

**COMMUNITY PARTICIPATION IN SOLID WASTE  
MANAGEMENT IN URBAN SETTLEMENT: A CASE OF  
MBEYA CITY COUNCIL - TANZANIA**

**COMMUNITY PARTICIPATION IN SOLID WASTE MANAGEMENT IN  
URBAN SETTLEMENTS: A CASE OF MBEYA CITY COUNCIL, -  
TANZANIA**

By

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**A Dissertation Submitted in Partial Fulfillment of the Requirement for Award  
of the Degree of Master of Research and Public Policy (MRPP) of the Mzumbe  
University**

**2018**

## CERTIFICATION

We the undersigned, certify that we have read and hereby recommend for acceptance by the University of Mzumbe a dissertation entitled “**Assessment for Community Participation in Solid Waste Management in Urban Settlements: A case study of Mbeya City Council,**” in Partial fulfillment of the Requirements for Awards of the Degree of Master of Research and Public Policy of the Mzumbe University

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## **DEDICATION**

‘Late Mwalimu Tatu Hassan Mzurimwendo’

## **LIST OF ABBREVIATION**

CBOs	Community Based Organisations
ECD	Early Childhood Development Programme
ENPHO	Environment and Public Health Organisation
ILO	International Labour Organisation
LGAs	Local Government Authorities
MCC	Mbeya City Council
MEO	Mtaa Executive Officer
NEAP	National Environmental Action Plan
NEP	National Environment Policy
NGOs	Non Government Organisations
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Science
SWM	Solid Waste Management
UNEP	United Nations Environment Programme
UNIDO	United Nation
URT	United Republic of Tanzania
WB	World Bank
WEO	Ward Executive Officer

## **ABSTRACT**

The main objective of this dissertation was to assess the community participation in solid waste in Mbeya City Council. Specifically the study were to assess the current state of the solid waste generation and management, to examine the role that the community plays in solid waste management, to examine the role City Council plays in solid waste management and to examine the influence of the City Council and community participation on waste management in the study area.

Data was collected by using systematic, purposive and convenience sampling methods from a sample size of 101 individuals. Date analysis of qualitative data was done by using the grounded theory approach; and for quantitative data, the multiple regression analysis was employed. The findings of this study revealed that the nature of solid waste generated by the Mbeya city council residents was mainly organic and inorganic waste material.

The community participates in managing solid waste through individual household efforts, not collective efforts. Also there was a limited effort from the City Council in establishing solid waste consolidation points in the streets; on the other hand, the city Council was doing well at enforcing the bylaws that fosters good waste management in the streets. Also the last discovery of this study was that both, the City Council and the community efforts were critical to the performance of good solid waste management in the city.

The researcher concludes that, the efforts of both, the city council and the community are critical to the reduction of waste produced in the cities. The study recommends that these two stakeholders need to play their roles in preserving the environment. The study also recommends that, the awareness campaign and education to the community should be given a priority which will eventually make them understand the benefit of Solid waste management. Consequently, City Authorities should invite other stakeholders including Community Based Organisations (CBO's) and other private sectors to collective responsibility in managing solid waste.

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## **CHAPTER ONE**

### **STUDY OVERVIEW**

#### **1.1 Introduction**

This section provides the overview to the background of the problem, statement of the problem, objectives of the study, research questions, significance of the study, limitations and scope of the study.

#### **1.2 Background of the Study**

In many parts of the world, environmental problems have revealed to create a great challenge. This is especially witnessed in the section of solid waste management in different regions. While the quantity of waste produced in cities continue to increase daily, the effectiveness of the means of handling waste in terms of collection and disposal remains undesirably low. Waste generations therefore tend to increase with an increase in population and economic growth which together add up to the problem of the waste management posed not only on the environment but also on the public health.

Clarke (2002) defines Solid Waste Management (SWM) as engineering based mechanism that has the direct link with waste generation and control, waste storage and collection, waste transfer and transportation and lastly, waste processing and disposal in a manner that it takes into consideration the public health and safety and environment. This study defines SWM as the control of waste produced from households and streets by the residents. Solid waste management involves aspects of administration, legal, financial mechanisms, planning and coordination. In most developing countries SWM is considered as potential threat to human health and environment.

The waste management responsibility mainly rely on the Governments efforts, while several sectors are involved in waste generation including domestic, commercial, industries and others. While the volumes of wastes keep growing, the available

facilities cannot accommodate the discrepancy. This state has led to piling up of solid wastes in many streets.

Solid waste management in many African countries has been left to the shoulders of government especially local authorities. Most of local authorities have low capacity as compared to responsibilities that have been assigned to them. Local authorities lack or have limited capacity to financial and institutional structure, appropriate technology and operational mechanism that affect the availability and sustainability of SWM services (Onibokun, 1996).

The rapid urbanization and population increase put under pressure local authorities. Solid waste generation has become a potential risk that undermines most efforts by local authorities to collect and disposed solid wastes generated. Most local authorities do not meet the target, According to Chinamo (2003), local authorities they capacity to collect and dispose only 20% to 30% of waste produced in their areas.

In Tanzania, across the country, administration of solid waste management systems in general involves many different organizational forms and institutional arrangement which in many cases remain fairly consistent among the regions. Solid waste management responsibility rests within local government authorities (Solid Management regulation Act. 2009 of Tanzania). The government has put in place the enforcement of the regulations, local governments have the responsibility to ensure the compliance on their respective areas for purpose minimizing the solid waste generation.

On the contrary, mostly these local government authorities tend to give higher priorities to national issues especially those generating income and service delivery unlike solid wastes management.

Though administration and financial constrains are among the weaknesses of solid waste management systems, the institutional context in which community operates is an important aspect worth analyzing in order to foster an improved performance in the solid waste management. In Tanzania, community participation has been

introduced since 1960s, however much emphasis has been given in late 1990s. The concept of community participation is largely known in development projects plan and implementation, not very much is known as a strategy in solid waste management. In the above context this study attempted to provide broad analysis of community participation in SWM by assessing potential community participation and come up with the suggestions for improvement not only for Mbeya City council but also other cities and towns in Tanzania and other regions in the world.

### **1.3 Statement of the Problem**

For a long time the community perception of waste as a valueless and harmless substance played a major influence to the manner in which solid waste was managed. However, there is growing realization that waste disposed of improperly can pose serious problems not only to the environment but also to the health of society (UNIDO, 2003). Poor solid waste management methods do not only pollute environment, but also affect human health hence they are threat to human security. It is clear that this burden needs a collective action involving government, the communities and other stakeholders (generators of waste). This study sought to assess community participation in SWM and come up with the counter measures.

### **1.4 Objectives of the study**

The objectives of this are categorized into general and specific objectives

#### **1.4.1 General objective**

To assess community participation in SWM in Mbeya City Council

#### **1.4.2 The Specific objectives**

This study aimed at attaining the following specific objectives

- i. To examine the current state of the solid waste generation and management in Mbeya City
- ii. To examine the role that the community plays in solid waste management in Mbeya City

- iii. To examine the role that the city council plays in solid waste management in Mbeya City
- iv. To examine the influence of City Council and community participation on waste management in Mbeya City

### **1.5 Research Questions**

This study addressed the following research questions:-

- i. What is the current state of the solid waste generation and management in Mbeya City?
- ii. What is the role that the community plays in solid waste management in Mbeya City?
- iii. What is the role that the city council plays in solid waste management in Mbeya City?
- iv. What is the influence of City Council and community participation on waste management in Mbeya City?

### **1.6 Significance of the Study**

The findings of this study will contribute to the knowledge on the existing literature and will act as supportive insights for further research on solid waste management systems. The study findings will help the local government authorities to come up with proper by laws and plan programs for solid waste management system. It will also help the community to have better insight and understanding on solid waste management practices by making them aware of the most sustainable and environmentally friendly ways of managing the solid waste they produce.

Moreover, the findings from this study will contribute to the improvement of solid waste management by the City Council as management and the community by stressing on improvement and enforcement of the bylaws which are concerned with preserving the environment and also to pressure the local government authorities to put more effort on the subject matter.

### **1.7 Scope and delimitation of the Study**

The study was carried out at Mbeya City Council. The study assessed the community participation in solid waste management where it focused on the potential community participation on solid waste management. It also considered various types of solid wastes stressing the Mbeya City Council and the strategies used to manage solid wastes.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter provides the review of literatures related to the study. It is divided into two major parts. The first part is concerned with the empirical literature review whereby related studies were reviewed. The second part is theoretical literature review whereby relevant theories were reviewed.

#### **2.1 Theoretical consideration in the study.**

##### **2.1.1 Definitions of key terms**

This section provides the definition of the key terms of the study. The key terms used are waste, solid waste and solid waste management. The definitions and further explanation of these terms is provided in the subsections that follow;

##### **2.1.1.1 Solid Waste Management**

There are several ways in which Solid waste Management can be defined or explained, in this regard solid waste management can be defined as organization of sequence of activities that provide the basis for the waste separation, storage, collection, transportation, others including transfer, dispensation, treatment and dumping of solid wastes.

The primary objective of Solid Waste Management (SWM) is basically the efficient utilization of resources available in the whole process of waste materials management (Tchobanoglous, 2009). Consequently, Solid wastes also take account of refuse from different places such as households, Waste from industries and others institutions including hospitals and schools, market places, garage yards and other sources. Generally, wastes generated from household also can be termed as domestic wastes are the results of the household's daily errands. It includes all activities from food preparation, general cleanliness to other activities like burning of materials such as fuel and other hazardous materials (White, *et al.*, 2012).

In this development era, where human development is dynamic due to technological advancement, and social life has been drastically changed, wastes generation is an avoidable phenomenon. Wastes also have economic value and advantages, can be collected and recycled for further uses (Awunyo, et al., 2013). Wastes are unwanted substances or materials or left over from Industries, mining or from agricultural activities. In the process wastes (Unwanted Materials) may be dumped or discarded, stores and sometimes treated through proper channels in the end to be recycled or discarded. Waste also means something that we use inefficiently or improperly (Agency, 2013).

### **2.1.1.2 The Concept of Community Participation**

Bray (1996) defines community as a group of people living in specified geographical location such as village or district and sharing some common values, may face some similar problems, share some common facilities, may be may be of different background, experiences and skills but living together.

The participation concept is broadly used in the theory and practice of development but the perception of participation varies accordingly (Toner, *et al.*, 2005) and Toner (2003), argued that participatory community participatory approach are said to offer social equity, sustainability, efficiency and effectiveness of development activities in collective responsibility concern their livelihood. Participation is widely involves a significant number of people in prevailing situation or actions which enhance their existence

### **2.1.1.3 Solid Waste Management**

Solid waste Management is a system of solid waste administration that include of activities in waste is separated from the source, stored, collected, transported, transferred, processed , undergo treatment and final recycled of disposed. The primacy of SWM is basically the efficiency use of resources in managing solid wastes (Tchobanoglous, 2009). Solid waste includes refuse from residential area resulting from various activities such as cooking, hazardous and non hazardous solid

waste, industrial waste, refuse from market places, refuse from garage yards and agricultural waste.

Basically, residential or domestic wastes are the consequences of human activities; Solid waste has direct linkage to human development both in development of technology and social dynamics (White, *et al.*, 2012). The composition wastes vary over time, location and distance, Waste has some components of economic significant value and can be recycled correctly once recovered (Awunyo, *et al* 2013).

#### **2.1.1.4 Waste**

Waste can be regarded as those materials (products from industries, market places or residential) that primary user has no desire of using them for another purpose including production or consumption, in that essence the user wants to dump or dispose them. Wastes also can be generated from the process of extraction of raw materials in order to produce immediate and final products for consumption. In the process of final consumption of final products together with other human social and economic activities also wastes are generated. The process of recycling or re use at the place where waste is generated is normally excluded (Tchonagolous, 2009).

A waste is therefore what regarded as something that people is responsible for dumping of discarding. All in all materials to be discarded to be disposed are seems to be waste. Relying on this controversy, any material defined as a waste is not useful until it is put into use again and become a resource. (Forbil, *et al.*, 2007).

Broadly, wastes may include all materials that people have no longer any need of utilizing them further, instead they are either intend to destroy or dump. In addition to that, wastes in most case are materials in people have lost interest in them. In this case many items can be considered waste eg Household garbage, leftovers from manufacturing industries, sewage sludge and other dumped or discarded materials/items (Environmental Agency, 2013). Moreover, Human daily activities can lead to raise different wastes from different sources. Waste is normally occurring in two forms, either as a liquid form or solid form.

### **2.1.1.5 Solid Waste**

Solid waste can be described as any type of waste which can be found in hard form, examples of these are used plastic bags, food leftovers (ILO, 2007). It is normally referred to as human by-products that are produced from their daily activities and it is dynamic due to changing social patterns and consumption, urban growth, standard of living improvements and population growth (ENPHO, 2008).

According to Rouse (2008), a solid waste is any item which has no significant value to the primary owner and yet is to be discarded. The main course of the solid waste in most of urban settlements consists of organic waste including garbage from kitchen and garden, paper, glass and other plastic materials. Other including ashes, dust also contribute a portion of the waste.

In urban settlements solid waste has usually been left to be land filled. This has been the biggest way of managing solid waste over the years in most countries in the world. Nevertheless, some countries have some steps away from traditional methods. Due to technological advancement, alternative methods are offered including incineration, composting and recycling paper, metal plastics and other materials including glass. Consequently, the land filling of waste has got some potential impact including the production of gas and fertilizers and also production of leachate and land use (European Environmental Agency, 2013).

Urban waste and preventions it is about taken steps ahead in getting rid of reducing the amount of solid waste produced from the prime sources. In this case the quantity of waste produced must be managed properly. Preventions can take several forms, either reducing the amount of materials used during the process of production or reducing the amount or quantity of materials which are harmful that may be contained in a product.

Prevention also considers the issue of products reuse. Prevention is also considered as the most solid waste management option as it reduces the need for the process of handling up to recycling or disposal of the waste. It provides the basis for

environmental protection by optimal use of resources and also removes the potential threat of pollution (Ibid).

In most of developing countries, Solid waste management (SWM) has been in the list of priority areas and part of sustainable development plans. Broadly, SWM system is there to make sure that, overall goal of pollution prevention is in the due course, organize ,control, manage and maximization of wastes as a resource. Hence, sound SWM system largely depends on its core planning and implementation and it is very responsibility of solid waste managers to operate under the influence of Sustainable Development Goals (SDGs) (Pinnock, 1998).

Solid waste management has to control and address the likely effects on air quality, ground and marine water, public health and safety. The Solid Waste Management evolves stages or cycle; this includes waste generation, pre collection, storage, collection, transportation, treatment and final disposal (European Environmental Agency, 2013). In the process of waste minimization, the aim is to reduce the waste production through various ways/methods including education and using of improved production process and harmless waste practices and also applying recycling to separate likely materials/items within the stream and reprocessing them (Ibid).

The concept of waste in most cases is referred as material of insignificant value. Nevertheless, what constitutes a waste is normally theoretical rather than tangible term because waste is simply recognized than explained. The thought of solid waste management is very tricky to define (Furedy, *et al.*, 2000). In that essence it becomes very clear that the notion of what constitutes a waste is likely to vary from and that the distinction between a waste and resources may not be valid (Baird, *et al.*, 2005).

#### **2.1.1.6 Municipal Solid waste**

Municipal waste refers to wastes from residential, commercial institution those from industrial manufacturing processes. Though, it is necessary to not that in most developing countries number of times for became very impractical or unlikely to put excrete and solid waste in most scenario solid waste mixes with excrete to the extent of being potentially risk or hazardous to public health and safety as well as environment.

#### **2.1.2 Theoretical Review**

As Yin (2003) pointed out, a preliminary theory is vital for a researcher in order to guide to the appropriate approach and to use for analysis process. Theory is used as guidance and without any guidance of a theory researcher may lead to astray. And will not be able to understand the case properly. Consequently, with the help of a theory a researcher is guided in come up with the possible solutions/measures in the case.

##### **2.1.2.1 Social Capital Theory**

As it pointed out about the important for a researcher to use a theory to the case under study as guidance, this study is very informed by the Social Capital theory and the Bottom up approach championed by Chambers (Field, 1985). Social Capital means institutions, close relationships, and the norms that shape the quality and quantity of society's social communications/connections in which make communities work. This is a glue that the hold community together. Social Capital is built in interaction among individuals including social networks and other societal norms and trustworthiness that derived from them (WB, 1999, Putnam, 2000, John Filed, 2003).

##### **2.1.2.2 Regulatory Frameworks**

The development of National Environmental Policy (1997) is the milestone achievement of the National Environmental Action Plan (NEAP) (1994). It is a result and a great step in addressing major concerns (problems) in developing countries including poverty, ppor health and other that put majority of people under active

threats (URT, 1997). These problems are environmentally related. The policy established to address issues that are at large likely to deteriorate the environment and threaten human development. It strikes to ensure environmental protection thus could bring in socio-economic and political development. The sustainability of environmental use as vital to the present and future generation is also a big concern under National Environmental Policy.

Basically, the need, for the environmental Policy is the need to seek the best option in the environment protection and conservation. The Tanzanians and other world citizens' lives are all intimately connected to the environment. The survivals of current and future generation depend on harmonious ecological relationship of natural elements (NEP, 1997).

Environmental Policy plays an important in providing the implementation guidelines and strategy in raising public awareness and provides frameworks of essential linkages between the aspects of environment and development in so doing promotes individual and community participation in environmental actions. Issues regarding environment are fragile and the best way to hand them is through community/citizens involvement at different levels from National level to village level. It is likely that, the interventions which have the greater significant are those that have greater back up from the grassroots level (NEP, 1997).

The major responsibility of Government Institutions and Non Government Organisations is to help communities at different levels to create awareness of their own localities and support them to become the owner of their destiny. The environmental policy (1997) also provides the basis of collection and transportation of solid wastes and other hazardous wastes.

On the other hand Environmental Management Act 2004 of the United Republic of Tanzania provides the jurisdiction to the local government authorities in their respective geographical area ensure minimization of solid wastes (Section 9, (1)).

The Local Government Authorities in their prescribed location shall describe different kinds of solid wastes generated, refuse or other kind of garbage to be separated in expense of the sources and there should be mechanisms in place to involve stakeholders on planning and coordination, raising awareness among waste producers, traders/vendors, manufactures and other.

Local Government Authorities in their respective areas of jurisdiction shall manage solid waste generated in accordance to the law and regulations. Sustainable plans must be put in place and ensure appropriate sorting of waste at the sources and with prescribed standard (Section 9 (2)).

### **2.1.3 Types and Sources of Solid Waste**

Solid waste classification may depends on its potential risk and origin, more over can also be classified rubbish/garbage, residues and ashes, waste from agricultural activities and others. Also, solid waste can be further classified due their characteristics as eco-friendly and non biodegradable (not friendly to ecology), moreover, the classification basing o n its potential risks can again be categorizes into hazardous and non hazardous waste (ECD, 2003). On the other hand solid wastes are normally classified according to their sources in which they emanate. In this context, solid waste can again categorized in to residential/household or domestic, commercial, industrial, City/Municipal services and waste from agricultural products (Ibid).

The main theme that derived from the Social Capital theory is that, communications and connections enables individuals to build communities, tie themselves to each other to bind the social foundation. A sense of ownership and belonging and a vast of experience of social networks based of trust and tolerance. It is the best to do and bring great things to the people.

The Social Capital theory portrays a normal view that, honest and trust between individual thus become honesty and trust among strangers and trust of a broad foundation of shared institutional set of values and strength (Field, 2003).

In this quest of finding solutions to solid waste management, the whole content cannot be analyzed with community participation in isolation.

Basically, there are some societal connections that should be left out of the discourse. Hope (1998), pointed out that community is an independent entity with resourceful actors who should afford special platform in SWM process. The priority should therefore not put into modern/technological approaches, but also to think of what community know and think. What they know, think and practice for the great part of their social welfare.

From the above arguments, this study is therefore argued that, social interaction have values and there is vivid evidence that communities or societies with a good stock of such ‘Social Capital’ are more likely to benefit from life with little or less discrepancy low crime incidences, better health care service, education and economic growth.

## **2.2 Empirical Literature Review**

Community is the group of people living together in some form social organization and defined structure. Members in that particular community share their common values, economic and socio –cultural characteristics and common interests, whereas community participation refers to the process in which individuals and institutions take their responsibilities for their own good and community development. The essence of community participation is to develop the sanity and capacity for the community development in the community members come to know their society and situation prevailing. This also enables them to be catalyst of their own development instead of relying from outside forces and aid (Waste, 1996).

Community Participation also is regarded as very crucial step towards solid waste management. Solid waste management process is often requiring community participation because SWM need collective and continuous maintenance system. SWM more than anything needs community participation as an important aspect in its operations from generation point to recycle or disposal. Recently, SWM received attention by the community (Anschutz, 1996).

The real community participation can be seen where the community members deciding what and how to do it. Consequently, the community solid waste based projects are normally carried out by the members of community themselves or their representatives.

Nevertheless, most of the communities are only concerned with collection and transportation of solid waste to dumping site and operations of these sites is the core responsibility of the city or municipal council through Environmental Sanitation Department (MCC, 2014).

### **2.2.1 Solid Waste management practices**

There are several factors that have facilitated increase in the volume of solid waste generated. One of the factors that have led to increased solid waste generation is rapid urbanization (UNEP, 2007). Urbanization comes with expansion of towns which manifests through the growth of social and economic infrastructure/services and industrialization. The growth in such services warrants the increase in population in such areas. An increased population automatically means increased demand for not only social services but also consumables which potentially present a larger base for waste generation-in most cases solid waste.

The increase in the volumes of waste generated has also been proved to be synonymous with the “new lifestyles associated with greater affluence” which convert into higher consumption levels, thus generating more waste amidst changes in waste composition (UNEP, 2007:224). Affluence influences people to adopt superfluous demand and purchase patterns making people acquire more of what is not very necessary for their wellbeing. When people possess more than what they actually need, failure to consume all that they affluently have, eventually leads them

to get rid of the useless excess which turns into solid waste. In most cases more purchases also mean more packaging material- which readily translates into solid waste especially for the manufactured products. The manufactured products contain materials which are very difficult to decompose, for example plastics, thus increasing waste volumes uncontrollably (Bournay, 2006).

### **2.2.2 Community Participation in solid waste Management**

Community participation can be defined in different context. In cultural context community participation refers the participation of community members assume their responsibilities for their own welfare (Maya and Thomas, 2007), also is regarded as the involvement of people both men and women in social and development processes as active participants at all levels (Njau and Mruma, 2004). The community should be encourage and harmonized enough to tackle problems they are facing on their own without help from outside.

The very success of solid management system largely depends on citizens or community mobilization. Community need to be involved in all staged of waste management (Monika, 2000). Solid waste management requires active involvement of community to provide the means to an end.

Generally, community participation is limited to activities pre collection of domestic refuse. Community can play very important role for example undertaking waste management within the household and removing them to collection sites and reducing the quantity of waste production and try to keep area around the premises tidy and clean (Sylvain, 1999).

Community participation is the critical step and component towards the success of solid waste management (Howlet *et al.*, 2001). Community participation has been linked to increasing of community mobilization and the sense of ownership of policies, programmes and projects. It has proved to have great efficiency, understanding social consistency and cost effectiveness. In addition to that, it has bring about transparency and accountability and empower disadvantaged.

Community participation alone cannot work properly until other actors such as Community Based Organisations (CBOs), NGOs, micro, small and medium enterprises local leaders and others. City or municipal authorities also play an important role since they are responsible for service delivery, providing enforcement and legislation (Kinyashi, 2006).

In promoting re use and recycling of waste materials CBOs also can be involved. However, they can be useful in hiring waste collectors, fees collection for waste removal making logistics and other arrangements with local authorities (Scherteleib, *et al.*,1996).

Urban solid waste can have significant economic value if well planned and executed. Experience from the other countries shows that waste when recycled can profit the community. In Latin America and Asia, NGOs and cooperatives are engaged in solid waste management through collection and separation of wastes in small scale enterprises. CBOs have taken part in refuse collection, separation and composting (Cofie, 2005). Mabula (2007) pointed out, any meaningful or effective participation in either social or development intervention must involve different actors or players.

Conclusively, when beneficiaries are involved in the process, the design of the activities reflects need and people's priorities and reaches community goal(s). Participation also provides the basis for sustainability, sense of ownership, motivation and gives voice to the voiceless. The community facilitates advocacy and accountability at all levels.

### **2.2.3 Major Sources of Solid Wastes Generated**

A solid waste is the term that includes refuse or garbage and litter. In Tanzania especially in urban areas a large quantity of solid waste originated from domestic activities, agricultural activities and industrial activities. In most cases solid wastes arise from human activities consumptions and production activities are inclusive. Agricultural waste largely accumulates in households, market places and slaughter houses (Tam and Tam, 2008).

According to Akinmoladun and Adejumo (2011), in developing countries agricultural wastes accounts for 70% to 80% of the urban wastes, the rest includes inorganic wastes which include (5%) plastic bags, (7%) waste papers and scrap metals and (8%) accounts for plastic containers, hospital waste, bottles and other industrial wastes.

Literature shows that, Dar es Salaam City through its Municipal Councils of Ilala, Kinondoni and Temeke generated about 1,200 – 1,400 tons of solid waste per day of which 95 percent is of organic origin (Mbuligwe, *et al.*, 2003). The types and forms of waste largely depend on food habits, culture and life styles, income status, weather and climate (Vidanaarachhi, *et al.*, 2005).

#### **2.2.4 Collection and transportation of solid waste**

The rapid growth of Cities and Towns and rapid urbanization in many developing countries constitutes the problems of solid waste management. The most growing parts are far from urban centres. Therefore, the transportation of waste from the point of generation to dumping sites is growing problem.

In developing countries, local authorities employ street – level collection point in which street dwellers are responsible for their own waste, this means people should transport to the transfer sites where local authorities or private enterprises take from there to final disposal area/location (Mediana, 2010).

Operational vehicles is the essence of transportation of solid waste, in most developing countries vehicles face frequent break downs for some time and may be longer. According to UNEP (1996), 70% of vehicles in West Africa faced extended periods of breaks down and caused delay in collection and transfer of solid waste.

Similarly, in areas where collection services are active, the containers those are used to pre collection and storage prior to pick up lacking standards (Board and Kitumen, 2005).

Residents have to designate the pre collection container. Most local authorities in developing countries face inadequate funds and skills needed to cope with SWM crisis (Qdais, 2006).

In most cases, people in their households place plastic bags containing wastes on the corners of the streets to wait for collections. This is not efficient and sanitary way in waste management and can led to health implications (UNEP, 1996).

Knowledge on solid waste generation should be the helping hand in making decisions regarding the source s and types of solid wastes generation, collection, transportation and disposal as well as density and composition. In the study conducted by Mato (2002), revealed that Dar es Salaam City had the following composition of solid wastes, 62.5% vegetable/organic wastes, 6.5% papers and glass, 4.5% metal, textiles, rubber/plastic and bones and 27.3% inert matter and waste generation was 870 per day and only 35% were collected and disposed.

Social and economic variations in urban societies determine the rate of waste management. In developed countries the quantity of goods consumed is in great quantity, results in higher rates of waste generation. Consumptions habit is due to climate and culture.

Solid waste handling associated with potential risks to public health and safety and environment. Cointreau (1982) categorized risks into the following categories namely, human fecal matter, potentially hazardous industrial waste, contaminate water and air system and burning of dumps and methane release.

Tanzania has to adopt one major approach to handle solid waste; waste recycling Uganda used the same approach to ease the burden of solid west. The problem is this approach has not been adequately studied so far . It is time now to explore the approach further and put it in use.

### **2.2.5 Current common solid waste management practices and their limitations**

SWM is all about solid waste generation control, storage of waste, collection and transportation, processing and disposal/recycle in which principles of other disciplines such as public health and safety, engineering and other environmental issues are maintained (Afroz, *et al.*, 2010). Mismanagement of waste from generation to disposal usually poses risks to public and environment in cities and towns.

As pointed out in this study, wastes are discarded items that generated from human domestic consumption or development activities or production. This includes kitchen leftovers, animal dung just to mention few.

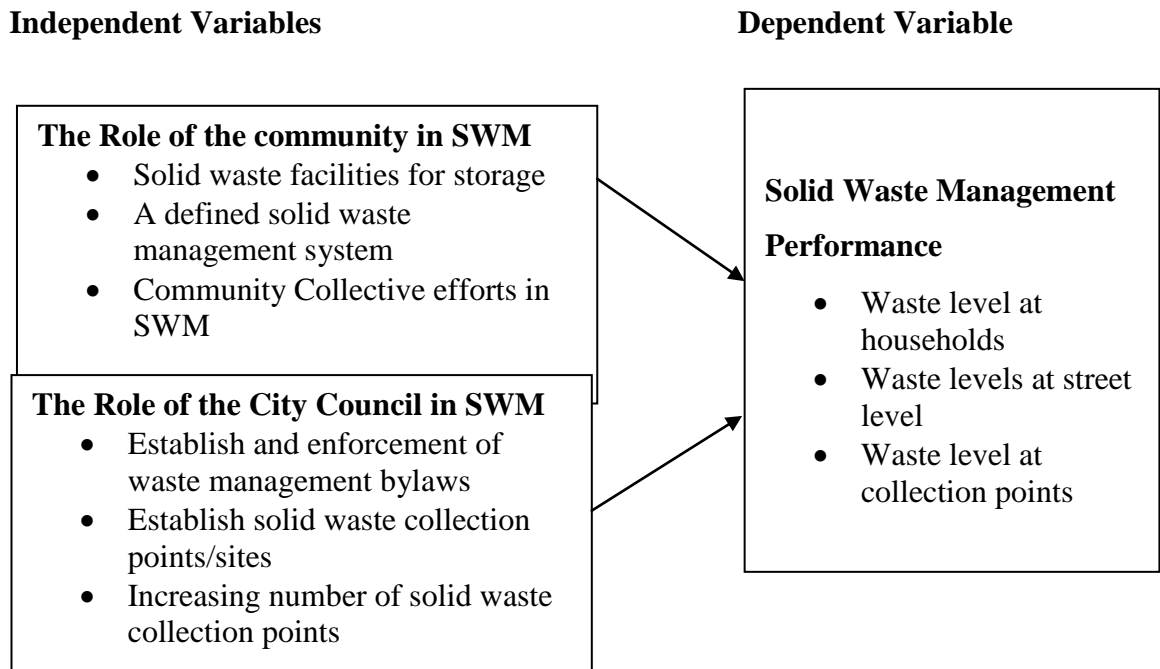
Tanzania Cities and Town in recent years have suffered a tremendous low standard of services from waste collection to solid waste disposal. This low level of solid waste management services, led to potential threat to public health and environment.

The public health and environmental aspects which are linked with SWM give the boost to the solid waste management. Solid waste management studies have to consider the element of waste composition, generation, storage, collection and disposal (Kishimba, *et al.*, 1995). Solid waste should feature best Monitoring and Evaluation systems which will track ongoing actions periodically (European Environmental Agency, 2013). Waste Management includes the optimal approaches that aim at reducing the waste production and avoid waste malpractices.

### **2.3 Conceptual Framework**

A conceptual representation of Solid Waste Management (SWM) for a typical local government authority (City Council) is provided in Figure 1 below. As noted above, the responsibility of managing the solid waste streamlines with the central SWM program. With its active planning and implementation of waste management, what happens to the wastes is within the purview of this program regardless of the community situation

**Figure 2.1: Conceptual framework**



**Source:** Researcher's construct (2016)

The conceptual framework of this study looks at solid waste management at two levels. It looks at the role that the community plays in waste management; and also looks at the role that the local government authorities play in solid waste management. Eventually the efforts from these two ends will be assessed by looking at the performance of such efforts mainly considering the amount of waste that is found in households, street levels and waste collection points in Mbeya City.

## **2.4 Study Hypotheses**

This study had two research hypotheses and they are presented as follows:

H1: Community participation significantly influences SWM performance

H2: City council participation significantly influences SWM performance

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter provides a description on how the study was conducted. It covers the area of the study, the research design, study population , sampling technique and sample size, data collection tools and methods and data analysis procedures.

#### **3.2 Study Area**

The study was conducted in Mbeya City Council. Uyole and Igawilo wards were the one selected for the study. The area was selected because it is adversely affected with poor waste management practices.

##### **3.2.1 Administrative Profile**

Mbeya City Council covers a total area of 222 square kilometers. Administratively, the City is divided into two divisions of Iyunga and Sisimba. It has 36 wards and 180 streets. 115 are found in Iyunga and 65 streets are found in Sisimba. Among 36 wards only 28 wards are provided with solid waste facilities. Mbeya City is located Southern part of Tanzania. The City Council borders almost all other Mbeya region districts in all directions. According to Population and Housing Census (2012), the total population is about 385,202, males are 182,620 and Females are 202,659 (MCC, 2014).

##### **3.2.2 Climate**

Mbeya City has mean annual rainfall of 1200mm while the mean annual temperature is 25<sup>0</sup>C, ranging from a mean minimum of 11<sup>0</sup>C and a mean maximum of 28<sup>0</sup>C. The City generally considered a highland characterized by moderate climate and sufficient rainfall.

### **3.2.3 Main Economic Activities**

Main economic activities in the City include commerce and trade, agriculture and livestock keeping, small and medium scale industrial production, and service provision. It is estimated that 33.3% of the city residents depend on agriculture for their livelihood, 21% are employed on public sectors, and 43.4% are engaged in the informal sector which is mainly small scale production including petty trading and vendors and 2.3% are domestic works and others (MCC, 2014).

### **3.3 Study Design**

The study adopted cross sectional survey where both qualitative and quantitative methods were employed. The design is useful in descriptive purposes as well as for determination of relationship between and among variables (Bailey, 1998). The design also offered the researcher with an opportunity of doing an in depth examination of the residents population as it covered a variety of characteristics ranging from individual to community level. It helped the researcher to get the detailed information and data about the study. It is also flexible in data collection and analysis.

### **3.4 Study Population**

A population is the entire set of observation or measurements under study. It is a full set of case from which a sampling frame is taken (Sounders *et al.*, 2000). The study population under this study was Mbeya City Council officials including District Environmental sanitation Officers, health officers, residents, WEOs, MEOs and street chairpersons from two selected wards of Uyole and Nsalaga.

### **3.5 Sampling Frame**

For the purpose of this study, the sampling frame consisted of households and individuals from market places from two wards of Uyole and Nsalaga as well as the officials from Mbeya City Council. The Sampling frame of the households from Ward Executive Officers (WEOs), Mtaa Executive Officers(MEOs) and Mtaa Chairpersons.

### 3.6 Sampling unit

The sampling unit for this study was the Mbeya City employees (Department of Environmental sanitation), heads of households and individuals from markets places. This type of sampling unit has been chosen due to fact that they would give required data and information regarding the study.

### 3.7 Operationalization of Variables and measurement

This segment provides the operationalization of the variables. Operationalization of variables means providing details on how the constructs of the studies were measured mulit-dimensionally. For the quantitative part of this study, there was a total of two independent variables and one dependent variables. The following is a detail of how these variables were measured.

#### 3.7.1 The role that the community plays in solid waste management

This variable was focused on encapsulating the role of the community when it comes to managing solid waste in their areas. The variable was measured by using three scale items which were having storage facilities, adopting proper methods of waste management and finally, collective participation to solid waste management. A 5-point Likert's scale was used to measure the variables.

**Table 3. 1 The role that the community plays in solid waste management**

<b>Item</b>	<b>Coding</b>	<b>Questionnaire wording</b>
Storage facilities	Comm1	We have waste storage facility in our household
Methodical waste disposal	Comm2	We have defined waste disposal methods
Community participation	Comm3	There is community participation in waste management through waste storage, collection, transport and disposal

Source: Field data, 2018.

### 3.7.2 The role that the City Council plays in solid waste management

This variable was focused on determining the role of city council in managing solid waste in their localities. The variable was measured by using three scale items which were the City Council effort to establishing waste collection sites, establishing bylaws related to waste management and increasing the number of waste collection sites. A 5-point Likert's scale was used to measure the variables.

**Table 3.2 The role that the city council plays in solid waste management**

Item	Coding	Questionnaire wording
Solid waste collection points	Council1	Our street has solid waste collection points
Distance	Council2	There is little distance from our household to the point of waste collection
Bylaws	Council3	Our local government has by-laws and regulations governing waste management

Source: Field data, 2018.

### 3.7.3 Waste reduction performance

This variable was used as a dependent variable in the quantitative analysis of this study. This variable focused on measuring the current perceived state of affairs in solid waste in Mbeya City Council. The variable was measured by using three items, namely: amount of waste in the household, amount of waste in the streets and amount of waste in the waste collection sites.

**Table 3. 3 Waste management performance**

Item	Coding	Questionnaire wording
Solid waste in household	Waste1	There is still a lot of solid waste in my household
Solid waste in streets	Waste2	Our street has solid garbage everywhere
Solid waste in waste collection points	Waste3	The dumpsite in our street is flooded with unmanaged garbage

Source: Field data, 2018.

### 3.7.4 Reliability

Reliability refers to the internal consistency of the scale items used. In this study, the variables which were used in the quantitative part of this study were the role of community, the role of the city council and the role waste management performance. All these variables were measured unidimensionally. It was therefore imperative to check the reliability of the instruments which were used to measure these variables.

To check for the reliability Cronbach's alpha was used. The Statistical Package for Social Science (SPSS) version 24 was used to test the reliability. The results of the analysis indicated that all variables were reliable, meaning that they an internal consistency of 0.7 and above.

**Table 3. 4 Reliability**

<b>Construct</b>	<b>Variable items</b>	<b>(<math>\alpha</math>)</b>
Role of community	Comm2, comm2, comm3	<b>0.85</b>
Role of city council	Council1, Council2, Council3	<b>0.86</b>
Waste management performance	Waste1, Waste2, Waste3	<b>0.76</b>

Source: Field data, 2018.

### 3.8 Sampling Techniques and Sample size

This involves decision on the techniques to be used in selecting the items of the sample. The study used both probability sampling and non probability sampling. The probability sampling used in this study is explained below in the subsection.

#### 3.8.1 Non-probability sampling

Under this sampling technique, the type of sample is left at the researcher's discretion. That is to say not all of the population members or units stand an equal chance of being selected as unit of analysis. The choice of the nature of the respondents was left completely on the discretion of the researcher based on the established criteria. The non-probability sampling used by the researcher was purposive sampling and convenient sampling.

### **3.8.1.1 Purposive/purposed sampling**

This is the non probability sampling strategy. Under this technique the researcher selected respondents basing on the feeling on who would be the best participant to inquire and provide the relevant data or information. The researcher purposively chose larger households because chances were most likely to produce a larger amount of solid waste.

### **3.8.1.2 Convenience/accidental sampling**

This is also non probability sampling. Under this method the sample selection were based on availability, accessibility and willingness of the respondents. Therefore, researcher selected a respondent/sample unit with which it was easy to access. The justification for using this comes from the fact that some households may not be around at the time when the researcher was collecting data, therefore the researcher had to use the people who were present at that time.

### **3.8.2 Probability sampling**

This is the type of the sampling in which every member in the population has equal chance of being included in the sample. In this study researcher used systematic random sampling.

#### **3.8.2.1 Systematic random sampling**

According to Castilo (2009), this method is used in selecting members from a large population according to a random starting point and fixed periodic interval. This method used to select households in the settlement (Houses).

### **3.8.3 Sample size**

A sample of 5% was selected using systematic random sampling. This sample size was selected with the assumption that it would provide good representation of the population because this study would not be able to access every member of the population in the study area. Kothari (2004) states that, a decision has to be taken concerning a sampling unit before selecting sample.

### **3.9 Data Collections Methods**

In carrying out the study and getting both primary data, various methods/techniques were used as follows;

#### **3.9.1 Questionnaire method**

This study used structured questionnaire to obtain data concerning the research topic. The questionnaires were given to respondents aiming at obtaining the data concerning the participation of the community in solid waste management. These questionnaires were used to gather data in the households' settlement under researcher supervision.

#### **3.9.2 Interviews method**

This was done through gathering data from key informants who are city councils staff (Department of Environmental sanitation) and heads of households. Interview guide was used. The first part of the primary data collection has been attained through interviews because this was the most possible way of getting from people with knowledge City Solid Waste management issues. The two wards of Uyole and Nsalaga were contacted through letters and phones calls on the field of the study representatives from each ward were chosen basing on their experience on the waste management systems and administrative responsibilities.

#### **3.9.3 Observation method**

Through observations data was obtained by assessing the general community practices, participation and their attitude towards solid waste management. Observation has been widely used as way to examine the problem on the ground, Being a resident of the City of Mbeya and knowing most streets contributed to the observation. Participant observation in the Solid Waste Management system has been an eye opener to both discovered and those not discovered in the interviews. Many collection points, waste containers and disposal sites have been visited. All these together have contributed widely to grasp and understand more the state of waste disposal in the City.

**Figure 3.1: Solid waste dumped in an open space (Uyole) along the Mbeya – Iringa road**



**Source:** Field photo, 2018

### **3.10 Data Processing, Analysis and Presentation**

#### **3.10.1 Data processing**

Raw data collected from the study area were sorted, edited, coded and classified then entered into a computer for descriptive analysis by using Ms excel and SPSS.

#### **3.12.2 Data analysis and presentation**

Descriptive analysis approach was adopted to analyze quantitative data in which frequency and cross tabulation was used to analyze variables. Qualitative data was analyzed by content analysis and interpretations.

For quantitative data analysis, the researcher used multiple linear regressions to check the relationship between variables. Multiple regression analysis enabled the researcher to ascertain significance levels and the degree to which the variations in the dependent variables are attributed by the variation in the independent variables. The variables were put in the following equation of the linear regression by using SPSS version 23.

$$Y=b_0+b_1X_1+b_2X_2+c$$

Whereby,

Y = dependent variable (Waste management performance)

X<sub>1</sub> = community participation

X<sub>2</sub> = Efforts of the city council

b<sub>0</sub> = y-intercept

b<sub>1</sub> = Coefficient of community participation

b<sub>2</sub> = Coefficient of efforts of the city council

c = Constant

The findings were presented by using tables, figures and texts.

### **3.11 Ethical Consideration**

In conducting the study, the researcher took into account all ethical considerations such as safeguarding rights of respondents to avoid direct or indirect physical harm, discomfort, pain or embarrassment. Redesigning a research to reduce degree of biasness, guaranteed rights of privacy and secrecy to respondents who participated in the study, protecting anonymity of clients and respondents and avoiding cooking data and instead the researcher reported only what were observed.

## CHAPTER FOUR

### PRESENTATION OF FINDINGS

#### 4.0 Introduction

The major focus of this chapter is to provide a detailed analysis of results. This chapter has four parts in total. The first part is the preliminary review which covers the response rate; and the demographic characteristics such as age, gender, marital status, level of education, household size, and source of income and estimated level of income on a monthly basis. The second part of this chapter shows how the four research objectives have been addressed in the study.

#### 4.1 Response Rate

The return rate of the questionnaires was calculated to be 91.81% of the total number supplied to the respondents. This means that it is not all of the respondents returned the questionnaires filled. Table 4.1 below provides a brief summary of the questionnaires distributed and those which were returned.

**Table 4.1 Response rate**

<b>Sn</b>	<b>Description</b>	<b>Rate</b>
1	Distributed questionnaires	110
2	<b>Returned questionnaires</b>	<b>101</b>
3	Response rate	91.81%

Source: Field data, 2018.

#### 4.2 Demographic Characteristics

This section provides demographic details of the respondents. The researcher needed to establish demographic dynamics of the respondents in order to fully understand them. The researcher therefore chose a few demographic elements to understand the respondents' socio-economic profiles. These included Sex of the respondents, Age in groups, marital status, education level, household size, source of income, estimated monthly income

#### 4.2.1 Sex of the respondents

The researcher wanted to ascertain the sex of the respondents. Through a questionnaire, the respondents were therefore requested to indicate their sex. Two options were provided before them to select. The respondents were required to choose either male or female.

**Table 4.2 Sex of the respondents**

Category	Frequency	Percent
Male	71	30.7
Female	70	69.3
Total	101	100

Source: Field data, 2018.

The results from the analysis have revealed that the majority of the respondents were females (69.3%) whereas the males made up 30.7% of the respondents. The researcher did anticipate the number of female respondents to be bigger than males because the questionnaires were distributed in a working day whereby most males are expected to be working and female stayed in the households

#### 4.2.2 Age group distribution of the respondents

The researcher wanted to identify the age groups of the respondents. In the questionnaire, the researcher therefore provided a list of four age groups whereby the respondents were required to select the relevant age group where they belonged. The two age groups were 20 and below, 21-30, 31-40, 40 and above.

**Table 4.3 Age group of the respondents**

Category	Frequency	Percent
20 and below	15	14.9
21-30	36	35.6
31-40	36	35.6
40 and above	14	13.9
Total	101	100.0

Source: Field data, 2018.

The results as indicated in the Table 4.3 indicated that the majority of the respondents were in the ages of 21-30 (35.6%) and 31-40 (35.6%). The second was those who were in the age group of 20 and below who made up of 14.9% of the total sample size. The last group was that of respondents who were 40 years old and above made up of 13.9% of the total number of respondents

#### **4.2.3 Marital status distribution of the respondents**

The third demographic detail was marital status. The respondents were required to indicate in the questionnaire their marital status. Three options were provided in the questionnaire for the respondents to choose the most relevant one to them. These options were married, single or divorced.

**Table 4.4 Marital status of the respondents**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Married	60	59.4
Single	35	34.7
Divorced	6	5.9
Total	101	100.0

Source: Field data, 2018.

The data has in fact, revealed that most people in the sample are married (59.4%). The second largest group of respondents was those who were not married who made up of 34.7% of the total number of respondents. Lastly, the respondents who were divorcees constituted of only 5.9% of the total number of respondents. These results have been indicated in Table 4.4.

#### **4.2.4 Level of education of the respondents**

The researcher was also interested in understanding the respondents' level of education. In the questionnaire the respondents were presented with six educational qualifications. These qualifications were primary school education, secondary education, certificate level, diploma level and finally, degree level. The respondents were therefore required to indicate the educational level/qualification that is relevant to them.

**Table 4.5 Educational level of the respondents**

Category	Frequency	Percent
Primary	29	28.7
Secondary	38	37.6
Certificate	16	15.8
Diploma	14	13.9
Degree	4	4.0
Total	101	100.0

Source: Field data, 2018.

As the Table 4.5 summarizes the results, the majority of the respondents seemed to belong in the category of those with secondary school education (37.6%). The second majority was those who had primary school education (28.7%). The respondents with certificate level of education were 15.8%. The respondents with a diploma were 13.9% of the total number of respondents. Finally, the respondents who had a degree were only

#### **4.2.5 Household size of the respondents**

Household size has the potential to determine the amount of waste generated. The larger the household size, the most likely it is for it to generate more waste than a smaller household. The researcher therefore wanted to examine the respondents' household size.

In the questionnaire, the respondents were required to indicate the size of their households. Five options were provided for the respondents to choose one that best describes their household size. The options were; single person, a couple, a couple with kids, single parent and extended family.

**Table 4.6 Household size of the respondents**

Category	Frequency	Percent
Single person	5	5.0
Couple	6	5.9
Couple with kids	50	49.5
Single parent	6	5.0
Extended family	35	34.7
Total	101	100.0

Source: Field data, 2018.

As the Table 4.6 indicates, the results from the collected data revealed that the majority of the respondents were couple with kids (49.5%). This was followed by extended families making 34.7% of the population. Couple families were 5.9% of the sample size. Single parents were 5% of the sample size and finally single people were also 5% of the population.

#### **4.2.6 Source of income of the respondents**

Source of income was examined in this research. The researcher needed to profile the respondents on the basis of their economic activities. The questionnaire therefore required the respondents to indicate whether they are unemployed, own a small business, own a mid range business or have a formal employment.

**Table 4.7: Source of income of the respondents**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Unemployed	5	5.0
Small scale business	26	25.7
Mid range business	60	59.4
Employed	10	9.9
Total	101	100.0

Source: Field data, 2018.

The results from the collected data revealed that the source of income for the majority of the respondents is mid-range income businesses (59.4%). Also, 25.7% of the respondent said that their source of income is small businesses. 9.9% of the respondents said that their source of income is formal employment whereas only 5% of the respondents said they have no source of income. These findings are indicated in the Table 4.7.

#### **4.2.7 Estimated income per month**

People with higher income are more likely to afford good and proper waste management styles. The researcher of this study therefore needed to understand the range of income of the respondents. The questionnaire provided four options for the respondents to choose from to indicate their range of income.

**Table 4.8 Respondents estimated monthly income**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Less than 300,000 Tshs. Pm	80	79.2
300,000-700,000	13	12.9
700,000-1, 100,000	4	4.0
1, 100,000 and above	4	4.0
	101	100.0

Source: Field data, 2018.

As the Table 4.8 elaborates, it was discovered that the majority of the respondents had an income level that is less than 300,000 Tanzanian shillings (79.2%). The second group which comprised of 12.9% of the respondents said that their income ranged at 300,000-700,000. Also the respondents who ranged at 700,000-1,100,000; and the respondents who earned 1,100,000 comprised of 4% of the total sample size each.

### **4.3 Study Findings**

As stated earlier in this chapter that this study had four specific objectives which were: to assess the current state of the solid waste generation and management in Mbeya City; to examine the role that the community plays in solid waste management in Mbeya City; to examine the role that the city council plays in solid waste management in Mbeya City; to assess the influence of City Council and community participation on waste management in Mbeya City. The findings as per each objective are presented in the subsections below.

#### **4.3.1 The current state of the solid waste generation and management**

This objective focused on looking at the prevailing situation of the solid waste generation and management in study area by looking at aspects such as the nature of solid waste generated by the residents, the methods used to manage such waste and the degree at which the people think such methods actually work.

**Table 4.9 Nature of waste generated, participation in waste management initiatives**

Category	Item	Frequency	Percent
Nature of waste generated by households	Plastic residue	3	3.0
	Organic waste	4	4.0
	Plastic and organic	94	93.1
Participation in solid waste management initiatives	Yes	98	97.0
	No	3	3.0

Source: Field data, 2018.

The findings in Table 4.9 discovered that the majority (93.1) of waste product generated is plastic and organic waste products. The 97% of the respondents seem to agree that there exists good participation in the solid waste management initiatives.

**Table 4.10 Handling of waste, waste management satisfaction levels, practicality of the waste management**

Category	Item	Frequency	Percent
Handling of the waste by households	Recycling	8	7.9
	Use dustbins	20	19.8
	Burning	73	72.3
Satisfied with waste management (Is it the best way?)	Satisfied	27	26.7
	Neutral opinion	5	5.0
	Not satisfied	69	68.3
Whether the waste management style works	It works for me	27	26.7
	Neutral opinion	5	5.0
	Its ineffective	69	68.3

Source: Field data, 2018.

The findings in Table 4.10 revealed that, the major method of handling waste generated from households is burning them. Majority (72.3%) of the respondents said they usually burn their waste as a method of waste management. 19.8% of the respondents said they use dustbins whereas 7.9% said they usually recycle the waste as a waste management technique. The majority of the respondents (68.3%) said they are not satisfied with their current method they are using to dispose waste, whereas 27.6% of them said they are satisfied with their methods of waste disposal and management.

The findings have also revealed that the majority of the respondents (68.3%) think that the solid waste management methods they are using is ineffective. 26.7% of them think that their methods of waste management work, whereas 5% of the respondents had a neutral opinion.

### **4.3.2 The role that the community plays in solid waste management**

The second objective was entirely focused on understanding the role that the community plays in solid waste management in their localities. This objective primarily looked at three different initiatives that individual household undertake to manage solid waste they generate. The first initiative is to ensure presence of waste storage facilities in the households, the second initiative is the application of defined waste disposal method, and the last initiative is to participate in community's collective efforts to management of waste generated in their localities.

A 5-point Likert Scale was used to measure all these variable, whereby a statement was provided in the questionnaire and the respondents were required to rate the degree to which such statements are relevant. The findings are presented in the following manner.

#### **4.3.2.1 Presence of waste storage facility in households**

The respondents were asked to rate a statement that said there is a presence of waste storage facilities in their households.

**Table 4.11 Presence of storage facility in households**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Strongly disagree	13	12.9
Disagree	5	5.0
Neutral	47	46.5
Agree	26	25.7
Strongly agree	10	9.9
	101	100.0

Source: Field data, 2018.

The findings in Table 4.11 revealed that the majority (46.5) of the respondents had a neutral opinion, 25.7% of the respondents agreed to the statement, 12.9% of the respondents strongly disagreed to the statement and 9.9% of the respondents strongly agreed to the statement that there is a presence of waste storage facilities in their households.

#### **4.3.2.2 Presence of defined waste disposal methods**

The respondents were asked to rate a statement that said there is a presence of defined waste disposal methods (recycling, burning, and collecting in dump-sites).

**Table 4.12 Presence of defined waste disposal methods**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Strongly disagree	13	12.9
Disagree	9	8.9
Neutral	50	49.5
Agree	24	23.8
Strongly agree	5	5.0
	101	100.0

Source: Field data, 2018.

The findings in Table 4.12 revealed that the majority (49.5) of the respondents had a neutral opinion, 23.8% of the respondents agreed to the statement, 12.9% of the respondents strongly disagreed to the statement and 5% of the respondents strongly agreed to the statement that there were defined waste disposal methods such as recycling, burning and collecting in dump – sites.

#### **4.3.2.3 Collective participation in waste management**

The respondents were asked to rate a statement that said there is a collective community involvement and participation in waste management in their streets.

**Table 4.13 Collective participation in waste management through waste storage, collection, transport and disposal**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Strongly disagree	14	13.9
Disagree	26	25.7
Neutral	35	34.7
Agree	19	18.8
Strongly agree	7	6.9
	101	100.0

Source: Field data, 2018.

The findings in Table 4.13 revealed that the majority (34.7) of the respondents had a neutral opinion, 25.7% of the respondents disagreed to the statement, 18.8% of the respondents agreed to the statement and 6.9% of the respondents strongly agreed to the statement. 13.9% of the respondents strongly agreed that there is a collective community involvement and participation in waste management in their streets.

### **4.3.3 The role that the City Council plays in solid waste management**

The third objective of this study was to examine the role of the Mbeya City Council in solid waste management.

The role of the city council in solid waste management was assessed in three parameters which were existence of established of the waste collection points in the streets, distance from the people’s household to the point of waste collection sites; and existence of established by-laws on solid waste collection.

#### **4.3.3.1 Establishment of solid waste collection points in the street Council**

This item is focused on determining the degree to which the city council makes effort to managing solid waste by establishing collection points in each vicinity. The respondents were provided with a statement that stated that the city council makes effort to establish solid waste collection points. The respondents were required to rate their response on the five point Likert scale based on that statement.

**Table 4.1 Establishment of solid waste collection points in the street Council**

Category	Frequency	Percent
Strongly disagree	14	13.9
Disagree	31	30.7
Neutral	24	23.8
Agree	21	20.8
Strongly agree	11	10.9
	101	100.0

Source: Field data, 2018

The findings in Table 4.14 revealed that the majority (30.7%) of the respondents disagreed that the city council makes any effort in establishing waste collection sites in local areas. Others (23.8%) had a neutral position about this statement (23.8%). 20.8% of the respondents agreed to the statement, 13.9% strongly agreed to the statement, whereas only 10.9% of the respondents strongly agreed to the statement that city council make and effort in established waste collection sites in local area.

#### **4.3.3.2 Distance from households to the point of waste collection**

The aim of this variable was to ascertain the distance that the respondents needed to travel to the nearest waste collection point. The more the number of these collection points the less the distance the people would need to travel to them to dispose the waste. Hence the role of the municipality to build these collection points was assessed in this variable.

The researcher therefore the respondents were presented with a statement that said “There is short distance between my household and the nearest waste collection site because the municipal authorized many collection sites. The respondents were required to rate their responses by using a 5-point Likert scale.

**Table 4.2 Distance from households to the point of waste collection**

Category	Frequency	Percent
Strongly disagree	12	11.9
Disagree	27	26.7
Neutral	32	31.7
Agree	21	20.8
Strongly agree	9	8.9
	101	100.0

Source: Field data, 2018.

The findings in Table 4.15 revealed that was collected revealed that he majority (31.7%) of the respondents had a neutral opinion, others (26.7%) disagreed to the statement, another group (20.8%) agreed to the notion and finally the last group (11.9%) strongly disagreed to the statement that there is low short distance between household and nearest waste collection points.

#### **4.3.3.3 Establishment of by-laws and regulations governing waste management**

This variable aimed at measuring the influence of waste management by-laws and regulations. The respondents were required to rate on a Likert's scale the extent at which they agree that there exists bylaws and regulations governing waste management in the areas (The statement was purposively negated to avoid common method error).

**Table 4.3 Establishment of by-laws and regulations governing waste management**

<b>Category</b>	<b>Frequency</b>	<b>Percent</b>
Strongly disagree	18	17.8
Disagree	35	34.7
Neutral	26	25.7
Agree	13	12.9
Strongly agree	9	8.9
	101	100.0

Source: field data, 2018

The findings in Table 4.16 indicated that the majority (34.7%) of the respondents disagreed that there is no any bylaws or regulations governing waste management in their areas. Other (25.7%) took a neutral position. 17.8% of the respondents strongly disagreed, 12.9% agreed and 9.9% strongly agreed to the statement that there exist by – laws and regulations governing waste management in the area.

#### **4.3.4 The influence of City Council and community participation on waste management in Mbeya City**

The fourth objective was concerned with assessing the influence of the city council and community participation on waste management. The hypotheses were tested by using the inferential statistics of multiple linear regressions.

## **4.4 Hypothesis Testing**

The hypothesis testing process was performed by using inferential statistical analysis known as the multiple regression analysis. The hypotheses provided in chapter 2 of this study all predicted a positive relationship between the independent variable and dependent variable. The following were the hypotheses which were tested by the researcher.

H<sub>1</sub> Community participation significantly influences waste management

H<sub>2</sub> City councils efforts significantly influence waste management

The following subsection therefore provides a breakdown of the multiple regression analysis to test the stated hypothesis.

### **4.4.1 Multiple Regression Analysis**

The multiple regression analysis in this study constituted of two independent variables and a single dependent variable. All three variables were measured multi-dimensionally by using scale items through the 5-point Likert scale. Multiple regression analysis allowed the researcher to ascertain two things from the data. The first aspect was it enabled the researcher to determine the extent to which the variations in the dependent variable are caused by the variations in the independent variables. The second piece of information that is provided by the multiple regression output is the extent to which independent variables affect the dependent variable.

Therefore multiple regressions were done on the data by using SPSS Version 23. Preliminary assessments were performed on the data in order to check if the data does not violate the assumptions of normality and outliers, homoscedaschity and multicollinearity. As indicated in the Table 4.17; the results from the multiple regression analysis revealed that about 88.7% of the variability in the dependent variable is attributed by the variability in the independent variables.

**Table 4.4 Model summary**

<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
.943 <sup>a</sup>	.889	.887	.31323

Source: Field data, 2018.

The results of the multiple regression analysis also revealed the relationship that the independent variables have with the dependent variable. The first variable which is ‘the influence of community participation’ appears to have a significant relationship with the dependent variable ‘waste management’ at ( $\beta=0.53$ ,  $t=13.58$ ,  $p=0.000$ ). The two variables also seem to have a directly proportional relationship, meaning the more the community participates the greater the performance of the waste management in the streets.

The second independent variable was the ‘influence of the city council’ This variable also appears to have a significant relationship with the dependent variable ‘waste management performance’ at ( $\beta=0.53$ ,  $t=13.56$ ,  $p=0.000$ ). Similarly, the two variables seem to have a directly proportional relationship, meaning the more the city council participates the greater the performance of the waste management in the streets.

**Table 4.5 Coefficients**

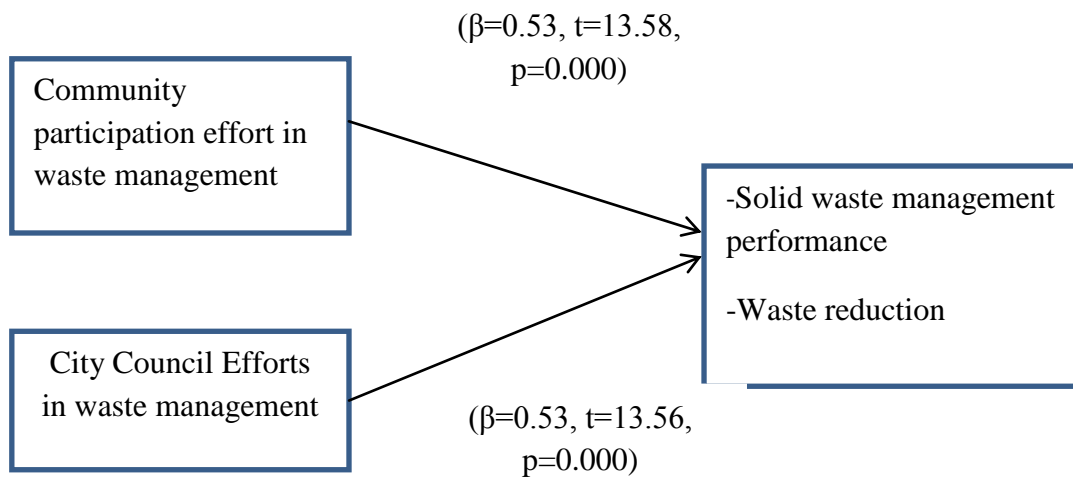
<b>Variable</b>	<b>Std. (β)</b>	<b>S.E</b>	<b>t-value</b>	<b>Sig</b>
Influence of community participation	.539	.039	13.579	.000
Influence of city council	.539	.035	13.563	.000

Source: field data, 2018.

**Table 4.6 Summary of tested hypotheses**

Hypothesis	Independent variable	Dependent variable	Relationship direction	Sig	Status
H <sub>1</sub>	Community participation influence	Waste management	Positive	0.000	
H <sub>2</sub>	City council participation influence	Waste management	positive	0.000	

Source: Field data, 2018



## CHAPTER FIVE

### DISCUSSION OF FINDINGS

#### 5.1 Introduction

This chapter has four main parts providing a detailed discussion of the qualitative and quantitative findings made with respect to the four specific objectives.

#### 5.2 The current state of the solid waste generation and management

The study assessed five dimensions to provide a picture on the current state of affairs in terms of solid waste management in Mbeya city.

These dimensions were the nature of waste generated by households in Mbeya City, the peoples' participation in solid waste management, how the households handle the solid waste they generate, the level of satisfaction of the methods of waste management methods and the perceived effectiveness of the methods of solid waste management that are currently in use

##### 5.2.1 The nature of waste generated by households in Mbeya City

This study discovered that both organic and inorganic (mostly plastic residue) wastes were being generated by household in Mbeya city. 90% of the respondents agreed that they generate both types of waste. It was discovered that the organic waste generated is usually food residue as well as agricultural waste. On the other hand, the inorganic residues were mostly plastic bags that have been used to carry or pack different items for easy mobility. One of the respondents provided the following reasons:

*I live in a big family, so, as a mother and a wife, I have responsibilities to do activities like cooking. If I go to the market to buy groceries like potatoes for example, the seller would also provide me with a plastic bag to carry the potatoes. So when I get home and I finish cooking, I have to get rid of the potatoes peel and the plastic bag... so as a family member that is the kind of waste we typically generate.*

Another respondent had the following things to say about inorganic waste generated by the residents:

*Well, we use plastic bags every time, basically there is no way we can avoid that unless some very drastic measures are taken by the government to regulate the use of plastic bags... personally do understand that plastic materials are really hard manage and they are not very good for the environment. But not many Mbeya residents understand the effect of inorganic materials to the environment.*

### **5.2.2 The peoples' participation in SWM**

After determining the nature of waste generated by households, it was essential to ascertain how the situation is with the community in playing its role in managing the waste they generate. This study has therefore discovered majority of respondents do participate in the solid waste management efforts in one way or the other. 97% of the respondents in this study admitted that they do make effort in managing the waste they collect.

The main reason to this is that as waste accumulates in a collection point it becomes unpleasant and a hazardous to the health of the people of that particular area. It is most likely that the waste products, especially organic waste could be breeding grounds for disease carrying organisms such as houseflies and cockroaches. These organisms could potentially lead to epidemic diseases. This may be a reason as to why the people always take the initiative to manage waste to avoid larger problems. One of the respondents for example said, pandemic

*Yeah, of course I do participate in waste management in my street. I want to be in a litter-free environment. You know when you have a lot of waste in an area, especially decaying waste; it attracts those flies that cause pandemic diseases such as Cholera and other disturbances including unpleasant smells. So in my belief, it's better to spend less money controlling the waste rather than spending a lot of money treating yourself from waste related diseases.*

### 5.2.3 How the households in Mbeya City handle the solid waste they generate

It has been discovered by this study that the most common method of handling the waste that households generate is burning. 72.3% of the respondents admitted to use burning method to get rid of the waste. This method basically involves collecting all the waste in a single place away from the household and the waste is burned. This can be done on a daily basis or on a weekly basis. The advantage of burning waste is that it is more of a permanent solution to the solid waste problem and it is cheaper than other alternatives. The downside of burning as a solid waste management method is that it may involve some toxic materials which when burnt can release toxic fumes or being hazardous to the environment.

However, despite burning of the waste being a commonly used method of waste management among the Mbeya City residents, many of them are not quite happy with the method. This study reports that 68.3% of the respondents were not quite happy with burning of the waste. The main issue basically is many of them are bothered by the smoke generated from randomly burning the garbage. One respondent had the following to say about this matter:

*Well we do burn the garbage here, it is very common because it is the cheapest way to manage waste. But personally I do not like it at all. It's just that we lack alternatives of managing it. You may find that someone is burning the garbage and all of the smoke flows in to someone else's window and gets inside the house. That is very disturbing... other alternatives can be quite costly for poor people like us because we can't afford to pay the city garbage collectors or regularly buying the dustbins because they deteriorate easily due to bad maintenance... so you see this is our problem here?*

The second method used to control waste is the use of dustbins to collect the waste. 19.8% of the respondents admitted that they use dustbins to gather a daily or weekly load of waste generated in their households. Dustbins are basically a temporary method of collecting waste, when these dustbins are filled up with waste, another measure needs to be taken to empty it up, either burning or taking it to the dumpsite or dump trucks.

However, dustbins may not be very effective, particularly if they are not well maintained. They could also be potentially a source of disease if the waste (for example, organic waste) is left to totally decompose without getting rid of. The advantage of this method however, is that it offers a temporary solution to where to throw the waste generated by residents.

### **5.3 The role that the community plays in solid waste management in Mbeya City**

The second objective of this study was premised on understanding the role played by the community collectively to manage waste. On this objective, three discoveries were made.

The first discovery was that the majority of the people do use waste storage facilities such as dustbins and other methods to manage waste collection in their communities. In order to avoid just throwing waste anywhere in their environment, the respondents exhibited that they do make effort to avoid that problem. They use facilities such as dustbins as waste consolidation units, and as soon as they are filled, they find ways to dispose such waste. For example one of the respondents had the following things to say about this:

*I am playing my part to conserve the environment around me. I cannot speak for other people I can only speak for myself that in my house you will find tools that I use to manage waste. So we usually collect all the waste in the dustbin and then later on we empty the dustbin because the truck passes by every week to collect garbage. This is not good trend as the wastes continue to be piled up and causes bad smell. The council should make sure to provide storage facilities in every street before the trucks pass.*

The findings of this study revealed that the majority of the respondents either agree or strongly agree to the fact that they use defined waste management methods (28.8%) against those who either disagree or strongly disagree (21.8%). The second discovery of this study is that the majority of the respondents use a defined waste management method. As discussed earlier in this study the most common method of solid waste disposal adopted by the local residents is burning of the waste. Others use

recycling or throw it in the dump sites or accumulate it in waste collection points. But all of these methods are in fact systematic methods of waste disposal which is a part of waste management.

Another finding of this study is that for the majority (44.4%) of the respondents, there seems to be no collective participation in their communities towards waste management in their areas. Despite having great personal effort at maintaining the environment by having good waste management in their households, there seems to exist little evidence from the respondents that there is a collective effort to managing waste. One of the respondents in the interviews had the following things to say:

*To be honest, in my street people are not organized collectively to deal with waste management. The city council is doing its best to mobilize the community but the people themselves aren't appalled by the effort. When the local government summons the residents for meetings to discuss matters such as this, very few people do show up in such meetings. Everybody would have excuses as to why they cannot attend meetings to discuss such issues.*

Another person had the following to say about community participation in solid waste management

*People are very difficult and they think in different ways. It is very unlikely to arrive into consensus on how to go about with solid waste. Some of show no corporation to others, but the most satisfying thing is that despite the people being unresponsive, they make really good personal effort to manage waste in their households... not at a community level though*

#### **5.4 The role played by the city council in solid waste management**

The second objective of this study focused on understanding the role played by the city council in solid waste management. This objective was measure by using three parameters, which were: the role of city council in establishing and enforcing of the solid waste management bylaws, the role of the city council in establishing official waste collection points, and finally the role of the city council in increasing the number of the waste collection points in the streets so that the people do not have to travel far to collect the waste generated from their households.

The findings of this objective have revealed that the local authorities play a limited role in the establishing the solid waste collection points in the city. In fact the total of 44.6% of the respondents disagreed that the city council makes a full initiative in establishing waste collection points in the streets compared to the 31.7% of the respondents who agreed and strongly agreed to the notion.

On the other side, the city council seemed to be doing a good job at enforcing the bylaws for waste management. It was discovered that a total of 52.5% of the respondents in this study either agreed or strongly agreed that the city council is effective at enforcing the bylaws that require individuals and household to manage waste properly.

### **5.5 The influence of City Council and the Community participation on waste management**

The fourth objective was to understand how the city council authority efforts and community participation efforts influence the performance of waste management. The findings from the regression outputs have shown that both the city council at ( $\beta=0.53$ ,  $t=13.56$ ,  $p=0.000$ ) and the community efforts ( $\beta=0.53$ ,  $t=13.58$ ,  $p=0.000$ ) have significant influence to the performance of the waste management in study area. The finding implies that both city council and community participation are important to managing waste generation and handling in Mbeya city. The regression outputs also imply that higher level of community participation and higher levels of city council involvement are associated with higher levels of performance of waste management and reduced waste in the city.

The role of the city council is to make sure that the bylaws of waste management are adhered to by the people; and also to provide conducive environment where it would be easier for the community to manage waste disposal in the areas they live.

## **CHAPTER SIX**

### **SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS**

#### **6.1 Introduction**

This chapter provides a short summary of the study, conclusions on the findings based on specific objectives, and Implications of the study.

#### **6.2 Summary**

The findings of this study revealed that the nature of solid waste generated by the Mbeya city council residents is mainly organic and inorganic waste material. The community participates in managing solid waste through individual household efforts but not collective efforts. Also there is limited effort from the city council in establishing solid waste consolidation points in the streets; on the other hand, ironically, the city council is doing well at enforcing the bylaws that fosters good waste management in the streets. Also the last discovery of this study was that both, the city council and the community efforts are critical to the performance of good solid waste management in the city.

#### **6.3 Conclusions**

This section provides conclusions based on specific objectives of this study.

##### **6.3.1 The current state of the solid waste generation and management**

In regard to the objective on the current state of the solid waste generation and management, five parameters were used to measure it. The parameters included: The nature of waste generated by households, peoples' participation in solid waste management, methods used by the households in handling the solid waste they generate, the level of satisfaction with the methods of waste management methods and the perceived effectiveness of the methods of solid waste management that were currently in use.

The conclusions are the type of waste generated by the residents is mainly organic and inorganic waste; there is very limited collective community participation in solid waste management in Mbeya City. However, there is a very good individual effort to solid waste management at household level. The way waste is handled by the households is that waste is collected in dustbins and then burnt or recycled or thrown in the dumps or collected by waste collection trucks.

Since the main method of waste management is collecting it and burning it, the majority of the respondents were not happy with this method due to health hazards which are attributed by the burning fumes that travel back to households. Despite this resentment on waste burning, a lot of people are using it since it is cheaper than other methods.

### **6.3.2 The role that the community plays in solid waste management in Mbeya City**

The findings on this objective revealed that the community does make a great effort in solid waste management in the city. Although this effort is not being made collectively, the people have been able to undertake waste management very efficiently at household level whereby people have trash cans to collect waste, they have systematic ways of destroying the waste (mostly by burning it).

### **6.3.3 The role played by the city council in solid waste management**

The conclusion in this objective is that the Mbeya city council plays a significant job at enforcing the bylaws that regulate environmental protection through good solid waste management by the people. However, it was discovered that the city council is not performing well in terms of creating conducive environment for people to have efficient ways of actually properly manage waste generated.

### **6.3.4 The influence of City Council and community participation on waste management**

The conclusion on this objective is that both community participation and the city council effort are significant factors for effectively managing waste generated by the Mbeya city residents.

## **6.4 Recommendations**

Based on the findings made by this study, the researcher was able to come up with several recommendations to the concerned stakeholders. The stakeholders in this case are the Mbeya city community and other stakeholders, the city council and the environmental activists across Tanzania, ministries and policy makers. The following therefore are some recommendations made by the researcher:

### **6.4.1 Recommendations to the Community and other stakeholders**

- i) Community members should adhere to Environmental Policy that everybody has the responsibility to make the environment clean through participating in solid waste management services provided in the City council.
- ii) Ward Executive Officers and Mtaa Chairperson should put emphasis to community and other stakeholders in their respective area on sanitary collection and disposal of waste to the designated place according to existing City Council By laws.
- iii) The community should be aware that there are solid waste management rules, regulations and by law and fines and penalties will be imposed upon a contrary to adherence.

#### **6.4.2 Recommendations to the City Council**

- i) The City Council should establish means of educating the community for the purpose of increase understanding important of participating on solid waste collection, storage and disposal.
- ii) The City Council should strengthen Environmental sanitation department at the level capable of providing solid waste management services at the satisfaction of the community and according to the existing rules and regulations.
- iii) The proper organizations and coordination for the enforcement of rules and regulations of solid waste management should be rouse up in cooperation with CBOs, NGOs and other stakeholders
- iv) The City Council should establish cleaning day operation for the entire community on every Saturday morning as means to ensure everybody is involved in making the City Clean.
- v) The City council should have vehicle designated for solid for solid waste collection including other necessary equipments and protective gears for solid waste collectors to ensure efficiently operation of services.

#### **6.4.3 Recommendations to the Vice President Office – Environment**

- i) There is need to establish clear programmes to disseminate and advocate on adherence to National Environmental Policy (1997), Environmental Management Act, 2004 by policy makers at different levels of implementation. On the other hand, there is a need to review those policies to allow flexibility. It has been a long since they have in use, a lot of changes in environment has been experienced.

#### **6.4.4 Recommendations to other Policy Makers**

- i) Solid waste management issue should be considered as permanent agenda in various platforms to ensure high coverage to community so that education on the adverse effects/impacts that pose threat to human health and environmental pollution. On the other hand solid waste when managed properly can be used as the source of energy and fertilizer.
- ii) Local Authorities should establish an appropriate mechanism for solid waste services in collaboration with the community, NGOs, CBOs and other private institutions. The services should be in payment basis and the amount to be set should be affordable to most of the people to ensure efficiency of the service and proper management of the solid waste.

#### **6.5 Implications of the Study**

The researcher hopes that the findings of this study will potentially assist the concerned environmental protection stakeholders including the government to look at the solid waste problem with a third eye. This study should be a trigger to establishing effective solid waste policies to be implemented in order to conserve the environment and avoid outbreaks of diseases like cholera and prevent them from happening in Mbeya city community.

#### **6.6 Suggestions for Future Research**

This study primarily focused on exploring the community participation in solid waste management in Mbeya City. However, this study was entirely limited on Mbeya region only. The researcher therefore proposes more similar studies to be conducted in other areas of the country for comparison to come up with the best ways and models on how integrated solid waste management can be planned, coordinated and implemented. Another area is willingness of public sectors servants and their involvement in solid waste management.

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## APPENDICES

### Appendix A: Interview guide for households

Dear respondent,

I am a student of Mzumbe University Main campus in Morogoro pursuing a master degree. The study is solid waste management in Mbeya City Council. Would you allow me to ask some questions which you can answer as you feel. The information you will give will be treated confidentially and will be anonymously used for academic purpose only

**SECTION A: DEMOGRAPHIC INFORMATION**

1. What is your gender?
  - a) Male
  - b) Female
2. What is your age group?
  - a) 20 and below
  - b) 21-30
  - c) 31-40
  - d) 40 and above
3. What is your marital status?
  - a) Single
  - b) Married
  - c) Divorced
4. What is your education level?
  - a) Primary
  - b) Secondary

c) Certificate

d) Diploma

e) Degree

5. What is your household size?

a) Single person

b) Couple

c) Couple with kids

d) Single parent

e) Extended family

6. What is your source of income?

a) Unemployed

b) I own a small scale business

c) I own a mid-range income business

d) Formally employed

7. What is your estimated monthly income?

a) 300,000 Or less

b) 300,000-700,000

c) 700,000-1,000,000

d) 1,000,000 and above

## **SECTION B: SOLID WASTE GENERATION AND MANAGEMENT**

8. What is the nature of waste does your households generate?
  - a) Plastic residue
  - b) Organic waste
  - c) Both types of waste
  
9. Do you and your household participate in solid waste management?
  - a) Yes
  - b) No
  
10. How do you handle waste in your household?
  - a) Recycling
  - b) Dustbins
  - c) Burning
  
11. Are you satisfied with such methods of solid waste management?
  - a) I am satisfied
  - b) I have a neutral opinion
  - c) I am not satisfied

For each statement below, please indicate your level of agreement or disagreement by checking the right response.

	<b>Item</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
12	There is a presence of waste storage facility in my household					
13	There is a defined waste disposal mechanism in my household					
14	There is a collective community participation in waste management effort in our street					
15	There is a solid waste collection point established by the city council					
16	The distance from my house to the waste collection site is small					
17	Our street has bylaws for solid waste management that people adhere to.					
18	There is still a lot of solid waste in my household					
19	Our street has solid garbage everywhere					
20	The dumpsite in our street is flooded with unmanaged garbage					

This marks the end of the questionnaire. Thank you for participating.