ENVIRONMENTAL KNOWLEDGE AND PRACTICES OF SELECTED ZAMBIAN PRIMARY SCHOOL TEACHERS OF LUSAKA DISTRICT

by

Namukolo Sitali

A dissertation submitted in partial fulfillment of the requirements for the degree of Master of Education in Environmental Education

The University of Zambia
November, 2014

DECLARATION

This dissertation is the original work of **NAMUKOLO SITALI**. It has been done in accordance with the guidelines for dissertation for the University of Zambia. It has not been submitted for a degree at this or another University.

Signature……

Date……

COPYRIGHT

All right reserved; no part of this dissertation may be produced stored in a retrieval system or transmitted in any form or by electronic or mechanical, photocopy or recording without prior consent of the author.

CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of **Namukolo Sitali** in partial fulfilment of the requirements for the award of the Degree in Master of Education in Environmental Education.

Examiner's signature :	Date:
……	……..
……	……..
……	……..…

DEDICATION

This dissertation is dedicated to my Dad and Mum (Dr and Mrs Sitali) who have always been and continue to be my source of inspiration and role models and to my sisters and brothers Liseli, Lungowe, Mubita, Mwangala and Etambuyu, who have always continued to encourage me in all my endeavours.

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the concerted effort and support of many people.

Many thanks go to my supervisor Dr L. Mweemba(Head of Students' Teaching Practice and lecturer at the University of Zambia) for reading my numerous revisions and making corrections.

Special thanks go to my Dad and Mum, Dr and Mrs Sitali, who sponsored my course and research work.

Many thanks also go to my sister Lungowe, for the support she rendered during my studies and helping me proof-read my work and Mrs P. Cheelo, lecturer at the University of Zambia, who also proof-read my work.

I also wish to thank my colleagues, course mates, friends and relatives, for the roles they played towards the completion of this dissertation.

Finally but not the least, I wish to thank the Ministry of Education,Science, Vocational Training and Early Education through Lusaka Provincial Education Office, for allowing me to collect data from primary schools in Lusaka District and the participants for their cooperation during data collection.

ABSTRACT

It is critical that society be made aware of environmental problems and about the importance of responding to reduce or eliminate those problems. The implementation of environmental management practices represents an important step in the process of limiting negative impacts of environmental degradation in Zambia.A teacher's knowledge base is important for learners' understanding of the environment. However, it seems there is a gap between theory and practice of what is taught in schools.

Primary school education attempts to cover cross cutting issues such as environment issues, human rights, democracy and citizenship, life skills, education for development and spiritual and moral education. Despite the incorporation of Environmental Education into primary school curriculum in Zambia, little is known on the knowledge and practices of Primary School teachers in Environmental Education as a cross-cutting issue.This study sought to ascertain environmental knowledge and practices of Primary school teachers in Lusaka District.

This research employed both qualitative and quantitative approaches, using a descriptive cross sectional design. The empirical data were collected from four randomly selected primary schools in Lusaka District. The study sample consisted of 62 primary school teachers. The data were collected using a structured questionnaire and analysed using Statistical Package for Social Sciences (SPSS) and Microsoft excel.

The results of the study show that less than a quarter of the respondents (33.1%) were very well informed about environmental issues while the majority (62.9%) of the respondents were fairly well informed. It was further observed that most of the respondents (66.1%) had not attended a course in environmental studies and were not involved in any environmental activities. It was also observed that more than 55% of the respondents indicated that environmental behaviours such as double-side photocopying of paper, switching off electricity when not in use and eliminating smoking in public placeswere important in solving environmental problems.Respondents further suggested

environmental problems to consider in a localised curriculum, such as population growth, solid waste management, climate change, fertilizer use, water shortages and poor food quality. It was further noted that primary school teachers faced a number of challenges such as lack of teaching/learning materials, lack of support from the school administration and community while others did not perceive themselves as having enough information and skills to teach environmental issues.

The study recommends that the Ministry of Education,Science, Vocational Training and Early Education should introduce training programs for in-service teachers in Environmental Education and provide teaching and learning materials for effective teaching and learning in Environmental Education. There is also a need to introduce Environmental Education as a discrete subject at levels of education in order to increase the level of knowledge among teachers and the country at large.

TABLE OF CONTENTS

List of Appendices

List of Tables

Table **Page No.**

List of Figures

List of Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
CDC	Curriculum Development Centre
ECZ	Environmental Council of Zambia
HIV	Human Immune-deficiency Virus
KofC	Knowledge of Context
MoESVTEE	Ministry of Education, Science, Vocational Training and Early Education
PCK	Pedagogical Content Knowledge
PEO	Provincial Education Office
PK	Pedagogical Knowledge
WCED	World Commission on Environment and Development
SMK	Subject Matter Knowledge
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation

CHAPTER ONE:INTRODUCTION

1.1 Chapter overview

This chapter gives a synopsis of the background to the present study. In addition, an attempt is made to explain concepts that are used in the study for the purpose of making them clear to the reader.

1.2. Background to the study

The global and local concern about growing environmental degradation has called for the need to help people to transform their attitudes and practices towards the environment. Environmental Education has the task of transforming the activities and behavior of entire societies to achieve an environmentally sound society (Palmer, 1998). This implies that education has been recognised as one of the important tools for conserving the environment through the cultivation of knowledge, skills, values and positive attitudes towards the environment among people. According to Palmer (1998), Environmental Education is seen as involving pupils in personal experience by direct exploration with all their senses, using the school and its immediate surrounding and going further afield if it is necessary. Teachers are expected to use these experiences to develop language in all its aspects, numeracy, scientific methods of inquiry, aesthetic appreciation and creative expression as well as to encourage the development of value judgment and an environmental ethic.

The importance of Environmental Education in the development of environmental sustainability cannot be overstated and should be an integral element in school curricula from primary level onwards, (Thompson, 1997). Therefore, the integration of Environmental Education into the primary school curriculum was a response to environmental conditions of the world deteriorating at an alarming rate. In Zambia, this approach has been adopted to include Environmental Education into the primary school curriculum by integrating it into other subjects since the 1990s. TheZambian Ministry of Education (2003) states that the curriculum integrates cross cutting issues such as HIV/AIDS, life skills, gender, human rights, reproductive health, good governance, environment issues and water and sanitation across the curriculum to ensure holistic development of the learner. Progress was also being made in the training of personnel for Environmental Education at all levels from primary

education to tertiary education. Primary school teachers' education is among the levels of education in Zambia where Environmental Education has been integrated in order for the teachers to teach children in schools about the environment.

The ZambianMinistry of Education (1996) National Policy on Education called 'Educating Our Future' emphasises a holistic approach to develop an individual through the acquisition of knowledge, skills and competences that are necessary for the development of the society and the economy. The Sixth Millennium Development Goal also emphasises on integrating principles of sustainable development into country policies. However, the Curriculum Development Centre (CDC) (2000) notes that the current Education Policy "Educating Our Future" of 1996 does not emphasise the status of Environmental Education in the curriculum but it emphasises Health Education and Environmental Health which are a social component of Environmental Education. Environmental Education, however, has been infused in the curriculum due to community demand to integrate Environmental Education as a critical local, national, regional and global concern.

At primary school, more emphasis is placed on the development of the child's understanding of his/her immediate environment. Understanding the influence of cultural values on the behavior of an individual and the community is important to enable the child appreciate and understand the importance of certain institutions in his/her community, (Ministry of Education, 2003). Although Environmental Education has been included in the school curriculum in Zambia, the condition of the environment has not improved. Signs of environmental degradation have been observed in form of soil erosion, poor waste management, water pollution and many other problems in schools and in the communities around the schools. The school is part of a community, therefore it is expected that what the pupils learn in school should be reflected in society. However, it seems that there is a gap between theory and practice of what is actually taught in schools, (Fullan, 2001). This shows that teachers face a number of challenges in effectively bridging the gap between theory and practice of what should reflect in society.

Teachers' knowledge base is at the core of teaching and learning, which means their knowledge base in Environmental Education,isvery important for learners' understanding of the environment. Environmental Education content is not clearly

stated in the syllabi for different subjects, such that when it comes to actual teaching in the classroom, teachers have to search for environmental content from different sources like books, magazines, newspapers and other sources to find relevant Environmental Education content to be included in different topics and individual lessons. The teacher has to identify areas and stages in which specific content can be integrated within the subject. This process requires the teacher to have a wide knowledge base of Environmental Education content without diluting the subject content. Moreover, a good teacher should possess a good knowledge base, which consists of knowledge, skills, understanding and disposition of collective responsibility, (Kimaryo, 2011).

Knowledge and understanding in Environmental Education are important in changing people's attitude and behaviors towards the environment. Environmentally friendly behaviors or practices are important in promoting environmental sustainability. The major concern of every citizen should be sustainability in consumption of resources such as electricity and water. For example, Olah (2001) states that buying products with minimal or no packaging will reduce the amount of waste to be managed in the environment; purchasing non-toxic materials avoids the problem of their disposal and other issues arising from safety in their handling and storage.

Teachers as role models to pupils and the community at large should be committed to promoting environmental sustainability not only in class but also throughout their day to day activities both outside the classroom and within the school environment. According to Olah (2001), while content is important, Environmental Education is looking at long-term values and changes in people's attitudes and behaviors. Activities that address current environmental issues such as enhanced greenhouse gas emissions, endangered species, the life cycle of products, urban expansion, feral animals, and loss of biodiversity, transportation and overconsumption of Earth's resources should be promoted. Teachers should understand that environmental activities should not just address environmental issues at a school level but should also focus on issues at local, national and global level in the natural, built, social and cultural environments. For this reason, this study attempted to establish environmental knowledge and practices of selected Primary School teachers in Lusaka District.

1.3. Problem statement

Changes have been made in the education system, where the curriculum and the content have to achieve an environmentally friendly society. The Zambian Ministry of Education (2003) states that primary school education attempts to cover cross cutting issues such as environmental issues, human rights, democracy and citizenship, life skills, education for development as well as spiritual and moral education. Despite the incorporation of Environmental Education into the primary school curriculum in Zambia, little was known on the knowledgeand practices of Primary School teachers in Environmental Education as a cross-cutting issue in the curriculum. Such little knowledge constitutes a problem in various ways. Firstly, curriculum developers may not know the knowledge of Zambian Primary school teachers in Environmental Education and secondly, this may create difficulties for the education system to improve the teaching/learning of Environmental Education. It was necessary, therefore, that a study be undertaken to document the knowledgeand practices of Primary School teachers who, on paper, were expected to implement Environmental Education.

1.4. Purpose of the study

This study sought to ascertain environmental knowledge and practices of Primary school teachers in Lusaka District of Zambia.

1.5. Objectives

This study was guided by the following objectives:

1. to establish the level of knowledge of Environmental Education among primary school teachers in Lusaka.
2. to determine environmental practices primary school teachers of Lusaka perceive as important in environmental protection.
3. to establish environmental issues primary school teachers consider being important in a localized curriculum.
4. to establish the challenges primary school teachers might be facing in teaching Environmental Education as a cross-cutting issue.

1.6. General Research Question

What are environmental knowledgeand practices of selected Primary School teachers in Lusaka District?

1.7. Specific Research Questions

The following questions guided this study:

1. What was the level of knowledge on Environmental Education among primary school teachers?
2. What was the environmental practices primary school teachers of Lusaka perceived as important in environmental protection?
3. What environmental issues did primary school teachers consider to be important in a localized curriculum?
4. What challenges did primary school teachers face in teaching Environmental Education?

1.8. Significance of the study

The Ministry of Education,Science, Vocational Training and Early Education has recognised the importance of environmental awareness by integrating Environmental Education into the curriculum from pre-school to tertiary education. In primary education, the Zambian Ministry of Education (2003) states that the curriculum integrates cross cutting issues such as HIV/AIDs, life skills, gender, human rights, reproductive health, good governance, Environmental Education and water and sanitation across the curriculum to ensure holistic development of the learner. However, teachers' knowledge base is at the core of teaching and learning which means their knowledge base in Environmental Education is very important for learners' understanding of the environment. Therefore, it was felt necessary to investigate the environmental knowledge and practices of Primary School teachers in Environmental Education. Such a study might help curriculum developers to improve or enhance effective implementation of Environmental Education. It is hoped that the information obtained may also enlighten the curriculum developers on the challenges primary school educators face in teaching Environmental Education. A similar study was conducted in Tanzania by Kimaryo (2011) among primary school teachers. It

was also conducted in Zambia by Mweembe (2008) but was among high school teachers.

1.9. Conceptual framework

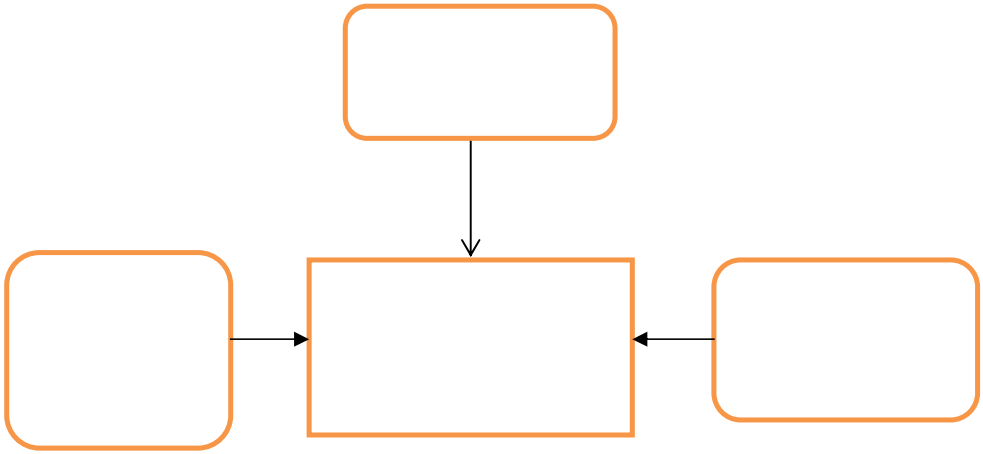
The concept Environmental Education involves education **about**, **in/through** and **for** the environment. Palmer (1998) suggested that, if Environmental Education is to be accepted as meaningful education, it needs to include three dimensionswhich are education **about**, **in/through** and **for** the environment. The view of Environmental Education as education **about** the environment considers the environment as a subject for investigation and includes the development of knowledge about the environment, environmental issues and problems, and the development of appropriate technical and intellectual skills to address the environmental problems. This view mainly focuses on developing knowledge and understanding about the environment and creating environmental awareness among people.

The view of Environmental Education as education **in or through** the environment was developed after awareness grew that transmitting knowledge about the environment was not enough because people did not take action on environmental degradation as had been assumed. It was an indication that Environmental Education entailed more than learning about the environment. It also entailed a wider interpretation of the environmental crisis that needed to be learnt about, (Palmer, 1998). In this case, the environment is used as a learning resource, a medium for enquiry and discovery, which may enhance deep learning. Environmental Education **for** the environment focuses on the aspect of ethics. It advocates the learning of Environmental Education which aims at the preservation and improvement of the environment by making individuals develop attitudes or concern for the environment so that they can take action to address various environmental problems or promote environmental quality (Lee and Williams, 2001).

The traditional Environmental Education model constitutes education **about** the environment, which means the transmission of knowledge that may explain aspects of the environment or provide conceptual capacity to do so. Environmental Education is this and more; it entails a wider interpretation of the environmental crisis that needs to be learnt about, as well as all important facets of education in the environment. For example, experiential field work aimed at interpreting and

appreciating the environment. Education **for** the environment aimed at challenging harmful exploitation of aspects of the environment and promoting a caretaker ethic on behalf of the environment. However, at the educational level practice, education **about** and **in/through** the environment tend to be predominant around the world. Rather rare attempts to enact forms of education **for** the environment are being prompted (Thompson, 1997). The dimensions have been illustrated in Figure 1.1.

Figure 1.1:ENVIRONMENTAL EDUCATION MODEL



Source: Modified from Thompson (1997)

This study looked at the three dimensions of Environmental Education in order to determine environmental knowledge and practices of primary school teachers. The concept education **about** the environment examined knowledge level of primary school teachers in Environmental Education. Education **in/through** the environment established what actions teachers consider as important to protect the environment. Education **for** the environment determined the care and love they have for the environment. Therefore, knowledge and practices of Primary school teachers in Environmental Education would contribute to meaningful education.

1.10. Scope of the study

This study was conducted in four primary schools of Lusaka District; therefore, the findings may not be generalized to all the teachers in Zambia.

1.11. Operational definitions

Knowledge: knowledge is the familiarity with something through facts, information, descriptions or skills which is mostly acquired through experience or education. Therefore, in this study, knowledge refers to the familiarity of Primary School teachers with environmental issues.

Practices: something done regularly as an established custom, habit or part of one's normal behavior.

Challenges: The term challenge refers to things that are a barrier to achieve the intended goal. Therefore, this study looks at the difficulties teachers are facing in order to achieve the intended goals in Environmental Education.

1.12. Ethical considerations

The researcher sought permission from the Provincial Education Office (PEO) before distributing questionnaires to the teachers. The researcher assured the respondents that the information they provided would be treated with confidentiality. A consent form was also signed by the respondents to show whether they were willing to take part in the study or not.

1.13.Chapter summary

This chapter gave anoverview to the present study. An attempt was made to explain concepts that were used in the study for the purpose of making them clear to the reader. The next chapter reviews the relevant literature on different perceptions on environmental knowledge and practices from other studies.

CHAPTER 2:LITERATURE REVIEW

2.1. Chapter overview

This chapter reviews the relevantliterature on different perceptions on Environmental knowledge and practices from other studies. The chapter starts by reviewing literature on the definition of Environmental Education, a historical perspective of Environmental Education and then literature on methods of teaching Environmental Education. Thereafter, reviews literature on teachers' knowledge base on Environmental Education and finally literature on related studies on Environmental Education.

2.2. Definition of Environmental Education

In order to understand what Environmental Education is, it is important to understand what is meant by 'environment'. Trivedy and Singh (1993) define an environment as all that surrounds human beings and their family of living species and governs, affects and /or influences life in general. It includes the atmosphere (particulate and gaseous matter surrounding the earth; the biosphere (plants and animals); the lithosphere (soil, mineral matter, earth mantle, and core) and hydrosphere (water in all states of aggregation and manifestation on the surface and inside of the earth). Therefore, Environmental Education as the key concept in this study is defined as a process of identifying critical environmental issues and problems, observing them, monitoring them, taking action and determining effective strategies of action in order to come up with possible solutions. Alternatively, Environmental Education may be defined as a process of learning and teaching about the environment so that we can understand and appreciate the inter-relationships or interactions of human beings and their biophysical, social, economic and political aspects of the environment, (CDC, 2000).

2.3. Historical perspective of Environmental Education

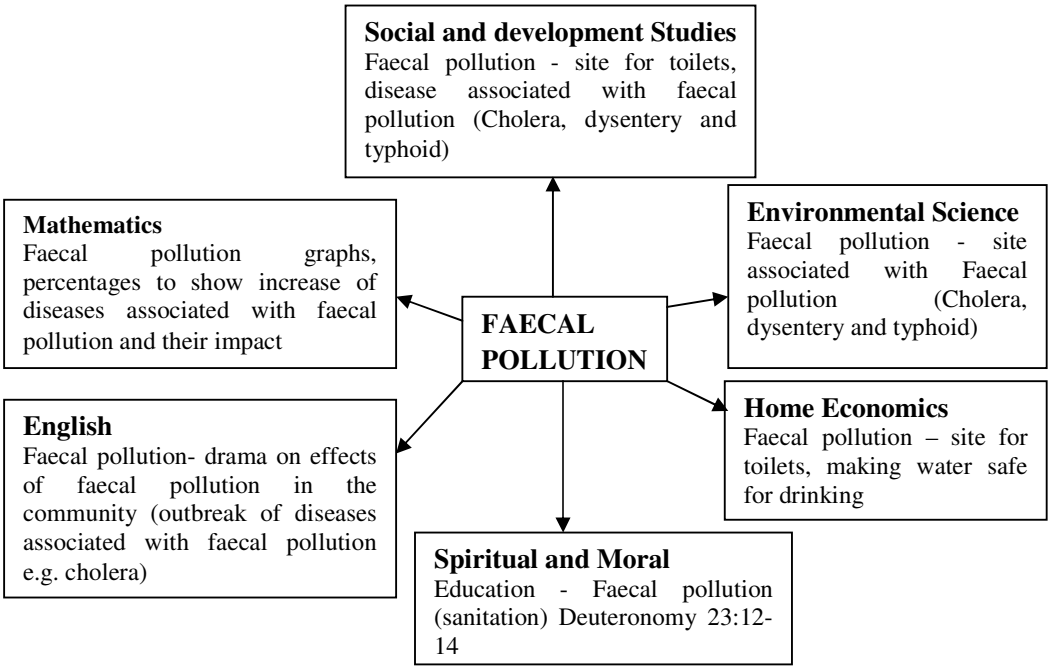
The roots of Environmental Education can be traced back to as early as the 18th century when Jean-Jacques Rousseau stressed the importance of an education that focuses on the environment. Jean-Jacques Rousseau maintained that education should include a focus on the environment which is one of the main things a teacher has to do to facilitate opportunities for the students to learn. Several decades later, Louis Agassiz, a Swiss-born naturalist, echoed Rousseau's philosophy as he

encouraged students to Study nature not books. This was known as the Nature Study. These two influential scholars helped lay the foundation for Environmental Education, (McCrea, 2006).

The first landmark in the history of Environmental Education at the international level was the United Nations' Conference on the Human Environment (UN, 1972) which strongly expressed the need for an international framework for the development of Environmental Education. The Stockholm Conference was the creation of the United Nations Environment Program (UNEP) which has the mission "to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and people to improve their quality of life without compromising that of future generations". However, the Stockholm conference had accomplished little to concretely integrate environmental concerns into development policies and plans, (McKeown, 2002).

It may, therefore, be stated that the response to Environmental Education in primary schools and higher education shows that Zambia, as one of the member states in international conferences on the environment such as The United Nations (UN) Conference on Human Environment in Stockholm (UN, 1972), The Belgrade Charter (UNESCO, 1976), The Tbilisi Declaration (UNESCO, 1978), The Brundtland Report (WCED,1987), The Rio Earth Summit (UNCED, 1992) and the Johannesburg Summit (UN, 2002), has reacted to global concern on international declarations by including Environmental Education in the school curriculum at all levels from the 1990s. CDC (2000) states that Environmental Education exists in Environmental Science, Social and Development Studies and Geography prior to the curriculum review of 1993 that made an attempt to integrate Environmental Education as a concept across the primary curriculum. This is illustrated in the infusion model in Figure 2.1 which shows how the Zambian Primary Curriculum has integrated Environmental Education across the board.

Figure 2.1:INFUSION MODEL



Source: CDC (2000)

There are several reasons why the infusion model is preferred. Classroom teachers are already burdened with overloaded curriculum with little opportunity to add a separate subject. There are a limited time and resources available; hence, the infusion model would enhance the existing curriculum without competing for limited time and resources. This means that all learning areas can draw on the environment at local and global levels, (CDC, 2000). As earlier stated, the infusion of Environmental Education in Primary education has not reflected much on the schools and the surrounding community. The school is part of the community, therefore it is expected that what the pupils learn in school should be reflected in society. However, it seems that there is a gap between theory and practice of what is actually taught in the schools, (Fullan, 2001).

2.4. Methods for teaching Environmental Education

The method for teaching Environmental Education is not standardised, (Lee and Williams, 2001). However, for effective learning to take place teachers have the task of planning and organising appropriate learning activities which will enable learners obtain actual experiences from the environment, such as making investigations in the

environment and reflecting on the interrelations that exist between man and his biophysical surroundings.

Teaching methodologies such as investigative, experiential and cooperative learning in Environmental Education address the issues of knowledge acquisition, skills and attitude development. Through these methods learners are provided with the opportunity to carry out guided inquiry into environmental issues (Meyers, 2006). The ZambianMinistry of Education (2003) suggests methods that are child centered such as individual work, pair/group work, field trip, project work, drama, role play, case studies, problem solving and demonstrations. However, the effectiveness of these methods depend on the knowledge of the teachers on the subject matter, skills and knowledge of the context.

2.5. Teacher's knowledge base in Environmental Education

Knowledge is regarded as essential for successful actions. This is not only the case for basic skills, such as reading and writing, but also for highly sophisticated professional performance, such as brain surgery. Knowledge based campaigns have always been a popular means of promoting certain behaviors in the general public, like conservation behavior. In health, for example, knowledge is provided to encourage people to avoid certain harmful behaviors such as excessive sun-bathing or drunk driving. All in all, knowledge is regarded as a means to overcome psychological barriers such as ignorance and misinformation. Although knowledge does not always have the intended effect on a target behavior itself, it may at least fuel other mechanisms that facilitate behavior change, (Frick et al, 2004).

For effective implementation of Environmental Education in schools, teachers need to have a good knowledge base on Environmental issues. Good teachers should possess a good knowledge base, which consists of knowledge, skills, understanding and disposition of collective responsibility. A good teacher should also possess means for representing and communicating the knowledge and skills to the learner, (Palonsky, 1993 in Kimaryo, 2011). Furthermore, teachers must not only know the subject matter that they teach, but also the appropriate methods to transform it for the purpose of instruction. Shulman (1987) referred to the knowledge that the teacher needs to have as pedagogical content knowledge (PCK). In general, it is defined as

the knowledge which is developed by teachers to enable learners learn. According to Shulman's model, pedagogical content knowledge is influenced by three other knowledge bases, which are subject matter knowledge (SMK), pedagogical knowledge (PK) and knowledge of context (KofC).

Knowledge that is connected to the teaching of a particular subject matter is referred to as pedagogical content knowledge (PCK), (Shulman, 1987). Therefore, pedagogical content knowledge also refers to teachers' understanding of how they can help learners understand the subject matter. This kind of knowledge is what distinguishes teachers from subject matter specialists, because knowing the subject matter is not a sufficient condition for teaching it. However, Grimmet and Mackinnon (1992) state that students are an important element for the teacher to consider while using a pedagogical model. A skillful teacherfigures out what students know and believe about the topic and how learners are likely to "hook into" new ideas. Therefore, teachers need to build a foundation of pedagogical learner knowledge.

As earlier stated, a good teacher should possess a good knowledge base, which consists of knowledge, skills, understanding and disposition of collective responsibility. It is important to note that a teacher is a role model such that learners tend to imitate his/her life style. For this reason, Loubser (2005) describes the behaviorist theory as being concerned with observable behavior and the effect of conditioning on such behavior. According to this theory, the motivation for certain behavior is derived from external stimuli rather than from internal drives. A teacher in this case can be such a stimulus. Therefore, a teacher who has a good knowledge base and skills in Environmental Education would be able to effectively teach and communicate good knowledge, behavior and skills to the learners.

2.6. Environmental behavior

Environmental behavior is an active responsiveness to current environmental issues, (Eilem and Trop, 2012). What determines one's environmental behavior is a direct correlate of an individual's attitudinal responses with respect to the social situations in which the person is exposed to relate problems, and the personal characteristics with his/her own ability to cope with problems, (Nickerson, 2003). Any aspect of

environmental problems is perceived as a threat that depends upon the personal characteristics of the individuals involved. According to Mweemba and Wu (2012), some of the social and psychological factors that would determine individuals' attitudinal responses towards tendencies of appropriate environmental behavior include environmental awareness, environmental attitudes and environmental barriers.

a. Environmental awareness

The assessment on the current level of awareness in Zambia is strengthened by the increase in the number of environmental awareness activities. Some of the evidence that point to an increase in environmental awareness includes increase in articles on environmental issues in the print media, number of programs aired on both radio and television; inclusion of environmental curricula in training courses for journalists. Other evidence is in the form of increased number of queries from the general public on environmental issues by telephone or letters/articles in the media. This valuable evidence notwithstanding, there is need for a formal study to quantify the level of environmental awareness in Zambia. The results would be used to change or modify the strategy or methods being used in order to effectively achieve the overall goal of increased environmental awareness, (ECZ, 2001).

b. Environmental attitudes

An attitude can be defined as a person's overall evaluation of persons (including oneself), objects and issues, (Eilem and Trop, 2012). Attitudes are viewed as a product of cognitive and effective responses in combination to objects and the relationship of this product is thought to function as partial motivators to behavior. This means that when an individual's beliefs and feelings are congruent with the issues in nature and the objects in the purpose, the person would be more likely to produce the corresponding patterns of behavior. The level of consistence and prediction between attitudes and behavior can be increased when the attitude being measured is more directly related to the actions in question, (Ajzen and fishbein, 1990). Therefore, in this study, it was important to identify the attitudinal responses pertaining to people's beliefs and feelings toward an appropriate attitude object that indicated the theme being of particular interest/threat to individuals.

c. Environmental barriers

There are two types of barriers that could be considered; internal and external barriers. One is internal because such barriers exist within an individual. For example, lack of appropriate information and knowledge or commitment, could possibly decrease the incidence of acting for the environment. The other one is external barriers, which exist outside the individual, such as one's background, social forces, economic and technological constraints, could disrupt the formation of positive attitudes toward appropriate environmental behavior, (Skrentny, 2003).

2.7. Related studies on Environmental awareness

A study was conducted in South Africa by Teane (2007) among Grade Ten teachers at a selected school on the integration of environmental awareness issues with the teaching of Life-sciences learning area. A qualitative study was used to describe how the integration of environmental awareness issues with the teaching of Life-sciences learning area was achieved.

The study indicated that the teachers were generally not integrating Environmental Education in their lessons. The teachers stated that they faced a number of challenges such as inadequate training, lack of resources; terminology and content. The policy also hindered the full implementation of Environmental Education. However, the study did not establish the level of knowledge and practices of teachers in Environmental Education and was conducted in secondary school among Grade 10 teachers.

In Tanzania, Kimaryo (2011) conducted a study on Primary School teachers' perceptions of Environmental Education in terms of its integration into primary school education and teacher's teaching practices. The study was qualitative in nature, adopting phenomenography and phenomenology as points of departure. The findings indicated that although it has been stated that Environmental Education should be integrated into the curriculum of all the subjects taught in schools, teachers did not know what and where to integrate Environmental Education in their teaching. For that, they faced problems in integrating Environmental Education in their teaching. The study further indicated that the approach used to integrate Environmental Education in primary school education seems to marginalize it,

because Environmental Education content and skills were not stated explicitly in the syllabus of different subjects. Teachers were not trained to teac Environmental Education. As a result, they did not know what to teach and how to teach it. However, the study did not go further to establish the environmental practices of these teachers.

A study was conducted by Jekayinfa and Yusuf (2008) in Kwara state of Nigeria to seek the opinions of teachers on the incorporation of Environmental Education in the Nigerian Primary School curriculum. A qualitative research method was employed for the study. The findings indicated that teachers were aware of the incorporation of Environmental Education in Nigerian School curriculum and they were teaching it. Based on the findings, it was recommended that teachers, who were the implementers of the curriculum, should be given the opportunities to undergo refresher courses, seminars and workshops that would expose them to new innovations in the curriculum. However, the study did not go further to find out teachers' knowledge and practices or behavior towards the environment.

In Zambia, Mweembe (2008) conducted a similar study but was done among high school teachers. The study indicated that the level of Environmental knowledge among high school teachers was quite high and their attitudes towards the teaching of environmental issues were found to be positive. But failure to define Environmental Education by both teachers and administrators posed a gap between knowledge, attitudes and Environmental Education. The knowledge and attitudes among teachers was as a result of the campaigns which were focused on environmental issues and not Environmental Education. However, this study did not state the behavior of teachers towards the environment.

The literature reviewed for this study has provided a glimpse of how scholars internationally and locally have tried to understand teachers' perception in Environmental Education. This literature gives an idea of the findings of previous scholars. However, most of the studies conducted concentrated on the perceptions of teachers in Environmental Education but very little has been done on their behavior towards the environment. Therefore, this study attempted to ascertain knowledge and practices of primary school teachers in Environmental Education.

2.8. Chapter summary

This chapter reviewed the relevantliterature on different perceptions on Environmental knowledge and practices from other studies.The subsequent chapter will consider the methodology of the study.

CHAPTER 3: METHODOLOGY

3.1. Chapter overview

This chapter explains the research design, study population, sample size, research instruments used, procedure of data collection and the process of data analysis. Finally, the chapter will look at the limitations.

3.2. Research design

This study used a descriptive cross sectional design. According to Kombo and Delno (2006), descriptive design is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. It can be used when collecting information about people's attitudes, opinions, habits or any of the variety of education and/or social issues. Therefore, a descriptive design was used to establish environmental knowledge and practices of selected Primary school teachers in four selected Primary schools in Lusaka District. This research employed both qualitative and quantitative approaches. According to Kombo and Delno (2006), qualitative and quantitative approaches to research are complimentary. Where appropriate, they should be combined to maximize the strength and minimize the limitations of each.

3.3. Study area

Lusaka District was selected as the study area due to the fact that it was one of the cities in Zambia with different environmental problems such as littering, deforestation and pollution, among others. The study was conducted in four primary schools of Lusaka District.

3.4. Study population

The study population was primary school teachers in Lusaka District. There were approximately 3, 488 primary school teachers in Lusaka District by 2013. The target population in this study comprised of teachers of four randomly selected schools with an average population of 48 teachers per school.

3.5. Study sample

The study sample was 64 but two respondents were not willing to take part in the study. Hence, this study was conducted on 62 respondents.

3.6. Sampling techniques

The study employed both probability and non-probability sampling technique. Lusaka District had 98 primary schools divided into eight zones namely Emmasdale, Mumuni, Chibolya, Lusaka Central, Kaunda Square, Lilanda, Matero and Chilenje.Stratified randomization technique was used to choose four zones namely;Lusaka Central, Kaunda Square, Mumuni and Chilenje.Each zone had an average of fourteenprimary schools. A school from each randomly selected zone was also picked using simple random sampling technique. Four schools were selected namely;Arthur Wina, Libala Stage III, Ng'ombe and Kalingalinga Primary School.According to Kombo and Delno (2006), stratified random sampling involves dividing the population into homogeneous subgroups and then taking a simple random sample in each group so as to ensure that certain subgroups in the population are represented in the sample in proportion to their number in the population.

Teachers were chosen from each school using simple random sampling. However, gender balance was not possible becausethe majority of the primary school teachers were females, hence more female participants (49 females and 13 males). The professional qualification of teacher was not considered as a criterion for selection because most of participants were Certificate holders (39) followed by 20Diploma holders and only three Degree holders. Limit of teaching experience was not set because the researcher wanted to get the knowledge and practices of both short and long serving teachers.

Non-probability sampling design, the purposive sampling technique, was used to select the Administrators (Headteacher and Deputy Headteacher) of the four schools. Kombo and Delno (2006) state that purposive sampling can be carried out in addition to probability sampling. However, administrators were treated as part of the teachers in this study.

3.7. Pilot test

A pilot test was conducted at Kamwala Primary School to test the data collection tools (questionnaire) for clarity before the actual study was conducted. Appropriate changes were made to ensure clarity, concise and consistence of the study instruments.

3.8. Instruments for data collection

A **structured questionnaire** with both open and closed ended questions was used to collect the necessary data from the teachers. Secondary data were obtained from any available records and other literature on similar studies.

Structured questionnaire: The questionnaire was given to selected teachers including administrators. It was divided into four parts: The first part covered the background information about the teacher such as gender and qualification, among other things. The second part sought to determine environmental knowledge of respondents. The third part sought to establish environmental practices of teachers and the fourth part to establish the challenges teachers were facing in Environmental Education.

3.9. Procedure of data collection

The process of obtaining the schools and participants for research involved three stages. The first stage involved taking a letter from the University of Zambia to the Provincial Education Office to seek permission to do research in the identified schools. In the second stage, the researcher visited selected schools and presented a letter from the Provincial Education Office to the school administration. The researcher thereafter administered questionnaires to the selected teachers. The third stage involved collecting questionnaires from respondents a day after administering questionnaire. Data were collected in November, 2013.

3.10. Data Analysis

The data wereanalyzed quantitatively using the Statistical Package for Social Sciences (SPSS) and Microsoft excel to come up with tables and graphs. Descriptive statistics were used and this involved the use of frequencies and cross tabulations. The data were then presented in form of graphs, tables and statistical figures so as to give meaning to the findings.

3.11. Limitations

Two teachers said that they were not interested in taking part in the study. Only two administrators took part in the study, the others gave their questionnaires to teachers

to answer. This study was conducted among primary school teachers of Lusaka District, hence cannot be generalized to all the teachers in Zambia.

3.12. Chapter summary

This chapter has outlined the methodology in the study. It has explained the research design, study population, sample size, research instruments used, procedure of data collection and the process of data analysis. The next chapter presents the main findings of the study.

CHAPTER 4:PRESENTATION OF FINDINGS

4.1. Chapter overview

In this chapter, the research findings are presented according to the objectives. The objectives were to: establish the level of knowledge on Environmental Education among primary school teachers from selected schools in LusakaDistrict; determine environmental practices primary school teachers of Lusaka perceive as important in environmental protection; environmental issues primary school teachers consider being important in a localized curriculum and to establish the challenges primary school teachers faced in teaching Environmental Education as a cross cutting issues.

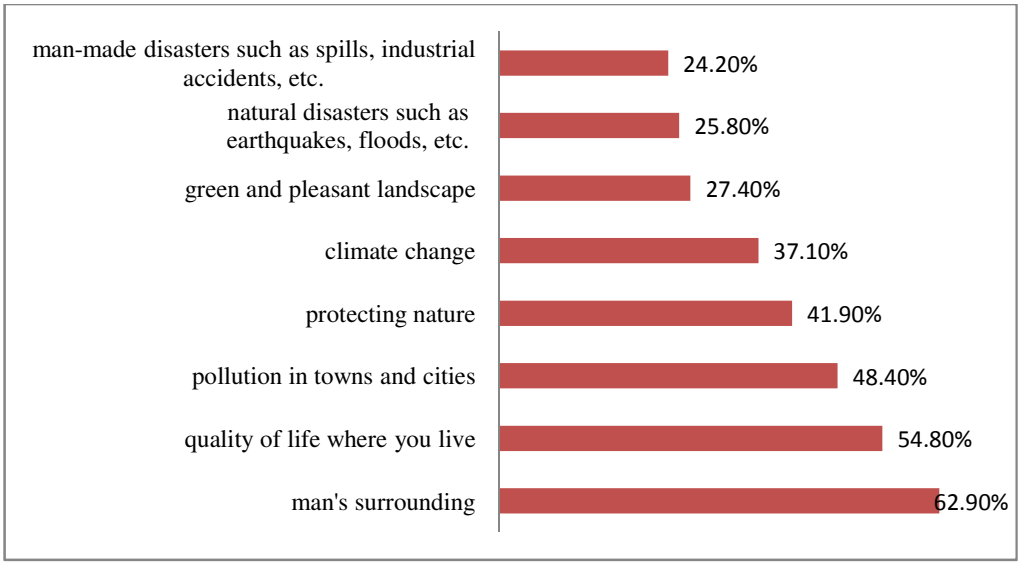
4.2. Knowledge on Environmental Education

The knowledge of the respondents was assessed based on their association with the word 'environment', how informed they were about the environment, environmental issues they were well informed about, environmental issues they felt they lacked information in as well as their main sources of environmental issues.

4.2.1. Association with the word 'environment'

Respondents were asked to give their first association with the word 'environment' by choosing from the list of topics. Responses are shown in Figure 4.1.

Figure 4.1: Respondents' association with the word 'environment'



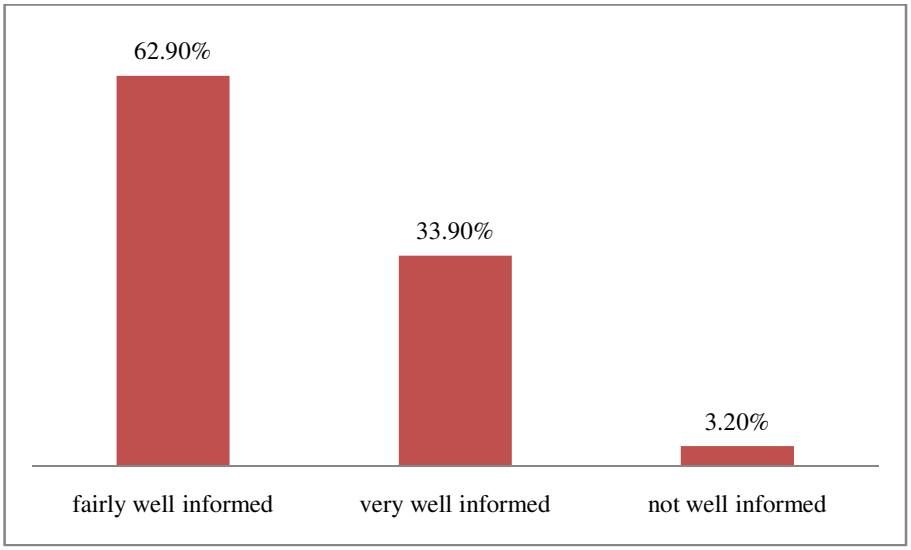
Source: Field data

The findings indicated that 39 (62.9%)respondents associated the word environment with man's surrounding, 34 (54.8%) the quality of life where they live while 30 (51.6%) pollution in towns and cities. Furthermore, 30 (48.4%) respondents associated the word environment with pollution in towns and cities and 26 (41.9%) protecting nature. However, other responses scored less than 40% such as 23 (37.1%) respondents associated the word environment with climate change, 15 (24.2%) man-made disasters, 16 (25.8%) natural disaster and 17 (27.4%) green and pleasant land scape as shown in Figure 4.1.

4.2.2. Level of knowledge about the environment

Respondents were asked to state how informed they were about the environment. The results indicated that 39 (62.9%) respondents were fairly informed while 21 (33.9%) were very well informed. Two (3.2%) respondents stated that they were not very well informed about the environment. Responses are shown in Figure 4.2.

Figure 4.2: Environmental knowledge about the environment



Source: Field data

An analysis was conducted between academic qualifications and how informed respondents were about environmental issues and between duration the respondents had been teaching and how informed they were about environmental issues. Furthermore, an analysis was conducted, between a course in environmental studies and how informed they were about the environmental issues and another analysis on

involvement in environmental activities and how informed they were about environmental activities. These are shown in Table 1, 2, 3 and 4 respectively

Table 1: Qualification of respondents and how informed theywere about environmental issues

		How informed are you about environmental issues?			Total
		very well informed	fairly well informed	not well informed	
Qualification of respondent	Bachelor's Degree	2 (3.2%)	1 (1.6%)	0 (0%)	3 (4.8%)
	Diploma	6 (9.7%)	14 (35.9%)	0 (0%)	20(32.3%)
	Certificate	13 (21.0%)	24 (22.6%)	2 (3.2%)	39 (62.9%)
Total		21 (33.9%)	39 (62.9%)	2 (3.2%)	62(100%)

The results show that 2 (3.2%) degree holders were very well informed and 1 (1.6%) was fairly informed. It is important to note that out of 62 respondents; only 3 (4.8%) respondents were degree holders. Six (21%) Diploma holders were very well informed and 14 (35.9%) were fairly well informed, 13 (21%) Certificate holders were very well informed and 24 (22.6%) were fairly well informed. Two (3.2%) Certificate holders were not well informed.

Table 2: Duration respondents had been teaching and how informedthey were about environmental issues

		How informed are you about environmental issues?			Total
		very well informed	fairly well informed	not well informed	
Duration respondent been teaching	1-5 years	7(11.3%)	18 (29.0%)	1(1.6%)	26(41.9%)
	6-10 years	7(11.3%)	13 (21.0%)	0(0%)	20 (32.3%)
	11-15 years	5(8.1%)	3(4.8%)	1(1.6%)	9(14.5%)
	16-20 years	2(3.2%)	2 (3.2%)	0(%)	4 (6.5%)
	21-25 years	0 (0%)	1(1.6%)	0(0%)	1 (1.6%)
	Above 26 years	0 (0%)	2 (3.2%)	0(0%)	2 (3.2%)
Total		21(33.9%)	39(62.9%)	2(3.2%)	62(100%)

The study indicated that 26 (41.9%) respondents had served in service between 1-5 years, 20 (32.3%) between 6-10 years, 9 (14.4%) between 11-15 years, 4 (6.5%) between 16-20 years, 1 (1.6%) between 21-25 years and 2 (3.2%) for over 26 years as shown in Table 2. An analysis between how long the respondents had been teaching and how informed they were about the environment was done. Seven (11.3%) respondents who served in service between 1-5 years were well informed while 18 (29%) were fairly informed. Seven (11.3%) respondents who had served between 6-10 years were very well informed whereas 13 (21%) were fairly informed. Only 1 (1.6%) of the respondents who had served in service between 1-5 years and another 1 (1.6%) between 11-15 years were not well informed about the environment. Other details are shown in Table 2.

Table 3: Environmental studies course and how informed they were about environmental issues

		How informed are you about environmental issues?			Total
		very well informed	fairly well informed	not well informed	
Environmental studies course	no	12 (19.4%)	27 (43.5%)	2 (3.2%)	41 (66.1%)
	yes	9 (14.5%)	12 (19.4%)	0 (0%)	21 (33.9%)
Total		21(33.9%)	39 (62.9%)	2 (3.2%)	62 (100%)

The findings also indicated that 41 (66.1%) respondents stated that they did not do a course in environmental studies while 21 (33.9%) stated that they did. The results also indicated that 2 (3.2%) respondents did not do a course in environmental studies and were not well informed.

Table 4: Environmental activities and how informed they were about environmental issues

		How informed are you about environmental issues?			Total
		very well informed	fairly well informed	not well informed	
Environmental activities	no	10 (16.2%)	24 (38.7%)	2 (3.2%)	36 (58.1%)
	yes	11 (17.7%)	15 (24.2%)	0 (0%)	26 (41.9%)
Total		21 (33.9)	39(62.9%)	2 (3.2%)	62 (100%)

Respondents were asked if they were involved in any environmental activities. Twenty-six (41.9%) respondents stated that they were involved in environmental activities while the rest were not. However, an analysis between how informed about environmental issues respondents were and environmental activities showed that 2

(3.2%) respondents who were not well informed did not participate in any environmental activities while 11 (17.7%) respondents who were very well informed and 15 (24.2%) respondents who were fairly well informed were involved in environmental activities as shown in Table 4.

A cross-checking was further conducted between respondents' affiliation to any environmental organization and their participation in environmental activities.

Table 5: Environmental organization and Environmental activities

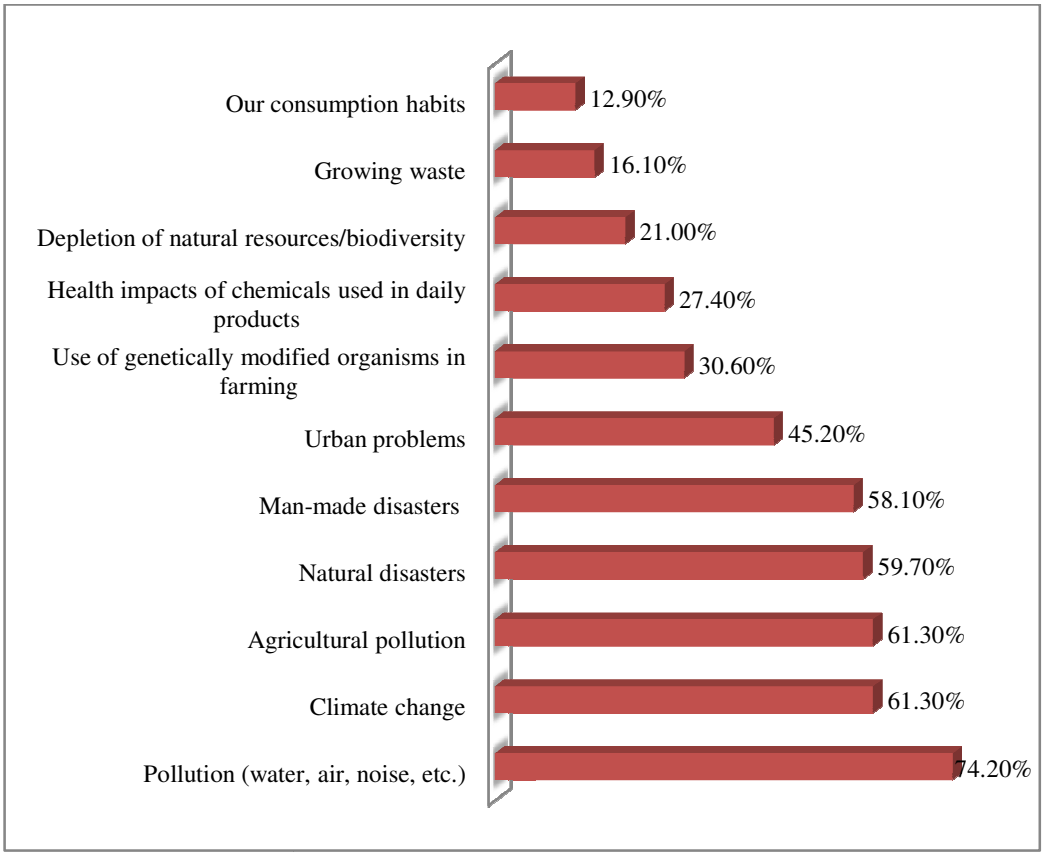
		Environmental organization	Total
		No	
Environmental activities	no	36 (58.1%)	36 (58.1%)
	yes	26 (41.9%)	26 (41.9%)
Total		62 (100%)	62 (100%)

The findings indicated that none of the respondents belonged to any environmental organization. However, 36 (58.1%) respondents were not involved in any environmental activities while 26 (41.9%) were involved.

4.2.3. Environmental issues respondents were well informed about

Respondents were asked to state which environmental issues they were well informed about. Responses are shown in Figure 4.3.

Figure 4.3: Environmental issues respondents were well informed about



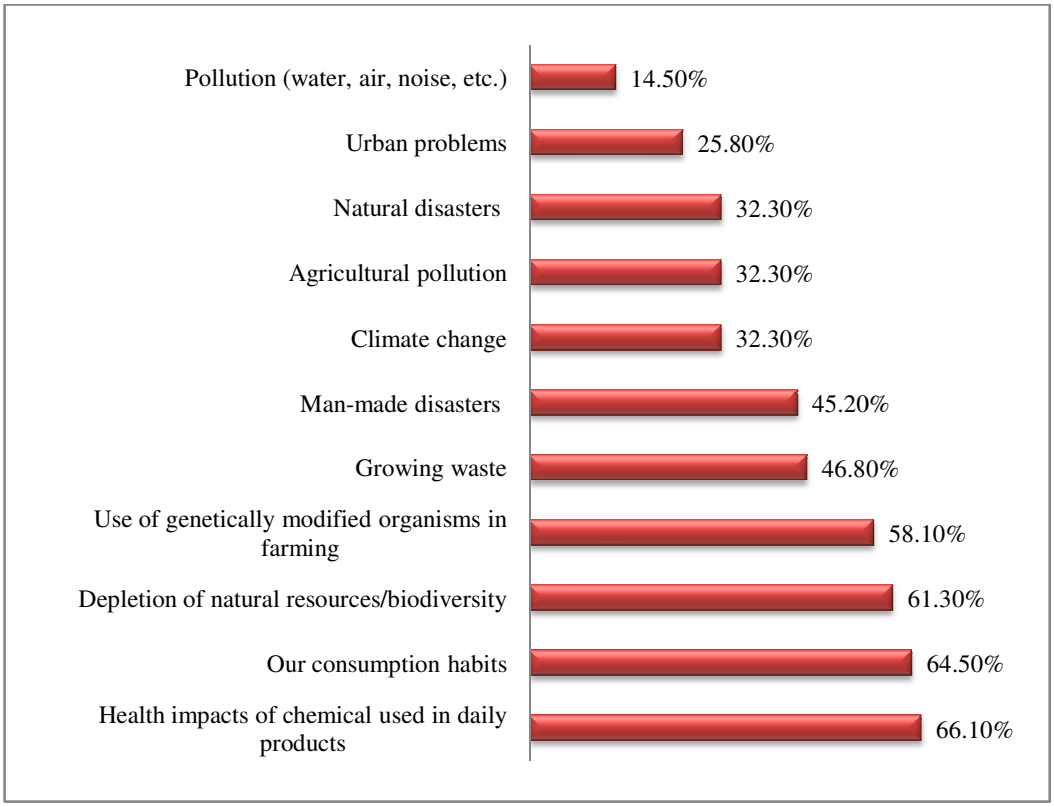
Source: Field data

It was noted that 46 (74.2%) respondents indicated that they were well informed on Pollution (air, noise and water), 38 (61.3%) on climate change and agricultural pollution (such as the use of pesticides, fertilizers, etc.), 37 (59.7%) on natural disaster (earthquakes, floods, etc.), and 36 (58.1%) on man-made disasters (oil spills, industrial accidents, etc.). However, only 8 (12.9%) were well informed on our consumption habit, 10 (16.1%) on growing waste, 13 (21%) on depletion of natural resources/biodiversity and other responses were below 50% as shown in Figure 4.3.

4.2.4. Environmental issues that respondents lacked information about

Primary school teachers were asked to state which environmental issues they lacked information. Responses are shown in Figure 4.4.

Figure 4.4: Environmental issues that respondents lacked information about



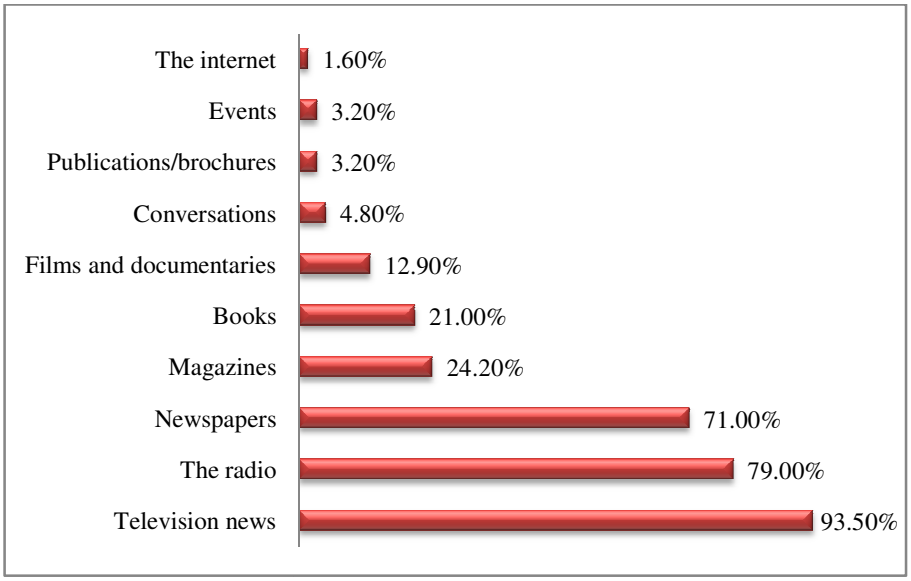
Source: Field data

The finding as shown in Figure 4.4 indicated that 41 (66.1%) stated health impacts of chemicals used in everyday products, 40 (64.5%) consumption habits, 38 (61.3%) depletion of natural resources/biodiversity and 36 (58.1%) use of genetically modified organisms in farming lacked information. However, environmental issues such as pollution (air, water, noise and agricultural pollution), urban problems, natural disasters, climate change and others had responses less than 50% as shown in Figure 4.4.

4.2.5. Main sources of information about the environment

Primary school teachers were asked to state their main sources of information about the environment. The responses are showed in Figure 4.5.

Figure 4.5: Respondents' main sources of information about the environment



Source: Field data

Fifty-eight (93.5%) of the respondents indicated that their main sources of information were television news, 49 (79.0%) radio, 44 (71.0%) newspapers, 15 (24.2%) magazines and 13 (21.0%) books. On the other hand, internet, events such as conferences, fairs/exhibitions and festival, publications/brochures were among other sources of information that scored less than 20%.

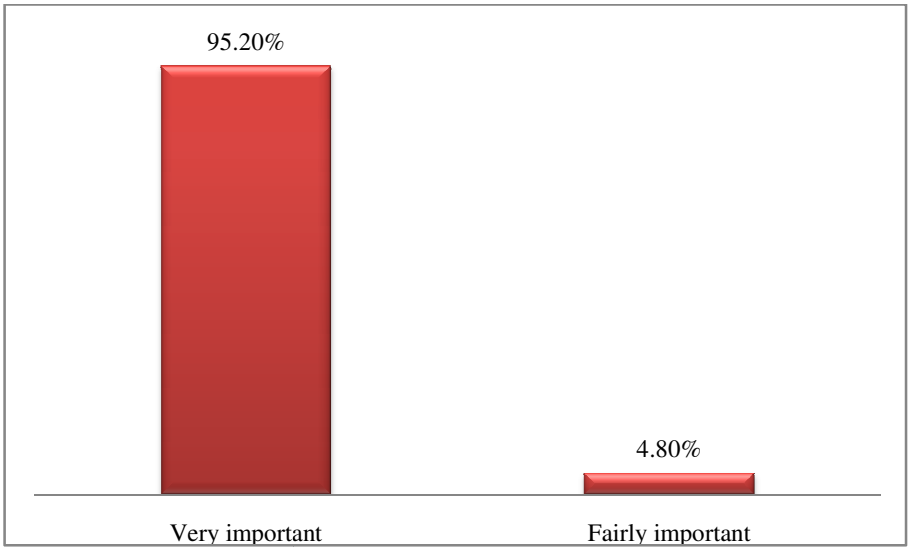
4.3. Environmental practices perceived as important in Environmental protection.

Environmental practices respondents perceived as important were assessed based on how important environmental protection was perceived, environmental behaviors that would contribute to solve environmental problems and methods they most used to teach environmental issues.

4.3.1. Importance of environmental protection

Respondents were asked to state how important environmental protection was. The responses are shown in Figure 4.6.

Figure 4.6: Respondents' views aboutenvironmental protection



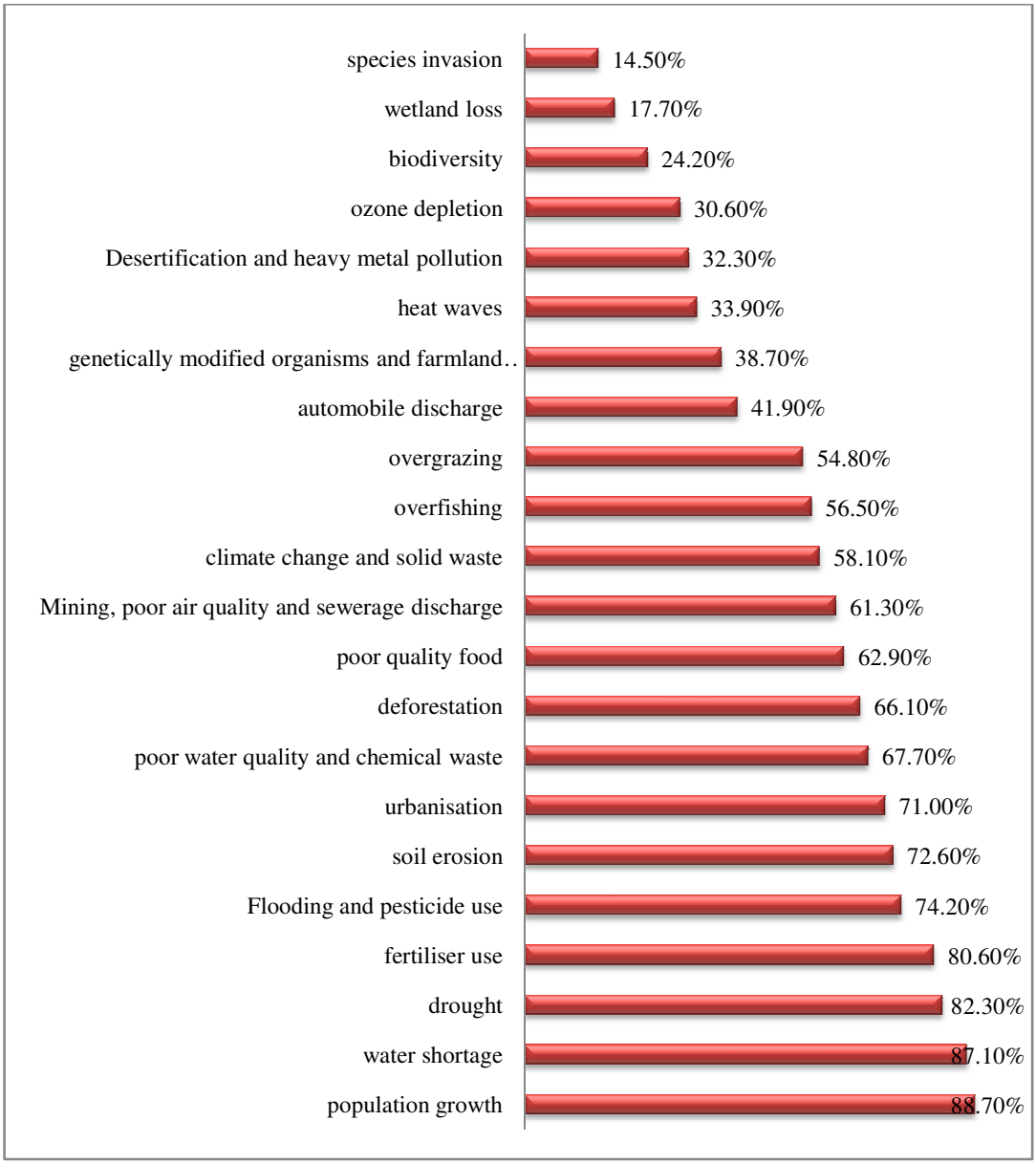
Source: Field data

Primary school teachers hold environmental protection with high esteem. The findings indicated that 59 (95.2%) of the respondents stated that environmental protection was very important while 3 (4.8%) stated that it was fairly important.

4.3.2. Personal experience with environmental problems

Respondents were asked to state theenvironmentalproblems they had personal experience with by choosing from the list of items. The responses are shown in Figure 4.7.

Figure 4.7: Respondents' personal experience with environmental problems



Source: Field data

Results in Figure 4.7 shows responses that emerged in the study related to current environmental problems. It was noted that 55 (88.7%) respondents had personal

experience with population growth, 54 (87.1%) water shortage, 51 (83.2%) drought, 50 (80.6%) fertilizer use, 46 (74.2%) flooding and pesticide use, 45 (72.6%) soil erosion, and 44 (71.0%) urbanization. However, environmental problems such as species invasion, wetland loss, biodiversity, ozone depletion, desertification, heavy metal pollution, heat waves, genetically modified organisms and other responses were below 42% as shown Figure 4.7.

4.3.3. Important environmental behaviors

Respondents were asked to state if the specifiedbehaviorsstated in table 6, 7 and 8 were important or not in solving environmental problems:

a. **Resource recovery and waste management.**

Table 6: Resource recovery and waste management

Item	Important		Not at all		Not sure	
	f	%	f	%	f	%
Maintenance and repair appliances, tools and other equipment to lengthen their lives	58	93.50	2	3.20	2	3.30
Share, barter, trade or donate what you no longer need	57	91.90	1	1.60	4	6.50
Separate your recyclables glass, metal or plastic container	52	83.90	2	3.20	8	12.90
Buy recyclables glass	50	80.60	2	3.20	10	16.20
Save cardboard boxes for later use	48	77.40	7	11.30	7	11.30
Return deposit beverage containers to stores	47	75.80	1	1.60	14	22.60
Use of mugs instead of paper	45	72.60	11	17.70	6	9.70
Bring your own shopping bags or re-use the bags	44	71.00	10	16.10	8	12.90
Double photocopying	43	69.40	9	14.50	10	16.10
Reduce purchase items which are over packaged	36	58.10	15	24.20	11	17.70

Results in Table 6, shows environmental behaviors important in solving waste management problems. Fifty-eight (93.5%)respondents indicatedthatmaintenance and repair appliances, tools and other equipment to lengthen their lives and 57 (91.9%) indicated share, barter, trade or donate what is no longer needed. Fifty-two (83.9%) respondents indicated that separate recyclable glass, metal or plastic container and 50 (80.6%) indicated buy recyclables glass. Other responses are shown in Table 6.

b. Energy and water conservation.

Table 7: Energy and water conservation

Item	Important		Not at all		Not sure	
	f	%	f	%	f	%
Switch off lights when not in use	60	96.80	1	1.60	1	1.60
Don't let water run when not in use	58	93.50	2	3.20	2	3.20
Promptly replace rubber washers on leaky water valves	58	93.50	1	1.60	3	4.80
When washing dishes in the sink, plug and fill second sink with rinse water	58	93.50	2	3.20	2	3.20
Buy non-toxic, phosphate-free, bio-gradable soaps and detergents	57	91.90	2	3.20	3	4.80
Set air conditioner control to a moderate temperature	56	90.30	2	3.20	4	6.50
Adjust the temperature of your refrigerator	56	90.30	2	3.20	4	6.50
Use electricity and water efficiently	52	83.90	6	9.70	4	6.40
Install sink faucet aerators and water efficient shower heads	51	82.30	1	1.60	10	16.10
Purchase energy efficient appliances e.g. refrigerator, air conditioner, dryer	46	74.20	5	8.10	11	17.70

More than 70% of respondents stated that the environmental behaviors indicated in Table 7 were important in solving energy and water conservation problems. Sixty (96.8%) respondents indicated switching off lights when not in use, 58 (93.5%) not to let water run when not in use, promptly replacing rubber washers on leaky water valves and plug and fill second sink with rinse water when washing dishes in the sink were important. However, 11 (17.7%) indicated that they were not sure if purchasing energy efficient appliances and 10 (16.1%) installing sinks faucet aerators and water efficient shower heads were contributing to solving energy and water conservation problems as shown in Table 7.

C. Transportation and air quality control.

Table 8: Transportation and air quality control

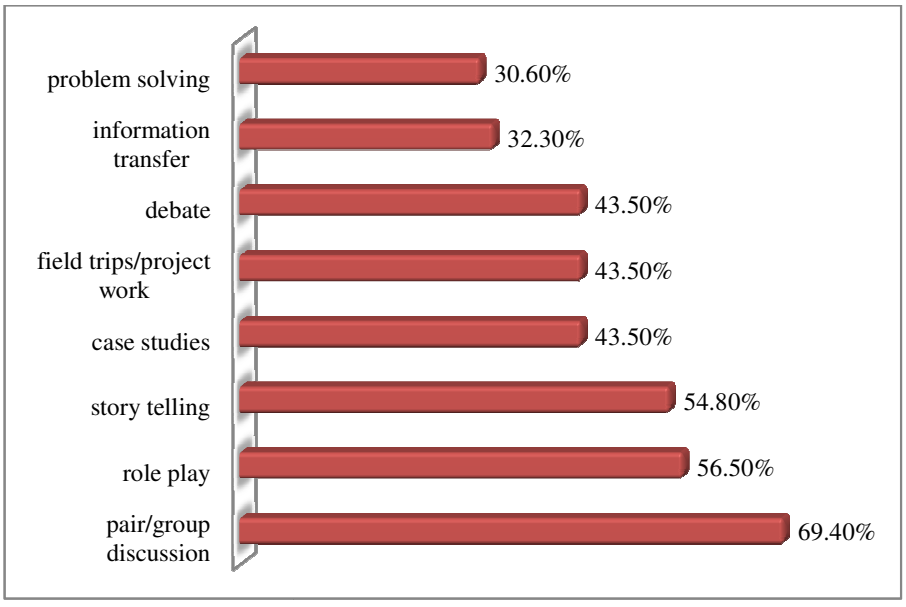
Item	Important		Not at all		Not sure	
	f	%	f	%	f	%
Eliminate smoking in public places, e.g. offices, factories, trains	60	96.80	0	0	2	3.20
Plant and care for tree in your own plot, school, community and town	60	96.80	0	0	2	3.20
Replace cars that have old engines and exhaust systems	57	91.90	2	3.20	3	4.90
Purchase an energy efficient car	56	90.30	1	1.60	5	8.10
Save gas by driving smoothly	55	88.70	2	3.20	5	8.10
Use only unleaded cars	53	85.50	6	9.70	3	4.80
Purchase the ozone safe products, e.g. coolants for refrigeration	52	83.90	6	9.70	4	6.40
Use public transport, bike or walk	47	75.80	3	4.80	12	19.40
Encourage the development of electric cars	45	72.60	10	16.10	7	11.30
Support taxing gasoline to encourage its more efficient use	43	69.40	11	17.70	8	12.90

More than 65% of respondents stated that the environmental behaviors indicated in Table 8 were important in solving transportation and air quality control problems. Sixty (96.8%) stated that eliminating smoking in public place and planting and caring for trees on a plot, school, community and towns were important. The findings also indicated that 57 (91.9%) respondents stated that replacing cars that had old engines and exhaust systems and 56 (90.3%) purchasing an energy efficient car was important. However, 11 (17.7%) stated that taxing gasoline to encourage its more efficient use was not important and 12 (19.4%) were not sure if the use of public transport, bike or walking was important as shown in Table 8.

4.3.4. Methods mostly preferred by respondents to teach environmental issues.

Respondents were asked to choose from the list of stated teaching methods they mostly preferred in teaching environmental issues. Responses are shown in Figure 4.8.

Figure 4.8: Methods mostly preferred by respondents to teach environmental issues



Source: Field data

The findings indicated that 43 (69.4%) respondents mostly preferred pair/group discussion, 35 (56.5%) role play and 34 (54.8%) story-telling. Furthermore, 27

(43.5%) indicated debate, field trip/project work and case studies, 20 (32.3%) information transfer and 19 (30.6%) problem solving as shown in Figure 4.8.

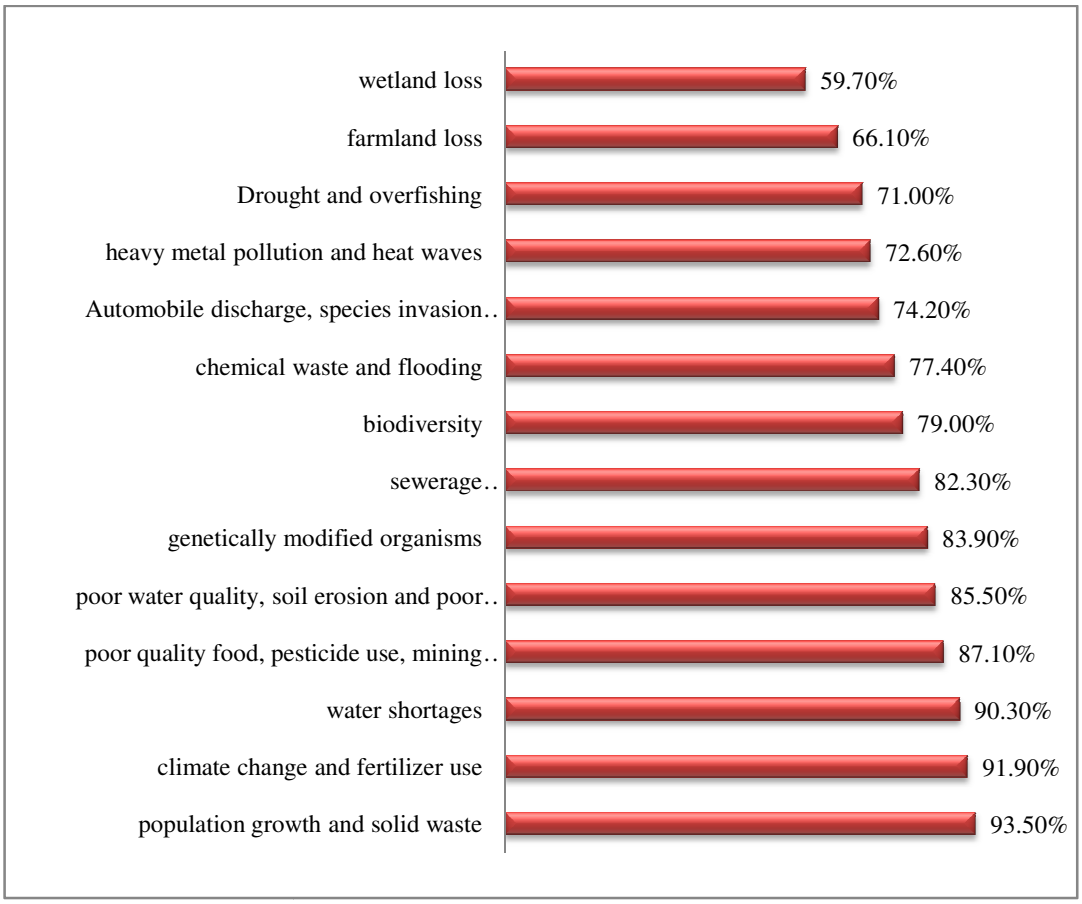
4.4. Environmental issues considered important in a localized curriculum.

Respondents were asked to indicate Environmental issues that should be considered in a localized curriculum.

4.4.1. Environmental problems to consider in a localized curriculum.

Respondents were asked to choose from the list of stated environmental problems which ones should be included in a localized curriculum. The responses are shown in Figure 4.9.

Figure 4.9: Respondents' view on environmental problems to consider in a localized curriculum.



Source: Field data

More than 58% respondents showed that all the environmental problems indicated should be included in a localized curriculum. Fifty-eight (93.5%) respondents indicated population growth and solid waste management, 57 (91.9%) climate change and fertilizer use, 56 (90.3%) water shortages and 54 (87.1%) poor quality food, pesticide use, mining and urbanization. Other responses include 52 (83.90%) genetically modified organisms and 51 (82.3%) sewerage discharge, overgrazing, deforestation and ozone depletion.

4.5. Challenges in teaching Environmental Education.

Primary school teachers were asked to indicate some of the challenges they faced in teaching Environmental issues. The challenges were grouped in 3 categories namely;barriers to behavioral change, challenges in teaching environmental issues and the sources of information which were difficult to access information about the environment.

4.5.1. Barriers to environmental behavioral change.

Respondents were asked to choose from a list of situations and indicate whether it would be ‘a barrier’, ‘somewhat a barrier’ or ‘not a barrier’, that might interfere with their behavioral choices. The responses are shown in Table 9.

Table 9: Barriers to environmental behavioral change

Item	Somewhat barrier		Big barrier		Not a barrier	
	f	%	f	%	f	%
Environmentally friendly alternatives for many of the products i want to buy are just too expensive	21	33.90	25	40.30	16	25.80
I don't feel like i can solve any environmental problems alone	19	30.60	17	27.40	26	41.90
My family/dwelling partners don't do and would not accept any change	27	43.50	15	24.20	20	32.30
I don't feel like a lot of products labeled environmental safe are any better for the environment than other regular products, thus, i don't buy them	25	40.30	15	24.20	22	35.50
I don't think that it is worth of sacrificing my personal freedom (e.g. hunting, wildlife collections) for environmental protection.	20	32.30	13	21.00	29	46.70
I don't perceive myself having more information, skills, and/or knowledge on most of the environmental actions that I want to perform.	15	24.20	27	40.30	20	32.50
Pursuing my own lifestyle and habits is more important to me than changing myself for environmental protection.	19	30.60	21	33.90	22	35.50
Environmental problems are caused primarily by industrial companies and I think it's these companies to who should solve the problems.	23	37.10	29	46.80	10	16.10
I am too busy to take part or action	21	33.90	15	24.20	26	41.90
It is too inconvenient for me to take action.	20	32.30	17	27.40	25	40.30
In our society there is no channel accessible for taking environmental actions.	12	19.40	22	35.50	28	45.20
Acting for the environment is not of interest at all to me.	20	32.30	10	16.10	32	51.60

Twenty-nine (46.8%) respondents felt that environmental problems were caused primarily by industrial companies and they thought that those companies should solve the problems. The findings also indicated that 27 (40.3%) respondents did not perceive themselves as having more information, skills, and/or knowledge on most of the environmental actions that they wanted to perform, another 27 (40.3%) respondents stated that the environmentally friendly alternatives for many of the products they wanted to buy were just too expensive, 22 (35.5%) respondents said that their society had no channel accessible for taking environmental actions and 21 (33.9%) respondents said that pursuing their own lifestyle and habits were more important to them than changing themselves for environmental protection. Other responses are shown in Table 9.

4.5.2. Challenges in teaching environmental issues

Respondents were asked to state some of the barriers they faced in teaching environmental issues. The responses are shown in Table 10.

Table 10: Challenges in teaching environmental issues

Challenges	Frequency (f)	Percentage (%)
There are no teaching materials such as books, pictures, etc. to effectively teach environmental issues.	32	59.7
The community surrounding the school is not supportive.	28	45.2
Don't have enough information, skills, and/or knowledge to teach environmental issues.	22	35.5
The school administration is not supportive	7	11.3
Don't know effective methods to use to teach	6	9.7
Just don't have interest in environmental issues; hence, don't like teaching environmental issues.	4	6.5

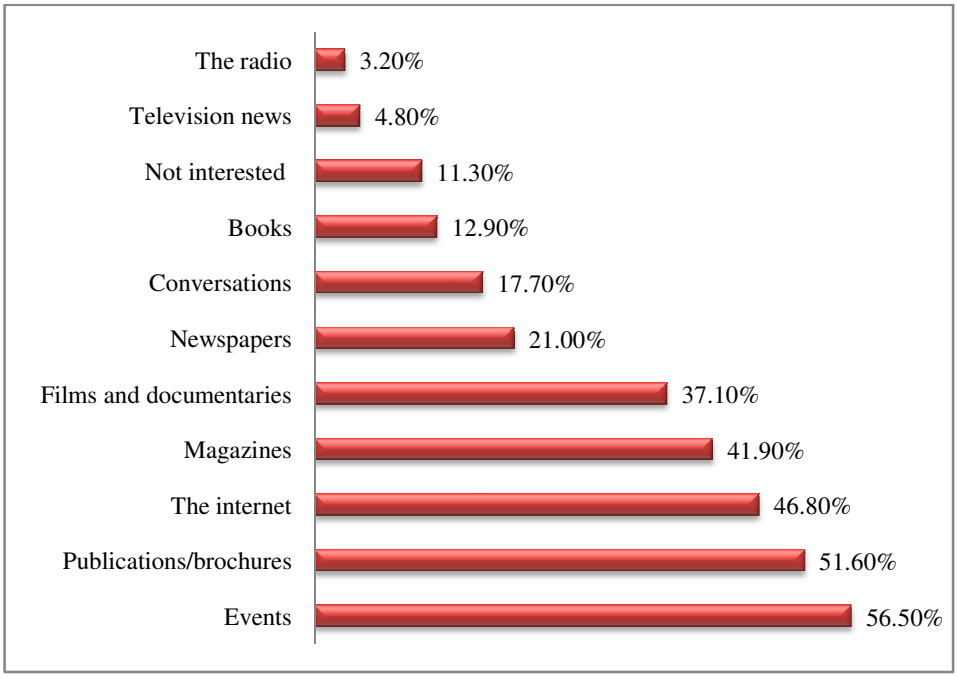
Thirty-two (59.7%) respondents said that there were no teaching materials such as books, pictures, etc. to help them effectively teach environmental issues, 28 (45.2%)

stated that the communities surrounding their school were not supportive and 22 (35.5%) said that they did not perceive themselves as having enough information, skills, and/or knowledge to teach environmental issues and 7 (11.5%) stated that the school administration was not supportive. Other barriers that teachers faced in teaching environmental issues are shown in Table 10.

4.5.3. Sources of information difficult for respondents to access environmental issues

Respondents were asked to state sources of information about the environment. The responses are shown in Figure 4.10.

Figure 4.10: Sources of information onenvironmental issues



Source: Field data

Thirty-five (56.5%) respondents said that it had been difficultto access information on environmental issues at events (such as conferences, fairs/exhibitions, festivals, etc.), 31 (51.6%) publications/brochures, 29 (46.8%) internet, 26 (41.9%) magazines, 23 (37.1%) films and documents. However, very few respondents said that they had difficulties accessing environmental issues on radio 2 (3.2%) and television 3 (4.8%).

4.6. Chapter summary

The aim of this chapter was to present the findings of the study. The chapter has outlined in details the results of the study. The subsequent chapter will discuss and endeavor to interpret the findings.

CHAPTER 5:DISCUSSION OF FINDINGS

5.1.Chapter overview

In this chapter, the research findings are discussed according toobjectives. The objectives were to: establish the level of knowledge on Environmental Education among primary school teachers in Lusaka district; determine environmental practices primary school teachers of Lusaka perceive as important in Environmental protection; environmental issues primary school teachers consider being important in a localized curriculum and to establish the challenges primary school teachers face in teaching Environmental Education as a cross cutting issue.

The findings suggest that more than half of the respondents were fairly well informed about the environmental issues and three quarters were very well informed. Teachers attach an irresistible importance to the protection of the environment although none of them belonged to any environmental organization. However, they felt that the presented list of environmental actions was important in solving environmental problems. The findings indicated that some respondents were not involved in any environmental activities even though most of them felt that the suggested environmental actions were important. It was further noted that most teaching methods such as problem solving and field trip/projects were mostly not used by teachers to teach Environmental Education. Such teaching methods help learners have a personal experience with environmental issues and suggest possible solutions to environmental problems.

The findings indicated that teachers faced a number of challenges in teaching Environmental Education which could be the reason behind the gap between theory and practice. Some of the challenges teachers faced included lack of teaching and learning materials such as books, pictures, etc. to help them effectively teach environmental issues, lack of support from the surrounding community, lack of information, skills, and/or knowledge to teach environmental issues and lack of a supportive school administrative.

5.2. Knowledge on Environmental Education among primary school teachers in Lusaka.

As earlier mentioned, the concept Environmental Education involves education **about**, **in/through** and **for** the environment. Education **about** the environment means transmission of knowledge that may explain aspects of the environment or provide conceptual capacity to do so. Environmental Education entails a wider interpretation of environmental crisis that needs to be learnt about, as well as all important facets of education in the environment, (Palmer, 1998). Therefore, respondents' knowledge about Environmental Education was assessed based on their association with the word 'environment', how informed they were about the environment, environmental issues they were well informed about and felt they lacked information as well as their main sources ofinformation.

5.2.1 Respondents' association with the word 'environment'

Respondents were asked to give their first association with the word 'environment' by choosing from a list of topics. The findings indicated that more than 50% of primary school teachers associated the word 'environment' with man's surrounding, quality of life where they liveand pollution in towns and cities. A similar question was asked by European Commission (2008) in a study among Europeans. However, these questions could not be comparable because two items (the state of the environment our children will inherent and using up resources) were not included in the study among primary school teachers. The question in the study among primary school teachers added a new item (man's surroundings). The findings in Europe indicated that respondents associated the word environment with pollution in towns and cities, climate change and green and a pleasant land scape, (European commission, 2008). Nonetheless, pollution in towns and cities remained the primary association in both studies.

These findings indicated that teachers had limited knowledge on what they associated the word 'environment' with. According to Ballantyne and Packer (1996) in Kimaryo (2011), studies have revealed that individuals' understanding of the environment can be limiting or expansive. These studies on meanings assigned to the environment show that most individuals have limited meanings of the concept. This was the case in the study among primary school teachers.

5.2.2 Respondents' level of knowledge about the environment

The level of knowledge about the environment was found to be fairly well informed. More than half of the respondents (62.9%) were fairly well informed and 33.9% were very well informed about the environment. Similar results were observed by European commission (2008)in a study among Europeans. The results indicated that slightly over half of respondents polled felt that they were fairly well informed about environmental issues (55%) and only 5% felt that they were very well informed. Both studies indicated that most of the respondents were fairly well informed about environmental issues.

The study revealed that most respondents had not attended a course in environmental studies while 21(33.9%)respondents stated that they did. Similar findings were observed by Kimaryo (2011) among primary school teachers in Tanzania. The studyrevealed that teachers had not received Environmental Education training when they were being trained as teachers.Such teachers considered themselves as not being competent enough to teach environmental issues. Similar findings were observed by Lindhe (1999) in Kimaryo (2011) among teachers in primary and secondary schools in Tanzania. According to Kimaryo (2011), teachers who did not receive training in Environmental Educationhad no initiative for self-learning and were not competent enough to teach Environmental Education because they lacked pedagogical content knowledge.

Furthermore, respondents' involvement in environmental activities and how informed they were, were assessed. The study showed thatdespite most of the respondents being informed in environmental issues, the findings indicated that 36 (58.1%)respondents were not involved in any environmental activities while 26 (41.9%) respondents were involved in environmental activities. However, this is not similar to the results in a study by the European Commission (2008) among Europeans. The European studyindicated that to a great extent, Europeans felt that as individuals they could make a difference in protecting the environment and consequently they had taken significantly more actions for environmental reasons.

5.2.3 Environmental issues respondents were well informed about

Respondents were asked to state which environmental issues they were well informed about. It was noted that more than 59% of the respondents indicated that they were well informed on Pollution (air, noise and water), climate change, agricultural pollution (such as the use of pesticides, fertilizers, etc.), natural disaster (earthquakes, floods, etc.) and man-made disasters (oil spills, industrial accidents, etc.). However, these results are not similar to what was observed in a study by European Commission (2008) among Europeans. The study indicated that Europeans were well informed on urban problems (traffic jam/congestion, lack of green space, etc.), consumption habits, noise pollution, natural disasters (earthquakes, floods, etc.), growing waste and air pollution.

Respondents were further asked to state the environmental issues in which they lacked information. More than 58% of the respondents stated that they lacked information in environmental issues such as health impacts of chemicals used in everyday products, consumption habits,depletion of natural resources/biodiversity and use of genetically modified organisms in farming.Similar results were observed by European Commission, (2008) in a study among Europeans. The two issues that were cited that Europeans lacked information were the health impact of chemicals used in everyday products and the use of genetically modified organisms in farming.

Lack of information on most environmental issues was attributed to limited access to sources of information. It was noted that most of the respondents (93.5%)indicated that their main source of information were television news, followed by radio and then newspapers.The internet, events (such as conferences, fairs/exhibitions and festival) and publications/brochures were among other sources of information where a few respondents (less than 40%) had access to. Similar findings were observed by European Commission (2008) among Europeans. It was observed that 68% of the respondents indicated that their main sources of information were television news followed by 43% newspapers.

Therefore, it maybe stated that despite respondents having limited knowledge on what they associated the word ‘environment’ with, the results indicated that they were fairly well informed about the environment. It was noted that respondents had limited access of sources of information which could have led to their limited

knowledge on environmental issues. There is need for primary school teachers to expand their knowledge base on environmental issues for effective teaching in Environmental Education.

5.3. Environmental practices primary school teachers of Lusaka District perceived as important in Environmental protection.

In the past, education **about** and **in** the environment was the focus of Environmental Education. Environmental Education was treated as "nature studies" within the area of natural sciences. It was concerned with the development of knowledge about the environment and the acquisition of skills using the environment as the medium. Initiatives in Environmental Education using this approach tended to avoid controversial issues, resulting in a failure to develop values, problem-solving skills and actions for the environment. However, Education **about**, **for** and **in** the environment now involves more emphasis on education for the environment, where the anticipated outcomes involve critical appraisal and active participation by all individuals in environmental issues. This shift encourages the development of attitudes, behaviors and problem-solving skills to build responsible and committed individuals, (Olah, 2001).

Teachers were asked about environmental practices they perceived as important in environmental protection. Such practices were assessed based on how important environmental protection was and environmental behaviors that would solve environmental problems. Furthermore, they were also assessed based on the methods they mostly used to teach environmental issues.

5.3.1 Respondents' view about importance of environmental protection

It was noted that most of the respondents (95.2%) stated that environmental protection was very important while only a few(4.3%) stated that it was fairly important. Similar findings were observed by European Commission (2008) among Europeans. The findings indicated that almost everybody said that environmental protection was very or fairly important (96%) and they were inclined to rank the issue as very important (64%) rather than fairly important (32%).

5.3.2 Respondent's personal experience with environmental problems

The state of the environment affects every individual both directly and indirectly. It is important that teachers have a personal experience with environmental problems or be aware of the environmental problems for effective teaching. Therefore, respondents were asked to state environmental problems they had personal experience with by choosing from the list of topics. Experiences which emerged in the study were related to the current environmental problems. More than 70% of the respondents stated that they had personal experience with population growth, water shortage, drought, fertilizer use, flooding, pesticide use, soil erosion and urbanization. However, these results are not similar to the results obtained in a study by Robinson et al (1998) among teachers and students in Poland. The findings indicated that teachers had personal experience with environmental problems such as pollution, human health and diseases, extinction of plants and animals (reducing genetic diversity), energy shortages (synthetic fuels, conservation, oil production, etc.) and population growth (world population, immigration, carrying capacity, foresight capability, etc.).

5.3.3. Methods mostly preferred by respondents to teach environmental issues.

The findings indicated that most teachers preferred pair/group discussion, followed by role playand story-telling. However, these results are not similar with what was observed in a study by Chileshe (2012) among teacher educators of Kitwe and Mansa College of Education. The results indicated that teacher educators mostly used question and answer, lecture and a few discussion methods. These studies could not be comparable because Chileshe (2012) conducted a study among teachers' college lecturer.

5.3.4 Respondents' views on important environmental behaviors

a. Resource recovery and waste management

Zambia is producing more waste than ever before. The rising trends of waste production estimated for Lusaka are coupled with inadequate financial resources to manage waste, (ECZ, 2001). Most items that a person buys come in packaging of some sort. As a result, municipalities face serious problems of disposal of waste produced by modern lifestyle. Landfills are one of the solutions to waste problems

but they are often more of a burial site than a location for recycling. However, recycling is another solution to waste problems. Every plastic bag or sheet of paper that is recycled means less material in landfill, (Loubser et al, 2005).

Individual behavior and actions are important in solving waste management problems. Respondents were asked indicate important environmental behaviors in solving waste management problems. More than 80% of the respondents indicated maintenance and repair of appliances, tools and other equipment to lengthen their lives, share, barter, trade or donate what was no longer needed, separate recyclable glass, metal or plastic container and buy recyclable glass. A similar question was asked by the European Commission (2008) in a study among Europeans. However, these questions are not comparable because respondents in Europe were presented with a list of nine actions and asked which ones they had done in the past month. On average, a European citizen had done nearly three things for environmental reasons. A large number of Europeans said they had separated their waste and reduced waste by, for example, buying bigger sizes, concentrated products, and second hand items or avoid buying over-packaged products.

b. Energy and water conservation.

Energy is the engine of economic growth in any country. However, its production and its use have negative environmental impacts. In Zambia, the production ofwood fuel, charcoal in particular, contributes to deforestation, while its use as well as that of other energy sources (coal, petroleum) causesenvironmental problems, (ECZ, 2001).

Respondents were asked to indicate the environmental behaviors that wouldsolve energy and water conservation problems. More than 70% of the respondents stated that the described environmental behaviors were important in solving energy and water conservation problems. However, the most indicated items included switching off lights when not in use, not to let water run when not in use, promptly replacing rubber washers on leaky water valves and plug and filling second sink with rinse water when washing dishes, were important.A similar question was asked by the European Commission (2008) in a study among Europeans. However, these questions are not comparable because respondents in Europe were presented with a list of nine actions and asked which ones they had done in the past month. A large

number of Europeans said that they had reduced their home energy consumption such aselectricity, heating and household appliances.

c. Transportation and air quality control

Respondents were asked to indicate important environmental behaviors in solving transportation and air quality control problems.The most prominent actions indicated in this study included eliminating smoking in public places and planting and caring for trees on a plot, school, community and towns.Respondents also indicated replacing cars that had old engines and exhaust systems and purchasing an energy efficient car.A similar question was asked in a study by the European Commission, (2008) among Europeans. However, these questions are not comparable because different items were asked under transport and air quality control.A large number of Europeans stated use of public transport as much as possible instead of using your own car, replace your car with a more energy efficient one, even if it is smaller or more expensive and consider environmental aspects when you make large expenditures such as traveling, buying a car, heating systems, building a house, etc.

From the three stated categories of environmental behaviors, it was observed that most respondents had knowledge on most environmental actions but they were not acting for the environment. The findings indicated more than half of the respondents (58.1%) were not involved in any environmental activities. For this reason, Thompson (1997) states that the educational level practice, education **about** and **in/through** the environment tends to be predominant around the world. Rather rare attempts to enact forms of education **for** the environment are being prompted.

5.4. Respondents' views on environmental issues to consider in a localized curriculum.

Western science and scientific knowledge is holding a hegemonic position when looking at educational and developmental initiatives. Indigenous culture and knowledge were for a long time ignored from educational discourses and have been characterized as old fashioned, not scientific and not relevant. However, increasingly there are calls that more attention should be paid to indigenous views. The Zambian government is now taking a step into this direction and integrated the new "localized curriculum" into formal school curriculum, (Motschilnig, 2011).

More than 58% of the respondents indicated that all the environmental problems presented in the study should be included in a localized curriculum. Most respondents indicated environmental problems such as population growth, solid waste management, climate change, fertilizer use, water shortages, poor quality food, pesticide use, mining and urbanization. However, these results are not similar withwhat was observed by Robinson et al (1998) among teachers and students in Poland. Teachers were asked to rank three most important issues in the curriculum. The top three problems were air quality and the atmosphere (acid rain, carbon dioxide, ozone depletion, global warming, etc.), hazardous substances (waste dumps, toxic chemicals, lead paints, etc.) and extinction of plants and animals (reducing genetic diversity). The three least important problems were mineral resources (non-fuel minerals, non-metallic minerals, mining, technology, low grade deposits, recycling, reuse, etc.), energy shortages (synthetic fuels, conservation, oil production,etc.) and population growth (world population, immigration, carrying capacity, foresight capability, etc.).

5.5. Challenges primary school teachers faced in teaching Environmental Education.

As earlier stated, Environmental Education has been included in the school curriculum in Zambia but the condition of the environment has not improved. Signs of environmental degradation have been observed in form of soil erosion, poor waste management, water pollution and many other problems in schools and also in the communities around the schools. The school is part of the community surrounding, therefore it is expected that what the pupils learn in school should be reflected in society. However, it seems that there is a gap between theory and practice of what is actually taught in the schools, (Fullan, 2001). The results revealed that teachers faced challenges in teaching Environmental Education.

5.5.1. Barriers to environmental behavioral change

The barriers to environmental behavioral change looked at the issues that prevented respondents to act for the environment. Most respondents felt that environmental problems were caused primarily by industrial companies and they thought that those companies should solve the problems. The findings also indicated that respondents did not perceive themselves as having more information, skills, and/or knowledge on

most of the environmental actions they wanted to perform, environmental friendly alternatives for many of the products they wanted to buy were just too expensive and their society had no channel accessible for taking environmental actions. Other barriers included that pursuing their own lifestyle and habits were more important to them than changing themselves for environmental protection.

A similar question was asked by Lenhart (2007) in a study among young people on examining the barriers and opportunities to sustainable behavior inLund and Malmo, Sweden. The two studies are not comparable because the Swedish study was conducted among high school students. The results indicated that respondents had barriers to environmental behavioral change such as lack of money or limited financial choices in the household, lack of perceived alternatives, unaware of the problems, laziness and over confidence in technology to alleviate problems of the environment.

5.5.2. Challengesin teaching environmental issues

The findings indicated that teachers faced a number of challenges in teaching Environmental Education. The challenges included lack of teaching and learning materials such as books, pictures, etc. to help them effectively teach environmental issues andlack of support from the communities surrounding the school. Other challenges were that some teachers did not perceive themselves as having more information, skills, and/or knowledge to teach environmental issues andlack ofsupport from the school administration among others.Similar results were observed in a study by Kimaryo (2011) among primary school teachersin Tanzania.The findings indicated that teachers faced a number of challenges such asunclear syllabus and short periods to teach environmental issues, lack of teaching and learning materials, lack of training in environmental education on the part of the teachers, hence lack of expertise and lack of collegial and administrative support.

A similar question was asked in a study by Chileshe (2012) among lecturers at Mansa and Kitwe Teachers' Colleges of Education. The respondents indicated a number of challenges faced to teach Environmental Education such as an unclear curriculum, lack of guidelines, lack of knowledge and skills by respondents, lack of interest and lack of teaching and learning materials. Therefore, this could explain

why teachers indicated that they did not attend a course in Environmental studies because of such challenges faced by teachers' educators.

5.6. Chapter summary

This chapter discussed the research findings according to the objectives of this study. It also discussed and endeavored to interpret the findings. The next chapter will give a conclusion and recommendations based on the findings of the study.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1. Chapter overview

In this chapter, the conclusion is drawn on the basis of the findings of the study and thereafter recommendations based on the findings and literature implications of the study are made.

6.2. Conclusion

The findings suggested that teachers were fairly well informed about the environment. It was observed that most respondents did not attend a course in environmental studies. Most primary school teachersstated that environmental behaviors such as double-side photocopying, use of mugs instead of paper cups, switching off lights when not in use, using water and electricity efficiently and eliminating smoking in public places were important in solving environmental problems. Despite mostof the respondents being informed about environmental issues, the findings indicated that more than half of the respondents were not involved in any environmental activities.Primary school teachers further suggested environmental problems to consider in a localized curriculum such as population growth, solid waste management, climate change, fertilizer use, water shortages and poor food quality. Teaching methods such as problem solving and field trip/projects were mostly not used by teachers to teach Environmental Education. Such teaching methods are important in helping learners have a personal experience with environmental issues and what solutions can be put across to solve environmental problems.

The results indicated that respondents faced a number of challenges in teaching Environmental Education which could be the reason behind the gap between theory and practice. Some of the challenges teachers faced included lack of teaching and learning materials such as books, pictures, etc. to help them effectively teach environmental issues, lack of support from the surrounding community and lack of information, skills, and/or knowledge to teach environmental issues and lack of supportive school administration.

It may be stated that educational level practice, education **about** and **in/through** the environment tends to be predominant among respondents though with limited

knowledge about the environment. The results indicated that there had been rare attempts to enact forms of education **for** the environment among teachers who are seen as role models by the learners and the community at large. This could be the reason for such a gap between theory and practice in Environmental Education.

6.3. Recommendations

1. The Ministry of Education, Science, Vocational Training and Early Education (MoESVTEE)should introduce training programs for teachers in Environmental Education. This will help teachers develop an expanded perception of what the environment is, which would include the biophysical, social, political and economic components.
2. Environmental Education should be introduced as a discrete compulsory subject at all levels of education. This will increase the level of knowledge among citizens about the environment.
3. There is a need to encourage teachers to belong to an environmental organization so as to increase their interest to take part in environmental activities.
4. The media should expand the coverage to discuss other environmental issues and encourage behavioral change.
5. There is need for the Ministry of Education, Science, Vocational Training and Early Education(MoESVTEE)to provide other sources of information for teachers to have a wide range of information about the environment.
6. Teachers should be encouraged to use teaching methods such as field projects and problems solving methods to teach Environmental Education so that learners can have a personal experience with environmental problems. This will motivate learners to come up with solutions to the environmental problems being faced.
7. The Ministry of Education, Science, Vocational Training and Early Education(MoESVTEE)should provide environmental teaching materials to the schools to enable teachers effectively teach Environmental Education.

REFERENCES

Ajzen, I. and Fishbein, M. (1990). *Understanding attitudes and predicting social behavior*. Engewood Cliffs. Prentice-Hall, In.

CDC, (2000).*Environmental Education: Teacher's manual (Save Planet Earth from destruction)*. Lusaka,CDC.

Chileshe, D. L. (2012). Teacher Educators' perceptions of Environmental Educationas a cross cutting issue and their participation in its teaching as Kitwe and Mansa college of Education. *Law and social sciences journal*. Vol.1, 53-65.

ECZ, (2001).*State of the Environment 2000*. Lusaka, ECZ.

Eilem, E. and Trop, T. (2012). Environmental attitudes and environmental behavior-which is the horse and which is the cart? *Sustainability.*Vol. 4, 2210-2246.

European commission (2008).*Attitudes of European citizens towards the environment*.Special Euro barometer 295/ Wave 68.2 – TNS Opinion & Social.

Frick, J., Kaiser, F. G., and Wilson, M. (2004) Environmental knowledge and conservation behavior: exploring prevalence and structure in a representative sample. *Personality and individual differences*, Vol. 37, 1597-1613

Fullan, M. (2001). *The new meaning of Educational change*. New York, Teachers College Press.

Grimmet, P. and Mackinnon, A. (1992). Craft knowledge and the education of teachers. In G. Grant (Ed). *Review of research in education,*Vol. 18, 59-74

Jekayinfa, A. A. and Yusuf, A. R. (2008). Teachers' opinions on the incorporation ofenvironmental education in the Nigerian primary school curriculum.*Educational Research and Review* Vol. 3 (11), pp. 334-338.

Kimaryo, L. A. (2011)Integrating Environmental Education in Primary School Education in Tanzania. Teachers' Perceptions and Teaching Practices. Tanzania,Abo Akademis Forlag – Abo Akademi University Press.

Kombo, K. K. and Delno, L. A. (2006). *Proposal and thesis writing: An introduction*. Nairobi, Pauline's publications Africa.

Lenhart, J. (2007) Examining barriers and opportunities to sustainable behavior: Linking knowledge and participation amongst young persons in urban environments. Lund, Lund University,IIIEE publishers.

Lee, J. C. K., and Williams, M. (2001). Researching environmental education in the school curriculum: An introduction for students and teacher researchers. *International Research in Geographical and Environmental Education* Vol. 10, 218 – 244.

Loubser C.P. (2005). *Environmental Education: some South African perspectives*.South Africa, Van schaik publishers.

Meyers, R. B. (2006). Environmental learning: reflections on practice, research and theory. *Environmental Education Research*, Vol. 12 (3-4), 459 – 470.

McCrea, E. J. (2006). *The Roots of Environmental Education: How the Past Supports the Future*. New York, Routledge.

McKeown, R. (2002). *Education for Sustainable Development Toolkit*. Energy, Environment and Resources Centre, Tennessee, University of Tennessee.

Ministry of Education, (1996) *National Policy on Education: Educating Our Future.* Lusaka, Zambia Educational Publishing House.

Ministry of Education, (2003). *Zambia basic education syllabi, Grades 1-7.* Lusaka, CDC.

Motschilnig, R. (2011) *Indigenous knowledge and localized curriculum inZambia…the road to sustainable development*. German, VDM Publishing.

Mweemba, L. and Wu, H. (2012) Greening our future and Environmental values: An investigation of perception, attitudes and awareness of Environmental issues in Zambia. *Environmental values.* ISSN: 0963-2719

Mweembe, O. M. (2008). Environmental Knowledge. Attitudes and Practices of High School teachers in Zambia. A case study of selected schools of Lusaka City. Thesis (M.E.D). The University of Zambia.

Nickerson, R. (2003). *Psychology and environmental change.* London: Lawrence Erlbaum

Olah K. (2001). *Implementing the Environmental Education Policy in your school*. Bankstown, Brewongle Environmental Education Centre.

Palmer, J. A. (1998). *Environmental education in the 21st century*. New York, Routledge.

Robinson, M., Trojok, T. and Norwiscz J. (1998). The ranking of global environmental issues and problems by polish secondary student and teachers. *Electronic journal of science education*, Vol. 2, 43-502

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*. Vol. 57, 1-22.

Skrentny, J. D. (2003). Concern for the environment: a cross-national perspective. *International journal of public opinion research*, Vol. 5, 335-352

Teane, F. M. (2007). The integration of the Environmental awareness issues in the teaching of life-science in the further education and training (FET) Band. A case study of the Experiences of the Grade 10 Educators in the Temba District. University of South Africa.

Thompson P. J. (1997). *Environmental Education for the 21st Century*. New York, Peter Lang, Inc.

Trivedy, P.R. and Singh, U.K. (1993) *Global Environmental Education visions of 2001*. Institute of Ecology and Environment. New Delhi.

United Nations, (2002*). Report on the World Summit on Sustainable Development, Johannesburg*. South Africa: UN, New York.

United Nations, (1972). *United Nations Conference on the Human Environment (UNCHE)*. Stockholm, Sweden.

UNCED, (1992). *Agenda 21*. www.unesco.org/education/esd/English/chapter.shtml.Retrieved September 9, 2006.

UNESCO, (1976). *Final Report of the International Workshop on Environmental Education*. Belgrade (Yugoslavia), 13-22 October 1975. Document ED-76/WS/97, Paris: UNESCO.

UNESCO, (1978). TheTbilisi Declaration.*Connect*, 111 (1), 1-8. UNESCO-UNEP Environmental Education Newsletter.

WCED (1987). *Our Common Future*, Oxford: University Press.

Appendix A: Time line

Activity	Aug. 2013	Sep. 2013	Oct. 2013	Nov. 2013	Dec. 2013	Jan. 2014	Feb. 2014	Mar. 2014	April 2014	May 2014	Sept. 2014	Nov. 2014
Submission of research proposal												
Seminar presentation.												
Correction of proposal after presentation												
Approval of research proposal												
Data collection												
Data analysis												
Report writing												
Presentation of the findings												
Submission of dissertation												
Defense of dissertation												
Graduation												

Appendix B: Budget

ACTIVITY	QUANTITY	UNIT COST	TOTAL
Research fees	1 year		K6,000
A4 Ream of paper	10	K 30	K300
Other stationary		K200	K200
Toner	1	K1, 000	K1, 000
Photocopying		K100	K100
Binding of findings for submission	2	K100	K200
Binding of the final report	5 copies	K200	K600
Poster	1	K800	K800
Transport		K3,000	K3,000
Lunch allowance		K50	K2,000
Communication		K1, 500	K1,500
Publication	1	K1,000	K1,000
Total			K16,700
Contingency (10%)			**K1,670**
GRAND TOTAL			**K18,370**

Appendix C: Consent form for participants

Consent Form

I am a postgraduate student at the University of Zambia pursuing a Master of Education in Environmental Education. I am conducting a research onEnvironmental Knowledge, Practices and Challenges of selected Primary School teachers in Lusaka District. Your sincere response will help me accurately write on the above topic. This study might help the Ministry of Education,Science, Vocational Training and Early Educationto improve the teaching/learning of Environmental Education in Zambia. 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 D: QUESTIONNAIRE

ENVIRONMENTAL KNOWLEDGEAND PRACTICES OF SELECTED PRIMARY SCHOOL TEACHERS IN LUSAKA DISTRICT

Section A: Background information

Kindly answer the following questions and tick where appropriate.

1. Name of school:
   ……..
2. Gender: Male ( ) Female ( )
3. What Grade are you teaching at the moment?
   …….....
4. For how long have you been teaching?
   …….
5. What is your qualification?
   Master's Degree ( )
   Postgraduate Diploma ( )
   Bachelor's Degree ( )
   Diploma ( )
   Certificate ( )
6. Do you belong to any environmental organization?
   Yes ( ) No ( )
7. Have you ever participated in any organized environmental activities (e.g. environmental education workshop, environmental conservation conferences, outdoor learning, etc.) either in or outside of school?
   Yes ( ) No ( )
8. Did you take a course pertaining to environmental studies (e.g. environmental science, environmental engineering, environmental conservation, environmental education, environmental communications, natural resource management, etc.)?
   Yes ( ) No ( )

Section B: General knowledge of Environmental Education

Kindly read the statements below and indicate your best answers.

9. When people talk about 'the environment', which of the following do you think of first?

Pollution in towns and cities	( )
Green and pleasant landscape	( )
Earthquakes, floods and other natural disasters	( )
Man-made disasters such as oil spills, industrial accidents	( )
Climate change	( )
Protecting nature	( )
Man's surrounding	( )
The quality of life where you live	( )

10. In general, how informed are you about environmental issues?

Very well informed	( )
Fairly well informed	( )
Not well informed	( )
Not informed at all	( )

11. From the following list, kindly tick the five main environmental issues that you are well informed about.

Climate change	( )
Natural disaster (earthquakes, floods, etc.)	( )
Man-made disasters (oil spills or industrial accidents	( )
Agricultural pollution (use of pesticides, fertilizers, etc.)	( )
The use of genetically modified organisms in farming	( )
The impact on our health of chemicals used in everyday products	( )
Pollution (Air, noise, water, etc.)	( )
Urban problems (traffic jam, pollution, lack of green spaces, etc.)	( )
Depletion of natural resources/biodiversity	( )
Our consumption habits	( )
Growing waste	( )

Other (specify) …….

12. From the following list, kindly tick five main issues which you feel lack information in particular?

Climate change	( )
Natural disaster (earthquakes, floods, etc.)	( )
Man-made disasters (oil spills or industrial accidents	( )
Agricultural pollution (use of pesticides, fertilizers, etc.)	( )
The use of genetically modified organisms in farming	( )

The impact on our health of chemicals used in everyday products ( )

Pollution (Air, noise, water, etc.) ( )

Urban problems (traffic jam, pollution, lack of green spaces, etc.) ( )

Depletion of natural resources/biodiversity ( )

Our consumption habits ( )

Growing waste ( )

Other (specify) …….

13. From the following list, which are your main three sources of information about the environment? Kindly tick 3 only.

Newspapers ( )

Magazines ( )

Television news ( )

The radio ( )

Films and documentaries ( )

Conversations with relatives/family/friends/neighbors/colleagues ( )

Books ( )

The internet ( )

Publications/brochures ( )

Events (conferences, fairs/ exhibitions, festivals, etc.) ( )

You are not interested in the environment ( )

Other (specify) ……

Section C: Environmental practices

This section is a list of environmental behavior comprising of environmental issues. Please read each statement and indicate your best answers. Kindly circle where you feel it's appropriate for you.

14. How important is environmental protection?

Very important	( )
Fairly important	( )
Not very important	( )
Not at all important	( )
Do not know	( )

15. How much personal experience do you have on the following environmental problems? 1=no experience, 2=not sure, 3= experienced.

Environmental issues/human activities	**No experienced**	**not sure**	**experience**
Biodiversity	1	2	3
Drought	1	2	3
Population growth	1	2	3
Flooding	1	2	3
Soil erosion	1	2	3
Sewerage discharge	1	2	3
Desertification	1	2	3
Climate change	1	2	3
Solid waste	1	2	3
Urbanization	1	2	3
Species invasion	1	2	3
Overgrazing	1	2	3
Over-fishing	1	2	3
Ozone depletion	1	2	3
Deforestation	1	2	3
Wetland loss	1	2	3
Poor water quality	1	2	3
Farm land loss	1	2	3
Chemical waste			
Fertilizer use	1	2	3

Pesticide use	1 2 3
Poor quality food	1 2 3
Poor air quality	1 2 3
Automobile discharge	1 2 3
Heat waves	1 2 3
Heavy metal pollution	1 2 3
Mining	1 2 3
Water shortages	1 2 3
Genetically modified organisms	1 2 3
	1 2 3

16. How important do you think the following behaviors would contribute to solving environmental problems?
    1=not at all, 2=somewhat important, 3=important, 4=very important, 5=extremely important.

Resource recovery and waste management	
How important is the following in solving environmental problems?	**Not at allextremely**
1. Use mugs instead of paper cups, cloth instead of paper napkins, rags instead of paper towels.	1 2 3 4 5
2. Double-side photocopies; use reverse sides of paper	1 2 3 4 5
3. Bring your own canvas shopping bags to the market, or reuse the bags.	1 2 3 4 5
4. Buy returnable/recyclables glass, metal, or plastic containers	1 2 3 4 5
5. Separate your recyclables (e.g. newspaper, glass, paper, aluminum and clothing) from trashes that you cannot reuse and that is being sent to the landfills.	1 2 3 4 5
6. Reduce purchasing items which are over –packaged.	1 2 3 4 5
7. Save cardboard boxes for later use.	1 2 3 4 5
8. Return deposit beverage containers to stores.	1 2 3 4 5
9. Maintain and repair appliances, tools and other equipment to lengthen their lives.	1 2 3 4 5
10. Share, barter, trade or donate what you no longer need but which has value to others.	1 2 3 4 5

Energy and water conservation					
How important are the following to solving environmental problems?	**Not at all**				**extremely**
1. Switch off lights in any space when not in use.	1	2	3	4	5
2. Use electricity and hot water efficiently.	1	2	3	4	5
3. Set your air conditioner control to a moderate temperature (about 28˚C) and clean air conditioner filter and coils regularly.	1	2	3	4	5
4. Adjust the temperature of your refrigerator-freezer based on the quantity of contents stored.	1	2	3	4	5
5. Purchase energy-efficient appliances, e.g. refrigerators, air conditioners, washing machines and dryers.	1	2	3	4	5
6. Do not let water run when it's not actively in use.	1	2	3	4	5
7. Install sinks faucet aerators and water efficient shower heads.	1	2	3	4	5
8. Promptly replace rubber washers on leaky water valves.	1	2	3	4	5
9. When washing dishes in the sink, plug and fill second sink with rinse water rather than running water freely.	1	2	3	4	5
10. Buy non-toxic, phosphate-free, biodegradable soaps and detergents.	1	2	3	4	5

Transportation and air quality control					
How important are the following to solving environmental problems?	**Not at all**				**extremely**
1. Use public transport, bike or walk.	1	2	3	4	5
2. Save gas by driving smoothly, within the speed limit, have regular tune ups and emissions check.	1	2	3	4	5
3. Purchase an energy efficient car.	1	2	3	4	5
4. Encourage the development of electric cars.	1	2	3	4	5
5. Support taxing gasoline to encourage its more efficient use.	1	2	3	4	5
6. Purchase the ozone safe products, e.g. coolants for refrigeration, even though the costs of these products are higher.	1	2	3	4	5
7. Eliminate smoking in public places, e.g. offices, factories, trains and buses.	1	2	3	4	5
8. Replace the cars that have old engines and exhaust systems.	1	2	3	4	5
9. Use only unleaded cars	1	2	3	4	5
10. Plant and care for tree in your own plot, school, community and town.	1	2	3	4	5

17. Environmental problems differ from one area to the other, which of the following problems are important to be emphasized in your localized school curriculum. 1=not at all, 2=somewhat important, 3=important, 4=very important, 5=extremely important.

Environmental issues/human activities	**Not at all**				**extremely**
Biodiversity	1	2	3	4	5
Drought	1	2	3	4	5
Population growth	1	2	3	4	5
Flooding	1	2	3	4	5
Soil erosion	1	2	3	4	5
Sewerage discharge	1	2	3	4	5
Desertification	1	2	3	4	5
Climate change	1	2	3	4	5
Solid waste	1	2	3	4	5
Urbanization	1	2	3	4	5
Species invasion	1	2	3	4	5
Overgrazing	1	2	3	4	5
Over-fishing	1	2	3	4	5
Ozone depletion	1	2	3	4	5
Deforestation	1	2	3	4	5
Wetland loss	1	2	3	4	5
Poor water quality	1	2	3	4	5
Farm land loss	1	2	3	4	5
Chemical waste	1	2	3	4	5
Fertilizer use	1	2	3	4	5
Pesticide use	1	2	3	4	5
Poor quality food	1	2	3	4	5
Poor air quality	1	2	3	4	5
Automobile discharge	1	2	3	4	5
Heat waves	1	2	3	4	5
Heavy metal pollution	1	2	3	4	5

Mining	1	2	3	4	5
Water shortages	1	2	3	4	5
Genetically modified organisms	1	2	3	4	5

18. From the following list of teaching methods, which methods do you mostly use to teach environmental issues?

Role play ( )

Story telling ( )
Problem solving ( )
Information transfer ( )
Pair/group discussion ( )
Field trips/project work ( )
Case studies ( )
Debate ( )

Section D: Challenges you face inEnvironmental Education

19. Below is a list of statements regarding various reasons why people might not be doing more for the environment. No matter how much effort you personally have made to help the environment, please imagine the following situations and check the one appropriate box for each item to indicate whether it would be 1= 'not a barrier' 2= 'somewhat of a barrier' or 3='substantial barrier' that might interfere with your behavioral choices.

How much of a barrier would the following situations be?	Not a barrier	somewhat barrier	big barrier
1. The environmental friendly alternatives for many of the products I want to buy are just too expensive.	1	2	3
2. I don't feel like I can solve any environmental problems alone.	1	2	3
3. My family/dwelling partners don't do and would not accept any change.	1	2	3
4. I don't feel like a lot of products labeled 'environmentally safe' are any better for the environment than other regular products, thus, I don't buy them.	1	2	3
5. I don't think that it is worth of sacrificing my personal freedom (e.g. hunting, wildlife collections) for environmental protection.	1	2	3
6. I don't perceive myself having more information, skills, and/or knowledge on most of the environmental actions that I want to perform.	1	2	3
7. Pursuing my own lifestyle and habits is more important to me than changing myself for environmental protection.	1	2	3
8. Environmental problems are caused primarily by industrial companies and I think it's these companies to who should solve the problems.	1	2	3
9. I am too busy to take part or action.	1	2	3
10. It is too inconvenient for me to take action.	1	2	3
11. In our society there is no channel accessible for taking environmental actions.	1	2	3
12. Acting for the environment is not of interest at all to me.	1	2	3

20. What are some of the barriers you face in teaching environmental issues? Kindly read the statements below and check the one appropriate box for each item to indicate whether it is a barrierthat interferes with your effectiveness in teaching environmental issues.

Barriers	**Tick**
1. I don't perceive myself having more information, skills, and/or knowledge on most of the environmental actions that I want to perform.	
2.The school administration is not supportive	
3. The community surrounding the school is not supportive	
4. I don't know the effective methods I can use to teach my learners	
5. There are no teaching materials such as books, pictures, etc. to help me effectively teach environmental issue.	
6. I just don't have interest in environmental issue, hence, don't like teaching environmental issues.	
7. others (specify):	

21. Which of the following sources have been difficult for you to access information about the environment?

Newspapers ( )
Magazines ( )
Television news ( )
The radio ( )
Films and documentaries ( )
Conversations with relatives/family/friends/neighbors/colleagues ( )
Books ( )
The internet ( )
Publications/brochures ( )
Events (conferences, fairs/ exhibitions, festivals, etc.) ( )
You are not interested in the environment ( )
Other (specify) ……