

**SOLID WASTE MANAGEMENT IN NDOLA URBAN PRIMARY
SCHOOLS OF ZAMBIA**

By

Nosiku Florence Mulanwa

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requirements for the award of a degree of Master of Education in Environmental
Education

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DECLARATION

I, Nosiku Florence Mulanwa, hereby, declare that this dissertation is my own work and has not been submitted to any University or College in Zambia or elsewhere in the world for the award of a Master's degree.

Signed.....

Date.....

CERTIFICATE OF APPROVAL

This dissertation of Nosiku Florence Mulanwa is approved as fulfilling part of the requirements for the award of the degree of Master of Education in Environmental Education by the University of Zambia.

Signature of Examiner	Date of Approval
Signed	
Signed	
Signed	

ABSTRACT

The environment is our mainstay. Our survival and that of future generations depends on how well we preserve our environment today. The effects of global warming are obvious as can be seen by drastic climate changes (unpredictable climatic conditions) arising from among other things the poor management of solid waste.

This study investigated solid waste management in Primary Schools of Ndola Urban in an effort to find out why indiscriminate disposal of solid waste among these schools and surrounding areas has continued. The lack of proper solid waste management systems in these schools has continued to degrade the environment not only around the schools but globally.

The study used a descriptive survey which involved the systematic collection and presentation of data. Questionnaires and focus group discussions were used. While pupils participated in focus group discussions, the teachers were given questionnaires to complete. School managers and Ndola City Council (NCC) and Zambia Environmental Management Agency (ZEMA) officials were interviewed face to face due to their busy work schedules. The study sample was composed of 80 pupils, 16 teachers, 4 administrators, 1 NCC and 1 ZEMA official.

The major findings of the study showed that the schools under study continued to burn and bury solid waste despite being aware of the negative effects that these practices had on the environment.

The study also highlighted the challenges faced by the various stakeholders in solid waste management in Ndola Urban Schools and these included poor funding and lack of equipment. It was also established that some respondents were aware of the effects of poor solid waste management on the environment and measures that should be taken to correct the situation.

The study established that all the stakeholders in the implementation of Environmental Education with regards to solid waste management faced a number of challenges. The study revealed that the Ministry of Education had a poor mechanism of

communicating with its officials as some of the information that was known by some administrators was not known by the teachers. Further, the study established that most teachers lacked knowledge on Environmental Education which made it difficult for them to acknowledge it, let alone teach and practice proper solid waste management.

The gap that the study established in the implementation of solid waste management in Ndola Urban schools was the lack of enforcement by mandated authorities and uncoordinated efforts by stakeholders.

The study concluded that lack of enforcement, by the local authority, of proper solid waste management and the lack of funding for both schools and monitoring authority led to the continued and environmentally unsustainable practices.

The study recommended the close cooperation of schools and local authority to effectively manage solid waste. It also recommended the sorting at source to enhance the 3Rs thus reduce, reuse and recycle at all levels namely home, school, council and industries. The study also recommended that government should provide incentives to encourage private sector participation in waste management.

Solid waste management can be a source of wealth and job creation. The study recommends that Zambia, through local councils, engages Private Public Partnerships to find ways of effectively managing solid waste. Inculcating this knowledge at a tender age in primary school will ensure a change of attitude and correct disposal of waste will be habitual. This will promote and enhance cleaner and healthier communities for generations to come.

DEDICATION

I dedicate this work to my children Beenzu, Kando and Chimuka.

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TABLE OF CONTENTS

Declaration	i
Certificate of Approval	ii
Abstract	iii
Dedication	v
Acknowledgements	vi
Table of Contents	vii
List of Tables	x
List of Abbreviations	xi
Chapter One: Introduction	1
1.0 Overview	1
1.1 Background to the Study	1
1.2 Statement of the Problem	3
1.3 Aim of the Study	4
1.4 Objectives of the Study	4
1.5 Research Questions	5
1.6 Significance of the Study	5
1.7 Delimitation of the Study.....	5
1.8 Limitations of the study	5
1.9 Theoretical Framework.....	6
1.10 Structure of the Dissertation.....	8
Chapter Two: Literature Review	9
2.0 Introduction	9

2.1	Origins of Solid Waste Management In other parts of the world	9
2.2	Waste Management in some parts of Africa.....	11
2.3	Solid Waste Management and its relevance	11
2.4	The aim of Solid Waste Management in Schools	13
2.5	Incorporating SWM in the Curriculum	14
2.6	MOE and SWM in Zambia	15
2.7	SWM in Zambian Primary Schools	15
2.8	SWM in Ndola	17
2.8.1	Local Government Act	17
2.8.2	Zambia Environmental Management Agency	19
2.8.3	Summary of the Chapter.....	20
	Chapter Three: Methodology	21
3.0	Introduction	21
3.1	Research Design	21
3.2	Target Population	22
3.3	Sample Size	23
3.4	Description of the Sample.....	23
3.5	Sampling Procedure	24
3.6	Research Instruments	24
3.7	Data Collection	24
3.8	Data Analysis	25
3.9	Validity and Reliability.....	26
3.9	Ethical Considerations	26

Chapter Four: Presentation of Research Findings	27
4.0 Introduction	27
4.1. What Respondents know about Solid Waste Management	27
4.2 How Pupils, Teachers and School Management are involved in SWM	32
4.3 Challenges faced by Pupils, Teachers and School Management	35
4.4 Measures to be implemented in schools	36
4.5 Chapter Summary.....	38
Chapter Five: Discussion of Results	39
5.0 Introduction	39
5.1. What Respondents knew about Solid Waste Management.....	39
5.2 How Pupils, Teachers and School Management are involved in SWM	39
5.3 Challenges faced by Pupils, Teachers and School Management	43
5.4 Measures to be Implemented in Schools	44
5.5 Chapter Summary.....	46
Chapter Six: Conclusion and Recommendations	47
6.0 Introduction	47
6.1 Conclusion	47
6.2 Recommendations	48
References	50
List of Appendices	54

List of Tables

1. Characterisation by Gender	24
2. Duration of Respondent at Institution.....	27
3. How I learnt about SWM	29
4. Decripyion of SW by Pupil-Respondents	29
5. Description of SW by Teachers and Administrators	30

ABBREVIATIONS

CTS	Creative and Technical Studies
DEBS	District Education Board Secretary
ECZ	Environmental Council of Zambia
EE	Environmental Education
ESD	Education for Sustainable Development
FGD	Focus Group Discussions
ILO	International Labour Organisation
MOESVTEE	Ministry of Education, Science, Vocational Training and Early Education
OBE	Outcome Based Education
RE	Religious Education
SDS	Social Development Studies
SI	Statutory Instrument
SWM	Solid Waste Management
UNEP	United Nations Environmental Program
ZCCM	Zambia Consolidated Copper Mines
ZECF	Zambia Education Curriculum Framework
ZEMA	Zambia Environmental Management Agency
ZNBC	Zambia National Broadcasting Corporation

CHAPTER ONE

INTRODUCTION

1.0 OVERVIEW

This chapter presents the background, research, statement of the problem, purpose of study as well as the specific objectives of the study. It also includes the significance of the study and finally outlines limitations encountered during the research.

1.1 BACKGROUND TO THE STUDY

Solid Waste Management is a global problem. The United Nations have over the years through various organs like the United Nations Environmental Program (UNEP) tried to put up guidelines and policies for member states to ensure proper waste management and disposal in a bid to save the environment for future generations (UNESCO, UNEP, 1978).

Zambia being a signatory of the United Nations has had a number of education reforms to incorporate Environmental Education (EE) and Education for Sustainable Development (ESD) in the school curriculum. It is against this background that this research was conducted to find out how solid waste was managed in the target schools and their surrounding communities.

To define Solid Waste Management (SWM), we shall begin by defining the individual words separately. Solid simply means firm or hard, not in liquid or gas form (Advanced Learners' Oxford Dictionary, 2010). Waste is a by-product of human activity. It contains the same materials as are found in the useful products; it only differs from useful products by its lack of value (McDougall et al, 2008). They turn to waste when they are mixed and no more provide the service they were planned or designed to do. International Labour Organisation (ILO 2007:1) defines waste as something which the original owner or user no longer values, and has been discarded or discharged by the original owner or user. It is something you do not want anymore and want to throw away. UNEP defines waste as objects which the owner does not want, need or use any longer, which requires treatment and/ or disposal (UNESCO, UNEP 1978). Management is the act of running or controlling something. Solid Waste Management has therefore been defined as the collection,

transportation, storage as well as the recycling and disposal of waste, including the care of disposal sites (ECZ, 2001).

The Ministry of Education, (MOE) has over the years revised the curricular to incorporate EE and ESD in a bid to conserve mother earth for future generations. Solid waste management is a major component of environmental education and its implementation would go a long way in ensuring sustainable development for the current generations while not jeopardising that of future generations (UNESCO, UNEP, 1991).

In Educating our Future (MOE, 1996), the focus of the policy was the holistic development of the learners. The policy sought to teach learners necessary survival skills while at the same time imparting values in them that would ensure sustainable development. If properly implemented, solid waste management would, therefore, ensure sustainability in the development process.

Focus on Learning (MOE, 1992) which succeeded the Educational Reforms of 1977, sought to make our curricular to suit the needs of our growing economy unlike the educational policy that was inherited from our colonisers in 1964 which prepared learners for office or white collar jobs.

With the advancement of technology, so did the increase in solid waste being generated. The levels of economic development of a country or indeed a city or its part, and the affluence of its citizenry and thus the varying consumption patterns, life styles, public attitudes, and seasons of the year impact on how much and what type of solid waste is generated (Chilinga, 2014). Schools were no exception hence the management of this solid waste became critical. Schools generated all sorts of solid waste ranging from stationery to leftover foodstuffs and non-biodegradable packaging materials. The revised curricular on the other hand tried to show the interdependence of creature and organisms in the environment. For instance, a Grade 5 Social and Development Studies textbook shows how open air burning pollutes the air and in the long run affects weather patterns (MOE, 1998). Therefore, by burning solid wastes, schools contribute to the degradation of the environment. The teaching of EE

in Primary schools was supposed to raise awareness among pupils and other stakeholders on the need for correct disposal of waste (MOE, 1996)

Solid waste management and disposal has been a problem worldwide especially in developing countries. Zambia being amongst these countries is no exception. Therefore, the management of solid waste in the target schools has a number of challenges. This is echoed by Hardoy J.E. et. al (1992), who argues that the waste collection system in most developing countries is grossly inadequate and local authorities are blamed for inefficient and unreliable domestic waste collection.

Environmentally friendly behaviours or practices are important in promoting environmental sustainability hence the need for effective solid waste management in primary schools. An example of this is the reduction of waste generated at the source. If pupils and the community at large were conscious of how much packaging materials end up in the bin each day, they could try to reduce the unnecessary packaging so as to reduce on solid waste being generated. Olah (2001) states that buying products with minimal or no packaging will reduce the amount of waste to be managed in the environment. Sensitizing pupils on this would be the starting point towards effective solid waste management in schools.

1.2 STATEMENT OF THE PROBLEM

Although on paper EE and ESD have been incorporated in school curricula for some years now in Zambia, indiscriminate disposal of solid waste has continued in schools and their surrounding communities despite efforts by the MOE hence the need for this study. This indiscriminate waste disposal poses great health risks and strains the already inadequate health services.

Dirty surroundings littered with garbage are a danger to the environment and people. In a school setting, many pupils and staff are exposed to diseases if solid waste is poorly managed.

Indiscriminate disposal of waste destroys the aesthetic beauty of the environment. Most schools in Ndola are surrounded by heaps of garbage and smouldering heat and smock from burning rubbish (ECZ, 2000). This makes

the environment not to be conducive for learning (Ojewale, 2014). Pupils and teachers are exposed to polluted air which is a health hazard. This situation in turn exerts pressure on the health system.

The accumulation of garbage in schools and the lack of a proper solid waste disposal system may also lead to outbreak of diarrhoeal diseases such as cholera. In the event that a disease outbreak occurred, the institution would be closed. This also constitutes a problem as the lives of pupils and teachers are not only at risk but they also lose out on valuable time for learning and teaching which in turn affects the quality of education and development in the country.

Garbage degrades the environment in many ways which include land, air and water pollution. Schools are places where people should learn about conserving the environment by maintaining their surroundings clean. It is problematic when schools do not practice what is taught in class about environmental conservation and appropriate disposal of solid waste.

1.3 AIM OF THE STUDY

The aim of the study is to investigate factors that affect the management of solid waste in Ndola Urban Primary Schools.

1.4 OBJECTIVES OF THE STUDY

This study will be guided by the following objectives:

- i. To establish what respondents know about SWM.
- ii. To investigate how pupils, teachers and school management are involved in SWM.
- iii. To explain challenges faced by pupils, teachers and school management in implementing activities to manage solid waste.
- iv. To determine measures that should be put in place in schools to enhance effective solid waste management.

1.5 RESEARCH QUESTIONS

Research questions to achieve the above stated objectives are:

- i. What do respondents know about SWM?
- ii. How are pupils, teachers and school management involved in solid waste management?
- iii. What challenges do the pupils, teachers and school management face in carrying out activities to manage solid waste?
- iv. What measures have primary schools of Ndola Urban put in place to manage solid waste?

1.6 SIGNIFICANCY OF THE STUDY

The researcher observed that the indiscriminate disposal of solid waste in Ndola urban schools was an environmental risk and therefore undertook a research to identify the cause of this state of affairs. The researcher hoped that the study may find ways of encouraging schools to participate positively in finding ways of managing solid waste not only in their school grounds but their surrounding communities. The study may also help the Zambian government and other stakeholders in finding solutions to solid waste management through the promotion of EE and ESD. It is also hoped that the study may help to identify gaps which should be addressed and help in fulfilling international agreements on environmental conservation.

1.7 DELIMITATION OF THE STUDY

The study was conducted in Ndola District of Copperbelt Province. The location was chosen because it was easily accessible to the researcher. The sample comprised pupils, teachers and school administrators of randomly selected schools, Purposely selected staff at the Ndola City council and the Zambia Enviromental Management Agency. This study was confined to residents of Ndola Urban District.

1.8 LIMITATIONS OF THE STUDY

Ndola urban has a total of 57 Primary schools and the research was conducted in four of these schools. The limitations of this study include among others the following:

- i. The findings could or may not be generalized because only 4 schools out of 57 in the district were sampled. However, results can be generalised to schools and communities with similar characteristics.
- ii. Limited resources constrained the researcher as she was self-sponsored and lacked financial resources to cover a wider population.
- iii. Difficulty in accessing statistical data from relevant authorities of some institutions. Some office bearers were unwilling and at times unavailable to provide the required statistics.

1.9 THEORETICAL FRAMEWORK

Theories help in guiding the process of delivering and bringing to fruition education programmes designed for any given group of learners. Therefore, this study was guided by theoretical frameworks based on Paulo Freire's theory of conscientisation and John Watson's theory of behaviourism. According to Mwamwenda (1995), if the consequences of action were unpleasant, the action would not be repeated. If, however, the consequences were pleasant, the behaviour would recur. In that regard, when teaching people to change behaviour, the behaviourists involved two important principles of reinforcement and conditioning which were important characteristics in behavioural change. This theory of behaviourists emphasised the inculcation of an awareness of the total environment and its problems, gaining of sound knowledge and understanding of how the environment function. Engleson (1991) stated that the aim of behaviourists was to help citizens become environmentally knowledgeable, skilled, willing to work individually and collectively toward achieving and maintaining a dynamic equilibrium between the quality of life and the environment. It further stressed the complexity of environmental problems and thus the need for critical thinking skills. It also utilised a broad array of educational approaches to teaching and learning and stressed each individual's responsibility towards the environment. The theory of Watson and others was found suitable for this study as a framework because the principles it applied to teach society could easily be evaluated and that might simply help the researcher establish the state of awareness of people on the effects of solid waste on the environment in the schools under study. This theory was picked because it lays much emphasis on behavioural change of learners towards solid waste management.

Further, the theory enabled citizens to play a role in planning their solid waste management activities. If citizens were actively involved in planning the management of their solid waste, this would be evident through their behavioural change as they would consciously limit or reduce solid waste generation, re use and recycle most of it as well as dispose of it appropriately.

It also considered the environment in totality; natural, social, economic and political, and that education should be a continuous lifelong process not to end after the facilitator had gone. In view of this, the theory was seen to be useful in order to find the state of awareness among pupils, teachers and school managers in schools and communities under study.

The other theory which guided this study was that of Paulo Freire's conscientisation also called transformation learning. According to Paulo (1989), critical thinking, conscientisation and dialogue helped society to be transformed. At the time society had embraced the type of education which encouraged memorisation and remembering (Banking education), where the learner was viewed as a mere recipient of knowledge (container or a vessel) only, Paulo stood up to reject such type of education as it did not encourage learners to change behaviour. Paulo implemented his pedagogy of the oppressed, which was meant to conscientise the oppressed people to be changed completely, as critical thinkers.

In the Paulo type of education, the core aim was critical consciousness which included features such as power awareness, critical literacy, desocialisation and self education. Since this theory emphasised the importance of conscientisation in any society, the researcher used this concept of conscientisation to find out how much pupils, teachers and school administrators had been conscientised on the effects of solid waste on their lives and environment and as a tool to interpret subsequent findings. The two theories were intended to find out how much people knew how to interact with their fellow humans and their environment. This was known through the interviews that were conducted to different stakeholders in the area. The study sought to establish if pupils, teachers and school administrators had been conscientised. Conscientisation is the type of education which made society become critical in whatever they did, not obtaining knowledge which was almost useless and end after passing the examination or upon the facilitator leaving. We looked at the problem of solid waste which was in the schools and their surrounding communities. It was also argued that the indiscriminate solid waste disposal faced by Zambians today was as a result of mindset, values and practices in the social, economic as well as political and natural affairs of the environment (Namafe, 2006). Therefore, the education people receive should be reflected in their lives even after many years of learning had passed.

What is critical in Paulo's theory to environmental education is the process of critical thinking and conscientisation reflecting back on previous experiences to determine whether or not what was learnt could still be justified under the prevailing circumstances. He strongly felt that such type of learning is very important as it leads into what he termed as conscientisation (transformation learning) as long as one engages oneself into critical reflection on his or her

assumptions and presumptions. He further suggests that it is from reflective assessment that conscientisation starts and it is premised on validating the communicated ideas. In essence, when one is reflecting on the premises of interpretation, then such a person is engaged in content reflection, which is good. The most important learning point to solid waste management of Paulo's theory is when learners begin to re-evaluate their lives and transform their behaviours, which in fact represents reflecting on experience (Paulo, 1989).

1.10 STRUCTURE OF THE DISSERTATION

The study is divided into six chapters. Chapter one has introduction, background to the study, statement of the problem, aim of the study, objectives, research questions, significance of the study, delimitation, limitations, theoretical framework and structure of the study. Chapter two addresses literature review related to the study topic. The third chapter describes the methodology used. It outlines how the research was conducted in terms of its design, target population, research sample, sampling procedure, research instruments, data collection and analysis procedures as well as ethical considerations. Chapter four embarks on the research findings using qualitative approach complemented by quantitative approach. Tables were used in quantitative presentation of data. The fifth chapter is discussion of the research findings presented in chapter four. Chapter six is conclusion and recommendations. The conclusion and recommendations are based on the findings of the study. The pages that follow are references and appendices.

The next section shows the significance of the study in relation to literature from previous studies that were done globally and regionally responding to similar challenges arising from the need to effectively manage solid waste and its effects on schools and surrounding communities.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter will discuss the origins of solid waste management at global, African and Zambian levels. It will look at the steps and processes that have been undertaken in the different countries and what is being done to ensure that waste is properly managed so as to preserve our environment for the present and future generations.

2.1 ORIGINS OF SOLID WASTE MANAGEMENT IN OTHER PARTS OF THE WORLD

Introduction

Waste is the by-product of human activity. It contains the same material as are found in the useful products; it only differs from useful products by its lack of value (McDougall, R.F. et. al., 2008). They turn to waste when they are mixed and no more provide the service they were planned or designed to do. ILO (2007:1) defines waste as something which the original owner or user no longer values, and has been discarded or discharged by the original owner or user. It is something you do not want anymore and want to throw away. UNEP/UNESCO defines waste as objects which the owner does not want, need or use any longer, which requires treatment and or disposal (UNESCO, UNEP 1991). Waste management has therefore been defined as the collection, transportation, storage as well as the recycling and disposal of waste, including the care of disposal sites (ECZ, 2001).

Historical background

In ancient cities, wastes were thrown onto unpaved streets and roadways, where they were left to accumulate. It was not until 320 bce in Athens that the first known law forbidding this practice was established (Nathanson, 2013). At that time a system for waste removal began to evolve in Greece and in the Greek-dominated cities of the Eastern Mediterranean. In ancient Rome, property owners were responsible for cleaning the streets fronting their property. But organized waste collection was associated only with state-sponsored events such as parades. Disposal methods were very crude, involving open pits located just outside the city walls. Unserved areas disposed waste in pits or dumped in open spaces, a matter that gives rise to vermin and diseases (UN-Habitat, 2009).

As populations increased, effort was made to transport waste further out from the cities. It was not until 1714 that every city in England was required to have an official scavenger. Toward the end of the 18th century in America, municipal collection of garbage was begun in Boston, New York City, and Philadelphia. Waste disposal methods were still very crude, however. Garbage collected in Philadelphia, for example, was simply dumped into the Delaware River downstream from the city (Nathanson, 2013).

Developments in solid waste management

A technological approach to solid-waste management began to develop in the latter part of the 19th century. Watertight garbage cans were first introduced in the United States, and sturdier vehicles were used to collect and transport waste. A significant development in solid-waste treatment and disposal practices was marked by the construction of the first refuse incinerator in England in 1874. By the beginning of the 20th century, 15 percent of major American cities were incinerating solid waste. Even then, however, most of the largest cities were still using primitive disposal methods such as open dumping on land or in water (Palmer, 1998).

Technological advances continued during the first half of the 20th century, including the development of garbage grinders, compaction trucks, and pneumatic collection systems. By mid-century, however, it had become evident that open dumping and improper incineration of solid waste were causing problems of pollution and jeopardizing public health. Modern solid-waste management plants in most developed countries now emphasize the practice of recycling and waste reduction at the source rather than incineration and land disposal (Nathanson, 2013).

2.2 SWM IN SOME PARTS OF AFRICA

SWM is a problem for most developing countries, Zambia inclusive. This starts right from the collection point and much of the garbage that is generated is not collected let alone treated or disposed of appropriately. This scenario has not spared schools and most government run schools lack proper or sustainable solid waste management. Local authorities which are mostly mandated to

collect and dispose of solid waste lack resources and political will to carry out their mandate. It is for this reason that Heeramum (1993) argues that waste collection and disposal in developing countries has been left to individuals or communities. This has led to garbage piling up almost everywhere in townships, urban centres and along the roadsides.

Studies carried out in South Africa show how success in solid waste management has been achieved in some sectors of society while others are still struggling with indiscriminate dumping of solid waste in any open spaces. Ddungu (2004) in South Africa revealed that EE reduced the problem of solid waste in the central business district of Thohoyandou. This was after the EE desk visited schools, youth clubs and conducted weekly radio talks on solid waste issues. Another study by Nshimirimana (2004) showed that attitudes of people towards waste management were negative. This was mainly due to lack or low levels of knowledge on EE. The sensitization of school children on solid waste management would hopefully have a spill over effect into surrounding communities.

2.3 SWM AND ITS RELEVANCE

Solid waste management is relevant in all spheres of life. Each day, every living organism produces a considerable amount of waste. According to the Zambia Environmental Management Agency [ZEMA], formerly, Environmental Council of Zambia [ECZ] (2008), the gross annual solid waste (SW) generated in Zambia as at December 2006 was estimated at

2, 000, 000 tonnes; with only about 20 percent of the waste having been collected and disposed of at designated sites.

This waste if not managed and disposed of appropriately would ultimately endanger the very existence of living organisms, humans included. Nature has its own way of managing and using its waste. For instance, plants grow, reproduce and finally die and the waste enriches the soil which in turn provides nutrients to continue the existence of plant life (Loubser, 2005).

Humans, through technological advancements, have continued to produce items to 'ease' their life. This has consequently increased the production or generation of by-products that are not needed or useful to humans. Some of the products just serve a single purpose and are sooner or later discarded by their user as useless. Examples of these include paper and plastic plates and cups, diapers, straws, disposable cameras to mention but a few. Unfortunately, the bulk of these substances are not biodegradable hence causing damage to the environment. It is for this reason that solid waste management is relevant and critical for sustained human existence (UNCHS, 2002).

The continued development in technology has greatly affected the earth's natural ability to recycle and ensure a sustainable existence. The world now places great importance on the management of solid waste in a bid to satisfy the needs of the current generation while not compromising the existence of future generations (UNESCO and UNEP, 1991).

The United Nations have come up with policies and guidelines for member states to ensure compliance and hopefully save mother earth from destruction (United Nations 2002). It is sad, however, to note that some of the great polluters have not ratified these policies and continue with impunity to pollute the world especially in poor African countries where laws are not very strict or governments in power are too weak to enforce them as they rely on donor funds from these economically powerful countries. For instance, the UN suggested a reduction in the emissions of pollutants into the atmosphere, yet the USA, a major polluter has not ratified the policy (UNCHS, 2002).

Solid Waste Management is mostly regarded as the sole responsibility of municipal and local councils. While the management of domestic and industrial waste seems to be taken care of fairly well by rich and developed countries, it is a sad and disillusioning reality for most under-developed countries especially in sub-Saharan Africa. Zambia no doubt falls under this category. The rapid growth of cities and loss of revenue by local councils in Zambia due to the sale of council houses resulted in most councils failing to cope with increased waste generation of solid waste in most cities.

For instance, in the tourist capital Livingstone, tonnes of waste generated have been increasing steadily. However, the city council only manages to collect and properly treat and dispose of only a small percentage of this waste (Livingstone State of Environment, 2000).

The same scenario was presented by Kitwe city council (Kitwe State of the Environment, 2010). This clearly shows that this is the trend in most city and rural councils. Over 80% of waste generated in our cities therefore is left to rot on our streets, blocking drainages and generally making our surroundings a health hazard. This gives rise to vermin and diseases (UN-Habitat, 2009).

2.4 THE AIM OF SWM IN SCHOOLS

Schools and other institutions of learning were identified as channels through which conservation of the world environment could be achieved (Panneerselvam and Ramakrishnan, 2005). The Bible teaches that, “Teach the child in the way he should go, even when he grows older he will not depart from it” (Holy Bible, 2011 - Proverbs 22:6). Zambia is a Christian nation and if such principles were inculcated in the young from primary school would definitely have an impact on people’s attitudes towards solid waste management. This helps to show the need for proper solid waste management practices in schools if we are to have an enlightened and environmental conscious citizenry.

Solid waste management in schools should therefore be the foundation of a clean country. Education should foster a positive change of attitude in communities. This can be achieved if environmental awareness and conservation are imparted in our youths through the various subjects throughout the curriculum. An integrated approach would help school children appreciate nature and the environment, hence managing of solid waste would be a habit rather than perceived as an unpleasant task meant as punishment for wrong doers.

2.5 INCORPORATING SWM IN THE CURRICULUM

Over the years, the Ministry of Education has undergone a number of reforms. Some of these aimed at incorporating various environmental aspects in the

curriculum. Some of these topics have been incorporated in subjects like Environmental science, Health science, Biology, Agriculture science, Civic Education, Geography and Religious Education to mention but a few (MOE, 2011).

Despite the revision of the curricular over the years and integration of environmental issues in the national education policy like “Educating our Future” (MOE, 1996) and “Zambia Education Curriculum Framework” (MOE, 2011) among others, there is still no significant behavioural change regarding the disposal of waste. Most schools and communities are an eye sore littered with all sorts of garbage ranging from plastic wrappers to metallic and other substances.

A study in South Africa suggested ways in which schools could deal with the challenges of managing solid waste in their schools. The call centre information reported that the best way to solve our waste problem is to firstly reduce the amount of waste we produce (Ojewole, 2014). Different classes were tasked to come up with their own ways of managing the waste generated in their classes. They further assigned specific duties to members of the class to ensure everyone participated.

In Nairobi, Kenya, a partnership strategy is being implemented. The strategy is based on the 3R approach that focuses on reducing, reusing and recycling generated waste with the aim of setting up a sound material's economy in a form of a working partnership of key waste management stakeholders of the city of Nairobi into a functional plastic waste return scheme. (http://www.unep.or.jp/Ietc/GPWM/table3_projects.html)

2.6 MOE AND SWM IN ZAMBIA

Waste management in Zambia is basically the responsibility of City, Municipal and Local councils. They identify sites and monitor the collection and disposal of both domestic and industrial waste. At Independence, most towns had very small populations. The situation however rapidly changed with the influx of

people from rural to urban centres. The increase in population also led to increase in the accumulation of waste which became a problem for local councils to manage. Poor funding, lack of machinery/equipment and inadequate collection points all contributed to failure by councils to manage waste effectively (ECZ, 2008). The problem was also exacerbated by the mushrooming of shanty and unplanned settlements surrounding the cities.

As part of the global village, Zambia through the Ministry of Education has time and again come up with policies to incorporate Environmental Education in the curricular as a way of conserving mother earth. In *Educating our Future*, it is the responsibility of management to ensure a clean and healthy learning environment for pupils (MOE, 1996). This has been a challenge for most schools as they lack resources to effectively implement solid waste management. However, there has been very little or no improvement in the management of waste countrywide, a situation which is worrying despite the creation of Zambia Environmental Management Agency (ZEMA), formally Environmental Council of Zambia (ECZ) to monitor environmental issues. This study, therefore, seeks to find out factors that have led to such a situation despite remedial measures having been put in place and hopefully find a lasting solution.

2.7 SWM IN ZAMBIAN PRIMARY SCHOOLS

Diversification of the curriculum in this context means provision of an education curriculum that meets the needs, abilities and interests of all learners and those of the society at large. Besides catering for different categories of learners, a diversified curriculum, particularly in the basic (primary) and high (secondary) school system, will ensure that learners are equipped with varied knowledge, skills and positive attitudes to enable them take up whatever opportunities came their way in life (CDC, 2011). This is what the curriculum was expected to achieve when reforms such as the 1977 Educational Reforms, Focus on Learning 1992 and *Educating our Future* 1996 were implemented. To date, however, no significant change has been noticed in schools and communities into which those who leave the school system are absorbed.

Zambia Basic Education Course (ZBEC) (CDC, 1985) was put in place in 1985 based on some recommendations from the 1977 education reforms whose curriculum underpinned the importance of teaching life skills and communication skills (CDC, 2011).

Outcomes Based Education (OBE) is an approach to learning that the Ministry of Education has adopted, moving away from behavioural approach. The approach seeks to link education to the real life experiences as it gives learners skills to access, criticise, analyse and practically apply knowledge (CDC, 2011). This shows that something is not quite right as solid waste management is worse now unlike when such corrective measures were being implemented. It is this missing link that this study seeks to establish and hopefully with the involvement of all stakeholders find a lasting solution to this problem.

Prevention of waste creation is the main priority of waste management as this will in turn enhance the conservation of resources. Ndola urban primary schools are littered with all sorts of waste which has an effect on the environment not only within school grounds but the community at large. It is this concern that has necessitated this research to investigate factors that affect the implementation of SWM in Ndola Urban Primary Schools. It is hoped that if and when these factors are identified may help stakeholders in finding ways of mitigating the indiscriminate disposal of solid waste in the schools as well as the surrounding communities. Integrated solid waste management can be a nation building exercise for healthier and wealthier communities. Therefore, it needs global attention but everyone should act locally where they are.

2.8 Waste Management in Ndola

2.8.1 Local Government Act

The Ndola Municipal council like all councils in Zambia derives its mandate to manage waste in the city of Ndola from Statutory Instrument (SI) 100 of 2011 of the Local Government Act of the Laws of Zambia Volume 16, Cap.281 (EMA, 2011). This Act among other things defines waste as well as identifies the different categories and how or who is permitted by law to dispose of such waste.

The Statutory Instrument clearly spells out the prohibitions as follows:

- a) “A person shall not, within the boundaries of a council:
 - i) Dispose waste in an open space or other place not designated as a waste disposal facility;
 - ii) Dispose or burn waste in an open fire on any private or public land;
 - iii) Accumulate or keep waste on any premises beyond the regular collection period stipulated by the waste manager concerned;
 - iv) Deposit or place waste in any street, storm water drain, premises whether vacant or not, water course, reservoir, forest or any place not intended for waste disposal as a means of permanently disposing of the solid waste;
 - v) Throw waste from any moving or stationery conveyance;
 - vi) For purposes of waste disposal, use any receptacles or other accessories other than those approved by the council;
 - vii) Dig a pit for purposes of waste disposal;
 - viii) Loiter or scavenge at any waste disposal facility; or
 - ix) Provide waste management services without a licence from the Agency and a solid waste management contract concluded with a council” (EMA of 2011)

The questions to be answered therefore include: “Why is there so much waste around the city when the law clearly prohibits any indiscriminate disposal of waste? Are the citizens aware of these regulations? Does the curriculum raise any awareness in pupils regarding the disposal of waste? Clearly, there is a missing link hence the need for this research.

The Ndola City Council oversees the collection, transportation, treatment and general management of solid waste that is generated within the city and surrounding areas. With the ever growing population of people and businesses in the city, coupled with insufficient funding of local councils in the country, the task of waste management has become too immense for the local authority to manage effectively. The council has now involved some stakeholders to find solutions to the ever growing problem. Some of the measures implemented include the

subcontracting of private companies to collect, treat and dispose of waste from residential as well as business premises (Kitwe State of the Environment, 2010).

The Ndola City Council also intends to carry out sensitisation programs within the district to enlighten citizens on environmental issues which will include environmental conservation.

The city of Ndola generates hundreds of tonnes of domestic solid waste per day but only a few tonnes are properly collected and disposed of by the council [Kitwe State of the Environment, 2010]. The remaining and ever increasing amount is left lying around blocking drainages and becoming unsightly mountains. While the city has been growing in terms of population and infrastructure, the council's waste collection capacity has remained almost stagnant. The privatisation of Zambia Consolidated Copper Mines (ZCCM) and its subsidiaries also left premises that were serviced by the company as regards waste management unserved or under the care of the local authority.

This is another area of concern as the former ZCCM employees have had a hard time adjusting to the new conditions. Whereas, initially garbage collection operated smoothly like clockwork, suddenly there was no one to collect and dispose of it. Changing the mindset and attitudes of these former ZCCM employees has been a great challenge as they view waste management as someone else's business and responsibility.

2.8.2 The Zambia Environmental Management Agency (ZEMA)

The ZEMA formerly the ECZ was established by an Act of Parliament in 1985 as recommended by the UNEP. Its mandate was to ensure that Zambia being signatory to the International Agreement on the conservation of the environment formulated policies to enhance the promotion of environmental conservation.

The ZEMA regulates and monitors the operations of local, municipal and city councils in the country (EMA, 2011). This, therefore, empowers it to monitor among other things the treatment and disposal of waste by the councils. ZEMA

classifies waste in two main categories namely general waste which comprises domestic waste, writing paper, packaging materials and garden waste to mention a few; and hazardous waste which includes ascertained (used oil), used batteries and clinical waste.

The ZEMA Northern Region which has its regional headquarters in Ndola regulates and monitors the operations of five provinces namely Copperbelt, North-Western, Luapula, Muchinga and Northern. It is worth noting that the ZEMA Northern Division only has a staff of about 9 as opposed to the required 25. This practically makes it almost impossible for the Agency to effectively monitor the operations of the numerous councils in the five provinces let alone perform other equally important duties of conducting inspections and issuing licences to the various categories of businesses that operate in these provinces (ZEMA, Ndola, 2014).

To mitigate the shortfall, ZEMA carries out public awareness activities such as sensitisation talks to school pupils on solid waste management as well as the distribution of brochures in the five provinces. However, due to the serious shortage of staff, presentations in schools are mostly conducted when a particular school invites them to talk to the pupils. This was echoed by one school administrator who said,

“We also invite other stakeholders like DEC, ZEMA, Council to give talks to our students,” (Administrator 2).

This has helped to raise pupils’ awareness of the need for proper solid waste management. ZEMA also uses the media through Radio and Television advertisements and talks through their communications department to try and reach out to the general public (ZNBC TV2, 2015). They also use the Agricultural Commercial Shows and the Trade Fair to publicise their activities and mandate to the citizens. Inspection of various institutions which is a cardinal component of their existence is not carried out effectively mostly due to shortage of staff and other logistics like insufficient funding.

This chapter looked at the background to solid waste management at global level down to the local level. Efforts by various world organisations aimed at safeguarding mother earth from indiscriminate disposal of solid waste have been discussed. The relevance of SWM and its incorporation in the school curricula have also been discussed. Finally, the Local Government Act as well as ZEMA's mandate as regards SWM at local level have been highlighted.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This chapter describes the research design employed, target population, sample size and sampling procedure, research instruments, data collection methods and analysis.

3.1 RESEARCH DESIGN

The research design that was used in this research was a descriptive survey. A descriptive design involves the systematic collection and presentation of data to give a clear picture of a particular situation. It is a method of collecting data through the use of questionnaires to a selected sample of individuals (Kombo and Tromp, 2006). Descriptive research also deals with: how, what is, or what exists in relation to some preceding event that has influenced a present condition or event (Creswell, 1994). As a result this design was used to find out what factors influence and affect the implementation of SWM in Ndola's Urban Primary Schools. In *Educating our Future* (MOE, 1996), The Ministry of Education is mandated with the responsibility to teach Environmental Education (EE) to pupils in Grades One to Twelve in subjects like Social Development Studies (SDS), Creative and Technical Studies (CTS) and Religious Education (RE) so as to reduce on environmental pollution of which solid waste is a major component.

To establish how waste disposal was implemented in the various areas of the curricula, questionnaires were administered while interview schedules, Focus Group discussions and on spot observations were conducted to find out why solid waste was still a concern in the targeted schools.

The survey instrument was designed to collect information and data on a number of categories including: respondents' demographic characteristics, knowledge of solid waste management and how this knowledge was acquired, methods of disposal of solid waste in target area and community participation in SWM and challenges encountered in implementing SWM among others.

Focus group discussions were conducted with pupils while interview schedules were used to get more information from managers of the sample schools as well as officials from ZEMA and the Ndola City Council. Questionnaires were administered to teachers. The interview guides were used to facilitate discussions among respondents on how solid waste was managed in their schools. Where options were provided in questionnaires, respondents were required to select the option that reflected their opinion(s). The researcher was also available to clarify or give guidance where need arose when answering the questionnaires.

Interviews were used to help capture as much information as possible regarding solid waste management in the target schools. Observation of the schools was also done with someone appointed by management or one of the management members.

3.2 TARGET POPULATION

According to White (2005), a total population is termed as the sampling frame and the individuals within the population are called sampling units. In this study, the sampling units comprised pupils in Grades 4 to Grade 7 as these are in a better position to participate meaningfully during focus group discussions; primary school teachers who are the implementers of the education policy and administrators of primary schools as immediate supervisors of the implementation process. Local authority and ZEMA officials were purposely selected and interviewed. This population is representative of all government and private schools on the Copperbelt and Zambia as a whole. Schools were chosen as these are some of the institutions through which change and transformation in national development can be achieved. The State of Environment Report (2000), lists learning institutions, government education wings and NGOs as institutional frameworks that existed to enhance environmental awareness among the general public.

3.3 SAMPLE SIZE

The primary schools are sub-divided into lower primary and upper primary sections. Five pupils were randomly picked from each class from Grades 4 to 7. This gave a total of 20 pupils per sample school. The researcher used simple random sampling by selecting every fourth or fifth pupil in each class. The study targeted a total of 80 pupils, 16 teachers, 4 administrators and 2 officials making a total of 102 respondents.

This sample selection covered the foundation stage where EE is taught in the primary school curricula. It also included officials who enforce the law concerning solid waste management in the district.

3.4 DESCRIPTION OF THE SAMPLE

The research comprised Primary Schools that were selected randomly in Ndola urban and purposely chosen institutions like the local authority and ZEMA. A list of schools in Ndola Urban was collected from the District Education Board Secretary (DEBS). Four schools were then picked randomly by placing pieces of paper with names of the schools in a box and randomly picking four.

Pupils and teachers from the selected schools were sampled. The grades 4 to 7 were purposely selected as the pupils in these grades were able to participate in a group discussion and have been in school long enough to express themselves as regards practices of solid waste management in English or a local language. The classes were then randomly selected by writing class names on pieces of paper and picking one class from each stream. The class teachers for the selected classes automatically participated in answering the questionnaire as well as participating in the Focus Group Discussions. The sample also comprised officials from the local council (solid waste management department) and ZEMA who were purposely selected as these institutions are mandated to ensure environmental protection. Primary schools have been chosen as they are the foundation of the education system in Zambia. It is hoped that any gaps identified at this level may help in implementing remedial measures in a bid to achieving sustainable and effective solid waste management in schools and communities at large.

Table 1 **Characterisation by gender**

Category	Male	%	Female	%
Pupils	40	50	40	50
Teachers	2	12.5	14	87.5
Administrators	2	50	2	50
Officials	2	100	0	0
Total	46	45.1	56	54.9

SOURCE: Field Data 2014

The pupil ratio by gender was 50% male and 50% female while there were more female teachers covering 87.5% and male 12.5%. Administrators were balanced at 50% each while officials from ZEMA and council were both male giving 100% male representation.

3.5 SAMPLING PROCEDURE

Five pupils were picked from each of the participating classes using the systematic sampling by picking either the fourth or fifth pupil. As for the teachers, the grade teachers for the participating classes also answered the questionnaires.

3.6 RESEARCH INSTRUMENTS

Self administered questionnaires were used to collect information on the management of solid waste in the sampled primary schools. These were administered to teachers. Interview guides were used during Focus Group Discussions with pupils while interview schedules were used with administrators and officials.

3.7 DATA COLLECTION

Primary data was collected through administering of semi-structured questionnaires to teachers. Structured interview schedules were administered to school administrators and officials from the local council and ZEMA. Focus Group Discussions were also held with pupils to find out in detail what topics have been included in the curriculum and how these were being implemented. The discussions helped to identify challenges that have led to the lack or poor implementation of solid waste management in Ndola Urban schools.

Secondary data was collected from literature in policy documents of education as well as from the local council, ZEMA, University of Zambia and Zambia Environmental Council libraries and the internet. The various sources helped in identifying the missing link in the effective management of solid waste in schools.

3.8 DATA ANALYSIS

Data analysis refers to examining what has been collected in a research and making deductions and inferences (Kombo and Tromp, 2006). Quantitative data were analyzed using microsoft excel to produce totals and percentages

which were presented in form of tables. Qualitative data from interviews and observation were analyzed and interpreted into themes by comparing responses from individual respondents, and meanings established to lay the foundation of codification. Creswell (1994) states that thematic analysis categorizes related topics, and major concepts or themes are identified to produce rich deep description of the phenomena being studied. The frequency with which an idea or description appears was used to interpret the importance or emphasis of the issue. Kombo and Tromp (2006) state that qualitative data such as finding out views of respondents on a certain issue are not always computable by arithmetic relations: the responses can be categorized into various classes and identifying patterns among the categories. The purpose of interviewing is to find out what is in and on someone else's mind (Cresswell, 1994). The collected data from interviews, Focus Group Discussions and observations were grouped into themes and then interpreted. The qualitative approach was used in the interpretation of the data.

3.9 VALIDITY AND RELIABILITY

This study used the combination of methods of data collection and sources of data. The study used questionnaires, interviews and observation methods to collect data. Other sources used included literature from books and online research through the internet. The combination of methods increases reliability and validity. Validity further examines the extent to which the results of the study can be generalised to the real world (Achola and Bless, 1997). The questionnaire was pilot tested on twenty (20) pupils, four (4) teachers and one (1) school administrator in Ndola urban where the study was conducted to obtain validation data and ensure that any anomalies and ambiguous questions were corrected before the questionnaires and interview guides were finally administered to the sampled population.

3.10 ETHICAL CONSIDERATIONS

The researcher first sought approval from the University of Zambia Ethics Committee to carry out the proposed research. Thereafter, permission was sought from the District Education Board Secretary, selected schools' administrators and the local authority to conduct the research in the district and selected institutions. Informed written consent was obtained to ensure the

privacy and anonymity of respondents; no risk, trauma or injury to subjects and assuring respondents that information gathered was to be used for academic purposes only.

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.0 INTRODUCTION

This chapter presents the findings of the research in line with the objectives which were:

- i) To establish what respondents know about SWM
- ii) To investigate how pupils, teachers and school management were involved in solid waste management
- iii) To explain challenges faced by pupils, teachers and school management in implementing activities to manage solid waste
- iv) To determine measures that should be implemented in schools to ensure effective solid waste management

4.1 What respondents know about solid waste management

The first part of the questionnaire and interview schedule sought to determine the gender of respondents and how long they had been at their institutions. The

duration of respondents at their institutions showed that they were in a better position to articulate issues on how their institution managed solid waste.

It was established that 50% of pupil respondents were female while the other were male. This gave a balanced view despite the selection having been done randomly. It was also established that 4 respondents out of the 80 pupils had been at their school for at least a year translating into 5%. Five had spent 2 years = 6.2%, 14 had 3years which represents 17.5%, 21 spent 4 years which is 26.2% and 36 had spent over 4 years at their schools which represents 45% as indicated in table 2 below.

Table 2. Duration of Respondent at Institution

No. Of years	No. Of pupils	Percentage
1 Year	4	5
2 Years	5	6.2
3 Years	14	17.5
4 Years	21	26.2
Above 4 Years	36	45

Another item in the questionnaire sought to establish how the waste generated in the school was disposed of. Most of the pupils and all the 16 teachers and 3 of the 4 administrators said the waste was thrown in pits and later burned. This represents about 90% of the pupil respondents; 100% of teacher respondents and 75% of the administrators. This gives 89.21% of the total number of respondents. One administrator representing 25% of administrators and 0.98% of all respondents said the waste was buried and this helped in enriching the soil for their gardening activities.

The researcher through the questionnaire sought to find out if respondents took part in any way in the treatment and disposal of waste and whether they employed the same activities at home and in the community at large. Through observations, the researcher noted that all the sample schools ran programs of cleaning the classrooms and surroundings. These included the sweeping of classrooms and surroundings, cleaning windows, picking up litter and burning and, or burying the garbage. Despite the daily supervised cleaning sessions, the cleanliness was short lived and the burning and burying of garbage also contributed to soil degradation and air pollution. The respondents therefore,

took part in one way or the other in the management and treatment of solid waste albeit the wrong way.

The researcher noted the gap between the regulations stated in the Local Government Act (EMA, 2011) and the implementation of the said practices. While the Act clearly outlaws the practice of burying and burning garbage, these are the popular modes practiced in all the sample schools and are representative of most government run schools. Of the 80 pupils interviewed, most of them did not relate what they were taught in class with what they practised.

For instance, when asked why they burnt or buried litter yet they had learnt during SDS that these methods polluted the environment; they responded as follows:

“We have always done that,” (Participant 1).

Another said,

“We do that at home and so does everyone in our community,” (Participant 8).

Participant 9 said,

“Well, we just obey teachers’ orders,” (Participant 9).

The statistics collected also revealed that all the pupils had an idea of what solid waste management entailed as displayed by their various sources of information as shown in the table 3.

Table 3. How respondents learnt about SWM

	Frequency	%	Valid %	Cum. %
Teacher during lesson	42	52.5	52.5	52.5
Media	7	8.8	8.8	61.2
Other (Mother, Home etc)	31	38.8	38.8	100
Total	80	100.0	100.0	

SOURCE: Field data 2014

Table 4 shows that all the pupils had some knowledge about solid waste management and the need to keep their surroundings clean. However, the failure to link this knowledge to effective and proper solid waste management was of great concern.

Table 4. Description of solid waste by respondents

Description	No.	%
Used plastic bags	80	100
Plastic bottles/ metal cans	76	95
Bottle tops	62	77.5
Leftover foods	30	37.5
Leaves	74	92.5
Writing paper	57	71.25
Rubbish	75	93.75
Wood	26	32.5
Pencil shavings/ pens	80	100

SOURCE: Field Data 2014

Table 4 shows that the respondents had an understanding of solid waste which means something (not liquid) that was unwanted or undesirable. A lot more needs to be done to ensure proper solid waste management for the good and well being of individuals and society at large.

Table 5. Description of solid waste by teachers and administrators

Description	No.	%
Garbage	19	95
Rubbish	13	65
Toilet waste (blocked sewerage)	3	15
Litter	17	85
Plastic paper	16	80
Plastic bottles	17	85
Leftover food	11	65
Writing paper	11	65

Broken furniture	10	50
Cardboard	7	35
Scrap metal	6	30
Building rubble	5	25
Glass	11	55
Diapers	9	45
Grass/ leaves	9	45
Bottle tops	15	75
Pencil shavings	6	30
Mops/ cloth	10	50

SOURCE: Field Data 2014

From Table 5, it was clear that respondents knew what solid waste was. The respondents were also tasked with the responsibility of ensuring that their wards were able to define and identify solid waste as well as to manage it accordingly. Ninety-five percent regarded solid waste as synonymous to garbage. The question, therefore, still remains as to why solid waste management was still a problem despite all that knowledge. Only three respondents representing 15% considered blocked sewers as solid waste. This clearly expresses respondents knowledge regarding solid waste.

A grade 5 text book in SDS for instance teaches that open air burning causes air pollution and in turn degrades the atmosphere and environment (CDC, 1998). The chain reaction of this process was purely academic and pupils did not relate their burning of garbage to contributing to air pollution. Through Focus Group Discussions and by interacting with the pupils, the researcher noted that the pupils were aware of land and air pollution.

Asked why the pupils continued with the act of burning and burying, most of them stated that they were simply obeying orders while others stated that they practised the same things at their homes hence they did not see anything wrong with it. In some schools, the actual burning and burying of garbage was done by general workers and pupils felt that they were not part of the practice.

One pupil participant had this to say,

“We were taught during a science lesson that burning and burying litter degrades the environment but when the same teacher tells you to throw litter in the pit, we just obey the order,” (Participant 5).

The researcher sought clarification through interview schedules if the measures implemented namely burying and burning were legal and/or the best options. Some of the respondents accepted the practice as normal while others were aware of the regulation banning the use of rubbish pits and burning. Those who were aware of the regulation, as expressed by Administrator 1 at School 01, however, stated that,

“We have no other options as the local council did not collect garbage from school and the school has no capacity to pay for the service,” (Administrator 1).

This was also expressed by the administrator at School 03. Both of these methods have serious environmental implications and cause air, land and water pollution and are serious health hazards. (L/stone env outlook, 2000,p53).

The members of staff in the four schools had no idea who their local area councillors were. This demonstrated a lack of cooperation among stakeholders. This could be attributed to lack of understanding by the general populace of their role and that of their civic leaders like councillors in ensuring that their surroundings were habitable. From the aforesaid, it is clear that the attitude of residents is that of distancing themselves from their local council.

The school administrator at School 04 had this to say,

“I do not see how it is our (school) business to involve ourselves with council business,” (Administrator 4).

This clearly shows lack of knowledge on the part of some teachers and administrators of their role as stakeholders in the management of solid waste in their areas.

While the council was aware of its responsibility to collect, treat and dispose of all municipal waste, it faced a number of challenges in executing its duties mainly due to inadequate funding. The council, among other responsibilities is

supposed to carry out regular inspections to see to it that residents and institutions adhered to laid down laws and regulations. These are only on paper as practically it lacked the manpower and financial resources to execute its mandate timely and effectively. (EMA, 2011).

4.2 How pupils, teachers and school management are involved in solid waste management

Through the questionnaires and the FGDs, the roles played by the different stakeholders were outlined. The pupils generally do the physical cleaning of their classrooms and surroundings under the supervision of the teachers. Most of the pupils said they took part in the actual cleaning while a few said they did not as they did not do that even at home. They have maids and other workers who do the cleaning up. All teachers representing 100% supervise the work being done. This is done routinely when the pupils report to school, after break and before they knock off. Generally, most pupils take part regardless of their gender or grade.

During Focus Group Discussion, one of the pupils had this to say,

“I do not take part in general cleaning. Why should I when I do not do that even at home.” (Participant 4)

Another echoed this and added,

“Well, our maid and garden boy do the cleaning at home. I expect the general workers to do the cleaning up. I came to learn and not do manual labour.” (Participant 7).

The teachers' role mainly was the apportioning of work to pupils and supervising them to ensure that the work was carried out. Apart from the supervision of the actual cleaning, the teachers had a great role of educating the pupils on the need to dispose waste properly. This was done through executing the different topics as stipulated in the curriculum. Some of these included personal and general hygiene, conservation of materials as well as the environment at large and recycling (MOE, 2011). When children understand the need for a clean and healthy environment, it becomes easy for them to

participate in cleaning activities. While they know that litter should be placed in designated places, the majority still discard of their litter anyhow and anywhere. A change in attitude is yet to be achieved and this could be achieved if school, home and community worked together.

Asked why there was so much litter around the school most of the time, some respondent had this to say,

“The bins are few and placed far from the classrooms,” (Participant 3).

Participant 6 said,

“At home we just sweep the dirt to edge of our yard or onto the road. The wind blows it away and people and cars trample it down.”

School managers were the custodians of the schools. They were, therefore, tasked with the responsibility of ensuring that their institutions were clean while observing statutory requirements like the Local Government Act on solid waste management. While school managers were aware of the requirement by law to subscribe to the local authority for garbage collection, they were unable to do so as schools do not generate any money in the primary section. The grants from government were so little and erratic that it was practically impossible to rely on them. The little amount when it came was used among other things to pay water and electricity bill, run examinations as well as buy basic stationery and cleaning materials for the office.

Administrator 1 said,

“Yes, it is law that we should subscribe to the Local Authority for them to collect our garbage. However, it is not practical as we are not funded and as primary schools we do not have any means of generating funds but rely entirely on the erratic grants.”

When asked what role the PTAs play, she said,

“Few parents pay user fees which mostly go to supplement office and examination needs.”(Administrator 1).

It is for this reason that they resort to burning and burying. The burying on the other hand is used as a way of generating manure for the school garden. When the composite is ready, it is used in the vegetable garden which helps to supplement the needs for Home Economics practical lessons. The burying, however, only uses organic matter like left over foods and leaves. The bulk of the garbage comprises non biodegradable substances like plastic wrappers and plastic bottles which do not decompose or take many years to breakdown hence have to be burnt as it is not taken to the dump site due to insufficient funds.

The Local Authority and ZEMA being institutions mandated with the responsibility of ensuring that residents and institutions disposed off solid waste properly, also face a number of challenges in carrying out their mandate. Shortage of staff and lack of equipment are the most critical. Official 1 from ZEMA official added that,

“Inspections which should be routine are only carried out at premises when a report is made usually by neighbours who are inconvenienced.”

Sensitisations in the communities were rarely conducted due to lack of resources. Some flyers were distributed when available. The media was also used to broadcast messages especially when there was an outbreak of a disease. Councillors who should be the main link between the local authority and residents seemed to exist on paper only as residents did not seem to even know who their councillors were.

Recently, however, community radio stations namely Radio Icengelo and Sun FM had been airing programmes where various stakeholders were featured.

“Some counsellors in Ndola Urban wards were featured on these programmes and highlighted how they worked with their local communities to manage solid waste which was now a critical issue in all spheres of life,”(Official 2).

Primary schools, however, were not involved in these community activities. This gap, therefore, between schools and the communities in which they are situated, contributed to the poor or lack of coordinated effort. Schools are agents of change and are in a better position to foster attitude change in communities.

4.3 Challenges faced by pupils, teachers and school management in implementing activities to manage solid waste.

Challenges faced by the various stakeholders are numerous. In schools where pupils were the ones directly involved with the handling of solid waste, the greatest challenge was lack of suitable materials to use. They usually brought tools from their homes like hoes, brooms and slashers but did not have protective clothing like gloves, boots or aprons. They also did not have detergents hence were exposed to infection.

Participant 2 said,

“I have to hide the slasher or hoe to carry to school because my parents do not allow me to take tools from home.”

Participant 8 said,

“It is not easy carrying a hoe to school as well as a school bag.”

Teachers who are the supervisors ask pupils to bring tools from homes and often suffer verbal abuse from some parents who may not allow their children to carry tools to school let alone participate in the cleaning process. If all or most parents took keen interest in their children’s curriculum, it could possibly help them understand the need for their children’s participation in various school activities. As parents, they would also enforce the same values and attitudes even in their homes. The curriculum contents would thus not only be an academic exercise but a life style. MOE (1996) emphasises the need for skills training for school children and participation in cleaning and solid waste management is only part of the required training.

School managers have a difficult time wearing two hats, that is being part of the community as well as representing the government. Whereas the government expects the school managers to ensure a clean and conducive environment for learning (MOE, 2011), it does not provide the necessary tools and materials as funding is often erratic and insufficient.

4.4 Measures that should be implemented in schools to improve solid waste management

In addressing the objective of identifying measures that should be implemented in Ndola Urban schools in order to have an effective and efficient solid waste management system, the starting point should be the involvement of all stakeholders. Parents, households, schools, civic leaders and local authority should all be involved. With the ownership of residential and business properties having changed over the years, so should the mentality of expecting someone else to clean up after one's property. If communities came together and established their own rules as well as measures to ensure everyone conformed, it would be much easier to enforce the standards expected rather than expecting the poorly equipped council to shoulder everything.

The data collected showed that all the respondents had an idea of what solid waste management was. They were either directly involved in the management by cleaning surroundings (pupils) or supervised the work (teachers/administrators). Table 3 (page 28) shows that the pupils had knowledge about solid waste management.

The common practice was collecting litter in bins which were later emptied in rubbish pits within the school grounds. The litter was mostly plastic or paper wrappers and leaves as well as some leftover foodstuffs. These are sooner or later blown all over the place and the place is a mess once again. The researcher observed that where bins were used, they were hardly adequate and pupils were subjected to running to the dugout pits to throw the collected litter.

Schools are part of society. Therefore, for positive practices to take root, the entire community must take responsibility and participate in activities that enhance proper solid waste management. This would enhance the realisation of the policy 'Educating our Future' MOE, (1996) which has a holistic approach to the learning process.

The sources of information on solid waste management for the respondents varied as shown in Table 3. This shows that the respondents are well exposed and understand issues of solid waste management and the need therefore for concerted efforts to improve the situation which at the moment is unacceptable.

4.5 Chapter Summary

Chapter four is a presentation of the research findings. This included awareness among respondents of the knowledge on SWM. It looked at how pupils, teachers and school management participated in SWM in their schools. It also presented challenges that the aforementioned faced in their quest to manage solid waste in their schools and surrounding communities as well as measures that should be put in place to enhance SWM.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.0 INTRODUCTION

This chapter discusses the findings from the research in line with the set objectives to: investigate how pupils, teachers and school management were involved in solid waste management; explain challenges faced by pupils, teachers and school management in implementing activities to manage solid waste; to establish what respondents knew about solid waste management and to determine measures that should be implemented in schools to ensure effective solid waste management.

5.1 What respondents knew about solid waste management

The study showed that most respondents did not fully understand the impact of burning or burying solid waste on the environment. This differs greatly from the study carried out in Australia where over 92% reuse and recycle their waste (Miller, 2003).

The study also revealed a poor attitude of most teachers regarding solid waste management. This contrasts with the South African study where teachers engage pupils in a fun way to take up responsibility and find ways of reducing and managing their waste (Ojewale, 2014), unlike in Ndola and Nigerian schools where recycling is nonexistent, the European Commission report (2008) shows how recycling is practised.

5.2 Pupils, teachers and school management involvement in SWM

- 5.2.1 The findings of the study revealed that 98% of the respondents did not use approved ways of disposing of solid waste. There is need therefore to encourage the re-use and recycling of materials classified as solid waste. This is similar to results by ZEMA investigations regarding the indiscriminate disposal of packaging materials (ZNBC TV, 12.06.2015/ Olah, 2001). A

respondent from ZEMA mentioned in a live interview on ZNBC TV2 that the Agency is working on a policy to ensure producers of packaging materials such as plastic bags, bottles and cartoon boxes should have measures in place to ensure that their used or discarded materials are properly disposed of. Recycling of such materials would help keep our surroundings and drainages clean while providing the much needed employment to the youth in our country. Most pupils carry packed meals to school. This would motivate them to return packaging materials to the producer and earn themselves a little income. This was emphasised by the ZEMA official at the Ndola regional office that their intervention in opaque beer producers packing the beer in plastic bottles has reduced the amount of discarded boxes on streets as people tend to re-use plastic bottles.

The study also established that the schools under study did not have approved or legal ways of disposing solid waste. This differs from findings in some South African schools where deliberate policies and activities have been put in place and are bearing positive results. The study in South Africa suggested ways in which schools could deal with the challenges of managing solid waste in their schools (Ojewale, 2014). The report stated that the best way to solve waste problem was to firstly reduce the amount of waste that was produced. Unlike the practice in the schools under study where teachers allocated portions to pupils to clean up, the schools in South Africa found a fun way of getting the pupils involved. The pupils in each class were tasked to come up with ways of reducing waste generation. They then went further and allocated themselves specific tasks to ensure that results were achieved, (Ojewale, 2014). This further differs from the practice in the schools under study where cleaning up is sometimes used as a form of punishment for offenders. This only makes pupils to have a negative attitude towards cleaning their surroundings.

The study established that reuse and recycle are nonexistent in the schools under study. This differs from a study carried out in Australia which revealed that Australians reuse and recycle most of their waste (Miller, 2003). The report states that in Australia, the recycling rate is high and is increasing, with

99% of households reporting that they had recycled or reused some of their waste within the year 2002, up from 85% in 1992.

Studies have also shown that one of the best ways to encourage recycling is pay- as- you throw programme that bases garbage collection on the amount of waste a household generates for disposal; materials sorted out for recycling are hauled away free (Miller, 2003). Recycling and reuse prevent waste creation at source and reduce amount of waste taken to disposal sites.

The study in South Africa Ojewale (2014) suggested ways in which teachers could encourage pupils to come up with clever ways of re-using the waste such as art and crafts. This differs from the case in Zambia where teachers in the schools under study in Ndola sometimes use the cleaning of surroundings as punishment for offenders thereby creating a negative attitude towards sanitation and cleanliness. Tasking pupils in different classes with projects to identify sources of waste generation, who should do the collection and how to re-use or recycle would unleash the creativity in the pupils while enhancing a positive attitude towards waste management which hopefully will flow into the neighbouring community as the Ojewale (2014) study in South Africa revealed.

Pupils learn what they live. A report in Kenya stated that some members of society threw their garbage on the street or in their neighbours' yards at night. Some pay those seeking piece jobs to take it away and do not bother to know the final destination (http://www.unep.or.jp/Ietc/GPWM/table3_projects.html). This is similar to the Zambian scenario. Respondent 4,

“It is common practice in our communities to just throw solid waste on the street.”

Pupils, thus learn from this practice that it is alright to dispose of garbage anywhere.

In Nairobi, Kenya, a partnership strategy is being implemented. The strategy is based on the 3R approach that focuses on reducing, reusing and recycling generated waste with the aim to set up a sound material's economy in a form of a working partnership of key waste management stakeholders of the city of

Nairobi into a functional plastic waste return scheme (http://www.unep.or.jp/Ietc/GPWM/table3_projects.html)

Investing in such schemes in Ndola may just be the much needed solution to make the schools and streets clean. Pupils and residents may be encouraged to recycle if there is an economic gain. Even what had been discarded onto streets could be cleared in no time as people would want to make a little income for themselves.

5.2.2 This study also revealed that 30% burn garbage while 10% bury it. Both methods pollute and degrade the environment. This is similar to Ojewale's (2014) report that the challenge arising from these practices as was the case in Nigeria was the emission of odours and pest infestation. In some instances, fires have started due to the methane that is created from the decomposing waste piles posing a grave danger to the atmosphere.

5.2.3 Sensitisation is therefore required to teach communities to appreciate the need to place garbage in bins according to classification for easy processing unlike the obtaining situation whereby solid waste of all kinds is mixed up. This process is already in place in developed countries and has taken root in some towns of South Africa (Ojewale, 2014).

Clubs and open days could help sensitize people on correct disposal of solid waste. The pooling of resources within the community could help in ensuring that communities maintained their surroundings. The pupils from these communities would develop the habit of correct disposal of solid waste and the lessons taught in class would make sense. Councillors therefore have a critical role of ensuring that their communities came up with strategies and agreements to ensure that all the members took part. For instance, efforts are being put in place in Addis Ababa and can be tried in Ndola as well. UNEP recently started a project on developing and institutionalising an Integrated Solid Waste Management Plan for Addis Ababa (http://www.unep.or.jp/Ietc/GPWM/table3_projects.html)

5.2.4 The study revealed that 93.75% of the pupils do the actual sweeping and picking of litter in classrooms and the surroundings. The effect is however short lived as bins and pits are not usually easily accessed. The bins are mostly placed at the entrance to the school while pits are dug behind the school grounds which in most cases are quite at a distance from the collection point. This is similar to the Nigerian situation where data suggested inadequate waste management facilities and practices in study schools. The lack of refuse bins may have contributed to spillages and burning which pose a community environmental health nuisance and may compromise school environmental quality (Journal of environmental health, 2014).

5.3 **Challenges faced by Ndola urban primary schools in implementing SWM**

Ndola Urban Primary Schools like most other schools in the country are inadequately funded. The government, however, still expects the administrators to ensure that their school surroundings are kept clean while executing their duties of teaching and administering of local and national examination. Administrator 3 of Primary school 03 stated that managing solid waste in the school is a great challenge. The grants are not received on time and when the little is availed, examinations and administrative work take priority therefore making it impossible for schools to afford the council fees. In an effort to keep the schools habitable, they resort to burning and burying despite being aware of the restrictions by law.

The Administrator 2 had this to say,

“Being an urban school, we are connected to the national electricity grid. This means electricity bills to be paid and without funding we have challenges.”

Administrators at Schools 01 and 04 pointed out that pupils do not pay to sit for Grade 7 examinations. The user fees are so low that the schools cannot afford to pay for garbage collection.

One administrator also mentioned that schools belong to zones and have to participate in Zone activities such as examinations and sports. Whether a school hosts or travels out to take part, there is a cost and schools have to bare

it. Therefore, finding a seemingly easier way of disposing of solid waste, they either burn or bury it or both. The challenge arising from these practices as was the case in Nigeria was the emission of odours and pest infestation (Ojewale 2014). In some instances, fires have started due to the methane that is created from the decomposing waste piles posing a grave danger to the atmosphere.

5.4 Measures that should be implemented in schools to ensure effective solid waste management.

The study revealed that all the sample schools used illegal ways of disposing of solid waste which impacts negatively on the environment. This is similar to the scenario in Kitwe District which cites habitat loss, change in ecosystem, degradation and fragmentation (Environment Outlook Report, 2010). The study in Ndola is yet to be compiled by ZEMA therefore the researcher could not give statistics in this regard. Suffice to say the unsightly mountains of garbage surrounding sample schools and the town centre speak volumes of the state of affairs regarding disposal of solid waste. Sample schools and their surrounding communities need to work things out with the local council to address this challenge.

Though no research has been carried out in Zambian Secondary and Primary schools, the scenario in Nigeria is similar to what is pertaining in Ndola urban primary schools where Administrators highlighted the lack or insufficient funding to schools (Capetown.gov.za).

During the interview with the council official, it was mentioned that the council had divided up the town into zones and sublet private companies to collect garbage. It is yet to be seen how this will impact on the schools as the issues raised were the lack of capacity by the schools to pay for the service. Efforts by some councillors to involve communities in the treatment and disposal of solid waste should be extended to schools as they are part of the community, (Radio Ichengelo, 2014). This differs from the South African situation where pupils are motivated to find ways of reducing and managing their solid waste (Ojewale, 2014).

The study also revealed that the solid waste in schools mostly comprised wrapping of packaging materials. Therefore, a campaign to reduce generation at source may help as the study by Olah (2001) encourages buying goods with the least packaging materials. Following this up with recycling by coming up with incentives such as producers of packaging materials paying for materials that are returned to them would go a long way in motivating consumers to return packaging materials to producer. Further, as Loubser (2005) stated, every plastic bag or sheet of paper recycled means less material at the landfill.

Recycling is not practiced in the schools under study. This is similar to the Nigerian situation as revealed in the report that waste sorting and segregation is not practised and as a result recycling and other proper disposal practices become cumbersome yet improved hygiene education and sanitation are important requirements (Ojewale 2014). Recycling would also encourage sorting at source. This is evident in the European Commission report (2008) which revealed that most respondents separated their waste or avoided buying over-packaged products. This is not applicable to the sample schools as there are no recycling plants and both domestic and industrial waste end up in the same place. This is further compounded by the fact that most places lack disposal sites or are poorly managed (ECZ, 2004).

The degrading effect on the environment of burning and burying solid waste cannot be over emphasized. Though no study has been conducted in the areas under study, the danger has been recognised in Nigeria as most of the open burning usually occurred near the classrooms. This is not unique to Ndola. Globally, most public schools are facing a high level of pollution especially in Less Developed Countries (LCDs). This is not the case in developed countries which typically receive enough revenue collection from the state or federal budget (UNDP 1978).

5.5 Chapter Summary

This chapter discussed the findings of the research which highlighted what respondents knew about SWM. The challenges faced by various stakeholders and suggestions of how these could possibly be overcome.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.0 INTRODUCTION

This chapter sums up the work covered in the study. It states the ways in which solid waste is disposed of and suggests how these can be improved to ensure the correct, effective and efficient way of waste disposal to sustain our environment for ourselves and future generations.

6.1 CONCLUSION

This study highlighted activities that schools undertake in managing solid waste. These include litter picking, sweeping, burning and burying. These activities are perceived as normal by the majority of respondents despite the knowledge by some pupils, teachers and school managers of their negative effect on the environment.

The study also revealed that some of the stakeholders were aware of the illegality of these activities but the lack of enforcement by local authority and lack of funding for both schools and monitoring authority have led to the continued but environmentally unsustainable practice.

The study further showed that the lack of recycling plants contributed to the respondents' poor attitude towards solid waste management. This was evidenced by the fact that respondents threw their litter anyhow. A change in attitude by respondents would go a long way in improving the situation and ensuring that their surroundings were kept clean. If this positive attitude was inculcated in young ones at home and school, it would become a living style that they would not depart from even in old age.

The study also revealed that the mentality of expecting someone else to clean after another's mess was part of the problem. As a result, communities and schools point accusing fingers at councils rather than being proactive and finding ways of ensuring that solid waste was disposed of correctly.

The study established that while the school curricular had topics that raised awareness of the need for environmental protection, the lack of corresponding

effort and practice to ensure that such values were inculcated in learners left much to be desired. Thus environmental education was merely an academic exercise to pass examinations.

The study also revealed that ZEMA and local authorities lacked manpower and resources to conduct regular inspections. In addition, the fines for offenders were not prohibitive enough hence those with money continued disposing solid waste indiscriminately.

It is hoped that the results and discussions presented in this study could help in enforcing a change of behaviour and promoting better ways of managing solid waste in our schools and communities.

6.2 RECOMMENDATIONS

1. Schools just like the rest of the community in Ndola urban try to manage solid waste independently hence resorting to burning and burying. The Ndola Municipal Council, therefore, as an institution mandated to monitor waste management in Ndola must educate all citizenry as they monitor the management of waste especially through the education system.
2. Reduce, reuse, recycle should be emphasised at all levels, homes, school, council and industries. Each individual should be aware of how much solid waste they generate and strive to find ways of reducing the amounts generated. This will encourage the reuse of some of the waste such as bottles or plastic containers and recycling of those that cannot be reused. This will in turn reduce the amount of solid waste that ends up at the dump site or along streets and in drainages.
3. Most respondents knew the effects of burning and burying solid waste. MOE needs to take the abundant solid waste and encourage the science of transforming solid waste into biomass energy, ethanol production and animal fodder.
4. Though EE has been incorporated in the school curriculum, it is merely for passing examinations and has little or no effect on change of attitude. MOE should therefore introduce EE as a compulsory subject with topics that are of value to man and the environment.

5. Ndola urban schools just like many others in the country are not adequately funded. The MOE must fund schools adequately while school management should also involve stakeholders to fund their management of solid waste.

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Appendix B: Consent form for participants

I am a postgraduate student at the University of Zambia pursuing a Master of

Education in Environmental Education. I am conducting a research on solid waste management in Ndola Urban Schools.

Your sincere response and/ or participation in Focus Group Discussions will help me accurately write on the above topic. This study might help the Ministry of Education, Science, Vocational Training and Early Education to improve the management of solid waste in the schools and surrounding communities. I am assuring you that the information you are going to give will be kept confidential.

If you are willing to take part in this study, please write your name and sign in the spaces provided below. Should you feel at any point of the study, like during an interview or answering a questionnaire that you cannot continue, you are free to withdraw.

Participant's Name:

Signature:

Appendix C

INTERVIEW GUIDE ADMINISTERED TO PUPILS

Brief Introduction.

This discussion is aimed at finding out your opinion concerning Solid Waste Management in your school. Solid Waste has an impact on our environment and general well being. Highlighting challenges that you face in managing solid waste in your school may help us find solutions to improve the situation. You are therefore requested to be as truthful as you can in view of what you know about Solid Waste Management.

SECTION A: Personal and general Information

1. Date of interview _____.
2. Name _____ of _____ the _____ school
_____.
3. Sex Male [] Female []
4. What is your Grade?
4 [] 5 [] 6 [] 7 []
5. How long have you been at this school?
1year [] 2years [] 3years [] 4years [] Above 4 years []

SECTION B: Solid Waste Management Information

6. Have you heard about Solid Waste Management?
7. What is Solid Waste Management?
8. Where did you first hear or learn about Solid Waste Management from?
9. What type of waste is generated in your school?
10. How is this Solid Waste Managed in your school?
11. How is the solid waste disposed of?
12. Do you take part in solid waste management in your school?
13. What do you do as pupils to manage solid waste in your school?
14. Are you taught solid waste management at your school? If so, how?
15. What difficulties or challenges do you as pupils or as a school face regarding solid waste and its management in your school?
16. What do you think should be done to overcome these challenges?

Thank you for your participation.

Appendix D

QUESTIONNAIRE ADMINISTERED TO TEACHERS

Brief Introduction

This questionnaire is aimed at finding out your opinion concerning Solid Waste Management in schools. Solid Waste has an impact on our environment and general well being. Highlighting challenges that you face in managing waste in schools may help us find solutions to improve the situation. You are therefore requested to be as objective as you can in view of what you know about Solid Waste Management.

SECTION A: Personal and General Information

1. Date of interview _____.
2. Name of the school _____.
3. Sex Male [☐] Female [☐]
4. What is your position in your school? _____.
5. How long have you been in this school?
1 year [☐] 2 years [☐] 3 years [☐] 4 years [☐] Above 4 years [☐]

SECTION B: Solid Waste Management Information

6. What comes to your mind when you hear the term ‘Solid Waste’? Tick as applicable.

Garbage	☐	Left over foods	☐	Glass	☐
Rubbish	☐	Writing paper	☐	Diapers	☐
Toilet waste (blocked sewers)	☐	Broken furniture	☐	Grass/leaves	☐
Litter	☐	Cardboard	☐	Bottle tops	☐
Plastic paper	☐	Scrap metal	☐	Pencil shavings	☐
Plastic bottles	☐	Building rubble	☐	Mops/ cloths	☐

7. Is what you have ticked above generated in your school?
a. Some [☐] b. All [☐] c. None [☐]
8. How is the solid waste in 7 above managed in your school?
a. Burn or bury
b. Re-use and recycle
c. Local authority collects and disposes of it
d. Throw anywhere
9. Does the Ministry of Education have a policy on solid waste management?
Yes [☐] No [☐] I don’t know [☐]
10. If yes to question 9. State the policy on solid waste management.

_____.

11. How is the information on solid waste management spread to the pupils?
a. Taught as an independent subject [☐]
b. Integrated in other subjects [☐]
c. Clubs [☐]
d. Other (specify) [☐]

_____.

12. What activities do you as teachers carry out to enhance solid waste management in your school?

- a. Supervise pupils in garbage collection []
- b. Conduct regular inspection []
- c. Nothing []
- d. I don't know []

13. What challenges do you face as a school in managing the solid waste in your school?

_____.

14. What do you propose should be done to overcome the challenges above?

_____.

15. If there is any information on solid waste management that has not been covered in this questionnaire include it below.

_____.

Thank you for your participation.

Appendix E

INTERVIEW SCHEDULE WITH OFFICIALS (School Managers/ Council and ZEMA staff)

INTRODUCTION

This interview is aimed at finding out your opinion concerning Solid Waste Management in Ndola Urban Schools. Solid Waste has an impact on our environment and general well being. Highlighting challenges faced in the management of Solid

Waste in schools may help us find solutions to improve the situation. You are therefore requested to be as objective as you can in view of what you know about Solid Waste Management as well as suggest ways of improving the situation.

SECTION A: Personal and General Information

1. Date of interview _____.
2. School [] Other Institution []
3. Sex Male [] Female []
4. What is your position in your school/ institution? _____.
5. How long have you been in this school/ institution?
1 year [] 2 years [] 3 years [] 4 years [] Above 4 years [].

SECTION B: Solid Waste Management Information

6. What comes to your mind when you hear the term ‘Solid Waste’? Tick as applicable.

Garbage		Left over foods		Glass	
Rubbish		Writing paper		Diapers	
Toilet waste (blocked sewers)		Broken furniture		Grass/leaves	
Litter		Cardboard		Bottle tops	
Plastic paper		Scrap metal		Pencil shavings	
Plastic bottles		Building rubble		Mops/ cloths	

7. From what you have mentioned above, what type of Solid Waste is generated in your school/ Ndola Urban Primary Schools?
8. How is this solid waste managed in your school/ Ndola Urban Primary Schools?
9. What role do you as a Manager/ Official play in the management of solid waste in your school/ Ndola Urban Primary Schools?
10. What challenges do you face in effecting Solid Waste Management in your school/ Ndola Urban Primary Schools?
11. How can the challenges you have mentioned be overcome?
12. Is there any other information on Solid Waste Management that has not been covered in this interview? If so, what is it?

_____.

Thank you for your participation.

