

**CONTRIBUTION OF SUSTAINABLE STREET VENDING TO MUNICIPAL  
SOLID WASTE MANAGEMENT IN TANZANIA:  
A CASE OF MOROGORO MUNICIPALITY**

**By**

**Didas Apolo**

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

**2018**

**CERTIFICATION**

We, the undersigned, certify that we read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled **Contribution of Sustainable Street Vending to Municipal Solid Waste Management in Tanzania: A Case of Morogoro Municipality** in partial fulfillment of the requirements for award of the degree of Master of Science in Environmental Management (M Sc. EM) of Mzumbe University.

.....

Major Supervisor.

.....

Internal Examiner

**Accepted for the Board of the Institute of Development Studies**

.....

**DIRECTOR, INSTITUTE OF DEVELOPMENT STUDIES**

## **DECLARATION**

I, Didas Apolo, declare 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.....

## **COPYRIGHT**

©

This dissertation is a copyright material protected under the Berne Convention, the copyright Act 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means in full or in part, except for short extract in fair dealings, for research or private study, critical scholarly review or discourse with an acknowledgement, without permission of Mzumbe University on behalf of the author.

## ACKNOWLEDGEMENTS

I thank my Lord and Saviour, Jesus Christ, for the gift of healthy life. His grace paved my way to Mzumbe University, through which various people played important roles in this study. Dr. Mamkwe C. Edward deserves my respect, thanks and appreciation; you have been not only my major supervisor but also a role model in so many ways. Thank you for being patient and a guide towards accomplishment of this work. God bless you.

I thank Prof. Eulalia Temba, Dr. Frank Theobald Theodory and Ms. Fatuma Nyihirani for encouragement and support throughout my study. Your contribution in this study is immeasurable. Special thanks to the late Mr. Batistino Mponzi for his memorable kindness, assistance and hospitality since my first arrival at Mzumbe University, may his soul rest in peace. Furthermore, I would like to thank all IDS student 2016/2017 academic year, especially Mr. Simon Mayeka, Mr. Robert Mwangi and Ms. Rose Mwaita, for their cooperation throughout my studies.

My heartfelt thanks go to Morogoro Municipal Executive Director, Mr. John Mgalula, for allowing me to collect the data in his area of jurisdiction. Thanks go to all environmental officers, health officers, sweep leaders and street vendors for their contribution and cooperation in my study.

My sincere gratitude should go to Malinyi District Executive Director Mr. Marcelin Ndimbwa, Human Resource Officer of Malinyi District Mr. Bhango Lyangwa, District Secondary Education Officer Mr. Abraham Mwakabungu, for the permission to continue with my studies. I thank you my staff members at Sofi Secondary School for their support in my studies.

I remain grateful to my mother Rosada J. Mseke for showing me the way in my life by insisting and encouraging me to reach this stage. I deeply thank my wife Secilia Kasanga, my daughter Debora Didas and my son Danson Didas for being patient to me during my studies. God bless all of you.

## **DEDICATION**

I dedicate this work to my father, the late Crispin S. Machallo who did extraordinary things in my life; he will remain my model in fighting. May the Almighty God rest his soul in an eternal peace.

## **LIST OF ABBREVIATIONS**

CBOs	-	Community Based Organizations
CPCT	-	Cleaner Production Centre of Tanzania
CWG	-	Collaborative Working Group
DE	-	Deep Ecology
ED	-	Eco-Development
EP	-	Environmental Protection
EU	-	European Union
FE	-	Frontier Economics
GEC	-	Global Environmental Concern
ID	-	Identification Card
ISWM	-	Integrated Solid Waste Management
LDCs	-	Low Developed Countries
MDGs	-	Millennium Development Goals
MSWM	-	Municipal Solid Waste Management
NCPC	-	National Cleaner Production Centre
NEMC	-	National Environmental Management Council
NGOs	-	Non Governmental Organizations
NORAD	-	Norwegian Agency for Development
NSC	-	National Sanitation Campaign
RC	-	Regional Commissioner
RM	-	Resource Management
SDGs	-	Sustainable Development Goals

SPSS	-	Statistical Package for Social Sciences
SWM	-	Solid Waste Management
UNEP	-	United Nations Environmental Program
UNIDO	-	United Nations Industrial Development Organization
URT	-	United Republic of Tanzania
VPOs	-	Vice President's Office
WB	-	World Bank
WEEE	-	Waste Electrical and Electronic Equipments
WEO	-	Ward Executive Officer
WHO	-	World Health Organization
WM	-	Waste Management

## **ABSTRACT**

This study provides an over view on the contribution of sustainable street vending to the municipal solid waste management in Tanzania a case of Morogoro Municipality. The main objective of this study was to determine the contribution of sustainable street vending to municipal solid waste management in Tanzania. The specific objectives were to examine the perception of street vendors on municipal solid waste management in Morogoro Municipality, to assess strategies used by street vendors to mitigate solid waste production in Morogoro Municipality, to assess strategies used by the Municipal government to ensure Sustainable street vending for sustainable SWM in Morogoro Municipality and to determine street vendors involvement in solid waste management in Morogoro Municipality. Mixed methods research design was employed. Questionnaires, interview and observation methods were used in data collection. The study had a sample of 96 respondents from: street vendors, environmental officers, ward health officers and sweeper leaders. Probability and non-probability sampling were used in which quasi-simple random was used to obtain a sample of street vendors and purposive sampling was applied to obtain the key informants. Data were analyzed by using both quantitative and qualitative methods. Quantitative descriptive analysis was done using frequencies and percentage, while qualitative employed content analysis.

The findings revealed that street vendors were not willing to participate in municipal solid waste management due to their negative perception towards the municipal solid waste management. The majority of street vendors were found to have low level of knowledge on solid waste management. They also, neither had ID nor license as a strategy that contributes to sustainable municipal solid waste management in Morogoro Municipality. The study findings contribute to the knowledge on how municipals can mobilize resources for sustainable solid waste management.

The study recommended that knowledge on solid waste management should be provided to street vendors for the purpose of influencing them to participate in municipal solid waste management. Lastly municipal council should develop and implement well integrated solid waste management action plan by involving street vendors.

## TABLE OF CONTENT

<b>CERTIFICATION</b> .....	i
<b>DECLARATION</b> .....	ii
<b>COPYRIGHT</b> .....	iii
<b>ACKNOWLEDGEMENTS</b> .....	iv
<b>DEDICATION</b> .....	v
<b>LIST OF ABBREVIATIONS</b> .....	vi
<b>ABSTRACT</b> .....	viii
<b>CHAPTER ONE</b> .....	1
<b>INTRODUCTION</b> .....	1
1.0 Overview of the introduction .....	1
1.1 Background to the Study .....	1
1.2 Statement of the Problem .....	4
1.3 Objectives of the study .....	4
1.3.1 General objectives .....	4
1.3.2 Specific objectives .....	5
1.4 Research questions .....	5
1.5 Significance of the study .....	5
1.6 Scope of the study .....	5
1.7 Limitation of the study .....	6
1.8 Organization of dissertation .....	6
<b>CHAPTER TWO</b> .....	7
<b>LITERATUREREVIEW</b> .....	7
2.0 Introduction .....	7
2.1 Theoretical Literature Review.....	7
2.1.1 Environmental theories/paradigm .....	7
2.1.2 Integrated solid waste management (ISWM).....	8
2.1.3 Policies .....	9
2.2 Empirical Literature Review .....	11
2.3 Conceptual framework .....	13
2.3.1 Possession of Licenses and ID .....	14
2.3.2 Types of Packaging materials .....	14

2.3.3 Participation in environmental cleanliness.....	15
2.3.4 Perception on SWM.....	16
2.3.5 Environmental rules and by-laws.....	16
2.4 Operationalisationof the key terms .....	17
2.4.1 Waste.....	17
2.4.2 Solid waste .....	17
2.4.3 Municipal Solid Waste (MSW).....	17
2.4.4 Municipal Solid Waste Management (MSWM) .....	17
2.4.5 Waste Management.....	18
2.4.6 Sanitation .....	18
2.4.7 Sustainable Development.....	18
2.4.8 Street Vender.....	19
2.4.9 Sustainable Street vending .....	19
2.4.10 Pollution .....	19
2.4.11Cleaner production .....	19
2.4.12 Controlled dump .....	20
2.4.13 Effective SWM.....	20
<b>CHAPTER THREE .....</b>	<b>21</b>
<b>RESEARCH METHODOLOGY .....</b>	<b>21</b>
3.0 Introduction .....	21
3.1 Study area.....	21
3.2 Research Design.....	21
3.3 Study Population .....	22
3.4 Sampling techniques and Sample size .....	22
3.4.1 Simple random sampling.....	22
3.4.2 Purposive sampling .....	23
3.6 Data collection .....	23
3.6.1 Primary data collection methods.....	23
3.6.1.1 Questionnaire .....	23
3.6.1.2 Observation .....	23
3.6.1.3 Interview .....	24
3.6.2 Secondary data collection method .....	24
3.7 Data analysis .....	24

3.7.1 Quantitative data analysis .....	24
3.7.2 Qualitative data analysis .....	24
3.8 Ethical issues .....	25
<b>CHAPTER FOUR</b> .....	<b>26</b>
<b>PRESENTATION OF FINDINGS AND DISCUSSION</b> .....	<b>26</b>
4.0 Introduction .....	26
4.1 Background Characteristics of the Respondents.....	26
4.1.1 Age of the respondents.....	26
4.1.2 Sex of the Respondents .....	27
4.1.3 Respondents level of education.....	28
4.2 Perception of Street Venders on MSWM.....	30
4.2.1 The influence of level of knowledge on SWM .....	30
4.2.2 Comparisons of participation between street venders and street sweepers.....	31
4.2.3 Littering behaviour of street venders .....	32
4.3 Strategies of street venders on mitigating solid wastes production .....	34
4.3.1 Level of waste generation .....	34
4.3.2 Possession of equipment for solid waste collection.....	35
Source: Field data (2018) .....	38
4.3.3 Provision of awareness to customers on MSWM .....	39
4.3.4 Types of Packaging materials of the sold goods.....	40
4.3.5 Business of recycled waste likes plastic and iron (scraps).....	41
4.4 Morogoro Municipal Strategies on MSWM .....	42
4.4.1 Types of goods sold .....	43
4.4.2 Possession of ID or License .....	45
4.4.3 Assistance from Municipal Council.....	46
4.4.4 Supervision for cleanliness in street vending areas.....	47
4.4.5 State of waste collection facilities and dumping Site.....	48
4.4.6 Frequencies of waste collection from collection points to dumping site .....	49
4.5 Street Venders Involvement in MSWM.....	51
4.5.1 Reasons for lack of involvement of street venders in MSWM.....	51
4.5.2 Environmental management action plan on MSWM.....	52
4.5.3 Level of obeying rules and by-laws of MSWM.....	54

<b>CHAPTER FIVE</b> .....	56
<b>SUMMARY, CONCLUSIONS AND POLICY IMPLICATION</b> .....	56
5.0 Introduction .....	56
5.1 An Over View of the Study.....	56
5.2 Summary .....	57
5.3 Conclusion .....	58
5.4 Policy implications.....	60
5.5 Suggestion for further studies .....	62
<b>REFERENCES</b> .....	63
<b>APPENDICES</b> .....	68

## LIST OF TABLE

Table 2.1 Selected urban centers shows waste generated, collected, uncollected daily in tones and percentage. ....	11
Table 3.1 Sample distribution of key informants.....	23
Table 4.1 Age Distribution of Respondents.....	27
Table 4.2 Respondents Distribution by sex.....	27
Table 4.3 Respondents distribution according to the level of knowledge on SWM..	30
Table 4.4 Respondents distribution by level of waste generation.....	34
Table 4.5 Respondents distribution by possession of equipment for solid waste collection.....	35
Table 4.6 Respondents Distribution by involvement in providing awareness to customers on MSWM .....	39
Table 4.7 Distribution of respondents by their possession of ID or License .....	45
Table 4.8 Respondents Distribution by assistance from Municipal Council .....	46

## LIST OF FIGURE

Figure 2.1 Conceptual framework.....	13
Figure 4.1 Distribution of respondents according to level of education .....	29
Figure 4.2 Unofficial solid waste collection point along the Sultan road .....	32
Figure 4.3 Street venders leave the solid waste after their business place at Sabasaba areas in Morogoro Municipality.....	33
Figure 4.4 Street venders share one bag for temporary storage of solid waste in Msamvu bus terminal.....	36
Figure 4.5 Respondents distribution by types of equipment used to manage waste in working place .....	37
Figure 4.6 Food venders using bags for storing solid waste outside Msamvu bus terminal .....	38
Figure 4.7 Collection point for buying plastic bottles .....	41
Figure 4.8 Respondents' Distribution by categories of goods or item sold.....	43
Figure 4.9 Street venders selling agricultural products alongside Ngaka street in Morogoro municipality .....	44
Figure 4.10 Three skip buckets at Mawenzi market were full with solid waste.....	50
Figure 4.11 Sweepers cleaning and collecting wastes left by street venders at Town bus terminal Morogoro Municipality .....	51
Figure 4.12 Respondents distribution by Level of obeying MSWM rules and by-laws .....	55

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.0 Overview of the introduction**

This introduction part contains eight sections; background of the study, statement of the problem, objectives of the study research questions, significances of the study, scope of the study, limitation of the study and organization of the dissertation.

### **1.1 Background to the Study**

Solid waste management becomes one of the Global Environment Concerns (GEC) because it threatens the humankind in modern times in spite of much technological advancement (UNFCCC, 1992). There is high increasing volume of solid waste generated by human activities like street vending which also lead to the increase in cost of management to the authority concern. It is estimated that 1.3 billion metric tons of municipal solid waste was generated globally in 1990 (Buenrostro, 2011). The data shows that during 2006, the municipal solid waste generated reached 2.2 billion tones globally. The increase in urbanization, different changes in consumption pattern and lack of recycling activities have resulted to the increase in waste generation. According to Rio declaration (1992), the cost estimated for implementation of managing of solid waste was about \$23.3 billion. Solid Waste Management has been reported as one of the famous environmental difficulty in many urban areas in the ASEAN continent and other part of the world such as Africa, USA, South America and Australia (Ngoc & Schnitzer, 2009).

A considerable amount of money goes into managing such huge volume of solid waste. It was estimated that Asian countries alone spent about US\$25 billion on solid waste management per year in the early 1900s, this exceeds \$23.3 billion which was the estimation done in Rio summit. This figure is expected to grow to about US\$50 billion by 2025 due the raise in population in urban areas and various economic innovations which did not consider the environment features (Hoornweg, 1999).

Developed countries have great awareness on municipal solid waste management; even though they produce the greatest waste they have well organizational structure for waste management. Example Japan has scarcity of landfill spaces due to high population and attention to the environmental problems associated with MSW disposal, there has been strong support for MSW management by citizens and government at all levels. As a result, Japan was one of the leading countries in managing waste generation (Matsunaga, *et al* 2009). Japan is the successful country in municipal solid waste management where solid waste is converted into energy. Japan is the largest user of MSW in the world, it is estimated that 65million tones generated about 40million tones are thermally treated by gasification in combustion plants and the rest are recycled (Nickolas, *et al* 2013).

Developing countries in Africa and elsewhere face severe challenges in improving municipal solid waste management performance. The challenges are connected to access, efficiency and quality system of waste management. This challenge goes parallel with the awareness of the community on how to put their environment clean and safe. In Nigeria, the concerns were in solid waste management (SWM) as a big problem which has survived for protracted times not only Lagos metropolis but also other big Nigerian cities, municipals and towns. (Ayotomuno *et al*, 2004). Many municipals authorities in third world countries fall short to collect, sort, treat, transport and dispose solid waste. Uncollected waste leads to different social economic menaces, as results many municipals are overwhelmed with social economic and environmental problems. Waste generated in the human living space should be removed immediately and properly in order to prevent risks of human health and environmental hazards (Kalwani, 2009).

Tanzania like other developing countries has the same problems of improper waste disposal. We need to focus in both cities and emerging towns; this will help the community develop habit/behaviour and makes the sustainability of proper solid waste management even to the growing towns (Kalwani, 2009). A large proportion of solid wastes generated in most urban areas of Tanzania originate from residential areas and agricultural products. Most of vending areas in Tanzania were occupied

with organic waste including remains of vegetable, fruits and fish. Also there were inorganic waste paper, plastic containers and bottles (Marietha, 2011).

Morogoro municipal waste management was not well efficiently conducted due to various reasons including awareness and perception of community on the solid waste disposal management; even though for now days community are aware in terms of knowing the effects or impacts of poor waste disposal to their environment but still streets of Morogoro municipal are dirty and experiencing eruption of diseases like cholera each year (Chengula, 2015). Street venter areas, along the main roads, street roads are polluted with plastic bags, food remains, food packaging materials like various bottles and papers most of these are sold by street venter.

Street vendors are part of small traders in the informal sector of business; street vending is an emerging sector in rural and urban areas. It is very potential to LDCs due to its contribution in eradicating poverty, which is one of the goals under SDGs. These informal sectors provides employment opportunity to citizen, increase national per capital income through taxes and tariff, makes goods and services be closer to the consumers hence improve the standard of lives of citizens. A good number of street vendors are found in cities, towns, and municipals where the solid waste generated in high quantity can be noticed. There are emerging cities and municipals that the increase in street vending leads to the increases in solid waste. Areas where street vending are conducted most of them are much polluted. Solid waste in Morogoro municipals also is associated with street vending.

Street vending seems to be a solution to a big challenge of unemployment to global south many records state that the informal employment accounts for more than a half of the total employment in the country, this signifies that a large population engages in street vending which contributes to solid waste in the municipals (Sally, *et, al* 2016). The street vending is the most visible occupation opted by many urban or municipal dwellers and by-products of their activities are visible to the environment. Street vendors in developing countries are visible and reallocated many times in urban public spaces all over the world, but the total number of people who work as street vendors is notoriously hard to come by. This is because most of them are not

permanent, they are not ready to be counted fearing adverse actions from the government and every day there are new immigrants who dissolves in the same work. This makes it difficulty in involving them in solid waste management in many cities and municipality.

## **1.2 Statement of the Problem**

Morogoro Municipality lacks sustainable solid waste management. This state leads to eruption of diseases such as cholera and typhoid. Cholera erupts every year and typhoid is a stubborn disease to municipal dwellers. Statistics show that every year Morogoro Regional Hospital and Sabasaba Health Centre admit cholera patients, example 802 cholera patients were reported in 2016 (Morogoro municipal council, 2017). Studies on solid waste management have been conducted on community awareness and perception towards solid waste management such as Fauziah *et al*, (2007) in Malaysia, Mangure (2008) in Arusha and Dar es Salaam and Kalwani (2009) in Morogoro Municipality. All these studies do not show the contribution of street vendors to the municipality to attain sustainable solid waste management. Street vendors were the one who producing municipal solid waste in their works (Asif, *et al*, 2017). It was known that street vending was the one of the human activities which leads to accumulation of municipal solid waste in many municipals in Tanzania while the contribution of sustainable street vending to municipal solid waste management was hardly known. In spite of all efforts made by municipal authorities to improve street vending for better SWM by reallocating them but still the vendors continue working as usual. This study sought to determine the contribution of sustainable street vending to municipal solid waste management in Morogoro Municipality.

## **1.3 Objectives of the study**

### **1.3.1 General objectives**

The main objective of this study was to determine the contribution of sustainable street vending to municipal solid waste management in Tanzania.

### **1.3.2 Specific objectives**

- I. To examine the perception of street vendors on municipal solid waste management in Morogoro Municipality.
- II. To assess strategies used by street vendors to mitigate solid waste production in Morogoro Municipality.
- III. To assess strategies used by the Municipal government to ensure sustainable street vending for sustainable SWM in Morogoro Municipality.
- IV. To determine street vendors involvement in solid waste management in Morogoro Municipality.

### **1.4 Research questions**

- i. What is the perception of street vendors on municipal solid waste management in Morogoro Municipality?
- ii. How street vendors can mitigate solid waste production in Morogoro Municipality?
- iii. How municipal government ensure sustainable street vending for sustainable SWM in Morogoro Municipality?
- iv. How the street vendors are involved in solid waste management in Morogoro Municipality?

### **1.5 Significance of the study**

The study contributes knowledge on how Municipal authorities can effectively mobilize resources and involve street vendors and other stakeholders for effective performance in Municipal solid waste management. The application of study knowledge, on management of solid waste production in the municipal, is expected to reduce the amount of solid waste generated in the Municipals as well as prevention of waste associated diseases like cholera, dysentery, malaria and typhoid.

### **1.6 Scope of the study**

The study focused on the contribution of sustainable street vending on MSWM by checking how street vendors interact and concern to environment, municipal environmental action plan for solid waste management and the involvement of street vendors to municipal solid waste management.

### **1.7 Limitation of the study**

The study faced the following limitation: Most street vendors did not have confidence in responding to questions as well as some officers were not confident that the data supplied will not leak and cause negative impacts to them. The researcher encouraged respondents fear not on participating; by showing them the permission letters from Mzumbe University and Morogoro Municipal Council as well as a student's ID card.

Also street vendors were too busy, to respond to questionnaires. The researcher used different techniques like starting a friendship stories based on solid waste management of which helped a researcher to create friendly environment to the respondents.

### **1.8 Organization of dissertation**

This dissertation consists of five chapters which are arranged in a logical sequence. Chapter one is an introduction of the research report. It includes the background of the problem, statement of the problem, objectives of the study research question, significances of the study, scope of the study, limitation of the study and an organization of the dissertation. Chapter two has literature review, in which there are theoretical part, empirical part, and conceptual frame work. Chapter three is a methodology part which describes: research area, research design, population and sample size, sampling techniques, data collection method, data analysis method and ethical issues. Chapter four has the presentation and discussion of findings. It presents analysis and discussion of data according to objectives and research questions. Chapter five contains an over view of the study, summary, conclusion, policy implication and suggestion for the further studies.

## **CHAPTER TWO**

### **LITERATUREREVIEW**

#### **2.0 Introduction**

In this part of literature review is going to cover three subsections which are theoretical literature review, empirical literature review and conceptual frame work. This part was very important to researcher because it shows how other researchers, scholars and academicians have been publishing on the municipal solid waste management. And help the readers to have wide knowledge on a researched topic.

#### **2.1 Theoretical Literature Review**

This subsection explains theories, model and policies which were used in this study. Frontier economy and Eco-Development were the theory used, integrated solid waste management modal and environmental policy were applied in this study.

##### **2.1.1 Environmental theories/paradigm**

The Frontier Economics (FE) theory perceives the nature as infinite supply of resources for human development and as sink for the by-products of human consumption. These developments by-products are in form of different types of pollution (waste production) and ecological degradation. The resources flow from the environment and waste flow back to environment did not go into economic thoughts (Boulding, 1966).The theory verifies that most of development activities lead to the flow of waste to environment and economists do not think much on environmental conservation. In reference to the WB reports of (1992), between 0.7 and 1.8 Kg per capita of waste is produced everyday in developed countries' urban areas and approximately 0.4 to 0.9 kg is produced in the cities of developing countries. Hence, waste production tends to increases with an increase in population and economic growth which leads to the problem of waste management posed both on the environment and on the public health, which threatens the livelihood.

Eco-Development focus on the sustainable level while achieving growth in economic welfare, the natural resources from the ecosystem to economy and by-products (pollution) flow into the environment from the economy is restructured in the way

that polluter pays to “pollution prevention pays” (mitigation) ecological principles to reduce this to sustainable level (Cobly, 1991). These two theories were used in this study because they explain the sources of solid wastes which were human activities and also the perception of economist to the environment have been mentioned and restructure the way that polluter will pay accordingly, as resulted to polluter pays principle.

Eco-Development theory insisting on sustainable level while achieving in economic welfare and make sure that for those who will pollute the environment are paying for it (polluter pays principle). This theory makes the base on insuring sustainability of the street vending by using the environmental principles like polluter pays principle. Implementations of strategies in large population are governed by rules, regulations and by-laws and this revealed on the findings on understanding and obeying of rules and by-laws of municipal solid waste management.

### **2.1.2 Integrated solid waste management (ISWM)**

This is methodology of dealing with solid waste in which different stakeholders are involved with action plan which implemented in step wise with the deliberation that the person’s waste can be the person’s resource. ISWM is channeled with Visions, missions, and strategies which can helps to reduce quantity of solid waste in the environment. Integrated Solid Waste Management (ISWM) Model is a model that allows studies of the intricate and multi-dimensional systems in fundamental way. The model was developed by WASTE advisers on urban environment and development (WASTE, 2004) and partners or organizations working in developing countries in the mid-1980s and further developed by the Collaborative Working Group (CWG) on solid waste management in the mid-1990’s (Anschütz, *et al.*, 2004). The model acknowledges the importance of three dimensions when analyzing, developing or changing a waste management system. The dimensions are: the stakeholders that have an interest in solid waste management and the elements or stages of the movement in dealing with solid wastes. Sustainable Street vending involves all activities conducted by street venders without compromising the future generation to meet their needs. In so doing the street venders should be involved as a stakeholder in ISWM as a process to municipal solid waste management the

implementation of ISWM in Morogoro municipality will lead to sustainable municipal solid waste management.

The operational efficiency of solid waste management depends upon the active participation of both the municipal agency and the citizens, therefore, socio cultural aspects mentioned by some scholars include people participating in decision making (Sharholly, *et al.*, 2008), community awareness and societal a path for contributing in solutions (Moghadam, *et al.*, 2009).Solid waste management in municipals provides a lot of opportunities for livelihoods, both from employment within the formal sector (public or private) but also in the informal sector, particularly in connection with recycling (Gonzenbach, *et al.*, 2007).

According to Gonzenbach (2007) many employments vacancies are found in waste collection and transportation as municipalities, NGOs and community groups work to extend collection services to all of the rapidly-growing urban populations. India with large of street venders, it is estimated that, nearly one (1) million of people find livelihood opportunities in municipals by engaging in waste collection, transportation and recycling, through systems that are known by all stakeholders and well organised, though informal in nature.

### **2.1.3 Policies**

Policies in Tanzania which addressing issues of waste management are national environmental policy, Human settlements policy and National Health Policy. The objectives of all policies are to raise public/community awareness and indulgent of the indispensable linkages between environment and development; and to promote individual and community participation in environmental actions like waste management. In this study the national environmental policy and human settlements policy was used as guiding policy to support the study.

According to URT (1997), the current state of the Tanzania environment is a matter of concern; a natural analysis has identified environmental pollution as the one of the problem for urgent attention. Pollution can be categorized into air, land, water, and noise pollution. Solid waste is mainly found on the land even though others may be disposed in the water. It is appreciated that pollution in towns, cities, municipal and

the countryside is affecting the health of many people, and has lowered the productivity of the environment. The environmental policy signifies the detrimental effects of pollution as a result of different human activities like industrial, agricultural and commercial activities. This policy needs to countercheck the human activities verses waste management, street vending is one of the human activities which contribute to municipal solid waste and it requires strong supervision to counteract the situation.

According URT (2000) environmental health is concerned, the protection and conservation of the environment from environmental degradation which includes poor solid waste management, crude dumping of industrial discharge and air pollution resulting from and controlled industrial and gasoline emission is important for the well being of people. The human settlements policy of Tanzania shows that Waste Management (WM) is a serious problem in the human settlements especially in urban areas and should be addressed properly in order to save dwellers lives. Management of solid and liquid waste in most urban areas is poor resulting in environmental deterioration. Policy statement in waste management is to ensure that human settlements are kept clean and pollution effects of solid and liquid wastes do not endanger the health of residents in rural and urban areas (URT, 2000). To keep the human settlement clean. The policy insists on developing environmental action plans and settlement action plans which indicate the effective waste management in settlements. The national health policy point out the idea of guideline or framework for conducting sanitation, waste management and maintain hygiene. URT (2003) Policy statements are provision of environment and health education and promotion at all levels to individuals, families and community.

National environment policy and national human settlement policy are the policies that addressing the issues of waste management in wide range. Policies provide the current situation of environment especially in towns, municipals and cities, shows the extent of pollution and the policy statement to deal with the situation.

## 2.2 Empirical Literature Review

The research conducted by Kalwani (2009) in Morogoro municipal revealed that, there were inefficient SWM in Morogoro Municipality especially in informal settlements. This was due to lack of political will to implement participation in solid waste management. Also the increase in migrants from rural to urban leads to the increase of unemployment in formal sectors and rise in employment in informal sectors as a results street vending expands in municipal. Other reasons were community awareness and participation in solid waste management.

Municipal solid waste management should foot holding on all administrative, financial, legal, planning, and processing of functions that lead to finding solutions to all problems of solid wastes (Tchobanoglous, 1993). Solid waste generated by the daily activities of the people needs to be properly managed in such a way that it minimizes the risk to the environment and human health. Inadequate collection and disposal of solid waste is a main cause in the spread of disease and environmental degradation in Morogoro municipality (Chengula, 2015).

**Table 2.1 Selected urban centers shows waste generated, collected, uncollected daily in tones and percentage.**

Urban center	Waste generated daily	Waste collected Daily		Uncollected waste daily	
	Tone	%	Tone	%	Tone
Arusha	200	60	120	40	60
Tanga	400	54	216	46	184
Moshi	92	51	47	49	45
Iringa	36	46	16	54	20
Mwanza	210	38	80	62	130
Dar es salaam	2000	24	480	76	1520
Morogoro	260	10	26	90	234

**Source:** (Kalwani, 2009)

It is unquestionable that Morogoro have serious problem of municipal solid waste management where only 10% of waste generated per day were collected and transported to dumping site.

Kalwani (2009) noted that rural to urban migrants are lured by formal employment expectations in the municipality limited modern sector, majority are not absorbed in

a formal employment. Most of them are absorbed in informal sector of business, micro or small business which known as street vending. The areas which occupied with these migrants are much polluted with solid waste due to their kind of activities conducted in those areas. Street vendors seem to be a source of solid waste in Morogoro municipality and other municipalities in the world.

Also a study on SWM in Morogoro municipal was conducted by Chengula, *et al*, (2015) which assessed on the awareness, knowledge, attitude and practice of the community towards solid waste disposal and identifying the threats and extent of bacteria in the solid waste disposal sites in Morogoro Municipality in Tanzania. It revealed that solid waste generated in Morogoro Municipal can either come from offices, shops, municipal area, market, industries and residential areas. Solid waste in Morogoro municipal were classified according to the source and biodegradability. Health effects caused by improper waste disposal were investigated and different diseases were mentioned as a result of poor solid waste management. These were dysentery, helminthosis, cholera, diarrhea, typhoid and malaria but the frequency of cholera was reported higher than the other diseases.

According to Chengula, *et al*, (2015) the rapid growth of cities and introduction of new technology generate new types of waste and pose the following challenges:- increase in wastes generation, outbreak of diseases related to wastes, challenges in managing sewage system and increase in cost of managing wastes in Morogoro Municipality. The use of private sector in waste management is very important for managing solid waste in Morogoro Municipal. Integrated Solid Waste Management (ISWM) is one of most recommended and compatible approach for waste management which provides a framework for the development of a sustainable municipal solid waste management service. Moreover it presents a use of various collection, transport and treatment options (White *et al.*, 1999).

Kalasa (2014) conducted a study on the critical analysis of the challenges of solid waste management initiatives in informal settlements Tanzania, a case study of Keko Machungwa Dar es Salaam city council. The aim of this study was to analyze factors which hinder solid waste management in informal settlements in Tanzania

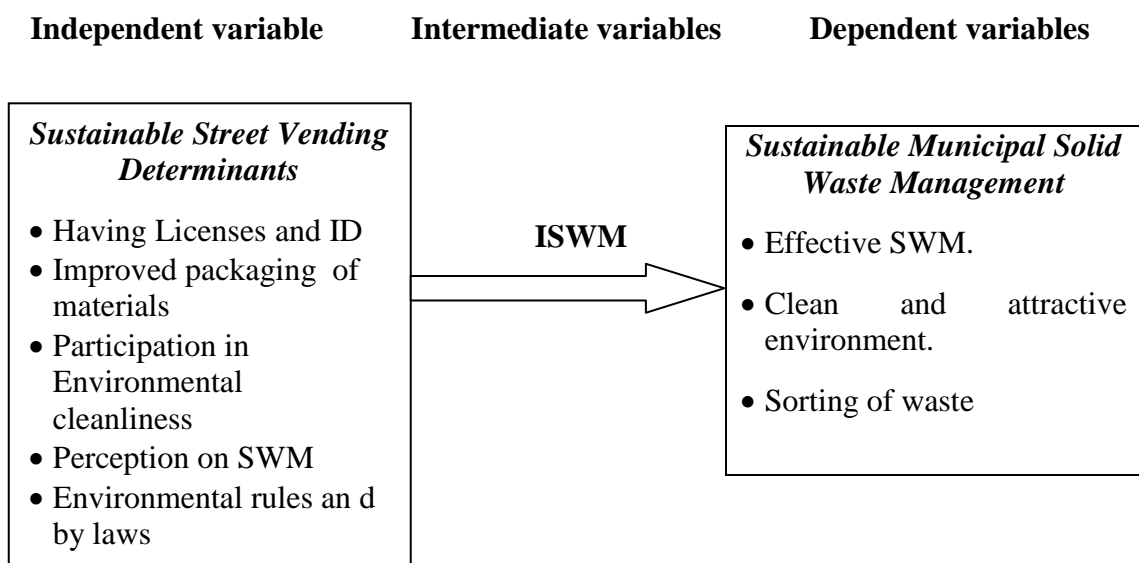
specifically in Keko Machungwa. Data were collected through interview, focused group discussion and physical observation methods with the sample size of 70 households. This study show that people were dumping solid waste into open spaces, drain system and others burning or burying into the ground. As Kalasa (2014) observed 62% of residents were disposing solid wastes into open drains and natural streams. And the waste collectors confirmed that large quantities of solid wastes were not collected.

Jamal (2002) investigated household preferences for solid waste management in Malaysia and the utility derived from improved solid waste management. The solid wastes generated in Morogoro based on previous findings were reported to be 260 tons per day while only 26 tons of the wastes generated were collected (removed) per day (Kalwani, 2009).

Municipalities, usually responsible for solid waste management in the streets, have the challenge to provide an effective and efficient system to the inhabitants. However, they often face troubles beyond the aptitude of the municipal authority to tackle (Sujauddin *et al.*, 2008) mainly due to lack of organization, financial resources, complexity and system multi dimensionality (Burntley, 2007).

### 2.3 Conceptual framework

**Figure 2.1 Conceptual framework**



**Source:** Researcher's own construct (2017)

Figure 2.1 show that sustainable Municipal solid waste management depends on sustainable street vending and integrated solid waste management. The ISWM act as a catalyst to speed up the all activities done by street vendors to reach the targets of Municipal solid waste management, As known the ISWM is a strategic plan initiated for sustained management of solid waste from the point of generation to disposal and involve many stakeholders like environmental officers, health officer, CBOs, residents and traders. When street vendors can conduct their work in sustainable ways in cooperation with those stakeholders there will be an improvement in municipal solid waste management in Morogoro Municipality. ISWM involves various stakeholders with different ways of dealing with solid waste because solid waste management provides many opportunities, including employment in public and private sectors. Individual people, private companies and NGOs can be employed in waste collection, transportation and others can be employed in waste recycling industries.

### **2.3.1 Possession of Licenses and ID**

The registration of the street vendors by providing license and ID as a determinant will help to get population data of vendors in the streets. Through these registrations municipal will be able to determine the number of vendors, types of goods sold and quantity of their solid waste production and they can find possible solution to minimize or get rid of it. These statistics will be used in preparation of action plans, organizing, raising awareness and involving the street vendors as a stakeholder in municipal solid waste management. Re-registration and de-registration should be done in the periodicity in order to know the status of the vendors in the municipal, this will ensure the effectiveness in solid waste management.

### **2.3.2 Types of packaging materials**

Another determinant of sustainable municipal solid waste management was the types of packaging materials of the goods sold, sustainable street vending involves the use of improved packaging materials of the various goods. This is to check the life time of the material used to the environment. Selection of packaging materials and the system of parking of different goods will helps street vendors to be in position to reduce the amount of solid waste to the environment by selecting goods which its

packaging materials are environmental friendly and discouraging multi-packaging by encouraging customer to use woven or basket weave, example the bottle of beverages packed again in a plastic bag should be discouraged. The government will be in position to assign the industries and other producers of goods to apply cleaner production in order to reduce the amount of solid waste to the environment. Selection of improved packaging materials will help in sorting, collection and transportation of the solid waste from municipal to dumping site. Improved packaging will helps to involve the community in sorting and collection of solid waste to the dustbins and collection points because street vendors will be the ambassadors of municipal solid waste management by provide awareness to customers and by encouraging them to dispose well packaging material after use.

### **2.3.3 Participation in environmental cleanliness**

Street vendors sell various types of goods depending on capital, environment (site of work), and availability of the goods and needs of the customers. Some street vending involves in selling food (food vendors) this kind of business needs high sanitation to avoid diseases to customers and themselves. Sustainable street vending should consider the life of next generation that should not be harmed with the present vending, all street vendors should make sure that the environment in which they conduct their business are clean, adhere to established environment by-laws, regulations and policy. Environment awareness will change the negative perception of street vendors toward the municipal solid waste management and they will participate fully in ensuring the environments are clean.

Participation as a determinant to municipal solid waste management can be divided into three categories which are financial contributions, community self-helps, and community consultation. Financial contribution involve the street vendors to contribute money before or during the services, participation by consultancy needs leaders to make meetings and forums with street vendors to share experiences and discussing solutions to MSWM and self-helps needs the community to participate fully in municipal solid waste management rather than financial contributions and participation by consultancy (Kalwani, 2009).

### **2.3.4 Perception on SWM**

Perception of street vendors toward municipal solid waste is a one of the major determinant in municipal solid waste management because all other determinants to work properly depend on the perception of street vendors. Perception was the main root to success in sustainable municipal solid waste management with categories which were positive and negative perception. Positive perception on waste reduction, sorting, collection and general cleanliness of the municipal will help to have clean, safe and attractive environment. Positive perception will be noticed by checking participation of street vendors in cleanliness, paying fees and contributions for pollution. Street vendors should perceive that environmental cleanliness is the one of their duties in the areas in which they conduct their business this will simplify sorting process of waste by keeping degradable and non degradable wastes in different dustbin for effective collection transportation and disposal of waste. Negative perception was that which street vendors were not willing to participate in municipal solid waste management. By conducting awareness campaign will help to change the attitudes of street vendors who have negative perception toward municipal solid waste management (Kalwani, 2009).

### **2.3.5 Environmental rules and by-laws**

There are regulations and by-laws which govern municipal waste management; these are derived from national environmental policy of 1997 and national environmental Act 2004. Municipal council is responsible in formulation of environmental by-laws. Polluter pays principle can be incorporated in these by-laws were street vendors who can pollute the environment or produce solid waste can pay for it. Environmental rules, by-laws and policy are kept to ensure that all activities concerns with environment are conducted systematically and penalty should be applied to those who will not obey (URT, 1997). This determinant will help Street vendors become a watch dog to them selves (make sure that no one practices poor solid waste disposal) and to consumers in order to ensure their environment are clean all the time.

## **2.4 Operationalisation of the Key Terms**

### **2.4.1 Waste**

In this study, waste can be defined as the materials that are no longer needed. These materials are like vegetable peelings, leftover food, scraps, food packaging such as plastic bags, tins, bottles, broken items, and human wastes such as urine and feces matters. Waste can be classified according to state, sources or origin, and hazardless. According to state waste have three types which are solid waste, liquid waste, and gaseous waste (Kalwani, 2009).

### **2.4.2 Solid waste**

Solid waste refers to the hard waste materials such as household garbage, plastic, paper, glass, scrap metals, waste tires, empty cans, construction wastes, and electronic waste (E-waste). E-waste is the fastest growing waste in municipalities in developing countries is due to importation of cheap and used electronic equipments like TV, radio, refrigerator, and toys from developed countries (Gonzenbach, *et al* 2007). According to the sources or origin, waste can be classified into major seven (7) categories which are Urban or Municipal waste, industrial waste, Agricultural waste, Bio-medical waste, mining waste, radioactive substance and commercial waste.

### **2.4.3 Municipal Solid Waste (MSW)**

Municipal solid waste refers to wastes arising from domestic, commercial, industrial, and institutional activities in an urban area. Municipal solid wastes encompass all those wastes that are neither wastewater discharges nor atmospheric emissions (Bernstein, 2004). With respect to this study Municipal solid waste explained as the waste, collected from residential houses, market, streets and other places mostly in the urban areas and disposed by the municipal (department of environment and solid waste management).

### **2.4.4 Municipal Solid Waste Management (MSWM)**

Municipal solid waste management refers to the collection, transfer, treatment, recycling, resource recovery, and disposal of solid waste generated in urban areas (Bernstein, 2004). Solid waste management helps in achieving some of the

Millennium Development Goals. Solid waste management can create employment to municipal dwellers. Other goals which are relating to improvement in public health and protection of the environment cannot be attained without devoting attention to solid waste management as one part of the solution (Gonzenbach, *et al* 2007).

#### **2.4.5 Waste Management**

Waste management is to prevent waste to cause harm to human health and environment and promote resource use optimization. Prevention of waste creation is the main priority of waste management which corresponding to the principal goal of Waste Management. The theory of Waste Management is based on considerations that waste management is to prevent waste causing harm to human health and environment, and application of WM leads to conservation of resources due to reducing, reuse and recycling of waste (Kumar, 2010).

#### **2.4.6 Sanitation**

Sanitation is a safe disposal of human urine and feces it includes the maintaining of hygiene. With respect to this study sanitation refers to the providing facilities and services for human excreta product through mobilizing, educating and raise community awareness on the impact of poor waste disposal to the human and environment (Kumar, 2010).

#### **2.4.7 Sustainable Development**

Sustainable development is a development that meets the needs of present generation without compromising/endangering the ability of the future generation to meet their own needs. Activity should balance economic, social and environmental benefits through implementation of development policies, programs, and projects that will enhance one type of benefit without jeopardising benefits of others (Todaro, 2009). According to this study sustainable development includes all activities done by street vender which contributing to sustainable municipal solid waste management. This including possession of equipments for temporarily storage of solid waste, obeying rules and by-laws of municipal solid waste management and participate fully in sustainable municipal solid waste management.

#### **2.4.8 Street Vender**

A Street vender refers to the person who offers goods or services for sale to the public without having a permanently built structure but with a temporary static structure or mobile stall or head-load (Asif, 2017). For the purpose of this study street vender can be defined as a person who conducts business or sells something in the street, either from a stall or with goods laid out on the side walk. In many areas of the world street vendors attract more people to shop and become very important to society, national and themselves as they earning benefits. Majority of street vendors were found in towns, cities and municipals.

#### **2.4.9 Sustainable street vending**

This involves all activities conducted by street vendors without compromising the ability of future generation to meet their needs. By involving street vendors in integrated solid waste management as a stakeholder will propel the sustainable street vending. In so doing the street vendors should cope with integrated solid waste management as a process to municipal solid waste management (Asif, 2017).

#### **2.4.10 Pollution**

Pollution is an action or process of making the environment dirty and unfit for human use (CPCT, 2017). There are four types of pollution named as water pollution, land pollution, air pollution and noise pollution. In this study pollution refers to the action done by street vendors to leave the byproducts of their goods in the environment, such as plastic bottles, rotten fruits and vegetable.

#### **2.4.11 Cleaner production**

Processes designed to reduce the wastes generated by production, this aims at reducing and preventing the production of waste in various economic activities, while increasing efficiencies in the uses of energy, water, resources and human capital. For Tanzania cleaner production centre (NCPC) was established in October 1995 under UNIDO-UNEP, currently is funded by NORAD and operating as CPCT under the Vice President office (CPCT, 2017).

#### **2.4.12 Controlled dump**

A planned landfill that incorporates, to some extent, some of the features of a sanitary landfill: sitting with respect to hydro-geological suitability, grading, compaction in some cases, leachate control, partial gas management, regular (not usually daily) cover. Access control, basic recordkeeping, and controlled scavenging. These kinds of dumps are mostly found in municipalities of developed countries and are very expensive to construct and to run. Example the Pugu dump site in Dar es Salaam was intended to operate as a landfill, but due to inadequate budget it has operated since opening as an open dump. At this time solid waste covers the large percentage of the total area and the upgrading of the landfill it needs the international acceptance norms for landfill site design and operation (Breeze, 2012).

#### **2.4.13 Effective SWM**

Effective solid waste management involves the awareness of sorting waste, frequencies of waste collection from collection points to dumping site. There are problems in sorting waste from domestic level, street vendors to municipal authority which makes difficult in waste management. Waste must be sorted to differentiate degradable and non degradable waste also hazardous and non hazardous waste; this is the good method of handling waste. Wastes in collection points should be transported to sanitary land fill or dumping every time in order to avoid accumulation of wastes in dustbins and collection points (Nachalida, *et al*; 2017).

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter describes methodology used in collecting relevant data for this study. The chapter consists of seven sections which are research area, research design, population and sample size, sampling techniques, data collection method, data analysis methods and ethical issues.

#### **3.1 Study Area**

The research was conducted in Morogoro Municipality. The study area was selected because there was a serious problem of solid waste management accompanied with eruption of cholera every year, and high population of street vendors who conducted their activities every day in the market place, street roads, open space and in the streets. Only 10% of solid waste generated were collected and disposed well, while the remaining was left in the street. This was associated with spreading of diseases (Chengula, 2015). Eight (8) streets from eight wards were selected as a representative of the other streets; those wards are Sabasaba, Kiwanja cha ndege, Boma, Mjimpya, Kingo, Mafisa, Mwembesongo, and Kihonda. These areas were selected because they have higher population of street vendors, bus stands, markets, shops and presence of solid waste.

#### **3.2 Research Design**

The research employed mixed method design. Mixed method guided the researcher to use both qualitative and quantitative methods. Mixed method design was appropriate because it allows in-depth study because it has the room for using both qualitative and quantitative data collection methods and analysis techniques. Through mixed method design the contribution of sustainable street vending to municipal solid waste management were investigated.

### 3.3 Study Population

Targeted population of this study was all street vendors, sweep leaders (CBO) ward health officers and environmental officers of Morogoro municipality. These groups will provide reliable data in contribution of sustainable street vending in Municipal Solid Waste Management (MSWM).

### 3.4 Sampling Techniques and Sample Size

For this study simple random and purposive sampling techniques were employed. Street vendors were selected by using simple random sampling in which each individual had equal chance to participate in the study. This method helps to avoid bias. The key informants including sweep leaders ward health officers and Municipal environmental management officer were selected purposively. Their selection was based on their knowledge on health and environment as well as solid waste management plans.

#### 3.4.1 Simple random sampling

The estimation of the sample was based on the formula of calculating the sample size =  $\frac{N}{1+N(e^2)}$ , as proposed by (Yamane, 1967).

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

Where

n = Sample size

N = Population

e = Error percentage

In this study the total population was 3081 (Municipal Business Report 2017); the percentage error expected was 10%

So,

$$n = \frac{3081}{1 + 3081(0.1^2)}$$

$$n = 96.87$$

Sample size was 96

The sample size was 96 respondents based of the above formula.

### 3.4.2 Purposive sampling

Purposive sampling was used to 36 sweeper leaders, 12 health officers and 4 municipal environmental officers. Four (4) sweeper leaders were selected, three (3) people was selected from ward health officers and two people from remaining group of municipal environmental officers as a key informants because they all had knowledge and procedures for municipal solid waste management.

**Table 3.1 Sample distribution of key informants**

	Respondents	Population	Sample Size Proportion
1	Sweeper leaders	36	4
2	Health officers	12	3
3	MEMO	04	2
	TOTAL	52	9

**Source:** Pre – Field survey 2017

## 3.6 Data Collection

### 3.6.1 Primary data collection methods

In this research questionnaire, observation and interview were the major method of collecting primary data.

#### 3.6.1.1 Questionnaire

Questionnaires were provided to street vendors. The questionnaires consisted of Open-ended and Closed-ended questions. Open-ended questions helped to collect data on perception, experience and feelings from street vendors about municipal solid waste management.

#### 3.6.1.2 Observation

Observation was used to collect primary data on littering behaviour around vending areas packaging material of the sold goods, waste collection points, relationship between street vendors and street sweepers in solid waste management, business of recycled waste like plastic and iron, waste collection facilities and dumping site.

### **3.6.1.3 Interview**

Interview was used in collecting data where two environmental officer, three ward health officers and four sweep leaders (CBOs) were interviewed in order to get their experience in municipal solid waste management in relation to street vending. This tool allowed flexibility to researcher in data collection because the researcher was in position to modify the questions according to the context and the mood of the respondent.

### **3.6.2 Secondary data collection method**

Data were obtained through documentary review. This study used the books, reports, journals, newspaper, published research reports in hard copies and soft copies from internet source to collect secondary data. Morogoro municipal cleanliness monthly reports were reviewed to check trends of cleanliness performance in Morogoro municipality.

## **3.7 Data Analysis**

Data from various methods were organized according to the research questions and coded to make data agreeable to analysis.

### **3.7.1 Quantitative data analysis**

The quantitative data were analyzed by using IBM SPSS statistics whereby descriptive statistics such as frequencies and percentage were employed and presented in tables and pie charts for categorical variables and for each continuous variable mode was computed also. This was mainly employed to two specific objectives which were to examine the perception of street vendors on municipal solid waste management in Morogoro Municipality and to assess strategies used by street vendors to mitigate solid waste production in Morogoro Municipality.

### **3.7.2 Qualitative data analysis**

Qualitative data analysis was employed whereby the findings were in narrative form; content analysis was employed in data analysis. Written data from the field were reduced, coded and categorized according to specific objectives then making quotation from transcriptions. This was mainly employed to two specific objectives which were to assess strategies used by the Municipal government to ensure

sustainable street vending for sustainable solid waste management in Morogoro Municipality.

### **3.8 Ethical Issues**

Before conducting research activities at Morogoro Municipal the researcher asked for permission from Mzumbe University in order to have supportive documents like latter which explain the purpose of the study. Also oral explanation was provided first before conducting the interview, in this way respondents understood the purpose of research, status of researcher, confidentiality and their position in research study.

## **CHAPTER FOUR**

### **PRESENTATION OF FINDINGS AND DISCUSSION**

#### **4.0 Introduction**

This chapter presents and discusses the findings of the study according to the objectives. Findings were discussed in detail with respect to background characteristics of respondents and four specific objectives which were perception of street vendors on MSWM, Strategies used by street vendor to mitigate solid waste production in Morogoro Municipal and Street vendor involvement in solid waste management in Morogoro municipality.

#### **4.1 Background Characteristics of the Respondents**

This subsection presents and discusses the background characteristics of the respondents especially age of respondents, sex of the respondents and respondent's level of education in accordance with specific objectives.

##### **4.1.1 Age of the respondents**

The study was interested with various age sizes of street vendors, and it was set in group wise ranging from 10 to 17 years old, 18 to 25 years old, 26 to 33 years old, 34 to 41 years old, 42 to 49 and 50 years old and above. The data findings revealed that 10.4% of the respondents aged between 10 to 17 years, 24% aged between 18 to 25 years, 36% aged between 26 to 33 years, 18.8% aged between 34 to 41 years, 7.3% aged between 42 to 49 years and 3.1% aged 50 years old and above. Tables 3 show the results.

**Table 4.1 Age Distribution of Respondents**

Age group	Frequency	Percent
10-17	10	10.4
18-25	23	24.0
26-33	35	36.5
34-41	18	18.8
42-49	7	7.3
50 and Above	3	3.1
Total	96	100.0

**Source:** Field data (2018)

The findings shows that people aged 26 to 33 years old were the majority in the study as this class emerged to be a model of the age groups with higher percentages compared to other groups. This revealed that most of the respondents were youth as indicated in Table 4.1. Perception on municipal solid waste of youth street vendors and elder street vendors were different. Youth street vendors perceived that cleanliness were the task of municipal council and CBOs which are responsible for cleanliness and collection of solid waste. As a result they sell their goods and leave the environments to be cleaned by street sweepers.

#### 4.1.2 Sex of the Respondents

The study was interested to study out if gender aspect has influence in municipal solid waste management at vending areas. The results in Table 4.2 revealed that 59.4% of the respondents were males while females were 40.4% of the respondents.

**Table 4.2 Respondents Distribution by sex**

Sex	Frequency	Percent
Male	57	59.4
Female	39	40.6
Total	96	100.0

**Source:** Field data (2018)

Areas where Male Street vendors were working were very dirty and polluted compared to areas occupied by female street vendor. Male street vendors had negative perception toward MSWM and had low contribution on sustainable municipal solid waste management. This also is supported by observation method, where it was observed that littering behaviour was at high level for Male Street Vendors compared to Female Street Vendors. Male Street Vendors were ignoring cleanliness and perceived it as the work of women. This kind of perception leads to dirty environment in various parts of Morogoro municipality.

A contribution on municipal solid waste management depends on the perception of street vendors on MSWM. Negative perception leads to worse situation in Morogoro municipality especially at Kikundi River, Madaraka Road and Ng'aka Street. Street vendors were aware with solid waste management and consequences of poor waste disposal but they lack willingness to clean their environment, and this why were disposing solid wastes at late evening and night to avoid to be seen by municipal officers as reported by one of the key informant municipal environmental officer as informed:

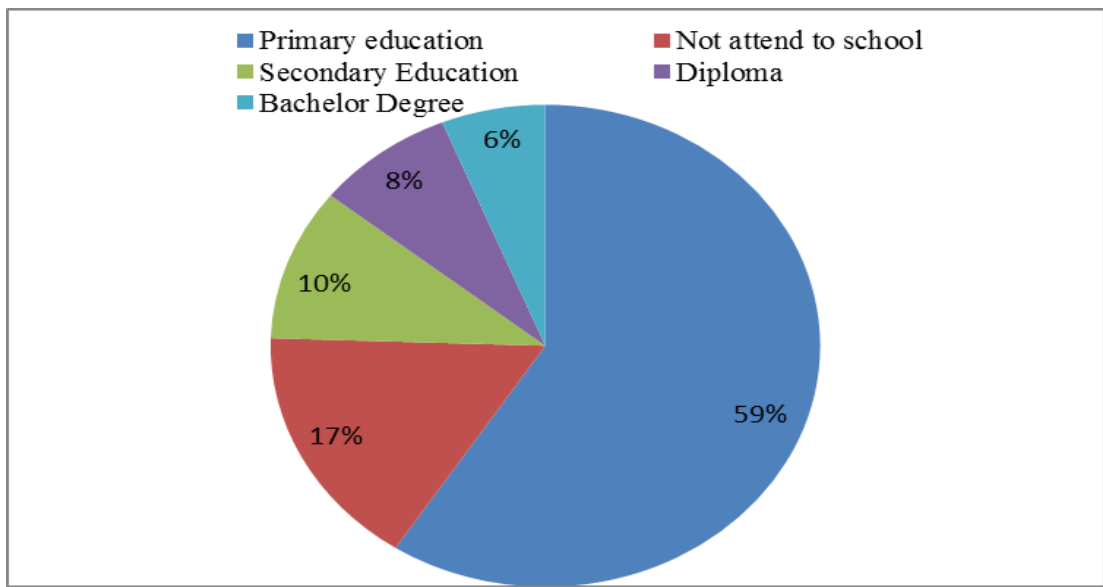
*... is not true to say that street vendors or community members are not aware with solid waste management. It is this reason that motivates them to conduct their business at late evening and dispose at late evening and night; they know that during that time officers are at home out of working hours (Interview, 2018).*

#### **4.1.3 Respondents level of education**

The study set five possible levels of education to street vendors, respondents were asked to identify the level of education attained. Level of education was used to determine the awareness on contribution of sustainable street vending to municipal solid waste management. This was done by checking the relationship of level of education of respondents and their awareness on contributions of street vending to municipal solid waste management. The level were bachelor degree, diploma, secondary education, primary education and groups of not attend to school. The findings revealed that 59% of the respondents attained primary education, 17% of the

respondents did not attend to school, 10% reached to secondary education, 8% had Diploma in various field and 6% had Bachelor degree in different discipline. Figure 4.1 illustrate the results.

**Figure 4.1 Distribution of respondents according to level of education**



**Source:** Field data (2018)

The findings revealed that the majority of the respondents were standard seven leavers. This signifies that most of the street vendors had Primary education. This implies that most of respondents had a low level of education. This is in line with a research done by Kalwani (2009) on the community participation on municipal solid waste management in informal settlements, in Morogoro municipality which it argued that: There was significance association between household participation on solid waste management activities in relation to education level of the respondents. Importance of education in understanding basic policy concepts and instructions in solid waste management, and knowledge on environmental diseases and prevention was needed because most of respondents were illiterate (Kalwani, 2009).

Education levels of street vendors was considered in sustainable street vending in Morogoro municipality because educated street vendors can follow the instructions of municipal solid waste management easily. They can cope with various methods and techniques of municipal solid waste management such as reuse, reduce and

recycle of waste the knowledge that is taught at school in a topic like waste and waste disposal. Low education level of street vendors was contributing negatively on municipal solid waste management. This is in line with the study done by Kalwani which argued that there was direct relationship observed between education achievement of heads of households and knowledge of different methods of municipal solid waste management (Kalwani, 2009).

## **4.2 Perception of Street Vendors on MSWM**

Perception of street vendors was one of the specific objectives of the study. In this subsection perception on level of knowledge on municipal waste management, comparisons of participation between Street Vendors and Street Sweepers and littering behavior of Street Vendors are presented were discussed in detail.

### **4.2.1 The influence of level of knowledge on SWM**

The study was interested to determine the influence of levels of knowledge on solid waste management to street vendors. Levels of knowledge was set in four categories which were respondents with high knowledge on SWM, respondents with medium knowledge on SWM, respondents with low knowledge on solid waste management and respondents who did not have the knowledge on solid waste management. The results are as presented in Table 4.3.

**Table 4.3 Respondents distribution according to the level of knowledge on SWM**

<b>Influence of Level of knowledge</b>	<b>Frequency</b>	<b>Percent</b>
High	8	8.3
Medium	22	22.9
Low	46	47.9
Non	20	20.8
Total	96	100.0

**Source:** Field data (2018)

The results revealed that respondents with high level of knowledge were 8.3%, medium level of knowledge were 22.9%, low level of knowledge were 47.9% and those with no knowledge were 20.8%. The findings showed that respondents with low level of knowledge on solid waste management were the majority in the study as this level emerges to be a model of level of knowledge with higher percentages compared to other groups.

To attain sustainable SWM through changing the perception of street vendors by educating to the extent that they will be able and willing to keep environment safe clean before and after vending. Knowledge on sustainable solid waste management is important in implementation of integrated solid waste management as mentioned in UNEP training manual that developing and implementing ISWM requires comprehensive data on present and anticipated waste situations, supportive policy frameworks, knowledge and capacity to develop plans/systems, proper use of environmentally sound technologies, and appropriate financial instruments to support its implementation (UNEP, 2009).

#### **4.2.2 Comparisons of participation between street vendors and street sweepers**

Street vendors did not participate well in municipal solid waste management with street sweepers in cleanliness with exception of Saturday morning during the implementation of President's announcement on the environmental cleanliness. There were no direct participation in municipal solid waste management between street vendors and street sweepers as well as municipal council, street vendors they had negative perception to municipal officers when they were told to go to the special areas like Kikundi and Manzese market for the matter of ensuring municipal solid waste management by having waste collection point nearby, litterbins, toilets, waste transportation services and strong supervision of solid wastes.

One of the street vendors lamented on the services provided by Morogoro Municipality on solid waste management, he said that:

*Cleaning of the environment is the responsibility of municipal council, but we fail to understand when the waste collectors demand for money from us, we give them money like five hundred to two thousand Tanzanian Shillings and take our waste. However, they are paid by the municipality yet they demand money from us. Without giving them money they delay to collect the specific waste for a long time. (Suggested by Street vender 6/1/2018).*

This argument shows that the perception of street vendors toward the municipal solid waste management was negative in such a way that street vendors cannot participate in Municipal solid waste management as they perceive that it is the responsibility of Morogoro municipal council. It was also impossible for them to cooperate with street sweepers in environmental cleanliness and the comparisons of participation between them were seen to base on one side of the street sweepers only.

#### **4.2.3 Littering behaviour of street vendors**

Most of street vendors were seen working during the late evening to night along the Madaraka road, Masika road, outside of Msamvu bus terminal, Sabasaba areas, Ng'aka Street and outside of Mawenzi market. After doing their business Street vendors leave solid waste in their areas and others disposed their waste in open spaces, along the roads in the river and undeveloped plots. Negative perceptions of Street vendors on municipal solid waste management lead to developing of unofficial collection points or dumping sites along the roads and backyards as shown in Figure 4.2. Littering behaviour was the results of perception of the street vendors in vending areas where by areas occupied by street vendors with negative perception were too dirty compared to areas occupied with street vendors with positive perception towards municipal solid waste management.

**Figure 4.2 Unofficial solid waste collection point along the Sultan road**



**Source:** Field data (2018)

The littering behavior of street vendors was contributed with willingness to keep the environment clean, inadequate of litterbins and for many areas lack of litterbins and nearby collection points as observed in Figure 4.3 where street vendors at Sabasaba areas leave the solid waste at their working areas.

**Figure 4.3 Street vendors leave the solid waste after their business place at Sabasaba areas in Morogoro Municipality**



**Source:** Field data (2018)

Observation done by this study revealed that areas where street vendors conduct their activities during late evening and night were more polluted and street vendors disposed their wastes along the roads, in river and bridges, open spaces and undeveloped plots. Littering behaviour of the street vendors was associated with negative perception of the street vendors. Street vendors perceived that they can throw solid waste anywhere and street sweepers may collect it and take it to dumping site. Example street vendors who worked at Madaraka road during the night they dispose their waste in river Kikundi that leads to overflow of water at Kikundi Bridge and those who worked at Sabasaba leaves their waste randomly to be collected by street sweepers this is in line with the study done by Kalasa (2014) observed that Keko Machungwa residents were disposing solid waste into drainage system and natural streams which leads to floods during rain seasons.

This also line with the study done by Brown (2010) on the assessment and appropriate design of integrated solid waste management system in Koulikoro, Mali which argued that this sparse and unsystematic waste collection service, the residents were openly burning their solid waste or dumping it in one of over 120 unofficial open dumps/collection points located throughout the city and most of them doing this activity during the night as a results city becomes too dirty with solid wastes.

### **4.3 Strategies of street vendors on mitigating solid wastes production**

Street vendors were seen to produce solid waste through their activities and this study was interested to understand the strategies in which street vendors can mitigate the solid waste production in Morogoro municipal. Rate of waste generation, possession of equipment for solid waste collection, provision of awareness to customers on MSWM, packaging materials of the sold goods and business of recycled waste likes plastic and iron (scraps) were presented and discussed in this subsection to examine the strategies of street vendors on mitigating solid wastes production.

#### **4.3.1 Level of waste generation**

The study was interested to understand the rate of waste generation by street vendors. The modality of obtaining these data was set in four criteria, such as respondents with high rate of waste generation, respondents with medium rate of waste generation, respondents with low rate waste generation and those who did not generate solid waste in their business. These data were used by this study to examine strategies which can be used by street vender to mitigate solid waste production in Morogoro Municipality. Table 4.4 shows the results.

**Table 4.4 Respondents distribution by level of waste generation**

<b>Level of waste generation</b>	<b>Frequency</b>	<b>Percent</b>
High	38	39.6
Medium	48	50.0
Low	8	8.3
Nothing	2	2.1
Total	96	100.0

**Source:** Field Work (2018)

The findings revealed that 50% of respondents generate waste in medium rate followed with 39.6% respondents who generate waste in high rate while 8.3% had low rate of waste generation and 2.1% were those who did not generate solid waste in their business.

Rate of waste generation in Morogoro municipality depends on type of goods sold by the street vendors and seasonal variation because was observed that rate of waste generation was high to street vendors who sold food, beverage and agricultural products. Also during the rain seasons was observed that most of waste resulted from agricultural products such as fruits and vegetable. This finding is in line with the study conducted by Malietha (2011) which reported that generation of waste per person depend on the socio-economic condition of the particular urban society, its cultural background, climatic conditions and seasonal variations. Seasonal variation of the year may increase fresh vegetables and fruits availability, thereby giving rise to varying rates of waste generation. Waste generated by street vendors with regardless of the seasonal variation can be managed according to the nature or state of waste by street vendors themselves, because they are able to reduce, reuse and recycle the waste.

#### **4.3.2 Possession of equipment for solid waste collection**

The study asked respondents if they possess and use equipments for solid waste collection like dustbins, bags, wheel barrow and baskets. The question required the respondent to either answer as yes for those who had the equipment or no for those who did not have the equipment. These data were used in this study to determine the strategies used by street vender in mitigating solid waste production in Morogoro Municipality.

**Table 4.5 Respondents by possession of equipment for solid waste collection**

<b>Possession of equipment</b>	<b>Frequency</b>	<b>Percentage</b>
I possess equipment	36	37.5
I do not possess equipment	60	62.5
Total	96	100.0

**Source:** Field data (2018)

According to the results in Table 4.5 on possession of equipment for temporarily storage of solid waste it was revealed that 62.5% of the respondents had no equipment while 37.5% of the respondents had the equipments for solid waste in their working places.

By having high proportion of respondents who had no equipments for temporarily storage of solid waste this indicate that most of street venders did not have strategies for mitigating solid waste production in their vending areas as a results more waste were observed in their working areas. While for those who had strategies to mitigate solid waste production by having equipment for temporarily storage of solid waste their areas were seen at least neat this encouraging other street venders to have the equipments for temporarily storage of solid waste. This was one of the strategies used to mitigate solid waste production.

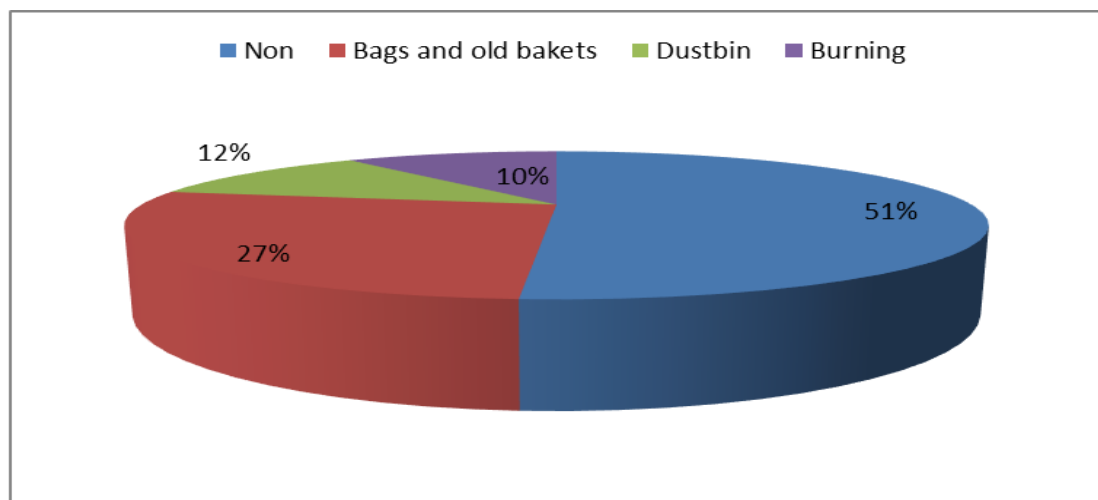
**Figure 4.4 Street venders share one bag for temporary storage of solid waste in Msamvu bus terminal**



**Source:** Field data (2018)

It was observed that more than five street vendors were sharing one bag for temporarily storage of solid waste however, the bag was not enough as shown in Figure 4.4. This implies that most of street vendors threw the wastes in their surroundings.

**Figure 4.5 Respondents distribution by types of waste storage equipment at working place**



**Source:** Field data (2018)

The results show that 12% of respondents used dustbins for solid wastes and 27% of the respondents were utilising and reusing bags like cement bags and old baskets as shown in Figure 4.5, few of them had specialized equipments for temporarily storage of solid waste which were dustbins. According to environmental and municipal solid waste management officials plastic bags and old basket were approved for temporarily storage of solid wastes at household at primary collection points but it seemed to be used by some street vendors (Kalwani, 2009).

**Figure 4.6 Food venders using bags for storing solid waste outside Msamvu bus terminal**



**Source:** Field data (2018)

The study revealed that only 11.3% of the respondents had dustbins for temporarily storage of solid waste while 26.2% had bags and old baskets for the same purposes as displayed in Figure 4.6. It was observed that at Msamvu bus terminal, more than five street venders were sharing one bag for temporarily storage of solid wastes which couldn't satisfy as shown in Figure 4.4 Most of the food venders were observed using plastics bags for temporarily storage of solid waste. One of the street venders asserted that:

*The Municipal Council should keep many litter bins along the roads and at bus stands because the nature of our work is to move from one area to another so it is impossible to move with dustbins everywhere, but if they are present everywhere we will use them effectively (Interview, 03/12/2017).*

Possession of equipments for temporary storage of solid waste was the one of the strategies used by some street venders to mitigate the solid waste production in their working areas, these equipments were used by street venders and their customers to ensure sustainable municipal solid waste management.

### 4.3.3 Provision of awareness to customers on MSWM

The respondents were asked if they provide awareness to customers on municipal solid waste management.

**Table 4.6 Respondents involvement in providing awareness to customers on MSWM**

Awareness providing	Frequency	Percent
No	54	56.3
Some time	32	33.3
All the time	10	10.4
Total	96	100.0

**Source:** Field data (2018)

The results in Table 4.6 revealed that 56.3% of the respondents were not providing awareness to customers, 33.3% of the respondents were some time providing awareness to customers and 10.4% of the respondents were all the time providing awareness to customers. The mode of these findings was 56.3%. It indicates that street vendors were not involved in providing awareness to customers on SWM.

Sustainable Street vending involves providing awareness to customers on solid wastes management. Those who are responsible to environment and conducting their work sustainably must provide awareness to their customers on solid waste management in order to avoid poor waste disposals. An example I taken on street vendors who sell electronic equipments must provide awareness to their customers to dispose it well after use, because is among the hazardous waste to the environment. Provision of awareness to customers helps to induce knowledge of solid waste management to community.

One of the objectives of National environmental policy is to raise public awareness and understanding on the essential linkages between environments, development and promote individual participation in environmental action (URT, 1997). This insists on contribution of the community on solid waste management. So the street vendors can helps to induce the knowledge of municipal solid waste management to customers. Some street vendors, who were providing awareness to their customers, were using posters and oral direction on how and where the customers can dispose

the solid waste for safe and clean environment. This was one of the strategies used by street vendors to mitigate solid waste production in Morogoro municipality for sustainable municipal solid waste management.

#### **4.3.4 Types of packaging materials of the sold goods**

The study was interested on packaging materials of sold goods, study interviewed sweep leaders, ward health officers and environmental management officers and used observation techniques on the packaging materials of goods sold by street vendors. Packaging materials used by street vendors were plastic bottles, nylons and papers as shown in Figure 4.3. These packaging materials were the main problem in solid waste management in Morogoro municipality.

Sweepers were the one who deals with solid waste generated by street vendors and one of the leaders said that:

*Packaging materials for goods sold by street vendors is a big problem in cleanliness most of the packaging materials are plastics, nylons, banana leaves and grasses for agricultural products. Always these are the wastes we deal with in street vending areas. Nowadays plastic bottles are marketable so it is rare to find with them as solid waste because all the time are picked for sell. (Interview, 10/1/2018)*

The remaining of food, banana leaves, grasses which used in transportation of fruits and soft nylons which were used to pack water, were observed along the roads, Mawenzi market and bus stands in Morogoro municipality. These organic wastes were directly associated with the results shown on Figure 4.4 respondents who sold agricultural products, food and beverages were found to contributed 80.2% of the respondents in the study area. Most of the solid wastes produced were left in the environment without proper disposing. One the key informant sweep leader said that:

*We had one Municipal Executive Director who assigned security groups and ward health officer to destroy water packed in nylons sold by street vendors. It was right because when caught and fined they had no money to pay, their capital was too small to afford the fines. That strategy helped to reduce solid wastes in bus stands and along the roads. I wish I could be the municipal*

*executive director I could applying the same technique to overcome the situation. (Interview, 10/1/2018)*

Integrated solid waste management involves strategies for discouraging packaging materials such as plastics and nylons that can pollute the environment. The possession of equipment for temporally storage of solid waste is also emphasized in integrated solid waste management.

#### **4.3.5 Business of recycled waste likes plastic and iron (scraps)**

Recycling of plastic bottles, scrap metals and used batteries was in high level in Morogoro municipality. There were many collection points for scrap metals and plastic bottles in which people go and sell their bottles and metals scraps. These goods were transferred to recycling industries in Dar es Salaam. It was observed that most of the pickers were drug addicted youth, women and children who live in difficulty conditions. They picked these plastic bottles and scraps sold to get money for subsistence. Scavengers were observed even at dumping site picking plastic bottles from unsorted solid wastes. A number of collection points for plastics bottles and scrap metals were observed as shown in Figure 4.7.

**Figure 4.7 Collection point for buying plastic bottles**



**Source:** Field data (2018)

Most of solid wastes in Morogoro Municipality were plastic bottles, plastic bags, nylons, and remains of agricultural products such as fruits and vegetables. Where observed that some street vendors were sorting the solid wastes in their working place, were keeping used plastic bottles separate with other waste for selling or provide to scavengers. Recycling and reuse of solid waste business was the strategies to reduce the amount of solid waste generated by street vending activities.

Sustainable street vending involve providing awareness to customers on solid wastes management and insisting on recycling business, the study was interested with these two criteria. The findings revealed that 56.3% of the respondents were not providing awareness to solid waste management including the issues of reuse, reduce and recycling of solid waste, followed by 33.3% of the respondents were sometimes providing awareness to customers. This result to poor solid waste management in Morogoro municipality street vendors who are responsible to environment and conducting their work sustainably must provide awareness to their customers on solid waste management in order to avoid poor waste disposal.

One of the objectives of National environmental policy is to raise public awareness and understanding of the essential linkages between environment, and development and promote individual participation in environmental action (URT, 1997). This insists on contribution of the community on solid waste management. So the street vendors can helps to induce the knowledge of municipal solid waste management to customers.

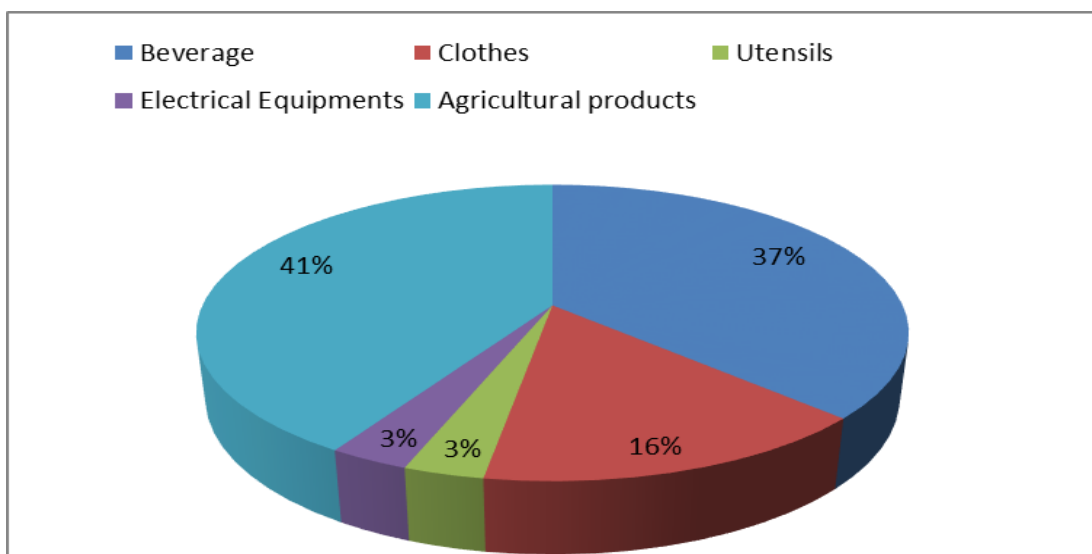
#### **4.4 Morogoro Municipal Strategies on MSWM**

Municipal strategies to Municipal solid waste management in this study was presented and discussed by checking types of goods or item sold by street vender, possession of ID or license, assistance from Municipal Council, supervision for cleanliness in street vending areas, state of waste collection facilities and dumping site and frequencies of waste collection from collection points to dumping site.

#### 4.4.1 Types of goods sold

The study was interested with different goods sold, like fruits, vegetables, cereals, foods, clothes, home equipments, drinking water and other beverage. The study set five categories of items sold by street venders; the categories of goods were food and beverage, clothes, household utensils, electrical equipments and agricultural products like vegetable and fruits.

**Figure 4.8 Respondents' Distribution by categories of goods or item sold**



**Source:** Field Work (2018)

The findings as observed in Figure 4.8 show that, the study was dominated with street venders who sold agricultural products who were 42% of the respondents and followed by those who sold food and beverage who were 38%. Others include those who sold clothes were 16%, utensils were 3%, and electrical equipments were 1%.

**Figure 4.9 Street vendors selling agricultural products alongside Ngaka street in Morogoro municipality**



**Source:** Field data (2018)

Findings on the types of goods sold by street venders shows that 42% of the respondents were selling agricultural products like fruits and vegetables followed by 38% who sell food and beverage as illustrated in Figure 4.9. Respondents who sell agricultural products and food and beverage made 80.3% of respondents who can generate solid organic waste. The study conducted by Mollel (2016) observed the similar results that 60.2% of solid waste generated in Morogoro Municipality were organic waste.

These statistics are useful in grouping and planning different areas for conducting business. For those who deal with agricultural products must reduce waste at production areas (farms) or at the main markets. Also reuse of the organic waste like remain of foods, rotten fruits and vegetables can be used to feed the animals like pigs instead of being disposed randomly. These wastes can be reused and is another source of income and sustainable way of street vending. It is reported that the rate of waste generation in 25 member states EU countries produce 700 million tons of agricultural waste annually, these waste are used to feed animals, production of electricity and fertilizers (UNEP, 2009).

#### 4.4.2 Possession of ID or License

The study was able to identify respondents who possess the Identification Cards (ID) and those who do not have it. Possession of license or ID was used in this study as a variable to assess sustainability of the street vending areas. Table 4.7 shows the results.

**Table 4.7 Distribution of respondents by their possession of ID or License**

Possession of ID or license	Frequency	Percent
I posses ID	7	7.3
I do not posses ID	89	92.7
<b>Total</b>	<b>96</b>	<b>100.0</b>

**Source:** Field data (2018)

The results revealed that 92.7% of the respondents did not have licenses or ID for conducting their vending activities in Morogoro Municipality while 7.3% had ID. Those with IDs were found in Msamvu bus terminal. The authority of Msamvu bus terminal provides ID to its all working staff, bus agents, and street venders who conduct their activities in their These findings show that the study was dominated with respondents who did not have licenses or ID This signifies that all street venders in Morogoro Municipality they did not have licenses or ID with exception of those who worked at Msamvu bus terminal.

The possession of licenses or ID contributes to sustainable street vending since it gives statistical data of street venders. Where discovered that street venders in Morogoro municipality had no license or identification card for their works except for those worked at Msamvu bus terminal. This is to say that Morogoro municipality had no clear data on population of street venders. One of the key informants environmental officer state that: “Every day new people were joined in the business which makes it difficult for municipal officers to estimate the population of street venders”. Provision of ID to street venders can be a good technique of solving municipal solid waste since the municipal council will be aware with the number of street venders, types of goods and location of business. This will help in providing services of municipal solid waste in accuracy form.

#### 4.4.3 Assistance from Municipal Council

In this point the study settled four possible types of assistance from the Municipal Council; the modality was education, equipment for cleanliness, education and equipment and nothing.

**Table 4.8 Respondents Distribution by assistance from Municipal Council**

Type of assistance	Frequency	Percent
Education	12	12.5
Equipment for cleanliness	18	18.8
Education and Equipment	10	10.4
Nothing	56	58.3
Total	96	100.0

**Source:** Field data (2018)

The results revealed that 12.5% of the respondents were provided with education on municipal solid waste management, 18.8% of the respondents were provided equipments for cleanliness, 10% of the respondents were provided both education and equipments for cleanliness and 58.3% of respondents were provided nothing as shown in Table 4.8.

Assistance from municipal council on solid waste management determined in four categories as indicated in Table 4.8. The findings revealed that majority of the respondents were not getting any assistance from municipal council on solid waste management with the same reasons that these street venders were located in unauthorized areas. This line with the study conducted by Tchobanoglous (1993) which argued that Municipal solid waste management needs the Municipal Council to foot holding on administrative, financial and plans in which community can be willing to work on MSWM under low supervision.

Municipal should be responsible in providing SWM services which cannot be done by community these services are litterbins, transportation of solid waste and awareness raising on MSWM (Sujauddin *et al.*, 2008).Fail to provide assistance to municipal street venders on municipal solid waste was a weakness which leads to

wastes in many areas of the municipality. Working in unauthorized area is not a matter of excluding them in municipal solid waste management; municipal council should be responsible in preparing areas for conducting business with all facilities and convincing street vendors by all ways to go there. But if all ways failed no way they must be involved in municipal solid waste management for betterment of life for current and next generation.

#### **4.4.4 Supervision for cleanliness in street vending areas**

Supervision for cleanliness in street vending areas was done as a result of implementations of announcements from President of Republic of Tanzania, VPO and department of environment and solid waste management. Ward executive officers and ward health officers were responsible in supervision for cleanliness in markets areas, street roads and open space. This finding was supported by the key informant interviewed where one ward health officer said that:

*We are conducting general cleanliness every last Saturday of every month as we assigned by President of Republic of Tanzania and every Saturday as assigned by Morogoro Regional Commissioner (RC). During this time supervision is done to all areas including area occupied with the street vendors. Ward Executive Officers (WEO) and ward health officers we are responsible to supervise in our areas concern (Interview 10/1/2018).*

Ward executive officers, ward health who participate well in supervision were those who their wards had market centers like Mawenzi, Manzese and Kikundi. But other officers remained in their offices waiting the last Saturday of each month and sometimes they did not participate. The interviewed Sweep reported that:

*WEO have been provided with the machine for collection of fines and fees for municipal solid waste but they don't use it effectively because most of them they not participate or conduct day to day supervision in their areas. This gives us difficulty condition in cleanliness and waste collection in many areas (Interview, 10/1/2018).*

Supervision for cleanliness in street vending areas, involvement of street vendors on solid waste management and assistance from municipal council on solid waste management were the good strategy for involving street vendors in solid waste management. Data collected on supervision for cleanliness were revealed that supervision where done and WEOs and ward health officers were responsible for conducting supervisions in their areas. However most of them were not conducting day to day supervision but were waited for last Saturday of each month. This implies that not only the street vendors but even some officers were not responsible in municipal solid waste management. In supervision is where officers can talk and discuss with street vendors on how to overcome different challenges on solid waste management also sharing experience on SWM.

#### **4.4.5 State of waste collection facilities and dumping site.**

Morogoro municipality had various equipments for solid waste management such as three 3 skip masters, 3 tippers (haulers), 1 compacter, 1 wing loader and 43 skip baskets. But all 3 skip master, 1 tipper, compacter and wing loader were not in good condition, so they were not used for solid waste collection, transportation and dumping. There were 75 litterbins were exhausted thus, they were in worse condition. It was reported that other litterbins were stolen and sold as a scraps.

*We lack sufficient facilities for solid waste management in this municipal. For instance when haulers go for maintenance we remain with few haulers to transfer wastes to dump but are not sufficient. Litterbins are not in use at all because the present one were destroyed and exhausted. The good dustbin should identify the types of solid waste to be deposited in, example can be labeled or coloured differently to denote the type of solid (Interview, 8/1/2018).*

Sweepers' facilities such as wheelbarrow, glove, hoes, gum boots, masks, uniforms and spade were not satisfactory to all workers. Also the CBOs did not have enough capital to buy all important equipments for solid waste management, and so they faced the same or more challenges like municipal council.

State of waste collection facilities and frequencies of waste collection to main dump were determined by considering the involvement of street vendors in solid waste management. The findings on state of waste collection facilities were revealed that there were high inadequacies of litterbins in the streets; haulers were not satisfactory thus why when they were in maintenance collection points were over whelmed with wastes. Frequencies of waste collection depends on the availability of haulers in municipals and involvement of street vendors, findings on the frequencies of waste collection from collection points revealed the availability of haulers in time were the main problem because cars were only three and one skip master so when they were in maintenance situation become worse in collection points especially at Mawenzi market, Manzese market and Msamvu bus terminal. Participation of the community can be in terms of carrying waste to a shared container, by segregating waste to assist recycling activities, or even only by paying for waste management services. Public awareness and community participation would assist in obtaining guidance in carrying out strategic planning of SWM and to enhance appropriate municipal solid waste management (Malieth, 2011).

#### **4.4.6 Frequencies of waste collection from collection points to dumping site**

Wastes from many collection points were transferred to a dump, located at Kihonda (Viwandani area) four kilometers (4Km) from the urban center.

**Figure 4.10** Three skip buckets at Mawenzi market were full with solid waste



**Source:** Field data (2018)

The dump was too local with no equipments for degrading the solid wastes. The frequencies of taking solid wastes from collection points was in low level because it depended on three haulers and one skip master which were not enough. The situation become too worse when the haulers were in maintenance, that solid wastes remained at collection points for a long time and threaten the health of nearby residents as observed in Figure 4.10. One interviewed key informant the ward health officer said that:

*Skip buckets are overwhelmed and wastes thrown outside the bucket because they are fulfilled but other street vendors sometime keep waste outside intentionally they say I know nothing about it forgive me; this results to the accumulation of wastes outside the buckets as you see (Interview, 8/1/2018)*

This is in line with the study conducted by Kasala (2014) on the critical analysis of the challenges of solid waste management initiatives in Keko Machungwa informal settlement, Dar es Salaam he revealed that it was confirmed that a large quantity of solid waste were not collected due to various reasons including the inadequate

equipments and machinery and community illegal dumping. This result to street becomes full of waste, unattractive and cause blockage of drainage systems.

#### **4.5 Street Venders Involvement in MSWM**

The study was interested to determine how street venders were involved in municipal solid waste management by checking the reasons for lack of involvement of street venders in municipal solid waste management, Environmental Management Action Plan on MSWM and Level of obeying rules and by-laws of MSWM.

##### **4.5.1 Reasons for lack of involvement of street venders in MSWM**

Street venders were not involved in municipal solid waste management because they were not working in planned areas and they have notion that municipal solid waste management were the work of municipal council. The study interviewed environmental officer and she said that:

*Street venders they do not participate in municipal solid waste management, they sell their goods and leave the wastes in the environment and they say that cleanliness is a duty of municipal council. (Interview, 8/1/2018)*

**Figure 4.11 Sweepers cleaning and collecting wastes left by street venders at Town bus terminal Morogoro Municipality**



**Source:** Field data (2018)

The involvement of street vendors in solid waste management is the pillar of the sustainable street vending. Morogoro Municipality had set the areas for street vendors and other business like other municipalities in they can involve their people in different development plans and activities like municipal solid waste management. But street vendors refused to go there and continuing worked along the roads, bus stands and in street roads where most of them conducted their work late evening. One of the key informants an Environmental Officer state that:

*For sure it is impossible to involve all street vendors in the municipal solid waste management because most of them are working in unofficial areas, areas which are prohibited to conduct such kind of business example those who conducting business in Madaraka road and Ng'aka Street they were strictly prohibited but they continue. In that case to involve them is to legalise their activities (Interview, 8/1/2018).*

Involvement of street vendors on solid waste management was determined by interviewing environmental officer on the involvement of street vendors on MSWM, results revealed that street vendors were not involved in solid waste management effectively because most of them were conducted their business in unauthorized areas, so to involve them in MSWM was to formalize to use that unauthorized areas.

The involvement of street vendors on municipal solid waste will help in sorting of waste before send it to collection points. This reduces the amount of waste in collection points because sorting solid waste will enable reuse and recycling to be implemented as a result few amount of solid waste will be in collection points for dumping.

#### **4.5.2 Environmental management action plan on MSWM**

Environmental management plan on municipal solid waste was developed with the following priorities to involve community in waste management, to ensure that for every one who generate waste should dispose well his/her waste in time and raise awareness to community to participate in municipal solid waste management.

Municipal solid waste management faces many challenges such as political interest, inadequate of facilities, by-law of 2011, willingness of leaders and street vendors, lack of industries for recycling glass waste, settlement plan. One of the key informants an Environmental Officer said that:

*We have environmental management plan in which solid waste management is described in detail and we try with our level best to implement what we develop. But the big challenges come when you implement it to street vendors politicians interfere the situations by saying leave these small traders to earn their income (Interview, 08/01/2018).*

This is in line with the study done by Kalwani (2009) argued that the inefficient of municipal solid waste management was contributed by poor political willingness on providing awareness to community on MSWM. Some of the politicians were standing on behalf of the street vendors to assist them continuing conducting business in unauthorized areas where there were no any solid waste management services as a results municipal became too dirty.

*By-law of 2011 does not state some street vendors in implementation, street vendors are not willing to participate in Morogoro municipal solid waste management they leave wastes in their area to be collected by sweepers. The settlements plan of Morogoro municipality leads to difficult in planning and developing many collection points (Interview, 8/1/2018).*

Environmental action plan were prepared well and documented but issue came in implementation, officers realised that they faced challenges in implementation of environmental action plan on solid waste management.

Integrated solid waste management insists on developing environmental action plan for solid waste management which involve different stakeholders, this study was interviewed environmental officer on environmental action plans on solid waste management, the results revealed that the municipal had the environmental action plan with the priorities of involving community in solid waste management and by

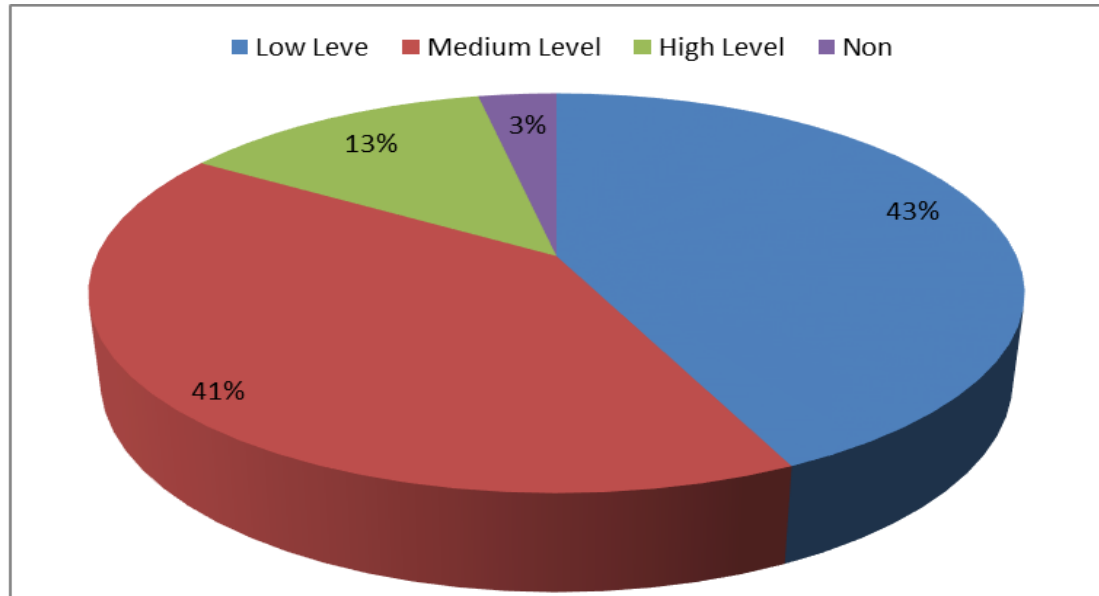
making sure that generated solid waste are immediately removed by those who generate it.

The implementation of the action plan faced challenges like political interest, willingness of leaders and street vendors, inadequate of facilities and settlements plan but overcame them by easy implementation of the environmental action plan ISWM needs to involve all stakeholders including street vendors and politicians in order to reduce misinterpretation of objectives in environmental action plan for solid waste management. Street vendors as the main solid waste producers in the municipalities must be involved in solid waste management action plan. This will help the street vendors to participate well in municipal solid waste management and to be a watchdog to those who pollute their environment. According to Marietha (2011) community should be motivated to solve their own common problem. They should be involved in development activities like municipal solid waste management to make them an agent of development rather than being beneficiaries of development, in so doing they will feel proud to own or master the environment and willing to participate in municipal solid waste management.

#### **4.5.3 Level of obeying rules and by-laws of MSWM**

The respondents were asked if they knew and obeyed municipal solid waste rules and by-laws. The study set these levels of obeying as high, medium, low and those who did not obey rules and by laws of municipal solid waste management (none). These levels were used in this study to check the obedience of street vendors on their contribution of street vendors to municipal solid waste management. The Figure 4.12 illustrates the results.

**Figure 4.12 Respondents distribution by Level of obeying MSWM rules and by-laws**



**Source:** Field data (2018)

The results revealed that 43% had low understanding and obedience to rules and by-laws followed with 41% of the respondents who had medium understanding and obedience to rules and by-laws as shown in Figure 4.12. These results signify that most of the respondents were not obeying the environmental by-laws and this leads to solid wastes seen in various areas of Morogoro Municipality.

This line with the study done by Milinga (2016) on analysis of solid waste management in Temeke municipal council, he argued that for the proper awareness on solid waste collection and disposal should be supplemented by fines/penalties to those who violate and go against the environmental rules and by-laws set by municipal council, these rules and by-laws should be known to everyone to reduce bias in judgments. These environmental rules and by-laws were set to ensure that all community were following the procedures for waste disposal in order to have clean, safe and attractive environment.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND POLICY IMPLICATION**

#### **5.0 Introduction**

This chapter consists of five main parts which are: an overview of the study summary, conclusion, policy implication and suggestion for further studies. The study is summarized by reviewing problem setting, purpose of the study, specific objectives, methodology and findings in summary part. Conclusion part which states in general all study especially the state of affairs with considering the problem at hand, policy implication and recommendations of what is to be made to solve the problem.

#### **5.1 An Over View of the Study**

This dissertation focused on the contribution of sustainable street vending on municipal solid waste management in Morogoro Municipality. In these aspects, the scope of sustainable street vending which was the interest of the study to examine whether or not street vendors were involved in solid waste management especially those waste generated by their business in their areas.

The objective of this study was to determine the contribution of sustainable street vending to municipal solid waste management in Tanzania, with four specific objectives which were to examine the perception of street vendors on municipal solid waste management in Morogoro municipality, to assess strategies used by street vendor to mitigate solid waste production in Morogoro Municipal, to assess strategies used by the Municipal government to ensure sustainable street vending for sustainable SWM in Morogoro Municipal and to determine street vendor involvement in solid waste management in Morogoro Municipality.

In order to fulfill the depiction of contribution of sustainable street vending on municipal solid waste, a mixed methods design was used for data collection, and analysis. The questionnaires, interview and observation were used in collection of primary data, except questionnaires, other methods were flexible for the researcher to obtain data and give both in depth and accurate data as the researcher had direct

interaction with the respondents and actual environment. The sample size for study was 100 respondents who were street vendors, sweep leaders health and environmental officers.

## **5.2 Summary**

Based on the findings, the study revealed that there was unsustainable street vending because of the following findings: -street vendors had negative perception toward municipal solid waste management, strategies for street vendors to mitigate solid waste production were not well developed and implemented and street vendors were not involved in municipal solid waste management.

From the findings it was revealed that perception of street vendors on municipal solid waste management was negative. This contributes to increase in solid waste production and poor waste disposal. The results showed that 47.9% of respondents had low level of knowledge on SWM and 20.8% of the respondents knew nothing about SWM. Other evidence revealed was the low level of education attained by street vendors, 77% of respondent were in low level of education which made large group of street vendors in municipal who contributing in poor solid waste management. The study revealed that street vendors threw wastes along the roads, river and in open spaces during late evening and at night. Others leave the waste in their areas to be collected by street sweepers. Street vendors perceived that municipal solid waste management was the task of municipal council staff.

This study also revealed that strategies used by street vendors to mitigate solid waste production in Morogoro municipality were not well developed and implemented as results showed that 50% and 39.6% of the respondents generated solid wastes in medium and high rate respectively, 62.5% of the respondents had no equipments for temporally storage of solid waste and 56.3% of the respondents did not provide awareness to customer on MSWM. This means that Morogoro municipality had no well developed strategies used by street vendors to mitigate solid waste production as a pillar of sustainable street vending.

Furthermore, findings revealed that street vendors were not involved in solid waste management in Morogoro municipality. This was indicated by the low percentage of the possession of licenses or ID, assistance from municipal council on MSWM and involvement of street vendors in municipal solid waste management. Results showed that 92.7% of the respondents had no licenses or ID, 58.3% had not get any assistance on MSWM from the municipal council and the officers confirmed that were not involving the street vendors in MSWM only because they were working in unauthorized areas.

### **5.3 Conclusion**

The main objective of this research report was to determine the contribution of sustainable street vending to municipal solid waste management in Tanzania. Findings revealed that street vendors were not willing to participate in municipal solid waste management due to their negative perception and low level of knowledge on municipal solid waste management. Strategies for mitigation of solid waste production were not well implemented due to the unfriendly environment in which street vendors conducting their business. Morogoro Municipality had solid waste management action plan, rules, by-laws and areas for vending but implementation faces the challenges such as politics and willingness of street vendors and customers to obey and follow those rules and by-laws. Also municipal council failed to involve all street vendors in municipal solid waste management because most of them were conducting business in unauthorized areas. The street vending in Morogoro Municipality was not conducted in sustainable way.

There were negative perception of street vendors on municipal solid waste management in Morogoro Municipality and they had notion that the SWM is the task of municipal council and CBOs who were employed by municipal council. Municipal solid waste management depends much on perception of community. Street vendors needs education of raising awareness by using workshop, seminar, posters and announcements on sustainable street vending for municipal solid waste management and changing perception of street vendors towards municipal solid waste management. There were needs of politicians not face the municipal solid waste management in negative way but they needed to provide awareness to their

community on sustainable street vending and municipal solid waste management for sustainable development.

Strategies used by street venders to mitigate solid waste production in Morogoro Municipal were not well implemented because most of the street venders conduct business at late evening up to the night time, in unauthorized areas. These bring difficult to municipal environmental and health officers to organize and implement municipal solid waste management rules and by-laws. Municipal Business Officer must provide licenses to all street venders which show the type of goods, area and time for conducting business, municipal business officers with collaboration with environmental and health officers are responsible in insuring all street venders processing licenses or ID. This will help police and security officers to deal with those who can violet the environmental rules and by-laws.

Strategies used by the Municipal government to ensure Sustainable Street vending for sustainable SWM in Morogoro Municipal were such as preparing municipal solid waste management action plan, prepare areas for vending (Manzese market and Kikundi), prohibiting street venders to conduct business in unauthorized areas and providing services for municipal solid waste management. But still the problem was the poor implementation of those strategies. These strategies should be revised and officers should be accountable in implementation of the strategies for municipal solid waste management. There was no strong supervision on municipal solid waste management in Morogoro Municipality.

Street venders involvement in solid waste management in Morogoro Municipality was not impressive because municipal environmental and health officers proved that they were not involving street venders in municipal solid waste. They thought that to involve a street vender who conducts business in unauthorized areas is to legalize the situation of conducting business in unauthorized areas. Integrated solid waste management insisting on involving all stakeholders in solid waste management, street venders are the one of the stakeholders of municipal solid waste management because they generate solid waste in their business. Environmental and health officers are ought to revise the municipal solid waste management action plan and

strategies and involve all stakeholders including street vendors and politicians for sustainable Municipal solid waste management.

Street vendor's contribution to municipal solid waste management was negative because they impeding the efforts of the municipal in dealing with municipal solid wastes. It was revealed that municipal council was not ready to involve them in MSWM and the vending was not sustainable. Municipal solid waste management as crosscutting issue needs different sectors and stakeholders including street vendors to be involved for better results. The involvement of street vendors in solid waste management by using integrated solid waste management strategies, helps reducing waste in their goods by avoiding packaging materials which are not friendly to environment such as plastics and nylons for industrial products. For agricultural products to avoid use of grasses and banana leaves for transportation and using wooden or plastic trays and baskets. Street vendors should be educated to encourage customers to reuse some material like glass bottles and tins. Recycling business also can be conducted by street vendors when they have dustbin they can sort recyclable waste and resale.

#### **5.4 Policy implications**

Solid waste management is a crosscutting issue and one of global concerns. Integrates solid waste management (ISWM) should be applied in developing strategies for solid waste management in which different stakeholders like politicians, street vendors, environmental experts, business officers, settlement planners and CBOs contribute in developing strategies and plans for municipal solid waste management. Through this street vendors as well as other business actors will be able to keep their environment clean by selecting packaging materials which do not pollute the environment. Any business should discourage plastics and nylons packaging materials and having dustbins for temporally storage of solid waste.

Also good implementation of environmental policy providing awareness to street vendors and customers to reduce littering behaviour, avoiding waste to their areas and they will become a watchdog to those who have littering behaviour for sustainable street vending.

Based on the finding that there was poor municipal solid waste management and low contribution of street vending, the study recommends the following in order to exterminate the problem in municipals:

- i. Department of environment and solid waste management should provide knowledge on municipal solid waste management to community especially street vendors regardless of their location for conducting business as insisted by national environmental policy to raise public awareness. Different ways of inducing knowledge like seminars, workshop, posters and other fora and media should be used. Street vendors can be used to provide awareness to customers who they meet every day. With respect to national environmental policy knowledge of municipal solid waste management should be provided to the extent that street vendors are willing to participate in municipal solid waste management (MSWM).
- ii. Environmental and solid waste department in collaboration with other stakeholders such as street vendors and politicians should developing environmental strategic plans for solid waste management which will involve the street vendors and show their responsibilities on municipal solid waste management. The strategies must indicate the ways of dealing with solid waste at working place, proper use of dustbins and collection points. Also should address rules and by-laws which will be for those who will misbehave. Environmental strategic plan will make the street vendors and all community members at large to be watchdog to each others on municipal solid waste management.
- iii. Municipal councils should involve street vendors in municipal solid waste management regardless of their location of their work. This is because the of municipals fail to allocate the street vendors in appropriate places where they can access customers and have all facilities for proper solid waste management such as collection points, litterbins and waste transportation services. Easy way to involve them is by having proper records on number of street vender, place of work and types of goods they sell. This can go together with provision of IDs which must indicate the types of goods sold and area or

street in which vending is conducted. Another strategy is the provision of education on proper use of SWM facilities and equipments and encouraging them for to participate in solid waste management. Municipal officers should be accountable and available for supervision of environmental cleanliness.

### **5.5 Suggestion for further studies**

The study revealed that level of organic waste generation was high compared to other types of waste in Morogoro municipality; this signifies that wastes are transported from farm (production point) to municipals. However most of the studies on solid waste management are done in urban areas only. For this matter, a scientific study should be done to investigate on the ways the organic waste from the production point can be reduced and reused for sustainable solid waste management at rural areas.

## REFERENCES

- Anschütz, J. (2004). *Putting ISWM to Practice*. WASTE Gouda. The Netherlands. Retrieved November 13, 2017 from the World Wide Web: <https://www.eawag.ch>CLUES>>.
- Asif, R. & Junayed, M. (2017). Livelihood Sustainability of Street Venders: A case study in Dhaka City. Paper presented at International Conference on Sustainable Development (ICSD 2017) Dhaka. Bangladesh. Retrieved March 05, 2018 from World Wide Web: <http://www.researchgate.net/publication/317568199>.
- Ayotamuno, M. J. & Gobo, A. E. (2004). *Municipal solid waste management in Port Harcourt, Nigeria, Obstacles and prospects*, Management of Environmental Quality. Nigeria.
- Bernstein, J. (2004). Social assessment and public participation in municipal solid waste management. *Urban Environment Thematic Group, World Bank*. Switzerland. Retrieved January 20, 2018 from World Wide Web: <https://siteresource.worldbank.org/resources>.
- Boulding, K. E. (1966). The economics of the coming Spaceship Earth. *Environmental quality in a growing Economy: essay from the sixth RFF Forum*. John Hopkins University Press. U. S. A.
- Breeze, R. (2012). Municipal solid waste in Dar essalaam. *Consultation report*. Toronto, Canada.
- Brown, M. L. (2010). Assessment and appropriate design of intergrated solid waste management system in Koulikoro, Mali. Michigan University. U.S.A. Retrieved January 20, 2018 from World Wide Web: <http://www.mtu.edu>civil>pdfs>lindsey-m-brown-thesis-2010.pdf>.
- Buenrostro, O., Bocco, G and Bernache, G. (2001). Urban Solid Waste generation and disposal in Mexico. *Journal of Environment Development*. 29(10) 169 –

176. Mexico. Retrieved December 19, 2017 from World Wide Web: <https://www.ncbi.nlm.nih.gov>.
- Chengula, A., Lucas, B. & Mzula, A. (2015) *Assessing the awareness, knowledge, attitude and practice of the community towards solid waste disposal and identifying the threats and extent of bacteria in the solid waste disposal sites in Morogoro municipality in Tanzania*. Sokoine University of Agriculture. Tanzania.
- Cobly, E. M. (1991). *Environmental management in development: the evolution of paradigms*. Elsevier B. V. Amsterdam, Netherland.
- Fauziah, S. H. Smoni, C. & Agumuthu, P. (2007). *Municipal solid waste management in Malasyia*. *Malasyia Journal of Science*. Malasyia.
- Gonzenbach, B. & Coad, A. (2007). *Solid waste management and the Millennium Development Goal*. Collaborative Working group (CWG). St. Gallen, Switzerland.
- Hoornweg, D. & Thomas, L. (1999). *Composting and its Applicability in Developing Countries, Urban Waste Management*, Working Paper Series No. 8, World Bank, Urban Development Division. Washington DC USA. 46pp.
- Jamal, O. (2002). *“Household demand for solid waste disposal options in Malaysia”* Environmental and Ecological Engineering. Malaysia. Retrieved 2010 from World Wide Web: <http://www.scholar.waset.org/1307-6892/5977>. Site visited 01/11/2017.
- Kalwani, J. D. S (2009). *Community participation in Municipal solid waste management in informal settlements*. University of Dar es salaam, Tanzania.
- Kasala, E. S. (2014). *Critical analysis of the challenges of solid waste management initiatives in KekoMachungwa informal settlement, Dar es Salaam*. *Journal of Environmental Protection*. Ardhi University. Tanzania.
- Kassim, S. M, & Ali, M. (2006). *Solid waste collection by the private sector: Households’ perspectivea study in Dar es Salaam city*. WEDC. Ethiopia.

- Krishnaswami, A. (2003). *Participatory Research: Strategies and Tools*. Practitioner: Newsletter of the National Network of Forest Practitioners. India.
- Kumar, S. & Tapan, C. (2010). *Effective municipal solid waste management in India*. INTECH, Croatia.
- Marietha, N. M. (2011). *Assessment of community participation in solid waste management: the case of Mbeya City council, Tanzania*. Sokoine University of Agriculture. Tanzania.
- Market management report (2007). *Global Solid Waste Management Market Analysis*. Market Research. USA.
- Matsunaga, K & Nickolas J. T. (2007). *Effects of affluence and population density on waste generation and disposal of municipal solid wastes*. Columbia university. New York U.S. A.
- Mensah, M., Stanford, J. &, Amponsah, S. (2009). *Comparison of municipal solid waste management systems in Canada and Ghana: a case study of the cities of London*. London university press. UK.
- Milinga, O. C. (2016). *Analysis of solid waste management process: the evidence from Temeke municipal council in Dar es Salaam*. Tanzania.
- Mollel, L. E. (2016). *Economic analysis of solid waste management options in Morogoro municipality*. Sokoine University of Agriculture. Morogoro, Tanzania.
- Momodu, N. (2011). *Mitigating the impact of solid wastes in urban centre in Nigeria*. J Hum Ecol 34:125–133. Nigeria. Retrieved October 24, 2017 from World Wide Web: <https://www.tandfonline.com>. Revisited on 06/06/2018.
- Morogoro Municipality, (2017). *Cholera Cases in Morogoro Municipality from Dec 2015-Dec 2016*.
- Mrayyan, B. & Hamdi, M. R. (2006). *Management approaches to integrated solid waste in industrialized zones in Jordan: a case of Zarqa City*. Waste

- Management. Jordan. Retrieved December 21, 2018 from World Wide Web: <https://www.researchgate.net>. Site visited 03/02/2018.
- Mungure, J. M. (2008). *Governance and community participation in Municipal Solid Waste management*, case of Arusha and Dar es Salaam Tanzania, University Press. Tanzania.
- Nachalida, Y. Beverley, C., & Kirstin, R. (2017). Barriers to effective municipal solid waste management in rapidly urbanizing areas in Thailand. *Environmental Research and Public Health*. Thailand.
- National Bureau of Statistics (2013). *2012 Population and Housing Census: Population Distribution by Administrative Areas*, Government Press. Tanzania.
- Nickolas, J. T. & Mussche, C. (2013). *Municipal Solid Waste Management and waste to-energy in the United State, China and Japan*. Columbia University. U. S. A.
- Pokhrel, D. & Viraraghavan, T. (2005). *Municipal solid waste management in Nepal: practices and challenges*. Waste Management. Nepal
- Sally, R. & Skinner, C. (2016). *Street vendors and cities*. International Institute for Environment and Development (IIED). U. S. A.
- Scheinberg, A. (2010). *Solid waste management in the World's Cities*. University of Netherland. Netherland.
- Scheinberg, A. (2011). *Value added: modes of sustainable recycling in the modernisation of waste management systems*. University Press. Netherland.
- Schnitzer, H. & Uyen, N. (2009). Sustainable solution for solid waste management in Southeast Asian countries. *Waste management* 29 (2009) 1982-1995. Austria.
- Sharholly, M., Ahmad, K., Mahmood, G. & Trived, C. (2008). Municipal solid waste management in Indian cities. *Waste Management*. India. Retrieved Jun 06, 2010 from World Wide Web: <https://www.sciencedirect.com>. Site revisited 06/06/2018.

- Sujauddin, M., Huda, M., & Rafiqul, A. T. M. (2008). Household solid waste characteristics and management in Chittagong. *Journal of Waste management*. Bangladesh.
- UN, (1992). *The Rio Declaration on Environment and Development*. Centre for Our Common Future. Geneva, Switzerland.
- UNEP, (2009). Developing Integrated Solid Waste Plan Vol.4. *International Environmental Technology Centre*. Osaka/Shiga, Japan.
- URT, (1997). *National Environmental policy*. Government printer Dar es Salaam. Tanzania.
- URT, (2000). *National Human Settlement Development Policy*. Government printer Dar es Salaam. Tanzania.
- URT, (2003). *National Health Policy*. Government printer Dar es Salaam. Tanzania.
- WASTE. (2004). *Integrated sustainable waste management (ISWM)*. World Bank. USA.
- World Bank, (1992). World Development Report 1992: Development and the Environment. *World Bank*. New York: Oxford University Press. Retrieved January 19, 2018 from World Wide Web: <https://openknowledge.worldbank.org/handle/10986/5975>.
- Yamane, T. (1967). *Statistics, An Introductory Analysis*. 2<sup>nd</sup> Ed., New York: Harper and Row.

## APPENDICES

### MZUMBE UNIVERSITY INSTITUTE OF DEVELOPMENTAL STUDIES (IDS)

#### Questionnaire to street vendors:

**TITLE:** CONTRIBUTION OF SUSTAINABLE STREET VENDING TO MUNICIPAL SOLID WASTE MANAGEMENT IN TANZANIA: A CASE OF MOROGORO MUNICIPALITY

Name of street.....

1. What is your age?(Number of full years)

.....

Read the following questions and circle the appropriate answer (qtn 2-14)

2. Indicate your Sex

1. (M)

2. (F)

3. Level of education

1. Primary School Education

2. Secondary School Education

3. Diploma

4. Bachelor Degree

5. Postgraduate

4. What items do you sell?

1. Food or beverage

2. Clothes

3. Utensils

4. Electronic equipments

5. Agricultural products (Example; Fruits, vegetables)

5. Reason for engaging in street vending

1. For easy access to customers

2. Easy to acquire empty space

3. To avoid rentals

4. No enough capital
5. Any other (please specify).....
  
6. Do you have license or ID that identifying you to conduct such kind of business in the Morogoro municipality?
  1. YES
  2. NO
  
7. What level of knowledge on solid waste management do you have?
  1. High
  2. Medium
  3. Low
  4. Non
  
8. Do you know and obey rules and by-laws of municipal solid waste management?
  1. High
  2. Medium
  3. Low
  4. Non
  
9. In what extent is your work or business generate solid waste to the environment?
  1. High
  2. Medium
  3. Low
  4. Non
  
10. Do you having the tools or equipment for collecting solid waste?
  1. YES
  2. NO
  
11. What method do you use to manage waste in working place?
  1. Dustbin
  2. Burning
  3. Land filling
  4. No any method

12. Do you guide your customers to be aware with solid waste management?

- 1. All the time
- 2. Some time
- 3. No

13. Cleanliness in your working place is done .....

- 1. Every day in the morning
- 2. Once a week
- 3. Once a moth
- 4. Not done

14. What kind of assistance do you get from municipal council to collect waste generated by your business?

- 1. Education
- 2. Waste collection facilities
- 3. Both of them
- 4. Nothing

15. Shortly can you outline your responsibilities in municipal solid waste management

- 1 .....
- 2 .....
- 3 .....

16. What is your suggestion to other street venders in accordance to municipal solid waste management

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

## **APPENDEX II**

### **MZUMBE UNIVERSITY**

#### **INSTUTE OF DEVELOPMENTAL STUDIES (IDS)**

**Interview guide to environmental officer, health officers and street sweep leaders:**

**TITLE: CONTRIBUTION OF SUSTAINABLE STREET VENDING TO MUNICIPAL SOLID WASTE MANAGEMENT IN TANZANIA: A CASE OF MOROGORO MUNICIPALITY**

1. Who is responsible to manage of solid waste generated by street venders?
2. Is there any supervision for cleanliness in street vending areas?
3. Do street venders participate in solid waste management?
4. How do street venders perceive municipal solid waste management?
5. What can you say about packaging material for goods sold by street venders
6. Do Street venders pay any fee or take positive action to the environment in relation to the solid waste they produce?
7. In short can you explain the state of the dustbin or collection centre, and other facilities for solid waste management
8. How do you involve the street venders in solid waste management?
9. Environmental by-laws and rules are known and implemented effectively?
10. Do you have environmental management plan for solid waste?
11. What you can do to ensure all street venders are involved in solid waste management?

### **APPENDIX III**

**TITLE: CONTRIBUTION OF SUSTAINABLE STREET VENDING TO MUNICIPAL SOLID WASTE MANAGEMENT IN TANZANIA: A CASE OF MOROGORO MUNICIPALITY**

Observation checklist

1. Littering behaviour of street vendors,
2. Packaging of the sold goods,
3. Participation between street vendors and street sweepers,
4. Business of recycled waste like plastic and iron (scraps)
5. Waste collection facilities and dumping site.
6. Frequencies waste collection from collection points to dumping site