aspects of human interaction. It was popularized by sociologist Pierre Bourdieu in the late 20th century and further developed by other scholars such as James Coleman and Robert Putnam. According to social capital theory, social networks and relationships can provide individuals and communities with access to resources, information, support, and opportunities. These resources can be instrumental in achieving individual goals, community development, and societal well-being.

The provision of these resources can be obtained in three ways. Bonding social capital is whereby they are connections and relationships within homogeneous groups, such as family, close friends, or members of a particular community. Bonding social capital tends to provide emotional support, a sense of belonging, and solidarity among group members. Secondly bridging social capital across

diverse social groups. It involves interactions and associations with individuals from different backgrounds, social classes, or communities. Bridging social capital can facilitate the exchange of information, resources, and ideas between different social groups, fostering social integration and cooperation. Thirdly, linking social capital between individuals or groups with unequal levels of power or resources. It involves connections between individuals and formal institutions, such as government agencies, businesses, or community organizations. Linking social capital can provide individuals and communities with access to resources, opportunities, and support from influential or powerful entities.

Overall, social capital theory provides a framework for understanding the social dimensions of human interaction and the potential benefits that can arise from strong social networks and relationships. Hence it is crucial to first understand it in assessing community participation in municipal solid waste management.

2.8.1 Relationship between social capital theory and community participation in MSW management.

Social capital theory provides a valuable framework for understanding community participation in municipal solid waste (MSW) management (Putnam, 2018). According to this theory, social networks and relationships can provide individuals and communities with access to resources, information, support, and opportunities (Bourdieu, 2018). In the context of MSW management, social capital can play a crucial role in promoting community participation and improving waste management outcomes (Coleman, 2018).In Mbare, a high-density suburb in Harare, Zimbabwe, community participation in MSW management is essential for effective waste management (Manyati, 2020). Bonding social capital, which refers to connections and relationships within homogeneous groups, can provide emotional support, a sense of belonging, and solidarity among community members (Putnam, 2018). For example, community groups in Mbare may come together to clean up public spaces, promoting a sense of community and social cohesion (Machingura, 2022).

Bridging social capital, which involves interactions and associations with individuals from different backgrounds, social classes, or communities, can facilitate the exchange of information, resources, and ideas between different social groups (Bourdieu, 2018). In Mbare, bridging social

capital can help to bring together community members, local authorities, and waste management experts to share knowledge and resources, promoting effective waste management (Chigwada, 2021). Linking social capital, which involves connections between individuals or groups with unequal levels of power or resources, can provide individuals and communities with access to resources, opportunities, and support from influential or powerful entities (Coleman, 2018). In Mbare, linking social capital can help connect community members with local authorities, NGOs, and private sector organizations, providing access to resources and expertise for effective waste management (Muponde, 2023).

2.9 Conclusion

Overall, social capital theory provides a valuable framework for understanding community participation in MSW management in Mbare. By recognizing the importance of bonding, bridging, and linking social capital, community members, local authorities, and other stakeholders can work together to promote effective waste management and improve community well-being.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the approaches that were used to gather relevant data and information for the study. The sampling methods and targeted population used are discussed. Questionnaires, key informant interviews, and observations as research tools used are also discussed.

3.2 Study area

Mbare, originally known as Harari is a suburb in the south of Harare, Zimbabwe. It was founded in 1907 as a township. It is a high-density suburb located 5 kilometers from the central business district of Harare. Mbare is the major trading market for vegetables and fruits in Harare. The suburb acts as the distribution center for agricultural produce in Zimbabwe. The suburb is dominated by informal sectors and illegal vendors which has contributed to poor waste management. Also, it is the major bus station for rural bound and incoming transport in Harare.

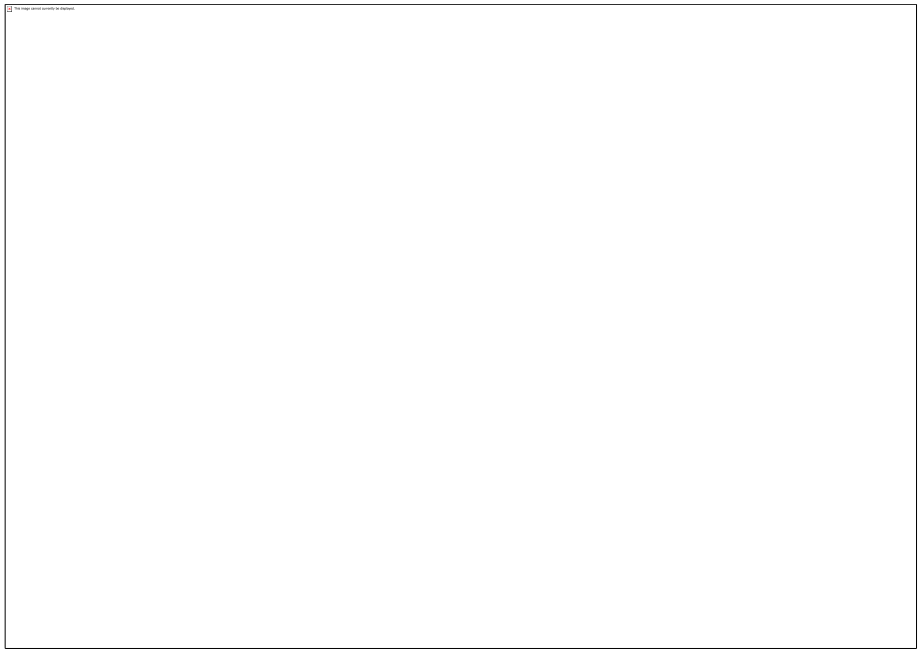

Fig 3.1: Mbare Map, Ward 4 ***Source (Author)***

3.2 Study design

Study design refers to the overall plan or strategy that a researcher uses to investigate a particular research question. Saunders, et al. (2012), the definition of research design is a plan aimed at answering a specific research question. It outlines the methods and procedures that will be

employed to collect and analyze data to answer the research question effectively. The study design is crucial in ensuring that the research is conducted systematically and rigorously, allowing for valid and reliable results to be obtained.

In this research, the researcher chose to use a mixed approach (qualitative and quantitative) to properly analyze community participation in MSW risk reduction. The approach allows for a more comprehensive and holistic understanding of the problem and also provides a complete picture of the community's perceptions and experiences as well as the social, economic, and environmental factors that influence community participation in MSW management. The data collecting tools used were the administration of questionnaires, interviews, and observations with community members, local leaders, and experts.

3.4 Sampling

Based on the 2022 census report Mbare Ward 4 has a total population of 11 966 and 3548 households. From that, the researcher chose Magaba residential flats which have an estimated 1 200 people. The sample size obtained was a representation of the study population. A confidential level of 99.9% was used and 0.1 % was the precision level in the determination of the sample size.

Equation 1

$$n = \frac{N}{1+N(e)^2}$$

Where n = sample size; N= target population and, e = level of precision.

$$= \frac{11966}{1+11966(0.1)^2}$$

$$= \frac{11699}{1+(116.99)}$$

$$= \frac{11699}{117.99}$$

$$= 98.51$$

3.5 Sampling Procedures

In the selection of residents for data collection, a systematic random sampling technique was used to extract a representative sample of the community to acquire information. This sampling technique requires arranging the population in an orderly manner, selecting elements at regular intervals based on that ordered list (Gravetter & Wallnau 2019). A random starting point was

selected and every 12th household was included in the sample. The selection was done by k □ h time that is population size divided by sample size. In this instance e.g1200/99=12.Every household had an equal chance of being selected and this provided the most valid and credible results that reflected the characteristics of the population from which they were selected.

3.5 Data collection methods

These are techniques used in acquiring and measuring variables from various sources in a research enabling one to answer stated research questions. They are important as they help in coming up with informed decision-making. Triangulation of data collecting tools was used to facilitate the validation of data and to reduce biases. In this study, the research used the following methods: -

3.5.1 Observations

This is a method of observing the behavior of a subject by simply watching in a natural setting as defined by Baker & Chenery (2020). The researcher went around the community during questionnaire distribution looking at how they were disposing of their waste and the number of open dump sites around the area. This was done without interfering with the community's day-to-day activities and also was done secretly which gave room for the researcher to get an accurate and clear picture of the community's behavior towards municipal solid waste management.

3.5.2 Questionnaires

In obtaining data from the households' sample, in this study the researchers used questionnaires. A questionnaire is defined as a research instrument consisting of a series of questions to gather information from respondents about their attitudes, experiences, or opinions (Bhandari, 2023) can be referred to as a written interview. The research used a set of research questions driven by the research objectives to obtain respondents' views on the subject under research. The study used an open-ended and closed-ended questionnaire to obtain both quantitative and qualitative data also it was divided into several sections under socio-demographic information, knowledge on municipal solid waste, and community participation in MSW risk reduction. The questionnaires were disseminated to the 13 blocks of Magaba flats. To ensure the best quality data, there was the translation of languages by research assistants the questionnaire from English to Shona to ensure that the terms used could be easily understood and had similar meanings. This method made it flexible for respondents in terms of time disruption of daily activities.

3.5.3 Interviews

In Commentary 2 written by Henning, (2019) stated that interviews are a common research tool in social sciences because they attract a great deal of commentary and discussion. Key informants' interviews were used in this study. This type of interview is usually done by people who share the same or particular knowledge and values on a particular study (Lampkin and Hall, 2021). They served as information-gathering catalysts by investigating the perceptions, attitudes, beliefs, and experiences of the strategies undertaken in risk reduction, their effectiveness, existing community-based initiatives, and challenges faced implementing them in Mbare. The open-ended interview was conducted to allow enquiring more information from the interviewee. The key informant interview was conducted with the Mbare councilor, the Mbare council, and EMA.

3.6 Validity and reliability

Validity represents the truthfulness of findings and reliability refers to the stability of findings (Altheide &Johnson, 1994). They increase transparency and decrease opportunities to insert researcher bias (Singh, 2014). To achieve this a pilot study was conducted by the researcher. The pilot study was done to enable the examination of questionnaire wording, sequencing, and layout. Also to estimate the response rate and time taken to complete the questionnaire.

3.7 Ethical considerations

These are a set of principles that guide your research designs and practices (Bhandari, 2023). The study sought permission from the community councilor. The following was done: -informed consent, confidentiality, use of vernacular language, and avoiding making promises of any form of gifts after filling out the questionnaires. As part of confidentiality, respondents did not write their names on the questionnaires. The research took into account the different cultural ethics in the community.

3.8 Conclusion

This chapter discussed research design and research methods as well as sampling techniques that were used for data collection. The research was designed in a way that accommodates both qualitative and quantitative methods although qualitative research was dominating the research.

The research methods discussed include questionnaires, key informants' interviews, and field observation.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings of the study obtained from data collection that were related to the study's objectives on community participation in municipal solid waste risk reduction in the Magaba Mbare suburb. Research findings were presented through the use of bar graphs, pie charts, and tables. The chapter includes demographic information, municipal solid waste management processes, and community participation strategies as presented below.

4.2 Demographic characteristics of respondents

This section will contain the demographical characteristics of the selected sample respondents in Magaba flats including key informants which consist of officers from the departments of waste management under EMA and the Harare City Council and the councillor. The characteristics include age, level of education, and gender.

4.2.1 Gender of Respondents

Table 4.1: Gender

Gender of respondents	Number of respondents	Percentage of respondents
Females	65	65
Males	34	35
Total	99	100

Source: primary data

From the table above, it can be noticed that females occupy a greater respondent percentage than males. The reason being, during the collection of data more women were present in their households than males who were at their workplaces. Latzman et al. (2018) agreed with the findings by saying" individuals with a traditional view support a gendered division of family labor, regarding women as homemakers responsible for parenting and men as the wage earner and decision maker" automatically assigning women with the responsibility of managing solid waste especially in the disposal than men. Abubakar et al (2022) also stated that this is a trend in countries like Thailand, where women play a critical role in MSW reduction efforts.

4.2.2 Age of respondents

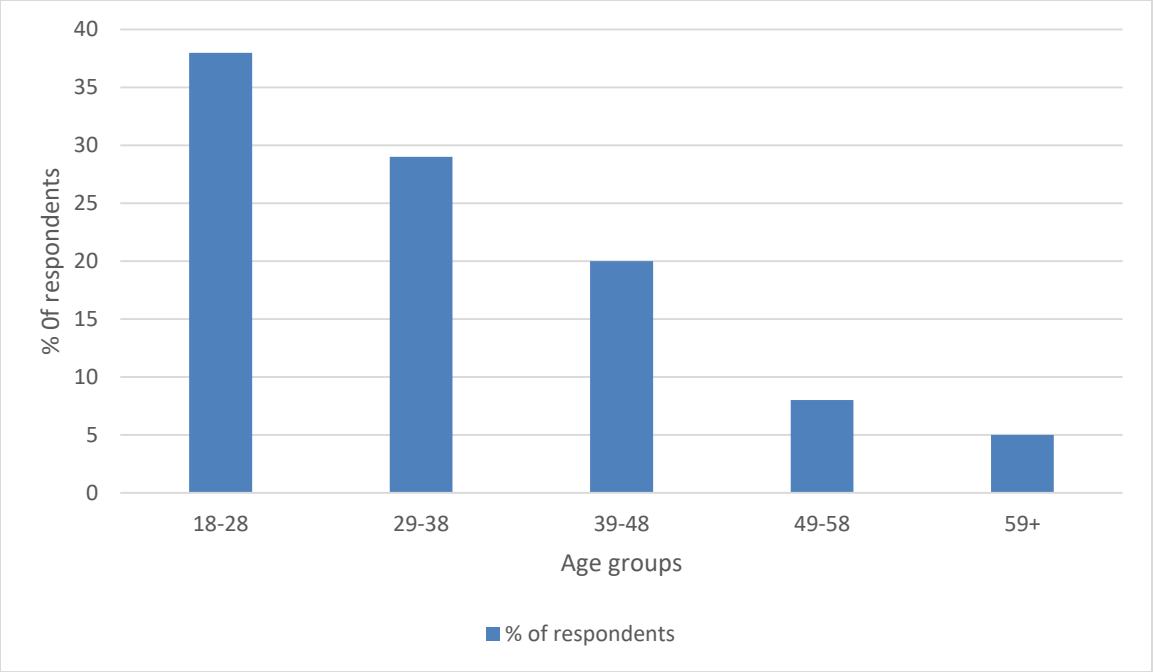

Fig 4 1.: Age groups

Findings from the administered questionnaires show that the active age groups have the highest respondents 18-28(38%), 29-38(29%), and 39-48 (20%). This shows the study area is congested with the main labor forces. The community has a smaller dependent population as shown by the percentage of respondents in that category of 5%, the blame can be put on urban-to-rural migration. Rural areas offer an affordable cost of living and a connection to nature. They were included in the study since older people possess more experience.

4.2.3 Level of education

The educational background of the respondents revealed the varying degrees of comprehension as well as people's attitudes and views on complex waste management challenges. The citizens' positive attitudes, opinions, and comprehension of several factors involved in solid waste management are positively impacted by the high percentage of 55.55% that represents their secondary education. Fig 4.1 also reflects that 18.18 % and 27.27 % were respondents who attained primary and tertiary education respectively. From the educational background of the respondents, it is implicit that all participants were educated.

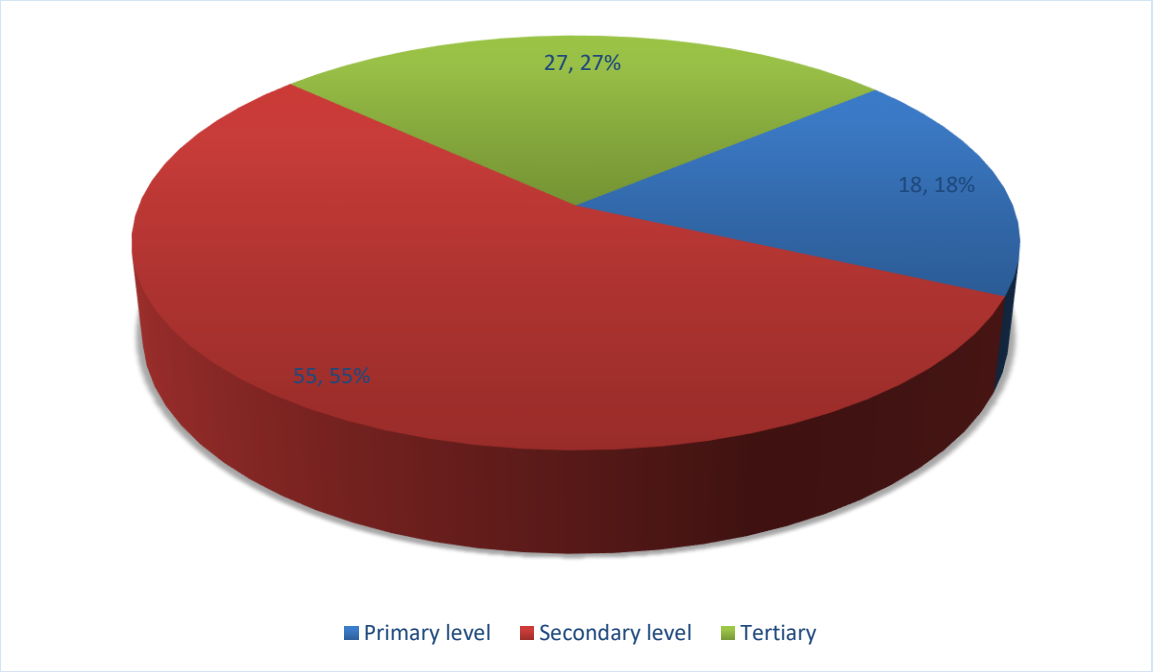

Fig 4 2. Level of education: Source (primary data)

4.3 Hazards associated with municipal solid waste disposal in Magaba

The questionnaire respondents were asked about the hazards linked to municipal solid waste disposal in their community and they managed to identify health problems, environmental pollution, aesthetics and odors, and fire outbreaks.

Table 4.2: MSW hazards

Hazards	Number of ticks
Fire outbreaks	8
Aesthetics and odors	43
Environmental pollution	20
Health problems	28

The higher number of ticks for aesthetics and odor (43) indicates that the respondents are being bothered by the unpleasant smells and unpleasant sights associated with improper waste disposal. This is not surprising given the importance of environmental cleanliness hygiene in maintaining public health and well-being. This could be due to inadequate waste collection, poor disposal practices, and lack of proper waste management infrastructure. One interviewee also stated that: -

"The once-thriving environment around the flats are now marred by unsightly litter, overgrown dumpsites, and unpleasant odor from decomposition. The neglect and lack of maintenance have led to a decline in the beauty of the area, making it unpleasant and unappealing to residents and visitors."

One of the primary major concerns related to MSW in Magaba is the increased risk of disease outbreaks and transmission (28). The improper disposal of solid waste at open dumpsites has led to the proliferation of disease-carrying vectors such as flies, rodents, and mosquitoes. The presence of these organisms increases the chances of spreading diseases like cholera, typhoid, malaria, and other illnesses that are threats to residents who live close to dumpsites. Also, these dumpsites release toxic chemicals, and exposure to these increases the susceptibility to skin diseases, respiratory problems, and gastrointestinal issues on waste pickers and the community at large. This is supported by one of the questionnaire respondents, who stated:-

"Makonzo, nhunzi, mapete nemosquito ndokudya kwedu muno Magaba"

Translated to "rats, flies, cockroaches, and mosquitoes are the norm here in Magaba"

Through observation and questionnaire response (20) ticks, one of the major hazards identified is the contribution to climate change under environmental pollution. The burning of dumpsites releases toxic gases like carbon dioxide, monoxide, and others which destroy the ozone layer hence the increase in the number of heat weaves being recorded. Also, the smog produced can lead to eye, nose, and throat irritation (Mandevere & Jeria 2018). The decomposing of organic waste in open unregulated dumpsites releases methane which is a greenhouse gas that also contributes to Climate Change and air pollution. The number of ticks indicates that the respondents are concerned about the impacts of solid waste on the environment.

Lastly, the relatively low concern for fire outbreaks shown by a low number of ticks (8) indicates that the community is not as aware of the risks of fires caused by improper waste disposal or may not have experienced a significant fire incident in the past. One key informant stated:-

"It's during rare occasions that a major fire outbreak will be caused by solid waste, in fact in Magaba it has never been heard of"

4.3.3 Municipal Solid Waste Disposal Strategies

Table 4.3 Disposal Strategies

Strategies	% of respondents
Open dumping	60
Recycling	10
Reuse	10
Burning	20
Composting	0
Weekly collection by local authorities	0
Total	**100**

The information gathered showed that while the municipality does collect household solid garbage for tenants of the Magaba apartments, the services are sporadic. This is consistent with the findings of Sani & Zimucha (2022), who pointed out that the Combined Harare Residents Association (CHRA) petitioned the Zimbabwean Parliament in 2020 due to inadequate service delivery, particularly concerning the provision of water and trash collection. Fuel shortages and broken rubbish collection vehicle components are to blame, according to a city of Harare waste management department officer he specifically said:-

> "Honzeri ikuita kuti kanzuru isatore marara inyaya yekuti haina zvikwanisiro zvakakwana semafuta ekufambisa uye motokari dzacho dzinotakura marara dzishoma nekuti dzimwe dzakafa"
>
> Translated to "The cause of the council not to collect refuse is due to lack of fuel and other waste collection trucks are no longer working"

Inadequate garbage collection services have encouraged the study area's residents to choose alternate illicit solid waste disposal techniques, such as open dumping and burning. Additionally, the attitude of the Magaba people is a major factor in the inadequate disposal of solid waste since they dispose of their rubbish in open landfills and then burn it without considering the potential risks to their health and the environment. The above table displays the disposal techniques that the respondents indicated.

4.4 Municipal solid waste activities are done by the community

From the questionnaire responses on the activities being done by the community in managing MSW. Strategies identified were waste picking, clean-up campaigns, reuse, and recycling were the strategies identified.

Table 4.4: MSWM Strategies

Strategies	Number of ticks
Waste picking	20
Clean-up campaigns	15
Reuse	30
Recycling	5
No response	29

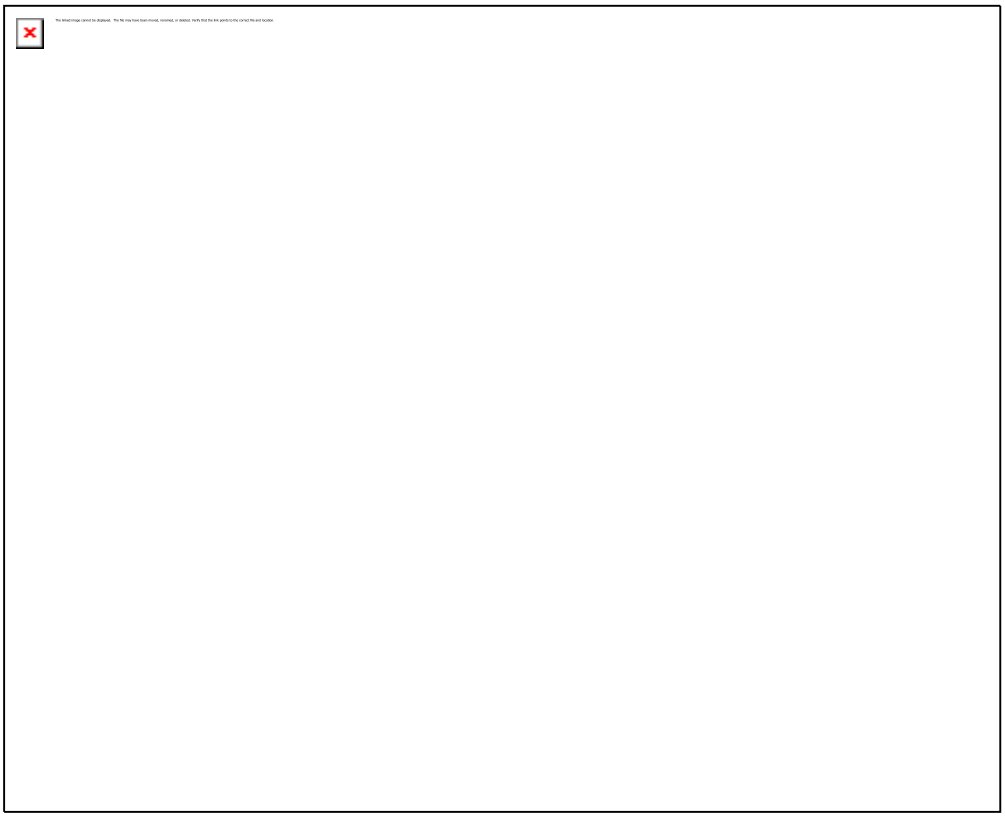

Plate 4.1 Women picking up plastic bottles for selling. Source (primary)

Waste picking also known as scavenging is one of the major activities being done by the Magaba residents. They collect plastic bottles, cans metals from surrounding open dumpsites for resale to

recycling companies' collection points. One of the plastic bottle collection points is situated just after the Magaba retail market. Most respondents undertake this practice because it generates income for them.

More so, most responses agreed on reusing some of their household trash. They are reusing plastic empty containers and glass containers for storing water and other household goods like sugar, and salt. This reduces the overall environmental impact caused by municipal solid waste that is gas emissions and pollution from resource extraction and production processes. Also reusing items can lead to financial savings associated with waste management and buying new things.

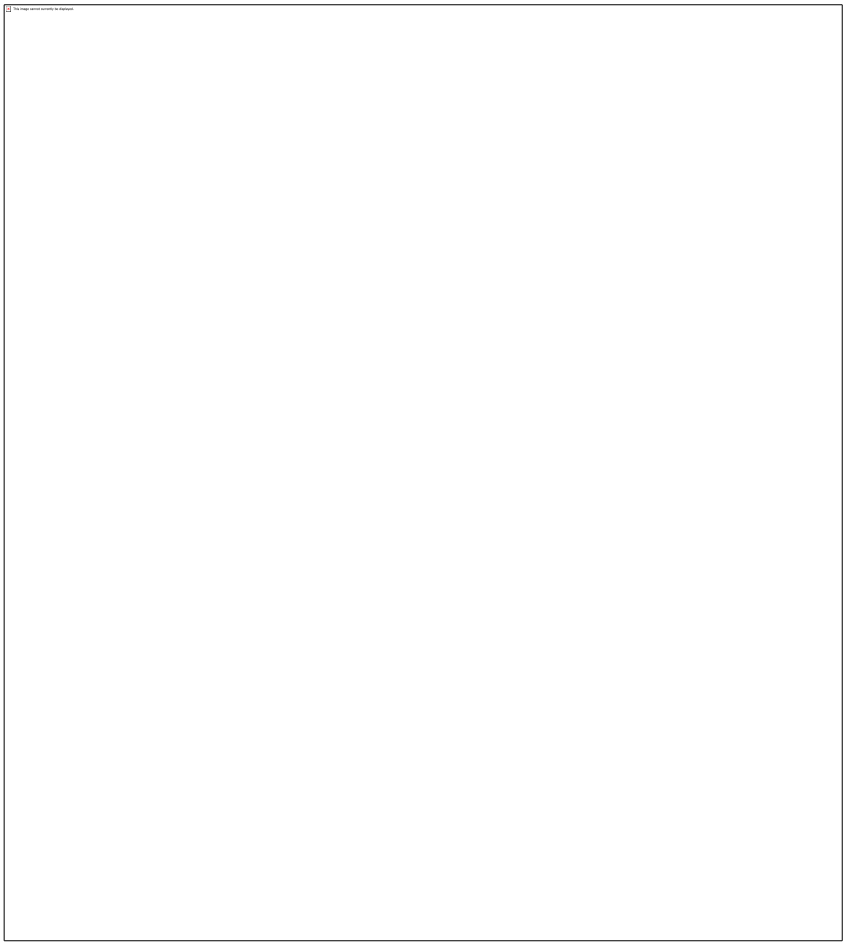

Plate 4.2: Plastic bottles used for storing water. Source (internet)

Through key informant interviews, it can be noted that educational awareness campaigns for municipal solid waste management (MSWM) are also conducted but at a smaller scale. Magaba the residents acquire it in school programs, public service announcements, and social media platforms. By providing information on the importance of proper waste disposal practices, the

environmental consequences of irresponsible waste management, and the benefits of recycling and composting, these campaigns aim to empower individuals to make informed decisions and take proactive steps towards waste reduction. One key informant alluded:-

> *"Information on MSWM is being taught in schools also through the public announcement on radios and televisions."*

More so, clean-up events are being done though not regularly. Various factors like lack of knowledge on the importance of engaging in such events have seen few residents taking part. Another respondent highlighted that:-

> "*Busy schedules are making most of the community members not take part in clean-up campaigns*."

A few of the respondents highlighted being involved in recycling although it is viewed as one of the strategies other communities are taking part in with the bid of managing municipal solid waste. The researcher observed that one of the reasons why residents are not fully engaged in recycling is the lack of peer influence which is the result of a lack of awareness of recycling that is, its benefits and how it is done. Due to this residents are less motivated to engage in recycling projects.

4.5 Effectiveness of Community Participation in MSWM

The questionnaire participants were asked how effective they think community participation has been in reducing MSW in Magaba. Two answers were outlined not at all and not very effective". These responses highlighted that residents are unhappy with their very own current MSW management. They feel that their efforts are not making a difference. From the key informant interviews, all three interviewees asserted that community participation is ineffective in managing municipal solid waste in Magaba flats. Factors like lack of awareness about proper waste management practices, incentives, inadequate resources, and competing priorities in the community are to be blamed. Leading to residents not fully participating in initiatives to do with MSWM. The Councilor stated that:-

> *"People are not fully informed on the importance of proper waste management practices or the impacts of improper disposal hence the ineffectiveness"*

The EMA officer said:-

"Lack of collaboration between the community and other agencies is hindering the effectiveness of community participation because the community needs support in terms of money, infrastructure and knowledge"

4.6 Conclusion

The detailed dynamics of community involvement in municipal solid waste management have been covered in this chapter, to sum up. After conducting a thorough analysis of several variables, including gender, household size, age, and education level, we have obtained important knowledge regarding the extent and kind of community participation in waste management programs. The results of our study indicate that although specific groups within the community exhibit high levels of involvement and activity, some significant obstacles and difficulties prevent broader participation.

CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of a summary of the research, the research findings, and the conclusion based on the key findings. It seeks to answer the research by the project objectives and also draw conclusions based on the findings. The key findings brought about the need for recommendations to be made.

5.2 Summary

In summary, the study managed to assess the Magaba flat residents' participation in municipal solid waste (MSW) management. The proposal part of the study consists of the background of the study, problem statement, research objectives, and questions. In assessing community participation in municipal solid waste (MSW) management, several key areas emerge. The community exhibits poor waste management practices, with limited engagement in MSW strategies and inadequate sponsorship. Residents lack awareness of the health and environmental impacts, highlighting a need for educational initiatives. This has been shown by the low participation of residents in recycling and the segregation of their waste as well as the improper waste disposal methods used such as open dumping and burning of waste. Self-provision of waste bins suggests a degree of individual initiative, but infrastructure support remains lacking. Some residents use poor materials like cardboard and sacks as their receptacles which are not advisable to use as they may easily spill and create a messy environment.

However, the lack of sponsorship and awareness, coupled with environmental and health hazards like contaminated water sources and air pollution, highlights the need for comprehensive intervention. Through a holistic approach, community participation in MSW management can be enhanced, leading to healthier environments and improved quality of life for residents.

5.3 Conclusion

The effective management of municipal solid waste (MSW) is a crucial aspect of urban sustainability, and community participation plays a vital role in achieving this goal. In Mbare, Magaba flats, the lack of community engagement and education on proper waste management practices has resulted in inadequate waste collection and disposal, leading to environmental and health hazards. However, this study has shown that the community is willing to participate in MSW

management and desires improved waste management services. Therefore, it is essential to implement community-based education and awareness programs, improve waste collection infrastructure, and establish community-led waste management initiatives to address the challenges faced in Mbare, Magaba flats, and create a cleaner, healthier, and more sustainable environment for its residents.

5.4 Recommendations

- From the findings, it was noticed there is a need to come up with and implement educational initiatives to raise awareness among community members about the importance of proper waste management practices. This could include workshops, seminars, and outreach programs to inform residents about the health, environmental, and aesthetic impacts of poor waste management.
- The Government needs to provide training and capacity-building programs for residents, local authorities, and waste management personnel. This needs to be done to empower individuals with the knowledge and skills necessary to implement sustainable waste management practices effectively.
- The local authorities should foster collaboration and partnership between NGOs, community groups, and residents to collectively address waste management challenges by so doing improvement of infrastructure for waste management can be achieved. This includes providing adequate waste bins, collection vehicles, recycling facilities, and disposal sites to make waste management more convenient and accessible for residents. Also engagement of stakeholders in decision-making processes and encourage active participation in waste management initiatives.
- The relevant authorities need to seek financial support and sponsorship from government agencies, businesses, and other organizations to fund waste management projects and initiatives. This could include grants, subsidies, or corporate sponsorship to support community-led waste management efforts.
- Community members must be empowered so they can take ownership of waste management by involving them in planning, implementation, and monitoring activities. Encourage residents to organize clean-up drives, recycling programs, and other

community-based MSWM initiatives. This fosters a sense of responsibility and pride in keeping the environment clean and healthy.

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APPENDIX I

BINDURA UNIVERSITY OF SCIENCE EDUCATION

Questionnaire

My name is **Rutendo Makuridzo** a final year student at Bindura University of Science Education undertaking an Honours Degree in Disaster Management Sciences. The purpose of this study is to research "**Assessing community participation in municipal solid waste management"**. A case of Magaba, Mbare, Harare. The findings are essential for academic purposes only and confidentiality is therefore guaranteed. Answer using ticks

Demographics

1. Gender

Male	
Female	

2. Age

18-28	
29-39	
40-50	
51-61	
62+	

3. Education level

Primary	

Secondary	
Tertiary	

Section B: Hazards and Awareness

1. What do you think are the hazards linked to municipal solid waste disposal in your community? (Check all that apply)

Environmental pollution	
Health problems	
Odors and pests	

Other (please specify) _____

2. How aware are you of the impacts of improper waste disposal?

- Very aware
- Somewhat aware
- Not very aware
- Not at all aware

3. Have you ever experienced any health problems due to poor waste disposal? (Check all that apply)

- Yes, respiratory issues
- Yes, skin problems
- Yes, other (please specify) _____
- No

Section C: Participation and Engagement

What strategy has your community implemented to reduce municipal solid waste (tick all that apply)

Strategies	Number of ticks
Waste picking	
Clean-up campaigns	
Reuse	
Recycling	

1. How often do you participate in municipal solid waste management activities (e.g., cleaning, recycling)?
   - Daily
   - Weekly
   - Monthly
   - Rarely
   - Never
2. What motivates you to participate in waste management activities? (Check all that apply)
   - Concern for the environment
   - Health concerns
   - Community pressure
   - Personal responsibility(cash)
   - Other (please specify) _____
3. Have you ever attended a community meeting or event focused on waste management?
   - Yes
   - No

Section D: Effectiveness and Suggestions

1. How effective do you think community participation has been in reducing municipal solid waste in your area?
   - Very effective
   - Somewhat effective
   - Not very effective

- Not at all effective

2. What measures do you think would enhance resident participation in MSW management? (Check all that apply)

- Education and awareness campaigns
- Incentives (e.g., rewards, discounts)
- Improved waste collection infrastructure
- Community-led initiatives
- Other (please specify) _____

3. How willing are you to participate in waste management activities if provided with necessary resources and support?

- Very willing
- Somewhat willing
- Not very willing
- Not at all willing

APPENDIX II

Semi-Structured Interview guide for Key informants

Thank you for participating in this interview. My name is Rutendo Makuridzo a student at the Bindura University of Science Education, am carrying out a research on assessing community participation in MSWM in Magaba residential flats. Your insights and experiences will help in understanding the hazards linked to MSW, resident participation, and how to enhance community involvement.

NAME OF INTERVIEW…….

DATE COMPLETED…../……./……

1) What are the most significant hazards prone to MSW in Magaba?

2) Are the Magaba residents aware of these potential hazards?

3) What criteria are used to store the solid waste given that different types of waste are generated at the household level?

4) What is your view about the handling and management of the various types of waste generated at a household level?

5) What solid waste management activities do you undertake with the communities and what support do you give?

6) How often do you participate with the community?

7) How effective is community participation and what is the community's attitude towards solid waste management when you work together?

8) Is community participation the solution to tackle solid waste management challenges affecting urban areas? Give reasons.

9) Which sustainable solid waste management strategies should be implemented to improve solid waste management at the household level and community level?

10) What measures do you think would encourage more residents to participate in MSWM?

11) What resources or support system is needed to sustain resident participation in waste management?


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