PREDICTION OF AMOUNT OF SOLID WASTE IN MOROGORO MUNICIPAL COUNCIL

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BY

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A Research Report Submitted in Partial Fulfillment of the Requirements for Award of Master of Science Project Planning and Management (MSc. PPM) of Mzumbe University.

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CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University the dissertation entitled, "**Prediction of Amount Solid Waste in Morogoro Municipal Council"** A case of Morogoro Municipality in partial/ fulfillment of the requirements for the degree of Master of Science of Project Planning and Management (MSc. PPM) of Mzumbe University.

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Major Supervisor

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DECLARATIONAND COPYRIGHT

I, RithaMalata, declared that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature…….

Date…….

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DEDICATION

With unconditional love and appreciation, this work is dedicated to my beloved parents Mr&MrsMalata for their love, inspirational, unlimited prayers, and financial support. My success is our success. God bless you all.

ABBREVIATIONS

EAC	-	East Africa Community
EMA	-	Environmental Management Act
MSW	-	Municipal Solid Waste
NBS	-	National Bureau of Statistics
SDGs	-	Sustainable Development Goals
SWM	-	Solid Waste Management
UN	-	United Nations
WB	-	World Bank

ABSTRACT

This study deals with prediction of amount of solid waste per household in Morogoro Municipality to implement sustainable development given that the households stop improper discarding of waste. Improper solid waste management is a problem in developing cities and towns; therefore, something needed to be done to solve this.

The study used cross sectional data obtained from 200 households in three wards of Kichangani, Sultan Area and Mwembesongo. Both quantitative and qualitative data were used. A study estimated the social status, formal institution variable, and willingness to pay to achieve amount of solid waste collected. To determine variables influencing amount of solid waste collection at household level, multiple linear regression model was used.

The estimated results showed that age, education (year spent on schooling), family size, awareness and law enforcement predict the amount of solid waste collection in Morogoro Municipal Council. But income, household ownership, year of stay, household distance from the dumping place, human power, and willingness to pay have insignificant effect on amount of solid waste collection. R Square of the model was 46%.

Therefore, the study recommended that the government has to enhance the effective Solid Waste Management by; formulating a policy that motivate people who under 25 years to participate on solid waste collection; provision of special training to the people who never spent year on schooling; promoting family planning programs to control the family size; extended households awareness through trainings and campaigns; and enforce laws through penalties and fines on offenders.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This section included the briefly summary about this study. This study dealt with the solid waste collection at the household level for sustainable development. This research concentrated much on the amount of solid waste collection for sustainable development. Sustainable development means the development that meets the needs of the present without compromising the ability of future generation (URT, 2019). This also means the organizing principle for meeting human development goals while simultaneously sustaining the ability of natural systems to supply the natural resources and ecosystem services upon which the economy and society depend (Yhdego, 2017).

The study included the social status, institution (EMA), and willingness to pay in determining amount of solid wastes collected for sustainable development. Therefore, this chapter had background, research problem statement, research objectives, research questions and significance of the study.

1.1 Background of the study

The Solid Waste Management problem has been a threat to both developing countries and developed countries, whereby probable more than 3.5 billion or more than 52% of the world population does not have access to waste management services (Alemayehu*et al*., 2017). Tanzania is among the developing countries which face the problem of Solid Waste Management. The problem becomes very serious in urban centers, since, big numbers of the people are living at squatter settlement with poor infrastructure of Solid Waste Management (Bakanga, 2014).The increase of population in the urban is due to the movement of the people from rural to urban, which has led to an increase of human activities which are the source of increasing rate of incomeand as well as waste production (Huisman H *et al*., 2016). The growth of population has considered as anorigin of all

environmental destruction which can cause additional costs in the government (Bakanga, 2014).So far, human activities are very important thus cannot be avoided (Mnyanyi, 2014). Therefore, there is a need of carrying activities of Solid Waste Management to all stakeholders in order to reduce solid waste products and increase GDP just like developed countries (Huisman *et al*., 2016).

The Solid Waste Management, according to Mnyanyi(2014) states that, 'it is the discipline associated with control of generation, storage, collection, transport, treatment and disposal of solid waste in a manner that is according with the best principles of public health, economics, engineering, conservation, aesthetic and other environmental consideration'.In general, weak Solid Waste Management can lead to various negative effects such as enhance diseases like cholera and diarrhea; and also provide breeding sites for diseases vectors, especially mosquitoes (malaria), flies (diarrhea) and rodents (Chengula*et al*., 2015). On top of that poor Solid Waste Management has negative environmental impact, like increasing greenhouse gas emission and methane (Yhdego, 2017). Therefore, proper solid Waste Management is very crucial to protect the whole community health (Mnyanyi, 2014).

Before 1970, Solid Waste Management was not taken as a very important issue to deal with by most of the countries (Yhdego*et al*., 2016). But, currently things are quite different due to the fact that different strategies have been done worldwide to reduce waste generation (Mnyanyi, 2014). For instance, UN introduced Sustainable Development Goals (SDGs) which has 17 goals to be accomplished on 2030 by the members of United Nations. Goal number 12 is specifically aiming to ensure sustainable consumption and production pattern whereby it is directly targeting in reducing waste products of both organic and inorganic materials. Moreover, the World Bank (WB) provides some aids to some developing countries including Tanzania, in order to support the project of Solid Waste Management (Yhdego*et al*.,2016).

after independence of Tanzania, there were introduction of various policy tools to ensure there is Solid Waste Management (Bakanga, 2014). Those tools some of them are

described in the following Acts, which are Environmental Management Act, Local Government Act (1982), Public Health Act (2009) and Land Act (1999) with the amendments of 2009 (Bakanga, 2014).In Tanzania, urban authorities are responsible for waste management (Yhdego, 2017). So far, the duty of Local government authorities as the stakeholder that deals with Solid Waste Management is specified by the Solid Waste Management Regulation of 2009 which developed under Environmental Management Act (EMA). Part IX of the regulations focuses on waste management by authoring local government with the duty to control and reduce waste at the source (Yhdego, 2017).

Moreover, the government of Tanzania increases more efforts by not to let the work of dealing with Solid Waste Management to onlytothe departments of public health just like before, with the single aim of fighting against diseases by reducing waste (Yhdego and Kingu, 2016). Through, the central government enacted "Environmental (Solid Waste Management) Regulations 2009, it integrated natural resources, health and environment in a single structure of legislative (Yhdegoand Kingu, 2016).

Furthermore, to solve the problem of Solid waste which challenging the government, Awopetu*et al* (2014); Oloruntade*et al* (2014) and Huisman *et al* (2016), suggested the creation of private special agencies to deal with Solid Waste Management which include the collection process, transportation, incineration, recycling and conversion of Municipal Solid Waste (MSW) to wealth. This is directly supported by another policy tool which include all other private stakeholders, known as the public private partnership policy (PPP) (Bakanga, 2014).

1.2 The Statement of the problem

The fast growth of Tanzanian towns and cities increase unavoidable generation of solid waste (Hoorweg, 2013: Megersa, 2018). The country has been striving to improve urban Solid Waste Management (Yhdego, 2017), through institutional frameworks for waste management since1990s(YhdegoandKingu, 2016).The severity of the problem has compelled the government to develop the Environment Management Act (EMA) of 2004

which is the umbrella law on environment management in Tanzania. Section 114 (1), 118 and 119 of the Act stipulates the duty of local government authorities in managing and minimizing solid waste. Other legislations governing municipal solid waste management includes; Environment (solid waste management) Regulation of 2009 which applies to all matters about solid waste and the Environment Management (Hazardous Waste Control) Regulation of 2009.

According to Alemayehu*et al*., (2017),used demographic factors, socio-economic factors and institutional factors to determine the household Solid Waste Management practices in Ethiopia.Educational and marital status, family size, monthly income, Year of stay, location of household, access micro and small scale enterprises , awareness on solid waste management , attitude on Solid waste management and law enforcement were found to be associated with improper solid waste management. Manpower, budget, and facilities such as adequate vehicles were the reasons for low performance of solid waste management.

Moreover, Brown (2015) studied factors such as demographic and socio-economic factors to analyze the influence to Solid Waste Management at household level and he concluded that the residents of Nyamagana Municipality needed health education, a regular supply of waste collection facilities, emphasis on Mwanza city council's waste management by-law and designated dumping sites in their wards.

Also, Megersa (2018), in his study which aimed to investigate the determinants of effective household Solid Waste Management at Jimma town in Ethiopia investigated demographic factors, socio-cultural factors and institutional factors as the determinants factors of effective household Solid Waste Management and recommended that the municipal administration to encourage the residents on effective ways to solid waste disposals and provision of training. Moreover he proposed to enact Solid Waste Management laws with stiffer penalties on offenders, provide more solid evacuation facilities and equipment.

According to Mpollo (2017), Morogoro municipal faced solid waste problem and the municipal council involved the Community Based Organizations' (CBOs) to implement Solid Waste Management strategy. Such strategy worked well in some of the wards in Morogoro municipal while other wards it did not work out. He argued that administrative, political, and social operation factors have influence on solid waste management.

Also, Mfinangaet *al*., (2018), studied factors such as awareness, willingness to pay, private solid waste collector involvement, law and regulations as a determinants of SWM. The results of the study conclude that the need of the separation of waste at source, increase awareness, household's willingness to pay for waste collection services and the municipality should penalize the households which violate the SWM regulation.

In addition, Mollel (2016), conducted a study assess economic analysis for SWM option. She analyzed the types and sources of MSW produced and conduct CB analysis of SWMoption. She argued that Morogoro municipality generate about 200 metric tons of solid waste products, but the Municipal authorities can only collect and dispose less than 130 tones the generated waste. Despite of all measures, yet, the problem persists.

The related studies of solid waste management which done in Morogoro municipalbyMfinanga*et al*., (2018), Mollel (2016) and Mpollo(2017) did not provide information about formal institution. This study used both qualitative and quantitative methods todeterminetheamount of solid waste at household level for Solid Waste Management.Also the sample size is 200 which is large number than other sample sizes of other studies. Also, other related studies such as Alemayehu *et al*., (2017), Megersa (2018), Brown (2015), Njoroge *et al*., (2014) and Ezechi*et al*., (2017) conducted their studies outside the Morogoro region. They supplied the informationwhich does not apply to environmental management. Hence,this study shed the light ondeterminant that influence amount of solid waste collected per household which made contribution inSolid Waste prediction as a strategy to implement sustainable development goals.

1.3 Research Objectives

1.3.1 General Research Objective

The general aim of this study was to predict the amount of solid waste collection among the households of Morogoro Municipal Council to implement the sustainable development goal.

1.3.2 Specific Research Objectives

i. To analyze thesocial status individuals in the houselds in relation to production of solid waste collected from their houses.
ii. Examinee influence of formal institutionon on the amount of solid waste collected from the households premises.
iii. To determine the influence of willingness to pay for the amount of solid waste collectionproduced by the household.

1.4Research study Significance

The findings of this study will help policy makers in Tanzania in planning programmes which will directly contribute to effectively Solid Waste Management (SWM) through setting up and formulating good policies to enhance proper allocation of waste products.

Also, this study will make possible for the people to be aware that everyone in the country is responsible to manage SolidWasteso as to protect a communities from communicable diseases and protect the environmentfor sustainable development.

Furthermore, the study will help the author to be assessed using this report and eventually receive her master's degree in project management.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is a theoretical chapter explaining theories guided this study. It gives ideas related to studies abut SWM and findings from other researchers. It is is about published articles, thesis, and books on SWM. That information related with this study which was done so as to develop new ideas liked to the past experiences from other authors. The first section enclosed theoretical review section which included theory which used by a researcher in the study. The second was empirical review section that involved numerous studies and their authors written so as to get information which was known and draw new idea on how to go about with the problem.

Therefore, this chapter discusses literature associated with the study. It includes key words of the study, theoretical, the conceptual and empirical study done by different scholars and authors on matter related to the problems under investigation. It also entails the study gap which appears on theoretical review and empirical study.

2.1.0Operational definition:

2.1.1 Social status

These took consideration of people's social and cultural context. According to Muche (2016), Solid Waste Management system is determined on the structure of managing wastes and the perception of people's social and cultural. Social status involves gender, age, level of education, education (years spent on education), year of stay, family size, awareness, human power, income and distance from the household to the dumping place.

According to the study which done by Alemayehu*et al*., (2017), social factors which affect or influence amount of household solid waste management are education status, marital status, family size and year of stay in current households. In their study results show that,

the higher the education of the head of household the proper household solid waste management. Also, the higher number of the family size, the proper solid waste management but if the family members increasing the manpower in waste management activity.According to McAllister (2015) and Luong *et al*., (2013), there is the need for the developing countries to raise public awareness as the way households to know their responsibilities in ensuring amount of Solid Waste collection.

The term "income" refers to revenue which received at a specific period such as annual or more frequent intervals and is available for current expenditure. Household income is the key determinant of knowing how muchhousehold consumes and save. The increase of income can be a source of waste generation due to the increase of consumption of a certain product (Mfinanga*et al*., 2018). Likely, the increase of income can lead to amount of Solid Waste Management.

According to McAllister (2015), the developing countries face the problem of poor Solid Waste Management due to the low or middle income level, unlikely developed countries that use their income in paying for the service cost of Solid Waste Management. This means it is possible for the person to be willing to pay for the waste service collection when the income is higher rather than when it is low. This shows that, there is positive relation between income and willing to pay. Therefore, poor Solid Waste Management can be caused by low- or middle-income level, as people fail to pay charges that imposed by the local authorities for solid waste collection.

2.1.2 Formal institutions

"Formal institutions" refers to all written rules which a certain community ordered to follow which are imposed by aauthority. Formal institution includes law enforcement (EMA) that influencing amount of Solid Waste collected. To ensure Solid Waste Management, the government has taken various efforts or strategies such as establishing various laws, policies and regulation (Khamis, 2016).

According to Mfinanga*et al*., (2018), the municipality should ensure law enforcement through penalize the households which break or violate the Solid Waste Management regulations. Sometimes, there is a need of full detail on how the implementation of laws should take place. For instance, absence of implementation strategy of laws due to the lack of detail on enforcement procedures and penalties from Environmental Management Act (2004) and Solid Waste Management Regulations (2009),cause poor enforcement of laws as it is resulted to ineffectiveness of Solid Waste Management (Huisman *et al*., 2016).

2.1.3 Willingness to Pay

The "Willingness to Pay" means to make an assessment or estimation of valuation of the benefit which a person will gain or earn from a resource (Lunoja, 2016). It is crucial to improve the Willingness to Pay for waste collection services (Mfinanga*et al*., 2018). Thus, those payment from the household, make possible for local authorities to collect the amount of waste products, unlikely when people are not willing to pay for the services which resulted to failure of collection of waste products due to the limited budgets which the local authorities have as resulted to low amount of Solid Waste Management. So, the local authorities should create or formulate by laws, whereby people will have willing to pay for Solid Waste collection due to theperceptionmade to them (Khamis, 2016).

Other definitions;

2.1.4Solid Waste Management

The term "waste" refers to unwanted material for an individual who releases it, as it has no value to him/her again after using it (Wangatia, 2013). Waste can be liquid, solid, gaseous or radioactive that exposed in the environment and causes changes (EMA, 2004).In this study, waste refers to any unwanted material which is produced after the consumption of a certain resource.

According to Swain P *et al*., (2018), Solid Waste may be defined as a creation of substances which are worthless that are remained after consuming once. Also means, those are materials which are from various activities such as waste water treatment plant, water supply treatment plant, or air pollution control facility (Millinga, 2016).Solid waste is a general term used to describe non-liquid waste materials arising from various consumption and production activities of people (Sizya, 2015).

The environmental management Act (2004), states "Solid Waste Management" as an essential services that is provided to protect the environment and public health, promote hygiene, recover materials, avoid waste , reduce waste quantities, decrease emission and residuals and prevent spread of diseases and environmental pollution. It involves the generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes (Wolde, 2015). Also, Mohamoud (2016), other activities of solid waste management are such as collection, transportation, and disposal of waste products.

Waste management encompasses management of all processes and resources for proper handling of waste materials, from maintenance of waste transport trucks and dumping facilities to compliance with health codes and environmental regulations (Business dictionary, 2014).

In this study, Solid Waste Management refers to the services provided by the local government to the cities, municipalities, towns, or urban areas for the purpose of managing solid waste products. The service involves the collection of solid waste products from the different areas such as households, institutions, and industrial sectors.

2.2 Theoretical Review

In this section involved one theory which was explaining factors relevant to the study. The study had only one theory because it wassufficient to explain the variables in the study of Municipal Solid Waste Management. The theory was known as Course theory.

2.2.1 Course theorem

This theory introduced by Ronald Coase in 18th century, who tried to assess what would happen in a world in which transaction costs were assumed to be zero. Course theorem states that ‘‘when there are conflicting property right, bargaining between the parties involved will lead to an efficient outcome regardless of which party is ultimately awarded the property rights, as long as the transaction costs associated with bargaining are negligible’’.

He examined two situations; one in which the firm is liable to pay compensation for the harm which their actions imposed on others and one in which the firms were not liable. According to his example one which had been used by his critics, was that ranchers whose cattle strayed and destroyed the crops of neighboring farmers. Then if transaction costs were assumed to be zero and the rights of the various parties well defined, the allocation of resources would be the same in both these situations. If the cattle raiser had to pay to the crop farmer the value of the damage caused by his cattle, he would obviously include this in his costs. But if the cattle raiser were not liable for damage, the crop farmer would be willing to pay (up to) the value of the damage to induce the cattle raiser to stop it, so that for the cattle raiser to continue his operations and bring about this crop damage would mean foregoing this sum, which would therefore become a cost of continuing to raise cattle. The same cost on the cattle raiser in both situations.

Also, if the cattle raiser were liable, it would always be possible to negotiate abandonment of crop production or a change in the crop planted whenever this reduced the damage by an amount greater than the fall in the value of the crop (excluding damage). In addition, he argues that other measures may consider in the costs of the cattle raiser may well be less than the damage which the cattle would cause. He concluded that the ultimate result (which maximizes the value of production) is independent of legal system if the pricing system is assumed to work without cost.

2.3 Empirical Review

In this section included some studies which done by some authors relevant to the social status, formal economic institution, informal economic, income and willingness to pay that led to the solid Waste Management at household level in different areas in the world. The below are those some authors and their studies:

2.3.1 Social status

2.3.1.1 Age

Age has got positive relationship with solid waste management.Age was found significantly related with proper household waste management. The increase of the age of a person leads to proper management of solid waste. As a person getsolderthemost likely a person can participate on proper solid waste management rather than the younger one (Alemayehu *et al*., 2017).

Also, sometimes age has positive relationship with solid waste management but not significant. This is due to the fact that, the elders have got a lot of economic activities to deal with so it is impossible for them to participate in activities of solid waste management.According to Kinyua*et al*., (2016) and Megersa (2018), said age does not influence the practice of solid waste management in the community. This means being older one or young one does not make any change in participation to the solid waste management.

2.3.1.2 Gender

There is strong relationship between gender and solid waste management. This implies that females tend to take partmuch on solid waste activities compared to male. According to Mnyanyi (2014), low amount of solid waste collection can be existed due to the participation of higher number of the males. This means males engaged themselves in other trade activities that performed outside of the compound than solid waste management activities.

According to Kinyua et al., (2016), gender has no relationship with solid waste management. This means being a female or male does not make any change with solid waste management. This is because other factor rather than gender can influence amount of solid waste collection.

2.3.1.3Education level

This is another variable which influencing Solid Waste collection. Education has a positive relationship with Solid Waste Management. This means a person with higher education level tends to manage solid waste. While a person with lower education level tends to improper solid waste management. According to Alemayehu*et al.,* (2017), literates were more likely to have proper solid waste management than illiterate. This implied that for the person who has got education has a possibility to manage Solid waste compared to the person who has no education. Literates know the impacts of improper manage of solid waste products such as diseases, which he or she must avoid them unlikely illiterate. Therefore, education was found to be significantly associated with improper household waste management.

According to Tassie (2018), education has a positive relationship with solid waste management. But it has not significant due to literates has an opportunity to work out of their households and use much of the time at the work as a result improper solid waste management. While illiterate hasnot an opportunity to work but still do not ensure there is proper management of the solid waste at their households.

2.3.1.4 Year of schooling

In terms of year of schooling (education), it has two sides whereby other study agreed that there is relationship between year of stay and solid waste management and others said there is no relationship. On the side of year of staying has got no relationship with solid waste management. According to Kinyua*et al*., (2016), said a person might spend lot of years on education and still practice poor solid waste management. This is due to the fact that a person might use many years on education but studying unrelated programmes with

the management of solid waste products. While a person might use short period of time (may be less than one year) in attending trainings and informal education, become more amount of on solid waste management activities compared to the other who spend more than one year schooling.

According to Brown (2015), there is strong relationship between years spend on education and the practices of amount of solid waste management. This means the practice of solid waste management will be higher to the person who spends more than seven years in schooling. While for the person who did not spend any year or less than seven years will lack of enough knowledge about in amount of solid waste management.

Therefore, it is very crucial to reach proper solid waste management but this can be done only through improving education which provided to the people (Alemayehu*et al*., 2017). A person can be spent long or short period on schooling due to proper education can lead to proper solid waste management.

2.3.1.5 Family size

The family size is another variable which influencing solid waste management. Empirical evidence of the relationship between family size and solid waste management is different. Example some of studies which done by Nkechi*et al*., (2017), Alemayehu*et al*., (2017)and Brown (2015), said when the household has got large number of family members, there is an opportunity of participating in solid waste collection as resulted to proper solid waste management. While small family size can lead to improper solid waste management due to the poor participation on separation and dispose wastes due to small number of the people. This show there is positive relationship between family size and solid waste management.

This is contrary to the other studies which done by Tassie (2018) and Megersa (2018), argued that when the household has small number of family members, there will be small generation of waste products. This will lead to proper solid waste management as there is little creation of solid waste products.While a household which has large family, members

has been generating large amount of solid waste products due to some reason such as consuming of a lot of commodities as a creation of food leftover. This shows there is negative relationship between family size and solid waste management.

Also, other study which done by Kinyua*et al*., (2016), said there is no relationship between family size and solid waste management. This means there might be increasing or decreasing of the family members without affecting solid waste management. They added that knowledge and altitude are the one which influencing the solid waste management.

2.3.1.6 House ownership

According to Vitor*et al*., (2013), said house ownership has a positive influence to the solid waste management. For instant, the house owner is willing to clean his or her compound without any force and pay for the service of solid waste collection. Tenant is not expected to be willing to pay and cleaning the house for achieving amount of solid waste management.

2.3.1.7 Years of staying

Also, year of staying in the household has got positive relationship with the proper managing of solid waste. This implied the person who stayed for more period than the other has got probability of doing proper solid waste management than the others. According to Alemayehu*et al*., (2017), existence of improper solid waste management at a certain place is due to a person stay for short period. This means a person who stayed for less than one year is likely to practice improper solid waste management compared to the one who for more than one year.

According to the Megersa (2018), said there is higher possibility for the long-existed dweller to take part effectively on solid waste management due to the experience he or she get for staying long period in the same households. While it is exceedingly difficult for the new comes to participateamount of on activities of solid waste management due to the lack of experience with the surroundings.

2.3.1.8 Human power

Human power has a significant positive relationship with amount of solid waste management. This means when the workforce is higher there is higher amount of solid waste management compared to low workforce. According to Megersa (2018), low amount of solid waste management activity is due to low workforce that leads to lack of enough services in collecting solid wastes from the households.

2.3.1.9 Awareness

There is positive relationship between awareness and amount of solid waste management. This implied that when people have high awareness about solid waste management there is more likely to have amount of solid waste management. According to Megersa (2018) and Nkechi et al., (2017), in their study which done in Ethiopia and Zanzibar respectively, argued that awareness is especially crucial factor in a society to ensure solid waste management. But due to majority of the people who are aware about managing solid waste ensuring high amount of solid waste management do not practice lead to improper solid waste management.

Moreover, Muche (2016) and Ezechi*et al*., (2017) argued that the public awareness has a relationship with solid waste management. According to him lack of public awareness in the community is among the social problems which led to low amount of solid waste management. Improving awareness in the public by educating the people can change the perception of people toward solid waste management.

2.3.1.10 Distance from household to the dumping place

Distance from household to the dumping place has got a positive relationship with solid waste management. This means the more the household near to the dumping place where solid wastes thrown, the more likely to ensure proper solid waste management. According to Alemayehu *et al*., (2017), said when the distance from the road where solid wastes are

collected is near the household there is possibility of ensuring higher amount of solid waste management.

Furthermore, according to Megersa (2018), argued that the distance from the main road where solid waste collected has positive significant but negatively significant level. This is since when the household is far from the main road where solid wastes collected there is a possibility of the people to practice poor solid wastes disposal such as throw solid wastes everywhere. Unlikely when the distance from the main road is not far (near) to the households.

2.3.1.11 Household income

Household income is another variable which influencing solid waste management. It has a positive relationship with solid waste management. This means an increasing of household income can associated with the high amount of solid waste management (Alemayehu *et al*., 2017: Brown, 2015). This is due to the fact that a rich person can afford to pay a cost of solid waste collection at any cost unlikely a poor person.

Income has got a positive relationship with solid waste generation that resulted to improper solid waste management. According to Tassie (2018), people with higher income have a possibility of generating more waste than the lower income people. This is due to demand of commodities for those people are higher when their income is also higher. This increasing the generation of solid waste products from the products consuming which resulted to improper solid waste management.

Furthermore, household income has no relationship with solid waste management. This means the increase or decrease of income level has no effect on activities of solid waste management. According to Megersa (2018), people can earn the same income level per month and they can be either amount of or low amount of solid waste management.

2.3.2 Formal institution

2.3.2.2 Law enforcement

There is positive relationship between law enforcement and amount of solid waste management. According to Alemayehu*et al*., (2017) and Njoroge*et al*., (2014), said strong law enforcement can lead to proper solid waste management. Unlikely the weak law enforcement can lead to low amount of solid waste management. Poor implementation of rules and regulation by municipality due to unfairness in community has led to poor solid waste disposal practices (Megersa, 2018).

2.3.5 Willingness to pay

According to Megersa (2018) and Subhan et al., (2014), said there is positive relationship between willingness to pay and proper solid waste management. This means when the willingness to pay higher also there is higher amount of solid waste management. Tassie (2018), in his study said willingness to pay is associated with the income level of the person. This implied that when the income level of a person is higher there is also higher willingness to pay due to the increasing ability of him or her to cover the cost for solid waste management.

Lower income earners were not willing to pay for the service due to low ability for them to cover the cost. Apart from low income level, other reasons which caused unwillingness to pay were some of the people feel it is okay for them to throw waste products outside in their compound instead of paying for collection. And also, other people believed there was no problem for them to stay with waste products. Therefore, when there was higher willingness to pay, there was existence of proper solid waste management.

2.4. Research gap

Section 2.3included overseers studies which done both outside and inside of Tanzania examined factors which determine solid waste management. The research used studies which have been done outside the country that used both qualitative and quantitative data

to analyze the amount of solid waste management. While for the studies which done in Tanzania, for examples some of them done with; Mollel (2016), MfinangaF*et al.*, (2018) and Yhdego (2017) contain only qualitative data. Therefore, this study usedbothquantitative and qualitative data to study the amount solid waste collected.

So far, this study was different with other studies in section 2.3due to the fact that it dealt generally with social status, institution and willingness to pay which influenced the Solid Waste collection.

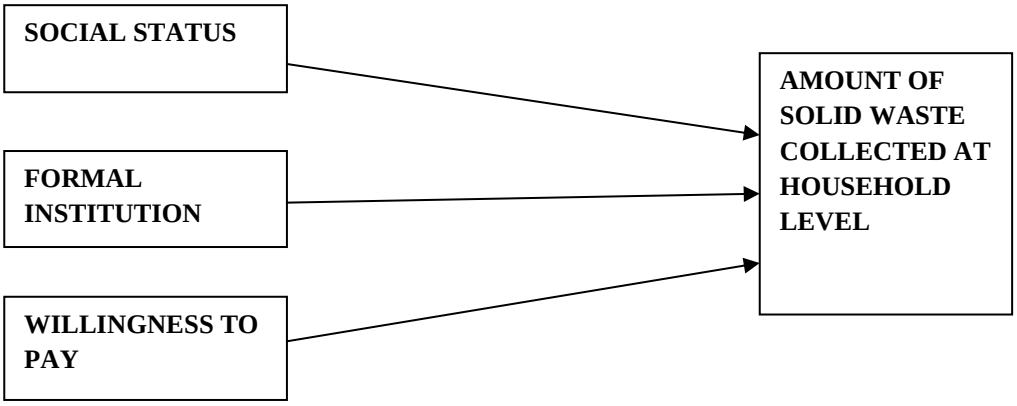
2.5 Conceptual framework

2.5.1 Introduction

According to Kothari (2004), the conceptual framework is an abstract idea, or a theory used to develop new concept or to reinterpret existing ones. In this study, conceptual framework was a diagram which was showing or explaining the relationship between the main aim and specific aims. Through framework, it was possible developing an econometrics model which was explaining the relation between each independent variables and dependent variable.This study analyzed variables that led to amount of Solid Waste collected at households' level; the independent variables were social status, formal institution, and willingness to pay for SW collection service.

2.5.2 Conceptual model

Figure: 2.1Conceptual Framework



Source: Researcher's own construct 2018.

From the figure represent conceptual framework, whereby the dependent variable is the amount of solid waste collected in the household level. Independent variables aresocialstatus, formal institution and Willingness to pay.

2.5.3 Social status

On the social status included variables such as age, gender, education, education level, family size, household ownership, income, awareness, human power, distance from household to the dumping place and years of stay of each household respondent. On the variable of age, the researcher examined if an age influenced the individual on Solid Waste collection at household level. The study assessed the interviewees' age and relate with their contribution of collecting solid waste in the community. Also, on gender variable, the researcher examined each gender (female or male) contribute on waste solid collection; this helped to know the contribution provided by both male and female. Another variable was education, the researcher assessed whether the education variable could contribute to solid waste collection and examined each level of education and check whether each level of education contribution on solid waste collection.

In family size variable, the researcher assessed each household's number of members in the family; assessed the generation of waste products and the contribution of collecting solid waste to manage solid wastes. Moreover, years of stay in a certain household whether it contributed to the solid waste collection. This was done by examining the number of years a person has stayed if it is long or short.

It included awareness of individual households and distance from the dumping place. Awareness variable, the research examined if the individual household's awareness about solid waste management. Also, distance from the dumping place, the researcher assessed

whether the distance from the dumping place contributed on the process of solid waste collection.

Average monthly income, the researcher assessed the income of each head of household and relate to solid waste collection. This helped to know the contribution of each level of income to the solid waste collection. Therefore, the study examined the involvement of household income to solid waste collection. Also, the study assessed human power by asked the respondents if the number of workers dealing with Solid Waste collection are enough.

2.5.4 Formal institution

It included lawn for cement the study assessed law enforcement to check whether it was implemented on solid waste collection.

2.5.5 Willingness to Pay

The willingness to pay by each household was assessed in the study to know the contribution to solid waste collection. So far, the respondent was asked if he or she was willing to pay for the services provided of collecting solid waste he/ she generated. And how much was he/she willing to pay for the services provided.

2.5.8 Amount of Solid Waste collected

This is a dependent variable which was determined by above variables, which were social status, formal institution, and willingness to pay.

2.5.9 Hypothesis

The following are hypotheses statements of different variables:

- The higher income, the higher amount of solid waste collected at household level.
- The higher rate of willingness to pay by household, the higher amount of solid waste collected at household level.

- The higher the age of a person, the higher amount of solid waste collected at household level.
- The higher the level of a person's education, the higher amount of solid waste collected at household level.
- The higher number of the year of staying at a particular house, the higher amount of solid waste collected at household level.
- The higher the degree of law enforcement, the higher amount of solid waste collected at household level.
- The higher number of human powers, the higher amount of solid waste collected at household level.
- The higher level of awareness to an individual, the higher amount of solid waste collected at household level.
- The shorter distance from household to dumping place, the higher amount of solid waste collected at household level.

2.5.10 Conclusion

The amount of Solid Waste collected was directly related to the above variables, which are social status, formal institution and willingness to pay. But also, according to the other authors from literature review amount of solid waste collected was determined by other factors such as demographic factors, health factors, social and cultural.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Chapter had different sections which summarized ways or methods used in doing the research to produce useful and proper research. The first section explained the type of research design which a researcher used in the study. There are many types of research design, but this study chose to use cross sectional research design as it is suitable for data which collected during interview.

The second section explained where the study took place and the number of people needed in the research. Type of sampling technique was used in obtaining of sample size. Also, other section specified all variables and measurements which used in this study. The section included types and sources of data were written on this chapter. And the methods which used in data collection were written. Last section involved data analysis methods, whereby the method used in analyzing data was mentioned.

Therefore, this chapter covered type of the study, study area, study population, units of analysis, variables and their measurements, sample size and sampling techniques, types and sources of data, data collection methods, validity issues and data analysis methods.

3.1 Research design

According to Kothari (2004), the research design is the conceptual structure within which research is conducted. It is the blueprint for the collection, measurement, and analysis of data. In this study research design, which was used took a form of the cross-sectional design, since only a collection of data was done across different households in Morogoro at a single time. Cross-sectional studies portray a snapshot of the prevalent situation as in

these studies variables of interest in a sample are assessed only once to determine the relationships between them (Singh, 2007).

The study used cross sectional research study because it did not cost much in terms of fund to conduct or perform and did not require a lot of time; and also contained multiple variables at the time of the data collection.Alsoother studies which used a similar research design of cross sectional were Hagos *et al.,* (2013), Mfinanga*et al.*,(2018), Brown (2015), Alemayehu *et al.*,(2017)and Kinyua *et al.*, (2016) to conduct their research studies.

3.2 Study Area

The study was conducted at Morogoro municipal which is among of the district found in Morogoro. Morogoro Municipal lies between Latitude 50 to 580 and 100 to 00 to the South of the equator and Longitude 350 to 250 and 300 to the East. Morogoro Municipal covers 260 square kilometers (100 sq mi) being surrounded to the east and south by the Morogoro Rural District and to the north and west by Mvomero District (Mfinanga*et al*., 2018).The municipal is under Morogoro region which is enclosed by Coast region to the east, Dodoma and Iringa to the west, Ruvuma and Lindi to the south and Tanga and Manyara to the north. Morogoro municipal contains 19 administrative wards and based on 2012 national census the total population was 315,866 whereby 151,700 were males and 164,166 females making an average household size of 4.1 (National Bureau of Statistics, 2014: Mfinanga*et al*., 2018).

Morogoro Municipal ethnic groups are Waluguru and mixed groups.Morogoro Municipality residents have mixed economic activities including civil workers, farmers, business enterprises and industries of various categories (Mfinanga*et al*., 2018). The study conducted on this area because it had all requirements needed for sufficient information about Solid Waste Management at household level such as Morogoro Municipality generated daily 200 metric tonnes but capacity of disposing them was less than 35% (Mollel, 2016).

3.3 Target Population

The target population defined as the group of elements that must be limited and can be counted to which the researcher wants to make conclusion (Ishach and Abubakar, 2014). The target population was all heads of households aged above 18 years, who were living in Morogoro Municipal Council at three wards that was Kichangani, Mwembesongo and Sultani Area. The total number of households was 12,912 where each head of household responded the questionnaire (National Bureau of Statistics, 2014).

3.4 Units of Analysis

The unit of analysis was three wards which wereKichangani, Sultani and Mwembesongo.

3.5 Sample size

This refers to the number of items to be selected from the universe to constitute a sample (Kothari, 2004). The size of sample should neither be excessively large, nor too small. It should be best. A best sample is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility (Kothari, 2004). In this study, three wards which were Mwembesongo, Kichangani and Sultani that contained 3231, 9410 and 271 households respectively. The total number of households was 12,912. From sample technique (formula), which was developed by Yamane (1967) to determine sample size (n) with the desire degree of precession for general population, had been used. In this case population variable (p) was house unit's variable. The formula was also used in the research study which done by Khamis (2016) to get a sample size.

It was given as;

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

Whereby,

n= sample size,

N= Total number of population (12,912)

e= Random error which can be (7% or 0.07).

From the formula above,

$$n= \frac{12,912}{1+(12,912*(0.07)^2)}$$

=200

Therefore, 200 respondents were used as a sample size in the research study

3.6 Sampling techniques

There are two sampling techniques that is probability sampling and non-probability sampling techniques (Saunders *et al*., 2007). In this study, probability sample technique used. It assumed that each element in universe has equal chance of being selected (Kothari, 2004). In other name the probability sample technique is known as random or chance sampling. Each element of population has known chance of being selected for the sample.

3.6.1 Simple random sampling

In this study, the method of simple randomly sampling was used to select a sample of respondents. According to Kothari (2004), simple random sampling was the one whereby, the individual observation or individuals were chosen in such a way that each had equal chance of being selected, and each choice is independent of any choice. This means each element had very important data or information to provide without any exceptional.

According to Kumar (2005) define Simple random sampling (SRS) is a method of selection of a sample comprising of n number of sampling units out of the population having N number of sampling units such that every sampling unit has an equal chance of being chosen. Furthermore suggested that, the samples could be drawn in two possible ways, firstly the sampling units were chosen without replacement in the sense that the units once chosen were not placed back in the population and secondly the sampling units

were chosen with replacement in the sense that the chosen units were placed back in the population.

This technique used in this study because the entire population was listed that were finite population. The simple random sampling technique used by Tassie (2018), Mfinanga*et al*., (2018) and Laor*et al* (2017) in their studies.

3.7 Nature of the Data/ Source of the Data

In this study both primary and secondary data were included.

3.7.1 Primary data source

These were data collected afresh and for the first time and thus happen to be original in character (Kothari, 2005).This was the source of the data at the first hand where by the origin information was collected from the people through questionnaires, observations and interviews (Thamilarasan, 2015). Primary data were collected from the respondents from the chosen households (200) in Morogoro Municipal through questionnaires. Respondents provided data on social status, formal institution, and willingness to pay from questionnaires which helped to know the whole situation of solid waste collected.

3.7.2 Secondary data source

Secondary data are those data, which have been collected by someone else, and have already passed through statistical processes (Kothari, 2004). These data generatedinreport documents, published data such as various reports, magazines, newspapers, different survey research papers, and presentation. Through secondary data, it was possible to obtain information of other authors on formal institution and solid waste management which helped to contribute in getting new ideas in the research.

3.8Instruments of data collection

These were methods or approaches which were used to gather or collect data from the various sources such as documentary review, observation, and questionnaires (Kothari,

2004). In this study, the methods were more than one, due to the fact that, every method of collecting the data has got its own strengths and weaknesses.

3.8.1 Documentary Review

This is the method of collecting data or information from the written documents or files such as statistical data, newspapers, text book, records, journal, pamphlets, research paper, project papers, and other written document (Kothari, 2004). This method was used to obtain data or information very easily to make the research possible. This helped in getting the theoretical and empirical background information of the study. That information contributed on what was known and not known in the research.

3.8.2 Observation

According to Kothari (2004), defines observation as a scientific tool and the method of data collection for the researcher. In this study, a researcher used direct observation. Direct observations did offer more information on the study and what activities have been taking place (Kothari, 2004). The information that obtained related to what would be happening. Through observation, it made possible to know how all those activities were incurred. Thus, helped to see directly to see how some of individuals from households participate in Solid Waste Management. Other study which used observation method was the one which done by Khamis (2004).

3.8.3 Questionnaire

This method involved asking questions through written ways or verbal ways, through questions made possible to obtain information or data (Kothari, 2004). In this study, written questionnaire was used to collect data. Both structural questionnaire and nonstructural questionnaires was used in collection of data in this study. The questionnaires were in a form of Swahili language.

Through questionnaire, information on social status, formal institution and willingness to pay of the heads of households in Morogoro Municipal Council were obtained.This helped

to get data for estimation in the model in the study. This questionnaire methods used by in other studies which were done by Alemayehu *et al*., (2017), Jacob (2017), Khamis (2004), Megersa (2018) and Tassie (2018).

3.9 Validity issues

A pilot study was conducted to evaluate the questionnaires in respective study area for their reliability: afterwards, corrections were done in order to obtain reliable data for the research. The questions were checked by the supervisor who has enough experience of preparing questionnaires. This allowed the researcher to study the properties of measurement scales and the items that make them. Since the reliability of data goes with the accuracy or precision of a measuring instrument, in this research study, reliability was concerned with the questionnaires' consistency of responses to the questions asked in repeated measurement (Jacob, 2017).

Validity is defined as the instrument's ability to measure exactly the concept it is supposed to measure (Kothari, 2004). For the researcher to confirm the data and instruments (questionnaires) used in the research, the researcher asked the experts to recommend on their representativeness and suitability. Besides, the researcher allowed suggestions to be made to the structure of these questionnaires. Through the questionnaires, it was possible to have accurate or exactly information about Solid Waste Management at household level.

3.10 Variables and their measurement

Table 3.1: Description of variables and their measurements

SN	Variable	Variable Prefix	Description	Measurement	Expected outcome (sign)
Dependent variable					
1	Amount of solid waste Management	Y_1	Amount of Solid Waste collected (KG).	Continuous	
Independent variables of Household demographic, socio-cultural and institutional factors					
1	Age	X_1	Age of respondent	Continuous (Years)	+/-

2	Education	X_2	Number of years spent in formal schooling	Continuous (Years)	+
3	Education level	X_3	0= None 1= Primary level 2=Secondary level 3= tertiary level	Ordinal	+/-
4	Income	X_4	Monthly household incomes	Continuous	+
5	Year of stay	X_5	Number of Years of spent in the resident	Continuous (years)	+/-
6	Distance from dumping site	X_6	1= <100 m 2=>100 m 2= 100 m	Ordinal	+/-
7	Family size	X_7	Number of the person living in the household.	Continuous	+/-
8	Human Power	X_8	Number of the manpower on Solid Waste Management. Whether a number is enough.	Categorical (Dummy: 1 is enough number and 0 is otherwise).	+
9	House Ownership	X_8	House ownership status 0= rent 1= own	Nominal	+/-
10	Gender	X_9	Gender status 0=Male 1=Female	Nominal	+/-
11	Awareness	X_{10}	Awareness of Solid Waste Management 1= Aware 0= otherwise	Nominal	+
12	Willingness to Pay	X_{12}	Willingness to Pay by a respondent for Solid Waste Management 1= he/she willing to pay 0= otherwise	Nominal	+/-
13	Law enforcement	X_{13}	Access of law enforcement (Whether there is law enforcement) 1= law enforcement 0= otherwise	Nominal	+

3.11 Data analysis methods

Guba and Lincoln (1994) describe data analysis as being a systematic process involving working with the data, organizing, and dividing them into small manageable portions. This explaining what is important and what has been learned to decide what to tell other. The analysis of data requires a number of closely related operations such as establishment of

categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences.

In this study descriptive statistics methods like percentage, frequency, mean, median and standard deviation whereby using table, bar graph and pie chart to describe different result data. Also researcher used the inferential statistics like multiple regression and F-test to test the relationship between variables.

SPSS version 20 software was used to run statistical tests in order to estimate results whereby eleven variables which were age, education, year of stay, income, willingness to pay, formal institution, family size, distance from the household to the dumping place and awareness. Regression coefficient was used by continuous variables to show the strength and direction of the relationship between the dependent and independent variables.

3.11.1 Econometric model

According to Gujarati (2004), there were things to consider when selecting a model, such as data should be predictable; also model should be consistent with the theory (make a good economic sense); have weakly exogenous regressors (explanatory variables should be uncorrelated with the error term); exhibit parameter constancy (the value of the parameter should be stable); exhibit data coherency (the residuals estimated from the model must be purely random); and lastly be encompassing, that is, the model should include all the rival models in the sense that it is capable of explaining their results.

This study used multiple regression models to show the relationship between dependent and independent variables.The method which used in estimating parameters in regression was OLS (Ordinary Least Square).This method depends with the nature of dependent variable which was continuous variable(Gujarati, 2004).Other similar study which used OLS (Ordinary Least Square) wasTassie (2018) in analyzing data. The studies which done by Kinyua *et al*., (2016), Alemayehu *et al.*, (2017), Sizya (2015) and Tassie (2018) used binary logistic regression to show categorical dependent variable explained by the

independent variables. Also, on the study which done by Lunojo (2016) both Tobit and probit regression models used.

The model that was used in this study is shown in the form of a general linear regression as follows:

$Y_i = \beta_0 + \beta_i X_{1i} + \beta_i X_{2i} + .. + \beta_k X_k + u_i$ ..... (I)

Whereby,

$Y_i =$ Dependent variable

β =regression coefficient that describe the changes in the dependent variable that caused by explanatory variables.

$X's =$ Independent/ explanatory variables

u_i= Regression errors term or random errors

Ith and k^{th} is number of observation and parameter to be estimated respectively

3.11.2 Analysis of overall significance of model

According to Gujarati (2004), it was impossible for the t-test to test the joint hypothesis that the true partial slope coefficients are zero simultaneously. This means the z-test and t-test examined only the significance of the different between the means of two samples (Kothari, 2004).Therefore, the joint hypothesis of the study tested by the ANOVA (The Analysis of Variance) technique.

In this study, ANOVA table shows whether the regression model explained a statistically sizable proportion of the variance. The study used ANOVA technique and not MANOVA because it was testing the difference among different groups of data for homogeneity (Kothari, 2004). This implied that the study tested the difference between amount of solid waste products collected and the determinants of solid waste management. Also, other study which used the similar technique of ANOVA was done by Tassie (2018) on his

study of solid waste management service in Ethiopia. Through the Analysis of Variance Approach (ANOVA) we could do F-test.

We could generalize the preceding *F*-testing procedure as follows.

Testing the Overall Significance of a Multiple Regression:

The *F* Test

Decision Rule: Given the *k*-variable regression model:

$Y_i=\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \ldots\ldots\ldots \beta_k X_{ki} + \mu_i$(iii)

To test the hypothesis

$H_0= \beta_2 =\beta_3 =\ldots\ldots\beta_k= 0$

(i.e., all slope coefficients are simultaneously zero) versus

*H*1: Not all slope coefficients are simultaneously zero

Compute

F= $\frac{ESS/df}{RSS/df} = \frac{ESS/(k-1)}{RSS/(n-k)}$……. (iv)

If $F > F_\alpha(k-1, n-k)$ we reject null hypothesis, or we fail to reject alternative hypothesis. Where $F_\alpha(k-1, n-k)$ isthe*critical F* value at theα level of significance and $(k-1)$ numerator df and $(n-k)$ denominator df. Alternatively, if the *p* value of *F* obtained is sufficiently low, one can reject null hypothesis.

3.11.3 Measure of "Goodness of fit"

In the three-variable or more than two explanatory variables model we would like to know the proportion of the variation in *Y* explained by the explanatory variables jointly. The quantity that gives this information is known as the **multiple coefficient of determination** and is denoted by R^2; conceptually it is taking to r^2.

To derive R^2, we may follow the derivation of r^2. Recall that

$$Y_i = \hat{\beta}_1 + \hat{\beta}_2 X_{2i} + \hat{\beta}_3 X_{3i} + \hat{\mu}_i \ldots\ldots\ldots\ldots \quad \text{(iv)}$$

$$Y_i = \hat{Y}_i + \hat{\mu}_i$$

Where $\hat{\mathbf{Y}}_\mathbf{i}$ is the estimated value of $\mathbf{Y_i}$ from the fitted regression line and is an estimator of true E ($Yi \mid X_{2i}, X_{3i}$). Upon shifting to lowercase letters to indicate deviations from the mean values, Eq. 1 may be written as

$$y_i = \hat{\beta}_2 X_{2i} + \hat{\beta}_3 X_{3i} + \hat{\mu}_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(v)}$$

$$y_i = \hat{y}_1 + \hat{\mu}_i$$

Squaring equation (iv) on both sides and summing over the sample values, we obtain

$$\sum y_i^2 = \sum \hat{y}_i^2 + \sum \hat{\mu}_i^2 + 2 \sum \hat{y}_i^2 \hat{\mu}_i^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(vi)}$$

Verbally, equation (v) states that the total sum of squares (TSS) equals the explained sum of squares (ESS) plus the residual sum of squares (RSS). Now substituting for $\sum \hat{\mu}_i^2$ from equation (vi), we obtain new equation (vii) as follows;

$$\sum \hat{\mu}_i^2 = \sum y_i^2 - \hat{\beta}_2 \sum y_i X_{2i} - \hat{\beta}_3 \sum y_i X_{3i} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(vii)}$$

We get equation 5 below;

$$\sum y_i^2 = \sum \hat{y}_i^2 + \sum y_i^2 - \hat{\beta}_2 \sum y_i X_{2i} - \hat{\beta}_3 \sum y_i X_{3i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(viii)}$$

Which, on rearrange gives, the followings;

$$ESS = \sum \hat{y}_i^2 = \hat{\beta}_2 \sum y_i X_{2i} - \hat{\beta}_3 \sum y_i X_{3i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ix)}$$

Now, by definition

$$R^2 = \frac{ESS}{TSS} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(x)}$$

Since the quantities entering equation (x), are generally computed routinely, R^2 can be computed easily. Note that R^2, like r^2, lies between 0 and 1. If it is 1, the fitted regression line explains 100 percent of the variation in *Y*. On the other hand, if it is 0, the model does not explain any of the variation in *Y*. Typically, however, R^2 lies between these extreme values. The fit of the model is said to be "better'' the closer R^2 is to 1.

3.11.4 Model specification

In the study the multiple regression model used was:

$$Y_1 = \beta_\theta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + +\beta_{11} X_{11} + u_i \quad \text{..... (ii)}$$

Where:

Y_1= Amount of Solid Waste Management (amount of Solid Waste collected in kilogram)

β_0 =Constant

$\beta_1, up\ to \beta_{11}$= Coefficients of corresponding explanatory variables of $X_1, \ldots\ldots, \text{and} X_{11}$

X_1= Age

This variable referredtothe age of the head of the household who answered all questionnaires of a single household. It was a continuous variable which was expected affected positively the amount of solid waste collecte.

X_2 =Education (year of spend on schooling)

This variable referred to year spends on education by the person who was a respondent. It was a continuous variable which was expected to affect positively the amount of solid waste collected.

X_3 =Income

This variable referred to the monthly income of respondent in a single household. It was a continuous variable which was expected to affect positively the amount of solid waste collected.

X_4= Year of stay

This variable referred to the year of stay in the same household which was currently living by a respondent. It was a continuous variable which was expected to affect positively the amount of solid waste collected.

X_5 =Distance from the dumping site

This variable referred to the distance from the household of respondent to the dumping place. It was expected to affect positively the amount of solid waste collected.

X_6 =Human Power

This variable referred to the human power that provides solid waste collection service. It was a dummy variable taking a value of 1 if there was enough human power and 0 if there was otherwise. It was expected to affect positively the amount of solid waste collected.

X_7= House ownership

This variable referred to the house ownership. It is a dummy variable taking a value of 1 if the respondent was the owner of the house and o if the respondent rented the house. It was expected to affect positively or negatively the amount of solid waste collected.

X_8 = Awareness

This variable referred to the respondent awareness. It is a dummy variable taking value of 1 if there was enough awareness and 0 if there was otherwise. It was expected to affect positively the amount of solid waste collected.

X_9=Willingness to pay

This variable referred to the willingness to pay of respondent. It is a dummy variable taking a value of 1 if there was enough willingness to pay and 0 if there was otherwise. It was expected to affect positively the amount of solid waste collected.

X_{10}= Law enforcement

This variable referred to the law enforcement. It was a dummy variable taking a value of 1 if there was enough law enforcement and o if there was otherwise. It was expected to affect positively the amount of solid waste collected.

X_{11} = Family size

This variable referred to a family size of respondent in the household. It was a continuous variable. It was expected to affect positively the amount of solid waste collected.

μ = Errors term

3.12 Ethical consideration

Ethical consideration involved willingnessofparticipation of all respondents in the study after being informed (Jacob, 2017). In this study, a researcher used a letter from the university which introduced her in data collection. The letter used to introduce a researcher to the leaders from the three wards in order to get support in data collection in wards.

Also, ethical considerations included; briefing the respondents as to the purpose of the research, their relevance in the research process and expectations from them. The information provided by respondents was treated as confidential and for academic purposes only.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.0 Introduction

Chapter deals with the central part of the study. It reported the findings after analyzing data. The findings included in this study were formal institution, social status, and willingness to pay that led to amount of Solid Waste collected in Morogoro Municipal council at household level.

In this study both qualitative and quantitative findings are presented. So far, the qualitative data are given by descriptive statistics on how the service of Solid Waste collection was effectively. Also, quantitative findings presented from estimated results, include the formal institution, social status and willingness to pay that are examined. At the end of this chapter, all major findings of this study have been summarized.

4.1Age

Age of respondent who was interviewed was considered to start from 18 years as it was believed that they matured to respond questions of the study. In this study, age of respondents was categorized into three groups which include a respondents with less than 25 years, a respondents with 26 up to 50 years and a respondents with greater than 51 years

Table 4.1 Distribution of the respondents' age and their percentages

Age	Frequency	Percent
<25	24	12.0
26-50	137	68.5
>51	39	19.5
Total	200	100.0

From the table 4.1 is distribution of the respondents' age. Out of 200 (100%), 24 (12%) were respondents with less than 25 years. This number may be ranked as the third in

magnitude while majorities were respondents with age between 26 years up to 50 years. The respondents with age between 26 years up to 50 years were 137(68.5%) out of 200(100%). The respondents with age less than 51 years were 39(19.5%).

4.2 Gender

In this study, respondents who were interviewed were 200. The table 4.3 shows the distribution of gender of respondents who interviewed.

Table4.2 Distribution of Gender of respondents

Gender	Frequency	Percent
Male	85	42.5
Female	115	57.5
Total	200	100.0

The table 4.2 is distribution of gender of respondents. Out of 200(100%) respondents, 85(42.5%) were males. This number may be ranked as the second in size while the majorities were females. Females were 115(57.5%) out of 200(100%).

4.1.1.3 Gender participation in solid waste collection

Each respondent specified which gender was responsible in collecting solid wastes in the household before taken into dumping places. The respondents mentioned one person who could be either male or female who collected solid waste products in the household.

Table 4.3 Distribution of respondents' gender took part in collecting solid waste products and their percentages

Gender	Frequency	Percent
Male	39	19.5
Female	161	80.5
Total	200	100.0

Table 4.3 is distribution of respondents' gender participated in collecting solid waste products. Out of 200(100%), 39 (19.5%) were males who collected solid wastes. This

number may be ranked as the second in magnitude while the majorities were females. Males were 161(80.5) out of 200(100%).

This means, in both wards (Kichangani, SultaniArea and Mwembesongo) females were participating in solid waste management more than males' .This was done through knowing who participated in collecting their solid waste products that generated inside their households, before taken to the dumping areas.

4.1.1.4 Marital status

In this study, marital status of respondents categorized into four groups which were single, married, divorced and widow. The table 4.4 shows a distribution of marital status of respondents.

Table 4.4 Distribution of marital status of respondents

Marital status	Frequency	Percent
Single	67	33.5
Married	120	60.0
Divorced	6	3.0
Widow	7	3.5
Total	200	100.0

Table 4 .4 is the distribution of marital status of the respondents. Out of 200 (100%), 67 (33.5%) were single. This number may be ranked as the second in magnitude while the majorities were married. Married respondents were 120 (60%) out of 200 (100%). The divorced respondents were 6 (3%) out of 200 (100%). This number may be ranked as a fourth in magnitude while third was widow. Widow respondents were 7 (3.5%) out of 200 (100%).

4.1.1.5 Education level

Education level is categorized into four groups which were none (respondent who didn't attend school at all), primary level, secondary level, secondary level and higher education level. In this study respondents lies into different categorized of education level.

Table 4.5 Distribution of respondents' education level

Education level	Frequency	Percent
Informal education level	1	0.5
Primary level	85	42.5
Secondary level	82	41.0
Higher education level	32	16.0
Total	200	100

Table 4.5 is the distribution of respondents' education level. Out of 200(100%), 1(0.5%) was a person who did not attend a school at all. This number may be ranked as a fourth in magnitude while the majorities were primary level. The respondents who attended primary level were 85(42.5%) out of 200(100%). The respondents who attended secondary level were 82(41.5%) out of 200(100%). This number may be ranked as a second in magnitude while higher education level followed. The respondents who attended higher education level were 32(16%) out of 200(100%). Therefore, the result shows most of respondents in this study attended primary education level (42.5%) and spent not less than 7 years in school.

4.1.1.6 Years of spending on education (schooling)

In terms of years of spending on education, respondents were classified into four classes. It involves, those who did not attend school at all (zero years), one up to seven years (1-7 years), eight up to fourteen years (8-14 years) and lastly more than fifteen years spent on education.

Table 4.6 Distribution of years spent by respondents on education and their percentages

Years	Frequency	Percent
0	1	0.5
1-7	82	41.0
8-14	97	48.5
>15	20	10.0
Total	200	100.0

Table 4.6 is distribution of years spent by respondents on education and their percentages. Out of 200 (100%), 1(0.5%) was a respondent who did not spend any year on education. This number may be ranked as the last in size. Out of 200(100%), 82(41%) were respondents who spent between 1 year up to 7 years on education. This number may be ranked as the second in size while the majorities of respondents were spent between 8 to 14 years on education. The respondents who spent between 8 to 14 years on education were 97(48.5%) out of 200(100%). And respondents who spent more than 15 years on education were 20(10%) out of 200(100%). This number may be ranked as a third in size.

4.1.1.7. Family size

Family size in this study is divided into four class size. The first class size is the family with one to three members; the second class size is the family with four to six members; the third class size is the family with seven to ten members and last class size is the family with more than ten members.

Table 4.7 Distribution of respondents' Family size

Household size	Frequency	Percent
1-3	2	1.0
4-6	67	33.5
7-10	90	45.0
>10	41	20.5
Total	200	100

Table 4.7 is distribution of family size of respondents. Out of 200(100%), 2 (1%) families has 1 to 3 members. This number may be ranked as the fourth in magnitude. 67(33.5%) families has 4 to 6 members, this number may be ranked as the second in magnitude while the majorities were 7 to 10 members. 7 to 10 family members were 90(45%) out of 200(100%). More than 10 family members were 41(20.5%) out of 200(100%).

Table 4.8 Family size means, std. Deviation, Minimum and Maximum

Number of respondents	**200**
Mean	2.85
Std. Deviation	0.749
Minimum	1
Maximum	4

The table 4.8 shows findings of family size means, standard deviation, minimum and maximum. The results indicated that the average of household size was 2.85; this means each household has an average of 2.85 family members. While minimum of family member is 1, and maximum of 4 family members. The variance of family size was 0.749.

4.1.1.7. House ownership

The respondents in the study responded the question of house ownership status by specifying ownership of the current household which he or she lived by said either it was rented or owned.

Table 4.9 Distribution of respondents' house ownership status

House ownership status	**Frequency**	**Percent**
Rent	101	50.5
Owner	99	49.5
Total	200	100.0

Table 4.9 is distribution of respondents' household ownership status. Out of 200(100%), 101(50.5%) were rented. This number is representing majority respondents who were living in the houses which were not owned by them. The respondents that owned the households were 99(49.5%). This number may be ranked as the second in magnitude while the majorities were rented.

4.1.1.8 Years of staying (household)

Years of staying in the current household was divided into three durations. The first duration was less than 1 year; the second duration was 1 year to 2 years and the third

duration was greater than 2 years. The respondents specified which duration they stayed in the current households.

Table 4.10 Distribution of years of staying of the respondents

Year of staying	Frequency	Percent
Less than 1 year	54	27.0
1 year to 2 years	44	22.0
Greater than 2 years	102	51.0
Total	200	100

Table 4.10 is distribution of years of staying of the respondents. Out of 200(100%), 54(27%) were respondents which stayed less than 1 year. This number may be ranked as a second in size while majority were the respondents stayed greater than 2 years. The respondents who stayed 1 year to 2 years were 44(22%) out of 200(100%). This number may be ranked as a third in size. The respondents who stayed greater than 2 years were 102(51%) out of 200(100%).

Table 4.11 Distribution of 200 respondents' years of stay of mean, std. deviation, minimum and maximum.

Mean	2.24
Std. Deviation	0.852
Minimum	1
Maximum	3

From the table 4.11, shows the average of respondents' years of staying in this study was 2.24. Whereas Std. Deviation was 0.852, a minimum and maximum year of staying for respondents was one and three, respectively.

4.1.1.9 Human power

The respondents respond whether the number of human powers was enough or otherwise to provide the service of solid waste collection to reach amount of solid waste management.

Table 4.12 Respondents respond of human power

	Frequency	Percent
Otherwise	89	44.5
Enough	111	55.5
Total	200	100

Table 4.12 shows the responding of respondents of human power. Out of 200(100%), 89(44.5%) were said human power were not enough. This number may be ranked as the small in size while majorities were said there was enough human power. The respondents who said human power was enough were 111(55.5%) out of 200(100%).

4.1.1.10. Awareness

The respondents were responding either he or she aware about solid waste management or otherwise. Each respondent answered according to the perception he or she has with solid waste.

Table 4.13 Respond of respondents' awareness

	Frequency	Percent
Otherwise	55	27.5
Aware	145	72.5
Total	200	100

Table 4.13 shows the respond about awareness of respondents. Out of 200(100%), 55(27.5%) were respondents who said were not aware about solid waste management. This number may be ranked as a small in size while the majorities were said were aware about solid waste management. The respondents were 145(72.5%) who aware about the solid waste management, out of 200(100%).

4.1.1.11. Distance from the dumping place

In this study, distance from household to the dumping place categorized into three. The first group was the distance which was less than 100 M. The second group was the distance which was 100 M. The third group was the distance which was the greater than 100 M.

Table 4.14 responds of distance from the dumping place of the respondents

Distance	Frequency	Percent
Less than 100M	109	54.5
100M	50	25.0
Greater than 100M	41	20.5
Total	200	100.0

The table 4.14 shows the responds of respondents' distance from their households to the dumping place. Out of 200(100%), 109 (54.5%) were majorities who said their houses were less than 100 meters to the dumping place. 50(25%) were respondents who said their households were 100 meters from the dumping place. This number may be ranked as a second in size. While 41 (20.5%) were the households of respondents which the distance from their houses to dumping place was greater than 100 meters.

4.1.1.12 Household Income

The household incomes earned per month were classified into three. The first class was less than Tshs. 100,000/=; the second class was between Tshs. 100,000/= to Tshs. 500,000/=; and the third class was greater than Tshs. 500,000/=.

Table 4.15 Distribution of respondents' income

Income level	Frequency	Percent
Less than Tshs. 100,000	102	51.0
Tshs. 100,000 to Tshs. 500,000	69	34.5
Greater than Tshs. 500,000	29	14.5
Total	200	100.0

Table 4.15 is distribution of income of respondents. Out of 200(100%), 102(51%) were most respondents which earned less than Tshs. 100,000/=. Out of 200 (100%), 69(34.5%) were the respondents which earned income between Tshs. 100,000/= and Tshs. 500,000/=. This number may be ranked as a second in magnitude. While out of 200(100%), 29(14.5%) were the respondents which earned income greater than Tshs. 500,000/=.

4.1.2. Formal institution

4.1.2.1. Law enforcement

On side of law enforcement, the respondents in this study responding either law was enforced or otherwise in solid waste management. 200 of respondents' answers were presented below:

Table 4.16 Respond of law enforcement of the respondents

	Frequency	**Percent**
Otherwise	81	40.5
Law Enforcement	119	59.5
Total	200	100.0

Table 4.16 shows the responds of law enforcement of the respondents. Out of 200 (100%), 81(40.5%) were respondents who said laws about solid waste management were not enforced (otherwise). This number may be ranked as a small in magnitude while majorities were respondents who said laws were enforced (law enforcement).

4.1.3. Willingness to Pay

In this study respondents answered when they were willing to pay for the solid waste management or otherwise. After examined the respondents' willingness to pay for amount of solid waste management results were presented as follows;

Table 4.17 Responds respondents' willingness to pay for the SWM services

	Frequency	Percent
Otherwise	48	24.0
Willingness to Pay	152	76.0
Total	200	100.0

Table 4.17 shows the respondents' responding about the willingness to pay for the solid waste management service. Out of 200(100%) respondents, 48(24%) were respondents who said they were not willing to pay (otherwise). This number may be ranked as a small magnitude while majorities were respondents who said they were willing to pay. The respondents who said they were willing to pay were 152 (72%), out of 200(100%).

4.1.4. Household Solid Waste Management Information

Using open- questions, 200 of respondents provided various information which was taken into additional information. Respondents touched different areas such as types of waste products, quality of SWM services, mode of collection, duration of Solid Waste products collection, fees for the Solid Waste collection and storage utensils.

Household waste products included both solid, liquid and gases waste products. But in this study many efforts were done on solid waste products. More than 90% of respondents mentioned examples of Solid waste products which generated from their households were plastics bags and remained foods.

4.1.4.1 Solid waste storage utensils

Respondents argued that they stored their solid waste products before collected by the private collectors. They used sacks, basket, metal containers and plastic containers. However, majority of respondents (76.5%) used sacks which were about 153 respondents. Also, 19% of respondents used baskets which were about 38 people. Moreover, one person used metal container which was about 0.5% and lastly, 4% of respondents which they were 8 said used plastic containers.

4.1.4.2 Duration of solid waste products storage

In this study, a researcher grouped three durations of solid waste products storage by the waste producer. These include 1-5 days, 6-10 days and 11-15 days. The respondents should tell which duration him or her store his or her solid wastes before taken by the solid waste collectors.

Table 4.18 Respondents' duration of solid waste products storage

Duration	Frequency	Percent
1-5 days	127	63.5
6-10 days	72	36.0
11-15 days	1	0.5
Total	200	100.0

Table 4.18 shows the duration of solid waste products storage which done by respondents. Out of 200(100%), 127(63.5%) were respondents who were majority. They stored their solid waste products from one to five days (1-5). While 72(36%) were respondents stored their solid waste products from six to 10 days (6-10), out of 200(100%). This number may be ranked as a second in magnitude. 1(0.5%) was respondent who said he stored his solid waste products from eleven to fifteen days (11-15), out of 200(100%).

4.1.4.3 Duration of solid waste products collection

Furthermore, duration of solid waste products collection had been divided into three periods. It involved daily, weekly, and monthly by private collectors (known as Kikundi kazi). The table 4.19 shows the duration which the solid wastes collectors collect the solid wastes.

Table 4.19 shows the duration of solid waste collection. Out of 199(99.5%), 100(50%) were respondents said solid waste products were collected daily; This number may be ranked as a big in size compared to others. 98(49%) were respondents which were said solid waste products were collected weekly.

Table 4.19 Duration of solid waste products collection

Duration	Frequency	Percent
Daily	100	50.0
Weekly	98	49.0
Monthly	1	0.5
Total	199	99.5
Missing	1	0.5
Total	200	100.0

This number may be ranked as a second in size. 1(0.5%) was respondent said solid waste products were collected monthly's (0.5%) was a respondent who did not say for how long the solid waste products were collected, out of 199(99.5%) respondents.

4.1.4.4 The mode of solid waste collection

The mode of solid waste products collection categorized into 5 groups which were roadside collection, Door to Door collection, Communal container collection, Block collection system and curb inside collection.

Table 4.20 Distribution of mode of solid waste products collection

Mode of solid waste products collection	Frequency	Percent
Roadside collection	72	36.0
Door to Door collection	88	44.0
Communal container collection	20	10.0
Block collection system	1	0.5
Curb inside collection	19	9.5
Total	200	100

Table 4.20 is distribution of responds of the mode of solid waste products collection. Out of 200(100%), 72(36%) were respondents said that the modes of roadside collection were used on their households' areas. While 88 (44%) were respondents said the mode of Door to Door collection had been used on collection of solid waste products on their areas out of 200(100%). 20(10%) were respondents said the mode of solid waste products collection was communal container collection, out of 200(100. 1(0.5) were respondent said the mode of solid waste products collection was block collection system out of 200(100%).

19(9.5%) were respondents said the mode of collection was curb inside collection. Therefore, majority of respondents said the mode of solid waste products collection was Door to Door. This means, the private collectors collected the respondents' solid waste products from their doors.

4.1.4.5 The fees for the solid waste collection

Respondents were ordered by law to pay Tshs. 200/= per day as a fee for collection of solid waste products. But they were examined which amount were willing to pay. The amounts were divided into; less than Tshs. 200/=, Tshs. 250/= and greater than Tshs. 250/=.

Table 4.21 Distribution of respondents' fees for Solid Waste collection

	Frequency	**Percent**
<Tshs 200	92	46.0
Tshs 200	76	38.0
>Tshs 200	16	8.0
None	15	7.5
Total	199	99.5
Missing	1	0.5
Total	200	100.0

The table 4.21 is distribution of respondents' fees for solid waste collection. Out of 199(99.5%), 92(46%) were respondents who were willing to pay less than Tshs. 200/=. This number may be ranked as the one represented majorities. While 76(38%) were respondents who were willing to pay Tshs. 200/=. This number may be ranked as a second in size.

16(8%) were respondents who were willing to pay greater than Tshs 200/= out of 199(99.5%). This number may be ranked as a third in magnitude. Out of 199(99.5%), 15(7.5%) were respondents who were not willing to pay any amount for SWM services. This number may be ranked as a fourth in magnitude. 1(0.5%) was a respondent who failed to respond to specify amount which he or she could pay, out of 199(99.5%).

4.1.4.6 Perception of respondents on solid waste responsibility

Furthermore, the study examined respondents' feeling on who is responsible on SWM. The researcher supplied four chooses on who was responsible on solid waste management. Those choose were government, community, both, or none who was responsible for solid waste management.

Table 4.22 Responds of Solid Waste responsibility

	Frequency	**Percent**
Government	59	29.5
Community	38	19.0
Both	95	47.5
None	8	4.0
Total	200	100.0

Table 4.22 shows the respond of solid waste responsibility by the respondents. Out of 200(100%), 59(29.5%) were respondents said the government managed the solid waste management. This number may be ranked as a second in size. While majority were respondents who said both (government and community) were responsible on solid waste management. Also, 38(19%) were respondents said the community handled SWM out of 200(100%). 95(47.5%) were respondents said both (government and community) were responsible on solid waste management. But 8(4%) were respondents said no one handled Solid Waste Management, out of 200(100%).

4.1.4.7 Quality of Solid Waste Management service

In terms of a quality of SWM service provided in the community. The researcher categorized answers into; excellent, average and poorly. The respondents should choose answer which he thinks was correct.

Table 4.23 responds of a quality of SWM service

Scale	Frequency	Percent
Excellent	65	32.5
Average	79	39.5
Poorly	56	28.0
Total	200	100.0

Table 4.23 shows the responds of participants to the quality of solid waste collection service. Out of 200(100%), 65(32.5%) were respondents who said the quality of solid waste management. This number may be ranked as a second in size while majority of respondents who said the quality of solid waste management was average. Out of 200(100%), 79(39.5) were respondents who said the quality of SWM services were averages. 65(32.5%). And 56(28%) were respondents who said the quality of SWM services were poorly out of 200(100%).

4.2. Estimated results

4.2.1 Analysis of amount of Solid Waste Management at households' level

According to Muche (2016) in chapter 2, amount of solid waste management refers to the amount of solid waste products collected at a certain amount met in a given objective. He studied solid waste management practices and factors influencing solid waste effectiveness in Ethiopia. Amount of solid waste management in this study was measured by the amount of solid waste products (in kilograms) collected from the households by the private collectors. The households were the main generators of solid waste products in the community.

We used a multiple regression analysis model to analyze amount of solid waste management at households' level. Independent variables were age, education, income, house ownership, year of stay, distance from the dumping place, family size, human power, awareness, law enforcement and willingness to pay which determine the amount of Solid Waste collected in kgs.

After estimated the model, the results indicated that all variables which were age, education, income, house ownership, year of stay, distance from the dumping place, family size, human power, awareness, law enforcement and willingness to pay were having positive relationship with the amount of solid waste collected. Significant variables were age, education, family size, awareness and law enforcement. While income, house ownership, year of stay, distance from the dumping place, human power and willingness to pay were insignificant variables.

Therefore, the results of analysis of amount of solid waste management have been shown on the table 4.24.

Table 4.24 shows Estimated Coefficients

Model	Unstandardized coefficients		Standardized Coefficients	T	sig	Collinearity Statistics	
	B	Std Error	Beta			Tolerance	VIF
(Constant)	-.916	.973		.942	.348		
Age	0.73	.019	.307	3.836	.000	.449	2.228
Education	.141	.066	.150	2.151	.033	.595	1.682
Income	-.525	.286	-.128	-	.068	.595	1.681
House_ow	-.065	.390	-.011	1.838	.868	.667	1.500
Year_stay	-.362	.220	-.103	-.166	.102	.724	1.382
Distance_dumping	-.052	.205	-.104	-	.799	.949	1.053
Family size	.400	.076	.348	1.641	.000	.652	1.534
Human Power	-.142	.345	-.024	-.255	.680	.864	1.157
Awareness	1.938	.403	.291	5.239	.000	.785	1.274
Law Enforcement	.744	.342	.123	-.413	.031	.899	1.112
Willingness_Pay	-.209	.400	-.030	4.814	.602	.868	1.151
				2.176			
				-.523			

a. Dependent variable: Amount_of SW_in Kg

Table 4.24 shows the estimated coefficients in the equation below.

$Y= -0.916 + 0.073X_1 + 0.141\ X_2 - 0.525X_3 - 0.065X_4 - 0.362X_5 - 0.052X_6 + 0.400X_7 - 0.142X_8 + 1.938X_9 + 0.744X_{10} - 0.209X_{11} + \mu$

Whereby;

Y=Amount of solid waste management

$\boldsymbol{X_1}$= Age

$\boldsymbol{X_2}$= Education

$\boldsymbol{X_3}$= Income

$\boldsymbol{X_4}$= Household ownership

$\boldsymbol{X_5}$= Year of stay

$\boldsymbol{X_{66}}$= Distance from the dumping place

$\boldsymbol{X_7}$= Family size

$\boldsymbol{X_8}$= Human power

$\boldsymbol{X_9}$= Awareness

$\boldsymbol{X_{10}}$= Law enforcement

$\boldsymbol{X_{11}}$= Willingness to pay

Also, Table 4.24 shows there was no multicollinearity, due to the VIF of variables were not exceeded to 10 (Gujarati, 2004).The test of 'goodness of fit' in multiple linear regression model was done by the R-square. The table 4.25 shows the R, R Square, Adjusted R Square and Std. Error of the estimate.

Table 4.25 The R, R Square, Adjusted R Square and Std. Error of the Estimate

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678[a]	.460	.428	2.253

The table 4.25 shows the R, R square, adjusted R square and Std. Error of the estimation. The R-square of the model was 0.460 (46%). This means that age, income, education, human power, willingness to pay, distance from the dumping place, family size, awareness and law enforcement (independent variables) explain the variance of amount of solid waste products (dependent variable) by 46%. This implied that the independent variables were at least strong to explain dependent variable. While the estimation result in table 4.26 shows the overall significance of the model is presented below:

Table 4.26 ANOVA[a]

Model	Sum of squares	Df	Mean Square	F	Sig.
Regression	812.013	11	73.819	14.546	.000
Residual	954.067	189	5.075		
Total	1766.080	200			

The table 4.26 showsAnalysis of variance (ANOVA), this used to measure F-test to get overall significant of the model. The F-test showed at 5% significant the estimated regression is quite meaningful in the sense that the amount of solid waste collection (dependent variable) is at least related to one explanatory variable which could be age, education, income, household ownership, year of stay, distance from the dumping place, family size, human power, awareness and willingness to pay at where $F_{0.05}$(10, 189. The followings are the interpretation of estimated results of significant variables;

4.2.1.1 Age

Age is positively related to the amount of solid waste collected, as the age increases in a Tanzanian context the extended family increase. This is attributed to increase solid waste collected from the family. It has significant effect on amount of solid waste collection because it has significant level of 5%.

When variables include education, income, house ownership, distance from the dumping place, family size, human power, awareness, law enforcement and willingness to pay are kept constant, the increase of age by one year leads to the increase of amount of solid waste management by 0.073. This implied that the more a person gets older the more he or she increases the numbers of participants on solid waste management activities.

4.2.1.2 Education

Year spend on education has got positive relationship with amount of solid waste collected. This means the increase of one year spends on education by a person lead to increase of amount of solid waste products collected, because he or she can get more knowledge on solid waste products collection .It has significant effect on solid waste management because it has significant level of 5%.

When variables include education, income, house ownership, distance from the dumping place, family size, human power, awareness, law enforcement and willingness to pay are kept constant, the increase of one year spends on education lead to the increase of amount of solid waste productscollected by 0.141. This means when a person spends one year on education, increase the amount of solid waste products collected and ensured effectiveness in solid waste management.

4.2.1.3 Family size

The family size has got positive relationship with solid waste management. This means when the size of family members increases leads to the increase of collection of solid waste products. This is because large family size will get an opportunity for many

members to collect solid waste products in the household and make people to perform solid waste management effective. Unlikely small family sizes where people fail to perform effectively on solid waste management activities of collecting large amount of solid waste products due to the people are busy with other activities.

Also, the family size has significant effect on amount of solid waste management, because it has significant level of 5%. Therefore, when the family size is increase by one member leads to the increase of solid waste products collection by 0.400. This implied that the increase of family members in the household lead to the increase of solid waste products collection.

4.2.1.4 Awareness

Awareness has got positive relationship with solid waste collection. This means increase awareness of the people lead to increase amount of solid waste collection. This implied that the increase of public awareness lead to increase the amount of solid waste products collected, because through awareness of the people will get knowledge about how to keep environment clean so as to achieve amount of solid waste management. Awareness has significant effect on amount of solid waste collected, because it has a significant level of 5%. Therefore, when there is increase of awareness of people leads to the increase of amount of solid waste products collected by 1.938.

4.2.1.5 Law enforcement

Law enforcement has got a positive relationship with amount of solid waste collected. This means the increase of law enforcement lead to the increase of amount of solid waste collected, because people would fear to be punished due to the failure of cleaning their surroundings. The law enforcement has significant effect on solid waste management, because it has significant level of 5%. Therefore, when there is an increasing of law enforcement leads to the increase of amount of the solid waste products collection by 0.744.

The estimated results show that variables such age, income, household ownership, year of stay, distance from the dumping place, human power, willingness to pay, education, family size, awareness and law enforcement in multiple regression model have a positive effect on amount of Solid Waste Management. Though income, household ownership, year of stay, distance from the dumping place, human power and willingness to pay have a positive relationship with SWM but insignificant effects.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.0 Introduction

This chapter briefly summarizes the findings presented in chapter four. So far, the findings relate the other studies to get new facts on prediction of solid waste in Morogoro Municipal Council.

Therefore, the chapter discusses the findings on amount of Solid Waste collected in Morogoro Municipal Council at the households' level. It discusses the findings presented in chapter four (4) in relation to the study area and other findings from other similar studies and derive conclusions of the study. It discusses findings from variables that determined amount of Solid Waste collected.

5.1 Determinants of amount of Solid Waste collection

The findings of this research showed that in some extent there was amount of Solid Waste collection. This was due to the related level of awareness, law enforcement, family size, age and education among the respondents. In those three wards (Kichangani, Sultan and Mwembesongo) respondents represented Morogoro municipal.

5.1.1 Respondents' awareness

According to result of the study, 72.5% of the respondents said that they were aware about solid waste collection. While 27.5% of respondents said they were not aware about solid waste collection. This indicated the level of awareness was higher due to the higher percentage of the respondents who agreed (72.5%). Also, according to the result, significant level of awareness is 5%, this means when the increase of awareness leads to solid waste collection.

The level of awareness was higher in this study due to the good promotion of Solid Waste collection from the local government. Both wards executive officers tended to educate their people and also ensure procedures of solid waste management to be attained by frequently supervision. This resulted to the people to participating much on solid waste management such in paying for service and collecting solid waste products from their environment.

The study is similar to other studies which was done in Ethiopia, Nigeria and Tanzania, supported that amount of Solid Waste Management attained through awareness of health and environmental among the people (Hagos *et al*., 2013: Millinga , 2016: Ezechi*at el*., 2017). Therefore, higher awareness made possible for the people to do their responsibilities in the community to achieve Solid Waste Management.

5.1.2 Age of respondents

The age of respondents were categorized into three groups, the first group was those who were less than 25 years; the second group was those who were between 26 years and 50 years; and third group was those who were greater than 51 years. Respondents' age was significant variable in the study because it has the significant level of 5%. This means the higher the person's age, the higher the amount of solid waste collected in the community. Therefore, the majority of respondents were between 26 up to 50 years which were 68.5%. This resulted to high amount of Solid Waste Management due to majority of them could do all activities of collecting solid waste products from their households.

The study is like other study which done in Thailand said age was significant variable when associated with knowledge, attitude and practice to attain Solid Waste Management (Laor *et al*., 2017). This means it is possible to achieve solid waste management through age of the people in the community. On contrary, other study which done in Kenya argued that age as a social demographic characteristic has have no relationship with household Solid Waste Management (Kinyua *et al*., 2016). This means whether there is an increasing or decreasing of the person's age does not lead to any effect to Solid Waste Management.

5.1.3 The respondents' family size

Furthermore, in this study the family size had seen as a significant variable to amount of Solid Waste collection at household level because it has a significant level of 5%. The family size has positive effect on solid waste collection. Means the higher the families size the lower amount of solid waste management. Also, the family size was categorized into four groups; first category has 1 up to 3 family members which has 2 families (1%). Second category has 4 up to 6 family members which has 67 families (33.5%). Third category has 7 up to 10 family members which has 90 families (45%). Last category has more than 10 family members which have 41 families (20.5%). The findings show that the family size minimum and maximum was 1 and 4 respectively.

Majority of households people were living into the third category (7 up to 10 family members). This indicated that most of the family members who were living in each household were many. When the members of the family were many it caused the household to generate a lot of solid waste products compared to small size family, which resulted to low amount of Solid Waste Management. This is similar to the study which done in Ethiopia by Tassie (2018), which argued that household size was among the determinant of household's solid waste generation. He said that the greater number of family members the more solid waste products generated.

Other study which done in Kenya said that Solid Waste Management had no relationship with family size (Kinyua *et al*., 2016). This means the increase of the number of family members caused no association with the production of solid waste products in the household. Therefore, the study is contrary with this study because it has different ideas of household size and solid waste management.

5.1.4 Years spending on education by respondents

This study on the side of years spending on education has got positive relationship on amount of solid waste collected. This is because of significant level of years spending on education is 5%. This indicated that the more years spent on education the more participation on solid waste products collection. This is due to the more period spent on education the more knowledge about solid waste a person got.

According to the study result, Majority of the people (48.5%) spent 8 to 14 years on educating themselves led to achieve amount of Solid Waste Management. This implied that the more years a person spent in schooling, the amount of Solid Waste Management. This proven in this study by only 0.5% which was equal to the one person who did not attended school at all, while others were at least one year above attended the school.

5.1.5 Law enforcement

In this study, law enforcement has positive relationship with amount of solid waste products and also it has a significant level of 5%. This means the higher law enforcement the higher solid waste management. Law enforcement had been practicing in a community to ensure amount of Solid Waste Management. This is shown in the study result whereby 59.5% of respondents said there is law enforcement in their community while 40.5% disagreed that there is law enforcement.

In the community there are regulations of collecting and paying fees for the solid waste collection service by every head of the household to the municipal council who supplied service. Respondents who said there is law enforcement explained regulations and punishments such as fines have been charged to the people who have failed to follow the rules and laws. Also, sometimes punishment such as imprisonment of people who did not collect solid waste products has been implemented.

The similar study which was done at Dar es Salaam in Tanzania argued that, lack of enforcement of municipal bylaws caused inadequate waste collection that resulted to low

amount of Solid Waste Management (Maziku, 2014). This means the amount of law enforcement is needed to reach Solid Waste Management.

Other variables such as income, household ownership, years of staying, distance from dumping place, human power and willingness to pay had negative relationship to amount of solid waste management.

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATION

6.0 Introduction

The chapter summarizes conclusion, and policy implication of this study. The chapter divided into three sections. The first section includes the summaries of study's results and conclusion of the study. It involved briefly explanation about objective or purpose of the study, number of respondents, the area of study, research design, type of questionnaire, sample size technique, type of data, method of collect data, method used to analyze data.

Also, the first section includes what a researcher think about the problem, explain some of the predictors of the amount of solid waste in Morogoro Municipal Council. The second section obtains policy implications, solutions of the problem, and recommendations of the study and the area of further study. While the last section has limitation of the research study, this involved what a research study lacked.

6.1 Summary and conclusion

The study aimed to analyze determinants that led to amount of Solid Waste collected at household level in Morogoro municipal council. Specifically, the study intended to examine the extent of social status on Solid Waste collection, to estimate the degree of formal institution and to evaluate the extent of Willingness to pay for the amount of Solid Waste collected in household level.

The study used cross sectional data obtained from three wards whereby 200 households interviewed in Morogoro municipal. Through the use of both structured and unstructured questionnaires data were obtained. Simple random sampling was used in the study as a sampling technique. The study included both primary and secondary means of data collection. Both descriptive and inferential statistics were used to analyze formal institution variable, social status, and willingness to pay variables for attainment of amount of SW collection. Multiple regression model was used to know the relationship

between independent variables and dependent variable which was amount of solid waste product collected.

The research findings revealed in the study explained below;

6.1.1 Age

According to the study, people who were under 25 years old were the one who did not engage much on activities of Solid Waste Management. The study said 12% of the population who was less than 25 years engaged on solid waste management. This showed that their contribution on SWAM was too small compared to other age groups in the community. This means the generation of that group will not make much consideration on future on collecting solid waste products in the municipal.

The result of the study, age of respondent has a positive relationship on amount of Solid Waste collection. Age is a significant variable in the study, this means as the age of respondent increasing also there is an increasing of Solid Waste Management effectiveness through collection of solid wastes. The similar studies which done by Lunojo(2016) and Laor *et al.,* (2017) concluded that the more increasing of age led to more amount of Solid Waste collection.

6.1.2 Education (year spent on schooling)

Majority of the people (48.5%) spent 8 to 14 years on educating, led to attain high amount of Solid Waste collection. This implied that the more years a person spent on schooling, the high amount of Solid Waste collection. Also, a year spent on education has a positive relationship with amount of Solid Waste collection. Education is a significant variable in the study, this means as the more year spent on education the more likely to higher collection of the amount of Solid Waste. While the less year spent on education led to ineffectiveness of Solid Waste Management.

This study is similar to the study done by Megersa (2018), concluded that the heads of households' education has positive relationship with effective solid waste management.

He argued that increasing of education to a person can lead to the increase of effective of solid waste management at the same time.

6.1.3 Family size

Also, on the side of family size, some of the families have substantial number of family members. The result from the study indicated that 20.5% of families living more than 10 people per a single household. So far, this showed that there was large generation of solid waste products per each household compared to the collection capacity. This is contrary to 1% of the two families who had one to three family members per households.

Furthermore, family size has positive influencing to amount of Solid Waste collected. Family size is statistically significant. This implied that the lower size of family led to Solid Waste Management. This result was similar to the study done in Ethiopia by Tassie (2018), which concluded that large family size caused higher generation of solid waste products and led to poor Solid waste Management.

6.1.4 Awareness

The result shows 72.5% of population was aware about Solid Waste Management and 27.5% of population was not aware about Solid Waste Management. This implied that some people were not participated on activities of Solid Waste Management due to lack of awareness to some extent. This discouraged the amount of solid waste collection in the municipal.

Also, awareness is statistically significant, and it has positive relationship with the amount of solid waste collected. This implied that the higher awareness the higher amount of solid waste collected. This result of the study is the similar to Megersa (2018), which concluded that awareness is very crucial variable to achieve Solid Waste Management. He argued that increase of public awareness could also increase the effectiveness in Solid Waste Management. So, it is important for all the people to be aware and participate in managing and controlling solid waste in the community.

6.1.5 Law enforcement

Also, law enforcement was not implemented to some extent for the achievement of amount of Solid Waste collection. According to the result 40.5% of the respondents disagree that there was law enforcement in the community. These were due to the existence of the people who did not follow laws in a society and not being punished by special institutions from the government.

Moreover, the result of the study showed there was law enforcement in Morogoro municipal. This means the higher the law enforcement led to the high amount of Solid Waste Management. This is similar to the result from the study which done in Moshi municipal by Khamis(2016), which concluded that Moshi municipal was the leading in cleanness municipal in Tanzania for more than five years due to enforcement of bylaws. The municipal council enabled by-laws were followed by everyone in the municipal, failure to do so fines and other punishments can be applied.

6.2 Implication

6.2.1 Policy implication

6.2.1.1 Age

The government should introduce more efforts on its policy on the people who are under 25 years towards Solid Waste Management. They are less participated (12%) in activities on solid waste collection. The government should make sure that those people have enough knowledge about the important of Solid Waste Management. They should be motivated because it will help on future as the next generation to be depended on Solid Waste Management.

6.2.1.2 Education (year spent on schooling)

Moreover, government should supply a special knowledge about SWM to the people who had never spent any year on schooling. This is due to the result whereby there were 0.5% of respondents who did not attend school at all. The government should organize some

special training for them in order to ensure everyone in the society to be responsible for the solid waste products he or she generated.

6.2.1.3 Family size

Also, the government should continue discouraging a large family size in the community to reduce the amount of solid waste products generated. The promotion of family planning programs should be increased so as to meet the capacity of municipal of collecting solid waste products. This study showed that 65.5% of the respondents, their family members were more than seven in each household. This means more should be done in order to have balanced situation between community generation and municipal capacity.

6.2.1.4 Awareness

The study revealed that 27.5% of respondents were not aware about Solid Waste Management. Therefore, the Morogoro municipal should promote more awareness of the people in improving Solid Waste Management service. This can be done through applying diverse ways such as campaigns, seminars and other training programs that will support Solid Waste Management. The campaigns should not only be in public meetings but also in social media whereby also other people are concentrated. Special seminars from the leaders of the wards with citizens should be encouraged in the community.

6.2.1.5 Law enforcement

Also, the municipal should make sure by-laws are implemented without any failure from them. Penalties and fines for the people who did not follow bylaws should be applicable without any restrictions or interferences from other parties. Through this people's behaviors will be easily to manage the amount of Solid Waste. will be achieved.

6.2.2 Area of further studies

The study was only conducted on three wards which were Kichangani, Mwembesongo and Sultana area and this might not be a good representative of the whole municipal. Therefore, on future it is recommended to extend the study to other wards in order to have more accurate data.

Also, similar study should be done into a consideration of not only the household level but to all groups such as hotels, restaurants, markets, hospitals and NGOs/CBOs. Through that it can possible to formulate policies which can be suitable to everyone in Morogoro municipal.

6.3 Limitation of the study

Firstly, some of information provided by the respondents might not accurate because some of them wanted to be seen very poor while others wanted to be rich. Also, some of the respondents provided false information with thoughts may be researcher wanted them to take their information to Tanzania Revenue Authority (TRA) offices for the tax collection.

Secondly, some of leaders from the streets where researcher collected data wanted to be paid during the time of data collection. This is due to the idea that most of those leaders think that researcher has got money to pay them. In added to that, poor collaboration from the leaders in data collection cause a researcher to be not on time in the report preparation.

Thirdly, the use of data obtained from households and left other groups such hotels, NGOs/CBOs, restaurants, markets and hospitals. This can lead to inaccurate information because small group of the people represent the whole people in Solid Waste Management in municipal. The researcher should use large number of sample size in order to get accurate information.

Fourthly, this study is mainly based on cross sectional data. The data collected once to respondents who came across this does not give more time for observation in study. Thus, a researcher to get inaccuracy data during the data collection due to that might draw poor conclusion.

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APPENDICES

PREDICTIVE OF AMOUNT OF SOLID WASTE PER HOUSEHOLD IN MOROGORO MUNICIPAL FOR SUSTAINABLE DEVELOPMENT

ORODHA YA MASWALI

Mimi Ritha Isdory Malata, mwanafunzi wa chuo kikuu Mzumbe Morogoro. Ninasoma shahada ya uzamili ya Sayansi kwenye Mipango ya miradi (Masters of science in Project Planning and Management). Kwa sasa ninafanya tafiti ya usimamiaji wa taka ngumu kwenye manispaa katika nyumba.

Maswali yameandaliwa kwa kusudio la kumaliza elimu ya shahada ya uzamili ya Sayansi katika Mipango ya miradi. Kwa ujumla, lengo kuu katika hii tafiti ni kuchunguza wa usimamiaji wa taka ngumu manispaa kwenye nyumba ndani ya Morogoro manispaa. Nategemea ushirikiano kutoka kwako kwa kupata taarifa muhimu kutoka kwenye maswali niliyoandaa.

SEHEMU A: TAARIFA ZA KIJAMII

1. Tafadhali onyesha jinsia yako
   i. Mwanaume
   ii. Mwanamke
2. Tafadhali taja umri wako ……..
3. Tafadhali onyesha hali yako ya kindoa
   i. Sijaolewa/ Sijaoa
   ii. Nimeoa / Nimeolewa
   iii. Mtalikiwa
4. Mpo wangapi kwenye familia yako?
   (Andika kwa namba) ……
5. Tafadhali onyesha kiwango chako cha elimu
   i. Shule ya msingi

ii. Shule ya sekondari
iii. Elimu ya juu
iv. Hakuna kati ya hayo juu

6. Ni miaka mingapi umetumia ukiwa shule? ……
7. Je unamiliki nyumba (unayoishi kwa sasa)?
   i. Ndio
   ii. Hapana
8. Kwa muda gani umeishi kwenye hiyo nyumba?
   i. Chini ya mwaka 1
   ii. Mwaka 1 mpaka miaka 2
   iii. Zaidi ya miaka 2

SEHEMU B: TAARIFA ZA TAASISI RASMI

1. Je una uelewa kuhusu sheria na taratibu za ukusanyaji na utupaji wa taka ngumu?
   i. Ndio
   ii. Hapana
2. Je, sheria ya ukusanyaji na utupaji taka ngumu inatiliwa mkazo?
   i. Ndio
   ii. Hapana

   Kama ni "Ndio" kivipi? (Taja) ……

3. Je, nguvu kazi (watu) ambao wameajiriwa kwenye ukusanyaji taka ngumu wanajitosheleza?
   i. Ndio
   ii. Hapana

SEHEMU C: TAARIFA ZA TAASISIZISIZO RASMI

1. Je, una uelewa kuhusu umuhimu wa ukusanyaji na utupaji wa taka ngumu?
   i. Ndio

ii. Hapana

2. Nani anawajibu wa ukusanyaji na utupaji wa taka ngumu katika jamii yako?
   i. Serikali
   ii. Jamii
   iii. Wote (SerikalinaJamii)
   iv. Hakuna kati ya hayo juu
3. Ni kiasi (kilogramu) gani cha taka ngumu unakikusanya kwa siku?

   …….
4. Je, huwa unahifadhi taka ngumu ambazo zinazalishwa kutoka nyumba unayoishi?
   i. Ndio
   ii. Hapana
5. Nani anaewajibika na ukusanyaji taka ngumu unazozizalisha ndani ya nyumba yako?……..
6. Je, huwa mnahifadhi kwenye chombo gani taka ngumu ambazo zinazozalishwa ndani ya nyumba unayoishi?
   i. Gunia
   ii. Ndoo
   iii. Pipa la chuma
   iv. Pipa la plastic
   v. Shimo la takataka
   vi. Kama kuna jibu lingine…….
7. Kipi kipengele kinachotumika kuzolea taka? (*Piga tiki kwenye , unawezapiga tiki kwenye kipengele zaidi ya kimoja*)
   i. Ukusanyaji pembeni ya barabara
   ii. Ukusanyaji wa mlango kwa mlango
   iii. Ukusanyaji wa jamii kwa pamoja kwenye pipa
   iv. Ukusanyaji kwa kutumia gari la takataka

8. Ni kwa muda gani takataka zinahifadhiwa?
    i. Siku 1 mpaka 5
    ii. Siku 6 mpaka 10
    iii. Siku 11 mpaka 15
    iv. Kama kuna jibu lingine……..
9. Je, takataka zinazohifadhiwa hukusanywa?
    i. Ndio
    ii. Hapana

    Kama jibu Ndio, nani huwaa nazikusanya?…….

10. Ni mara ngapi takataka huwa zinakusanywa?
    i. Kila siku
    ii. Kila wiki
    iii. Kila mwezi

    Kama jibu linguine……

11. Je, huwa unapata huduma za ukusanyaji wa takataka kutoka kwa wakusanyaji binafsi?
    i. Ndio
    ii. Hapana
12. Ni umbali gani kutoka nyumba unayoishi mpaka mahali pakutupa takataka?
    i. Chini ya maili 100
    ii. Ni maili 100
    iii. Zaidi ya maili 100

13. Kwa maoniyako, unaonajeubora wa hudumainayotolewanawakusanyaji wa takatakabinafsi? (*Piga tiki kwenyekipengelesahihi)*

Nzurisana(wafanyakaziwanakuwanavifaa, wafanyakazimarafiki, hutoahudumakwawakati)	Wastani (wafanyakazihawanavifaavyakutosha, wafanyakazimarafiki, hutoahudumakwawakati)	Inatakiwakuongezajitihada (wafanyakazihawanavifaavyakutosha, wafanyakazisiorafaki, hawatoihudumakwawakati)

14. Kwa maoniyako, jitihadazifanyikekatikamaeneogani matatu?
    i. …….
    ii. ……..
    iii. …….
15. Ni ninimaoniyakokwaujumlakuhusiananakuboreshahudumazinazotolewakatikaeneolako?

    .....
    .....……
    ……..……
    ……
    ……

SEHEMU D: TAARIFA ZA KIPATO

1. Ni kiasigani cha kipatounapatakwamwezi?
    i. ChiniyaTshs. 100,000/=
    ii. Tshs. 100,000/= mpakaTshs. 500,000/=
    iii. Zaidi yaTshs. 500,000/=
2. Ni ninichanzo cha kipatochako?

……

SEHEMU E: TAARIFA YA DHAMIRA YA MALIPO

1. Je, una dhamiriakulipahudumayaukusanyaji wa taka ngumu?
   i. Ndio
   ii. Hapana
2. Unalipiakiasiganihudumayaukusanyaji taka ngumukwasiku? (Andikakwanamba) Tshs ……..
3. Ni kiasiganikwasiku una dhamiriakulipakwaajiliyahudumayaukusanyaji taka ngumu? (Andikakwanamba) Tshs ……