

**COMMUNITY PARTICIPATION IN SOLID WASTE
MANAGEMENT IN KIGOMA URBAN
A CASE STUDY OF KIGOMA UJIJI MUNICIPALITY**

By

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**A Dissertation Submitted in Partial Fulfillment of the Requirement for the Award
of Masters of Science in Environmental Management (MSc EM) of Mzumbe
University
2013**

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled “Community Participation in Solid Waste Management in Kigoma Urban ”. A case study of Kigoma / Ujiji Municipality, in partial/ fulfillment of the requirements for award of the degree of Master of Science in Environmental Management of Mzumbe University.

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DECLARATION

I, Deogratus Luvakule, declare that this dissertation entitled **Community participation in solid waste Management in Kigoma, A case study of Kigoma Ujiji Municipality**, is my own original work carried out by me under the guidance of Mr B. Mponzi and that it has never been presented and will not be presented to any other University for a similar or any other degree award.

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(1 Peter 4 vs.12).

DEDICATION

This dissertation is dedicated to my beloved wife Mrs Bertha Lugai , my mother Felista Mihale and my children Gaston Deogratius, Alfred Deogratius, Grace Deogratius and James who's provided moral support during my studies. I pray that God may bless all of them wherever they are and in whatever they do now and forever.

LIST OF ABBREVIATIONS

CBOs	Community Base Organizations
EPA	Environmental Protection Agency
KRH	Kigoma Regional Hospital
KUMCO	Kigoma Ujiji Municipal Council
MSW	Municipal Solid Waste
NGO's	Non Governmental Organizations
NSGRP	National Strategy for Growth and Reduction of Poverty
SPSS	Statistical Package for Social Sciences
SWM	Solid Waste Management
UK	United Kingdom
UN	United Nations
UNCHS	United Nations Center for Human Settlement
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Protection
USA	United States of America

ABSTRACT

Achieving full and effective community participation in development activities is a hard task. However, it has been a key element to project development and sustainability. The inability of municipalities to handle the increasing amount of waste generated is a growing problem in many African cities.

This study conducted in KigomaUjiji Municipality 2013, attempts to address the problem of solid waste management by looking at community participation on waste management issues. Solid waste in Kigoma Ujiji Municipality mostly are generated during the extraction of raw materials, processing of raw materials into intermediate and final products, consumption of final products, and other human activities such as agriculture, fishing, construction, demolition and carpentry.

Different methods of waste disposal for example, dumping and land fill leads to attraction of vermin example rats and mice which harbours diseases, dumping generate leachate which contaminate underground water, production of gas (carbon dioxide and methane) which produce unpleasant odor, green house gases and kills surface vegetation. Plastic bags when thrown in the farm reduces filtration of water into the soil, leading to low fertility of soil and low agricultural production also harbor mosquitoes and other pathogenic organisms. Eruption of diseases such as malaria, typhoid, and cholera can occur, especially when the plastic bags obstructed sewage system. Plastic bags lose attraction of the area. Burning of waste material and dust from industries can cause respiratory problems and air pollution to people and all these problems can lead to climatic change/global warming.

This study recommended best ways which can make the environment clean. People have to pay for collection and transportation of solid waste, the community has to change attitude and culture. In doing so, one day we would have a clean Municipality.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter covers the background of the problem, the problem statement and the delimitation. It elaborates in brief the problem situation of solid waste in United States of America, India, South Africa, Nigeria, Uganda, Kenya and Tanzania as well as problem of solid waste in the study area which is municipality of Kigoma Ujiji. It also draws attention to the research objectives, research questions, hypothesis and the status of waste generation in Kigoma Ujiji municipality; also it shows significance and limitations of the study.

1.1 Back ground of the problem

The issue of solid waste management is a challenge throughout the world, in both developed and developing countries. Collecting garbage from the streets has proved to be a nightmare (distressing, emotional pain, mental, financial difficulties) for most local government authorities in the world, solid waste categorized into three major categories which is domestic, industrial and hospital waste (UN, 1992), community participation gives opportunity to people to devise and initiate strategies to improve their situation (Bulle, 1999).

People always generate solid waste through their daily activities. Service quality to manage waste is generally poor, and costs are spiraling, often with no or less effective mechanisms for improved cost recovery. Two key alternatives to the present impasse are currently favoured: (1) decentralized approaches and, (2) privatization. Solid waste needs to be properly managed in a way that minimizes risk to the environment and human health. This means collection, storage, transportation, processing, recycling and proper disposal (UN, 1992). At the same time, solid waste creates livelihoods for the urban poor in terms of employment and business. The importance of solid waste management is now recognized at international, national and community level as it has been written in Agenda 21 declaration of the United Nations (UN, 1992).

1.2 Problem of solid waste material

The management of solid waste continues to be a major challenge in urban areas throughout the world, but particularly in rapidly growing population cities and towns of the developing world (Arlosoroff, 1982). Ineffective and inefficient community participation in solid waste management results in environmental health hazards, for example, the problems of environmental pollution and diseases such as cholera, typhoid, dysentery, tetanus, pneumonia and malaria (Okafo, 2011).

Other main hazards of solid waste material are; injury from sharp objects such as broken glass, nails protruding from timber and sharp metal edges. Fire can erupt from paper, rubber, plastics and oils; therefore they should be stored with proper consideration of their fire risks. Small watertight objects, such as broken bottles and tires, can offer chances for mosquito breeding; food remains attracts rodents, and encourage fly-breeding (Lund, 1983).

1.2.1 Population Increase

Rapid population growth and urbanization have led to the massive growth of cities, increases consumption of goods and services hence accumulation of waste material in Local District Councils. Population growth has far outstripped efforts of municipal governments to provide basic services to their citizens; including the services of solid waste management (Taylor, 2004). Therefore it is very important to manage solid waste for the aim of improving sanitation and prevention of diseases, pests and vermin. This also has been clear stated in Millennium Development Goal number six, and seven. Where goal number six states about combating malaria and other diseases and goal number seven explains about ensuring environmental sustainability. Waste management is a serious issue because it concerns many stakeholders, most importantly the community. Therefore community participation helps to the larger extent in environmental conservation hence making the scenery more attractive and appealing to our eyes and improves the condition of daily life. It comprises various degrees of individual or collective involvement, for example, financial and /or

physical, social, and political contribution at different stages of the project (Kawachi, 1999).

1.3 Solid waste management globally

Globally, effects of solid waste material leads to global warming, land degradation, increase of diseases, rise in sea level, drought, and pollution (Syagga, 1992). In USA problem of solid waste leads to creation of international solid waste association (Richard et al 1994). International Solid Waste Association's objective is the worldwide exchange of information and experience on all aspects of waste management. The association promotes the adoption of acceptable systems of professional waste management and of public cleansing through technological development and improvement of practices for the protection of human life, health and the environment as well as the conservation of materials and energy resources (Richard et al, 1994). Production of solid waste materials is very big problem in America because up to now there are more than 200,000 sites in the United States that are now being used or were used for disposal of municipal wastes (Moeller, 2005). Municipal Solid Waste (MSW) in America, more commonly known as trash or garbage, consists of everyday items that are used and/or thrown away, such as product packaging's, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. They come from our homes, schools, hospitals, and businesses. Each year Environmental Protection Agency (EPA) produces a report on MSW generation, disposal and recycling (EPA, 1998).

1.3.1 Effects of industrial pollution in USA

In USA the waste from industries are directly dumped into surrounding water bodies and open lands which causes various types of pollution. This is known as industrial pollution. Industries are the greatest source of pollution, accounting for more than half the volume of all water pollution. Some 370,000 manufacturing facilities use huge quantities of freshwater to carry away wastes of many kinds. In its National Water Quality Inventory, reported to Congress in 1996, the U.S. Environmental Protection Agency concluded that approximately 40% of the nation's surveyed lakes, rivers,

and estuaries were too polluted for such basic uses as drinking supply, fishing, and swimming. The pollutants include grit, cement, metals, gypsum, asbestos, phosphates and nitrates, mercury, lead, caustic soda and other sodium compounds, plastic wrappers, decaying organic matter—blood, grease, offal, and manure from slaughterhouses, meat packing plants, glue factories, tanneries, and fertilizer manufacturers (EPA, 1998).

The impact of pollution in USA varied according to prevailing methods of waste disposal, the shifting geography of manufacturing, changes in the city's economic base, and specific political initiatives designed to reduce human exposure (EPA, 1998).

1.3.2 Solid waste management at community level in USA

In USA, 10,000 private firms are encouraged to participate in solid waste management services; Private firms in USA collect more than 80% of the solid wastes, where by 70% goes to landfills (Wolsink, 1994).

1.3.3 Problem of solid waste in India

Indian cities alone generate more than 100 million tons of solid waste a year. Trash and garbage is a common sight in urban and rural areas of India. Solid wastes are the major source of pollution. Street corners are piled with trash. Public places and sidewalks are despoiled with filth and litter, rivers and canals act as garbage dumps. India's waste problem also points to a stunning failure of government (Urdal, 2005). Improper disposal of waste material leads to outbreak of cholera in India. Total of 68 outbreaks occurred in 18 states of India from 1997 to 2006 and the overall number of cases was 222,038, a figure several times higher than the one reported to WHO 37,783 over the same time period (WHO, 2008).

In 2000, India's Supreme Court directed all Indian cities to implement a comprehensive waste-management program that would include household collection of segregated solid waste, recycling and composting. These directions have simply been ignored. No major city runs a comprehensive program of the kind envisioned by the Supreme

Court. Waste segregation and recycling directive of the India's Supreme Court, the Organization for Economic Cooperation and Development estimates that up to 40 percent of municipal waste in India remains simply uncollected. Even medical waste theoretically controlled by stringent rules that require hospitals to operate incinerators, is routinely dumped with regular municipal garbage. A recent study found that about half of India's medical waste is improperly disposed off (Urdal, 2005).

Some of the few waste landfills in India are near the cities, and are overflowing and with a very poor management. Ms Asha Shivajiaro Bhise, left her job and took up vermi-compositing in a big way (India express, 16-04-2004). She set up a composting project and harvested 20 ton of composite in 40 days which was picked by farmers within days it is an example of tapping commercial opportunities in solid waste management and total commitment by an individual.

Solid waste material in India have become significant sources of greenhouse gases such as methane and carbon dioxide and breeding sites for disease vectors such as flies, mosquitoes, cockroaches, rats, and other pests (Urdal, 2005). People generate solid wastes such as food and kitchen wastes, paper, glass, metal and plastic containers and packaging, construction wastes (bricks, tiles, concrete, rebar, lumber, sheeting, etc.), clothing, and hazardous wastes (medications, batteries, paints, chemicals, etc) and if not handled appropriately (recycled or disposed of properly) have the potential to become litter. Marine litter or debris is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment from any source (Coe & Rogers 1997) and (UNEP, 1997).

1.3.4 Solid waste management in Africa

The main problem of waste management in an African context is however not only brought about by the amount of waste accumulated in the cities but also the incapability of the governments and waste management authorities to keep up with the scope of the problem itself (Collin, 2006).

In South Africa, over 42 million cubic meters of general solid waste is generated every year across the country, with the largest proportion coming from Gauteng province (42%) because the area is highly populated (Dwaf, 1997). In addition, more than 5 million cubic meters of hazardous waste is produced every year, mostly in Mpumalanga and KwaZulu-Natal (due to the concentration of mining activities and fertilizer production in these provinces). The average amount of waste generated per person per day in South Africa is 0.7 kg. This is closer to the average produced in developed countries (0.73 kg in the UK and 0.87 kg in Singapore). The average production of house hold solid waste in developing countries such as Nepal is 0.3 kg in (Dwaf, 1997). By far the biggest contributor to the solid waste is mining waste (72.3%), followed by pulverized fuel ash (6.7%), agricultural waste (6.1%), urban waste (4.5%) and sewage sludge (3.6%). (Refer to www.sawic.org.za for future updates),

In Developing countries such as Ghana, there are many communities, which are unplanned and are occupied by squatters and illegal settlements. Accra has many fast-growing, low-income communities with no infrastructure for waste disposal. Wastes wash into drainage ways and are hypothesized to cause increase flooding. Possible causes of the increase in flood severity in Accra range from inadequate flood management practices to poor waste management (Peter, 2009). In Accra as in most urban centers in Ghana, provision of infrastructure facilities has growing very slowly compared to the rapid rate of housing development. Inadequate storm water drainage is one of the most serious problems facing Accra today. Flooding in low-lying areas, erosion of steep slope areas, and pollution of streams by waste discharges, has been identified as major Environmental problems facing the city (Peter, 2009).

Nigeria key strategies in achieving effective waste management include participatory community awareness campaign and waste education; effective monitoring of industrial activities; encouraging community to separate waste at source. Collection points and the introduction of stringent legislation/regulations and guidelines on waste management (Petts, 1994).

In Uganda plastic bags are frequently used as a packing material and they are locally called “*Kaveera*”. Plastic bags were introduced in Uganda as a substitute to the paper bags which were initially used for packing especially the light communities. As a result plastic bag wastes material has indeed been a hazard to the Ugandan environment. Plastic bags can best be defined as a non-biodegradable substance made from thin plastic that is used as packing materials. Despite the fact that they are cheap as well as light, they are hazardous in the following ways;

The fact that they are non biodegradable makes them hard to dispose and as a result, they can act as breeding places for many of the disease germs which, sooner than later cause an epidemic in the surrounding people. The poor disposal of the plastic bags can also lead to the spread of diseases. This is because the plastic bags can easily block the sewage system and water pipes which can eventually lead to the spread of the Diseases e.g the break out of cholera in Kampala in 1997. They can also cause water logging since the water cannot percolate through them and this can be a good breeding ground for some of the vectors which spread diseases, example mosquitoes (Tukahirwa, 2010). Plastic bags are very light also makes it very easy for them to be blown from place to place and as a result, the unending littering of the environment.

In Uganda there is lack of enough literacy programs on Waste management which leaves most of the people backward on waste management. This is because of poor or no sensitization of the masses by the government and other organizations. Other problem in Uganda, include inefficient collection methods which is mainly due to lack of funds to provide the necessary machinery. Lack of machinery like the trucks that carry the waste from the various areas have poor covering systems such that even the waste goes on leaking on the road while being transported, and even there are few places with proper garbage containers or at times the containers are over flooded when there are rain showers (Tukahirwa, 2010).

Inadequate government attitude towards waste management. From a citizen's point of view, it is realize that very little money from the government is directed towards waste

management, with most of it going towards industrialization. This leads to poor purchase of collecting equipment. Another cause is the poverty that exists in Uganda. This undoubtedly leads to masses buying cheap non bio-degradable containers which are not easy to dispose off, and also substitutes like paper bags are not easily available to the rural poor areas. Also the low expense of these solid wastes especially polythene bags which are very cheap as compared to other containers makes them very common, which makes their proper disposal very difficult. Lack of trained manpower/personnel to deal with garbage collecting machinery is very scarce (Tukahirwa, 2010). Lack of recycling facilities in most parts of the country for instance most of the polythene bags used are not recycled by the manufacturing industries. There is very little voluntary work. People don't work together as a community for the betterment for the environment. Voluntary organizations such as scouts put little emphasis in such activities.

In Uganda also there is mis-allocation of funds and even embezzlement of the little funds allocated waste management. In Kenya the capital city of Nairobi, solid waste generation ranges from about 800-1000 tons per day. But the city municipality has a capacity of collecting only 400 tones daily (ADB, 2002). Likewise in Malindi, a secondary largest town in Kenya estimates for 1991 indicates that less than 21% of waste generated reached the dumping sites.

Plastic bags also are the biggest problem in Kenya where some of these bags have been used by a number of ignorant or careless people as mobile toilets, example Machakos Kenya. These mobile toilets are then carelessly thrown away to unknown area which also makes work of the concerned parties rather hard (Tukahirwa, 2010).

These plastic bags have over time been proved to be environmentally unfriendly considering the time taken for their decomposition. As a result of this time spun they can cause further problems like blocking water penetration into the soil which in turn affects food growth and development. Plastic bags causing low soil fertility to the area where deposited in a larger quantities, this mainly is because it cannot be decomposed and cannot lead to formation of good soils. Plastic bags also got an acidic combination

which disturbs the chemical formulas of the soils (Mtegetwa, 2008). Unnecessary littering of the plastic bags on the roadsides destroys the world beautiful scenery. If the *buveera* (Plastic bag in local language of Kenya) are carelessly thrown all over the place, they make the environment very untidy and unpleasant to look at. This is the case in some parts of the city (Tukahirwa, 2010). Death of domestic animals especially the cattle and goats may appear after eating the plastic bags. This clearly shows that waste if mismanaged can be very dangerous to the environment. Heaps of uncollected garbage, stench from those heaps, swarms of flies, and the presence of rodents make the problem apparent. Regrettably, Nairobi, once known as the "The Green City in the Sun," has lost its glory and is now "The Stinking City in the Sun" because of improper solid waste management (Best, 2002).

In Dar-es-salaam, Tanzania improper waste disposal in the area is found to be a major factor in the spread of diseases and environmental degradation. It contributes to the poor living standards of inhabitants. (Mvungi, 2005). Solid waste management is a service for which local governments are usually responsible. However, due to inadequate capacity in the public sector, in many developing countries the private sector has stepped in to fill the gap in service provision. Dar es Salaam, Tanzania, is one of developing country's city in which the private sector has become involved in solid waste collection services. The sector comprises Non-Government Organizations (NGOs), Community-Based Organizations (CBOs), individuals and local private companies (Kassim, 2003).

In 1991 the city of Dar-es-salaam, Tanzania was generating 1400 tones of solid waste per day out of which only 5% was being collected. Currently daily solid waste generation is estimated at about 2500 tones and approximately 48% of the total waste generated is collected and the rest 52% remain uncollected. Some of solid waste material example medical waste, fungicides or pesticides and fertilizers are very hazardous that means, improper management may cause serious health and environmental problems through air, water and land pollution (Manyele, 2004).

In Kigoma Ujiji Municipality, solid waste material including fecal sludge and untreated waste water are the major problem in urban settlement. Also it is a major environmental hazards threatening Lake Tanganyika. This environmental problem leads to outbreak of diarrhea diseases including cholera (Mtegetwa, 2008). Other threats arise from poorly solid waste management in municipal council, includes non-existent solid waste collection and disposal systems, deforestation, over-exploitation of biological resources, and siltation caused by soil erosion, inappropriate agricultural practices and poor drainage. Siltation is already causing operational problems in Kigoma and Uvira port of the Democratic Republic of Congo, resulting in significant reductions in voyage loads (Mtegetwa, 2008). The problem of solid waste materials leads to formulation of Kigoma Ujiji Municipal Council by laws of 2007, which explains about environmental cleanliness and also this by laws states that, it is a responsibility of every one to protect environment. Supervision of environment will help to reduce degradation of the land, and also it is shown in Millennium Development Goals of United Nation and National strategy for growth and reduction of poverty (NSGRP) of Tanzania.

Pollution and eutrophication from solid waste and untreated wastewater in the Kigoma/Ujiji Municipality is having an increasingly detrimental effect on biodiversity. Kigoma presently lacks a water treatment plant as well as capacity to adequately process solid waste. The UNDP/GEF Project on Lake Tanganyika aims to pilot innovative strategies for sustainable catchment management in the Kigoma and neighboring Rukwa region, and strengthen capacity for pollution control in the Kigoma/Ujiji Municipality (KUMCO, 2010). The Kigoma Ujiji Municipality through his master planning, it is expected to construct the modern sanitary land fill in Msimba village about 10 kilometers from Kigoma town (KUMCO, 2012). Hence the present sites used for solid waste management are usually within the neighborhood of urban dwellers. Fly infestation, bad smell pollution from such heaps of refuse and other vermin such as rats are the most disturbing problem among people in the town.

Municipal council through support from United Nation Development Programme

(UNDP) provided waste collection facilities to the people such as wheel barrow, waste bins, hoes and spade, but still little participation in solid waste management.

1.4 Importance of solid waste disposal

Waste disposal is often seen as simply removing waste from human settlements. Nowadays, waste is also seen as a resource that should benefit the community: resource recovery (reuse or recycling) is a basic element in waste management. This factor plays an important role in the planning of waste–disposal systems.

The main benefit that waste management will yield is a clean environment, but other benefits can be:

- The production of fertilizer through composting;
- The recovery of energy through biogas or incineration;
- Recycling of the various materials in waste;
- Land reclamation (Arlosoroff, 1982).

1.5 Problem statement

In recent years, the rate of accumulation of waste material in Kigoma Ujiji Municipality has been increasing from 80 tons per day 2002 up to 107.5 tons per day 2010. The waste generation rate estimated to range between 0.3kg - 1.33kg per person per day, where municipal council is un able to collect about 43% of waste produced (KUMCO, 2012). This rate is very high compared to developed countries such as England where the highest production per personal is about 0.87kg. The capacity of collection is about 57% of 107.5 tons produced per day. Houses have been constructed in outdated plan that limiting ways between houses, which can be used for collection of waste material. As the consequences, solid waste materials are indiscriminately piled in the streets and this has put the citizens at high risk to hazardous situation and problem of insufficient good quality water. Community members are exposed to dominants disease such as malaria, coughing, typhoid fever, cholera, diarrhea, schistosomiasis, tetanus, bacillary dysentery, and other water and air bone diseases. Kigoma Ujiji lies nearest Lake Tanganyika which is now polluted with leachiest and

surface run off containing waste material from surrounding hills.

Solid waste management needs community participation in order to improve the development and sustainability of the project, but the possible causes of poor community participation in solid waste management could be the attitude of people toward the responsibility of collection and disposal of solid waste, problem in leadership, and political interference, and low accountability, problem in financial and physical contribution. Also an unavailability of registered Community Base Organizations, inadequate groups of task force, low motivation, low education level among people on solid waste, low level of awareness and low enforcement of the law pertaining to solid waste management might contribute to the trend. Besides, lack of policies, inadequate monitoring and evaluation of solid waste activities by government might be perennial problem of scattered-ness of garbage within the area. This research intends to assess the performance of community participation and challenges people faces in solid waste management in Kigoma Ujiji Municipality.

Table 1.1. The status of waste generation in Kigoma Ujiji Municipality

Number	Source of waste material	Number of tons
1	Residential waste	67 tons per day
2	Commercial refuse	20.3 tons per day
3	Street refuse	10.1 tons per day
4	Institutional waste	10.1 tons per day
5	Total	107.5 tons per day

Source: Kigoma Ujiji annual report, 2011

1.6 Study objectives and questions

1.6.1 General objective

To assess the performance of community participation in solid waste in Kigoma Ujiji Municipality.

1.6.2 Specific objectives

- (1) To assess the impact of community participation and people's awareness on proper solid waste management.
- (2) To find out problem and challenges facing community when implementing solid waste management.
- (3) To establish the underlying causes of poor solid waste management in Kigoma Ujiji Municipality from both the Management of Municipal Council and community.

1.6.3 Research questions

- (1) Are there any impact of community participation and awareness on proper solid waste management?
- (2) What are the main problems and challenges facing community during the implementation of solid waste management?
- (3) What are the underlying causes of poor solid waste management in Kigoma Ujiji Municipality?

1.7 Significance of the study

It is hoped that the findings of this study will help to raise awareness on issues pertaining to solid waste management in Municipality because community participation can increase the knowledge on implication of waste material. This awareness will help build initiatives to increase the level of community participation in SWM. This study will be a resource for further research studies on community participation in solid waste management. It is a requirement for an award of Masters Degree in environmental management of Mzumbe University.

This research will help to provoke debate on waste management issues, example effects of solid waste material on human health, animals, air, soil and environment and the way community participation can contribute to mitigate the problem. In the course of this debate better options may be developed. Partners and stakeholders in solid waste management could use this information by identifying specific

income generating activities, thus making solid waste contribute to the poverty eradication programme in the region and large at national level. The findings of this study will be also utilized to attain knowledge and insights about what causes of poor community participation in solid waste management. Additionally, the findings will determine how incentives, education and motivations can boost the spirit of people to participate in solid waste management. Eventually, through this study, recommendation to different stakeholders are proposed for the improvement of community participation in solid waste management.

1.8 Scope and limitation of the study

This study was conducted in five wards of Kigoma Ujiji Municipality (Mwanga north and Mwanga South ward, Bangwe, Kigoma and Gungu ward, where community members, Health workers, environmental workers and leaders were interviewed in all five wards. Actually, the research was based on assessing the extend of community participation for SWM in Kigoma Ujiji Municipality.

1.9 Limitations

In the course of conducting the study, the researcher encountered a number of challenges. Major limitations were; time limit, financial constraints, transport problems and accessibility to the needed data.

a) Time limit

The study needed an in-depth and thorough investigation. Also people given self administered questionnaire took much more time to understand and to answer those questions. The allocated time for field work (data collection) was not long enough, bearing in mind the nature and volume of work. Another limitation was unavailability of respondent at their centers of appointed time; resulting tolerance of waiting and sometimes following to their home place helps the researcher to attain the desired need of the study. During discussion some people came after using alcohol where they were talking too much in such a way that researcher had to be carefully to note only relevant information.

b) Financial Constraints

The researcher had no any kind of sponsorships apart from his salary; therefore, the amount of money he used was not sufficient to cover all the costs of the activities. Example the cost of stationeries, printing, photocopying and refreshments when discussion took long time. Some of respondents were asking for money or refreshments for the aim of providing reliable information. To make successfully completion of the study, researcher took the loan from working place to supplement the deficit.

c) Transport problem

Because the study was conducted in Kigoma Ujiji Municipal council which is about 10 square kilometer, the researcher used private transport, town buses and motorcycles.

d) Accessibility to the needed data.

During the data collection, some respondents were very co-operative and others were not co-operative in giving relevant information, and some of the answers provided by the respondents were very difficult to interpret. This problem was mainly encountered in self administered questionnaires.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction of literature review

This chapter of literature review elaborates the issues of solid waste management, definition of concepts, such as waste, types of solid waste, effect of wastes, international convention and Bamako convention on solid waste, government policy and sustainability of community participation in solid waste management and conceptual frame work.

2.1 Solid waste management

The management of solid waste is one of the challenges facing many urban areas in the world. Where aggregation of human settlements produce a large amount of solid waste and leads to difficulties in collection, transporting and disposal of waste material. Garbage is collected either by a government agency, private contractor or community participation, and this constitutes a basic and expected government function in the developed world (Arlosoroff, 1982).

The solid waste management in municipalities has become a major issue of concern for many developing nations. The problem is compounded by urbanization rapidly taking place in many developing countries where 30-50% of populations are urban (Syagga,1992). Inadequate altitude towards waste management from community members, inadequate facilities such as trucks, trucks which goes leaking on the road while waste materials are transported, poverty, poor political leadership and political interferences, are the most cause of inadequate solid waste management in most of the countries, especially developing countries (Tukahirwa, 2010).

There is very little amount of money allocated to the solid waste management, this problem leads to low purchasing power of facilities required for controlling solid waste. Facilities bought are of low quality and cannot collect properly waste materials.

Most of the money is going towards industrialization and construction of other social infrastructure such as roads, schools and hospitals (Tukahirwa, 2010). Another cause is the poverty that exists in Kigoma/Ujiji municipality. This poverty undoubtedly leads to masses buying cheap non bio-degradable containers which are not easy to dispose off, and also substitutes like paper bags are not easily available to the urban areas. Also the low expense of polythene bags which are very cheap as compared to other containers makes them very common(Tukahirwa, 2010).

Indeed the overall problem of solid waste management is multi-faceted: many organizations, including the United Nations organization such as UNDP, UNEP, UNCED and various non-governmental organizations (NGOs) advocate for an integrated approach to solid waste management by identifying key stakeholders, identifying specific issues which comprise important “stumbling blocks”, and making recommendations based on appropriate technologies, local information, and pressing human and environmental health concerns (UNEP, 1996).

2.2 Definition of concepts

2.2.1 Waste(s): Refers to the discarded or a useless or unwanted matter that remains after the valuable components of material have used. Waste can be toxic or non toxic and hence harmful or harm-less, they can be solid or liquid in nature (Mtegetwa, 2008). Also waste known as rubbish, trash, refuses, litter, garbage and junk. Waste is unwanted or useless materials. Wastes are materials that are not prime products (that is products produced for the market) for which the initial user has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded. (Mtegetwa, 2008).

2.2.2 Community participation in solid waste management is a sociological process by which residents organize themselves and became involved at the level of living area or neighborhoods in collection, transporting and disposal of waste material (Seik, 1997).

It aims at attracting coordination and promoting wellbeing of the people in the society. People can participate through the following ways;

- Directly by engaging in community activities like waste collection, sorting of waste, cleanliness, planning, training and financial contribution.
- Holding discussion and coming up with a project or a decision to uplift their way of living
- Gives information about their culture to the planners therefore planners comes up with projects that adapt to the way of living hence promoting their wellbeing (Bulle, 1999).

2.2.3 Solid waste is defined as any garbage, refuse, sludge from waste treatment plant, water supply treatment plant, or air pollution control facility and other materials, including solid, liquid, semisolid, contained gaseous resulting from industrials, commercials, mining and agricultural operations from community activities (Moeller, 2005). Solid waste material can be treated in incinerator, solidification, heat treatment, and chemical treatment, while disposal of waste material can be done in land fill, waste piles, and land treatment and in less developed countries solid waste materials are being disposed in flowing rivers (Boyle, 2000). The groups at risk from poor waste disposal include; population in areas where there is no proper waste treatment method, children, waste workers, populations living close to waste dump and animals especially when eats plastic bags and other foreign material such as nails (Reddy, 2011).

2.2.4 Waste disposal

Is handling of discarded materials, or is the management of waste to prevent harm to the environment, injury or long term progressive damage to health (Boyle, 2000).

2.2.5 Environment

The world environment has a very broad meaning. It is everything surrounding us: Living and non living organisms. It includes: Air, land and water; plants and animal life; the social, economic, recreational, cultural and aesthetic conditions and factors that influence the lives of human beings and their communities; buildings, structures, machines or other device made by man; and any part or combination of the foregoing and the inter- relationships between two or more of them. (Dias, 2005). Other people defined environment as sum total of the condition within which organisms live. It is the result of interaction between living and non living parameters where living things includes animals, plants, and microorganisms while non living includes air, soil and water (Reddy, 2011).

2.2.6 Solid Waste Management

Solid waste management is the collection, transport, processing, recycling or disposal and monitoring of waste materials. In this study the term usually relates to the materials produced by human activity. This is generally undertaken by reducing the side effects on health of people and the environment. Solid waste management is also carried out to recover resource from it. Waste management can involve solid, liquid, gaseous or radioactive substance, with different methods and field of expertise for each. It is practiced differently from developed and developing nations, for urban and rural areas and for the residential and institutional waste. In the municipal areas, it is usually the responsibility of local government in collaboration with the local communities to manage the solid waste (Boyle, 2000).

The primary objective of waste management is to protect the public and the environment from potentially harmful effects of waste. Some waste materials are safe, but can become hazardous if not managed properly. For example, industrial fertilizers.

2.3 Types of solid waste material

Types of waste material includes residential wastes such as paper, food

waste, textiles, glass, metal, ashes, batteries, house hold hazardous waste, plastic waste and old clothes.

Industrial wastes include packaging, food wastes, housekeeping, demolition material, ashes, and hazardous material.

Commercial wastes include paper, cardboard, plastics, glass, hazardous wood, and paper and demolition material (Reddy, 2011). Institution waste is the same as commercial. A construction and demolition waste includes wool, steel, concrete and dirty. Municipal services wastes includes street sweepings, landscape and tree trimmings, general wastes from parks, beaches and other recreation areas. An agricultural waste includes spoiled food wastes, agricultural wastes, hazardous wastes such as pesticides and insecticides (Reddy, 2011).

2.4 International conventions on hazardous waste

Globally, the problem of waste material leads to formulation of different international conventions. **(a) Basel convention** was one of the conventions aiming to control trans-boundary movement of hazardous waste and their disposal. Addressing the movement of radioactive waste. The convention also aims to reduce the movement of radioactive waste. The convention aims to reduce the amount and toxicity of waste generated. To assist less developed countries in environmental management from source of generation. The convention signed 22/03/1989 and entered into force on May 1992 (UNEP, 1996).

Creation of Basel convention was the Khian sea waste disposal incidence where a ship carrying incinerator ash from the city of Philadelphia in the United state of America after having dumped half of its load on a beach in Haiti. A ship was chased away where it sailed for many months, changing its name several times. Unable to unload the cargo in any port (UNEP, 1996).

Another case which leads to creation of base convention was Koko case in which 5 ships transported 8,000 barrels of hazardous waste from Italy to the small town of Koko in Nigeria exchange for \$100 monthly, rent which was paid to Nigerian

for the use of his farmland. These practices have deemed “Toxic Colonialism” by many developing countries.

According to Maureen Walsh, only around 4% of hazardous waste that come from European countries are actually shipped across international borders. These wastes include chemical waste, radioactive waste, asbestos, incinerators ash, and old tires (UNEP, 1996).

(b) Bamako convention

This is a treaty of Africa nationals prohibiting the import any hazardous waste, including radioactive waste. The convention was negotiated by twelve nations of the Organization of Africa Unity at Bamako, Mali in January, 1991, and came into force in 1998.

Bamako convention arose from the failure of the Basel convention to prohibit trade of hazardous waste to less develop counties and from realization that many developed nations were exporting toxic waste to Africa (UNEP, 1996).

Tanzania National Health Policy of 1990 is aimed at improving the health status of all people by reducing morbidity and mortality and rising life expectancy. Good health, that is physical, mental and social well being which is a major resource and economic development. Tanzania health policy explains maintenance of clean environment around houses and village institutions for the betterment of human health. It encourages also safe basic hygienic practices in families, but when you walk around the streets of Kigoma Ujiji municipality you find different things because you can see a lot of uncollected solid waste material including plastic bags, papers, empty plastic and glass bottles, pieces of wood and used clothing. This is because, collected solid waste material around the house, takes long time to be transported to the dumping site and the municipal council has no enough skip buckets, no special dumps, no constructed land fill and inadequate trucks or vehicles (KUMCO, 2011).

It has been appreciated in Tanzania National Environmental Policy of 1997 that, solid waste material is one of the environmental problems in Tanzania which degrade the

land, causing low soil productivity and environmental pollution. Solid waste material pollutes the towns and countryside and leads to inadequate good quality water, deterioration of aquatic system and health effect of human being. Land degradation in Tanzania caused by pollution of waste material is due to rapid growth of human population, resettlement and industries activities. The overall objectives of the Tanzania environmental policy aim to ensure sustainability, security and equitable use of resources for meeting the basic need of the present and future generation without degrading the environment or risking health or safety (TNEP, 1997).

Tanzania environmental policy aims to prevent and control degradation of land, water, vegetation, and air which constitute our life support systems, to conserve and enhance our natural and manmade heritage, including the biological diversity of the unique ecosystems of Tanzania. To improve the condition and productivity of degraded area including rural and urban settlements in order that all Tanzania's may live in a safe healthful environment, productive and aesthetically pleasing environment.

2.5 Government Policy on Solid Waste Management

In view of environmental problems arising out of inadequate delivery of solid waste management, the government recognized the need for a national approach to handle this issue. The National Policy for SWM of 2008 has been prepared to ensure and to integrate economical and environmental to be soundly feasible. The policies are as follows;

- i) To ensure environmental accountability and social responsibility of all waste generators, waste Managers and service providers.
- ii) To actively involve individuals and all local and international institutions in integrated and environmentally sound solid waste management practices.
- iii) To maximize resource recovery with a view to minimize the amount of waste for disposal.
- iv) To minimize adverse environmental impacts due to waste disposal to ensure health and well being of the people and ecosystem.

- v) Persecution or penalizing (fines) of the violation of cleanliness regulations (URT, 2008).

The existing management of solid wastes relies on an overly centralized approach. With a rapidly growing population of Kigoma/Ujiji municipality, piles of rubbish are left to rot in streets, presenting a particular Health risk to the public. The traditional approach taken by the municipality has resulted in people regarding solid waste disposal as the government's responsibility. With the government apparently assuming responsibility, communities have little influence on trying to improve services.

However, on June 21st, 2010, the Government of Tanzania has taken a major step towards improving the SWM situation. It has formulated new national policy on solid waste management in order to provide a long term solution of the garbage problems arising from unplanned regions. It has duly taken into consideration of mobilization of local authorities. As well as the involvement of private parties in the arrangement of solid waste management. New policy states that national and foreign private agencies will be invited to undertake the work of SWM. As per policy, a concept of cleanliness suitable to the local technology and social environment will be developed.

Involvement of various NGOs and CBOs in such campaigns will be encouraged. Solid waste will be used as resource to produce useful materials through recycling processes. It further intends to bring promising strategy to levy service charge to be paid by the public. Additionally, it intends to introduce SWM as a subject in the schools and to develop non-formal education curriculum. It has also determined to impose fines to people who violate cleanliness regulations. A person who violates these regulations is liable to be fined 50,000 thousands Tanzania shillings or sentence for 5 years imprisonment. Any person who contravenes any part of Section 69 or 70 shall be guilty of an offence and shall be liable to imprisonment for a period of not more than 5 years, or a fine not exceeding 50,000 Tanzania shillings, or both such imprisonment and fine (URT, 2010).

In 2004 the Government of Tanzania formulated the law number 20 which will help to supervise the environment. This law formulated because it is the right of every

one living in Tanzania to live in clean environment for the better health of today and future generation. Therefore everyone has the right and responsibility to protect and to preserve environment, also everyone has the right to take action for anybody who found destroying or who intend to destroy the environment (URT, 2010).

The main intension of this law is to direct people on the way they can protect the environment. This law is the one which direct the law of 2002 and the fisheries law of 2003. And if these laws will contradict each other, the law which will be followed is the law of environment (URT, 2010).

2.6 Humanist Approach

According to humanist theory, Rodger (1902-1987) articulated that community participation in solid waste management depends on the will and voluntary basis of the people. People are striving for self actualization trying to develop their inborn capacities. This development is spontaneously in a possible way as long as the communities are granted enough relational opportunities from their surroundings. Additionally, people in the community have important role of free will, this approach sustain people to make free choices. Thus, every person has the right and duty to take his own decision freely and responsibly to participate in solid waste management. She/he can build out his/her own life on safe and hygienic environment.

The humanist approach has an influence on how people may learn and being educated on problematic situation which affects their surroundings in non directive school. However, with this study the humanist approach will have great influence about education on the communities on how to participate in the solid waste management programmes. This will impart the community with insights and knowledge on how to control and manage the collection and dumping of garbage in the community. These will motivate the members to recognize the importance and its benefits of full participation in solid waste management. In this study, humanist theory is the methodology approach.

The community adopts the convincing power with the aim of stimulating the attitudes

and behavior of people in communities to participate in solid waste management (UNDP, 1989).

Community participation approach is part of series of ambitious efforts aimed at making the government more responsive and accountable to citizens and empowers the latter to play a greater role in the development of their communities. Non- involvement of people in the development process usually results in lack of interest and sustainability of development programmes which will lead to increase in dependence of Government resources (Bulle, 1999).

2.7 Benefits of Community Participation in solid waste

Many local authorities in developing countries suffer from a lack of financial, technical and human resources and are therefore not capable or willing to deliver and maintain urban basic services (Bulle, 1999).

Possible benefits of community participation for solid waste projects are:

- i) Improvement of project design and effectiveness. If the community is involved in the design of the waste project, it is possible to integrate its needs and constraints in the objectives of the project and in this way come to a more effective implementation.
- ii) Enhancement of the impact and sustainability of projects. Involving the community in the solid waste project may increase local ownership of projects and enhance a sense of responsibility for maintaining services provided by projects. These aspects are both essential for the durability and continuity of projects (Bulle, 1999).
- iii) Improvement of project efficiency. Community participation may be used to enhance the understanding and agreement of cost sharing (both financial and physical contribution). Furthermore, community participation can be used to prevent conflicts and to stimulate cooperation, relationship and agreement between different actors. In this way delays in project execution can be reduced and overall costs minimized (Bulle, 1999).

Possible benefits of participation for communities include:

- i) Building local capacities and capabilities. Community participation may for instance increase awareness of knowledge and capacities, may improve the ability to negotiate as equals with authorities and other stakeholders to promote common objectives, and increase responsiveness to conflicts within the community.
- ii) Involvement in decision-making. Participation can ensure that the different needs and problems of the community are integrated in the project's objectives (Bulle, 1999).
- iii) Empowerment. Community participation may give people the opportunity to devise and initiate strategies to improve their situation (Bulle, 1999)

2.8 Impact of waste material

Solid waste has positive and negative impacts, negative impacts includes spread of diseases such as malaria, typhoid, dysentery and cholera, obstruction of the storm water runoff and air, water and land pollution. Positive impact includes production of fertilizers through composting, production of biogas or incineration and recycle ring of the various waste materials,

2.8.1 Impacts of solid waste on human health include chemical poisoning, through chemical inhalation which reduces lung functioning, uncollected waste can obstruct the storm water runoff resulting in flood which leads to breeding sites of vectors and organisms causing diseases such as malaria, cholera and dysentery. Methane from land fill or dumps causes low birth weight due to its effects on climatic change which are the main cause of drought and low food production, Many of the pollutants are carcinogenic that is they may cause cancer. Some pollutants like sodium can cause cardiovascular disease, while mercury and lead cause nervous disorders.

Dichloro diphenyl trichloroethane (DDT) is another toxic material which can cause

chromosome changes. Other water problems caused by industries pollution may cause skin rashes, ear aches, pink eyes respiratory infections, hepatitis, diarrhea, and vomiting and stomach ache, cancer including leukemia. Cancer may affect people due to strong radiation from sun because of ozone layer destruction, which has been affected by green house gases; other effect of solid waste includes congenital malformations and neurological disease (Goorah et al. 2009).

Pollution from solid waste material may cause nausea and vomiting, increase in hospitalization of diabetic for residents living near hazard waste sites. Human health may also be affected by using fish with high mercury toxicity, drinking of contaminated water, and contact with disease vectors living in dumps and landfills (rats and snakes) as well as through inhalation of toxic gases. The impact of solid waste on health has continued to rise. We have seen an increase in the number of diseases associated with wastes; this on the other hand has increased healthcare costs. Increase in technological advancement and population in the country has led to increase in number of wastes produced ranging from solid, liquid and gases. Waste has become an important health issue that need to be addressed due to several reasons ranging from its impact on health and the environment. (Reddy, 2011).

The municipal workers are most affected people by the occupational danger (hazard) of waste handling; they suffer from illness like eye problems respiratory problems, stomach and skin problems. The persons who wander for collecting the discarded things for selling purpose through wastes also suffer from various health problems like respiratory problem from inhaling particles, infection from direct contact with contaminated materials which lead to headache, diarrhea, fever and cough and cold (Kawachi, 1999).

2.8.2 Effects of Solid Waste on Animals and Aquatics life

These includes increase in mercury level in fish due to disposal of mercury in the rivers, plastic found in oceans ingested by birds, degrades water and soil quality as well as high algal population in rivers and sea. Some of these wastes can also be very harmful to the atmosphere. These wastes when improperly dumped into the atmosphere can lead to the destruction of the ozone layer and may cause drought, desertification and diseases such as cancer. As a result they can lead to problem of global warming. Air pollution can also lead to formation of acidic rain which is dangerous to crop life since it fastens the removal of soil fertility from the surface of the ground. Waste materials like toxic if consumed by animals can be very dangerous to life and worse still if these wastes are dumped in water bodies. They are dangerous to aquatic life.

Poor solid waste management has also led to the death of animals (especially domestic animals), example plastic bags cause's plastic diseases to the ruminants, nails and wires when eaten by animals causes hard ware diseases to the animals. Death of animals like cattle leads to poverty and the death of animals like dogs, leads to insecurity in homes (Moeller, 2005).

2.8.3 Impacts of solid waste on Environment

These includes waste breaks down in landfills to form methane, a potent greenhouse gas resulting in change in climate and destruction of ozone layer due to waste biodegradable, Littering, due to waste pollutions, illegal dumping, Leaching: which is a process by which solid waste enter soil and ground water and contaminating them. Poor domestic waste management also displays an ugly scenario (unattractive to look) of the environment. This can affect the tourism industry, as the tourists may not get attracted to visit the country (Mvungi, 2005).

It has also led to the spread of diseases in such a way that when wastes like broken bottles and these are dumped anywhere, they collect water in them (when it rains) and this may become a breeding ground for mosquitoes. Wastes like human stool cause diseases when poorly dumped, as the flies will carry the germ from the stool (EPA,

1998). The improper management and lack of disposal technique of the domestic waste pollutes to the environment. It affects the water bodies. It also changes the physical, chemical and biological properties of the water bodies. Uncollected waste is scattered everywhere and reaches to the water bodies through run-off as well as it percolate to underground water.

It can also lead to human injury. For example, when a person is walking and steps on the broken bottles or nails or even pins (sharp objects), he can get injured which may lead to bleeding (Reddy, 2011). Uncontrolled dumping of solid waste can lead to wastage of land where we find lots of land being used as dumping sites for wastes. These same pieces of land are later on neglected by the inhabitants of the area. Poor waste management can be a source of under development around the societies surrounding that particular area. This can cause harm to tourist industries of the particular countries (EPA, 2009).

2.8.4 Impact of solid waste on soil

Soil pollution is the biggest environmental problems we are facing today. Most of the solid wastes, like paper, plastic containers, bottles, cans, and even used cars and electronic goods are not biodegradable, which means they do not get broken down through inorganic or organic processes. Thus, when they accumulate they pose a health threat to people, plus, decaying wastes also attract household pests and result in urban areas becoming unhealthy, dirty, and loss of ground attractiveness. Moreover, it also causes damage to terrestrial organisms, while also reducing the uses of the land for other, more useful purposes such as agricultural production. The toxics contain in the waste, contaminates water. It also makes soil infertile and decrease the agricultural productivity (EPA, 1998).

2.8.4.1 Recycling

By composting solid waste it can be recycled into a valuable soil amendment. When plants grow they extract nutrients from the soil. Many of the nutrients are concentrated in the seeds and leaves of the plants. These nutrients return to the soil for future use by other plants when they fall to the ground and decay. For plants that are specially grown as crops, the removal of the seeds, fruits and leaves takes nutrients from the soil. The majority of solid waste comes from the consumption of food. Nutrients are restored to the soil and can be used in growing nutritious crops by returning this waste to the soil (Reddy, 2011).

2.8.4.2 Organic Matter

The broken down components of plants and animals build up in the soil as organic matter. Solid waste is primarily organic matter, which has a large surface area for small amounts. The large surface area provides the ideal surface for elements essential to plant nutrition to attach to. Once these elements, including nitrogen, phosphorus and potassium, are held in the soil they are more accessible to plants. Adding composted solid waste to the soil will increase its fertility, structure, water holding capacity and increase the population of beneficial soil microorganisms (Syagga, 1992).

2.8.4.3 Soil Fertility

Solid waste material contains many of the nutrients which is essential for the growth of the plants. As solid waste is composted some of these nutrients will become more concentrated, while others, such as nitrogen, may be consumed by microorganisms aiding in the decomposition process. By adding organic matter to the soil, nutrients added to the soil by fertilizing will be held in the soil better, thus increasing its fertility. Without organic matter, fertilizer can easily be leached from the soil by water. Organic matter acts as a sink that holds nutrients in the soil for plants use (Reddy, 2011).

2.8.5 Effect of waste material on air.

Air pollution refers to an introduction of chemicals particulate matter or biological materials on air that cause harm or discomfort to humans or other living organisms or cause damage to the natural environment into the atmosphere. Source of air pollution can be dust from roads, smoke from burnt waste material, smog, volcanic activity, which produces sulfur chloride and ash particulate, smell, fumes from paint, hair spray, vanish, arousal spray and radioactive decay (Kawachi, 1999). Effect of air pollution on environment is green house effect, particulate contamination, increase ultraviolet radiation, acid rain, increase ground level ozone concentration, increase level of nitrogen oxide and cost to control side effects.

Acid rain can harms forests in several ways. One detrimental effect of the rain is that the leaves are damaged. For example, the wax on the leaves is worn away, making them less resistant to more rain and insects. The leaves also lose nutrients, leading to the eventual demise of the tree. Furthermore, the fallen leaves do not decompose as quickly because acid rain causes many organisms living in the soil to have diminished respiration rates. This in turn increases the ammonia in the soil because the nutrients that are usually released in decomposition are not being made (Aluiar, 1983).

This decrease of nutrients prevents the forest from growing. Acid rain also stifles new growth and kills many of the seedlings. Another effect from acid rain is that the tree's growth is decreased because the microorganisms that live near it die. Acid rain also causes physical damage to the roots, decreasing the rate of growth and eventually leading to the death of the tree. Acid causes the pH level in the soil to fall and when it reaches 4.0; aluminum and other metals are leached out of the soil. The aluminum is filtered through the roots, damaging them, and causing the tree's death (Chippelka, 1998).

2.8.6 Negative effect of solid waste material on water

Water pollution caused by hazardous solid waste material and leads to lack of accessible good quality water. In Tanzania 50% of people lack safe water for cooking, washing, bathing and drinking (TNWP, 2002). The level of pollution in the water supply is directly related to the level of pollution in the air. Water pollution is caused due to the discharge of harmful chemicals and compounds in water, which leaves the water unsuitable for drinking and other purposes. This renders the water useless for humans, and also endangers aquatic life (Reddy, 2011).

For the World nearly 70% of the Earth is covered with water, only 2.5% of this is freshwater. Seventy percent of the freshwater is frozen in ice caps of Antarctica, Arctic and Greenland. The remaining 30% of this freshwater is available as soil moisture, or lies in deep underground aquifers as groundwater and as surface water. Only one third of this water is the water found in lakes, rivers, reservoirs and those underground water sources that are shallow enough to be tapped at an affordable cost. Only this amount is regularly renewed by rain and snowfall, and therefore available on a sustainable basis (URT, 2002).

That means 70% of the Earth covered by water, are the water of the seas and the oceans which is saline and hence, cannot be used for drinking, agriculture and industrial uses. Only the water bodies like lakes, ponds, rivers, reservoirs and streams provide us with fresh water. Water pollution is caused by emission of domestic or urban sewage, agricultural waste, pollutants and industrial effluents into water bodies. Nowadays, its main source is the waste material discharged by industrial units. Waste materials like acids, alkalis, toxic metals, oil, grease, dyes, pesticides and even radioactive materials are poured into the water bodies by many industrial units. Some other important pollutants include polychlorinated biphenyl (PCB) compounds, lubricants and hot water discharged by power plants. The pollutants unloaded into the water bodies usually dissolve or remain suspended in water. Sometimes, they also accumulate on the bottom of the water bodies (Mansfield, 1978).

Excess fluoride in water may damage the spinal cord, while arsenic can cause significant damage to the liver and the nervous system. In addition to all these,

organic compounds present in the polluted water facilitate the growth of algae and other weeds, which in turn use more oxygen dissolved in the water. This reduces the amount of oxygen dissolved in the water and the consequent shortage of oxygen for other aquatic life. In yet another instance of pollution, hot water discharged by factories and power plants causes' so-called thermal pollution by increasing water temperatures. Such increases change the level of oxygen dissolved in a body of water, thereby disrupting the water's ecological balance, killing off some plant and animal species while encouraging the overgrowth of others (Manfield, 1978).

Almost 40% of the endangered fresh water fisheries in North America are at risk because of water pollution. Much of that water has come from pulp mill, where wood chips are manufactured into pulp and paper product. The toxic organo chlorine compounds ruin fish habitat. Often pollutants collect in increasing quantities over time and have long lasting effect are determined to be the cause of plant and animal death. It is often too late to prevent more damage. Once the area is contaminated with pollutant it is very difficult to clean it up (FAO, 1997).

2.9 The role of the Community participation in Waste Management.

The community sector needs to be included in waste management efforts as both private and public sector actors are unable to provide waste services to low income areas of the city (Syagga,1992). The involvement of the community sector can be taken as an effective way of increasing access of the poor to urban services, including waste management (Kim, 1998). It is observed in Nairobi that, organizations in the community sector, such as charitable organizations, ethnic associations, professional "support" NGOs, welfare societies, village committees, self-help groups, and security committees are already providing many of these services (Zerbock, 2003). Potential change to the waste disposal framework must take into account the urban poor, many of whom dependent on waste scavenging for their entire subsistence.

Micro-enterprises, or community based organizations can be effective in addressing the garbage problem (Zurbrugg, 2000). They often use simple equipment and labor intensive methods, and therefore can collect waste in places where the

conventional trucks of large companies cannot enter (Zurbrugg, 2000).

The growing problem of lack of solid waste management collection as well as improper disposal techniques also lead to various diseases and even death of the animals specially cows, birds and stray dogs that wander and rummages through the waste for food. These wastes are having different characteristics and having toxic elements. Many times the animals like the cows, buffalo eat up the plastics along with their food and leads to death of animals. Due to eating up of waste generated food it affect the quality and quantity of the milk products of the animals. (Goorah et al, 2009).

The improper management and lack of disposal technique of the domestic waste pollutes to the environment. It affects the water bodies. It also changes the physical, chemical and biological properties of the water bodies. Uncollected waste is scattered everywhere and reaches to the water bodies through run-off as well percolation to underground water. The toxics contained in the waste, contaminates water. It also makes soil infertile and decrease the agricultural productivity (Moeller, 2005).

Due to uncollected waste and improper disposal techniques drains also get clogged, this provides conducive breeding grounds for mosquitoes by which various diseases like malaria, chicken-guinea, wire fever, dengue etc. arise and affect the health of people (Moningka, 2000).

2.10 Consideration of community participation in solid waste management

Waste disposal is often seen as simply removing waste from human settlements. Nowadays, waste is also seen as a resource that should benefit the community: resource recovery (reuse or recycling) is a basic element in waste management. This factor plays an important role in the planning of waste-disposal systems.

The main benefit that waste management will yield is a clean environment, but other benefits can be:

- The production of fertilizer through composting;

- The recovery of energy through biogas or incineration
- Recycling of the various materials in waste;
- Land reclamation and proper environmental conservation.
- It improve recreation site by adding the quality of the area (Reddy, 2011).

It improve the capacity of the people as far as solid waste management is concerned by gathering people together, sharing experience and help people solve their own problems (Goorah et al, 2009). Since the largest cost factors in waste disposal are transport and collection, reduction of the quantities, through early separation and recycling, is a very effective means for achieving savings. Reductions in the volume of waste and decentralized processing are some of the approaches which could be followed and from which an organized community could benefit.

Community participation in waste disposal can be a catalyst in community–development work, because it gives residents a feeling of self–esteem. It can lead to the possibility of income generation through recycling which will also reduce the quantities of material that have to be transported for disposal (Kawachi, 1999).

2.11 Community participation in waste management

Keeping a solid waste or liquid waste running at a minimum capacity in required. Community should practice this method by using fewer materials or products or using less toxic materials. Example clothes should be recycled instead of disposing. Employees should use both side of the sheet instead of one side. Family can use cloth instead of paper napkins. Composting grass clippings and tree leaves at home rather than disposal or to be used as much in garden. Community should buy material with less packaging (Goorah et al, 2009).

The garbage should be put at a street in the right time for the place where waste material trucks are being used to collect waste material. Garbage should be kept on the road soon before the truck came.

Separate recycle or organic matter from other. All people in the community should participate in sorting waste material. The community should keep waste in bag or waste bin. People can participate more collectively in more or less activities example meetings, cleaner campaigns, awareness and other activities example planting trees (Kawachi, 1999).

Community participation can make financial and physical contribution in waste collection charges. That means it is easy for the people to participate physically and to contribute money through community participation, for instance working as cart operator or sweeper, and paying fees for waste collection.

People in the community should be actively involved in formulation of waste material projects.

High level of the participation is community management member committee being accountable to other community members about decision taken (Kawachi, 1999).

2.12 Community participation in solid waste management system

A solid waste management system is in fact a continuous maintenance system, which always requires community participation. Community participation comprises varying degrees of involvement of the local community. This can range from the contribution of cash and labor to consultation, adaptation of behavior, involvement in administration, management and decision-making. With community management the highest level of community participation is meant, i.e. involvement in decision-making (Moningka, 2000). To fully understand the fundamental problems in the management of solid waste it is important to scrutinize on the governance atmosphere in connection with the policies structure, implementation strategies as well as the economic framework of a country. Moreover some key elements in the process of governance which are essential for the performance of the management systems in use have to be considered these include the effectiveness of the managerial and organizational structure, accountability and transparency in decision making.

Furthermore the degree of participation with informal structures such as community based institutions, the public and private organizations and the coordination

between formal and informal structures for collection, transportation and disposal of waste (Onibokun et al, 1999).

In general the problems of solid waste management and their solutions are different in Africa and the rest of developing countries as compared to those in developed nations, this is not only on the various differences in their waste composition but also on the standards of waste management services.

While in developed countries concentration is more on maximizing the recovery of resources from wastes, in developing countries more attention is given to attaining proper collection, treatment and disposal. One of the means to go about this problem would be through incorporating a waste management approach which attests to be environmentally accepted, economically feasible and socially enviable.

Integrated Solid Waste Management (ISWM) is one of most recommended and compatible approach for waste management which provides a framework for the development of a sustainable municipal solid waste service. Moreover it presents a use of various collection, transport and treatment options (Kim, 1998)

Consequently, the challenge of waste management is further being extended to the effect of methane emissions in the landfills which is a primary constituent of landfill gas and a potent greenhouse gas when released to the atmosphere. One of the most known project activities under the Kyoto Protocol on Clean Development Mechanism (CDM) has been landfill gas management.

This can be of a potential to Africa through benefiting from financing in the waste sector. The high investment costs and lack of expertise are some of the immediate obstacle most countries will face, however this can be viewed as an opportunity where CDM could contribute by providing funds for such projects (Reddy, 2011).

2.13 Sustainability of community participation in waste management

The success of community participation in solid waste management depends on other actors involved, such as the municipality, community-based organizations (CBOs) micro enterprises, and local leaders. For instance, if the municipality does not collect the waste separately, it has no use for the community to separate their waste.

Women participation is very important because they play a determining role in waste management and they form important channels of communication. Special attention should be paid to the role of women. In many situations women are the first to be affected by a deterioration of the environment and are most willing to participate in projects that improve their living conditions. However, religious barriers, traditions, social hierarchy, low rate of literacy, or the burden of domestic tasks may impede their participation (Bulle, 1999).

Communication strategies are essential to generate a broad-based understanding of solid waste issues among community members and responsiveness of the stakeholders (Kawachi, 1999). Community participation in corroboration with tendering and privatization, use of waste bay in public places, community mobilization, using task force groups, conducting strategies in waste management plan and procurement of solid waste equipments can lead to sustainability and greater improvement of the solid waste management project. Representative local leaders and CBOs can stimulate community participation and ensure that community needs are taken into account. The responsibilities of community leaders is to encourage people to subscribe for waste collection, to make sure that people pay the fees, to stimulate the separation of waste, and to monitor the performance of the service level. Furthermore, they should act as a negotiator for local authorities, supervise the performance of local authorities and private enterprises, and act as a pressure group to obtain services from the local authorities (Bulle, 1999).

Community initiatives and CBOs are less durable if they are not, at some point, recognized and supported by the local authority. Cooperation between the CBOs and the local authority are very important to maintain and operate the service system according to formal agreements with stakeholders. Financial and operational viability to make community services mostly are less dependent on external support (Bulle, 1999).

2.14 Solid waste disposal follows several steps

The **waste production** cycle is inside the house, market, industry etc. Easy separation can be made at the source where the waste is not yet mixed (bottles, paper, food remains, plastics, metals. etc).

- i) The **primary collection** cycle is at the community level where wastes of the same sort are collected.
- ii) The **secondary collection cycle** is at city level where dumping at a communal depot or recycling takes place (Reddy, 2011).

Low income versus high-income in solid waste management

The amount of waste produced per inhabitant in high income areas is a multiple of the amount of waste produced by low income households. Yet, it can be observed that, while it seems possible to keep high income areas clean, low income areas remain unclean. There are two factors which contribute to this common situation:

- Registered households in high-income areas pay sewerage taxes, waste-collection taxes and, possibly, land taxes, all sources for financing municipal services. Households in low income areas are often not registered and do not pay these taxes.
- Senior governmental officials, diplomats and politicians and their acquaintances tend to inform and pressurize the municipality in their residential areas, where excessive waste accumulation occurs. In low income areas, communities often do not have the influence.

Community participation is essential in the choice of methods, in co-operation, in storage and in decisions about separation and recovery of resources, as will be explained later (Urdal, 2005).

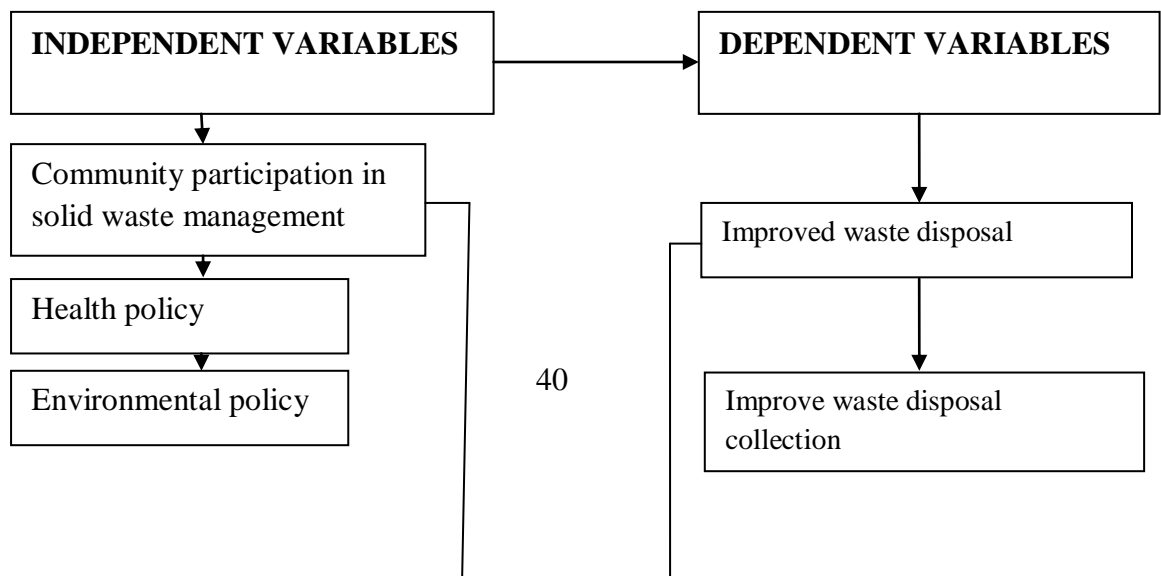
2:15 Conceptual framework

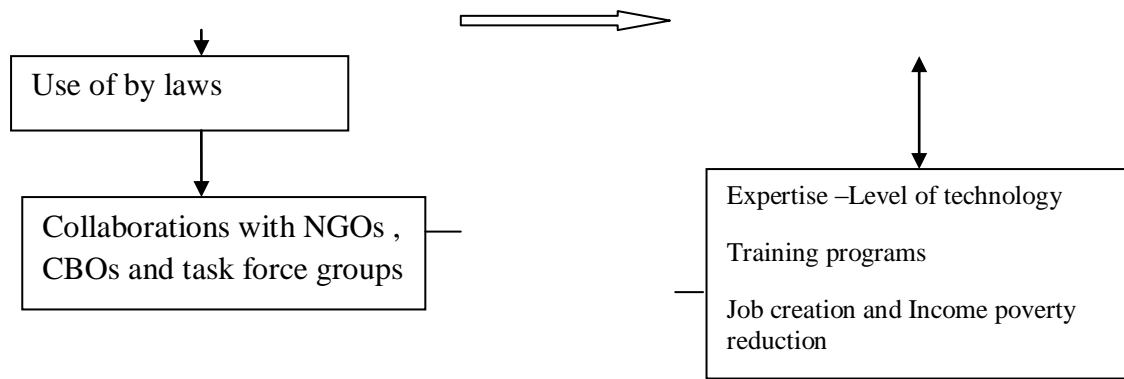
Community participation in solid waste management is the sociological process by which residents organize themselves and become involved at the level of a living

area or a neighbour hood, to control solid waste in order to improve the conditions of daily life (water, sanitation, health, education, etc.). It comprises various degrees of individual or collective involvement (financial and/or physical contributions, social and/or political commitment) at different stages of a project. It starts from project design and implementation to evaluation, community participation can increase capabilities at the level of the community and it encourages cost sharing of solid waste project activities (Urdal, 2005).

Community participation can be performed better by the use of environmental policy which helps to strengthen the funding of the Government and the corresponding institution in solid waste management or environmental protection. Environmental protection involves many sectors and interest groups. The challenge is to ensure all concerned take priority actions on environmental management. National health policy aim to strengthen environmental sanitation for the aim of improving waste collection and waste disposal. This has to be done by cooperation with community and other sector from planning, implementation and evaluation. In doing so, the income poverty will be reduced and health of the people will be improved (URT, 2000).

Figure 2.1: Conceptual Framework





Key

- (1) Direct relation
- (2) Indirect relation

2.16 Summary

This section elaborated about the community participation in solid waste management which involves community members in building, designing and implementation. As well as evaluation in collecting, transporting, processing, recycling and monitoring of solid waste.

However through community mobilization, community members gain advantages by participating in solid waste management effectively. These advantages include exchange of information knowledge, training, education and experience in solid waste management. Furthermore, to integrate into SWM with the techniques which are incorporated into overall methods in curbing the social phenomenal.

This phenomenal stipulates the reinforcement of the implementation of the local by-laws and policy as a trigger for the community participation in SWM.

Participation of the community members in a solid waste management are activity which should be considered as a voluntary act of civic responsibility. The actual tasks which are always visible in community participation are to control, awareness rising and providing information.

This is realized in promoting, decision making and building capacity. This is a commitment of the residents to one or several stages of a collective project.

Solid waste management and clean-up actions are most effective when community members gain genuine control over their context. The social and environmental sanitary scope, which is taking an active part in informing people, monitoring the service and rising their awareness at community level.

CHAPTER THREE

RESEARCH METHODOGY

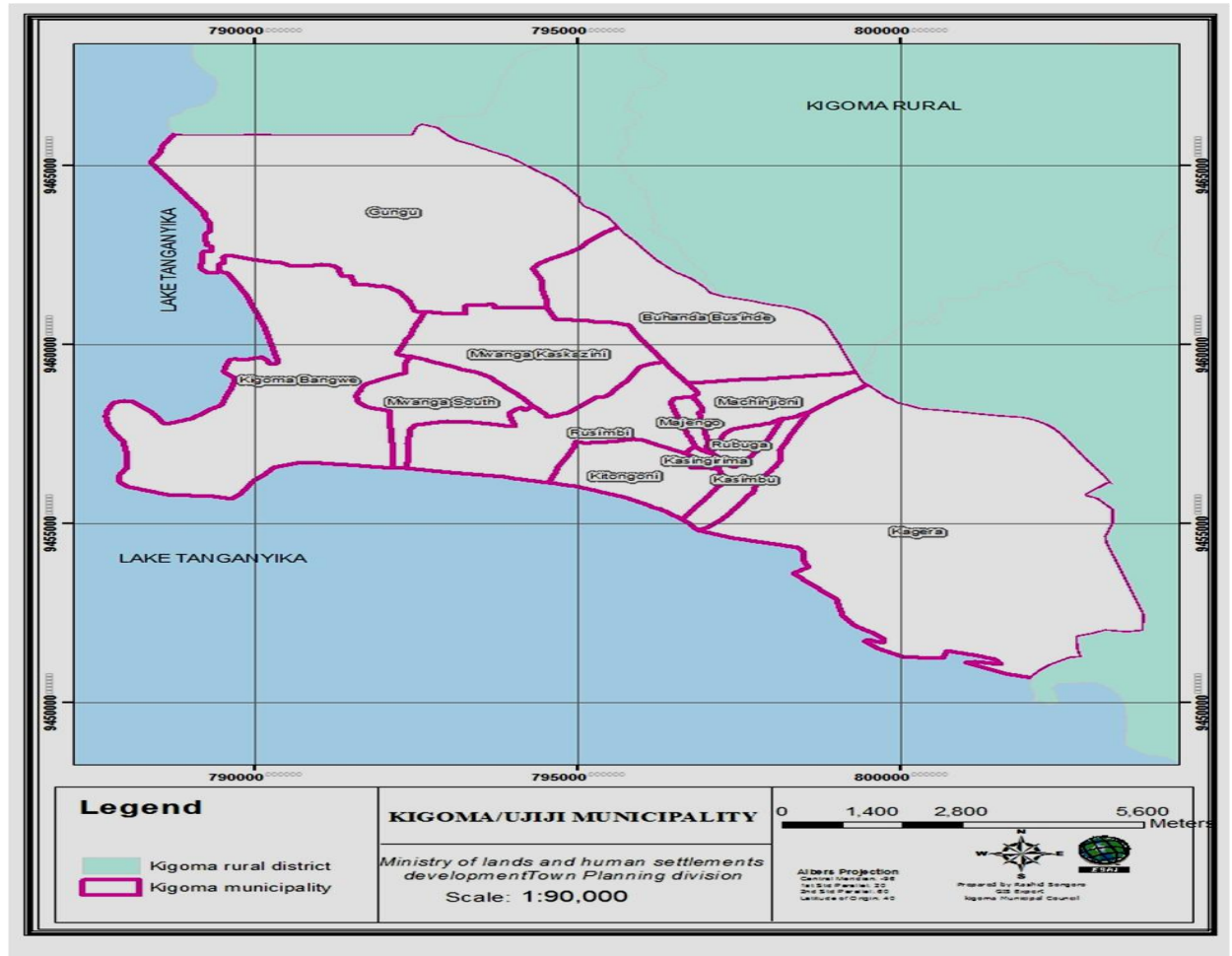
3.0 Introduction of research methodology

This chapter show how research was planned. It also focuses on the study area, research methods used such as questionnaires, participant observation, focused group discussions and interviews.

3.1 Study area

The study area was Kigoma Ujiji Municipality, in Kigoma region where by four wards of Bangwe, Gungu, Mwanga South and Mwanga North was involved in collection of data. It is located in the western part of Tanzania. Kigoma Ujiji municipality is bordered by Kigoma rural on the north and east, and Democratic Republic of Congo and Lake Tanganyika on the west and south.

Figure 3.1 A map of Kigoma Ujiji Municipality



Kigoma Ujiji Municipality covers 10 kilometers square; it has 19 wards which are found in two divisions, Kigoma north and Kigoma south. According to the national census of 2012, the population is about 302,365 people where 147,770 are male and 154,595 female, where by the growth rate is 3.9%. The main economic activity in study area is business, fishing, working in government and private organizations and agriculture especially horticultural crops.

The researcher selected this study area because it was near to my working place rather than going to other places. That means it was much more cost effective.

3.2 Research method used

In this study, different methods were used for data collection for the aim of

improving the study report. Both qualitative and quantitative methods in this study were carried out using statistic package for social sciences (SPSS). This package helped the researcher to prepare tables, and charts to present the data. In qualitative method the researcher collected data through Questionnaires, group discussion, interviews and participation observation. Use of more than one data collection method permits the researcher to increase the validity and reliability of data collected (Kothari, 1990). The relevant literature about community participation details were taken from cited books and internet. Besides, the department of environmental management and health at the Municipal was consulted in order to get the sources about the policy and by laws concerning the solid waste management.

3.2.1 Questionnaires

This technique was used where researcher distributed questionnaires to supplement other data collection methods. Selected members of community, street leaders, government official were served with questionnaires to seek their opinion on how they perceive the participatory approach. In most cases the closed-ended questionnaire were used in the study, though some open-ended questions were in the questionnaires. Some of these were self administered and other was supervised by the researcher, and was distributed to community member and street leaders. The self administered questionnaires were distributed to the most educated people. Street leader was very important to supervise the questionnaire. The closed ended questionnaires were preferred in order to maintain consistence in responses (Kothari, 1990).

3.2.2 Observation

Direct observation also was used in this study, by visiting the study areas and taking some pictures (Picture shown on chapter four). Where this tool was found to be very helpful in getting personal view of the area researched and witnessing community participation in waste material management. Also this method was used in order to get first hand information. Also researcher used this method through participating in the exercise of cutting grasses around houses and collecting the garbage from the streets with workers of Kigoma district council and other community members. As well

as participating in the meeting and in the collection of money charged for garbage collections from the community members through door to door in Mwanga north ward. The researcher visited the designated and strategic places for dumping wastes early in the morning and late evening to observe people on how the garbage from their household are being managed. The time of observation was appropriate because people throw their waste material in the streets when it is dark and where people are really moving about. The information obtained in this method was directly related to the situation. The main advantage of this method is that subjective bias is avoided. The method was not expensive but the information obtained was also very limited (Kothari, 1990).

3.2.3 Focused group discussion

Researcher used this method to collect data through group discussion. Researcher decided to use this method because it draws upon respondents' attitude, beliefs, feelings, reaction and experience which is difficult to get by using other instruments. Under this method, researcher respondents were selected and divided into three groups to participate in focus group discussion.

Under this method, researcher operated as a guide for the discussion. This instrument helped the researcher to collect more information for a short period of time (Kothali, 1990).

3.2.4 Interview

In this study, researcher asked questions generally by face-to-face contact where respondents also were allowed to ask questions and the researcher responded to those questions. Structured and unstructured interview was used in order to collect data from the Street leaders, ward leaders, Community, Health and environment personnel. Researcher used open and closed questions because they gave an opportunity for the respondents to express their views from their experience and professionalism. But researcher decided to use much more structured method because it did not consume a lot of time; it is economical and non-bias. It enabled the researcher to collect data and information at a very convenient and quickest moment (Kothali, 1990).

3.3 Sample size

The sample size used was 100 respondents from four wards of Mwanga north, Mwanga south, Bangwe, Kigoma, and Gungu. The sample size was selected due to limited time and following the guide line from the University where the researcher was studying. Respondents includes Community members, business mans, Jobless people like house women, workers such as ward and street leaders, municipality environmental officers and health officers. The population of those wards is about 100,000 people, therefore to get sample size researcher used a formula of $n = \frac{N}{1 + N(e)^2}$ where n is sample size, N is total population, while e is 10% = 0.01 and 1 is constant. Therefore to get the sample size researcher took $100,000 / 1 + (100,000 \times 0.01) = 100,000 / 1001 = 99.9 = 100$

Table 3.1 Number of respondents

No	Categories of respondents	Respondents selected by sex			% number of respondents
		Male	Female	Total	
1	Community members	31	12	43	43%
2	Businessman	12	4	16	16%
3	Jobless	0	3	3	3%
4	Students	10	8	18	18%
5	Street leaders	8	4	12	12%
6	Municipal officials	6	2	8	8%
	TOTAL	67	33	100	

Sources: The research findings, 2013

3.4 Sampling technique

The sampling techniques of the study were simple random sampling and purposeful sampling.

3.4.1 Simple random sampling was used to sample out the members of community where the study was undertaken. This method is also known as chance sampling or probability sampling. This technique was used because everyone in the community

in the entire population has an equal chance to provide reliable information.

3.4.2 Purposeful sampling was used in this research basing on the position or occupation and education level of respondents. The researcher applied purposeful sampling to select the environmental officer, health officers and ward and street executive officers (Kothari, 1990).

3.5 Data processing and analysis

The analysis of the data from the study was analyzed using different methods. Researcher was able to do editing, coding, screening and computer data entry as well as data verification.

The study used both qualitative and quantitative analysis. Quantitative data processing was carried out to summarize the data by using Statistics Package for Social Science (SPSS) to analyze and present data, this package enabled the researcher to prepare charts, diagram and tables to present the data. Qualitative analysis included searching for patterns of data, behavior, and attitudes to make interpretation of meaning. After doing so researcher analyzed the facts and converted the data into statements and conclusion which ultimately answered the research objectives. (Kothari, 1990).

CHAPTER FOUR RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

4.0 Introduction of research findings

In this chapter the study findings are presented, analyzed and discussed. In the course of analysis and discussion, elaboration and justification of a certain outcome of the study are provided.

Based on using a questionnaire guide for structured interviews, it elaborates the data as were presented by the respondents. Moreover the presentation and discussion is organized according to the research question and instruments used.

4.1 Data analysis

Data analysis and interpretations mainly focuses and analyze the research findings from the study. This analysis displays and establishes the relationship based on independent and depended variables. This assisted the researcher to answer the research questions. Therefore, the data was analyzed through the use of coding the data which was descriptive and interpretive codes from the respondents. The respondents include Health and Environment Officers, Municipal authorities and Street Executive Officers, students, business man and non employed persons.

4.2 Characteristics of respondents

Table 4.1 The distribution of respondents by age

Number	Age	Male	Female	Frequency	Percentage
1	15-25	11	9	20	20%
2	26-40	15	6	21	21%
3	41-50	16	8	24	24%
4	51 AND ABOVE	25	10	35	35%
	TOTAL	67	33	100	100%

Source: Research findings, 2013

Distribution of respondents by age

Results in Table 4.1 indicate that, 35% of the respondents in the study area has an age above 51 years old, 24% of the respondents were in age group ranged from 41 to 50

years old and 21% of the respondents were in age group of 26 to 40 years while 20% respondents were of the age between 15 to 25 years old. This implies that, the study involved respondents of maturity age who have good knowledge and skills toward community participation in solid waste management. The researcher decided to have such study respondents to acquire required information from the respondents.

Table 4.2 Respondents by level of education

Respondent's level of education	Female	Male	Frequency	Percentage
Uneducated.	3	3	6	6%
Primary education.	17	14	31	31%
Secondary education.	6	20	26	26%
Certificate.	6	8	14	14%
Diploma.	2	10	12	12%
Degree.	1	10	11	11%

Source: Research findings, 2013

The table number 4.2 shows that most of the respondents' education was in the level of primary. This covered 31%. Only 11% of the respondents have University educations, who were Environmental Officer, Government workers of Municipal council and Kigoma district council. In this finding most of women were in the level of primary education. Furthermore most of the male were in the level of secondary education which is 20% while female were 6%. Also the table indicates diploma holders 12%, and 14% certificate holders. Uneducated respondents were 6%. This shows that women are not educated comparing with men counterpart.

Table 4.3: Respondents by occupation

Occupation	Male	Female	Frequency	Percentage
Employed	30	10	40	40%

Unemployed	0	3	3	3%
Self employed	25	14	39	39%
Students	12	6	18	18%

Source: Research findings, 2013.

Respondents according to occupation

Table number 4.3 indicates that majority of respondents were employed by government and private sectors. These respondents who were 40% include health officers, environmental officers, ward and street leaders, teachers, private employees and other district/municipal council’s employees. Based on occupation, 39% are self employed and most of them are doing business in different markets of Kigoma Ujiji Municipality. Meanwhile 3% respondents were unemployed such as married women, who spend most of the time in taking care of their children, and doing other house hold activities such as cooking and cleanliness at home. The percentage number of students is 18% as it is indicated in table number five.

4.3 Analysis of the findings

This part shows the findings and interpretation of the results that were obtained from the study. The findings and the results are presented basing on the main research questions.

Research question number 1

Are there any impact of community participation and awareness on proper solid waste management?

The researcher intends to test whether the low level of awareness about their roles in solid waste, inadequate mobilization, inadequate knowledge among community members and lack of good leadership could lead to low community participation and improper solid waste management.

Table 4.4 indicates respondents’ answers when they were asked different questions to test their level of knowledge and awareness on solid waste

management

No	Indicators	Response from respondents			
		Yes	Percentage	No	Percentage
1	Low level of awareness, lack of awareness campaign in SW contributes low level of community participation and inadequate waste disposal.	72	72%	28	28%
2	In adequate knowledge and understanding on solid waste among people in Kigoma Ujiji municipality reduces community participation in SWM	70	70%	30	30%
3	Low community mobilization interfere community participation in SWM.	64	64%	36	36%
4	Is there any good leadership among community in SWM.	38	38%	62	62%

Source: Research findings, 2013

Basing on the responses of the most critical problem hindering effective community participation, table 4.4 above indicates that 72% of the respondents mentioned low level of awareness and lack of awareness campaign as a cause of low community participation in solid waste management while 28% disagree. It also indicates that 70% mentioned inadequate knowledge among community members leads to improper community participation while 30% disagree. The research findings also shows 64% of respondents who said yes for lack of good mobilization while 28% said No and 62% of respondents mentioned that there is lack of good leadership while 38% said that there is good leadership in solid waste management.

Research question number 2

What are the challenges and problems facing community during the implementation of solid waste management?

The researcher tested the second question to find out the main problems facing community during implementation of SWM. Problems such as inadequate facilities, political interference with law enforcement and attitude of depending the government can lead to low solid waste management. Therefore the researcher tested the research question by asking the following questions.

- i) Is there an adequate facility such as vehicles, wheelbarrows, spade, waste bays and wastes bins that used for solid waste management?
- ii) Is there political interference with inadequate enforcement of laws and by laws in solid waste management?
- iii) Is there government depending attitude among the community in solid waste management?

Table 4.5: The results of second hypothesis

No	Indicators	Response from Respondents			
		Yes	Percentage	No	Percentage
1	There is people’s attitude in depending on government in Solid waste management.	74	74%	26	26%
2	There is in adequate facilities such as vehicles, wheel barrows, spade, waste bays and waste bins interfere Solid waste management.	64	64%	36	36%
3	There is political interference with inadequate enforcement of law and by laws, causing problem in SWM	63	63%	37	37%

Source: Research findings, 2013

Research findings shows that 74% of respondents said that most of the people has attitude to depend on Government for solid waste management, they think that, it is a government responsibility to fund and implementing solid waste projects. This contention implies that there is still low understanding on the role of communities in urban development projects. The result of second hypothesis shows that 64% of total respondents said that inadequate provision of communal facilities such as waste bays,

waste bins and wheel barrows may lead to low solid waste management while 36% disagree. Also 63% of respondents said that political interference example protection of some areas not to be used for construction of modern waste bays, in ability to establish solid waste disposal sites (sanitary landfill) and in adequate enforcement of law, causing problem in solid waste management because some people throw waste material everywhere without punishment taken to offenders but 37% disagree. This state of affairs calls for a purposeful and strategic measures of awareness creation among the urban communities, to make them understand their role to participate in solid waste activities and other development projects.

Research question number 3

What are the underlying causes of poor solid waste management in Kigoma Ujiji Municipality?

The researcher aimed at assessing the accountability, financial and low physical contribution among community members. Also researcher aim to assess the accountability of government and non Governmental organizations if are the underlying cause of improper solid waste management. To come up with apparent picture relating to this research question, the researcher used the key indicators in order to measure this question. These are as follows;

- (1) Low physical contribution among community members which increase the problem of Solid waste management.
- (2) Low accountability among community members, non-governmental organization and governmental officials that affects Solid Waste Management.
- (3) Inadequate financial contribution from community members leads to difficult Solid waste management.

Table 4.6: Results of the third question

No	Effects	Response from respondents
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		Yes	Percentage	No	Percentage
1	Low physical contribution among community members increase the problem of SWM	80	80%	20	20%
2	Low accountability among community members, non Governmental organization and Governmental officials affects SWM	77	77%	23	23%
3	Low financial contribution from community members and lack of transparency on contributions and expenditure leads to difficult SWM	72	72%	28	28%

Source: Research findings, 2013

The findings in the table 4.6, indicates that, through unstructured interview and group discussion 80% of respondent agreed on low physical contribution to be the cause of poor SWM, while 20% disagree, also the research findings on table 8 shows that 77% of all respondents said that, there is low accountability among community members, non Governmental organization and Governmental officials which affects community participation in SWM while 23% disagree, and 72% said that low financial contribution from community members and municipal council contributes difficulties in community participation for solid waste management while 28% said that low financial contribution cannot affect SWM. Here the finding indicates that, there is very low or no voluntary work. People don't work together as a community for the betterment for the environment. Voluntary groups such as task force groups, scouts and other private agencies put little emphasis in such activities, because they lack awareness, working facilities, protective gears and motivation. Mis-allocation of funds done by municipal council, lack of transparency and even embezzlement of the little funds allocated for such work are the factor which limit the performance of solid waste management.

Table 4.7: Level of community participation in solid waste management

No	Rating	Frequencies	Percentages
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1	Very low community participation	79	79%
2	Good community participation	11	11%
3	Average people during participation	10	10%
4	Very good community participation	0	0%
	Total	100	100%

Sources. Research findings, 2013.

Table 4.7 indicates that most of the people who are 79% said that there is very low community participation in solid waste management and other development or economic activities. Most communities participate during cleanliness campaigns announced by governmental officials or when cleaning churches, schools or hospitals.

The table also indicates that 11% out of 100 respondents said that, there is good community participation in solid waste management while 10% out of 100 respondents said that it is average number of people who mostly participate in solid waste management. This is because of ignorance of the masses about the need to dispose of these wastes material and how to dispose them off. There is lack of education programs to community members on Waste management. This leads to most of the people to backward on waste management. Also this is because of poor or no sensitization of the masses which can be done by the government and other non Governmental organizations.

Table 4.8: Respondents understanding on effects of solid waste to the people, livestock and environment

No	Effects of waste	Respondents said “YES”	Percentages
1	Causing land degradation and epidemic diseases such as cholera, dysentery and diarrhea.	64	64%
2	A chemical from waste materials kills microorganisms responsible for soil fertility.	12	12%
3	Death of animals, after eating plastic bags or drinking water contaminated with poison.	10	10%
4	Loss of environmental attraction.	6	6%
5	Bad smell and a lot of flies which causes annoyance and spread diseases.	6	6%
6	Sharp object can cause injury to the people hence tetanus disease.	2	2%
	TOTAL	100	100%

Source: Research findings 2013

Table 4.8 shows that most of the people especially educated one knows that waste material can cause problem such as epidemic diseases and land degradation but for the rest of the people, especially people with low education, they cannot mention problem of solid waste such as injury, bad smell, death of animals, flies annoyance and loss of environmental attraction.

Table 4.8 indicated that only two people know that sharp object can cause injury and tetanus.

Ten people said that waste material such as plastic bags can cause death to the domestic animals, six people said that bad smell with a lot of flies can cause diseases and twelve people said that waste material are the major cause of land degradation in urban area and sixty two people who are the majority know that waste material are the major cause of diseases especially diarrhea diseases and malaria.

Table 4.9: Difference between area cleaned by community participation and area cleaned by individual person.

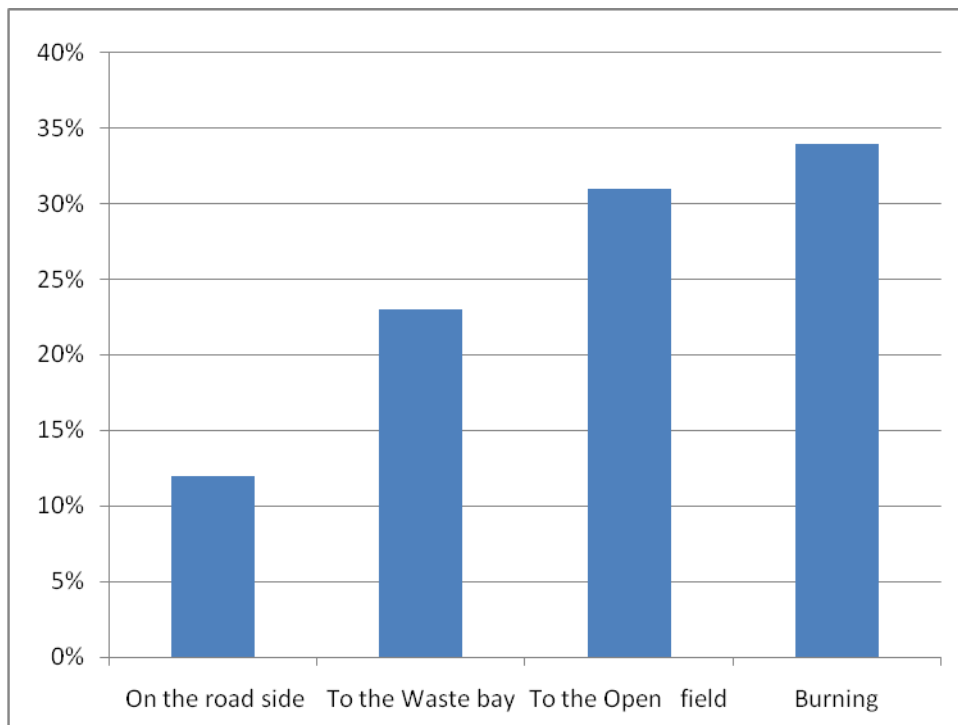
Number	Statements	Response from respondents			
		YES	%	NO	%
1	Through community participation people can clean big area rather than individual person.	66	66%	34	34%
2	One personal can clean small area, for a long time and near to his residential house.	68	68%	32	32%
3	Through community participation people can clean much more accurately, area look attractive and participation includes people with different skills where community shares experience.	67	67%	33	33%

Source: Research findings 2013

The findings on table 4.9 shows 68% accepted whether individual person clean small area for a long time and near to his residential house but 32% said no. Also on the same table 67% of respondent's especially educated one said that the area can look much more attractive when cleaned by community participation because it involves people with different skills, power and ideas rather than individual person while 33% said that one person can clean much more accurate than community. Respondents who disagree most of them was people with less education.

Table 4.9 also indicate that 66% of the respondents said that through community participation people can clean accurately a very big area rather than cleanliness which is done by individual person. They have said that, individual person can clean small area near to the residential area without focusing other area, 34% disagree.

Chart 4.1: Showing the way people use to dispose solid waste from house hold



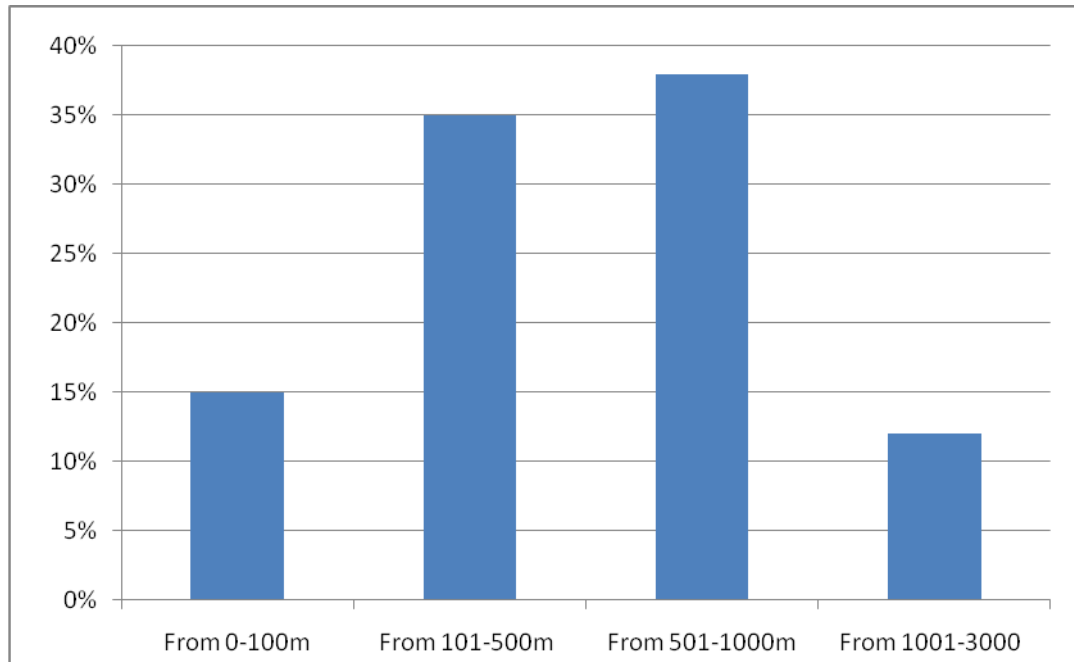
Source: Research findings, 2013

The chart 4.1 indicates that 34% of the people in community dispose solid waste by burning. 12% on the road side, 31% on open field and 23% on the nearest dumping pit.

This here is to say that, a lot of the solid waste material has been displayed on the open field and dumping site without any one taking care of it. When it rains waste material are taken by rain water to the drainage system along the road and lead to obstruction of drainage channels. Also when it is raining, other people took waste material and throw it in the drainage channels where also it is taken by rain water to other place. This situation caused by Lack of recycling facilitates, for instance most of the polythene bags used and plastic bottles, are not recycled by the manufacturing industries because they are taken by rain water to the river, ocean or lakes. Keeping solid waste on the road or on open field is due to lack of proper dumping or proper place to deposit the solid waste. This is to say that the issue of community involvement in solid waste

management is new in Kigoma Ujiji municipality and wasn't considered to be the responsibility of the community.

Chart 4.2: Distance from house hold to waste bay or collection point

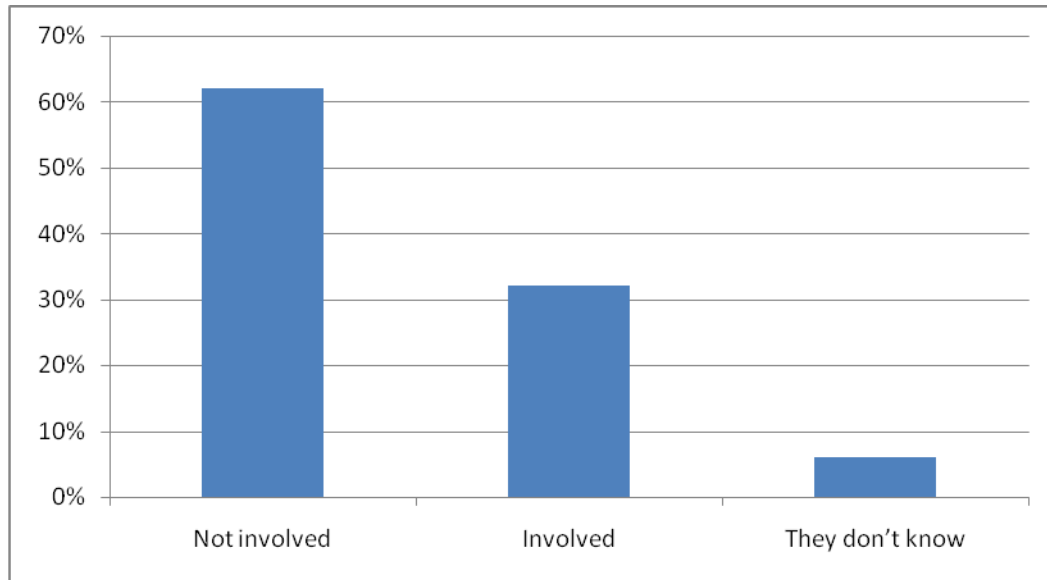


Source: Research findings, 2013

The chart 4.2 shows that so many people are very far from waste collection point or waste bay. Out of 100 respondents only 15% of the total respondents said that, the distance from living area to waste bay is about 100 meters, most of them are people living near to the tarmac road of Mwanga south and north ward or people living near to the markets. But even presence of waste bay has not promoted the level of community awareness in solid waste management. People are still throwing waste material outside of the waste bay. 35% said that the waste or collection point is from 101 to 500 meters, most of these people are living far from tarmac road and markets, while 38% said that collection point is from 501 to 1000 and 12% especially people living Bangwe ward said that collection point is about 3,000 meters. This problem indicates inadequate collection point and waste bay, lack of designated solid waste disposal sites and

inadequate facilities.

Chart 4.3: Involvement of community in street or ward meeting concerning solid waste management

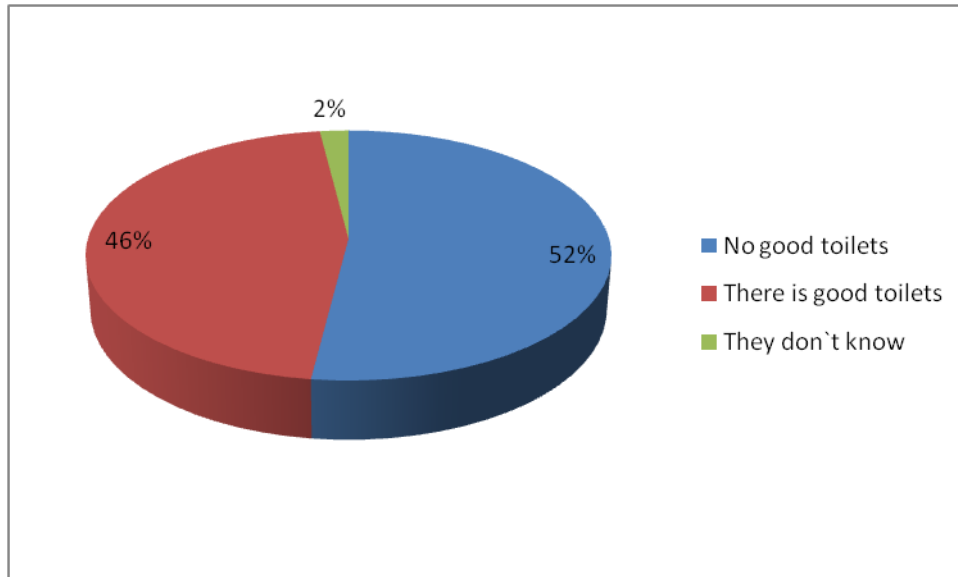


Source: Research findings, 2013

According to the chart above, it is indicated that 62% of the people interviewed they have said that, they are not being involved in meeting concerning solid waste management and most of the time, solid and liquid waste is not an agenda in meetings which are being conducted in the in Ward and streets.

Out of 100 respondents 32% said that, communities are being involved in meetings and 6% out of them said that the involvement is very little and that is why the knowledge of solid waste management is very little.

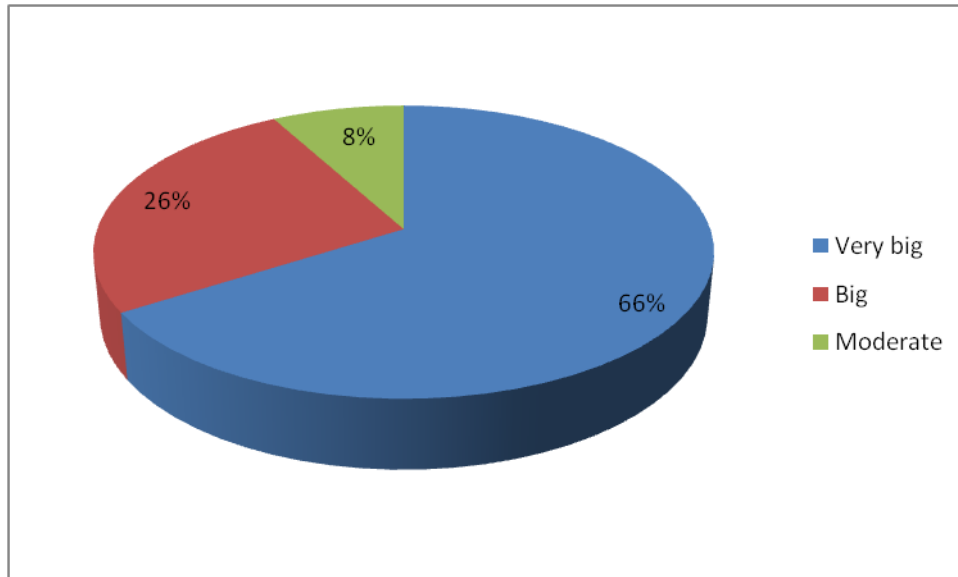
Chart 4.4: Community centers with good toilets



Source: Research findings, 2013

The chart above 52% of respondents said that there are no enough, good and permanent toilets in public centers example schools, play grounds and churches. Mostly good and permanent toilets in public centers are found in bus stand and markets where people pay for service such as Tanzania shillings 300/= for defecation, 200/= Tanzania shillings for urination and 500/= Tanzania shillings for taking bath. Also 46% of respondents said that there is good and clean toilets in public centers, while 2% of respondents said that they don't know whether there is no good toilets in public centers. This is due to the fact that there is no adequate awareness campaign on SW, no adequate privatization and provision of funds for solid waste management projects. Also it implicate that there is no good creation and good establishment of solid waste disposal sites including toilets in Municipal council. Most of schools especially government primary and secondary school lack enough and good toilets, sometimes students and teachers share the same toilets. Most of the time toilets are not clean, and there is no water for cleaning. This leads to using the bush for urination and defecation.

Chart 4.5: Showing evaluation of problem related to solid waste material



Source: Research findings, 2013

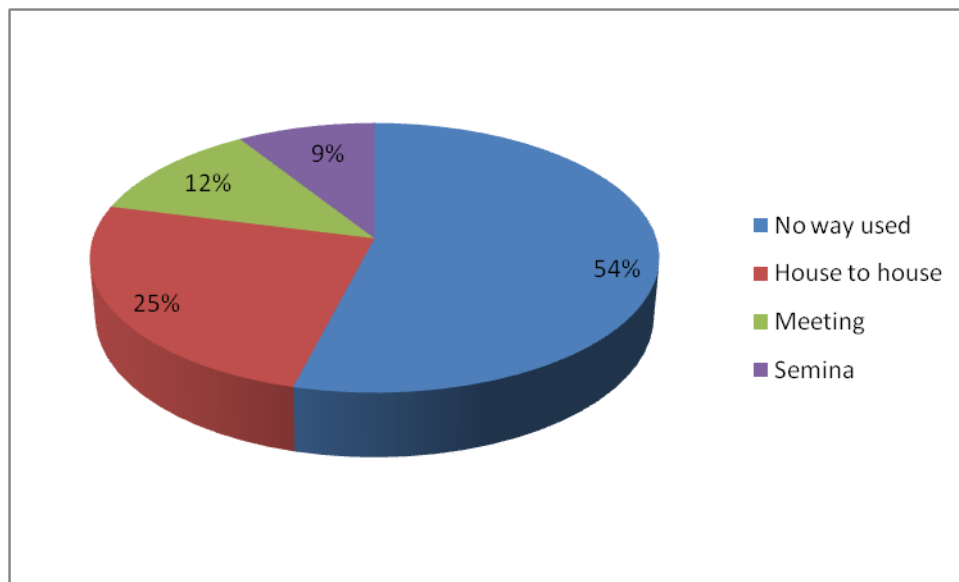
The chart compiled from interviews done by researcher and 12 leaders from municipal leaders, ward and street leaders indicate that 66% said that the problem of waste material is very big, 26% said that the problem is big and 8% said that the problem is moderate. Nobody said that the problem is little. These status is shown in problem statement where by 107.5 tons of solid waste material are being produced by municipal council every day with the range of 0.30kg and 1.33 kg per person per day, whereby the collection capacity is 57%. Most of respondents said that, problems related to waste is very big because of in adequate public awareness on safe solid waste management and environment, inadequate solid waste collection points, lack of designated solid waste disposal sites, lack of appropriate disposal technology and inadequate involvement and participation of the communities as well as informal groups.

Chart 4.6: Showing way used to mobilize community participation.

Community mobilized through meetings, seminars, house to house mobilization, also both ways were used.

Mobilization is being done because participation in solid waste management in every Saturday is very little. Community do not use solid waste bays. People throw waste material out of the collection point or waste bay, plastic bags spread everywhere that means most of the people not aware on solid waste management. People do not pay 1000/= Tanzania shillings for solid waste management.

Chart 4.6: ways used to mobilize community in solid waste management



Sources: Research findings, 2013

The Chart indicates that mobilization through public meeting is very low for about 12%, this is one of the factors reducing awareness of the community on solid waste management, and sometimes solid waste agenda not included in every meeting conducted in Municipal council. Also the chat showing mobilization through house to house indicates 25%, these activities done when Municipal officials (environmental officers, health officers, and street and ward leaders) are doing supervision, collection of cleanliness fees as well as when doing monitoring and evaluation in solid waste activities. During supervision people who found accumulating waste material at their homes or throwing on the road side are going to pay 50,000/=, Mobilization through seminars indicates about 9% and peoples who said that, there is no mobilization

conducted in the community was about 54%.

This is to say that mobilization for awareness campaign among stake holders for community participation in solid waste management is still very low in Kigoma Ujiji municipality.

Proposed initiatives to enhance community participation

Respondents asked to suggest what could be done to make community participation effective. The majority suggested that all stake holders including members of communities should be enabled to participate in planning, decision making and ownership of solid waste projects.

They also suggested that, transparency and accountability should be enhanced, as a means to check mismanagement of funds and other resources meant for solid waste projects. Another suggestion by many respondents, was the need for government officials to show recognition and appreciation of people`s initiatives. They should visit the people and in their respective localities and participate with them in solid waste management. Such moral support boost peoples morale to participate effectively.

Also suggestion from community leaders was the need for continued awareness creation to the member of communities in order to change their mindset.

Finally respondents suggested that, agreed sanctions and penalties for non participants should be administered without fear or as stipulated in the enacted by laws.

**Picture 4.1: showing community participation in solid waste management-
Bangwe road**



Source: Research findings, 2013

This picture is showing community participation in cleanliness and collection of waste material in Kigoma Ujiji Municipality - Bangwe road. This activity is done once per week usually on thursday. This activity helps to make the environment clean and very attractive.

Picture 4.2: showing accumulation of waste material: Nazareti market-Kigoma urban



Sources: Research findings, 2013

The picture 4.2 is showing accumulation of waste material around Nazareti market. These waste materials include plastic bags, used boxes from shops such as package materials, broken bottles and plastic bottles, sugar cane cuttings, rotten cassava, tomatoes, banana, cabbages, water melons and other crops residues. Also when it rains you can see water lodging which leads to breeding site of different organisms including mosquitoes.

**Picture 4.3: Accumulation of waste material Lumumba road
Mwanga**



Source: research findings, 2013

The picture above is showing the initiative of Kigoma Ujiji Municipal Council in collection and transporting waste material from different collection point. Production of waste material is very high leading to low capacity of municipal council in collection of waste material. Other waste material from primary collection do not reach easily to the secondary collection point because houses have been constructed in outdated plan that limiting ways between houses, which are being used for collection of waste material. Other people keep waste material outside the waste bay leading in difficulties during collection and sometimes waste material are taken by rain water to the sewage system leading to obstruction and flood.

Picture 4.4: Community participating in construction of waste collection point Lumumba road Mwanga north



Source: Research findings, 2013

The picture above is showing community participating in construction of modern waste bay around tarmac road of Lumumba street Mwanga ward. The area is very high populated than other area in Kigoma Town; the area has high production of waste material. It is near to the bus stand, shops, restaurants, guest houses, schools, garage and residential houses. United Nation development programmes (UNDP) have decided to construct modern waste bay by corroborating with municipal council and community. Collected waste material from this area will be transported to modern land fill which is found in Msimba village.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction of conclusion and recommendation

This chapter presents the overall conclusion of this study and highlights the recommendations to local authorities, policy makers, Municipality and health organizations, Ward Executive Officers, nongovernmental organizations at regional, national and international level.

5.1 Conclusion

This study focused on assessment of the performance and challenges people face during community participation in solid waste management in Kigoma Ujiji municipality. In this study, chapter one glanced at the back ground of the problem and the problem statement, looking at the possible cause of poor solid waste management, also it elaborates objective and the significance of the study. Chapter two reviewed the literature on the definition of the concepts such as community participation, solid waste, and environment. Also it discussed the International conventions on hazardous waste, Bamako conventions, Government policy on solid waste management, benefit of community participation, effect of solid waste, role of the community members in waste management and the conceptual frame work.

Chapter three the researcher presented the study area, the methodological issues with regard to the study. The adopted methodological approach used to conduct the study; it includes qualitative and quantitative methods carried by statistic package for social studies (SPSS), sampling methods, data collection technique example by using questionnaires, interview, group discussion and observation, also the chapter shows data processing and analysis.

In chapter four demography characteristic of respondents were presented and the data was analyzed through coding the data, in a descriptive way as well as interpretation of the findings. The findings have revealed that lack of awareness, low education, the attitude and culture of the community members has the influence on people not to participate in solid waste management.

The given attitude by the community members showed that the responsibility of collection, transporting and dumping of solid waste is for municipality. Beside, people do not know the right and health procedure of storing and transferring the solid waste material. This is because of insufficient education among the community members about the solid waste management. This leads people hesitate to contribute or to pay the fees as a way of participation in solid waste management. On the centrally, it is the responsibility of every person, community member to manage the solid waste generated at his or her domain in collaboration with other stakeholders.

Another major problem is the failing of municipal council in secondary collection (collection of waste material from waste bays/bins to the land fill or dumping site); this issue undermines the motivation of the community members who undertake primary collection. Bad coordination of primary and secondary collection, illustrated by accumulated garbage at transfer stations. The bad performance of the municipalities in this respect is rooted in a lack of funds, inappropriate equipment, inefficient management, and unskilled personnel. Provisions of motivation to community members, task force groups or CBOs may lead to high level of participation in SWM. Motivation can be in term of facilities such as wheel barrows, spades, hoes, waste bays, rakes, waste material containers, plastic bags or financial resources.

Lack of enforcement of laws, and policies on solid waste management had shown that the leading factor for insufficient community participation in SWM. On top of that, this factor had been contributed by the inadequate mobilization, monitoring and evaluation of solid waste activities by environmental, municipal leaders and health governmental officers.

This has been discovered as a contributing factor which leads to poor community participation in solid waste management. The community members are not aware of the laws and policy attributes to solid waste management. They don't receive organized and educational activities pertaining to solid waste management.

However, population increase or high concentration of population and economic activity in urban areas means that solid waste generated is very high and cannot be disposed effectively on an individual basis. On centrally, solid waste has the public characteristics, because it can be disposed on public or private land.

These causes nuisance and become an environmental or health hazard affecting society. Although the commercial, private households and firms that generate solid waste may consider themselves to have done their duty by removing solid waste from their private domain. Still solid waste management benefits the whole community, and any resident can enjoy the benefit of the service without diminishing anyone else's benefit. Thus, solid waste management stands squarely in the public domain as a community benefits or public good.

5.2 Recommendations

In view of the finding analysis and conclusions the researcher suggested the following measures in order to improve community participation and speed up the pace of solid waste management.

5.2.1 Community members

Methods of waste disposal include dumping, land fill, burning, recycling, prevention, reducing waste material and biological control. Community members must not expect the governments to be responsible for solid waste management to act and keep the environment clean. Nevertheless, it is the responsibility of members to participate together with the community based organizations (CBOs) and task force groups in collaboration with the municipality to manage the solid waste. The divisions of power, responsibilities, and resources between the government and local authorities rely on the community members in solid waste management. The success of the authorities' in solid waste management as well as with community members hinges on availability of resources and good governance. These create legitimacy for the state in the eyes of the community participation. This has important implications for resource generation, democracy, transparency and accountability in effectiveness of

community participation in solid waste management.

Community participation in collaboration with tendering and privatization, use of waste bay in public places, community mobilization, using task force groups, conducting strategies in waste management plan and procurement of solid waste equipments can lead to sustainability and greater improvement of the solid waste management project. People in the community has to change their attitude, culture and also has to pay for solid waste management, in doing so one day we should have very clean municipality.

5.2.2 Local leaders

The researcher recommends the local leaders to play their important role in community participation in solid waste management. Local leaders have the responsibilities in the community as leaders and encourage people to subscribe for waste collection and to make sure that people pay the contribution fees. They have also to stimulate the separation (sorting) of waste, and to monitor the performance of the service level. Furthermore, they should act as a negotiator for the municipal authorities and supervise the performance of community based organizations. Local leaders should also recognize the importance role of women which they play in community.

Women are the manager of households and therefore they are responsible for cleanliness within and around the home and for taking care of solid waste. The task of paying for waste collection is vital to include women in determining the fees for waste services. Apart from domestic tasks, women can be active members of CBOs and stimulate participation of other women. For women to fulfill a key role, projects should address the particular needs of women. The difficulties faced by women to overcome obstacles against their participation, and the problem for women to reconcile project activities with their normal daily activities.

The local leaders also must initiate projects for the youths to indulge in collecting the solid material for recycle. This may be done in collaboration with industrial and

manufacturing of the byproducts. This will create many employments for the youths who are loaming in the streets as well as improving the economical status of the region.

5.2.3 To the government

Due to lack of cost recovery by municipality on waste collection, the high costs for services and inadequate revenues, waste collection is economically inefficient. On the other hand, local municipality does not have the financial capacity to administer solid waste management effectively.

The municipal councils are under resourced to carry out sufficient enforcement of the policy act. This act covers waste prevention, offence s and procedures for prosecuting alleged offenders, and enables public authorities to appoint waste prevention offices. Lack of manpower is an issue, and improvements must be made in training of staff in implementation of the act with existing resources. The government must train many environmental and health officers and accommodate them in designed areas.

Currently there is a shortage of health officers; a huge population is only catered by one health officer. This is more strenuous for one person. This may improve and better efficiencies of community participation in solid waste management. Currently the Kigoma ujiji municipal council has no land fill for the dumping of garbages. One discovered form of solid waste management is the Msimba land fill which will be the second sanitary land fill. The first one was Burega but because it was located within the vicinity of the people the government shut it down. The proposed Msimba land fill should alleviate the solid waste problems in Kigoma/ Ujiji municipality for the moment. However, it is important to increase the life span of the Msimba land fill by developing appropriate policies. The land fill is expected to service the entire area of Kigoma/Ujiji municipality. To allow the land fill to run for its expected lifespan, proper solid waste management as in separation, redirection of green waste for composting needs to be practiced at the house hold level.

For the effective implementation, awareness and education to the community members are indispensable. The government must initiate sustainable projects such as supporting CBOs to introduce collection of used plastic bag and bottles. There after sell them to manufacturing industries for recycling. This is a way of participating in solid waste management as way of earning a living. Not only that but also improving sustainable green agriculture such as gardening and environmental conservation through the use of composite manure from solid waste.

5.2.4. Local authority

Local authorities should create short and long term action plan for solid waste management also should open space for other waste management option and models like the World Health Organization (WHO), United Nation Development Programme (UNDP) and United Nation Environmental Programme (UNEP). In supporting solid waste projects by providing the local authority for the sustainability of solid waste management. The provision of solid waste management at present is the responsibility of municipality.

Therefore the efforts of NGOs, the private sectors and community participation are very low. The private sector role is very limited because of lack of attractive mechanisms designed to accommodate, manage and integrate partnership and cooperation. Some activities can be carried out by private sector with reduced costs. There is a need to adopt integrated solid waste management system and reduction of waste at source. This need will promote waste generation at the source, waste minimization, recycling, reuse, recovery and composting.

Nevertheless, local authorities should create an enabling environment for formalized waste collection and recycling, Should allocate areas for solid waste disposal. These will stimulate the need for the local authorities and NGOs to engage the community members in solid waste management by establishing and supporting community based recycling and composting projects. Local authority should raise public awareness not only on the importance of creating health environment but also on the mechanisms

of controlling generation of waste at the source.

They should provide disposal mechanisms and share of responsibilities between the general public, local and traditional institutions. This includes business communities, NGOs and institutions through regular campaign, education and training programme. Local authority should establish additional solid waste transfer disposal facilities in residential areas at accessible sites depending on the rate of solid waste generation.

The local authority should also introduce and provide trash and waste bins for the public areas and vehicles such buses to allow the passengers and pedestrians to dump their wastes. These interventions should be supported by strict enforcement of legislation and environmental education and awareness rising.

5.2.5 The International donor

Many donor agencies already have extensive funding programs for NGOs in developing countries. This is an effective method of funding local environmental initiative since the NGOs and CBOs which are often closer to the people than governments, including local authorities. At the same time the international community must provide assistance to local authorities to improve their human resources and administrative and financial capacity.

Investments in infrastructure and equipment will not be sustainable in the long term because local authorities' lack technology and maintenance capacity. Finally, international organizations with the full participation of NGOs and local authorities should support the creation of a regional network, which promotes solid waste recycling and reuse. Relationships between city planners, the private sector, NGOs, CBOs and recycling industries would be useful in sharing innovations and best practices in solid waste management. Such a net work could also result in a powerful lobby.

5.2.6 Non Governmental Organization

Municipal council should encourage different stake holders such as NGOs and CBOs to be involved in solid waste management. NGOs and CBOs are very

important links between local authorities. They have a role to play in providing technical advice and training to citizens. They also have a role to play mobilizing and educating community about solid waste management.

If such support is created, it should be an instrumental in generating the political will needed to make the necessary changes. In Nairobi the NGOs have successfully educated and motivated the CBOs on the benefits and opportunities of composing solid waste (UNEP 1997). They also attempting to build broad based support for composting and recycling through the “Garbage is money” poster campaign, along with continual community participation in solid waste management throughout the city council. Therefore in Kigoma Ujiji municipal council small scale composting of organic waste should be introduced as a means of reducing the quantities of municipal solid waste. Compost produced should be used for agriculture application.

5.2.7 Policy enforcement

There is a lack of comprehensive policy frameworks for solid waste management and the existing legislations lack enforcement. Some of the laws that can be enforced for improper disposal, accumulation of solid waste are:

Municipal by laws, Public health act,

Waste decree

Municipal authorities have by laws dealing with solid waste management issues. The bylaws stipulate that every owner or occupier of house, resident or shop is required to provide proper garbage pans with lids. The garbage should be stored in the bags and to be kept around the roadsides for secondary collection. The by-laws also prohibit the indiscriminate dumping of waste within the city and community boundaries. Therefore, it is the duty and responsibility of the municipal council to enforce these laws to the communities of Kigoma/Ujiji Municipality. The waste decree encourages and enforced by the Health inspectors in the municipal councils. It states and defines the solid waste offences and the fines that people are liable to pay if they offend.

The public health act has several sections relevant to solid waste including issues

such as garbage pan accumulations, inspection to be carried out by Health officers and duties of sanitary inspections. The Public Health Act is the main legislation for solid waste management in Kigoma Ujiji Municipality at the moment. Likewise there is no single legislation in place that makes the producers responsible for their production and post-consumer waste. Therefore, the researcher recommends the enforcement of by-laws and policies to the community members through awareness and education by the concerned authorities.

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APPENDICES

QUESTIONNAIRE ON COMMUNITY PARTICIPATION IN SOLID WASTE MANAGEMENT KIGOMA UJIJI MUNICIPAL COUNCIL.

SECTION ONE

WARD.....

STREET.....

PERSONAL INFORMATION

(i) Sex A. Male B. Female

(ii) Group age: A.15-25 B. 26-40 C. 41-50 D. 51 and above

(iii) Job A. Civil servant B. Private sector C. Not employed

(iv) Education back ground.

 A. Primary B. Secondary C. Certificate D. Diploma D. Degree and above

QUESTIONNAIRE

(1) How often do you dispose solid waste from your household?

 (A). every day (B). Every third day (C). Every fourth day (D).Every week

(2) What material do you use to collect solid waste of your house hold?

 (A). Bamboo basket (B). Sack (C). Plastic bag

(3) Is a Solid waste disposing container available in your neighborhoods?

 (A). Yes (B). No

(4) If your answer in question 3 is yes do you use it? (A). Yes (B). No

(5) If your answer in question 3 is No, what other means do you use to dispose the solid waste of your house hold?

 (A) On the road side (B). on open field (C). I burn it (D). I dump on the sewers

(6) How far is the municipal solid disposing container from your house?

In meters (M)

(7) Who take the solid waste of your house hold to the container?

(A).Myself B. My wife C. My children D. Small scale for disposing solid waste

(8) Are the people participate fully in solid waste management? A) Yes B) No

(9) If yes to what extent? A. Very big B. Big C. Moderate D. Little

(10) How many days per week does the community participate in solid waste management?

A. Once per week B. Twice C. Three times per week, D. Every day.

(11) Are the community aware on effects of solid waste management?

A. Many peoples know B. Some of people knows C. Very few peoples know.

12) Is there any challenges in the community which interfere solid waste management.

A Yes B No

13)If yes what are they? A). Lack of facilities, B). Lack of knowledge, C) Negligence,

D). Lack of mobilization.

E)

Any

other

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(14) Asses the effort of Kigoma Ujiji Municipality in provision of education to the community a

About the solid waste management

(A) Best

(B) Good

(C) Satisfactory

(D) Not satisfactory

(15) Is there a solid waste disposing truck services in your living area?

A. yes B. No

(16) If the answer is yes how often does it come?

A. Daily B. Weekly C. Twice a week

(17) Has the availability of solid waste disposal container contributed to the community awareness on dispose solid waste. (A). Yes (B). No

(18) If the answer for question number 15 is yes mention some reason

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(19) Do you pay fees for solid waste disposal service you get from the Municipal?

A. Yes B. No

(20) If the answer is yes how much do you pay per year? Tshs

(21) What is the effective solid waste management?

A. Composting B. Landfills C. Dumping D. Recycling

(22) Is there any challenges facing community participation in solid waste management?

A. Yes B. No

(23) If yes what kind of challenges facing community participation?

A) Lack of facilities B. Lack of awareness C. Negligence D. lack of mobilization.

D) Others.....

(24) Is there any sorting or separation of solid waste done by community participation?

A. Yes B. No

(25) Does the community centers/public centre's have good and permanent toilets?

A. Yes B. No

(26) Is there any difference between area cleaned by community participation and area cleaned by Individuals? (A). Yes (B). No

(27) If the answer is yes, can the area cleaned by community participation be much more clean? (A) Yes (B) No

(28) Are the community involved in ward or street meeting concerning solid waste

Management? (A) Yes (B) No

**QUESTIONNAIRE TO BE FILLED BY MUNICIPAL HEALTH OFFICERS/
ENVIRONMENTAL OFFICERS**

PERSONAL INFORMATION:

i) Name of the personal filling the questionnaire.....

ii) Position..... Date.....

iii) Profile of workers engaged in solid waste disposal services.

EMPLOYEES			CONTRACT EMPLOYEES		
MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL

QUESTIONNAIRE

1) Are the community aware on the importance of solid waste management?

A. Yes B. No

2) Is there any problem that interferes community participation in solid waste management?

A. Yes B. No

3) If there is a problem mention them

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4) What are the causes of inefficient solid waste management? Lack of

A. Accountability B. Financial contribution C. Physical contribution

D. Others.....

5) Can low solid waste management cause problem to the community?

A Yes B No

6) If yes, mention those problems:

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7) Is the solid waste from the community being handled responsibly?

(A) complete efficient

(B) Somewhat but need more attention

(C) Not at all/Not efficient

8) How do you evaluate the problem of poor solid waste in Kigoma Ujiji Municipal Council?

A. Very big B. Big C. Moderate D. Little

9) Are there adequate numbers of trucks?

A. Yes B. No

10) If yes how many trucks for solid waste disposal

11) Do you plan your work?

A. Yes B. No

12) If the answer is yes. What type of plan do you prepare?

A. Short-Range plan B. Long-Term plan C. Medium-range plan

13) Is there any organization in your Municipal gives similar service as yours?

A. Yes B. No

14) If yes mention them:

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15) What are the sources of income for solid waste disposal services?

A. Municipal budget B. Donor Countries C. Fees collected from services

D. Others.....

16) How many people are assigned to solid waste disposal services daily?

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17) Does the Municipal council provide incentives to the workers under the department

to initiate better performance? A. Yes B. No

18) Is there any appropriate container for solid waste collection? A. Yes B. No

19) Is there any by laws, rules and regulation for solid waste management?

A. Yes B. No

If yes what are the challenges for implementation of those by laws, rule and regulation.

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20) Do the Community participates effectively in solid waste management?

A. Yes B. No

21) Who mostly participate in the community?

A. Children, B. Youth C. Adults D. Men E. Women

22) Do they separate hazardous and non hazardous solid waste? A. yes B. No

23) Is there any sorting which is done from household? A. Yes B. No

24) Are there any organization participate with community in solid waste.

A. Yes B. No

25) If yes what are they?

(1)..... (2).....

(3)..... (4).....

(5).....

26) Does the community centers/public centre's have good and permanent toilets?

QUESTIONNAIRE FOR STREET LEADERS

This questionnaire is for collection of data concerning community participation in solid waste management. Therefore according to your experience, I want to get your opinion on the way community participate in environmental management.

PERSONAL INFORMATION

- i. Ward.....
- ii. Street.....
- iii. Position.....
- iv. District.....

QUESTIONNAIRE

1) Do you participate in mobilization of community to participate effectively in collection of solid waste material for the aim of avoiding problems related to solid waste materials?

a) Yes b) No

2) What kind of ways do you use to to mobilize the community.

a) General meetings b) Seminar c) House to house visit.d) Both way used

3) Are the community participate effectively in solid waste management

A) Yes B) No

4) If the answer is no, mention reason hindering community participation in solid

waste management.

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5) If the answer is yes, how many days per week does the community participate in solid waste management?

a) Daily

b) Once per week

c) Twice per week

6) Is the agenda of solid waste material being discussed in every meetings conducted in the ward? a) Yes b) No

7) What challenges which interfere community participation in solid waste management?

a) Lack of facilities b) Lack of knowledge c. Negligence, d. Low mobilization

8) Are the community pay fees for solid waste management? a) Yes b) No

9) If yes how much do they pay per month?

10) Is there any Non governmental Organizations or community base organizations dealing with solid waste management? a) Yes b) No

11) If the answer is yes mention them.

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12) How do you evaluate the problem of solid waste management in Kigoma Ujiji Municipal council?

a) Very big

b) Big

c) Moderate

d) Little

13) Are there enough trucks which collects waste material in your area?

A) Yes B) No

14) If yes how often does the truck come to collect waste material?

d) Daily

e) Once per week

f) Twice per week

15) How many facilities do you use to collect waste material in your area?

16) Is there any by laws concerning solid waste material? A) Yes b)No

17)What are the challenges interfere implementation of those laws?.....

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18) Does the community or public centers in your area having good and permanent toilets?

A) Yes B) No

19) Are the community aware on the importance of solid waste management?

a) Yes b) No

20) Are the community understand and know the importance of solid waste management?

a) All people know b) Half of people knows c) Few people knows