Integrating Environmental Education (EE) for Sustainability into Primary School Curriculum in Tanzania: Exploring Stakeholders' Views and Perceptions

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Abstract

This study sought to explore the views and perceptions of education stakeholders (i.e. teachers, heads of schools and curriculum specialists) on the integration of environmental education into primary education curricula in Tanzania. The study also sought for stakeholders' views and perceptions to explain why EE has not been a successful story despite having been integrated in schools for decades. Empirical studies by Kimaryo (2011) and Mtaita (2007) discovered that although EE was included in Tanzanian primary schools since 1960's and was even stressed in the policy of education in 1990's; yet, the condition of environment has rather deteriorated.

Studies that have been conducted in this field, mainly explained the success or failure of EE implementation basing on teachers and students as key agents, thus capturing a narrow view to explain the phenomenon. As argued by Klitgaard (1973) in the theory of diffusion of innovations in education, success or failure of educational innovations and reforms cannot be a priori attributed to only one part of the educational system. He says educational systems operate in a chain of command where different actors and levels of authorities need to function properly and collaborate with other levels so as to ensure successful implementation of change and reforms in curriculum. For this reason, this study involved the curriculum specialists and heads of schools besides teachers. Moreover, none of the studies has explored how the school theory promotes or hinders the integration of EE into the curriculum.

The study attempted to answer the following four questions:

Which views and perceptions do teachers have on the environment, environmental changes and challenges?

How do teachers perceive EE integration, content adequacy and relevance; And which instructional methods and resources do they use in integrating EE content into their subject curriculum?

How do teachers perceive their motivation and professional development on environmental education issues?

How do heads of schools and curriculum specialists perceive EE integration, and how do they motivate teachers to successfully integrate EE into their teaching?

The study is qualitative in nature, employing research techniques such as interviews and document analysis to answer the inquiry. Data was obtained from five primary schools' teachers, heads of schools and curriculum specialists with a total of 30 participants taking part in the study. Grounded theory and thematic strategies were employed in data analysis.

The findings from teachers revealed that environmental changes and challenges are mainly seen as anthropogenic. The issue of climate change was a concern for a majority of participants. Awareness of the concept of 'pillars of sustainability' (i.e. ecology, economy and culture) is generally low and their balance is perceived impossible without addressing the poverty issue. Teachers' competence and motivation are low due to lack of resources and professional training, large class sizes and work load as well as lack of government priority on environmental issues. Moreover, results revealed that EE goals and principles are

incompatible with the traditional role and goals of schooling, and as EE is not a subject in itself, it is marginalized in teaching. Findings from heads of schools and curriculum specialists confirmed most of the findings from teachers, and acknowledged that very little support for teachers to implement EE was provided. In general, results concluded that there was no perspective for effective implementation of EE in the near future, unless there is due priority given from top authorities downwards.

The study recommends capacity building of teachers as well as involvement in planning and development for curricula reforms. Government priority on environmental issues is insisted on and urged to set concrete criteria for EE competence assessment in curricula. To ensure environmental sustainability the government should keep striving to fight poverty. Lastly the study proposes a model to improve the implementation of EE in primary schools. The findings of this study hold imperative implications for the government through the Ministry of Education and Vocational Training in Tanzania, curriculum specialists, and heads of schools as well as teachers as they are key players in determining the success or failure of educational innovations and reforms.

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Dedication

This dissertation is dedicated to my lovely family: My husband Donald Benjamin, and my two children, Owen and Deborah for their endurance, support and love throughout this remarkable academic endeavor.

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List of Abbreviations

AMCHUD	African Ministers Conference on Housing and Urban Development
AMCEN	African Ministerial Conference on the Environment
AR	Accelerated Reader
BEST	Basic Education Statistics in Tanzania
BPR	Book-Pupil Ratio
CFCs	Chlorofluorocarbons
CI	Conservation International
CPR	Class Pupil Ratio
CS	Curriculum Specialist
CSR	Country Status Report
DESD	Decade of Education for Sustainable Development
DfEE	Department for Education and Employment
EE	Environmental Education
EESD	Environmental Education for Sustainable Development
EMA	Environmental Management Act
ESA	Education Sector Analysis
ESD	Education for Sustainable Development
ETP	Education and Training Policy
EU	European Union
FAO	Food and Agriculture Organization
FGI	Focused Group Interview
GDP	Gross Domestic Product
GHG	Green House Gases
GIS	Geographic Information System
GISc	Geographic Information Science
HoS	Heads of Schools
ICT	Information and Communications Technology
IDRC	International Development Research Centre
IL	Instructional Leadership
ITV	Independent Television
IUCN	International Union for the Conservation of Nature
KACEE	Kansas Association for Conservation and Environmental Education
MDG	Millenium Development Goals
MIE	Malawi Institute of Education
MoEC	Ministry of Education and Culture
MoEVT	Ministry of Education and Vocational Training
NCLI	No Child Left Inside
NEAP	National Environmental Action Plan
NECTA	National Examination Council of Tanzania
NEECS	National Environmental Education and Communication Strategy
NEMC	National Environmental Management Council
NEP	National Environmental Policy
NEPAD	New Partnership for Africa's Development
NER	Net Enrolment Ratio
NGO	Non Governmental Organizations

NSA	Non-State Actors
NSGRP	National Strategy for Growth and Reduction of Poverty
OAU	Organization of African Unity
OECD	Organization for Economic Co-operation and Development
OUT	Open University of Tanzania
PCK	Pedagogical Content Knowledge
PEDP	Primary Education Development Program
PK	Pedagogical Knowledge
PMO-RALG	Prime Minister's Office, Regional Administration and Local Government
POPs	Persistent Organic Pollutants
RS	Rural School
SADC	Southern African Development Community
SACMEQ	Southern African Consortium for Measuring Educational Quality
SCP	Sustainable Cities Program
SD	Sustainable Development
SES	Social Ecological Systems
SUA	Sokoine University of Agriculture
TALIS	Teaching and Learning International Survey
TBC	Tanzania Broadcasting
TFCG	Tanzania Forest Conservation Group
TIE	Tanzania Institute of Education
T/L	Teaching and Learning
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Education Scientific and Cultural Organization
UNIPCC	United Nations Intergovernmental Panel on Climate Change
URT	United Republic of Tanzania
US	Urban School
USA	United States of America
WB	World Bank
WCED	World Commission on Environment and Development
WCST	Wildlife Conservation Society of Tanzania
WMO	World Meteorological Organization
WWF	World Wildlife Fund

CHAPTER ONE: INTRODUCTION

Environmental challenges have enormously dominated global, regional and local agendas over the past four decades. Evidence from numerous studies has shown that biodiversity is declining rapidly, due to human activities such as overexploitation, harvesting, habitat destruction and modification, pollution and the introduction of exotic species (Trombulak et al., 2004; Hooper et al., 2005). In the same vein, Kimiti and Kipkoech (2013) state that *"Globally, the environment is under pressure from climatic variability and anthropogenic activities including deforestation, wetland and water catchment destruction, agro-chemicals use and urbanization, among others"* (p. 51). As a consequence, the loss of biodiversity and deteriorating ecosystems have contributed to worsening human health, increasing food insecurity and the vulnerability of ecosystems to natural disasters, lessening material wealth and worsening social relations by damaging ecosystems that are highly valued for their aesthetic, recreational or spiritual values (MEA, 2005). Moreover, studies have associated environmental changes with a host of negative impacts, including altered distributions of some infectious disease vectors (ticks at higher latitudes, malaria mosquitoes at higher altitudes) and a trend towards extreme weather events and associated casualties, injuries and other health risks (McMichael & Lindgren, 2011). Worldwide, environmentally related problems have become a multisectoral issue, with reports on the projected radical impacts of climate change on human existence beginning to shape educational research in areas such as curricula and learning (Selby & Kagwa, 2009). With this in mind, both educational policy-makers and curriculum developers play an active role in shaping the environmental agenda (Mutisya & Barker, 2011). On this basis, environmental education (EE) has become a part in global agendas the past decades and a recognized area of the curriculum in many parts of the world since the 1990s. International documents, such as *Our Common Future*, are calling for the integration of environmental education into curricula at all levels of national educational systems (WCED, 1987). Both EE and environmental education for sustainable development (EESD) are now aspects of curricula in many countries of the world (Bonnett, 2003).

1.1 Background of the study

As pointed out by Sarabhai et al. (2007), the 1977 Tbilisi intergovernmental conference on EE is considered to be the defining milestone in the field of EE. Amongst the very important recommendations of the conference was an emphasis on knowledge, awareness and understanding of environmental problems, their causes and solutions, both locally and globally (UNESCO, 1978) and according to the UNESCO Tbilisi Declaration (1978), EE is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes motivation and commitment to make informed decisions and take responsible action. The need and importance of EE has been emphasized in various national policies and strategies, on the other hand the United Nations Decade of Education for Sustainable Development (DESD) (2005-2014) aimed to provide people with skills, values and knowledge, to create a sustainable present and future, including environmental, social

and economic dimensions. Sustainability education is therefore an education that enables pupils to develop knowledge, skills, understanding and values to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now, without damaging the planet for the future (DfEE, 1999). Sustainability is a paradigm for thinking about a future in which environmental, social and economic considerations are balanced in the pursuit of development and an improved quality of life (UNESCO, 2012). Therefore, EE is a subset of sustainability education or education for sustainable development. It is an important tool for the realization of sustainability.

To attain awareness on environmental issues, researchers, including Xi, Fan and Deng (1998), have identified basic education as a pre-requisite for fostering attitudes and behaviors that are less harmful to the environment. This echoes the Tbilisi declaration that EE should be provided to all ages and grade levels and be interdisciplinary in its approach (UNESCO-UNEP, 1978). That is to say, EE should be taught in multiple disciplines and not taught solely in one subject or discipline. Environmental educators such as Simmons (1989), Ramsey, Hungerford and Volk (1992), Lane (1993) and Disinger (1993) support this idea.
To accelerate EE initiatives, the 1992 Earth Summit in Rio de Janeiro awakened the world to the urgency of sustainable development that takes environmental issues on board. Among the historical documents signed in Rio was Agenda 21[1], through which countries committed themselves to promoting sustainability through a great variety of means, including education. Recognizing that no nation could resolve these issues on its own, those attending the Summit signed agreements on international cooperation for tackling development and environmental concerns, such as *"the perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy and a continuing deterioration of the ecosystem, on which we depend for our well-being"* (p. 2). Most significantly, Agenda 21 of the Earth Summit called for a global partnership for sustainable development (UNESCO, 1992, Preamble), which led to a declaration of a Decade of Education for Sustainable Development from 2004-2014 at the Johannesburg UN conference in 2002.

We all understand that today most environmental problems and challenges are global and borderless, affecting life supporting systems of the earth across countries, including Tanzania. These problems include environmental pollution, deforestation, land degradation, lack of access to safe and clean water, loss of biodiversity and global warming (UNEP, 2012). As a consequence, these problems incapacitate earth's ability to provide for her diverse population. Cognizant of the environmental problems and the associated impacts, Tanzania, like many other countries, has shown a strong commitment in an effort to implement Agenda 21 by enforcing EE in schools. Hence, the Tanzanian educational system has included EE

[1]'Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations Systems, governments and major groups in every area in which humans impact on the environment' The Rio Declaration on Environment and Development in (1992)

content in its curriculum throughout different levels. For example, objective 13 in the Social Studies curriculum (2005), Science Syllabus (2005) and 'Stadi za Kazi'[2] syllabus (2005) of the primary schools reads 'Kuthamini na kupenda kuhifadhi mazingira.'[3] This objective is handled through several content topics in these syllabuses and at the different grade levels. However, EE content is dominant in social studies and science subjects (MoEC, 2005). One can assume that if EE is adequately addressed at primary school level, awareness will be created and most likely sustained, since personalities are easily molded and shaped at earlier ages (Kimaryo, 2011). Siraj-Blatchford (2009) and Davis (2009) emphasize that early years have an indispensable role in achieving goals of sustainable development in terms of raising necessary attitudes, values and behaviors towards environmental, economical and social 'pillars of sustainability'[4].

The country's Net Enrolment Ratio (NER) has been about 95 percent between 2003 and 2013 (BEST, 2014). From developmental science, studies have shown that experiences deeply felt by children are likely to be carried with them throughout their lifespan (Pressoir, 2008; McCain, Mustard & Shanker, 2007). Mustard (2000) and Rutter (2002) add that, childhood years are the period of the greatest and most significant developments in a person's life and are generally regarded as the foundation upon which the rest of life is constructed. Yet, the early years are those that traditionally receive the least attention from the education world, especially in the field of environmental education and education for sustainable development (OECD, 2006).

In line with that, both the old and new Tanzanian Education and Training Policies (ETP) of MoEC (1995) and MoEVT (2014) emphasize in their objectives the need to provide knowledge from childhood such as preprimary and primary school children. The rationale has been on the holistic development of the child in physical, mental, moral, attitude and social dimensions. It further emphasizes that education that is provided in schools must build capacity for students and the community to be responsible citizens with a culture to love and care for the environment. Education should help children acquire values, appreciate, respect and develop pride and identity in their societies. In countries like Finland EE has been placed in the national curricula for primary education and *"[r]esponsibility for the environment, well-being and sustainable future"* is the objective of basic education (Finland National Board of Education, 2004, p. 39). Other countries which have included EE in their school curricula include Australia, Germany, France, USA, Hongkong, Kenya and Tanzania to name a few. Nevertheless, in many countries EE is still a non-mandatory content in school curriculum (Mutisya, 2011; Eames et al., 2008)

[2] In English it is translated as "Vocational skills"

[3] In English it is translated as "To value and like to protect the environment".

[4] 'Pillars of sustainability' as expressed in www.thwink.org means a pictorial representation of the three fundamental aspects of sustainability i.e. Ecology, Economy and Culture

Following the education and training policy in 1995, the government of Tanzania necessitated the formation of the National Environmental Policy (NEP) of 1997. It stresses that the lives of all Tanzanians are closely connected to the environment. The economy of the country depends entirely on the country's environment and natural resources, and 66% of the Gross Domestic Product (GDP) is realized from agriculture, forestry, fisheries, livestock, water, energy, tourism and mining activities (URT, 2005a). Thus, the current survival and that of future generations depends very much on the relationship with the natural elements. The Tanzania Development Vision 2025, states, inter alia, that a strong and competitive economy will be pursued while *"effectively reversing current adverse trends in the loss and degradation of environmental resources and the accumulation of hazardous substances"* (p.14). The National Strategy for Growth and Reduction of Poverty (NSGRP) has mainstreamed environment and set a framework on national efforts from 2005-2010 on achieving higher and sustainable levels of growth and reduction of poverty. Poverty is a widespread phenomenon in Tanzania and is perceived by many as both a cause and consequence of environmental degradation. The percentage of population living below the poverty line of USD 1.25 per day is 67.9% (UNEP, 2012). People who lack adequate resources have little alternatives and are likely to overuse their environment. Thus, the issue of how poverty impacts the environment and how a degraded environment reinforces poverty are mutually interrelated processes. The National Environmental Policy identified the country's six major environmental problems, which include: environmental pollution, land degradation, lack of accessible, good quality water for urban and rural inhabitants, loss of wildlife habitats and biodiversity, deterioration of aquatic systems and deforestation. Following these challenges, the policy stipulated, among other objectives, to raise public awareness and understanding of the essential linkages between environment and development, and to promote individual and community participation in environmental action; to ensure sustainability, security and equitable use of resources for meeting the basic needs of present and future generations without degrading the environment or risking health or safety (URT, 1997).

To strengthen the environmental policy, later in 2004 the government established Environmental Management Act (EMA) No. 20 stating clearly that, environmental education is a statutory requisite for ensuring sound environmental and natural resource utilization in the nation, in order to improve quality of life and social wellbeing of people (URT, 2004). As a result, EE content was integrated into the Tanzanian national educational system. For example, the 2005 primary education curriculum realizes EE through the following objectives:

- To encourage and promote the overall personality development of the child in physical, mental, moral and social characteristics and capabilities;
- to mold the character of the child and enable him or her to develop acceptable norms of social conduct and behavior;

- to help the child acquire, appreciate, respect and develop pride in the family, his or her cultural background, moral values, customs and traditions as well as national ethics, identity and pride (URT, 2010, p. 20).

According to the report URT (2008), the overriding objective that made the Ministry of Education and Vocational Training integrate EE in curricula for preprimary, primary, secondary schools, Teachers' and Vocational Training Colleges, was to continue preventing an adverse impact of environmental problems or degradation on the quality of human life, by imparting knowledge that will enhance sustainable development through actions that will protect, preserve and conserve the environment for the benefit of future generations. The report further outlined the strategies to attain that objective. These include:

- to conduct capacity building for teachers at all levels on EE;
- to promote teaching methods, which are child-centered, with a variety of inquiring methods, problem-solving, critical thinking and practical learning;
- to empower learners to be able to relate environmental content to real life that will promote active learning; and lastly
- to promote environmental conservation practices, including, but not limited to, planting trees in schools and other educational institutions.

Despite these strategies, literature shows that implementation of EE has yielded little results and environmental problems in Tanzania keep mounting day by day (Kimaryo, 2011; Wells et al., 2007). This suggests a need for critical analysis of the implementation process.

Nevertheless, teachers are key elements to the successful integration and implementation of EE in schools. A comprehensive integration strategy demands a great deal of cooperation from the teachers and they must be in favor of the integrated EE curriculum (Volk, 1993, p. 58). Other researchers agree that for EE to be successfully integrated into the curriculum, teachers need background information to provide ideas and strategies to teach about environmental issues (Disinger, 1993; Braus, 1993; Simmons, 1989). A plethora of studies have found that the teaching of EE in many schools is not implemented effectively, not only in Tanzania, but also in many other countries (Kimaryo, 2011; Mtaita, 2007; Barraza, Duque-Aristizabal & Rebolledo, 2003). Studies by Mastrilli (2005) and McKeown-Ice (2000) have pointed out that actual implementation depends on the motivation of the individual instructor. This suggests that the implementation of EE is a complex and a challenging process for educators. As argued by Rauch and Steiner (2005), the integration of EE into the school curriculum is an innovation in education; therefore it requires an appropriate design and implementation of teacher programs and conceptual changes. Nevertheless, Wright (2002) is of the opinion that, without an implementation plan that takes account of educators, environmental policies will remain statements of intent and will not be used to guide the daily activities of institutions. A study done by Yero (2010) restates that the most important factor that affects students learning is quality of teaching. The study emphasizes the lack of attention to teachers in issues of educational planning and adds, that, at times, teachers are perceived as 'constants', much like the books, desks and other objects in an educational

environment. A considerable body of literature, across different areas of the curriculum, suggests that unless curriculum developers take account of teachers' beliefs in designing new curriculum materials, these materials are unlikely to be implemented as intended (Cotton, 2006; Brown & McIntyre, 1993; Ball & Bowe, 1992). Moreover, policy makers increasingly recognize that schools cannot be better than the teachers and administrators who work in them (Guskey, 2002).

However, successful integration of educational innovation or change cannot be simply determined and explained by the implementation process. There are other prior important actors and factors which can foster or impede this process. These include the government which is responsible for designing sound educational policies and laws, training as well as financing the entire education system; curriculum specialists who are capable to translate the policy and involve teachers to design quality curriculum, ensure quality of teachers and provide T/L resources. The heads of schools also have the role to ensure the school climate is conducive and teachers have what they need to implement the change. It is a collective responsibility that ensures successful implementation of innovations/change in education as explained in theoretical framework in chapter two. On the other hand, understanding the social and cultural purposes of schooling is crucial to determine and explain success or failure of innovations/change in education. This study therefore intends to involve curriculum specialists, heads of schools as well as teachers to have a broader picture on the integration of EE in school curriculum. Documents such as the educational policy and curricula will reflect the government position and role to ensure educational goals and objectives are clear and feasible.

1.2 Statement of the problem

Evidence from studies shows that human beings are degrading the Earth's ecosystems, creating serious problems for all creatures and causing unknown long-term changes to our planet (McMichael & Lindgren, 2011; O'Brien, 2010). Environmental education is identified as one of the important tools which enhance the realization of sustainable utilization of environmental resources (URT, 2009; UNESCO, 1978). On this basis, EE has been integrated in school curricula of many countries, including Tanzania. Despite the fact that EE has been integrated at all levels of education in Tanzania for more than two decades, yet studies have shown that its implementation in schools is not successful. Numerous recent local and international studies commend that the implementation of environmental education has not been successful while the state of environment is deteriorating. These studies have found common barriers to the successful implementation in schools, which can be categorized into either personal or logistical barriers according to Ko and Lee (2003). Such barriers include lack of: self initiatives and motivation, as well as proper teacher training, T/L resources, funds, adequate teaching time due to overloaded curriculum thus leading to lack of outdoor activities to name the most common. Examples of studies in Africa and Tanzania in particular include those of; Kiarie (2016), Mwanza (2016), Kelani (2015), Nsamenang & Tchombe (2011) and Ajiboye and Silo (2009), and in Tanzania: Mwendwa (2017), Kimaryo (2011) and

Mtaita (2007). Studies from outside Africa include: Kuwahara et al. (2017), Morrison (2013), Salih & Yahya (2009), Pulkkinen (2006), and Barraza, Duque-Aristizabal & Rebolledo (2003). The reviewed studies have shown that most researchers have placed emphasis on teachers and students as main determinants for successful implementation of EE (as shown in Chapter two). Moreover, literature review shows that there is dearth of research in an attempt to critically analyze and understand the integration of EE in basic primary education despite the fact it forms a foundation upon which the rest of life is constructed. Many studies have concentrated on understanding the status and the implementation of EE in secondary education (Mwendwa, 2017; Allen, 2008; Ndeskoi, 2007) and very little is known about the status of EE in Tanzanian primary education (Kimaryo, 2011; Mtaita, 2007). Thus, conducting a study on EE integration into primary school curriculum in Tanzania is of great importance, since the majority of the population (over 90%) has sure access to this level of education. Exposing and investing in such a large human resource with proper environmental knowledge, awareness, skills and values will enable them to care and sustainably utilize the environmental resources, to improve their individual and societal wellbeing.

On this basis, the present study aims to explore the views and perceptions not only of teachers but also of other educational actors with higher authority who work more close with teachers (i.e. curriculum specialists and heads of schools) to better explain the mechanism of introducing educational innovations /changes into the primary school curriculum and how its success or failure is determined by each of these actors in the system and not only by the implementers in the field (teachers in this case). Understanding the perceptions of heads of schools as well as curriculum specialists towards EE will shed more light, since their roles can influence the attitudes of teachers, who are the key implementers of EE (Pedretti & Nazir, 2014; Potsi, 2013).

1.3 Purpose

The aim of this study is to answer the main research question, which states:
How is EE for sustainability perceived by educational stakeholders (curriculum specialists, heads of schools and teachers) and how is it integrated into the primary school curriculum in Tanzania?
Specifically, the study intends to explore:

1. The views and perceptions of teachers on environmental experiences, issues and challenges.
2. Teachers' views and perceptions on EE content, instructional methods and resources in integrating EE content into their subject curriculum.
3. Teachers' views and perceptions on their motivation and professional development on environmental/sustainability issues.
4. Views and perceptions of heads of schools (HoSs) and curriculum specialists (CSs) on the integration of EE and their role in teacher motivation.

Research Questions

1. *What views and perceptions do teachers have on environmental experiences, issues and challenges?*
2. *How do teachers perceive EE? And what instructional methods and resources do they use in integrating EE content into their subject curriculum?*
3. *How do teachers perceive their motivation and professional development on environmental/sustainability education?*
4. *How do Heads of schools and curriculum specialists perceive EE integration and how do they motivate teachers to successfully integrate EE into their teaching?*

1.4 Rationale

The environment and contested notions of sustainability are increasingly topics of public interest, political debate and legislation across the world. Wide research on EE has been done from a variety of methodological traditions linking between the environment, health, development and education. Thus, conducting a study on school curriculum regarding environmental issues is deemed necessary (Stevenson, et al., 2013)

Environmental Education is an integral component of the old and current Tanzanian National Education and Training Policy documents (MoEC, 1995; MoEVT, 2014). It is also one of the focuses of Education Vision 2025 and has constituted an agenda in the Primary Education Development Program (PEDP). Apart from its integration in the PEDP in 2002, there appears to be very little critical empirical research on the issue of environmental education in the context of the primary school curriculum in Tanzania. Studies such as Spodek and Saracho (2005) recognized early years of education as essential and an important avenue for social change.

The formal education system provides a good framework for reaching a large segment of the population, making future generations conscious of the importance of environmental conservation and motivating them to take action in this respect. For example, in developing countries like Tanzania, primary education forms part of the basic level of education. As afore said, about 90 percent of the children in the relevant age groups receive at least some primary education (URT 2012), compared to only 13.3 percent who progress to start secondary school (Stralin & Wiman, 2009; BEST, 2016). In general, enrolment ratios are much higher in primary schools than in secondary schools.[5] In addition, given that agriculture is the hub of the Tanzanian economy and about 85 percent of the primary school children who do not progress to secondary education join the local agriculture in rural areas, EE is not only important but essential. The enrolment statistic in figure 1 below shows the importance of the primary education sector in terms of numbers. Climate change as a result of global warming is also advancing in most areas of the world, in ways that feature increasing storm

[5] However, enrolment in four years of junior secondary are expected to rise as the new education policy of 2014 has declared it fee free with effect from 2016 (ETP, 2014).

intensities, shifting rainfall patterns, melting glaciers, rising sea levels and other manifold alterations (Philander, 2008). Therefore, conducting this study at the level of primary education may have a significant qualitative and quantitative impact when it comes to young peoples' thinking, attitudes, feelings and behavior towards the environment.

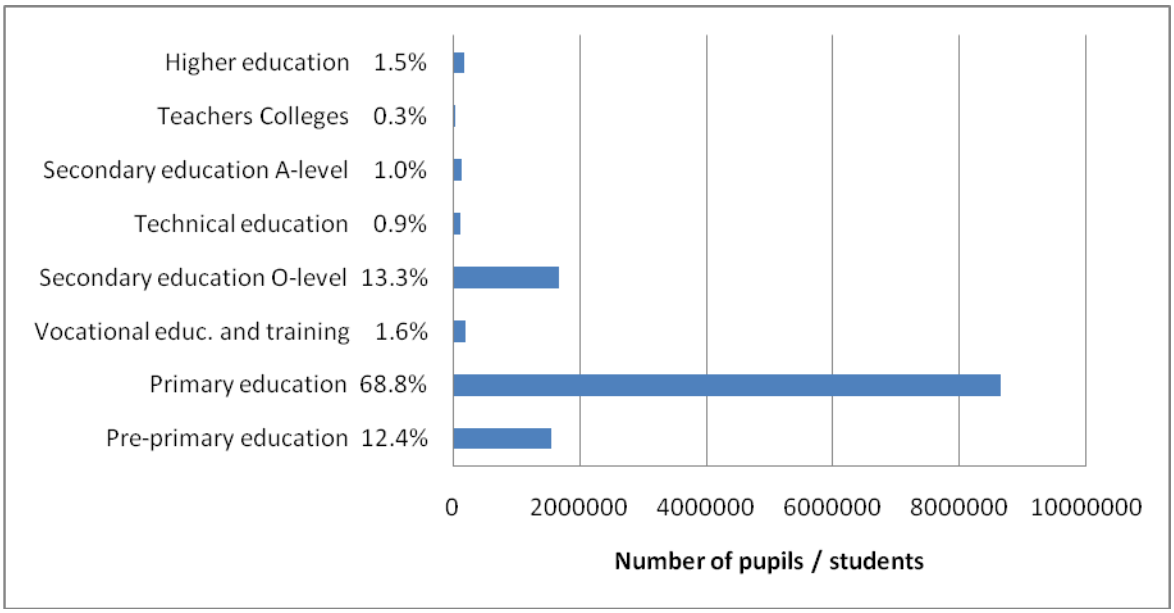

Fig. 1: Education enrolment statistics 2016 by sector (BEST, 2016)

Although environmental education is integrated into all levels of formal education in Tanzania, this study will focus on primary level, because a large segment of the population has access to primary education, and research indicates that early investment in human capital offers significant returns, both to individuals and to the wider community (Davis, 2009). As such, if we do not invest in early years, the future cost and damage will be even higher.

Education at a young age is foundational for the establishment of lifelong skills, knowledge values and attitudes. Therefore, the need to enhance capabilities for sustainable development from a young age is becoming increasingly urgent, as the world braces itself for a future likely to be characterized by global crises like climate change, resource depletion, poverty and food insecurity (UNESCO, 1987; World watch 2013). Hence, conducting research in this area is commended.

1.5 Significance

- The study will offer a current significant insight into stakeholders' views and perceptions in EE in primary schools in Tanzania where there is paucity of research.
- It will also provide a close view on the integration of EE into formal curriculum, its challenges in implementation, and whether its practices promote ESD.
- The study will inform policy makers of the degree of effectiveness of EE in Primary schools and may act as a platform for reform or modifications for positive results.

- The findings from this study will provide vital feedback to the Ministry of Education and curriculum developers on the practice on the ground and effectiveness of the content integrated into the Primary education curriculum.
- Understanding the perceptions and roles of different educational actors in the process of integration of educational innovations and reforms provides an important insight and a sense of collective responsibility towards a successful implementation of change/reforms in school curriculum.
- Moreover, this study may help to reshape sensitization programs conducted by various environmental agencies and NGOs to make them more effective and tailored to the needs.
- Lastly, the study will form a baseline for future researchers embarking on EE issues within and outside the country. Findings will also advance literature in this emerging area of research, especially in a Tanzanian context.

1.6 Scope and limitations

Environmental Education is very important for everyone living on this planet, since we entirely depend on the environment for our well-being. EE can be done formally or informally but in this case, the study will confine itself to a formal system and to primary schools only. Due to limited resources such as time and finance the study is restricted to five schools, public and private; rural and urban in two Regions of Tanzania: Dar es Salaam and Kilimanjaro respectively. (The rationale for the choice of these study sites is detailed in Chapter Three). Hence, it cannot reveal a comprehensive picture of the phenomenon under investigation and any generalization has to be made carefully. Due to its qualitative nature, knowledge is obtained by construction and interpretation from both the researcher and the participants, providing authentic and deep insight, however, lacking the contribution from the quantitative perspective.

1.7 The Structure of the thesis

This thesis is structured into six chapters. Chapter one sets the context of the study and the introductory background. Chapter two presents literature review on key concepts and the theoretical framework with diffusion of innovation in education theory and school theory as main components informing the study. The methodology of the study is discussed in chapter three where the research design is presented. The detailed empirical findings proved by participants' voices are found in chapter four. The presentation of findings is followed by the detailed analysis, discussion and interpretation in chapter five. Finally, chapter six marks the end of this thesis where the study is summarized, conclusions are drawn and feasible recommendations are made with a reflection on theoretical framework and reviewed literature.

CHAPTER TWO: LITERATURE AND THEORETICAL FRAMEWORK

This chapter reviews the literature that covers the origin and development of environmental education (EE) at a global scale and in Tanzania in particular. The conceptualization of the environment, environmental education (EE) and education for sustainable development (ESD) will be reviewed together with the debates on EE and ESD at the global, regional and local levels. This chapter will also cover a description of the human-environment relationship, and global and local environmental problems will be put to light. Moreover, the development of EE and its position in school curricula will be examined at the global and the local level. The Tanzanian education system and the integration of EE contents into primary school curricula will be discussed. EE models and methods for their integration will be explored in conjunction with instructional resources. Last, the literature will put to light professional teacher development and motivation as pre-requisites for the successful implementation of EE. The limitations for teaching EE are also presented, as well as the diffusion of innovation and the school theories which shape the theoretical framework for this study. A review of already existing studies on the integration of EE in school curricula is done and the knowledge gap identified.

2.1 Operational conceptualization of terms and concepts used in this study

Environment – the environment can be defined as the totality of things that surround man and can be categorized into biophysical, social, economic and political aspects.

Environmental Education – is defined as the education 'about', 'for' and 'in/through the environment with the purpose to promote an understanding of the rich and active experiences in as well as an appreciation for the dynamic interactions of the Earth's physical and biological systems; the dependency of our social and economic systems on these natural environments; the scientific and human dimensions of environmental issues; and the positive and negative consequences, both intended and unintended, of the interactions between humanly created and natural systems (Bondar et al., 2007). Thus, promoting critical thinking, problem-solving and effective decision-making skills among individuals and groups (KACEE, 2010).

Education for Sustainable Development – refers to the education that ensures the acquisition of knowledge, skills and values necessary to shape a sustainable future (Mwendwa, 2017) and envisions a better world with a balance between ecology, economy and culture or society (Kimaryo, 2011).

The official school curriculum – is a written document which may contain various components. It is basically a plan for the education of pupils during their enrolment at a given school which represents curricular frameworks and courses of study set forth by the state or district officials who expect teachers to teach it and students to learn it.

Integration - is the fusion or infusion of content and skills into the already existing curriculum/courses without jeopardizing its integrity.

Fusing environmental content into different subject areas at all levels of the curriculum encourages team teaching thus increasing the knowledge of other disciplines and provides unique skills to teachers of lesser abilities (Drake, 2012; Hungerford, Volk and Ramsey, 1994).

View – in this study is referred to as a personal opinion, thought or observation on a subject (Oxford Advanced Learners' Dictionary of current English) (3rd edition)

Perception - is referred to as the way of regarding, understanding or interpreting something (Consise Oxford English Dictionary) (11th edition)

2.2 Perspectives on the environment

According to Tani (2006), EE can be properly conceptualized after a clear definition of the term 'environment'. Tani affirms that many studies on EE and its implementation were conducted without clearly conceptualizing the term. Different societies have defined 'environment' in different ways depending on their cultural values and beliefs. Knowledge about people's perceptions of the environment and how they relate to it has been found to be important for their adoption of attitudes and environmental behaviour as well as in the T/L of EE (Ballantyne & Packer, 1996). Tani (2006) analyzed research done between 1995 and 2004 and identified three different ways of how individuals view the environment: as an *entity*, as an *experienced phenomenon* and as a *socially/culturally produced phenomenon*.

The perception of the environment as an *entity* is taken to be something which is separate from man. It is seen as an object like the sun or the moon. This can be called an 'objective view' of the environment. It implies that knowledge about the environment can be obtained through scientific research. The second view perceives the environment as an *experienced phenomenon*. In this view, it is seen as a space which surrounds an individual, i.e. where the individual is at its centre and has control over the environment. This is a subjective view and constitutes a setting for man's life. The third perspective views the environment as a socially/culturally constructed phenomenon where man is seen as an integral part of the environment and shapes it through his/her social and cultural behaviour. This implies that knowledge about the environment depends on the understanding of man and his/her socio-cultural aspects and not only on the environment itself.

The environment should therefore be considered in its totality, which refers to the quality or state of being holistic to include all aspects of a given phenomenon. In this sense, the environment can be defined as the totality of things that surround man and can be categorized into biophysical, social, economic and political aspects. UNEP (2005) emphasizes that a holistic understanding of the environment in the context of sustainable development is central for EE and stresses that good governance through political systems – in which power is exercised fairly and democratically to make informed decisions on the way social, cultural, political and economic systems use the bio-physical sphere – is highly required so as to

ensure the effective and balanced integration of the three 'pillars'[6]. Thus, EE helps create an awareness of the interdependence of these pillars so as to enhance environmental responsibility among nations. EE is regarded as an important tool for solving environmental problems caused by human activities (Tsuma, 1998). Therefore, it is very important to understand how to work towards solutions through laws, policies and the development of technologies; but EE should also help people realize that solving environmental problems is a collective responsibility of both governments and themselves (Budvytytė, 2011), as shown in figure 2.

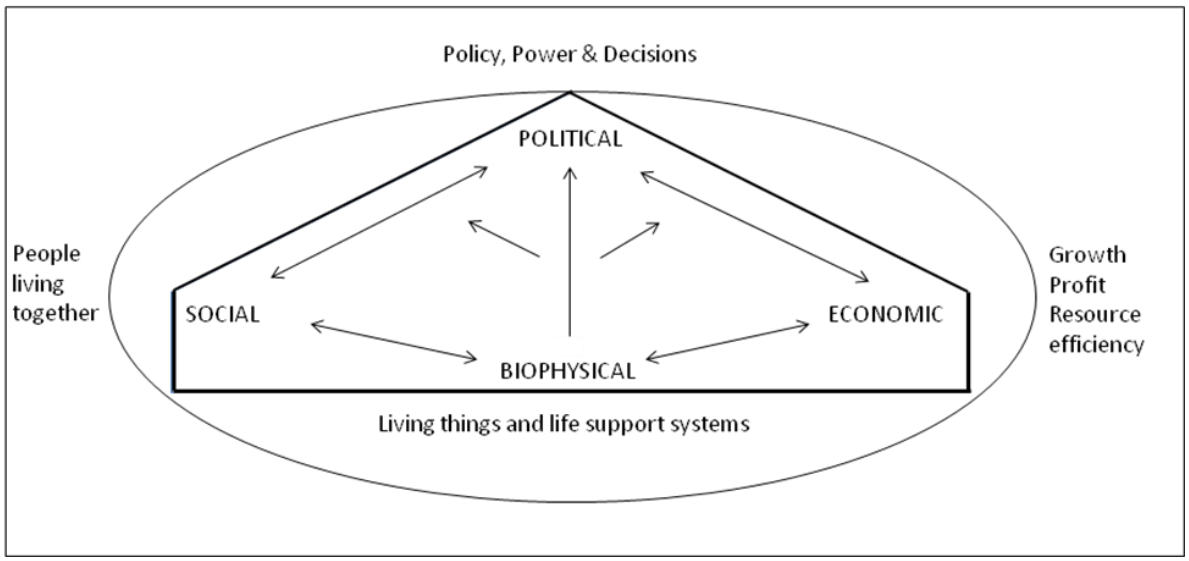

Fig. 2: Dimensions or holistic view of the environment, adapted from O'Donoghue (1993)

- The biophysical dimension includes living and non-living things as well as the natural systems of the environment. It sustains the life-support systems and the base of the economic, social and political dimensions. The biophysical sphere encounters issues of natural resource depletion, increased greenhouse gas emissions, overflowing landfills, rising sea levels and polluted waterways with a focus on how the poorest countries are most affected by these challenges in terms of poverty, migration, food and water scarcity as well as healthcare problems (Siraj-Blatchford et al., 2010).

- The socio-cultural dimensions refer to people living together as part of the environment and deal with participation, security, freedom, emancipation, solidarity, equality and fairness that affect the quality and continuity of people's lives – between individuals and groups, within and beyond national borders as well as between generations.

[6] As mentioned before these pillars are: 'ecology, economy and culture' (UNESCO, 2006, 2012)

- The political dimension refers to the condition that enables people to contribute to and influence the policies and decisions that shape access to resources, the economy and how people live together (O'Donoghue & Russo, 2004).
- The economic dimension is the system within which different production sectors can be found and jobs exist in order to enable individuals to pay for the resources they need. However, economic activities have an impact on the environment, and in turn, the environment can affect economic activities. This dimension is concerned with reducing the direct environmental burden of producing, using and disposing of goods and services, increasing the development and adoption of energy- and water-efficient appliances, public transport and other demand-side measures, as well as the production and sale of new goods and services being adapted to global environmental constraints. It is therefore important for teachers and pupils to understand the environment in its totality so that they can value it.

Human-environment relationships

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature (Schreuder, 2009). Man-environment relationships date back to the pre-historic era of humankind. Humans depend on their relationship with the environment for safety, health and survival. In numerous ways, humanity is linked to the millions of other species on Earth. What concerns them equally concerns us. The more we ignore the general ecosystem's health and welfare, the greater are the many threats to our own species. The better we understand and the more we rationally manage our relationships to other living beings, the greater is the guarantee of our own safety and quality of life (Chivian & Bernstein, 2008). Chivian and Bernstein (2008) emphasize that to a larger extent than we might imagine, human health depends on the health of other species and on the healthy functioning of natural ecosystems.

There is a significant relationship between living things, particularly man, and the environment. This relationship is intensified by the human motives to improve the quality of life and, consequently, our socio-economic and political development. Thus, such interdependence compels human beings to respect and use the environment sustainably for present and future generations. Humanity is increasingly using the world's environments, leaving less space for other creatures. Examples of this increase in the scale of human life include large-scale agriculture and land development that destroy habitats and deplete resources, the increase in pollution and human population that make ecosystems less hospitable to other species (O'Brien, 2010). Human activities are drastically altering global biodiversity, with potentially severe consequences for ecosystem functioning. For example, hunting pressures have frequently caused species to disappear locally, often as a lead-up to global extinction. In recent years, humanity has played an important role in the destiny of species, with many having disappeared or currently being threatened with extinction, while others have largely changed their distribution (Penuelas, & Fillela, 2001; Flambaum, 2008). According to Social Ecological Systems (SES) concept, human social behaviours are altering

many of the factors that determine the fundamental properties of ecological systems, which in turn alter the capacity of the environment to sustain human societies (Pérez-Soba & Dwyer, 2016). In the last fifty years, humans have changed ecosystems more quickly and extensively than during any comparable period of human history. The Arctic, for example, is now experiencing some of the most rapid and severe climate changes on Earth (UNEP, 2017; Worldwatch, 2013). Milan et al. (2015) state that climate change and its associated calamities are a global challenge as well as key drivers of migration and dislocation now and in the future. Over the next 100 years, it is expected to accelerate, contributing to major physical, ecological, social and economic changes, many of which have already begun (Vanderheiden, 2008). For example, climate change currently contributes to the global burden of diseases and premature deaths as well as adverse health impacts from diseases like malaria, dengue and diarrhoea which are more prevalent in low-income countries (Gemeda & Sima, 2015).

2.3 Global Environmental Problems

According to UNEP (2012), the global community is facing a number of environmental problems and issues. These are climate change, the depletion of stratospheric ozone, pollution (air, water, land), ocean and land degradation, the worldwide spreading of persistent organic pollutants and the loss of biodiversity. These problems have common characteristics and are not independent from each other, but rather mutually linked together. Human beings are victims of these global problems, but also the only solution provider. These problems foster the need to bring about sustainable livelihoods and development, as presented in the next sub-section.

2.3.1 Sustainable Development (SD)

The term sustainable development (SD) was discussed, popularized and defined in the World Commission on Environment and Development (WCED) report in 1987 – commonly known as the Brundtland Report – as a *"development which meets the needs of the present without compromising the ability of future generations to meet their own needs"* (WCED, 1987, p. 24). The attention to SD was raised after the damaging and deterioration of the global social and environmental networks due to using the wrong types of technology in development projects (UNESCO, 2012). The impacts of humankind on the Earth's ecological systems (in terms of climate change, resource depletion as well as the extinction of species) highlighted the urgent need for SD (Elliott, 2010). Thus, the kind of sustainability addressed in the report focused on three main points (Tilbury, 1995):

- the need for reconciliation between economic development and environmental conservation;
- the need to place any understanding of environmental concerns within a socio-economic and political context and
- the need to combine environmental and development concerns.

On a similar vein, studies by World Watch (2013), Ehrlich and Ehrlich (2013) as well as the WWF (2012) maintain that over the last 50 years, human socio-economic development has continued to compromise the biosphere's ability to support life on Earth through phenomena such as climate change, widespread chemical pollution, stratospheric ozone depletion, biodiversity and species loss, freshwater depletion, desertification and more.

SD is an enigmatic concept which has been debated with varying definitions over the past two decades (Drexhage & Murphy, 2010). Nevertheless, a few common principles can be emphasized. The first one is a commitment to equity and fairness according to which priority should be given to improving the conditions of the world's poorest, and that decisions should account for the rights of future generations. The second one is a precautionary and long-term principle. In the Rio declaration on the environment and development (UNCED, 1992), principle 15 states that *"[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environment degradation"(p. 3).* The third highlight embodies the integration, understanding and acting on the complex interconnections that exist between environment, economy and society. UNESCO (2012) accentuates that sustainability is a paradigm thinking about a future in which environmental, social and economic considerations are balanced and intertwined in the pursuit of development and an improved quality of life. Therefore, SD is a visionary development paradigm which is generally accepted and calls for a convergence between the three pillars (ecology, economy and socio-cultural life) in order to achieve sustainability. Recognizing the interdependent nature of these three pillars is paramount (Drexhage & Murphy, 2010). Thus, sustainability is often regarded as a long-term goal to achieve a more sustainable world, and SD is the means and processes to achieve it, for example through sustainable agriculture, education and training, sustainable production and consumption, to name just a few (UNESCO, 2012).

Since the Agenda 21[7] was passed, education and capacity-building have been increasingly recognized as critical to help shift societies towards SD. Sustainability is now recognized as the process of adaptive management and system thinking, requiring creativity, flexibility and critical reflection (IUCN, 2004; Tilbury, 2003).

2.3.2 Education for sustainable development and environmental education

'Education for sustainable development' and 'environmental education' are terms that have given rise to a debate on how they should be defined and how they relate to each other. Some arguments state that ESD has evolved from environmental education (Yang, Lam & Wong, 2010; Tilbury & Cooke, 2005). Other authors claim that these terms are synonymous and can be used interchangeably; even others say EE has changed its name to become ESD (McKeown & Hopkins, 2009). Hence, there are varying perspectives on the relationship between them. A closer look at ESD and EE reveals that both have the same vision, with a

[7]'Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations Systems, governments and major groups in every area in which humans impact on the environment' The Rio Declaration on Environment and Development in (1992)

focus on creating a better world and establishing a balance between economy, ecology and society. Hence, education for sustainable development (ESD) is a vision of education that seeks to balance human and economic wellbeing with cultural traditions and respect for the Earth's natural resources. The former UN Secretary General Ban Ki-Moon once said: *"We hold the future in our hands. Together we must ensure that our grandchildren will not have to ask why we failed to do the right thing, and let them suffer the consequences"* (High-Level Meeting "The Future in our Hands: Addressing the Leadership Challenge of Climate Change", 24 September 2007).

On the other hand, KACEE (2010) defined EE as a process directed towards creating an awareness and understanding about environmental issues, promoting critical thinking, problem-solving and effective decision-making skills among individuals and groups. This has been used as the operational definition in this study as explained above. Moreover, the International Union for the Conservation of Nature IUCN (2008) explains EE as the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness between humans, their culture and their bio-physical surroundings.

These definitions reflect the three main goals of EE that were defined during an intergovernmental conference held in Tbilisi in Georgia in 1977. These were:

- to foster a clear awareness of, and concern about, the economic, social, political and ecological interdependence in urban and rural areas;
- to provide every person with the opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment and
- to create new patterns of behaviour towards the environment among individuals, groups and the society as a whole (UNESCO, 1977, p. 26).

These goals address five main categories of objectives: awareness, knowledge, attitudes, skills and participation. All of them aim at helping social groups and individuals with the following:

- acquire awareness and sensitivity towards total environment and its associated problems – **Awareness**.
- gain a variety of experiences in and a basic understanding of the environment and its associated problems – **Knowledge**.
- acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection – **Attitudes**.
- get skills in identifying and solving environmental problems – **Skills**.
- have an opportunity to be actively involved at all levels in working towards the resolution of environmental problems – **Participation.**

EE goals are guided by a number of principles on how EE ought to be conceptualized and implemented in order to help resolve environmental problems and to achieve sustainable livelihoods. The more fundamental principles include:

- First, considering the environment in its totality, i.e. natural and man-made, technological and social (i.e. economic, political, cultural, historical, moral and aesthetic) environments.
- Second, EE should be a continuous, life-long process, commencing at the pre-school level and continuing throughout all formal and non-formal stages.
- Third, EE should be interdisciplinary in its approach, drawing on the specific content of each discipline by enabling a holistic and balanced perspective.
- Fourth, EE should examine major environmental issues from the local, regional, national and international perspectives for learners to acquire insights into the environmental conditions of other geographical zones, but also to promote the cooperation in preventing and solving environmental problems.
- Fifth, the focus should be on current and potential future environmental situations while taking into account the historical perspective.
- Sixth, EE has to emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills.
- Last but not least, EE should utilize diverse learning environments and a broad array of educational approaches to T/L about and from the environment with an emphasis on practical activities and first-hand experiences (UNESCO/UNEP, 1978).

Both EE and ESD are seen as tools for bringing about sustainable development. EE is inseparable from SD; both tools have more common features than differences. The model of ESD is based on the UNESCO (1977) Intergovernmental Conference on EE, which capitalizes on the balance between ecological, economic and social development, which also accounts for EE. Issues of biodiversity, environmental problems and the concept of sustainable development form the core of both concepts. The ecological, social and economic systems are interdependent complex systems. As such, they are heterogeneous, dynamic, non-linear with adaptive groups of actors who have influence within each of the three realms (Center for the Study of Complex Systems, 2002). Figure 3 shows this complex interaction of pillars of sustainability.

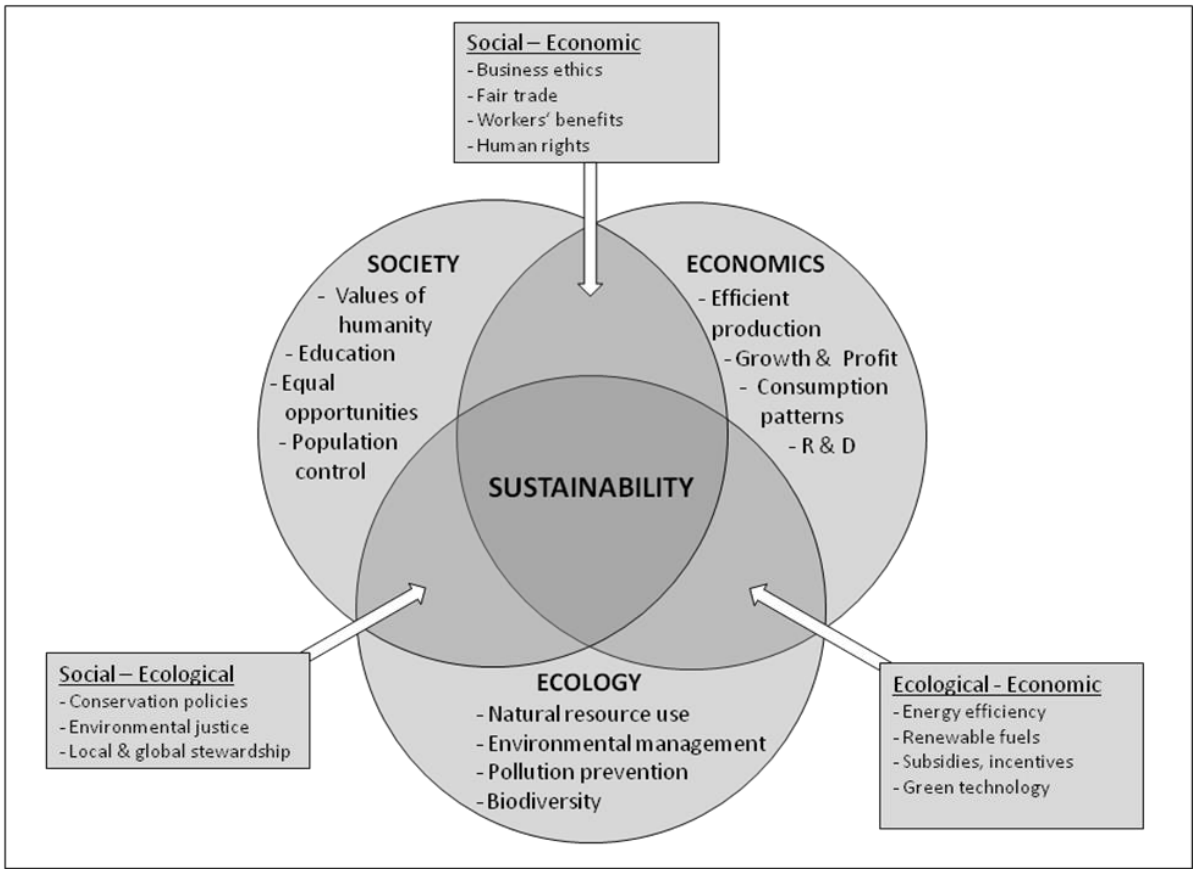

Fig. 3: Pillars of sustainability adapted from University of Michigan Sustainability Assessment (2002)

- The ecological or environment component is the ability to hold the three basic functions of the environment: the power function of resources; waste receptor function and the direct utility. By its complexity the ecological component of SD does not only capture the actual economic development in relation to the environment, but the entire development. Environmental development ensures the protection considering physical and biological system stability and develops their capacity to adapt to change as well as renewal of natural resources and environmental heritage (Bran, 1991 as cited in Duran et al., 2015). Thus, economic growth should not affect the environment to attain SD.

- The economic development component is desired to produce a maximum flow of income in terms of rational use, resource efficiency especially with scarce resources. The main concern is related to how countries develop their economies. Rapid economic growth with obtaining maximum profit creates a heavy burden on the ability of the planet to support. From the perspective of SD, economic growth should be such that negative environmental impact is limited. Thus, development must be conceived as a multidimensional process, involving major changes in social structures, attitudes and national institutions aiming at accelerating economic growth, reducing inequality and eradicating poverty.

- The societal or cultural component has regard to social interactions, relationships, behavioural patterns and values of humanity. It aims at achieving fairness and socio-cultural stability and diversity. It is also geared to promote education, training and public support for the environment, to protect and promote human health, fight against poverty and control population growth. Realizing the need for further social development is imperative to protect and improve the state of the environment in order to create and maintain the welfare of both the present and future generations (Dempsey et al., 2011).

ESD began to be consolidated when world leaders agreed that the concept of sustainable development should be actively pursued as a global goal. From the time it was endorsed in the UN General Assembly in 1987, the parallel concept of education supporting SD has been explored. From 1987 to 1992, the concept of sustainable development matured, as committees discussed, negotiated and drafted the 40 chapters of the Agenda 21. The initial thoughts concerning ESD were captured in Chapter 36, "Promoting Education, Public Awareness and Training" (UNESCO, 1992). A series of major UN conferences helped further develop the concept of sustainable development. Each of them also contributed to the conceptual framework of ESD. All of these UN conferences recognized the importance of education and advanced the evolution of ESD from an international perspective.

ESD deals with the links between humans and nature – as they relate to the health of our planet – and also with our responsibilities towards the health of the present and the future world. As such, education is then the key to any sustainable development programme (Shohel & Howes, 2011). The Decade of Education for Sustainable Development (DESD) was adopted by the UN General Assembly in December 2002 for 2005-2014 so as to enhance the central role of education and learning in the quest for sustainable development, to facilitate links and networking, to provide an environment for refining and promoting the vision of and transition to SD, to foster an increased quality of teaching and learning of ESD and to develop strategies to strengthen capacities in ESD (UNESCO, 2006). Hence, ESD is an evolving approach with key characteristics of holism and interdisciplinarity, critical thinking, participatory decision-making, applicability, local relevance, a pluralism of pedagogies and fostering values that underpin SD. Its main aims are social empowerment and building personal capacities for future-oriented thinking and action (UNESCO, 2006). However, within the field of ESD, educators debate whether we should attempt to change pupils' sustainability behaviour or the opportunities they have to learn for themselves how to behave, or to make other appropriate changes in line with the international sustainability mission (Blewit, 2009; Jensen & Schnack, 2006). Educators also debate the educational frameworks in which such analysis occurs.

2.4 Development of environmental education

"We are living at a time when environmental issues are receiving unprecedented attention" (Taylor et al., 2009, p. 3). According to UNESCO (2007), research into EE came up in the 1970s, and since then, numerous formal and non-formal education programmes have been

designed and implemented at various regional and international levels. These EE programmes are globally seen as being vital components of the fight against environmental degradation (Taylor et al., 2009). Nevertheless, an empirical evaluation of those programmes is still missing, and therefore, it is difficult to evaluate their effectiveness (Walsh-Daneshmandi & MacLachlan, 2006). As emphasized by UNESCO (2002) that,

> [e]ducation, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for achieving environmental and ethical awareness, values and attitudes, skills and behavior consistent with sustainable development and for effective public participation in decision-making (p. 4)\

2.4.1 Environmental education: An international perspective

The actual concerns for EE emerged in the late 19th and early 20th centuries, with a major focus on the promotion of nature and outdoor activities, essentially in primary education and later with the conservation movement. According to Wheeler (1975), the nature focus became well-known through rural studies in countries like the UK, while in Australia, it became prominent through the school camps movement. According to Dreyer (1996) this is a traditional view according to which the environment is related to nature and ecology studies. In the same vein, the 1891 publication by Wilbur Jackman, 'Nature study for the common schools', made nature studies well-known in the U.S.A. (Stevenson, 2007). The conservation movement grew gradually and raised concerns for the preservation of species and areas of natural significance through sound management, which was expressed by Aldo Leopold in his 1948 'Sandy County Almanac' in moral and aesthetic as well as political terms (Stevenson, 2007). According to Stapp (1997), conservation education aimed at supporting people to better understand the significance of natural resources to the society, and the liberal progressive educational philosophies by Dewey, Rugg and Counts shaped the perspective of these movements. These studies were fairly widely incorporated into school curricula and aimed at developing peoples' knowledge, skills and awareness about natural resources and their management. However, nature studies and conservation education could not challenge the socio-economic and political frameworks of the society (UNESCO, 1977).

Environmental education in Europe got more momentum and was turned into a formal discipline of sensitization by outdoor educators and conservationists in the 1960s, as well as by official publications and conferences held in the late 20th century. Examples of these publications include 'Silent Spring' by Rachel Carson in 1962 who warned about imminent ecological disasters, followed by 'The Population Bomb' by Paul Ehrlich in 1968. He called for immediate action on population growth due to limited resources, predicting mass starvation in the 1980s. However, his idea was criticized by Marxists who saw the unequal distribution of resources to be a major problem and not the growth of the world population as such.

The United Nations Environment Programme and the International Environmental Education Programme (which was held in Belgrade, Serbia, in 1975) were a result of the United Nations

(UN) International Conference on Human Environment in Stockholm, Sweden, in 1972 which declared the importance of the sustainable utilization of natural resources and of conservation for the wellbeing of people and global economic development. It also declared that EE and integrated development planning are vital (Velempini, 2016).

The main objectives of the Belgrade conference were to foster the awareness of social and ecological interdependence; to conduct research about pedagogy and methods for EE and to train personnel through courses for pre- and in-service teachers and curriculum developers (Palmer & Neal, 1994). This was picked up by the Tbilisi conference in 1977 which mainly influenced educational policies. And so, EE was integrated into school curricula mainly through infusion, as explained by Drake (2012). The infusion approach focuses on the principle that environmental concerns have an effect on every aspect of life, and thus, EE must be integrated into all school subjects. This was further emphasized by the Brundtland Commission in 1987 which stated that *"[g]overnments should strive to update or prepare strategies aimed at integrating environment and development as a cross-cutting issue into education at all levels"* (p. 136). Thus, economic development and environmental stability were linked in sustainable development, which means meeting the needs of the present without compromising the ability of future generations to meet their own needs (UNESCO, 2012). The report for this Commission was published as 'Our common Future' in which education was regarded as central*: "The changes in human attitude that we call for depend on a vast campaign of education, debate and public participation"* (Brundtland Commission, 1987, p. 8). The recommendations from this Commission have urged many countries to integrate EE into their educational policies.

The 1992 Earth Summit held at Rio de Janeiro, Brazil, was influenced by the debates of the 1987 Brundtland Commission. This summit's focus was on the Agenda 21 which emphasized that environment and development should be integrated by governments as an essential component of learning and as a necessary requirement to achieve SD in the 21st century. Based on the Agenda 21, many countries across the world have integrated EE at all levels of education (Velempini, 2016; Stevenson, 2007; Stokes et al., 2001).

2.4.2 Development of environmental education in Africa

"Environmental integrity in Africa and the world continues to grapple with a myriad of threats, consequences of increased anthropogenic activities" (UNEP, 2017, p. 2). These include climate change, desertification, biodiversity loss, degradation of arable soils, reduced quality and quantity of freshwater, food insecurity and increased pollution.

The widespread environmental degradation in Africa has been largely attributed to the absence of a clear and sustained environmental awareness on the continent, especially among the poor and uneducated (UNEP, 2017; Plumwood & Routley, 1993). However, according to Darkoh (1992), the foremost causes are rapidly increasing human and animal population pressure, modernization factors shaping the world economy and the overexploitation and poor management of resources such as forests, soil, water and the atmosphere through over-cultivation, overgrazing, deforestation, poor irrigation practices and pollution. Thus,

> [e]nvironmental education and training is critical for the acquisition and application of knowledge, skills, values and action competences for participation as active and informed citizens in the development of an ecologically sustainable, socially just, economically viable and sustainable society. […] [This] is also critical for poverty reduction and for ensuring human wellbeing and sustainable livelihoods development on the African continent (UNEP, 2017, p. 10).

The IDRC (1994) workshop on research issues on EE in Africa highlighted four elements for its development. The first was to define the scope and methodologies of introducing EE worldwide. Second, it emphasized the need for EE to be contextualized by taking into consideration the fact that many people in Africa *"live in poverty, the school systems had declined considerably and catered for a limited number of children, and capacity for realization of EE goals was limited in schools, among NGOs, communities and government institutions"* (IDRC, 1994, p. 2). Third, it emphasized the need to rethink and redefine EE in the totality of the development process by making a distinction between building awareness and the integration of environmental concerns into education, culture, behaviour and activities of individuals and communities. The problem with this process is that *"[t]he school curriculum is often overloaded; teachers are not highly motivated, basic learning materials are lacking, and schools are isolated from the communities and the environments they are located in"* (IDRC, 1994, p. 2). Last, it addressed the lack of coordination and sharing of information as militating against maximizing the impact of available resources and capacities and, therefore, development.

Public concerns about local environmental problems in Africa vary widely from one country to another and even from one place to another. Within a single country, for example, differences can exist between urban and rural areas (UNEP, 1990). Due to the differing physical, socio-economic, cultural and political conditions in African countries, there are no substantive universal solutions for EE. People's attitudes about and perceptions of the environment depend on their respective development status (Chonjo, 1993). Thus, EE programmes must undoubtedly reflect the regional or local environmental conditions.

Environmental problems that are prevalent in most of the continent are further complicated by the low levels of socio-economic development. Poor methods of resource exploitation coupled by population pressure culminate into a series of environmental problems (UNEP, 2017; Plumwood & Routley, 1993: Darkoh, 1992).

An attempt to integrate EE into the education system has been made at a regional level. The East African Project was launched in 1995 and included Tanzania, Kenya and Uganda as partner states. It was implemented in regional schools for a period of 30 months (July 1995 – December 1997). Some achievements of the project include: the sensitization of some tutors and teachers in EE; writing EE materials such as 'Maarifa ya Jamii'[8] or 'Elimu ya Mazingira'[9] which are pupil's standard textbooks for grades three to seven. These books have

[8] 'Maarifa ya Jamii' is interpreted as 'social studies'.

[9] 'Elimu ya Mazingira' is interpreted as 'environmental education'.

been piloted and published for use in Tanzanian primary schools. Kenya and Uganda have implemented similar projects (Bakobi, 1998).

The Sustainable Cities Programme (SCP) was one of the 19 different programmes under the UN Habitat umbrella to implement Agenda 21, with 29 out of 45 participating cities being in Africa. It was mainly conceptualized for solid waste management in urban areas. Dar es Salaam was one of the first 'Demonstration Cities' in Africa where environmental planning and management were revitalized. Other cities included Ismailia in Egypt, Dakar in Senegal, Ibadan in Nigeria, Accra in Ghana and Lusaka in Zambia (Myers, 2005; UNEP, 2005) Some of the project outcomes in Dar es Salaam were: improved accessibility of living quarters and overall physical environment. Controlled floods which led to drastic reduction of water borne diseases from 4,137 cases in 1996 to less than 2000 in the year 2000 as well as improved and affordable water accessibility (UNEP, 2005).

Intergovernmental cooperation among African governments on environment and development has evolved since the Organization of African Unity (OAU) first adopted the African Convention on the Conservation of Nature and Natural Resources in Algiers in 1968. The African Ministerial Conference on the Environment (AMCEN) was established in 1985 as a policy forum to facilitate ministers in charge of environmental issues to formulate, harmonize and coordinate their activities and programmes in a better way. AMCEN remains key for environmental and development issues in Africa, has helped launch various environmental initiatives within the region and has significantly influenced environmental policies in Africa. The New Partnership for Africa's Development (NEPAD) was adopted in 2001, with new institutions being created and existing ones strengthened to facilitate the implementation of NEPAD programmes and projects. An Action Plan for the Environment Initiative of NEPAD was adopted in 2003 at the summit of the African Union with the aim of improving environmental conditions in Africa in order to contribute to economic growth and poverty reduction. In 2005, the African Ministers Conference on Housing and Urban Development (AMCHUD) was established for promoting the sustainable development of human settlements in Africa under the backing of the African Union. In the same year, the Forum of Energy Ministers in Africa was established. Regional and sub-regional institutions, such as the Economic Commission for Africa and the African Development Bank, are also involved in sustainable development cooperation and have joint programmes throughout the continent (UNEP, 2017).

A forum of environment ministers addressed the emerging environmental challenges and international environmental governance in Africa, especially those related to climate change and its adaptation in 2008. The continent, however, has many good practices to draw upon, such as the work of the Southern African Development Community's (SADC) Regional Environmental Education Programme in which EE has been identified as a key process for achieving SD despite its member states' differences in education systems and colonial history (Matsoga, 2009). Other practices include the Eco-Schools initiatives and the Mainstreaming Environment and Sustainability in African Universities (MESA) programme initiated by UNEP (UNEP, 2017).

The majority of African countries have struggled to place EE in formal curricula; yet, it has been integrated across the school curricula of many countries, especially in Science and Social studies subjects, for example in Tanzania, Kenya and Uganda in East Africa. Southern African countries include Botswana, Namibia, Zimbabwe, Zambia, Malawi, Mozambique, and South Africa, and in the West there are Nigeria, Benin etc. However, issues of poor teacher training and development, a lack of T/L resources, poor funding, overburdened curricula, large class sizes, the lack of EE assessment and an ignorance towards indigenous knowledge have often impeded the effective implementation of EE (UNEP, 2017; Velempini, 2016; Kimaryo, 2011; Mutisya, 2011).

2.4.3 The development and status of EE in Tanzania

Tanzania's economy depends mainly on the country's natural resources. The largest part of the country's GDP, namely over 66%, comes from agriculture, forestry, fisheries, water, energy, livestock, tourism and mining activities. Poverty is a widespread phenomenon, aggravated by natural environmental disasters such as floods and droughts (URT, 2005a). In the same vein, poor environmental sanitation, insufficient waste management and pollution affect many communities, leaving the poorest most vulnerable. In this situation, EE is deemed necessary for creating awareness and for equipping people with the knowledge and skills to make informed decisions about the sustainable use of resources for their wellbeing. The government of Tanzania acknowledges the importance of EE, stating that

> [e]nvironmental education is one of the tools for improving the quality of life of Tanzanians and achieving the medium and long-term national development goals and targets spelled out in Vision 2025, the Millennium Declaration, and MKUKUTA[10] as it provides knowledge which contributes to a change of attitude and practice of individuals and the society at large (URT, 2005a, p. 5).

The field of EE is continually evolving, and hence, there is no single universal definition; therefore, environmentalists have approved to see EE as a 'process' rather than an 'entity'. This means drawing attention to its multiple forms, the evolving fluidity of the concept and the open-endedness of its aims and methods (URT, 2005a). A place-based definition in the context of EE in Tanzania is viewed as

> a life-long process whereby individuals and the whole Tanzanian society acquire knowledge, develop ethics and become environmentally aware/conscious, and responsive and acquire relevant skills in identifying, managing, monitoring, evaluating and solving environmental issues and problems (modified from URT, 2005a, p. 9).

[10] MKUKUTA is a Kiswahili language acronym for "National Strategy for Growth and the Reduction of Poverty".

In view of this definition, the overall goal of EE and communication is *"to develop an informed citizenry that is environmentally conscious and motivated to actively participate in managing and sustainably utilizing its environment"* (URT, 2005a, p. 10).

In UNESCO-UNEP's (1992) perspective, EE is the

> lifelong process with the objective of imparting to its target groups in the formal and non-formal education sectors environmental awareness, ecological knowledge, attitudes, values, commitments for actions, and ethical responsibilities for the rational use of resources and for sound and sustainable development (preface, p. 1).

Literature argues that there is no single unified definition for EE because of its comprehensive nature. However, the educational movements for and development of EE were based on nature studies, conservation education and outdoor education (Shalash, 2017).

The history of EE in Tanzania can be traced back a long way into the 1960s, but did not really gain momentum until the 1990s with the UN international initiatives for environmental sustainability. After having attained independence in 1961 under the late Mwl J.K. Nyerere, the nation adopted 'education for self-reliance' as the policy and guiding philosophy of education. The policy was purposely geared on the *"development of enquiring mind, the ability to learn from others, the ability to contribute to the society […] and the ability to appreciate and develop national culture"* (Makundi, 2003, p. 135). The main goal of education was production, and the schools were meant to be areas of production in farming and providing artisanal skills. The educational approach was mainly place-based, with learning from others and relating to other members of the society being crucial (Makundi, 2003). This emphasized learning through participation in service projects for the local school and/or community. Overall issues of the environment and natural resource management were not given the weight and emphasis they ought to have.

Tanzania intensified its efforts in the 1980s and 1990s to deal with environmental issues in response to the severity of environmental problems and their related health problems (Mtaita & Eames, 2009). The Government made efforts to respond to the problems by introducing environmental policies in various sectors. For example, in 1983, the National Environmental Management Council (NEMC) was established and assigned to coordinate both governmental and non-governmental agencies to promote both formal and non-formal EE (Mtaita & Eames, 2009). One of the education objectives as stated by the URT (2010) is to enable a rational use, management, and conservation of the environment.

The nation therefore confirmed its commitment to the EE principles and guidelines through a variety of strategies after signing a number of international agreements, such as the Convention on Biological Diversity in 1992, the United Nations Framework Convention on Climate Change in 1992 and the United Nations Convention to Combat Desertification in 1997. These efforts indicate Tanzania's good will to engage in international initiatives on environmental conservation. However, challenges such as diseases, poverty, pollution, soil

erosion and drought still prevail (Mtaita & Eames, 2009). The National Environmental Management Council (NEMC), MoEVT, academicians and NGOs have been in partnerships for enhancing proper attitudes, skills and values that can functionally redress the state of environmental problems in the country. Makundi (2003) adds that *"equipping learners with these values, knowledge and skills would reduce unemployment and improve the skills of the youth"* (p. 136).

The initiatives began with awareness creation programmes by the Ministry of Education and Culture (MoEC), school inspectors, teacher educators, heads of schools and a few teachers. Later, the Tanzania Institute of Education (TIE) integrated environmental contents into the primary and secondary school curricula. There were also initiatives to introduce them in tertiary education like at university. The EE package was integrated into some courses, and there were even fully-fledged degree programmes such as Environmental Engineering and the Management of Natural Resources at the University of Dar es Salaam. Some environmentally related disciplines with both long- and short-term courses were established at the Sokoine University of Agriculture (SUA) and the Open University of Tanzania (OUT) (URT, 2005a).

NEMC has been responsible for the development of policies and the coordination of the broad-based environmental programmes and projects in Tanzania. NEMC has implemented a number of activities to support the Agenda 21, such as environmental management, pollution and control, EE and public awareness as well as natural resource conservation and management (URT, 1997). This also works with the Ministry of Education and other governmental/non-governmental organizations to promote formal and non-formal EE (URT, 2005a).

Despite these formal initiatives, numerous non-governmental organizations (NGOs) also implement EE by raising awareness among people and therefore complement the educative government efforts towards an environmentally responsible society. The formations of conservation clubs by three different organizations focus on EE for the youth with the purpose of increasing their awareness of the relationship between human actions and their environment. For example, in 1985, the Malihai Club[11] was established and has been working in secondary schools. The Roots and Shoots as well as the Wildlife Conservation Society of Tanzania (WCST) were also formed in the early 1990s and cater to both primary and secondary school children. These associations were funded by the government, NGOs and international agencies (URT, 2005a). Some of the regional organizations include: Envirocare, the Tanzania Forest Conservation Group (TFCG) and the Tanzania Renewable Energy Association (TAREA). At an international level, organizations such as the Sierra Club (founded 1892), the World Wildlife Fund (WWF, 1961), Greenpeace (1971) and the Worldwatch Institute (1974) are found.

The power of the media with regard to EE cannot be underrated. There have also been efforts to disseminate EE via the media. Numerous EE programmes have been broadcast via radio,

[11] Translated as " Life resources association"

television and print media since the late 1990s. The Mazingira yetu[12] programme was aired by ITV, while 'Urithi wetu'[13] was shown in local TBC channels. The 'Guardian' daily newspaper has a page set for environmental education topics. However, radio is ranked as the most effective means of communication and education since it is cheap, and hence, a majority of (particularly poor) people are exposed to this medium (URT, 2005a).

Furthermore, the National Environmental Education and Communication Strategy (NEECS) was developed to harmonize and facilitate the effective implementation of EE and the corresponding communication processes with policies and strategies that focus on the sustainable utilization of natural resources as well as on sound environmental management in Tanzania. For example, NEECS has been positioned to support the implementation of the National Strategy for Growth and Reduction of Poverty (NSGRP) – commonly known by its Kiswahili acronym MKUKUTA –, a communication strategy for sharing knowledge on and experiences with poverty-environment linkages (URT, 2006). The NEECS also assists in sharing the success, in exposing problems faced during the implementation of EE processes and in enhancing networking among key players in education and environmental management. The NEECS is expected to contribute to the NSGPR and MKUKUTA through an increased awareness and understanding of the links between poverty and the environment. To the majority, poverty is perceived as both a cause and a consequence of environmental degradation. People with insufficient resources have little alternatives and are likely to over-utilize their environmental resources. Hence, the way poverty impacts the environment and how a degraded environment reinforces poverty are two mutually interrelated processes.

In general, the level of environmental awareness is rising, and at times, people have dared to question why certain issues like sanitation, pollution from factories and other issues endangering their lives are not addressed. Despite improvements in creating awareness, having the ability and making decisions to take action is not simple. Numerous studies have proven that people's environmental behaviour has not changed considerably. For example, a study by Makundi (2003) comments that rare improvement of environmental skills has been made among the youth. Makundi says that when comparing students *"who had been exposed to environmental education in the school curriculum, and a group of learners who had not received environmental education, it was found that there was no difference in the ways in which they approached an environmental problem" (2003, p. 138).*

2.5 Environmental Problems and issues in Tanzania

Environmental concerns are also crucial in Tanzania in both rural and urban areas. There are numerous problems and issues. Various studies including those conducted for the development of Tanzania's National Environmental Action Plan (NEAP) identified six major environmental problems that require proactive actions. These are: deforestation, land degradation, environmental pollution, lack of water and sanitation, loss of wildlife habitats

[12] "Our environment"

[13] "Our inheritance"

and biodiversity, and deterioration of aquatic systems (URT, 1997). More recent sources include waste (solid and liquid) (Membe, 2015), natural disaster risks and climate change (WMO, 2016). Socio-political issues include inadequate political will, poor implementation of policies, over consumption tendencies etc.

Environmental problems have escalated serious diseases such as cholera, dysentery, schistosomiasis (bilharzia) and malaria (Mtaita & Eames 2009). The National Environmental Policy (NEP) (1997) insists on the need of Tanzania to adopt environmentally sustainable management practices in order to ensure long-term sustainable economic growth. The need to address environmental issues and problems led to setting of environmental content into formal schooling. Following in this section is an overview of these main environmental problems in Tanzania.

Deforestation

Tanzania is set to lose its entire forest cover within the next 100-160 years if nothing is done to reduce the current rate of deforestation (CI, 2010). Unsustainable use of forests has resulted in severe problems including soil creeping, desertification, destruction of water sheds, soil erosion and siltation of dams, shortage of water and electricity as well as declining of agricultural production (NEMC, 1994). Annual deforestation rate of 1.1% marks a decline from 39.9% in 2005 to 36.8% in 2012. The main factors for the destruction include population growth, agriculture, urbanization, trade and energy. Other factors include recent mineral discoveries and infrastructural developments. Forests provide valuable ecosystem services such as purification and regulation of water, climate regulation and carbon sequestration thus deforestation contributes to climate change. Moreover, soil erosion and siltation affects water runoff (Kideghesho, 2015).

Land degradation

Land degradation appears to be the dominant environmental problem in Tanzania because it directly affects the livelihood of a large portion of the population since the country's main activity is farming. It is mainly caused by agricultural expansion and use of unsustainable agricultural practices and deforestation. About 41% of the land is classified as degraded and 61% is affected by soil erosion. Land degradation has mainly resulted from both human and natural processes manifested as soil erosion, siltation, deforestation, loss of fertility, overgrazing, desertification, degradation of water sources and wetlands, as well as loss of biodiversity (Kirui, 2016)

Air pollution

The urban areas in Tanzania suffer more from pollution compared to rural areas. Air pollution is mainly caused by emissions from factories, vehicles, and road dust. The road network does not correspond to the increasing number of vehicles leading to serious congestion. Moreover indoor domestic pollution caused by burning of firewood, charcoal etc. for cooking and heating has long been a large environmental health issue. It is estimated only 10% of the population in Sub Saharan Africa has access to modern fuels and only 14% penetration rate of improved cook stoves (WB, 2015).

Water and sanitation

Water is a mutual common resource fundamental to life and in sustaining the environment as well as enhancing the social economic development of our wellbeing. Availability of adequate and clean water supply reduces the incidences of debilitating water-borne diseases such as diarrhoea and cholera and hence, improves the socio-economic wellbeing of the users (URT, 2012b; WHO & UNICEF, 2006). Tanzania did not meet the MDG target of 78% accessibility to water by 2015, when the overall access was estimated at 55.6%, (urban 77.2% & rural 45.5%). Furthermore the MDG of having access to improved sanitation lagged far behind with overall figure at 16% (urban 31%, rural 8%) by 2015. Currently, population growth, intensified agriculture including use of pesticides, deforestation, increased urbanization, lack in proper sanitation, industrialization as well as climate change has the potential to affect negatively the quality of water (Drakenberg, Ek & Fernqvist, 2016).

Loss of biodiversity

Tanzania is one of the world's richest in biodiversity, but currently experiencing a rapid loss in habitats and natural resources. The main drivers for the loss are pollution, including the use of pesticides, habitat change through resource exploitation, invasive species and climate change. In terms of wild life hunting, for example demand for ivory both legal and illegal have contributed to the loss of elephant population by 50% which has caused a big debate in the country since 2009 (WWF, 2015).

Marine depletion

The marine and coastal environment is threatened by extensive and intensive human economic activities such as overharvesting of mangroves and coastal forests, overfishing, pollution and destruction of coral reefs, and increased temperatures due to climate change. The coastal environment contributes a vast amount of ecosystem services and provide a habitat for fish and birds. It also functions as a buffer zone against waves (Yanda, 2013).

Waste

With an increasing population especially in urban areas the production of waste also increases. Waste management is a critical problem in big cities. For example waste production in Dar Salaam alone is estimated to be 2252 tonnes of solid waste per day (Membe, 2015). The projections of the city's waste output increases at an alarming rate of 10% per year (Huisman et al., 2016). There are also poor facilities to manage solid waste and many at times dumped in an open space posing threats to the environment and public health. Liquid waste alike is poorly managed as only 10 to 15% of urban populations have access to the sewerage system. Electronic waste management is yet another growing challenge. The rapid inflow of electronic products especially computers and its peripherals, mobile phones and television sets have caught the country unprepared on how safely to dispose such end products. It was estimated that by the year 2015, e-waste from computers alone will amount to 9500 tonnes (URT, 2013b as cited in Drakenberg, Ek, & Fernqvist, 2016).

Climate change and natural disaster risks

The clearing of forests affects to a high degree the evapotranspiration rates which implicates on humidity. It also affects atmospheric levels of green house gases negatively, since forests are carbon sinks. Land use change is perceived to be the main cause of regional or local climate change, compared to other drivers such as burning fossil fuels or emissions from industries. Nevertheless, emissions rates are on the rise. For example it was estimated in 2012 Tanzania contributed to the global CO2 emissions with 9.295 metric Mt per year compared to 7.3 and 6.8 in 2011 and 2010 respectively (WMO, 2016). Although it is insignificant compared to the industrialized countries it should not be ignored.

2.6 The education system of Tanzania

The system of education in Tanzania is based on the philosophy of the late Mwl J.K. Nyerere who was the first President of Tanzania; it is called '*Education for self-reliance'*. This philosophy is based on the fact that primary education is terminal for the majority of people, in the sense that the primary school curriculum should be able to equip learners with life skills to become self-reliant, rather than for future academic education (John, 2009) (however it has changed recently to include junior secondary education part of basic education). The philosophy also emphasizes on developing critical thinkers and inquiry minds in learners, on learning by theory and practice as well as on developing self-esteem and decision-making skills (URT, 2016).

Tanzania comprehends that the provision of quality education to its citizens is the strongest pillar of development, through its skilled human resources that will serve in various sectors (URT, 2009) and bring about social transformation to the lives of Tanzanians through the implementation of the development vision 2025. The nation is also a signatory to the United Nations Millennium Development Goals as well as to the Jomtien Declaration on Education for All, as reaffirmed in the Dakar Framework of Action (2000) (URT, 2014b).

The current educational policy of 2014, which has been implemented in 2016, takes a form of 1-6-4-2-3+, instead of 2-7-4-2-3+ in the old policy of 1995. Currently, this means one year of pre-primary education; six years of primary education (Standard I-VI); four years of secondary ordinary-level education (Form 1-4) which are now part of basic education; two years of secondary advanced-level education (Form 5 and 6); and three or more years of university education. The official school-attending age ranges 5–6 for pre-primary, 7–13 for primary, 14–17 for lower secondary, 18–19 for upper secondary and 20–24 for university education (URT, 2011; 2014c). There are other, tertiary alternatives to higher education and complementary sources of the provision of primary and secondary education levels, including complementary approaches to basic and technical education. Special education is integrated in regular schools as inclusive education, except for extreme cases of deaf-blindness and autism who attend special schools. Primary education is compulsory and universal, but pre-primary school is not mandatory (URT, 2011). Non-formal education is provided through various programmes aiming at catering for a variety of learning needs of different age groups of youths and adults in the society. Their mode of delivery is through evening schools,

libraries, radio, television and other types of media as well as distance education (MoEC, 1995). Figure 4 shows the structure of education in Tanzania.

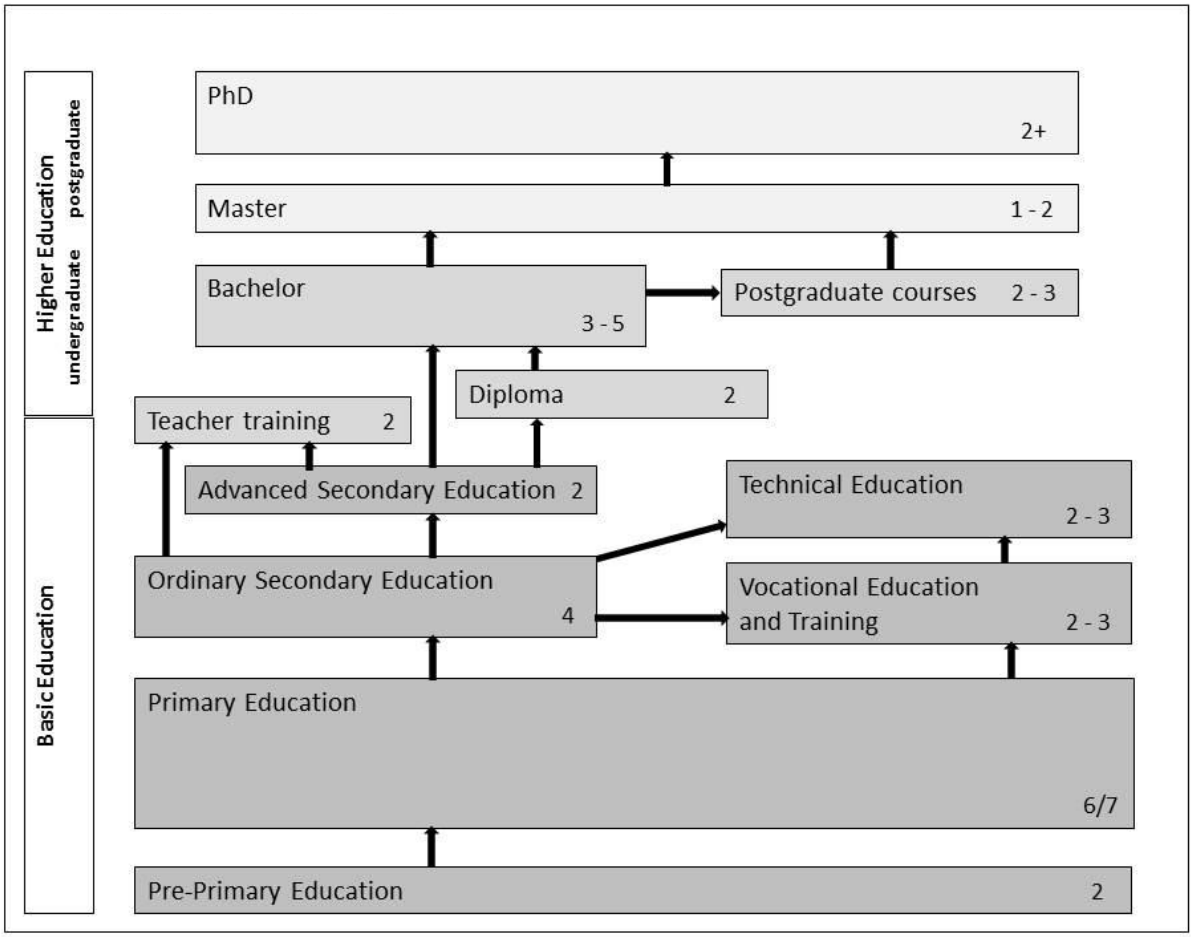

Fig. 4: The structure of education in Tanzania modified from EP-Nuffic (2015)

2.6.1 Primary education in Tanzania

According to the new Education and Training Policy (ETP) of 2014, primary school education marks the primary phase of a six-year (in the former policy of 1995 seven) cycle after one year of pre-primary education (URT, 2016). It is universal, fee-free and compulsory to all children aged six to twelve years. This is the main delivery system for the basic education of children outside the family. The curriculum design is subject-based and courses are offered by discipline. Each discipline has its teaching outline, and various materials and requirements are discipline-based. The main objective of primary education is to lay the socio-cultural foundations which ethically and morally characterize the Tanzanian citizen and nation. It prepares every citizen for lifelong education, training and learning processes. Primary school education is fundamental for strengthening higher levels of education by laying strong foundations in scientific and technological literacy and capacity; thus, it is a means for becoming a self-reliant person and for national development in general (ETP, 1995, p. 4). Meanwhile, this education sub-sector is in a transition period and administered by implementing both ETPs of 1995 and 2014 towards a full adaptation of the 2014 policy (URT, 2016).

The curriculum was revised and updated between 2005 and 2010 to ensure it takes a competence-based approach over the former content-based one. It also accommodated cross-cutting issues like the environment, HIV/AIDS, gender, life skills, human rights and special education affairs (URT, 2014). It was later streamlined down to eight subjects from thirteen. These subjects were Kiswahili, English, History, Geography, Civics, Mathematics, Science and ICT. However, History, Geography and Civics were combined to form one subject named Social studies. Following the new policy of education in 2014, the number of subjects has been increased again to ten (eight compulsory and two optional) since 2015. These are Kiswahili, English, Mathematics, Science and technology, Social studies, Civic and Moral education, Vocational skills and Religious education. However, vocational skills are taught only in grades V and VI. Optional subjects are Arabic and French. There are also co-curricular activities, such as subject clubs, sports games and art, entrepreneurship activities and self-study/library.

The provision of primary education occurs through various stakeholders, including the government, civil society organizations, communities, development partners and individuals. The system of education is decentralized, and the Ministry of Education and Vocational Training deals with issues of policy formulation and regulation, quality assurance in the curriculum, teacher training, examination and assessment, planning, monitoring and evaluation, setting standards and education research. The Prime Minister's Office, Regional Administration and Local Government (PMO-RALG) is the main overseer of the delivery of pre-primary and primary education through the councils and is complemented by non-state actors (NSAs) who run a few non-government schools (URT, 2009, p. 6). These private schools came about with the liberalization and privatization policies after the implementation of the 1995 Educational Amendment Act into the education policy which states that

"the establishment, management and ownership of primary schools shall be liberalized" (MoEC, 1995, p. 5). This has led to competition in the provision of social and economic services. Currently, private initiatives, encouraged by the concept of public-private partnerships (PPP), are increasing in the education sector and thus in the provision of education. Tanzania is striving to attain a curriculum that is responsive to national, regional and international standards so as to prepare its pupils to be competitive with other people across the world (URT, 2016). In order to ensure this, the curriculum specialists' role is very important. They work under the Tanzania Institute of Education (TIE), and their main roles include:

- First, to develop and design curricula for the pre-primary, primary, secondary and teacher education levels;
- Second, to design and develop materials, including books, for basic and secondary education as well as in-service teachers;
- Third, to conduct long- and short-term courses on curriculum-related subjects;
- Fourth, to carry out in-service teacher training for the efficient and effective implementation of curricula;
- Fifth, to provide and oversee education quality assurance with regard to the teaching methods, subject objectives and standards of T/L materials; and
- Sixth, to provide technical advice to the government through the Ministry of Education as well as to other stakeholders with the ultimate objective of providing quality education at all levels.

Tanzania has made significant progress in ensuring access to education for the majority of children qualifying for enrolment, which is realized through the implementation of several policy reforms such as the Primary Education Development Plan (PEDP) which started in 2001 and is currently in its third phase (Hakielimu, 2014). Due to this, Tanzania is on the track to achieving the Millennium Development Goal of universal primary education and the Education Sector Analysis (ESA), also known as Country Status Report (CSR) (2011), which shows that access is almost universal in primary education, with an enrolment rate of over 90% while the completion rate is close to 90% (URT, 2012). This success is mainly contributed by the fee-free primary education policy which has had a positive impact and boosted both access and retention (URT, 2012c). The tremendous success in enrolment resulted into overcrowded classes, thus making quality teaching a big challenge (Matete, 2016). The policy of education (URT, 2014c) also emphasizes that

> there has been a decline in the quality of education. This is reflected in the poor examination results at primary and secondary education levels which dropped drastically from a 54% pass rate in 2007 to 31% in 2012 and from 90% in 2007 to 43% in 2012 for primary and secondary education respectively (p. 4).

One of the factors that contribute to this poor performance is the enrolment expansion which was not aligned with the provision of resources. In line with this, a study by HakiElimu (2014) strongly states: *"Though many more children are attending school today more than*

any other time in Tanzania, they are not learning" (p. iv). The study further narrates: *"Our children are not getting the skills and knowledge that they should be getting as a result of schooling"* (p. 3).

Previous studies have shown that the quality of primary education is poor despite impressive enrolment rates (Hardman et al., 2012; UNESCO, 2010; John, 2009), with input, process, output and outcome perspectives being key aspects in the measure of quality (Sumra & Katabaro, 2014). However, comparative studies have also shown that there is a big quality gap between government and private schools. In terms of human and material resources, private schools are far better off than government schools. Well-trained teachers with in-service training and better salaries as well as non-teaching personnel such as librarians, matrons/patrons and security guards assist during extracurricular activities. Moreover, small class sizes of a maximum of 25 pupils, computer labs as well as subjects such as art and craft, French and music are taught additionally (Vuzo, 2008; Lwaitama & Galabawa, 2008). None of these qualities were found in public primary schools where the medium of instruction is Kiswahili except for a few schools, while the English language is the medium of instruction in private schools. The standard teacher-pupil ratio (TPR) for government schools was 1:45, but some schools have a higher TPR depending on their social and geographical location. For example, findings in EdQual Tanzania policy brief in 2010 revealed that the TPR ranged from 1:23 to 1:66 (Dachi, 2010); the URT (2014a) even found a TPR of 1:70. Usually, urban schools have higher TPRs than rural schools (URT, 2014a). The study by Tshabangu and Msafiri (2013) found that there is a widespread lack of sufficient manpower and infrastructure, poor policy implementation and at times a lack of political willingness to engage stakeholders in a purposeful and trustworthy environment, thereby jeopardizing healthy links between education and other national socio-economic goals.

The current study has a special interest in the second phase of the PEDP from 2007 to 2011 since here, environmental education was among the three major cross-cutting issues that were given priority. Others were HIV/AIDS and gender equality (URT, 2008). Among many factors that can influence the quality of education, this study has also chosen to focus on teachers since there is adequate research evidence to show that their effectiveness and quality is the single most important factor in improving pupils' achievements (Sumra & Katabaro, 2014; HakiElimu, 2014; The Sutton Trust, 2011; Dobbie, 2011).

2.6.2 The quality of primary school teachers in Tanzania

In any system of education, teachers play a significant role. Not only are they agents of the state who are responsible for the inculcation of vital skills and knowledge as well as moral values, but also agents of change who are functioning as community leaders. The Organization for Economic Co-operation and Development (OECD) has repeatedly stressed that *"[h]ighly qualified and competent teachers are the key for excellent education systems"* (OECD, 2017, p. 3). They are able to create critical awareness by reflecting, reading and sharing with others, thereby improving the lives of communities (Sifuna & Sawamura, 2010). Nevertheless, teachers are also viewed as a major obstacle to change due to their adherence to

outdated forms of instruction that accentuate factual and procedural knowledge at the expense of deeper levels of understanding (Prawat, 1992). Lassa (1996) is of the view that education is a source of national development and that the teacher has the key to it. Thus, through training teachers to the highest degree of quality, a nation fosters its development. Although the goals of teacher education vary considerably from one country to another, academically and professionally qualified teachers are regarded as a pre-requisite for the provision of high-quality and relevant education at all levels. This is commonly described as

> the degree to which education can be said to be of high standard, satisfies basic learning needs and enriches the lives of learners [...] It involves effectiveness and efficiency in the use of the available educational resources (human, material and financial) in meeting nationally and locally agreed goals, relevant to the needs, rights and expectations of the learners, community and society at large (URT, 2014b, p. 103).

In Tanzania, primary school teachers' basic training has undergone changes over time due to the fact that they have different academic backgrounds. Some teachers were trained for two years and others four years after completing their primary education; they were awarded certificates Grade C and B respectively, which was the minimum qualification as a primary school teacher. This accounted for 70% of all teachers in primary schools in 1992 and dropped to 54% in 1999 (Towse et al., 2002; Sumra & Katabaro, 2014). This programme was abandoned by the government in the 1990s and re-stated the minimum academic qualification for primary school teachers to be at the ordinary secondary school level (Form four). Teachers at this level of education are expected to teach all subjects, so there is little specialization. The quality of education is directly related to the quality of T/L which is determined by various factors such as teacher qualifications and experiences, their level of motivation and working conditions (HakiElimu, 2011).

According to international standards, average academic qualifications are low for those entering primary teacher training. Teacher trainees normally complete four years of lower secondary school and are merited with the ordinary level secondary education certificate (Towse et al., 2002). Many teachers were unqualified having Grade B and C certificates obtained after completing primary education (grade seven). However the government has upgraded almost all the teachers to have Grade A certificates obtained after completion of junior secondary education. This has successfully doubled the proportion of trained teachers from 48% in 2000 to 90% in 2009 (URT, 2011). This has allowed majority of teachers to have at least the minimum qualification for teaching (Grade A certificate). Teacher training covers general studies, specific studies for the chosen field of teaching and teaching practice. The teacher curriculum is centrally governed by the institute of education and examined by the National Examination Council of Tanzania (O'Sullivan, 2010).

In general, teacher training both pre- and in-service is judged to be of poor quality since many trainers for pre-service teachers lack experience and expertise in primary education, which has resulted in the teacher-centred approach that is using mainly lectures. This has been worsened by insufficient supervision during practical teaching, which has caused a huge

gap between theory and practice (O'Sullivan, 2010; Mattson, 2006). Another study came to similar results: that teacher training curricula in Africa have been too theoretical, with little emphasis on practical knowledge (Westbrook et. al., 2009). On the other hand, the in-service teachers' ability to transfer knowledge to their classrooms was also insufficient due to their poor quality (Mulkeen, 2010; Penny et al., 2008). Other researchers found that there is evidence to suggest that poorly prepared teachers and school managers are in the way of desirable reforms in education and development and thus of quality education provision in Tanzania (Malekela, 2004; Mosha, 2004). It is also argued that poor quality education in Tanzania and many African countries is a limiting factor to development (UNESCO, 2010).

Following the curricula review in 2005, the knowledge-based mode of teaching was replaced by the competence-based approach. However, there was no proper prior orientation of teachers before its implementation in schools. Thus, many teachers could not be able to interpret the curriculum properly (URT, 2016). The teacher education curriculum also emphasizes the competence-based approach where the learner is placed at the centre, while addressing specific competences in diverse areas of study. The philosophy behind teacher education strives to enable students to learn in the course of more experiential, hands-on activities which feature more open communication, challenges and appropriate feedback. The competence-based approach advocates learner-centred methods such as inquiry-based learning which fosters the intellectual curiosity of learners and allows them to create their own conceptual frameworks through experiences and to make use of problem-solving methods. By doing so, their knowledge and skills become applicable in real-world contexts (URT, 2014).

Studies that were conducted by Wedin (2010), Vavrus (2009), Abd-Kadir & Hardman (2007) as well as Osaki and Agu (2002) on classroom pedagogy in Tanzania's primary schools revealed that T/L was a teacher-dominated discourse which promoted mechanical rote-learning and recitation. These unsatisfactory teaching standards in primary schools are again a result of the poor quality of pre-service teacher training among two thirds of under-qualified teacher trainers. Teacher trainees usually have a poor academic background, which has been further worsened by the PEDP policy which aimed at ensuring gender equality in enrolment (Bennell & Mukyanuzi, 2005). There is a dire need to improve the quality of primary education in Tanzania where learning resources and teacher training are limited and teacher-pupil ratios are high (Tharp & Dalton, 2007).

In many eastern and southern African countries, the promotion of a more learner-centred pedagogy has been crucial and high on the agenda of the primary teacher education reform. However, the implementation of such pedagogy in low-income countries such as Tanzania remains a major challenge especially for those charged with reforming teacher education (Schweisfurth, 2011). In general, the education curricula suffer in varying degrees from a lack of integration of theory and practice and a failure to address the daily realities of the Tanzanian primary classroom (Hardman et al., 2012). Research shows that through teaching, teachers are expected to provide answers to many questions and challenges such as poverty alleviation, empowerment, environmental challenges so as to ultimately achieve sustainable

development (Kavenuke, 2013; Bennell & Mukyanuzi, 2005). Therefore, teacher education is quite a specific area of action in re-orienting education towards sustainability where reforms would need new teaching attitudes and skills (Fien & Bhandari, 2000). The literature argues that teachers are the main determinants for the success or failure of any education endeavour, and therefore, their ability to teach is one of the most important factors in education, which can only be attained through good teacher training (Hanushek & Rivkin, 2012). Together with the provision of T/L resources, the quality of teachers is what can have an effect on pupils' learning. The efficacy of a teacher depends on his/her capability (academically and pedagogically) and efficiency (ability, workload and commitment), T/L resources, T/L methods as well as the support by education managers and supervisors (Mosha, 2004; Rogan, 2004).

2.7 Integration of EE into the curriculum

Tanzania like many other countries in the world has integrated EE into all levels of education. Prior to the discussion on integration of EE, curriculum theorizing is presented first to set a context through which EE is integrated.

2.7.1 The school curriculum

The educational endeavour is intensely value-laden. Values enter the curriculum development and delivery process at every step (Chapman, 2011). A school curriculum reflects the political and ideological values of a society. Its philosophy is inseparable from the social political system that education is called to serve. Factors such as religion, culture, technology, economy, political regime, history, environment, research and tradition influence the curriculum directly or indirectly. The curriculum is not a neutral document but rather a cultural artefact, and its analysis is political in essence (Sofou, 2010).

Political activity can influence the curriculum more than factors such as economics or socio-cultural characteristics. The political influence mainly comes through the power of public policies on education and training, state engagement in funding as well as supporting the education system and its capacity to constitute various committees in the education sector (Nkyabonaki, 2013). According to Kessler (1991), curriculum decisions depend on what the community believes to be important and involve assumptions about the nature of knowledge, on what is valued and considered important as well as on answers to the questions of how to live 'the good life'. Philosophical analysis is central to all discussions about the curriculum. Some curriculum theorists such as Zais (1976) have considered the curriculum to be *"a blueprint for education"* (p. 8), a view that is reflected in the curriculum definition given by Beauchamp: *"a curriculum is a written document which may contain many ingredients, but basically it is a plan for the education of pupils during their enrolment in a given school"* (1968, p. 6). However, this conception was criticized by a number of scholars for its narrow view (Zais, 1976), so a wider conception was adopted so as to include all the experiences both intended and unintended learners are exposed to in their interaction with the school environment (Tyler, 1949).

Cuban (1995) advocates that there are actually four types of curricula in schools:

- The *official curriculum* consists of curricular frameworks and courses of study set forth by the state or district officials who expect teachers to teach it and assume pupils learn it. This curriculum may be loosely connected to what teachers teach in the classroom. Dahlberg and Moss (2005) state that although there are curricula, standards and guidelines as regulatory frameworks, they only provide external norms that may be reinforced through the process of inspection; but practitioners also have their own internal norms, which are definitely very vital in determining their conduct.
- The *taught curriculum* is what teachers working in their classes actually choose to teach. Their choices derive from their knowledge of the subject, experiences in teaching the contents, the preference or repudiation of topics and their attitudes towards the pupils they attend daily.
- The *learned curriculum* is much more inclusive than the overt taught curriculum. It is beyond what the test scores reveal about content knowledge, and pupils also learn many other unspecified lessons embedded in the classroom atmosphere. They will learn to process information in meticulous ways, know when or not to ask questions and respect others depending on teacher models.
- The last model is the *tested curriculum* which is tested in schools and limited to what is prescribed by policy-makers, taught by teachers and learned by the pupils. Standardized tests often represent the poorest assessment of other curricula.

Any curriculum theory bases its underlying philosophy, rationale and assumptions on the purpose of schooling, with different key questions being asked:

- Which knowledge is most valuable to meet these purposes?
- How can this "worthwhile knowledge" be organized and implemented so as to achieve the intended purpose of schooling?
- And how to find out whether the initial goals of schooling are achieved? (Yeshalem, 2013).

The issue of how the educational objectives of a school are obtained is critical and has been an ever-debated aspect among various schools of thoughts. For instance, the *essentialists* argue that the cultural heritage of a society through knowledge accumulated for a long time should serve as the source of educational objectives. On the side of *progressives*, they view the child as the core point to decide on the objectives where the needs and interests of the children are given priority while considering anticipated problems and challenges a child may face. A different view emanates from the *sociologists* who argue that the main source of information to derive educational objectives from should be the contemporary societal problems. Varying perspectives and arguments also come from psychologists, subject

specialists etc. with regard to the possible sources of curriculum objectives (Yeshalem, 2013). This has been one of the very difficult and controversial issues in the education industry to find a common agreement concerning the ultimate sources of curriculum objectives (Tyler, 1949).

After the conceptualization of the curriculum theory and the philosophies on which it is based, the next section covers the integration of EE contents into the school curriculum.

2.7.2 Environmental education integration into the curriculum

Environmental education has been defined differently by different scholars due to its fluidity and evolving nature. Bondar et al. (2007) define it as education about, for and in the environment that promotes an understanding of, a rich and active experience in and an appreciation for the dynamic interactions of the Earth's physical and biological systems; the dependency of our social and economic systems on these natural systems; the scientific and human dimensions of environmental issues; and the positive and negative consequences, both intended and unintended, of the interactions between humanly created and natural systems.

Environmental education to young children is therefore a holistic concept that encompasses knowledge as well as emotions, dispositions and skills. It includes the development of a sense of wonder; an appreciation for the beauty and mystery of the natural world; opportunities to experience the joy of proximity to nature and respect for other creatures. It also includes the development of problem-solving skills, an interest in and an appreciation of the world around us.

In many parts of the world, including Tanzania, EE has become a recognized area of the curriculum during the 1990s (Lee, 2000). However, despite the pertinence and urgency of resolving environmental problems, EE remains non-statutory in many curricula (Gough, 1992). Nevertheless, the Tanzanian government has called for the need to consider EE in the formal sector. The curriculum for EE in schools has thus been formally recognized and integrated into the curriculum at all levels of education (MoEC, 1997).

However, since 2004, the Tanzania Institute of Education (TIE), in collaboration with the Ministry of Education and Culture as well as other education stakeholders, has reviewed the pre-primary, primary and secondary education curricula. This review removed outdated content and introduced current social interest issues, including EE and other crosscutting topics. The so-called 'host' subjects such as Science, Geography and Social studies have received more EE content than others. However, the organization of content, learning materials and methodologies is still weak (Kimaryo, 2011; Mtaita, 2007).

Following the syllabus review in 2004/05, the government has endorsed the inclusion of EE at all levels of education (URT, 2004b), and it has to be taught to every child, which also meets the requirements of the United Nations (UN) through the United Nations Environmental Program (UNEP) to provide EE to every individual in the community at different levels of education to have all people participate in sustainable development practices (UNCED, 1992). The main aim is to enable school children to have opportunities to

learn about environmental issues in order to develop their understanding, awareness and concern about Tanzania's ecological richness and to participate in working for the sustainable conservation of natural resources as well as for national development (URT, 2004b). However, Dasilva (1995) argues that most moves towards EE in Tanzania have sought to introduce environmental issues into existing disciplines rather than forming new interdisciplinary EE courses. He adds that the compartmentalization of subjects in schools has been criticized by researchers in Tanzania because environmental problems are holistic and interdisciplinary by nature. He further says that very little use is being made of the actual environment for the practices of EE.

According to Karrian (1994), in order to facilitate the integration of EE into the school curriculum, issues related to 'where', 'what' and 'how' need to be addressed.

- Lack of agreement on the relative importance and location of such content in the curriculum (i.e. where it should be taught),
- lack of clearly established course program outcome objective related to EE (i.e. what should be taught)
- Insufficient teacher experience in instructional design to facilitate the integration of such content (i.e. how it should be taught?) can hinder effective integration and therefore lead to ineffective teaching.

It is emphasized that schools play a leading role in the implementation of EE and ESD (Bertschy, 2013). Thus, teachers' awareness of EE goals and active participation is critical for the entire process of curricular integration (Mellado, Ruiz, Bermejo & Jimenez, 2006). Moreover, teachers' attitudes towards EE will also influence the process because it can only be improved with their input (Erol & Gezer, 2006).

According to UNESCO-UNEP (1975) in Belgrade conference, the overriding goal to include EE in school curricula is

> to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (p. 7).

Thus, a curriculum for EE that reflects on this goal would entail a sum of all experiences learners undertake in order to assist them in developing knowledge and awareness as well as literacy skills in problem-solving, decision-making and active participation in taking action towards the environment while considering present and future ecological, social and economic aspects. However, Taylor et al. (2009) argue differently that the particular EE that has been developed in the formal education system is not transformative because it supports transmissive pedagogy, resulting in rote-learning, and also capitalizes on the false rhetoric of performance standards and testing. The next section explores and discusses the methods or models by which EE can be integrated into the curriculum.

2.7.3 Models of integrating and teaching EE in the school curriculum

The principle way to expose school children to EE is its integration into school curricula. However, there is no single universal method of how to incorporate EE into school curricula or educational programmes (Kimaryo, 2011). Environmental researchers have devised a range of methods, some are shown here:

Integrating EE as a separate discipline

Environmental education can be incorporated into the curriculum as a subject on its own, whereby each subject is treated as a discrete component of the curriculum. The EU report therefore calls it a subject area in its own right (Stokes et al., 2001). The advantage of this approach is that it allows for more in-depth study of the subject because it will allocate its own syllabus and time like other subjects such as Geography, Science and language lessons. In practice, this is rarely done because existing curricula usually leave no room for the inclusion of an entirely new subject and because this requires teachers who have been sufficiently trained to teach EE as a separate subject. Moreover, the UNESCO (1978) states that EE has not been acknowledged to stand as a subject on its own with a complete body of knowledge and skills like other disciplines. It is further argued by Powers (2004) that the aims of EE cannot be achieved through teaching one subject. The focus on a single subject is narrow and will need a relationship with other subjects (Rusinko, 2010). The Tbilisi declaration also emphasized that *"[e]nvironmental education should not be just one more subject to add to the existing programs, but should be incorporated into programs intended for all learners, whatever their age"* (UNESCO, 1977, p. 20). The orientation of EE is believed to be that of an infusion across the whole curriculum. However, research shows that several countries have placed EE in their curricula as a separate subject. These include Finland, Belgium (the Flemish community), France, Spain and Greece. For example, in Belgium, environmental studies are divided into six domains: nature, technology, humans, society, time and space (Stokes et al., 2001). This approach was supported by a number of teachers during this research.

Integrating environmental education into the existing curriculum (a holistic approach)

It is believed that while integrating EE into broad learning areas, students can develop an understanding, skills and attitudes which enable them to participate in the care and conservation of the environment (Gough, 1997). As an orientation in the curriculum, EE intends to capture the context of all subjects within the existing school and is approached as a cross-curriculum initiative. Drake (2012) calls this approach 'fusion' whereby EE content is fused into an already existing curriculum or subject across all the educational levels. Similarly, Powers (2004) calls it an 'infusion model', which describes the process of integrating EE concepts, skills and strategies throughout an existing general curriculum and teaching it in all subjects. This approach is adopted for the primary school curriculum in Tanzania (Lindhe, 1999; Mtaita, 2007). Besides Tanzania, many other countries such as Uganda, Kenya, Botswana, Namibia, Malawi, Mozambique, Nigeria, Zambia and Zimbabwe have also adopted an integrated or holistic teaching approach to address EE. However, it is

argued that a simple addition of environmental contents or topics into the existing school curricula may not be sufficient to bring about the desired environmental behaviours (Rickinson, 2001).

EE has been recognized as being holistic in nature due to its complexity and totality (Tilbury, 1995). It should consider the environment in its totality: natural and built environments, technology, cultural, historical, moral and aesthetic environments (UNESCO, 1978). The approach to EE in schools should therefore be interdisciplinary, drawing on the specific content in each discipline. Simmons (1989) states that *"by incorporating environmental education throughout the total curriculum at every grade level, a more comprehensive treatment of environmental concerns can be accomplished"* (p. 15). Environmentalists such as Lane (1993), Dissinger (1993), Ramsey, Hunger and Volk (1992) also support that knowledge and skills from multiple disciplines are needed to address the goals of EE. This approach is considered to make more sense in education as it connects what is learnt to real situations (Drake, 2004), and teaching ideas holistically rather than in fragmented pieces better reflects how young pupils' brains process information. However, this approach is associated with a number of challenges, such as a difficulty in linking EE with other subject contents, as there seems to be no clear principle for its implementation, hence making teachers uncomfortable to use the integrated approach (Hwang, 2009; Drake, 2004). Kadji (2002) adds that when EE is taught through the integrated approach, learners may find it difficult to develop a clear understanding of how different disciplines or forms of knowledge contribute to the comprehension of an environmental topic. Moreover, as EE has a wide scope, it demands more resources such as time, material and skilled personnel. On this basis, its integration into other subjects may not be accorded sufficient weight (Rusinko, 2010). An early study by Monroe (1991) also found that the implementation of EE encounters a number of challenges especially with already overloaded curricula. She states: *"Adding anything more to an already overburdened curriculum is out of the question. Expecting every teacher to become an expert on environmental issues is unrealistic"* (p. 8).

2.7.4 Pedagogical approaches to environmental education

Literature reveals that learners can acquire diverse skills, such as analytical, cooperative, research and communication ones, best when active learning strategies are used, such as active critical thinking and engaging in real issues (Lotz-Sisitka & Raven, 2001). Chatzfotiou (2006) also emphasizes that the active learning approach ensures an active participation in learning and in the acquisition of knowledge. Participatory methods – like the learner-centred one – are active learning strategies which are recommended in the teaching of EE (Ketlhoilwe, 2003). Examples of such methods include: investigative/experiential learning, group work, role plays, presentations, active learning and demonstration. Thus, teachers need to be aware that learners are unique and need to consider their differences in styles of learning. As classified by van Rooyen & De Beer (2006), some learners are considered auditory (i.e. they learn well through hearing), some are visual (they learn well by seeing) and others are tactile (these learn well by touching, moving and doing). Such differences in ways

of learning require educators to consider and implement methods that develop listening, seeing and touching as well as problem-solving skills and action-based teaching methods.

However, the learner-centred approach has been found to be a major challenge in the Tanzanian learning context (as well as in many other countries) due to overcrowded classrooms, a shortage of T/L materials and poorly trained human resources, leading to the teacher-centred discourse instead (Wedin, 2010; Vavrus, 2009; Abd-Kadir & Hardman, 2007; Osaki & Agu, 2002). It was also found by Mahenge (2004) that teachers use traditional methods although they are aware that active learning is more appropriate. Abid (2006) affirms that quality teaching in EE has two dimensions: first, to develop innovative strategies, new skills, capabilities and an understanding about the environment, environmental issues and conservation; second, to transform the learners' knowledge and skills within contextually relevant learning experiences. These two dimensions depend on the pedagogical approaches the teacher opts to apply. It is therefore recommended that educators apply more than one strategy or method in their teaching so as to meet the diverse needs of their pupils and to achieve all learning outcomes. As Abid emphasizes, quality teaching in EE can be ensured by introducing quality learning experiences to the learners. For example, they should know that the field visits they engage in are meant to help them understand the complex human-environment relationship. Learners should also explore the nature of ecosystems through partnerships with organizations which are involved in promoting EE. Through such experiences, learners' understanding of EE is enhanced and they can become environmentally literate citizens.

The teaching of environmental issues varies in terms of complexity and tangibility; therefore, teachers may encounter difficulties in addressing such issues (Kim & Fortner, 2010). According to Gruenewald (2003), place-based pedagogies are more significant because the *"education of citizens might have direct bearing on the well-being of the social and ecological places people actually inhabit"* (p. 3). Researchers like Duffin et al. (2004) found that place-based education cultivates a sense of connection to local places among students, which can also enhance partnerships between schools and communities. Moreover, Bruce (2011) adds *that "place-based education uses the concept of place or environment as an integrating context across disciplines"* (p. 21) and is mainly characterized by *"interdisciplinary learning, team-teaching, hands-on experiences that centre on problem-solving projects, learner-centred education that adapts to students' individual skills and abilities and the exploration of local communities and natural surroundings"* (p. 21).

2.7.5 Dimensions of teaching environmental education

The effective teaching of EE requires a clear understanding of concepts, proper contemporary methods and strategies for instruction, a reliability of T/L resources and the evaluation of teaching. According to Tilbury (1995) and Osaki (1995), the teaching of EE comprises three components: education *'about'* the environment; education '*for*' the environment; and education *'in'* or *'through'* the environment. They suggest that these three elements should be integrated in order to achieve EE goals. The overriding goal of EE as mentioned above, is to develop a world population that is aware of, and concerned about, the environment and its

associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones (UNESCO-UNEP, 1975). On this basis, different scholars have put forth the dimensions in which EE can be taught to address its goals.

According to Osaki (1995), education *about* the environment emphasizes the acquisition of knowledge and skills. It is concerned with developing awareness, knowledge and understanding about human-environment interactions. Therefore, 'environment' becomes a topic of study. Pupils gain knowledge on ecological functions, which may sometimes result in environmental concerns. Robbotom (1987) adds that this kind of education is based entirely on building the learners' cognitive domain without taking any action to promote sustainable living. Robottom and Hart (1993) emphasize that the main curriculum concern in this approach is subject content. This is a dominant approach to sustainability in most schools in Tanzania as well as in other countries (Mtaita, 2007; Lee & Williams, 2001). It is also widely regarded as a narrow perspective of teaching EE. It focuses on the knowledge about sustainable development, including the issues pertaining to human actions considered unsustainable, such as using non-renewable resources, over-consumption, climate change, loss of biodiversity and other aspects that are generally categorized under the topic of environment, society and economy, Kollmuss and Agyeman (2002) as well as Hunger and Volk (1990) argue that knowledge does not necessarily lead to behaviour change in the environmental dimension. It was assumed that if people had adequate knowledge and skills, they would take action to solve the problems in their surroundings and to prevent the further degradation of their environment (Gough, 1997). The literature calls this an objective view which is consistent with the behaviourist model of learning in which the student plays a passive role (Gough, 2002). The teaching of EE in schools is therefore based on the mere transmission of knowledge about the environment and its problems. The UNESCO (1994) states that "[i]t is not sufficient to 'tell' students about ecology. Students must experience a curriculum which allows them to discover how they interact with the environment themselves" (p. iv).

Education *for* the environment focuses on the acquisition of skills and attitudes that promote the efficient use of natural resources. It regards environmental improvement as an actual goal of education and develops a sense of responsibility and active pupil participation in the resolution of environmental problems (Lucas, 1979). According to Palmer (1998), this method emphasizes issue-based, action-oriented and problem-solving approaches. It is the contemporary approach that focuses on the aspect of ethics and capitalizes on reflections about values and moral issues. It aims at developing attitudes and concerns for the environment and therefore takes action to promote environmental quality or to address various environmental problems (Lee & Williams, 2001).

When combined, education *about* and *for* the environment provides people not just with the knowledge and understanding to engage in sustainable development issues, but also with

skills and a capacity to plan, motivate and manage change towards sustainability within an organization, community or industry (Osaki, 1995).

Education *in/through* the environment implies the use of the bio-physical environment as a learning resource. It favours pupil-centred and activity-based learning. This approach usually takes the form of outdoor education or fieldwork, thus developing environmental awareness and concern by encouraging personal growth through contact with nature (Lucas, 1979; Osaki, 1995). The notion of a 'place' (context) is important since EE *in* the environment can only be real when students have a direct interaction and experience with the local environment (i.e. place) (Yeshalem, 2013). According to Mortari (2003), this approach is based on the constructivist view of learning which enhances the learners' capacity of thinking when constructing their knowledge. It enables them to develop a team-work spirit and to be free to share their ideas (Tabulawa, 2003). Moreover, it stimulates the development of higher-order thinking skills and enhances independent learning skills (Vavrus, 2008). Such an approach, which calls for learner participation, stimulates a critical thinking about environmental issues in the learner. His/her involvement has a greater potential for promoting rational decision-making capacities, thus continuously and positively changing the environment. Teaching methods related to this learner-centred approach are dialogue, encounter, discussion and reflection. Molapo (1999) comments that although this approach advocates outdoor activities and field trips, it may not get any further than the planning phase (with not much action being taken) if there is no concrete school environmental policy. However, in order to achieve the goals of environmental education, the integration all of three approaches (knowledge and understanding, skills, attitudes and behaviour) is required for the purpose of EE (Scott & Oulton, 1999; Tilbury, 1995). These scholars suggest that these three components should be interlinked, issue-based, action-oriented and complementing each other so as to achieve EE goals, although they have originated from different paradigms. For instance, education *'about'* the environment is associated with positivism, while education *'for'* the environment comes from the critical approach in research and education, and education '*in*' the environment is linked to the interpretivist school of thought. Due to its complex nature, EE not only creates challenges in its interpretation but also in the way it could be approached. A study by Palmer (1998) found that EE has been marginalized in school curricula. She proposed a model for teaching and learning where the three dimensions are interrelated as shown in figure 5.

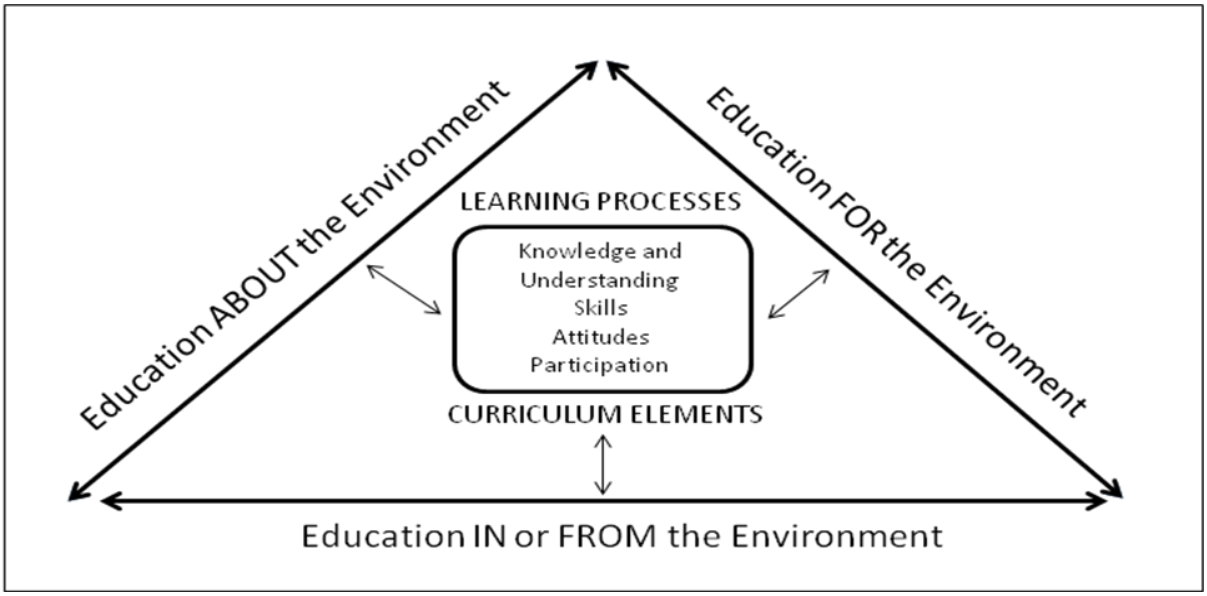

Fig. 5: The interrelated components in teaching of EE as adapted from Palmer (1998)

As shown in this figure the three components are interrelated and should not be treated as mutually exclusive. Together the education *about, for* and *in/through* the environment can achieve the various levels of EE objectives namely: Awareness, knowledge, skills, attitudes and participation as explained in previous section.

2.7.6 Components of environmental education in the curriculum

Through the Institute of Education, The Ministry of Education and Vocational Training of Tanzania has highlighted the EE components to be integrated into the primary school curricula (MoEVT, 2005; 2006; 2016). As shown in the appendix 1, EE contents have been integrated into various subjects but in varying degrees. It is more prominent in Geography (MoEC, 2006), Science and Social studies (MoEC, 2005) as well as Civic and Moral education (MoEVT, 2016). In these subjects as well as in Personality development and sports, EE is placed as a content yet to be taught, and in others as a T/L resource and learning tasks, for example in language subjects (Kiswahili and English). Here, environmental concepts may appear in comprehension or reading passages. In mathematics, the environment is also used as a learning resource.

However, most of the content shown in different subjects emphasizes on the knowledge acquisition dimension or on teaching *about* the environment and only little on teaching *in/through* the environment. Instead, environmental activities are mostly covered in additional curricula whereby learners are engaged in various environmental management activities such as gardening, cleaning the school environment, planting trees and waste management (field data, 2015–2016). Such activities seem to be a routine but play a significant role in helping learners broaden their understanding and skills in the environment and its management (Ferguson, 2008).

2.8 Curriculum implementers

Within the network of educational actors in ensuring successful implementation of curriculum goals and objectives, teachers are regarded to be key implementers as they determine the actual teaching and learning process. Thus, investing in teachers' capacity building is indispensable.

2.8.1 Teachers' professional competence and motivation

Both academically and professionally qualified teachers are regarded as being crucial for the provision of high-quality and relevant education at all levels (Sifuna & Sawamura, 2010). The literature has also shown that teacher quality has a direct effect on student achievements (Sumra & Katabaro, 2014; HakiElimu, 2014; The Sutton Trust, 2011; Dobbie, 2011). The question of teacher competence is one of the most fundamental pedagogical issues, and teacher competencies have been considered an outcome-based method for assessing teacher performance. Aziz et al. (2014) define competence as the ability to fruitfully meet multifaceted demands in a particular context through the mobilization of psychosocial prerequisites. Competencies have also been referred to as those latent dispositions that enable the teacher to master his/her professional tasks (Weinert, 2001). These dispositions include cognitive abilities (in terms of professional knowledge) as well as professional beliefs. Professional competence encompasses more than just knowledge. It involves skills, attitudes and motivational variables which also contribute to T/L.

Teacher competence is affected by the quality of training. When it is poor, it causes deficiencies in subject knowledge abilities, which hinders teaching and undermines the confidence of teachers. The interdisciplinary nature of EE naturally leads to its integration across the curriculum in the arts and science subjects. Therefore, teachers should be provided with training on how to integrate it. They will be better poised to teach about environmental issues when they are given information on the issues facing the nation and the world. Studies have shown that their training is too poor to equip them with the ability to effectively teach EE (Kiarie, 2016; Kimaryo, 2011). It is proposed that distance-learning EE programmes that are up-to-date, based on scientifically valid research, and innovative and content-based are very beneficial to teachers since many of them who teach in rural areas cannot travel to forums, seminars and conferences on EE (NCLI, 2008). However, the applicability of distance-learning in many African countries and Tanzania in particular remains a big challenge due to poor communication networks, especially in rural areas.

It has also been found that teacher competence has an influence on teacher motivation and that there is a general belief that all people can be motivated, although not in the same way, at the same time, for the same reasons or with the same intensity (Wyk, 2011). According to Nel et al. (2004, p. 310), motivation is a very complex issue due to the uniqueness of people and the wide range of internal and external factors that influence it. They argue that it is difficult for organizations to operate successfully if the workforce is not motivated. On this basis, the role of managers and supervisors is crucial. However, they can effectively motivate their employees only if they are aware of the internal and external factors influencing them.

Motivating the workforce needs to be a continuous process that organizations have to undertake as it significantly contributes to success or failure (Cronje et al., 2000).

The word motivation has widely been defined by various authors. For example, Bagraim et al. (2007 p. 69) define it as *"the force within us that arouses, directs and sustains our behaviour"*. The first aspect is arousal, which determines the energy that drives our behaviour. The second aspect addresses the choices people make between different possible behaviours in order to achieve their goals. Persistence is the last aspect, which is concerned with how long and how intensely people are willing to persist in their attempts to meet their goals and thus to sustain their behaviour. Mills et al. (2006, p. 210) explain motivation as an individuals' desire to direct and sustain energy toward performing to the best of their ability and the tasks required in a work position. In general, motivation is a psychological process that influences internal motives responsible for directing our behaviour towards reaching specific goals and objectives through meaningful result-oriented actions. Sansone and Harackiewicz (2000) argue that when individuals are intrinsically or internally motivated, they engage in an activity because they enjoy and have interest in it. Conversely, when people are extrinsically or externally motivated, they engage in activities for instrumental or other reasons, such as the prospect of receiving a reward.

There are two important and interrelated aspects of occupational motivation: *'will do'* and *'can do'*. The former is referred to the extent to which an employee has adopted the organizational goals and objectives, while the latter focuses on the factors that influence the capacity of individuals to realize organizational goals (Bennell & Mukyanuzi, 2005). When a teacher is lacking the necessary competencies to teach effectively, he/she gets de-moralized and de-motivated even if he/she might be highly committed to the attainment of the school's learning goals. Thus, the actual and perceived competence of primary school teachers is deemed necessary for their motivation (Bennell & Mukyanuzi, 2005).

2.8.2 Teachers' professional knowledge

There is a consensus that not only content or pedagogical content knowledge, but also basic orientations shaped by personal experiences (beliefs, world views or subjective, naive or implicit theories) play a significant role in the professional activities of teachers, especially when it comes to the organization of T/L in the classroom (Schoenfeld, 2002).

According to Shulman (1985), teachers' professional knowledge can be subdivided into three facets: Content Knowledge (CK), Pedagogical Content Knowledge (PCK) and General Pedagogical Knowledge (GPK). The first two are subject-related facets and the latter is general teacher knowledge. A teacher needs to be well-equipped with all three types to be able to deal with the various challenges of professional life. The PCK perspective by Shulman (1986) argues that the complexities of teacher understanding and the transmission of content knowledge necessitate a more coherent theoretical framework.

CK is explained as the 'what' of teaching; it is the amount and organization of knowledge per se in the mind of the teacher, for example the one represented by Bloom's cognitive taxonomy (i.e. drawing from the three domains of learning: cognitive, affective and psychomotor) (Bloom, 1956). The cognitive domain involves knowledge and the development of intellectual skills. According to Bloom, this domain has six levels which advance from simple to complex: knowledge, comprehension, application, analysis, synthesis and evaluation. In the different subject areas, the ways of discussing the content structure of knowledge differ and require going beyond the facts or concepts of a domain. Despite their capability to define concepts, teachers must be able to explain why a particular proposition is deemed necessary, why it is worth knowing and its relationship (both theoretical and practical) to other propositions within and outside the discipline.

PCK is the 'how' of teaching; it goes beyond knowledge of the subject matter per se to the dimension of subject matter knowledge for teaching. This is generally acquired through education and personal experiences. It is a form of practical knowledge that is used by teachers to guide their actions in highly contextualized classroom settings. Among other things, this form of knowledge entails a competence of how to structure and represent academic knowledge for direct teaching to pupils; of common conceptions, misconceptions and difficulties they encounter when learning; and of the specific teaching strategies that can be used to address pupils' learning needs in particular classroom circumstances. GPK engages broad principles and strategies for classroom management and organization that goes beyond subject matter, as well as knowledge about learners and learning, assessment and educational contexts and purposes (Shulman, 1987). It is also referred to as the specialized knowledge of teachers for creating effective T/L environments for all learners (OECD, 2009). Shulman suggests that in order to be successful, teachers should combine all three types of knowledge in their teaching.

In general, the efficacy of a teacher depends on a number of factors, including his/her capability (academically and pedagogically) and efficiency (ability, workload and commitment), T/L resources, T/L methods and support from education managers and supervisors (Mosha, 2004; Rogan, 2004; van den Akker & Thijs, 2002). Educating for sustainability has proven to be highly demanding for teachers unless they acquire specific knowledge and abilities. They need both content and pedagogical knowledge for the effective implementation of ESD (Bertschy et al., 2013). However, the other factors mentioned above are equally important. As has been discussed earlier, Tanzanian primary school teachers are generally poorly trained, which has negative effects when it comes to teaching EE.

2.8.3 Teachers' beliefs and knowledge

Pajares (1992) emphasizes the need to distinguish between belief and knowledge to clearly understand the meaning of the former. He argues that knowledge is based on objective facts while beliefs are based on evaluation and judgment. However, teachers' professional knowledge can be regarded as belief when claiming that knowledge is considered a belief that

has been affirmed as being true on the basis of objective proof or a consensus of opinion (Kagan, 1992). In general, beliefs are personally founded basic orientations (Calderhead, 1996; Pajares, 1992). As noted by Pajares (1992), teachers' beliefs have a greater influence than their knowledge on how they plan lessons, on the decisions they make and on general classroom practice. Similarly, social constructivists have discovered that teachers' beliefs were far more influential than their knowledge in determining how people organize and define tasks and problems and were better predictors of how teachers behave in the classroom. They tend to be culturally bound, to be formed early in life and to be resistant to change (Williams & Burden, 1997). Nespor (1987) adds that beliefs are closely related to what we think and know but provide an affective filter which screens, redefines, distorts or reshapes subsequent thinking and information processing. Nespor is of the view that a better understanding between these two constructs can be explored through their relationship as well as by considering beliefs as a form of knowledge which could be referred to as personal knowledge. As a teacher's experiences in classroom grow, this knowledge also grows richer and more coherent and hence forms a highly personalized pedagogy or belief system which actually controls the teacher's perception, judgment and behaviour (Kagan, 1992). Kagan (1992) states that,

> a teacher's knowledge of his or her profession is situated in three important ways: In context (it is related to specific groups of students), in content (it is related to particular academic material to be taught), and in person (it is embedded within the teacher's unique belief system) (p. 74).

2.8.4 Teachers' beliefs and their influence on the teaching and learning process

Teachers' beliefs, thoughts and decisions on educational matters make up a highly significant part of the teaching process, and mastering practices and beliefs is their key to success (Fullan, 1989). Researchers have argued that a greater understanding of teachers' beliefs is paramount for the improvement of educational practices (Lumpe et al., 1998; Fang, 1996; Tobin et al., 1994). Beliefs exist in the complex realities of an individual's life, and what one believes in affects how one acts. Studies have shown that the individual beliefs and values of teachers play a vital role in shaping the objectives, goals, curricula and instructional methods of schools (Yero, 2010). An earlier study by Pajares (1992) has also confirmed that there is *"a strong relationship between teachers' educational beliefs and their planning, instructional decisions and classroom decisions"* (p. 326) and that *"educational beliefs of pre-service teachers play a pivotal role in their acquisition and interpretation of knowledge and subsequent teaching behavior"* (p. 328). He concludes that *"beliefs are far more influential than knowledge in determining how individuals organize and define tasks and problems and are stronger predictors of behavior"* (p. 311). In the same vein, a study by McMullen (1999) has also shown that personal beliefs are good determinants of practice. However, other studies indicate that other environmental factors may have a great impact on teachers' practice, such as parental or administrative pressures (Charlesworth et al., 1993; Charlesworth, 1991). Contextual factors such as administrative support and collegial attitudes, school climate, children's abilities and backgrounds – in conjunction with

government regulations – can have a powerful impact on teachers' beliefs and, thus, influence classroom practice. Nevertheless, the belief-action relationship may differ for teachers with varying degrees of experience or professional training (Wang, 2008; Rosenthal, 1991).

Teachers' beliefs about the nature of teaching and learning

The conceptions of T/L have been widely documented and analyzed internationally from varying perspectives. The teaching- and learning-oriented basic approaches are regularly distinguished and understood as endpoints of a continuum (Kember, 1997). According to Kember (1997), the T/L conceptions can be presented in five dimensions:

- first, the role of the teacher as either a presenter or a change agent;
- second, the concept of teaching as a transfer of information or as the development of a person and conception;
- third, the role of the learner as a passive recipient or developer;
- fourth, the nature of the learning content as defined by the curriculum or constructed by learners and
- last, is the ownership of knowledge either as possessed by the teacher or as being socially constructed.

These different viewpoints have been proven in interview studies conducted by Leveson (2004), Lucas (2002), Trigwell, Prosser and Waterhouse (1999) as well as Prawat (1992).

Williams and Burden (1997) argue that teachers' beliefs about what learning is will affect everything they do in the classroom, whether these beliefs are implicit or explicit. They can only be effective teachers if they are clear in their minds about what they mean by learning, because only then can they know what kinds of learning outcomes they want their learners to achieve. If their aim is to teach for their pupils to pass exams, this will have significant implications for the way in which they teach. If, on the other hand, they see learning as a lifelong process with much broader social, cultural and educational implications, they will take a very different approach to teaching.

However, pedagogical beliefs are categorized into two main groups: direct transmission beliefs and constructivist beliefs (OECD, 2009; Staub & Stern, 2002; Gow & Kember, 1993). The direct transmission belief about learning and instruction implies that a teacher's role is to communicate knowledge in a clear and structured way, to explain correct solutions, to give pupils clear and resolvable problems and to ensure silence and concentration in the classroom. Here, pupils are viewed as passive recipients. On the other hand, in the constructivist view, pupils are perceived as active participants in the process of acquiring knowledge. Teachers holding this view emphasize on student inquiry, give them the chance to seek solutions to problems on their own and allow them to play an active role in instructional activities (OECD, 2009; Gow & Kember, 1993). In this approach, thinking and reasoning processes are stressed more strongly than the acquisition of specific knowledge (Staub & Stern, 2002). From a constructivist perspective, learning is regarded as the active

construction of knowledge in gradually expanding networks of ideas through the interaction with others and the materials in one's environment. Marshall (1992) and Roth (1994) add that the primary emphasis is placed on the independence of each person's interpretation of his/her own experiences. Moreover, research shows that beliefs do have effects on T/L and that a teacher's constructivist orientation can positively impact learning success (Peterson, Fennema, Carpenter and Loef, 1989). However, Mansour (2009) alerts that although researchers often categorize teachers' beliefs into these two categories, it should be noted that such a dichotomy may be simplistic and misleading despite being able to categorize beliefs. Theories of learning are very diverse, so Ernest (1994) argues that it is questionable whether sets of beliefs can just be categorized into the behaviourist/constructivist dichotomy. Not only are these theories complex and allow for a variety of interpretations; but teachers' beliefs are also complex, at times contradictory and thus elude a concise classification.

Teachers' beliefs about themselves

There is a growing body of evidence that human accomplishments and positive well-being require an optimistic sense of personal efficacy and self regulation, since social realities are full of setbacks, frustrations, impediments, adversities and inequities (Bandura, 1994). Therefore, teachers must have a vigorous sense of self-efficacy in order to sustain the perseverant efforts needed to succeed in teaching. A strong sense of self-efficacy thus enhances human accomplishment and personal well-being in various ways. People with a high assurance in their capabilities, approach difficult tasks as challenges to be mastered rather than as risks to be avoided. Such people set themselves challenging goals, maintain a strong commitment to them and quickly recover their sense of efficacy after failures or setbacks. Such an efficacious outlook produces personal accomplishments, reduces stress and lowers one's vulnerability to depression (Bandura, 1994).

To summarize the above discussion on the teacher competencies the model developed by Blömeke and Delaney (2012) fits well as it expresses the two mutually embedded and complementary facets that constitute teacher competence.

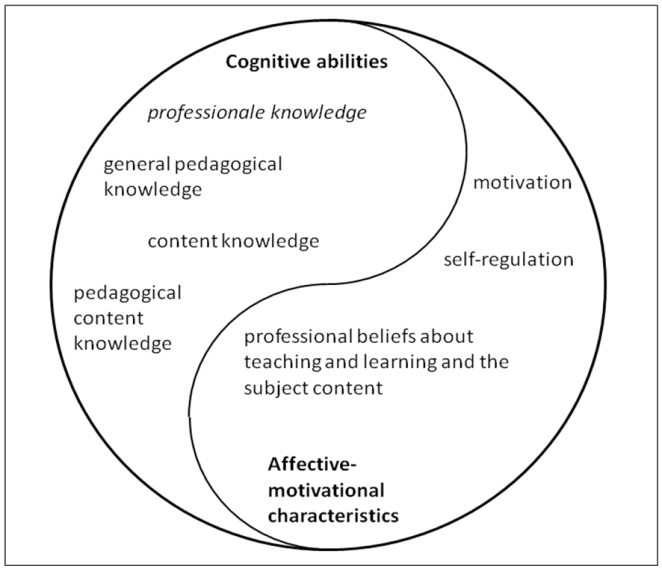

Fig. 6: Professional competence of teachers adapted from Blömeke and Delaney (2012)

These are: Cognitive abilities which are mainly professional knowledge and are made up of General Pedagogical Knowledge GPK, Content Knowledge (CK) and Pedagogical Content Knowledge (PCK), and affective motivational characteristics which involve teachers' beliefs about T/L and the subject, professional motivation and self regulation.

2.8.5 Heads of schools (HoSs) and their role in education

It is generally documented that among other leaders, heads of schools are change agents to facilitate pupils' learning. HoSs are the top executives in schools and hence responsible for supervising and evaluating all their staff (both teaching and non-teaching) as well as for ensuring that all members of the school adhere to the rules. They are also key agents for enforcing the national education policy within the school and responsible for ensuring that the curriculum is followed and covered (Hungi, 2011). As leaders, HoSs are role models and their actions are noticed and interpreted by others as reflecting what is important. They also link their school with society, and they represent the image of their school (Lashway et al., 1997).

Scholars and practitioners agree that instructional leadership (IL) can be one of the most useful tools for creating an effective T/L environment (Manaseh, 2016). IL is an educational leadership that centres on the core T/L responsibility of a school by defining the school's vision, mission and goals, managing the instructional programmes and promoting the school climate (Hoy & Miskel, 2008). According to Jita (2010), heads of schools who are instructional leaders go beyond the traditional role of school administrators and spend more time focusing on developing knowledge and advancing the implementation of the curriculum, as well as instruction and assessment. They are aware of what goes on in the classrooms and develop the capacities of their staff by building on their strengths and reducing their weaknesses (Spillane & Zuberi, 2009). Despite the increase in administrative roles, they also view themselves as responsible for professional teacher development (Dachi, 2010). Unlike instructional leaders, conventional school leaders usually spend most of their time dealing strictly with administrative duties. Studies have proven that in Africa and Tanzania in particular, HoSs seldom practice IL despite the fact that it is essential for promoting teachers' instructional practices and students learning (World Bank, 2010; Spillane & Zuberi, 2009; Lwaitama & Galabawa, 2008). This suggests that leadership development programmes are required to provide HoSs with the necessary knowledge, skills and abilities to manage schools effectively. Research findings proved that the attitudes to leadership of HoSs were transformed after having participated in action research. They showed that there was a clear change of mindset among HoSs, from seeing themselves as bureaucrats and functionaries to a view that they could act as instructional leaders (Bush & Glover, 2003). Evidence from other research in developing countries such as Uganda has shown that IL instilled the spirit of hardworking in pupils and that teachers were more dedicated to their work. Moreover, it strengthened cooperation between parents and administrators, which led to better discipline, effective management and counselling (Galabawa & Nikundiwe, 2000).

2.9 The diffusion of educational innovation theory

One of the two main theories this study employs is the diffusion of innovations theory developed by Klitgaard (1973). According to him, there are many factors that contribute to the success or failure of an innovation or reform in educational systems. He argues that the failure of a particular innovation cannot be a priori attributed to only one part of the educational system. Many analytically different factors contribute to the success or failure of a change, and any explanation must take them into account. All the sub-parts of a system have their own roles and responsibilities to perform in order to have a functional system. Klitgaard perceives educational systems as operating in a chain of command where different actors and levels of authorities need to function properly and collaborate with other levels so as to ensure the successful implementation of innovations. He says that when an innovation fails, it is difficult to pinpoint that failure to just one part of the system. Rogers (2003) defines innovation as *"an idea, practice or object that is perceived as new by an individual or other unit of adoption"* (p. 12) and views an organization as *"a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor"* (p. 403).

According to Klitgaard (1973), a theory of innovative behaviour or a general theory of educational change comprises four main parts: objectives, implementation, production possibilities and evaluation. He emphasizes that these four aspects are the main determinant factors for the success or failure of an educational innovation.

Objectives

This aspect entails how policy-makers arrive at their objectives; what these objectives are; and how different levels of government with their differing objectives interact. The process used by policy-makers to obtain educational objectives is highly significant because in turn, the success of every other level would be determined by how well the objectives have been formulated. Objectives thus need to be clear and achievable. However, Yeshalem (2013) argues that the issue of how the educational objectives of a school are obtained is critical and has been an ever-debated aspect among various schools of thoughts as discussed earlier. Similarly, Tyler (1949) noted that to find a common agreement concerning the ultimate sources of curriculum objectives has been one of the very difficult and controversial issues in the education industry.

Implementation

This stage shows how institutions, bureaucracies, and individual actors transmit policy choices into practice. Objectives may be very clear but may also fail during the implementation phase depending on how well the actors are ready, capable and willing to co-operate with each other and across levels to perform their tasks.

Production possibilities

This stage includes the techniques available to obtain desired ends and their efficiency. If the implementers use techniques that are not effective to achieve the desired effects, then the innovation will not be successful. Rogers (2003) insists that implementers, for example teachers and heads of schools, need to have sufficient technical know-how in order to implement the change. If they are not competent enough – in terms of the knowledge about the innovation itself and the strategies in which it can be effectively implemented –, it is likely to fail in this phase. Thus, teacher training is crucial to ensure the successful implementation of any innovation.

Evaluation

This stage shows how the system 'feeds back', i.e. how different responsible authorities evaluate educational outcomes and give feedback to the top authority. Examination results could serve as a feedback to the entire system, with the evaluation providing a reflection of what goes on, on the ground. For example, have the set objectives been achieved or not? If not, a platform for review of the set educational goals and objectives needs to be created. In any case there must be clearly defined assessment procedures to determine whether or not educational objectives have been achieved. However, as Klitgaard (1973) points out, it is difficult to ascertain the failure of an innovation or change by pointing only to one part or aspect of the system. This is also said to be a shortcoming of the top-down approach where more authority and power is used for lower levels to comply with what the top authorities say or contribute to the system. It has also been advised to involve other parties, especially implementers like teachers, for the planning of an innovation or change; otherwise, it is likely to be unsuccessful.

Figure 7 shows how the different levels and actors in education institution interact and communicate to accomplish educational goals.

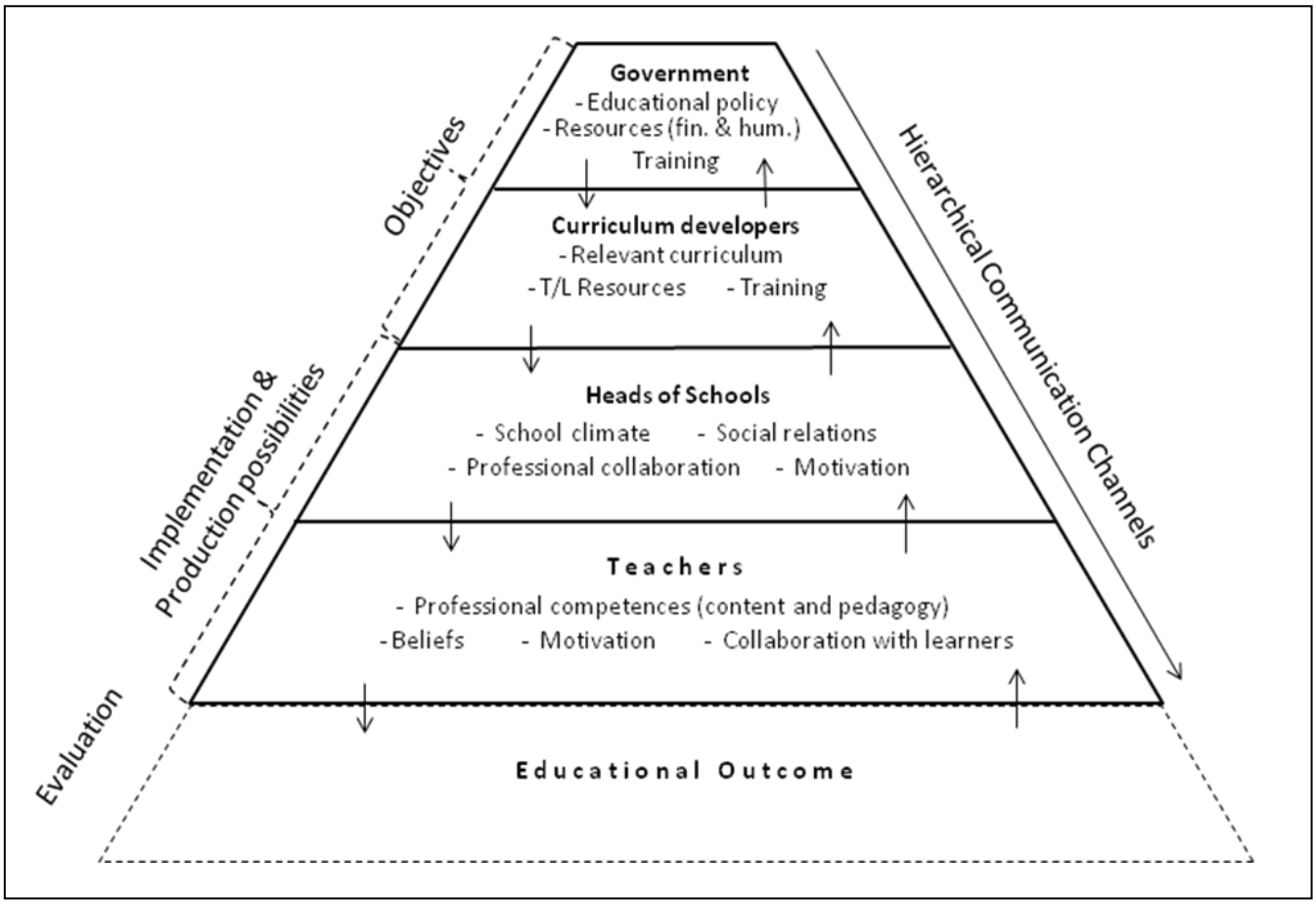

Fig. 7: Diffusion of educational innovation theory adapted from Klitgaard (1973)

2.9.1 Educational innovation and organizational change

The process of educational innovation starts at the point when a critical mass of people is sufficiently motivated to initiate change. And when the motivation gets to a point where it can overturn a complete curriculum, a complex process of change is put into action (de Graaff & Cowdroy, 1997). Teachers are central to the whole process of T/L and play a role in fulfilling the desired goals of schooling; however, whenever changes are made in a curriculum, they tend resist to these changes. This is because teachers have their own views, philosophies and ideologies about a curriculum. The literature on educational innovation proposes that elaborate procedures of planning and preparation are essential to effect such a change and that the degree of involvement of the participants is fundamental to success. This is to say, the more participants perceive the innovation to be instrumental to the realization of their own goals, the better are the chances of success. This implies that an extended process of preparation is necessary to involve participants and to support their dedication to the change before actually implementing a new curriculum (de Graaff & Cowdroy, 1997). On the other hand, the literature on organizational change suggests that in order to achieve change in

an organization, some force needs to be applied. Chin and Benne (in Bennis et al., 1969) distinguish three types of strategies that can be applied to achieve change in organizations:

- First, empirical or rational strategies which view man as a rational being who is interested in positive changes. People will make changes if information is provided that suggests the change makes sense. In other words, they need to perceive it as important.
- Second, normative or re-educative strategies which emphasize on the social aspects of human behaviour and the ability to learn new behaviours. It uses a cultural approach where relationships, norms and values are addressed in a culture.
- Third are power or coercive strategies which are based on a less optimistic view of human nature. De Graaff and Cowdroy argue that people identify primarily with their personal tasks or task perceptions, and most of them are blind to their advantages for the organization as a whole. Thus, legitimate power may be exercised to protect the larger or common interest.

Most change efforts utilize some system of belief of each strategy, but the rational and power/coercive ones are mostly used. In larger organizations, people appear to be more conservative when considering change than in small ones. Therefore, under stable external conditions, significant change in large-scale educational organizations is unlikely. The use of top-down authority is therefore often necessary when the need for change is imperative and urgent. Power/coercive strategies may be successful in solving the most urgent problems; however, innovation based on this approach is unlikely to be sustainable. People who have been left out from decision-making processes and those displaced without the provision of a more attractive alternative do not 'own' decisions or the philosophies on which they are based, and they will have little reason to support the outcomes. It is therefore vital to deploy a long-term strategy by creating conditions for both individual and corporate commitment.

2.9.2 Barriers to educational innovation

A study conducted by Havelock and Huberman (1977) revealed a number of obstacles to educational innovation in developing countries. They are categorized into six types, but for the purpose of this study, the researcher has condensed them to four.

- The first one is to underestimate the process, which results in poor co-ordination and connection to political leaders, confusion about the objectives as well as inadequate planning and consideration of the implementation. This leads to a failure to take into account the nature of the system into which the innovation is being integrated. Therefore, careful planning for the implementation of the innovation/change is required by building and maintaining connections with key persons and groups.
- The second obstacle addresses the personality conflict and motivation, which includes difficulties associated with poor interpersonal or social relations among implementers themselves as well as between them and their leaders, which results in an inappropriate selection of personnel that is to lead and implement the innovation, as well as inadequate and inappropriate motivations and rewards. Psychological issues cannot be ignored in the planning of innovations, and considerable care needs to be

taken to select people who are both motivated and sensitive to others. This obstacle also points to the fact that people will not contribute their best if they are not rewarded for their efforts appropriately. Havelock and Huberman (1977) emphasize that regardless of how good an idea may be, innovation efforts can be jeopardized if the wrong people are employed to execute them.

- The third obstacle is underdevelopment; this is related to the low level of financial support from inside or outside as well as to the economic condition and priorities of the respective country. A country may have national economic priorities on other areas than education. Poor financing is linked to poor transportation systems, manpower lacks and a weak educational infrastructure, which makes it difficult to deliver required materials and expertise. Colonial marks are also associated with underdevelopment. Historically, it has been observed informally that educational systems in the global south reflect their former colonial educational systems, which makes reforms difficult. It is argued that the seeds of resistance to change have actually been sown by the colonialists who installed a rigidly inappropriate European model of education which still persists in many countries. Herzog (2008) argues that for 50 years, education has sought to 'enlighten' Africa's tropics with more Euro-American educational torches and that education in most African countries is more suitable for foreign than for domestic labour markets. The Africans have changed their curricula and pedagogies on the assumption that this will be as productive as in the West – but have done so in vain. This implies that the problem of educational relevance still persists in Africa.
- The last but not least obstacle is opposition from key groups in the society, such as the ruling elites. Conflicting ideologies and special interests are yet another barrier. People with power and influence can hinder or support an innovation depending on the priority they attach to it and the different ideologies they hold about change.

2.9.3 The diffusion of innovation studies

The range of the diffusion theory is enormous and extends to a huge number of disciplines outside education (Katz et al., 1963), as the term innovation encompasses an array of ideas, practices, tools and behaviours. But the literature covered in this study only referred to those related to educational innovation. Studies discussed in this section provide a useful framework for understanding how change takes place within the field of education. These studies give an insight into the usefulness of the theory of innovation and its applicability in the field of education. Numerous educational researchers have used this theory and could achieve the goals of their inquiries. Some studies reviewed here show how they have applied this theory to identifying the primary barriers to adoptions of innovation and to exploring reasons for having caused unsuccessful adoptions.

A study conducted by Bednarz and ven der Schee (2006) has explored factors influencing the adoption and diffusion of Geographic Information Science (GISc) and Geographic Information Systems (GIS) for geography courses at secondary schools in both Europe and

the USA. This was a comparative study examining why GIS has not been widely adopted at the secondary school level. It revealed that several factors had contributed to this failure:

- first, a lack of teacher training, especially in terms of pedagogical content knowledge (PCK);
- second, inadequate curriculum resources and textbooks;
- third, a lack of national efforts to develop and promote such a curriculum. A theoretical model they authors employed related to the implementation of educational reforms which consist of authority, power consistency and manageability (external issues) as well as teacher perception and their acceptance of an adoption (internal issues).

Another study which employed diffusion as a framework was conducted by Buddy (2006) in order to better understand why resistance to innovation adoption occurs. The main purpose of her study was to provide a deeper understanding as to why school media specialists did not utilize the 'electronic school assignment alert form'. She found out that the school library media specialists did not perceive it to be advantageous over former practices of occasional contacts with public librarians about student assignments. Buddy also used this theory to better understand why the Accelerated Reader (AR) was successfully adopted in the same school district. She found that the programme was highly publicized in schools and that pupils were also observing each other when taking the AR test. Moreover, parents were knowledgeable on the product, and the programme was wide-spread in the county.

In the same line, a case study conducted by Kebritchi (2010) examined the factors affecting teachers' adoption of a new educational computer game called Dimenxian in mathematics. The study also examined whether the factors affecting the adoption of modern educational computer games were different from what is found in the literature. Moreover, it identified whether the adoption factors were related to the o of using the games in K-12 settings. Purposive sampling of experienced mathematics teachers was used, who contributed their experiences with using computer games in learning. It was found that the key adoption factors included the empirically based indication for effectiveness of the game, support, a rich mathematical content, problem-solving instructional strategies and an alignment of the game-learning objective with the state and national standards. Last, time and technology compatibility was seen to require a suitable amount of game complexity, and access to a trial version of the game was important, too (Kebritchi, 2010, p. 263). In summary, Kebritchi identified four key barriers to the successful adoption and implementation in the field of education: curriculum issues, the time and purpose of innovation (here: game) implementation, outcome as well as technical issues.

It should be noted that numerous studies that are using the diffusion of the innovation theory framework refer to organizations as networks for conceptualizing change patterns within organizations. This can be well explained by a study of Valente and Davis (1999) who have visualized the structure of communities and organizations functioning as a network of

interconnected individuals and emphasize that such a network should not be ignored when designing programmes. They emphasize that when communities function as a network, they can be referred to as a 'network analysis'; therefore, research can *"locate individuals who are more central to a community and thus perhaps more influential [...] to initiate the diffusion of a new idea or practice"* (p. 57). They contend that the selection of opinion leaders must be connected to collaborative efforts within the community concerned so as to ensure its genuine representation.

In a similar vein, Vanderslice (2000) has shown that educational projects or programmes that are designed with the involvement of teachers as opinion leaders have proven to be an extremely successful means of promoting innovative teaching practices in both secondary and higher education, compared to traditional top-down professional development techniques. Teachers' participation and voices as opinion leaders are very important for an optimal preparation and continuous education of teachers.

In summary, the understanding of an organization as a network is crucial for the diffusion of innovation implementations as it allows an understanding of the complex interconnections occurring during the diffusion process and as emphasized by Klitgaard (1973), each segment of the network is equally important to ensure the successful adoption of an innovation.

2.9.4 Advantages of using the diffusion of innovation theoretical framework

This framework has helped the researcher understand the chain or network within which educational innovations or changes occur, as well as the importance and role of each level in contributing to successful innovation. The role of key educational players such as curriculum specialists, heads of schools and subject teachers for ensuring an effective implementation of EE into the primary school curriculum were examined. Issues of awareness or knowledge of the innovation itself and how to implement it into their subjects were also explored. Material resources for its implementation as well as motivational strategies are fundamental for determining the adoption or rejection of an innovation. The roles of curriculum specialists as well as heads of schools were examined to determine whether teachers as key change agents were getting the necessary support and were having the necessary requirements for the implementation of EE. The challenges or obstacles to the diffusion of innovation were also highlighted. Moreover, the perceptions of the factors that led to the success or failure of an innovation (here: EE) were explored.

Suffice it to say that the diffusion of innovation theory is a valuable framework for this research to understand how EE can be diffused into the school curriculum and how the different levels of authority in educational institutions function and interact with other levels to effectively bring about changes in the system. However, it is argued that no single theory is sufficient to devise a generic framework for analysing the adoption of innovation (Ntemana & Olatokun, 2012). In order to draw a comprehensive picture of how changes diffuse in

educational systems, it is important to understand the theory of schooling which explains its socio-economic and cultural purposes.

2.10 The school theory

Krishnamurti (1989) once asked:

> Why do we go to school? Why do we learn various subjects, why do we pass examinations and compete with each other for better grades? What does this so-called education mean, and what is it all about? This is really a very important question, not only for the students, but also for the parents, for the teachers, and for everyone who loves this earth. Why do we go through the struggle to be educated? Is it merely in order to pass some examinations and get a job? Or is it the function of education to prepare us while we are young to understand the whole process of life? (p. 1)

In the shape of their classrooms, regular structures and rules that organize the work of instruction, contemporary schools have remained remarkably stable for over a century (Tyack & Tobin, 1994). They evolved as institutions for mass education and credentialing since the early nineteenth century (Stevenson, 2007) and were mainly designed to transmit basic knowledge and the skills of reading, writing and arithmetic. Moreover, they were meant to convey a broader understanding of society and the student's role in it (Schrag, 1988). This is to say that schools were structured to present basic information, to facilitate the practice of routine skills and to maintain existing social conditions and relations. The universality and stability of their structural organization for centuries signifies that schools (in the form of classrooms) are generally efficient in meeting the above-stated purposes (Schrag, 1988). As argued by educational sociologists, the contemporary role of schools is still primarily concerned with the transmission of cultural knowledge, skills and values.

However, modern industrialized societies feature a social stratification due to the division of labour and contains a plurality of cultures and subcultures with unique knowledge and values. Thus, compulsory public education encounters choices in defining the culture it is to transmit. These choices, taken as being ultimate, reflect the 'mainstream' or the dominant beliefs, values and norms shared by those who have political power in the respective society (Lundgren, 1981; Popkewitz, 1983). On a similar vein, Cuban (1984) adds that the structure of school life, the knowledge that is highly valued and the dominant pedagogical approaches mirror the norms of the larger class and economic system. Credentialing students with respect to their ability to demonstrate their mastery of 'valued' knowledge and skills is one of the dominant beliefs a school role should have. The main consequence of this is that the participants see the 'real' purpose of schooling as the quest for individual academic achievements. Thus, norms such as individualism, competition, achievement and independence are conveyed by schools. These norms prevail in the dominant culture and maintain the existing structure of a society. Apple (1982) argues that schools and other social institutions contribute to the reproduction of social and economic inequalities in a society

since some groups have only limited access to culturally valued forms of knowledge. Similarly, Cuban (1984) asserts that schools are a form of social control and sorting. Thus, instructional practices that seek obedience, uniformity and productivity through tests, grades, homework and paying attention to the teacher are more functional for achieving the desired ends. This traditional purpose of schooling contradicts the purpose of EE which fosters equality and improving the quality of life of all humankind on the planet by finding ways to ensure that *"no nation should grow or develop at the expense of another nation and that the consumption of no individual should be increased at the expense of other individuals"* (UNESCO-UNEP, 1975, p. 5). In a similar vein, Gruenewald (2004) argues that EE values have been undermined and thus become ineffective because they are dwarfed by the power of the dominant educational discourse.

On this basis, it is difficult for EE to achieve its goals since they differ from the goals of the general education systems. Gruenewald (2004) adjoins that corporations, governments and the media continuously emphasize the connection between education and success in the global capitalist economy. Thus, strong economic factors in education narrow its purpose down to creating a competitive workforce. Due to the close relation between the educational and economic systems, information which is given in schools is structured to ensure environmental conformity to economically acceptable norms (Sauvé, 1999). Thus, general/traditional education keeps silent and ignores environmental issues which then become marginalized from socio-political concerns, leading to a low influence in framing social and educational issues (Gruenewald, 2004; Sauvé, 1999). Gruenewald (2004) strongly remarks that the ineffectiveness of EE is determined by the standards of general education as it tends to ignore *"the social, economic, political, and deeper cultural aspects of the economic problems"* (p. 73).

A discrepancy also exists between EE and traditional schooling in terms of the curriculum and pedagogical practices. EE practices are geared towards focusing learners (working both individually and collectively) on resolving environmental problems. Teaching and learning are intended to be co-operative processes of inquiry into and action on real environmental issues. This demands learners to actively engage in a critical or complex thinking about real problems. Curriculum and pedagogical planning need to be highly flexible for learners to adapt their own social constructs. In contrast, studies have shown that there is one consistent pattern to the curriculum and pedagogical practices in schools (Everhart, 1983; Goodlad, 1984). The emphasis is on the mastery of many fragmented facts, concepts and simple generalizations organized loosely within discrete fields of study. The teacher is seen as a distributor of factual knowledge. The curricula are predefined, discipline-based and focused on abstract theoretical problems. Learning tends to be independent and individual in school, and the function of knowledge is to be stored for future use and the enhancement of one's individual status and economic well-being. Such curricula and pedagogical practices are not aligned with the goals and principles of EE which advocates that a curriculum should be interdisciplinary and focus on real practical problems; thus, pupils should be involved in specific environmental problems. However, the way to solving these problems is uncertain

for both teachers and students, and learning is holistic and co-operative. The function of knowledge is to be of immediate use for the social value of the sustainable quality of life (Stevenson, 2007).

In schools, teachers interact with learners in organized confined classes, with a properly defined assessment system which measures learners' mastery of a broad range of standardized content for comparison purposes among schools. The efficient coverage of content within a specified time as well as pupils' achievements is what qualifies a teacher to be effective. The organizational conditions and the demand for covering content compel the teachers to be concerned first and foremost with maintaining order and control in their classrooms (Stevenson, 2007). Even the dominance of teacher talk can be attributed not only to the desire to dispense information but also to the control of the classroom. Given the school roles in credentialing pupils and determining their future opportunities by means of competitive grading and ranking, pressures are exerted on teachers and school administrators. In many cases, due to the influence of the centralized and standardized curriculum, very little space is left for schools to establish a clear link between pupils and the surrounding community to engage them in a real environment. Cuban (1984) adds that ideas about how children develop, the role of the school, classroom authority and the place of the subject matter in instruction determine teaching practices. In contrast, the goals and principles of learning EE are not restricted by space and time. Learners need the time and freedom to visit sites with environmental problems and to consult local citizens, experts and libraries. Therefore, given school conditions such as class size, teachers' workload, time schedules and so on, it is not surprising that teachers fail to engage students in critical and reflective analyses of environmental issues. On a similar vein, Barrett (2007) argues that teachers face a number of structural barriers making it impossible for them to engage in EE. Such barriers include overloaded curricula, a lack of resources and time for outdoor activities, insufficiencies in both content and pedagogical knowledge etc. She adds that the general/traditional education discourse works in restrained undermining ways, even for engaged and motivated teachers. Furthermore, Lieberman and Miller (1992) emphasize that teachers face severe constraints in terms of 'universal tensions' in primary education, such as teaching the subject within a limited amount of time in the school day and organizational obstacles.

2.10.1 Teachers' curricula and pedagogical ideologies

Teachers' views about knowledge and teaching (i.e. their epistemological and pedagogical beliefs) are likely to influence which form of knowledge is selected and how it is then organized and transmitted in the classroom (Young, 1981). According to Esland (1971), two forms of knowledge underlie the pedagogical process: the first is objective (value-free), discrete and empirically tested as well as measured by explicit and public criteria (Popkewitz et al., 1982). The second knowledge is said to be subjective, problematic and essentially personal in nature, being socially constructed by the learners' active participation in the production and verification of meaning. These forms are compared to what Harbermas (1971)

called technical and practical knowledge. The former results from objective inquiry associated to the empirical-analytic sciences and intended to serve the human activity of work, leading (in modern technological societies) to the professionalization and compartmentalization of scientific knowledge in specialist disciplines. The latter remerges from the historical hermeneutic sciences which are concerned with generating knowledge in order to interpret communicative or social interactional experience. On this basis, the conception of knowledge in schools can be categorized as authoritative, objective, discipline-centred and technical. Thus, the school role of objectively assessing and credentialing students provides a powerful pressure to acknowledge only this epistemological position. Stevenson (2007) also argues that *"beside the organizational pressures, teachers' views about knowledge and teaching (their epistemological and pedagogical beliefs) are likely to influence what form of knowledge is selected and how that knowledge is then organized and transmitted in the classroom"* (p. 150).

It is argued that teachers' pedagogical approaches are associated with curriculum organization and student assessment, as well as with their desired degree of control of classroom processes (Bernstein, 1975). According to this theory, in a subject-centred curriculum, pedagogy will focus on the acquisition of concepts and ideas associated with discrete discipline and assessment, and will us explicit subject-derived criteria to measure pupils' degree of mastery of pre-specified knowledge and skills. In contrast, a problem-centred or interdisciplinary approach as required in EE (UNESCO, 1977) creates problems for teachers in organizing the curriculum, in pedagogical control (i.e. limits of learners' personal knowledge) and in the assessment of pupils' learning (i.e., alternative criteria and modes of evaluation have to be developed). This theory is supported by a study conducted by Young (1981) in five Australian secondary schools that involved 152 teachers. It found a significant correlation between teachers' beliefs in a subject-centred curriculum, a competitive and objective assessment process and a high degree of control over classroom interactions. Young concludes that teachers' epistemologies are an important part of their pedagogical ideologies and are consequently likely to be involved in the shaping of their pedagogical practices. On this basis, McIntyre (1985) also concludes that the nature of the contemporary school curriculum can be related to teachers' professional ideologies and the institutionalisation of dominant beliefs about knowledge, teaching and learning.

Moreover, it is argued that the culture of passing civil service examinations as a pathway for social mobility and promotion is also a dominant phenomenon in education. This cultural influence has a great impact on the aims of education as well as on the role of the teacher and the nature of classroom activities. The role of a teacher emphasizes his/her authority and pupils' obedience to, and respect for, their teacher. Classroom activities focus on the maintenance of classroom order and the efficiency of transmitting knowledge, and only little time is devoted to group and individual activities (Lee & Dimmock, 1998). This situation is similar to the one in Tanzanian primary school classrooms.

The introduction of EE to the school curriculum challenges the dominant conception, organization and transmission of knowledge, creating for most teachers a conflict with their approach to teaching and learning (Esland, 1971). These issues are paramount and need to be addressed if EE is to become a reality and effective in schools. Research done in Australia in 2004 reviewed EE in the formal education sector and its contribution to sustainability in Australia. It found that the formal education sector has been most resistant to change towards sustainability. The curriculum policies and guideline documents across all Australian states were found to be slow to react to this thrust in environmental education (Tilbury, Coleman & Garlick, 2004). Table 1 shows the magnitude of change and transformation required for integrating EE or sustainability education into the traditional system of schooling, which would require substantial shifts in thinking and practice.

Traditional schooling	**Sustainability/environmental education**
Transmissive learning	Learning through discovery
Teacher-centred approach	Learner-centred approach
Individual learning	Collaborative learning
Learning dominated by theory	Practice-oriented linking of theory and experience
Focus on accumulating knowledge and a content orientation	Focus on self-regulative learning and a real-issues orientation
Emphasis on cognitive objectives only	Cognitive, affective and skills-related objectives
Institutional, staff-based T/L	Learning with staff but also with and from outsiders

Table 1: The magnitude of change and transformation adapted from Andamon & Iyer-Raniga (2013)

2.10.2 The limitations for teaching environmental education

Ko and Lee (2003) have identified two types of barriers to environmental education: logistical and personal barriers. The former entails barriers such as a lack of teaching materials, textbooks, sufficient funding, science laboratories and equipment as well as of access to outdoor learning. Others include unqualified and under-qualified teachers, overcrowded classrooms, heavy teacher workload and an overloaded curriculum. The latter include barriers that focus on teacher traits such as their attitudes towards teaching EE. Many countries, both developed and developing, are facing a number of challenges when it comes to EE implementation. What environmentalists refer to as EE and what actually takes place in schools is a situation which is termed the 'rhetoric-reality gap', which is due to a number of factors (Grace & Sharp, 2000; Palmer, 1998; Walker, 1997). It is argued that this rhetoric-reality gap is to be expected given the traditional purpose and structure of schooling (Stevenson, 2007).

A study conducted in Benin by Kelani (2015) found that EE was not taught effectively there due to a lack of teaching and T/L, of funding and poor support from heads of schools, to an overloaded curriculum and large class sizes – which is a characteristic of many developing countries. The study also found that a lack of knowledge on both EE and environmental issues among the educators is a serious challenge. Another study done in Namibia found that there was a poor conceptualization of EE and poor attention put on teaching EE due to cross-

curricula teaching. Subjects such as Mathematics, English and others were given more attention because they were examined, unlike EE. Kiarie (2016) did a study in Kenya and recommended that for EE to gain weight in the curriculum, it should become an independent and examinable subject in national examinations, just like other subjects. However, challenges and the multidisciplinary nature of EE remain in the workload of teachers. Other limitations were poor teacher training, a lack of T/L materials and thus to the exertion of the transmission approach. Moreover, Ajiboye and Silo (2009) identified a number of limitations to implementing EE in Botswana. They include: the assessment practices do not support and enhance environmental learning; no adequate guidance is provided for environmental processes by both environmental and educational policies; A poor mobilization of prior knowledge and experience, including indigenous knowledge; poor funding for environmental issues; A lack of skills to implement action-oriented, inquiry-based approaches to EE learning; and poor participation of teachers in the EE curriculum development.
Other studies done in Africa (especially in Uganda) found the major limitations to be a lack of trained personnel for EE, of funds, of reference and text books, of adequate instructional materials, of motivation, of adequate land for EE activities and of adequate time in the school timetable. Other limitations include large class sizes, a lack of EE awareness, teachers lacking self-initiative and motivation and schools being exam-oriented. It has been reported by Nsamenang and Tchombe (2011) that formal education in most African countries operates with either sub-standard or inadequate facilities at all levels. They argue that the management of African education is weak and lacks visions for the implications of educational and global trends for local and national realities.

Research done in other countries outside Africa has proven that EE limitations are more or less similar in many countries. For example, a study done by Pulkkinen (2006) in Finland found teachers' major constraints in teaching EE were a lack of T/L materials, time, funds and knowledge. Research results from a study in Malaysia found major constraints to be a lack of training and capacity-building (leading to poor EE knowledge), of skills and awareness amongst teachers, a lack of resources, an overloaded curriculum, teachers' workloads, poor outdoor learning and a lack of awareness in students (Salih & Yahya, 2009). Other studies identified a lack of time, resources, school support as well as knowledge and motivation among teachers (Lee, 2000; Ballantyne, 1999). These are samples from just a few studies. Tanzania's case is therefore not very different from other countries (Kimaryo, 2011; Lindhe, 1991).

Teachers are regarded as key implementers to any curriculum reform or innovation. Providing sufficient pre- and in-service training to them, together with their full involvement in curriculum planning, will improve their self-efficacy and motivation to effectively implement EE. This, however, is not the case with Tanzanian teachers. As discussed earlier, their teaching is of poor quality in general. Their low morale to teach EE is due to overloaded syllabi, inadequate knowledge, T/L resources and low salaries which are moreover sometimes delayed for months (URT, 2010). Many of the identified limitations are associated with teachers' own theories or beliefs about schooling, knowledge, teaching, pupils and

learning (Stevenson, 2007) as well as a lack of adequate teacher training for EE both pre- and in-service (Cutter-Mackenzie & Smith, 2001). This results in a lack of competence and thus a tendency to avoid teaching EE since its nature is complex and demanding intellectually, physically and emotionally.

Many of these problems are in line with the theory of schooling as explained by Stevenson (2007), that historically and traditionally, schools are structured to transmit basic information to enable the practice of routine skills and to maintain existing social conditions and relations. Even educational sociologists have described the contemporary role of schools as still being primarily concerned with the transmission of cultural knowledge, skills and values. It has been proven that teachers in Tanzania are driven by the coverage of syllabi and the competition for examination results, as the curriculum is centrally formed; therefore, anything included without clear assessment procedures (like EE) is not easily accommodated (URT, 2010).

The issue of EE's low priority is also seen as an obstacle for its implementation in Tanzania. Many stakeholders argue that most people's interpretation of sustainability issues is skewed towards one's orientation according to their field of expertise. Planners fail to integrate ESD issues into sectoral plans, and thus, it is given a low priority by politicians who are the main decision-makers. A lack of transparency and accountability among the implementers has led to a loss of trust, especially from donors, leading to a poor allocation of funds in environmental issues (URT, 2010).

2.11 Studies on the perceptions of EE integration in schools

Worldwide numerous studies have been conducted on the perceptions by educational stakeholders of the integration of EE in schools. In the following, a review of these studies is presented and the knowledge gap which this study contributes to fill is identified. The review will cover some studies done in Africa (and Tanzania in particular) as well as outside of Africa.

The study conducted by Mwendwa (2017) in Tanzania evaluated the subjects that carry environmental contents and explored the perceptions, challenges and recommendations for implementing EE in secondary schools. It was qualitative in nature, using a case study design. It was cross-sectionally stratified, involving students, teachers experienced in Geography and Biology and heads of schools. The findings revealed that most EE competencies were delivered mainly through the Geography subject – and some in Biology by using an integrated approach. It was also found that both pupils and teachers were fairly knowledgeable and had an understanding of basic environmental issues. The main identified challenges were inadequate knowledge on EE, a lack of collegial and school administration support as well as cultural myths and beliefs. The study concluded that the findings can represent similar situations in public secondary schools in Tanzania as they all use a centralized system. However, disparities may exist between schools due to variations in

population, school facilities and T/L materials, experience and skills of teachers, rural and urban schools etc.

Kimaryo (2011) has conducted a study on the integration of EE in the primary school curriculum. The study examined the perceptions of teachers on EE and their teaching practices. It was qualitative in nature, adopting phenomenography and phenomenology as its points of departure. Four primary schools from the Morogoro district in Tanzania were involved, with a sample of 31 subject teachers. Interviews and classroom observations were used to collect data. The study found that all participating teachers supported that EE knowledge was important for the primary school curriculum, and they had varying perceptions of EE and ESD. The majority focused on the aspect of knowledge acquisition. It was found that some teachers were not aware of the integration of EE contents into their subjects, and they claimed that the way EE contents were to be integrated was not shown clearly in the curriculum. Thus, many teachers suggested EE be addressed as an independent subject. They also claimed to use participatory methods, but it was found during classroom observation that they only limited themselves to questions and answers as well as group discussions. Among the obstacles to the effective teaching of EE, a lack of T/L resources, time and large class sizes were found. The study concludes that the role of teachers in the implementation of EE is critical for developing an environmentally literate citizenry. Therefore, the government needs to act responsibly and in a determined manner to develop a curriculum with clear goals and content, to foster capacity-building for teachers as well as to improve T/L resources. However, the study also found that little research has been done regarding EE issues at the primary school level in Tanzania.

Kiarie (2016) conducted a study in Nakuru, Kenya, to investigate the effects of teachers' viewpoints on pupils' perceptions and achievements in EE. A causal comparative survey design was employed for a sample of 150 Form three students and 20 Biology teachers. Questionnaires were used for both categories of participants, as well as the Achievement Test d for data collection. Both inferential and descriptive statistics were used in the data analysis. The T-Test and Pearson's product moment correlation coefficient were used to analyse the data. The findings revealed that both teachers and pupils had a positive perception of EE. It was also found that there was no statistically significant relationship between Biology teachers' perceptions and the pupils' achievements in EE. Moreover, there was no statistically significant relationship between Biology pupils' perceptions of their environment and their achievements in EE. Results also indicated that teachers had no regular in-service training in EE.

Another study conducted by Mwanza (2016) in Zambia aimed at exploring teachers' and pupils' perceptions regarding EE integration into the primary school curriculum as well as at determining the approaches used by teachers in its implementation. Ten primary schools with a sample of 130 respondents were involved. The study was qualitative and employed a descriptive research design to collect in-depth data from semi-structured questionnaires and focus group interviews. It revealed that both teachers and pupils perceived EE as a means of

acquiring knowledge and skills about the environment, as seen from a biophysical perspective. Teachers had varying perceptions, with majority supporting that EE needs to be integrated into all subjects. Some showed ignorance towards the integration of EE. The study also found that teacher-centred methods were preferred due to the examination-oriented curriculum. They encountered a number of challenges, including a lack of knowledge due to poor training in EE, of guidelines and unclear syllabi, of T/L resources coupled with large class sizes, of time, ineffective monitoring and evaluation mechanisms. It was also reported that some pupils lacked reading skills, which prevented them from acquiring EE at an individual level. It was concluded that EE was not effectively taught and that teacher re-training was necessary to re-sharpen their pedagogical skills. EE should be included in the curriculum as an independent subject so as to broaden its content, scope and status. The government should increase the EE budget in the educational sector to support and sustain its proliferation through mass media.

Furthermore, another recent study was conducted in Surabaya, Indonesia, to examine pupils' and teachers' perceptions of EE in primary schools (Kuwahara et al., 2017). This was also a qualitative study which surveyed 6th grade children and teachers from eleven public and private schools to determine their respective conceptions of EE. The findings showed that the children were highly motivated to learn Mathematics, Science and Environmental education; however, they were limited in practical skills and participation opportunities to apply their environmental knowledge in daily life. The pupils who participated in the study showed a sincere interest in environmental studies and a promise towards sustainable behaviour. Teacher training, facilities, budget and time were also challenges encountered during the implementation of EE. The study suggests that effective pre- and in-service training can empower teachers to manage these challenges effectively. It also found that teachers showed strong interest in EE and concern for regional environmental issues, but were primarily focused on awareness- and knowledge-centred approaches, with a low emphasis on participation and practical skills.

In the same vein, a study conducted by Blanchet-Cohen and Reilly (2013) in Canada focused on exploring teachers' perspectives on enacting environmental education in a Quebec urban locale with high student diversity. Teachers from schools with a significant linguistic and ethnic diversity participated. This was a qualitative study in which focus groups and individual interviews were used to collect data. Teachers noted to have an interest in EE matters and activities from three schools took part in the study which explored their experiences with incorporating EE into their multiculturally diverse classrooms. It found that teachers need support from beyond their classrooms and the capacity to develop a curriculum that facilitates the inclusion of students. Findings suggest a move towards practices of culturally responsive EE that demand more than just an awareness and include an interactive dialogue. Both internal and external challenges were identified as limiting possibilities of adapting EE to their multiculturally diverse classrooms. These included teacher values versus perceived student values; i.e., there was a perception of a clash between the environmental values held by teachers and those held by their students. Another challenge was the lack of

common lived experiences with the students, which is linked to the perception that teachers and students hold distinct and often contradictory values with respect to the environment.

The knowledge gap

The studies reviewed above show that teachers and students are placed as key actors in ensuring the successful implementation of EE in schools. All studies tried to explore the perceptions and roles of either teachers or students (or both) in determining the successful implementation of EE. As argued by Klitgaard (1973), in the theory of innovation applied in this study, it is difficult to ascertain success or failure in educational innovation/change/reforms by focusing on only a few aspects or factors. Educational institutions operate as a system in which different actors or levels have different roles and responsibilities to ensure the successful implementation of such changes. The present study will address this gap by exploring the views and perceptions of other actors in education, including curriculum specialists, heads of schools as well as teachers to get a comprehensive picture and to be able to explain the whole process of integration. Moreover, none of the above studies have tried to understand the social and cultural purposes of schooling to explain the compatibility of EE in terms of goals and objectives as well as pedagogical approaches with the traditional purpose of schooling, which is an important factor to determine the success or failure of EE integration into the existing curriculum. Last, the literature reveals that there is paucity of research on the views and perceptions on EE integration in primary education – despite its value and primary function in human life.

2.12 Summary

This chapter has presented an extensively reviewed literature, both theoretical and from empirical studies conducted on the EE field.

In the theoretical part, issues of environmental perspectives as well as global and local environmental problems were covered. The origin and development of EE from a global to a local view were featured. The debates between EE and ESD as well as their common vision and goals were analysed. The investigated literature also covered the education system in Tanzania (and its primary education in particular) as well as the entire procedures and strategies in which EE is being integrated into the system. The status and quality of implementers was reflected upon in conjunction with the challenges they encounter during the implementation process. Prospects for the future were also proposed. The main theoretical frameworks adapted to this study – the diffusion of innovation and school theory – were presented.

The second part presented a variety of empirical studies on stakeholders' perceptions of EE integration into the school curriculum. A majority of the reviewed studies almost covered the same aspects, such as perceptions, methods and models for integration, T/L resources, challenges or barriers to EE implementation. These studies have shown that EE was not effectively implemented in schools, but they only included teachers and students. This study

therefore aims at filling this gap by also exploring the views and perceptions of other educational stakeholders, such as curriculum specialists and heads of schools together with subject teachers, as well as their interaction, to come to a comprehensive picture of the integration of EE into primary education.

CHAPTER THREE: METHODOLOGY

This study aims at exploring the views and perceptions of educational stakeholders (teachers, heads of schools and curriculum specialists) on the integration of environmental education into the primary school curriculum in Tanzania. This chapter intends to explain and discuss the methodological procedures that were applied in collection and analysis of data. The discussion of methods will enlighten the reader on how the study was carried out and how the research findings were achieved. This chapter will cover the following issues: a description and discussion of the selected research paradigm and its philosophical assumptions that informs the methodology which includes the design of the study. Other fundamental aspects covered include the context of the study, research participants, sampling procedures, data collection methods and data analysis, research ethics and strategies to substantiate the credibility of the study.

3.1 Research design

The proposed study is qualitative in nature, employing an interpretative paradigm in which philosophical underpinnings about the nature of reality (ontology)[14] are subjective and multiple. Hence reality is constructed through the interaction between language and aspects of an independent world (Frowe, 2001). The main principle of interpretivism is that research can never be objectively observed from outside but rather from inside through direct experiences with the people. Thus, the researcher's role under this paradigm is to *"understand, explain and demystify social reality through the eyes of different participants"* (Beck, 1979 as cited in Cohen et al., 2007, p. 19). Moreover, the researcher's epistemological stance is central to the choice of methodology in terms of purpose and goals (Snape & Spencer, 2003, p. 1). The strength of the claim to new knowledge is dependent upon how that knowledge is developed, as well as the rigour of the methodology. Epistemologically, this study has gained knowledge by lessening the distance to the researched, as the assumption emphasizes on the nature and form of acceptable knowledge which is determined by the relationship amongst the investigator and the research contributors (Cohen et al., 2007). A research paradigm therefore represents a cluster of beliefs, it dictates and influences scientists in a particular discipline on what should be studied, how research should be conducted and how results should be interpreted (Bryman, 2012). Early researchers like Guba and Lincoln (1994) referred to the research paradigm as *"the basic belief system or world view that guides the investigator, not only in choices of methods but also in ontologically and epistemologically fundamental ways"* (p. 105). However, the interpretative paradigm is criticized for neglecting the scientific procedures of verification and therefore limiting the possibility to generalize its results. It also neglects the acknowledgement of the political and ideological influences on knowledge and social reality.

[14] Blaikie (as cited in Grix, 2004, p. 59) has defined ontology as the study of "claims and assumptions that are made about the nature of social reality, claims about what exists, what it looks like, what units make it up and how these units interact with each other".

The study used a qualitative methodology to explore the ways in which educational stakeholder participants perceive EE integration into the primary school curriculum. The study partly applied the grounded theory procedures from a Straussian perspective due to its ability to interpret complex phenomena, to accommodate social issues and its appropriateness for socially constructed experiences (Strauss & Corbin, 2015; Glaser & Strauss, 1967). The researcher does not begin with a hypothesis about the phenomenon under scrutiny and instead remains open to whichever theory emerges from the data. The Straussian school of thought has its roots in the social constructionist ontology and the post-structuralist paradigm which has an emphasis on diverse local worlds, multiple realities and complexities of particular worlds, views and actions (Strauss & Corbin, 2015). The methods selected to collect data for the analysis (and thus to answer the research questions) were in-depth interviews and document reviews. Data sources, interpretation and analysis need to be rigorous in terms of reliability (consistent methods of data collection that give accurate evidence and portray an honest representation of the findings) and validity (precise questioning, data collection and interpretation in relation to the research questions) so as not to compromise the quality of research (Wilson, 2009).

The study also applied qualitative content analysis with thematic procedures in order to analyse the data (Kuckartz, 2014).

3.2 Data collection process

This series of activities connected to each other and facilitate the researcher to answer the research inquiries and appraise the outcomes (Creswell, 2008). The process includes activities such as locating a study site, sampling of participants and schools, as well as the choice and operation of data collection methods.

3.2.1 The study sites

According to Taylor and Lindlof (2011), a study site is referred to as an immersive environment which contains numerous settings for the researcher to manipulate. This study was conducted in two regions of Tanzania: Dar es Salaam and Kilimanjaro. These two regions were chosen due to their unique features.

The former region is the largest city with the largest population in Tanzania; it undergoes rapid growth because of urbanization that culminates in a number of environmental challenges. However, the Dar es Salaam region contributes the largest income per capita of the country. Many government offices are found in this region, including the state house (where the President office is located). This region is comprised of numerous cultural groups from all over the country; therefore, the population has a variety of values, experiences, perceptions and attitudes with regard to environmental concerns. According to the country's 2012 demography report, the city of Dar es Salaam has more than 4.3 million inhabitants (URT, 2013). The latter region was selected because Mount Kilimanjaro forms part of the Eastern Arc Mountain Forests and is one of Conservation International's 25 global biodiversity hotspots. Mount Kilimanjaro is a World Heritage Site and its famous glacial ice cap has become a symbol of climate change. Research shows that 80% of Mount Kilimanjaro glaciers have been lost since 1912 and projected to disappear completely by 2025 (UNDP,

2011). Climate studies in the region have demonstrated an overall warming trend and progressively reduced precipitation since the 1950s. Moreover, the Kilimanjaro forests are severely threatened by human activities through unsustainable agricultural practices like shifting cultivation and wild fires (Chandler, 2017). The empirical findings obtained from this study will shed light on the situation on the ground, concerning environmental issues on these sites, and serve as a catalyst for change.

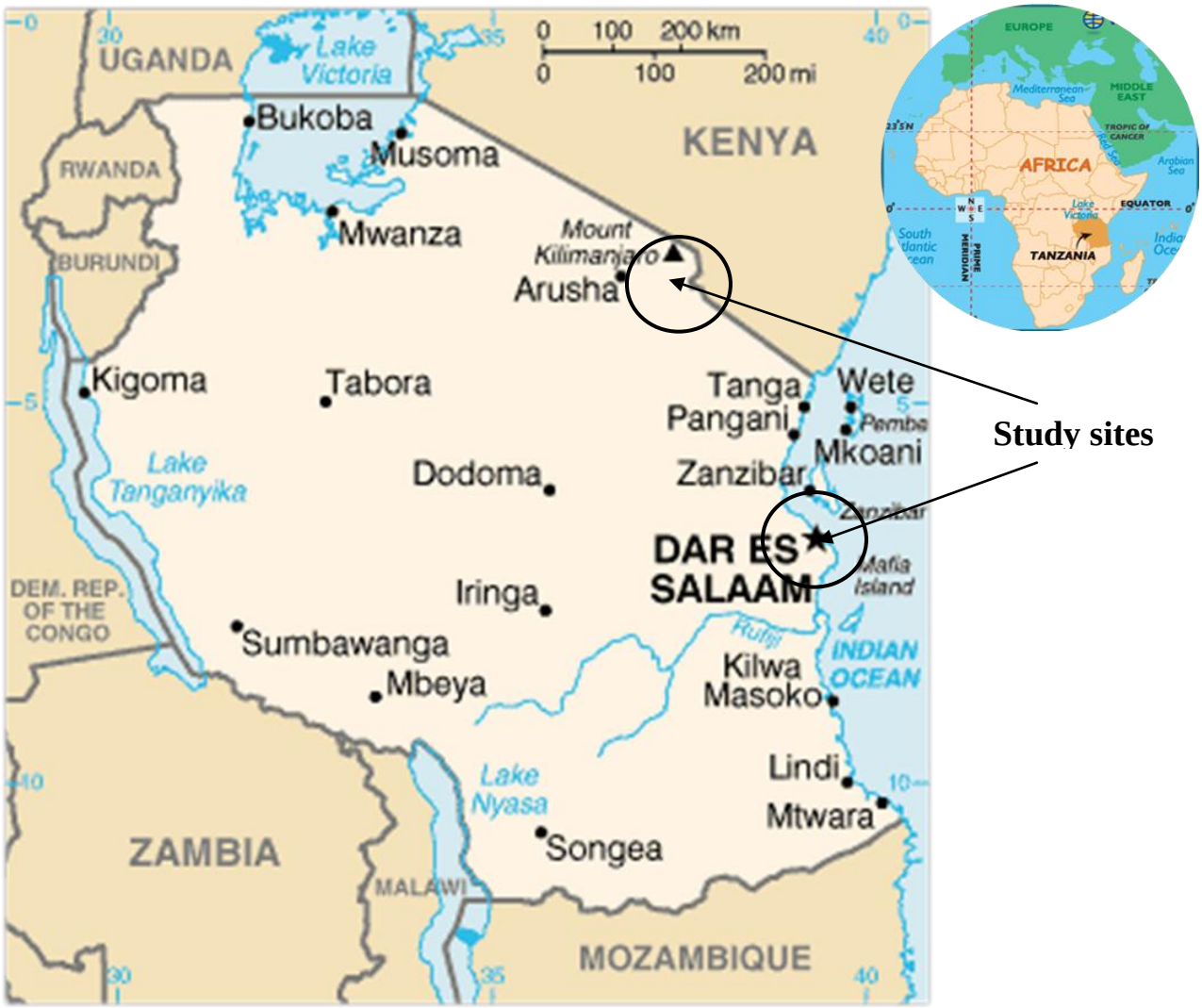

Fig. 8: Map of Tanzania with study site indication

Source: http://www.worldatlas.com/webimage/countrys/africa/tanzania/tzmaps.htm

3.2.2 Population of the study

The population for this study comprised all public and private primary schools, both urban and rural, as well as all primary school teachers from the two selected regions and Ministry of Education officials such as curriculum specialists. A target population consists of the specific group who the researcher is interested in for gathering information and drawing conclusions

(Cohen et al., 2000; Depoy & Gitlin, 2005: Best & Kahn, 2006). From this target population, the researcher can narrow her focus down to specific schools and participants to be involved in the study, as will be explained in the next sections.

3.2.3 Selection of schools

The study included five primary schools which were purposively selected: three schools from Dar es Salaam and two from the Kilimanjaro region. The schools in Kilimanjaro were selected from the rural area around Mount Kilimanjaro and were named school A and B. The schools in Dar es Salaam were municipal schools, one from each district, i.e. Kinondoni, Ilala and Temeke; these schools were named school C, D and E respectively. Schools A and E were private while schools B, C and D were public schools. The researcher employed purposive sampling to select the schools. Even though this technique may not result in a selection that is representative of the whole population and may therefore lack generalizability, it still provides an in-depth understanding of the curriculum praxis with regard to EE integration in these primary schools (Potsi, 2013). The location of schools in different localities may influence teachers' views and perceptions, even their knowledge and awareness of environmental concerns. For example, in urban areas in Tanzania, schools are more densely 'populated' compared to rural schools, and life is more commercial in an urban environment, while the rural lifestyle is more farm-based. Urban schools thus differ from rural schools in terms of their context and daily life experiences. However, classroom patterns and sizes as well as educational resources are more or less the same. Nevertheless, there is a notable difference in terms of infrastructure such as classrooms, school discipline and waste management between private and public schools. Private schools tend to have a more conducive learning environment compared to public schools. As shown in the study conducted by John (2009), the quality of education in private primary schools is generally better since the teachers are more skilful and committed, as well as due to more and better available resources and facilities, the use of child-centred methods in teaching, a good learning environment and usually more responsible parents. A later research by Tshabangu and Msafiri (2013) also discovered a big gap between many poorly resourced public schools and the very few well-maintained private ones.

3.2.4 Sampling procedure

Three different groups were sampled in order to answer the four research objectives. These were subject teachers, heads of schools and curriculum specialists/developers. Each category contributed unique experiences and perceptions with regard to the issue under investigation. The researcher employed purposive or theoretical sampling, which involved the deliberate selection of individuals based on predefined criteria because the researcher needed to consider the sample that would generate rich data for the study (Cohen et al., 2007; Best & Kahn, 2006); the sample also allows for an understanding of the social process of interest here (Nigatu, 2009). Purposive theoretical sampling was used to select the subject teachers, heads of schools and curriculum developers. Moreover, their positions and roles in education influenced their choices.

Sampling of subjects and teachers

The curriculum for both public and private schools was uniform. Following the 2014 policy on education, the Ministry of Education and Vocational Training (MoEVT) identified ten official subjects offered in primary education. These encompass the eight compulsory subjects of Kiswahili, English, Mathematics, Science and Technology, Social Studies, Civic and Moral Education, Vocational Skills and Religious Education. These eight are compulsory subjects. In addition there are two optional subjects: Arabic and French. In order to obtain a rich corpus of data, the study focused only on few subjects which were found to have a significant environmental content. These were Geography, Science, Civic and Moral Education as well as Social Studies (MoEC, 2005, 2006; MoEVT, 2016). The teachers involved in the study were only those who were teaching Geography, Science and Civics in grades four to seven. They also acknowledged that there is more environmental content in their syllabi compared to other subjects.

This aimed at getting rich in-depth information from the teachers. The class level the teachers taught was also considered because the grade levels had a varying scope and depth of environmental contents. The aspect of gender was not so much a criterion to be involved in the study since a teacher's subject was more relevant. However, it was good to have different perspectives between male and female teachers for a balance of views. The teachers' qualifications were a criterion since there is quite a variation between Grade A (certificate) and Diploma and Bachelor teachers. When completing one's ordinary secondary certificate after four years, a teaching student has to study for two more years to qualify as a Grade A teacher. In contrast, the Diploma teachers complete their ordinary secondary certificate, then study for two more years for an advanced secondary certificate and then join one or two years of additional teacher training. Finally, Bachelor teachers hold an advanced secondary certificate with or without Diploma qualification and then join three years of a teachers' training programme at university. No teachers in the study were trained as primary school teachers only. The Diploma and Bachelor teachers were also qualified to teach at secondary schools. In general, the qualification of teachers ranged from the minimum requirement of Grade A to degree levels. The majority of teachers had the minimum qualification for teaching. The highest qualification was mostly for curriculum specialists, and one was a head of school. Teaching experience was also considered to be important in this study since it may add more insights into the issues studied, especially when exploring environmental experiences among teachers. This aspect also helped check whether there were variations or reforms in the teachers' programme with regard to environmental concerns. Table 3.1 elaborates the categories of the participants.

The teachers' locations were also important to be included in the study because urban and rural environments have different lifestyles and experience different environmental changes and challenges. The researcher is supposed to interview as many subjects as necessary to find out what she needs to know. Nevertheless, the number of required respondents depends on the purpose of the study (Corbin & Strauss, 2015; Kvale, 2007). Based on available resources (such as time and funds), the researcher had to make judgments about when to end data collection.

Sampling of educational authorities

By virtue of their positions, five heads of schools were purposefully sampled, as well as two curriculum developers. However, only four heads of schools took part in the study. These were useful as they work closely with the teachers to ensure the effective implementation of any curricular reforms and innovations. They also play a vital role in determining the success or failure of any school curriculum.

In general, the sampling constituted 30 respondents under the following categories: 24 subject teachers, four heads of schools and two curriculum developers. Table 2 shows a synopsis of the participants' background characteristics.

Characteristics	Categories	Number of participants
Gender	Male	18
	Female	12
Teaching qualification	PhD	1
	MA	2
	Bachelor degree	7
	Diploma	3
	Grade A	17
Teaching experience (in years; only subject teachers)	1-10	10
	11-20	3
	21-30	8
	31+	3

Table 2: Synopsis of the characteristic features of the participants involved in the study

3.2.5 Data collection methods

According to Flick (2015), social research consists of three main forms of data collection: surveys and interviews (by asking people) as well as observing or studying documents. The researcher has to choose an appropriate method according to the purpose of her research and in order to obtain useful information to answer the research questions. A careful selection of the data collection method is essential for reducing errors in research and for maintaining integrity or reliability. The research questions for this study were answered with the help of interviews and document reviews.

Data was expected to be collected through interviews, classroom observations and document reviews. However, due to field limitations, only interviews and document reviews were applied. The primary aim to employ multiple methods was to triangulate the information obtained. According to Flick (2007), triangulation is applied when researchers take different perspectives by using several methods and/or theoretical approaches on the issue under study. It combines different sorts of data against the background of the theoretical perspectives applied to the data. Lesson observations could not be carried out as the teachers involved in the study were either doing class revisions for mid-term tests or tests themselves. Others were not involved in topics that had EE content. However, triangulation was conducted between the interviews and the document reviews. Moreover, it was also carried out with the different

sources of data. The study used subject teachers, heads of schools and curriculum specialists as referential sources.

Both primary and secondary sources were used to collect information. Interviews formed the primary sources of data. The main respondents for interviews included subject teachers, heads of schools and curriculum developers. The curriculum specialists also provided their opinions and perceptions in conjunction with the professional experiences and challenges in planning the curricula, and they contributed their views on the prospects of effectively integrating EE content into primary school curricula. On the other hand, secondary data were obtained through policy and primary school curricula documents. The secondary sources enabled the researcher to obtain information about the rationale, the aims and the objectives as well as the scope of environmental content integrated in curricula, about its relevance and whether it focuses on the balance between ecology, economy and culture as the three globally defined pillars of sustainability. The following subchapters provide details on the data collection methods applied in the study.

Interviews

In qualitative studies, the interview is the key method in data collection since it is the most effective mode of gathering data in various types of qualitative inquiries, specifically for understanding people's world views (Kvale, 2007). The in-depth nature of an intensive interview fosters eliciting each participant's interpretation of his or her experience. The interviewer seeks to understand the topic, and the interview participant has the relevant experiences to share. Thus, an interview is a two-person conversation initiated and guided by the interviewer for the purpose of obtaining relevant information about the issue under scrutiny. Interviews can be formal, informal to highly structured or unstructured (Cohen et al., 2007). A semi-structured interview method was prioritized in this study for its high degree of objectivity, its rich information potential and its room for flexibility in the discussion (Creswell, 2008; Kvale, 2007). Although this method consumes more time than others, it can unveil in-depth information that would be difficult to obtain through other methods. Yin (2012) said that one interview session can last for two or more hours; therefore, the participants have to be well-informed beforehand on the interview purpose and the value of the information they provide.

This study began its data collection with a general opening of a subject area. From this initial opening, the study became continually focused towards an area of social concern. The researcher had a general plan for the topic to be discussed but did not follow a fixed order of questions. She sometimes deviated from the sequence of questions, not necessarily sticking to the exact formulation of the questions when asking them, thus rather trying to initiate a dialogue (Flick, 2015). Interviewees were allowed a great deal of freedom in terms of how they answered, in the length of their responses and even in the topics they discussed (Hittleman & Simon, 2006). Moreover, semi-structured interviews were favoured in the study because they allowed the researcher to maintain some consistency in the concepts covered in each interview.

In-depth interviews were used to gather relevant information on environmental experiences, issues and challenges, curricular content relevance and adequacy, instructional methods,

motivation as well as professional development information. Views and perceptions of heads of schools and curriculum specialists on the rationale of EE were also gathered, as well as how they facilitated the teachers to ensure the effective integration of EE as an education innovation into their teaching. The views on the strategies they used for teacher motivation were asked as well. Moreover, the challenges and recommendations for an effective implementation were also brought to light.

The researcher conducted a total of 30 interviews through verbal communication after establishing rapport with her interview respondents. The participants were also asked to fill in a consent form voluntarily, and the researcher clarified that they were free to withdraw from the study at any time and for any reason. Among the 30 interviews, 24 were conducted with subject teachers, four with heads of schools and two with curriculum specialists. The interviews were arranged at a date, time and place convenient to the participants; however, there were a lot of irregularities on dates and time due to the teachers' roles and availability. All interviews were held at official places, such as in schools for the teachers or in government offices for curriculum specialists. Interview guidelines were used which had several open-ended questions (Kvale & Brinkmann, 2009; Kvale, 2007). See appendices 2-5.

The interviews were introduced with a briefing which defined the situation for the subject. For example, the researcher explained the purpose of the interview as well as the use of the tape recorder and asked if the participant had any questions before starting the interview. The researcher began with a few broad open-ended, non-judgmental questions and then focused on initiating a detailed discussion of the topic. This helped the interviewees respond in their own words (Creswell, 2012). This way it encouraged unanticipated statements and stories to emerge. Then the interviewer asked the participants to describe and reflect upon their experiences in terms of how they occur in everyday life. Provided that the participants were chosen with a purpose, their values were clarified in the interview (Taylor & Lindlof, 2011). The researcher had the task to listen, to sensitively observe and to encourage the person to respond. Her comments and questions helped the interviewees articulate their intentions and meanings (Charmaz, 2006). As pointed out by Kvale (2007), good interview questions contribute thematically to knowledge production and to dynamically promoting a good interpersonal relationship during the interview. Therefore, the questions of 'what' and 'why' are thematic and were answered before the 'how' questions which are dynamic. The researcher used a range of introductory questions: follow-up, probing, specifying, direct and indirect questions, a moment of silence and lastly interpreting questions. The structure of an intensive interview may range from a loosely guided exploration of topics to semi-structured focus questions, with time allotted at the end of the interview for participants to add topics that are important to them (Corbin & Strauss, 2015). Kvale (2007) calls it debriefing, where the researcher also recalled some main points learned during the respective interview. The interviews were recorded and later transcribed, and an interview session lasted between 30 minutes and one hour depending on the time participants could spare. Semi-structured interviews were the best method for this study due to the advantages they render. However, some limitations are associated with this method. First, interviews have a reactive effect, which is to say that the interviewer's presence and characteristics may bias the results. This is a time-consuming and expensive method and may thus reach only a small sample. It also

requires the researcher to meet the respondents face-to-face, so those who prefer anonymity may be inhibited by the personal approach.

Document review

The researcher reviewed the Tanzanian Educational Policies (ETPs) of 1995 and 2014. This was due to this study having begun when the 1995 policy was still in operation and was changed to a new policy with effect from 2016. The review of policies aimed at identifying aims and objectives of EE as well as its position and the rationale in Primary education. Moreover, curricula of all subjects were also analyzed to capture the extent to which environmental content is integrated into them. The content analysis of the curriculum guides was also undertaken in order to establish whether and how the formal curriculum in Tanzania reflects the central principles of the global sustainability discourse, which emphasizes the balance between the ecological, economical and societal or cultural aspects.

A checklist of several items or categories (variables) was used to guide data collection and to draft a protocol or data collection sheet to critically analyse the primary education policy and curriculum documents, particularly the syllabi of the subject. A list of questions, items, categories and variables was made to guide the data collection from documents. For example, protocol guidelines for document analysis included questions such as: by whom and when was the official document published? What are the aims and goals of integrating EE into primary education? What does the document say about EE content? Is EE content integrated into all subjects equally? And does it reflect the three pillars of sustainability? See appendix 2. The protocol guidelines facilitated framing the inquiry to elucidate descriptions (Patton, 2002).

Qualitative document analysis relies significantly on text, narratives and descriptions and hence tends to be less precise and fairly short with fewer categories (Altheide & Schneider, 2013). The protocol may have some pre-coded items for each of the categories. The focus of the analysis was on the nature of the curricula, objectives, content coverage (scope) and relevance in relation to environmental awareness (covering the three pillars of sustainability, i.e. ecology, economy and culture) and practices in primary education. These documentation data supplemented the interview data.

3.2.6 Data collection phases

Gathering relevant information from the field began with a process of locating schools and participants who would take part in the study. This process involved four phases, as explained below.

The first phase of data collection began with the preparation of the research instruments: the interview and document analysis guides. This was done from June to July 2015. This was followed by writing to the university managements, the regional administrative secretaries and the district education officers in order to request research permits for information collection from the selected schools and government offices. This stage was fundamental and adhered to the ethics of conducting humanist research. The researcher then visited the schools for an introduction and for explaining the purpose of the research at hand. The researcher made clear that all the information obtained would be treated confidentially and would only

be used for research purposes. She also made clear that participating in the study was voluntary and that every participant could withdraw from it at any time. The researcher asked permission to record all the interviews, and the heads of the schools assisted in obtaining the relevant interviewees and in providing proper time for the interviews. This process reduced tension from the teachers and allowed them to participate with confidence. However, Cohen (2000) cautions that this process might cause constraint upon the interviewee. Since the main target of the study was to explore perceptions and life experiences, establishing rapport was crucial prior to conducting the interviews. The majority of participants willingly agreed to participate in the study. Later, piloting the interview instrument was carried out. This was done in different schools from the ones that were selected for the study. The instruments were piloted to six teachers who were teaching the same subjects as those selected for research. Three teachers were chosen from each region of the study. At the ministry level, two officials from the curriculum specialist department assisted the researcher in the pilot test. The instruments were then adjusted for use.

In the second phase, initial interviews were conducted with individual teachers in schools A and B respectively, a public and a private school located in the rural area. The simple preliminary analysis through field notes was done in order to enable the researcher to be more focused on which kind of data to collect additionally (Strauss & Corbin, 2015; Creswell, 2008; Glaser & Strauss, 1967). This phase took place in August and September 2015. Olshansky (1996) advises that the researcher must identify and suspend what she/he already knows about the experience being studied so as to avoid preconceptions before approaching the data. However, this idea was criticized by Baker et al. (1992) who argued that a researcher is a social being who creates and recreates social processes as well. Hence, prior experiences are also data, and the researcher uses ideas or assumptions about the situation under scrutiny in order to better understand the processes being observed.

The teachers were given freedom to choose the time and venue for the interview in order to create a friendlier interview atmosphere. All interviews were conducted within the school compounds, in offices or in a silent area around the school. Most of the participants were interviewed between August 2015 and January 2016. All questions were developed from the four research objectives and were administered according to the respective category of participants and the information required from them. See appendix 3. Two languages were used to conduct the interviews (English and Kiswahili) although the researcher preferred English. However, only five out of thirty participants agreed and were comfortable to speak English. These two languages are the medium of instruction in public (Kiswahili) and private (English) primary schools. All interviews were recorded in order to capture the verbal interactions, feelings and naturality of the conversation. The interview times ranged from 30 to 60 minutes. More interviews were carried out with the teachers in schools A and B, including the two heads of schools. This marked the end of second phase.

The third phase focused on the teachers in urban schools in Dar es Salaam. These were schools C, D (public) and E (private). A few teachers were interviewed in each school, and the researcher reflected on the collected data before involving more teachers. This helped her make a simple comparison of the research objectives and the obtained answers. This reflection assisted her in deliberately choosing more specific individuals due to their deep

understanding of the researched phenomenon (Flick, 2014). In this way, the data became more refined and elaborate. The heads of schools were also interviewed alongside teachers. This parallelism was useful as some issues emerged during the interviews with teachers needed to be compared, clarified or confirmed by the heads of schools for the purpose of data triangulation. This phase covered the time between October and December 2015.

Phase four, which took place in January and early February 2016, covered interviews with some teachers left in school C. The curriculum specialists were also interviewed in this phase as they were also located in Dar es Salaam. This phase marked the end of field data collection.

In general, data was successfully collected despite some field barriers encountered. These included, naming just a few: preparations of grade 7 national exams; vacations; a majority of teachers being involved in the country's general elections; a change of the expected research language. The researcher began her thorough data processing in March 2016 when the interviews were transcribed to verbatim and later translated and completed in September 2016.

Phase five included data processing and analysis as well as the presentation of the research results which are presented in the next sections.

3.3 Data processing and analysis

Transcription

The data collected from the 30 interviews were transcribed from audio files into verbatim for the researcher to be able to analyse it. Data transcription took a long time since it is a listening-and-writing process. The interviews lasted between 30 and 60 minutes. The convention names that were used were 'Researcher (R)' and 'Participant (P)'. Almost all data were transcribed by the researcher, which gave her a good opportunity to familiarize with the content, to begin the analysis early enough and to generate new ideas about the data. Data transcription was done with the help of 'Easy Transcript' which is a computer-assisted programme.

Translation

The original data was collected by using Kiswahili since many teachers were not fluent in English and therefore not willing to use the English language for conversation. The collected data were then translated from Kiswahili to English for use in this thesis. This process also took more time than expected since it is sometimes difficult to transfer the exact meaning of words from one language to another.

Data organization, structure and analysis

Data processing continued with the familiarization with, and organization of the data. After familiarization, the researcher applied different methods to structure and organize the data for analysis through the help of the MAXQDA and EXCEL programmes.

Qualitative data analysis is the classification and interpretation of linguistic or visual material in order to make statements about implicit and explicit dimensions and structures of meaning-making (subjective or social) in the material and what is represented in it. It is also applied to discover and describe issues in the field or structures and processes in routines and practices (Flick, 2014). It is a process in which research advances from the collected qualitative data to an explanation, understanding or interpretation of the people and the situation under investigation through a range of processes and procedures (Gibbs, 2010). Qualitative data analysis serves three major aims: first, to describe a phenomenon in some or greater detail based on the subjective experiences of a specific individual or group. Second, to compare several cases of individuals or groups and what they have in common or of the differences between them, for example by identifying the conditions such differences are based on and to seek explanations. Lastly, it aims at developing a theory from the analysis of empirical material (Flick, 2014). This study mainly fulfils the first two aims and, instead of developing a theory, proposes a model that will serve as a guide to effectively implement EE/ESD in primary schools.

This study employs several strategies to analyse the data. First, the researcher employs some of the grounded theory strategies as proposed by Strauss and Corbin (1990). The main reason is that this allows for the broader environmental and contextual factors (macro-conditions) to influence the phenomenon under investigation. It also provides explicit guidelines for data analysis (Corbin & Strauss, 2008) and later a thematic content analysis by Braun and Clarke (2006). The researcher studied and familiarized with the data thoroughly and began to separate, sort and synthesize them through open coding. Open coding aims at developing substantial codes that describe, name or classify the phenomenon under investigation. According to Strauss and Corbin (2008, 2015), open coding is the analytic process by which concepts are identified and developed in terms of their properties and dimensions. This analytic procedure is accomplished by asking questions as well as by making comparisons to identify similarities and differences between each incident, event and other instances of phenomena. Thus, the analytic grasp of the data begins to take form, and this procedure is used to generate the description of themes. Concepts or codes allowed the researcher to group data under the same heading that have a common element or purpose, and it helped reduce the amount of data. These concepts or codes were placed under a broader heading so as to form categories which are referred to as themes. And according to Braun and Clarke (2006), thematic analysis is a method for identifying, analysing and reporting patterns or themes. At this stage, the researcher used visual representation, for example mind maps, in order to group the codes into themes. Thematic maps helped her see the relationships between codes, themes and sub-themes. In these initial thematic maps, the researcher did not discard anything, not even the codes that did not seem to belong to any theme. She labelled this theme ‘miscellaneous’ so as to accommodate these data temporarily, so that it could later be fitted into the main themes which were refined and separated or discarded if they did not fit

anywhere. Here, the researcher adhered to the criteria for judging categories, as explained by Patton (1990) as internal homogeneity and external heterogeneity. This is to say that data within themes should cohere meaningfully; on the other hand, clear and identifiable distinctions between themes should be explicit. The themes emerged inductively (bottom-up) since they were strongly linked to the data.

Along with coding and identification of the themes, the researcher constantly wrote analytic notes called memos about the codes and comparisons as well as any other ideas about the data (Strauss & Corbin, 2008, 2015; Charmaz, 2006). Memo-writing began with the first analytic sessions and continued throughout the writing phase. The researcher deviated from using all the procedures for data analysis in the grounded theory by Strauss and Corbin (2008, 2015), and instead mixed them with a thematic analysis approach as proposed by Braun and Clarke (2006). The main reason for this was that during data collection, she could not adhere to theoretical sampling, which is an important step in the grounded theory approach. This stage could not be done as suggested due to limited time and financial resources. Therefore, the researcher was flexible to use what fitted best to the data and the purpose of research.

Document data were analysed through content analysis and description. Conceptual analysis was used as a strategy where concepts were chosen for examination and the analysis involved quantifying or tallying its presence in the documents. The main focus was put on looking at the occurrence or existence of selected terms within a text. The analysis started by identifying research questions and choosing one or several samples. Then the text was coded into manageable content categories guided by steps, as developed by Carley (1992), which enabled the researcher to decide on: the level of analysis; how many concepts to code for; whether to code for the existence of a concept or its frequency; how to distinguish between concepts; rules for coding the text; coding and analysis of the results. By reducing the text to categories of words or phrases, the researcher could focus on and code for specific words or patterns that were indicative of the research questions. She simply wanted to examine their presence with respect to her research questions.

3.4 Quality of the study

Quality assurance in any scientific endeavour / research is imperative. To ensure credibility of this study the researchers has observed and employed a number of strategies as explained in the following sub sections.

3.4.1 Ethical considerations

The issue of research ethics is paramount whenever human beings are involved in a study. Thus, ethical considerations addressed three important elements. First, informed consent[15] was required of the participants to take part in the study. The second concerned confidentiality, and the third one considered possible consequences (Cohen et al., 2000). On the aspect of consent, the researcher obtained research clearance from authorities in charge in order to legally conduct the study. Institutional informed consent and participants' consent to

[15] Informed consent is the process by which potential study participants are informed about the study and its participation requirements (Depoy & Gitlin, 2005).

participate in the study were also obtained. The district authority issued research permission letters for schools involved in the study. A permission to conduct research in the Institute of Education where the curriculum specialists were located was obtained from the Ministry of Education before the data collection phase began. Flynn and Goldsmith (2013) added that it also implies that subjects know and understand the risks and benefits of participating in research. Participants should also understand that their participation is completely voluntary. The researcher established a rapport with participants and participants voluntarily provided permission to be studied. So the researcher introduced herself and explained the purpose of the study.

The researcher assured the participants that the information obtained for this study would only be used for academic purposes to ensure confidentiality. Interviews were conducted in the areas where teachers felt secure, and all teachers and schools were given aliases in the data analysis and presentation of the research findings to maintain confidentiality. This enabled teachers to feel free to give information that was needed for the study.

On the consequences aspect, the researcher assured the institutions and participants that she would take responsibility for any consequences arising from the study. As pointed out by Cohen et al. (2000), the fact that participants contribute their concerns, views, perceptions and even feelings to a study could cause potential harm. This has to be seen in the light that all participants in this study were either government or private employees.

3.4.2 Validity and reliability of the study

The degree to which the conclusions drawn by the researcher come from the research findings is referred to as the validity of the study. In general, validity is more profound in designs that include quantitative data but are sometimes also used in qualitative inquiries (Boudah, 2011). It is argued that writing about validity in qualitative studies is challenging in many ways; nevertheless, there is a general accord in terms of how qualitative researchers articulate the credibility of their studies (Creswell & Miller, 2000). Criteria for evaluating qualitative research to ensure credibility have been proposed by a number of researchers. Among the earliest ones are Guba and Lincoln (1985) who identified five strategies for ensuring credibility. These include: trustworthiness, credibility, transferability, dependability and confirmability. They used these criteria to replace traditional quantitative criteria. For example, the internal validity was alternatively replaced by credibility; external validity by transferability; reliability by dependability; and objectivity by confirmability. According to Denzin and Lincoln (2008), these criteria are considered by qualitative researchers in terms of a trustworthy study. These four criteria are explained in the next sections.

3.4.3 Credibility of the study

In quantitative studies, credibility is synonymous with internal validity which seeks to ensure that the study measures or tests what is truly intended according to a positivist view. Merriam (1998) argues that when qualitative researchers strive to answer the question ‘How congruent are the findings with reality?’ they address the issue of credibility which is regarded as the most important criterion for establishing trustworthiness. The following were addressed so as to ensure the credibility of this study

Member-checking

Member-checking was done to enhance the credibility of this study. Some teachers, heads of schools and curriculum specialists were asked to read the transcripts, to correct and confirm the conclusions from the data. These procedures gave them the opportunity to advice and correct what seemed to be wrong interpretations. Member-checking was also regarded as a type of triangulation which instilled confidence to the researcher that the gathered data was correct as the participants confirmed their representations and experiences concerning EE integration in primary schools.

Triangulation

Triangulation of methods is another way to check credibility, as proposed by Taylor and Lindlof (2011); here, collected data can be compared by using different methods. The data collected through semi-structured interviews was compared with the data from the documents to ensure the validity of the research results. Cross-checking the consistency of data from different methods enabled the researcher to generate a thick description of data to answer the research questions.

Data triangulation was also done when the researcher compared the information from the same inquiry among three categories of participants, that is: subject teachers, heads of schools and curriculum specialists. This helped cross-check the data and further enhanced the credibility of the study. This is what Taylor and Lindlof (2011) describe as multiple sources from one method being compared with others. In this regard, interview responses from one participant were compared with the ones from the other participants.

3.4.4 Transferability

As said above, the researcher's ability to develop thick description should not only ensure credibility but also enhance transferability. Thick description also produces statements that create in the reader a sense or a feeling that they have experienced themselves the phenomenon described in the study. Nevertheless, due to the nature of subjectivity, this criterion is considered to be a challenge and is criticized for failing to apply its results in a wider spectrum (Taylor et al., 2007). In the context of this study, the participants and themes are described in detail in order to allow the reader to make their own judgments on whether the results of this study are applicable in similar or different contexts. Thus, according to Trochim (2006), transferability is the degree to which the research findings of qualitative studies can be generalized or transferred to other contexts; he compares it with the generalization or external validity in quantitative studies.

3.4.5 Dependability

Dependability is synonymous to reliability in quantitative research. It expresses the extent to which the study could be replicated with similar results (Boudah, 2011). According to Shenton (2004), by addressing the issues of reliability, the positivist employs techniques to show that if the work was repeated in the same context, with the same methods and the same participants, similar findings would be attained. Equally, if the qualitative study ensures that the research findings are consistent and could be repeated, this refers to dependability.

However, in order to ensure dependability, the process within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not unavoidably to gain the same results. The in-depth coverage also allows the reader to develop a thorough understanding of the applied methods and their effectiveness (Shenton, 2004). Nevertheless, different conclusions may be drawn by a later researcher due to the fact that contexts change over time (Taylor et al., 2007). This situation may happen to this study, too, with later researchers investigating the same phenomenon.

3.4.6 Confirmability

Miles and Huberman (1994) claim that a key criterion for confirmability is the extent to which the researcher admits his/her own dispositions. For example, pre-conclusions underpinning made decisions and adopted methods should be acknowledged in the report. The reasons for favouring one method over others and weaknesses in the selected method should be explained. In other words, confirmability refers to the degree to which results can be confirmed by others and argues that the best strategy is for the researcher to document the procedures for checking and rechecking the data throughout the project (Trochim, 2006). In order to ensure the confirmability in this study, the researcher made sure that she carefully verified and examined the data collected and analyzed throughout the project in order to reduce the chances of having a bias. Nevertheless, qualitative research is criticized for its subjectivity and therefore its tendency to be biased. Conversely, this is particularity viewed as strength of qualitative studies by qualitative researchers as it allows establishing rapport with participants in order to gain an in-depth perspective (Litchman, 2010).

3.4.7 Research bias

It is argued that all researchers have biases; however, they should be striving to make sure they recognize and restrain unpleasant biases (Stake, 2010). This study employed purposive samples, so that other teachers could not be included as they would not have been able to give detailed information. Moreover, engaging all subjects and teachers would result in more research time and higher costs. Despite EE content integration, the primary school curriculum also integrated other contemporary cross-cutting issues such as HIV/AIDS as well as gender equality, but they were not part of this study.

3.4.8 Researcher's experience

The study locations for this study were specifically chosen due to their unique features. However, the researcher has more own life experiences in these places compared to other areas in Tanzania. Moreover, the qualitative experiences acquired during a Master's programme enabled her to successfully conduct a fieldwork and writing a convincing report. A working experience as a researcher and instructor at the University of Dar es Salaam also contributed to the skills for conducting qualitative research and added to the credibility of this work. Shenton (2004) argues that the background, qualifications and experience of the investigator is an important criterion for conducting plausible qualitative research.

3.5 Summary

This study was designed qualitatively and aimed at understanding stakeholders' views and perceptions on the integration of EE into Tanzanian primary school curricula. It employed an interpretative paradigm which emphasizes the construction of knowledge and multiple realities. Kilimanjaro and Dar es Salaam were the two areas selected for the study. It purposively sampled 30 participants to take part. A sum of 24 teachers and four heads of schools from five schools were selected. Moreover, two curriculum developers also took part in the study. Semi-structured interviews and document review methods were used to gather information. The interview data were audio-recorded, transcribed and later translated. In order to gather the data from documents, a checklist was used and these data were compared to the interview data. Research ethics as well as strategies to ensure the credibility of the study were adhered to. The interview data were analyzed through a qualitative inductive analysis, whereas strategies from grounded theory and thematic analysis were used to obtain the categories and themes for presenting the findings of this study, as presented in the next chapter.

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CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

This study aims to explore the views and perceptions of educational stakeholders (specifically teachers and curriculum specialists) on the integration of environmental education into the primary school curriculum in Tanzania for sustainability. This chapter presents the empirical research findings as reported by teachers, heads of schools and curriculum specialists. The first findings to be presented will be from the teachers, then heads of schools and lastly curriculum specialists. The findings are presented in accordance with the order of the four research objectives and questions. These include:

1. *What views and perceptions do teachers have on environmental experiences, issues, and challenges?*
2. *How do teachers perceive EE? And what instructional methods and resources do they use in integrating EE content into their subject curriculum?*
3. *How do teachers perceive their motivation and professional development on environmental/sustainability issues?*
4. *How do heads of schools and curriculum specialists perceive EE integration and how do they motivate teachers to successfully integrate EE into their teaching?*

With reference to the chapter on methodology, different methods were used to analyze the results, depending on the nature of the research questions. The first research question aimed to explore the views and perceptions of teachers on how they understand and interpret the concept of environment, environmental issues and challenges in their day to day life. It is argued that the way teachers perceive things and understand concepts and issues is of great importance, since they will convey it in the same manner to their pupils (Yero, 2010). The findings were derived from the concepts that formed categories or themes, and further analysis resulted in sub-themes or sub-categories. The combination of grounded and thematic analysis approaches helped to generate and identify the main themes or patterns and their sub-themes. Grounded theory strategy was used in this study, due to its ability to interpret complex phenomena and to accommodate social issues (Glaser, & Strauss, 1967; Charmaz, (2003), while thematic analysis was applied as it offers an accessible and theoretically-flexible approach to analyzing qualitative data (Braun &Clarke, 2006). The themes are presented and supported by empirical data from the respondents, by quoting their responses and closing with inverted commas. All the respondents' voices will bare 'pseudo' names for ethical reasons, as well as their locality, rural or urban, and their voices are shown by a transcript number and line numbers.[16] This chapter will only present and analyze the findings from the three categories of participants. The discussion and interpretation will be in chapter five.

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[16] Citations from interview transcripts are referenced with pseudo names, school site rural (rs), urban (us), number of interview transcript and line numbers.

Example: (Mr Kisima, rs, 17. 75-80 meaning Mr Kisima speaking from a rural school, interview transcript 17, lines 75 through 80.)

4.1 Teachers' views and perceptions on environment, environmental changes and challenges

This research objective aimed to explore teachers' awareness, experiences and their perceptions on the meaning they attach to the concepts of environment, environmental changes and challenges. This objective was more general and was meant to serve as a foundation question, upon which the rest of the questions were built

The first set of results under this objective centers around what perception teachers have on the term environment, as one of the key concepts in the study. The second part presents the views and experiences teachers have with environmental changes and how they perceive such changes. The last part under this objective will focus on what teachers perceive to be environmental challenges as a result of environmental changes.

4.1.1 Conceptualization of the term 'environment'

The concept of environment has been perceived differently by different societies. Some view it as an entity, or an experience, or as a socially/culturally constructed phenomenon (Tani, 2006). It is also seen holistically as bio-physical, socio-economic and political aspects of environment (UNEP, 2005). Teachers in this study also expressed their views on how they conceptualize the term. During the interview session teachers said:

> I personally I can say may be is all the totality of things that surrounds a human being. All for example, mountains, valleys, animals plants everything. (Ms Rachel, rs, 6. 77-78)
>
> Environment consists of so many things, plants and other living organisms like human beings, non-living organisms like buildings and so forth. So if we destruct the environment there will be things like acid rains, global warming etc. (Mr Japhet, rs, 3. 70-72)

From the field voices above it can be noted that teachers put more emphasis on observable objects to explain the meaning of the environment. While teacher Rachel defines the environment as everything that surrounds human beings, teacher Japhet thinks that the environment includes everything, including human beings. Teacher Rachel's definition excludes man from being part of the environment and regards all other living and nonliving things as part of the environment. The findings revealed that very few teachers define human beings as part of the environment, until asked by the researcher, then some teachers responded:

> Of course I am, it's me with all that surrounds me. The environment constitute the living and non-living environment (Mr Haroun, us, 9. 20-24)
>
> Definitely, I am part and parcel of the environment. Is all that surrounds me, including myself. (Mr Jacob, rs, 1. 58)

This view conforms with the social construction phenomenon, where man is placed at the center as he shapes the environment through his social-cultural behavior (Tani 2006).

Some teachers expressed their definitions of environment, attaching it to socio-cultural values and believing man is a determinant factor on how the environment should look. As stated by Spencer-Oatey (2008:3) "culture is a fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures and behavioral conventions that are shared by a group of

people, and that influence (but not determine) each member's behavior and his or her interpretations of the 'meaning' of other people's behavior." Thus, culture is very powerful and influences the way people think and do things, and by doing so, it shapes people's behavior. Different cultures have different perceptions and attitudes towards the environment. Therefore, they will act differently towards it. Teachers believe that human behavior has a great influence on the environment, and therefore has shaped the environment into what it is. Concerning this view some teachers had this to say:

> If you look at the real meaning of the environment, it is a totality of all things that surrounds human beings, whether good or bad they form the environment because man is the source of that. That's why when we talk of the environment; we very much look at man because he is the sole source of good or bad environment. People are the sole source of destruction of the environment. (Mr Jamal, us, 8. 65-68)

Teacher Jamal agrees with those teachers who exclude man from their definition of environment, regarding all other things surrounding humans as part of the environment. However, he sees man as the determinant factor for a good or a bad environment and considers the social cultural values of people as an important factor whether people care about and protect the environment or destroy it. Mr Jamal feels that human beings have the ultimate power to decide how they want their environment to be and considers human beings as the source of all destruction.

Many teachers excluded humans from their definition of environment, very few teachers included things like the atmosphere or air to be part of it, although many teachers defined environment as including living and nonliving things. Some teachers had this to say:

> The environment is all that surround us including buildings, trees, and atmosphere, because when you want to burn may be papers you need to know the time to do it so that you don't pollute others environment. (Ms Hadija us, 11. 56-58)
>
> The environment is all that surrounds us, for example there are plants, water, air, and also people are polluting the air so much and it affects the environment (Ms Suzan, rs, 2. 31-32).

These teachers are of the opinion that the atmosphere and air are also part of the environment.. They consider invisible elements like air to be part and parcel of the environment. This shows that they have a broader understanding, compared to other teachers who only mentioned the observable things. Both teachers agree that the atmosphere needs to be clean and regard humans as the main polluters even though it affects their lives. Teacher Hadija thinks that if you burn garbage it should be done at certain times, however this teacher fails to understand that the atmosphere has no boundaries and once you burn rubbish the smoke will spread into the atmosphere.

The views and perceptions of teachers and their definition of the concept 'environment' are varied. However, the majority of teachers had the same opinion of what the concept environment entails, they associate the meaning with physical objects, living and nonliving. Only a few teachers identified the atmosphere and air as part of the environment. Despite the fact that all the teachers' acknowledged themselves as part and parcel of the environment, only very few mentioned 'man' in the definitions they gave. Many teachers focused their

descriptions on the physical nature of the environment, which is mainly bio physical and which includes living and nonliving organisms, such as plants and animals, rivers, valleys, mountains, air, buildings etc. Having seen how teachers perceive the concept of environment, the next section explores their awareness of issues and challenges they experience in the environment.

4.1.2 How do teachers perceive environmental changes and challenges?

The results to this question are closely linked to the above descriptions of how those teachers define the concept of 'environment.' The majority of them regard it as a bio-physical environment. On a similar vein some teachers perceived environmental changes as the changes that happen to nature.

The teachers gave their views and experiences on which changes they see in the environment. Teachers were asked to compare current changes in the environment to any changes they may have experienced several years ago and to report, whether these changes were significant. The environmental changes identified by teachers include: rising temperatures (global warming), climate change, drought, floods, disease, pollution, deforestation, desertification, soil erosion, land degradation, waste management, infrastructure, population growth and town planning. Teachers identified human activities as the sole source of all the changes they observed and experienced. They said that humans cause all these changes in the environment when they struggle to meet their daily needs. Almost all the teachers were of the opinion that the current environment has changed significantly, in the last 5 to 10 years. Almost all the changes identified were negative and a majority of teachers said the environment has been deteriorating and changing for the worse. To verify these claims some teachers narrated:

> There is a change because even the food that people ate is different from now, food which makes people loose memory. If we look at the environment geographically the weather has really changed. Things are not the same. Temperatures have risen. People kept environment in the past. They planted trees different from now, so desertification was little. But now it is so rampant, because people are cutting down trees a lot, burn charcoal and they don't replant. They have interfered the sources of water so the temperatures are increasing a lot and there are a lot of side effects. For example in India the temperatures raised so much that people were dehydrated and died. The industries are so many nowadays and they can't control the fumes. Many countries have built nuclear reactors, they release those hydro fluorocarbons in the atmosphere they interfere with the ozone layer, and you see that's why there are many cases of cancer because the air is so polluted with poisonous substances. There are even many cases of operations especially to pregnant women. During the times of our parents there was nothing like that. Currently everything is risky, from the food they eat, medicines, the environment itself is not safe now, so the environment has really changed, and as the time goes by it is from better to worse. People have no priority of safeguarding the environment, they only concentrate in destroying if a person sees a tree he/she just think of cutting it for timber and not more. So there are a lot of changes as far as the environment is concerned. (Mr Jacob, rs, 1. 5-19)
>
> There are quite great changes, for example when I talk about trees; there has been a lot of deforestation and very little replanting. There is a lot of deforestation but when we look at the advantages of trees, first is the source of oxygen which living things

> need. So there is no enough oxygen for human being and animals. There is great possibility for desertification to come so close to our environment. (Mr Jamal, us, 8. 4-10)

Teacher Jacob points out the issue of pollution from industries. He identifies many current issues, like air pollution from industries depleting the ozone layer, which is one cause of an increase of diseases like cancer, and an increase in cesarean sections to deliver babies. This teacher also seems to have lost hope in many things, because people are greedy and don´t prioritize protecting the environment and he feels that everything is risky. He also argues that the quality of the food we eat has changed for the worse, due to environmental degradation. He thinks that the current quality of food affects people's memory. He also believes that the rise in temperature, desertification, interfering in water sources is a result of deforestation. This argument suggests that this teacher views forests as a very important component in the environment and human wellbeing depends on it. Teacher Jamal thinks along the same line, stating how important forests are. He also expresses his worries about excessive deforestation that leads to a lack of adequate oxygen, which is paramount for living organisms. The value that these two teachers have attached to the forest component is important, but seems to be a narrow perception of the problem, when compared to what is documented in literature. This will be discussed in detail in chapter five.

The responses from these teachers suggest that desertification is a product of deforestation and according to them it is more pronounced now than it was in the past because there is not enough afforestation.

Another respondent agrees with the previous speakers, that people cut trees for economic reasons, but he added that deforestation has led to the change of seasons and rainfall patterns are not reliable anymore. He claimed:

> There is a very big change because nowadays forest are not as many as used to be but people nowadays are cutting trees down, maybe to use them for burning of charcoal and they don't replace them so you find that the trees are not there that has even led to change of seasons. We see nowadays the weather is not predictable the way it used to be those days, sometimes you find that rains delay. So that one is also a problem because there are so many that rely on rains for farming so it is a problem. (Mr Emmanuel, us, 18. 9-14)

This teacher adds that the survival of many people and agriculture relies heavily on rainfall and a lack of it affects the availability of food and other crops. He also connects these changes and challenges to human activities.

Other teachers raised different issues as the reasons for cutting down trees or destroying forests. They had this to say:

> Eeeh, yes there are environmental challenges. Still there are some people who have not been educated on the conservation of forests so they are cutting down tree haphazardly. (Mr Kisima, rs, 17. 27-30)
>
> He added:
>
> There are two things that have been contributing to the fires on Mount Kilimanjaro. I have a long time experience, I watch the media I talk to forest expert people and I also read. The first reason is that when people harvest honey in the forest, they use fire to

> kill and chase the bees away first, the moment they finish harvesting they leave that fire in the forest and when the wind blows it catches the grasses in the forest and fire spreads. The second reason is that, some people go to cut timber by stealing because they are not allowed. They cook food in the forest and when they finish they eat and take the timber and leave the fire on. But now these causes to a larger extent have been controlled. (Mr Kisima, rs, 17. 17-24)
>
> Challenges are there, when we talk locally the challenges are there, people don't see the importance to keep the environment because they have no education and they cannot measure things and know the impacts when they destroy it. They can't measure what advantages and disadvantages are there for keeping and not keeping the environment. They just think of immediate profit for example when they cut trees they get timber or burn charcoal immediately and get their needs. They don't know by doing so they create a big problem than they would leave it or plant another. This is because of low environmental knowledge that they have. (Mr Jacob, rs, 1. 22-28)

According to these two teachers, the lack of environmental education is a contributing factor to the gross mismanagement of forests, and are of the opinion that education will make people aware, which, in turn, will help protect the forests.

Teacher Kisima is of the opinion that forests are destroyed during bee harvesting or illegal timber harvesting. During these processes fires are started, which destroy the forests. However, this teacher connects these actions to a lack of knowledge.

Teacher Jacob says ignorance of people is the main cause for environmental destruction. He assumes that their ignorance hinders them from imagining the impact of the destruction; their main focus is on fulfilling their needs. This indicates that ignorance creates a higher probability of the environment being destroyed, since people do not realize the impact of destruction. These two teachers are convinced that with knowledge people will protect the environment.

Concerning the issue of air pollution, especially the depletion of the ozone layer and the side effects, several other teachers shared the same opinion. They said:

> Yes we see how the developed countries are trying to see how they can reverse things into order again, but I have no wide understanding on how far they have done that and where they started it. There are a lot of cancer issues like skin cancer it is a problem but the source may not be what our local people are saying it is, it could be because of the destruction of the ozone layer and the sun rays hit us direct. But in our local environment people could attribute the disease with false beliefs which are not formal. So I believe globally that this is the reason why the western countries are fighting to reduce industries or reduce the smokes that contribute to destroy the ozone layer. (Mr Jamal, us, 8. 45-51)
>
> The developed countries are so much polluting the environment by the smokes from the industries. And there is no boundary to the atmosphere, the effects are everywhere. They deplete the ozone layer and you hear a lot of cancer and many other diseases you don't even know where they come from. (Mr Rashid, rs, 5. 31-34)
>
> [….] there are so many countries in Europe contributing a lot of pollution, I am talking of demerit, they produce pollution, destroy ozone layer, destroy climate especially in our countries. There is big change about the seasons of the rain. There are big changes about the seasons of the rain. There is no rain, which causes

> drought…Yes there is a significant change in our environment (Mr Kizito, us, 16. 8-13)

These teachers also focus on air pollution as one of the changes and challenges they experience in the environment and they believe that industrialized countries are leading in polluting the environment. The first two teachers seem to attribute the cause of cancer, especially skin cancer, to pollution, which, they claim, depletes the ozone layer. Teacher Jamal also claims that many locals are misinformed about the cause of cancer. He also seems to be sure of the efforts carried out by the industrialized countries to deal with the problem, but is uncertain to what extent any changes may have been implemented. Teacher Dickson supports the idea that pollution is a cause of ozone depletion, but he also argues that the big variations in rainy seasons and drought are caused by air pollution from industries.

The issue of pollution by industries was given weight by the majority of teachers. The responses from other teachers were:

> […..]. Internationally also there is a great environmental pollution, for example in developed countries like USA they have a lot of industries and they increase more industries daily for various products. Issues of nuclear power, all these release a lot of fumes in the atmosphere. So the developed countries especially the G8 contribute greatly to the destruction of the environment. (Mr Jacob, rs, 1. 44-47).
>
> Nationally and internationally also industries pollute the environment but Tanzania contributes very little compared to developed nations. (Mr Kisima, rs, 17. 28-30)

These teachers are of the opinion, that industrial emissions are the main source of environmental pollution. They emphasize that this problem is mainly caused by heavily industrialized nations like the USA. Teacher Jacob voices his concern on the use of nuclear energy, as it is harmful for the environment. Teacher Kisima thinks that pollution is caused on both national and international levels. However, he insists that heavily industrialized nations pollute more than less developed countries like Tanzania.

The findings reveal that a majority of the teachers stated that the issue of industrial pollution is a critical environmental issue and they perceive industrialized countries to be the main contributors to the problem.

It was also found that noise pollution was not perceived and identified by teachers as one of the changes they experience, even by those living in the city of Dar es Salaam. The main changes they reported were air, water and land pollution.

The issue of waste management was also a point of concern for the teachers, especially for those living in urban areas. Most responses on this issue were very negative and they reported a significant change from the past. They talked about both organic and inorganic waste disposal and the impact on the environment. In this aspect some teachers had this to say:

> […..]. And when we look at randomly throwing of garbage and especially when the knowledge of plastics came it is very dangerous. They do not decompose, so this is also dangerous for human, soil and animals. It is even difficult for plants to grow. (Mr Jamal, us, 8. 7-9)

> Pollution may be these plastic bags; they should stop bringing us such bags. One day I tried to bury it and it never decomposed. You can burn them, but when you burn them the smoke pollute also, and they claim that the smoke can cause cancer and other diseases. (Ms Rachel, rs, 6. 54-60)
> Waste management in our country (laughing) is still very poor, I think because of our government, because of our government, they are not serious, people are not serious. (Mr Kizito, us, 16. 22-24)
> There are lots of challenges; first of all there are no proper places to dump garbage, so people throw it anywhere and anyhow. They throw it in valleys or drainage system and when it rains the garbage is transported to other places where people live. There is also very poor planning in building settlements, people are building anyhow blocking everything. Toilets built so close to other people's houses. It is just chaos….Sometimes they build in water ways and they block the water passage/drainage so when it rains it floods the whole area. I think this is just a weakness and poor town planning from the top to down management of the government. They should know how people live, where to dispose garbage, where the children play, how each ward conserve its environment etc. all these chaos would diminish if the leaders were responsible. (Ms Annah, us, 10. 23-33)

Teacher Jamal and Rachel focus more on the poor management of inorganic waste, which they perceive to be very dangerous for humans, soil and animals, as it does not decompose. On the other hand, teacher Kizito and Annah talk about general poor waste management and poor town planning and relate it to a lack of government responsibility. Their assumption is that if the government was responsible then the problem would be solved, they do not view it as a collective responsibility between the community and the government. However, some teachers contradict this opinion, saying this:

> There are some challenges because you find that people living around are not ready to take part in cleaning of the environment so I think if it is done collectively then we can take it to the best. (Mr Emmanuel, us, 18. 27-29)
> […..]. The people themselves need to know their role and not just to wait for the government to do everything, so should the government come clean your compound? If you are a mother and you teach your children they will understand but we need to teach them. (Ms Hadija, us, 11. 47-50)

These teachers perceive the duty of keeping the environment clean as the collective responsibility of both the government and society itself. They argue that people are not willing to clean even their own compounds and they consider this behavior as irresponsible and short sighted. In their opinion the waste problem could be solved, if each party considered waste disposal as their joint responsibility. Teacher Hadija however connects this problem to a lack of family education and she is convinced that if parents teach their children the correct attitude towards waste management at home they will emulate this behavior as they grow up.

Other teachers also talked about poor management of organic waste and say it is a cause of unclean water, which they associate with the outbreak of diseases like cholera. They said:

> The water is very dirty and people have built settlement so randomly and others channel dirty water into the water sources that's why cholera is still a big problem.

> Population is growing so fast, a lot of random buildings, and the government seems to ignore, and they come now to destroy the houses. (Mr Alex, us, 12. 13-16)
> Challenges are there. First of all diseases. Currently there is an outbreak of diseases as a result of unclean environment. For example cholera which is now so rampant. (Ms Suzan, rs, 2. 11-12)
> [….]. I think there is change in water; it is unsafe water that is why last year you heard of cholera. I think now the water is not safe and not enough because of large population there are more people using it. (Mr Paul, us, 14. 14-16)

These three teachers share the view that the prevalence of diseases like cholera is a result of poor sanitation in the environment, as contaminated water can cause diseases. Teacher Alex and Paul argue that population growth has contributed to the problem. However, teacher Alex adds that the unplanned settlements that have been built as a result of population growth have accelerated the outbreak of diseases, while teacher Paul argues that population growth has resulted in water scarcity, which is already unsafe to use. Teacher Alex continues to say that these problems could be controlled if the government was serious about safeguarding people's property.

More issues concerning waste management were raised, as it seems to be a challenging and common problem, especially in urban areas. Other teachers went on to say:

> For sure our environment is very dirty if you compare it with the past, especially the city of Dar es salaam it is very dirty that's why cholera issue never ends. The city of Dar es salaam leads in dirty; it is very dirty. Nowadays people are not self-motivated to maintain cleaning not like before, people now are very different. (Ms Hadija, us, 11. 14-23)

This teacher considers Dar es Salaam to be the dirtiest city in Tanzania. It shows that the problem of waste management, water pollution, scarcity of water and high population growth is a problem in both urban and rural areas. However, problems in urban areas are more complex due to a rapid increase in population. In general, the majority of teachers perceive waste management to be an indicator of the change they experience in their localities. They associate the regular outbreak of cholera with poor hygiene and sanitation, due to a contaminated environment. Issues of population increase and poor town planning and infrastructure have been connected to the prevalence of the problem.

According to teacher Hadija, people´s current environmental behavior has changed for the worse in the past to 5-10 years. Another teacher supported the view that people´s conducts have changed in a negative way. He said:

> [….]. When we look at previous years water sources were safe and people did not pollute them and people were trying in their own means to protect the water sources. But now when you look at the industrial use and the poor waste management, deforestation and random construction of buildings they contribute to the pollution of water sources. So you find the sources are no longer safe and adequate for use. (Mr Jamal, us, 8. 13-17)

This teacher tries to show that there has been a shift in behavior towards the environment from previous generations to the present. To him people of today are no longer good stewards

of the environment. The development of factories and constructions of buildings have contributed to this behavior. This teacher doesn't say anything about the growth of population and the rising demand to cover people's needs could be a challenging issue when trying to protect the environment.

In contrast however, some of the teachers reported witnessing positive changes in the environment. To verify this, one teacher narrated:

> [….]. Concerning water resource, this is not really a problem here but other people outside this place are complaining there is no water in their places, I'm just surprised and feel sorry for them, yes because for me I have never seen a problem of water in this place. And I see the water resource is still good, despite the tap water we are using, there are also permanent rivers and streams so it is not easy for rivers and streams to dry up. But the plumbing/tap infrastructure is too old and you can get water only twice a week, but we have an alternative to that, we have a river and streams that hardly dries up. The water can just be low in dry season. So this issue has not really affected me. (Ms Rachel, rs, 6. 8-15)

Teacher Rachel neither finds water availability to be a big issue, nor does she feel it is unsafe for consumption. She considers the sources of water to be good and multiple. She does however raise her concern about the old water drainage system, which makes the availability of tap water challenging. So she doesn't see many changes in the water resource in her locality. However, some teachers from the same locality had different opinions on water resources. They reported:

> […..]. The water resource too is diminishing not like before. For example in the low land areas things are so bad even the tap water is difficult to get. So accessibility of water resource is not good now compared to the previous. In the meantime the stream water is not really used as before. Every passing day issues of pollution of water sources are increasing, but for now at least people have got a little education and know that they need to drink clean and safe water. In former times people used the stream water and they never got problems. (Mr Rashid, rs, 5. 7-12)
>
> Today because of growth of population, first of all there is growth of population, in the past not many people were living on the slopes of mount Kilimanjaro and water, the rain…… the streams the water run offs, had got their constant volume but today it seems there is no water. Because of the destruction of the sources, and also you can find people who are planting or growing crops near water banks, that is the major destruction of the sources of water they make the water dirty. (Mr Japhet, rs, 3. 29-34)

Unlike teacher Rachel, who claims to experience a positive change in water resources, teacher Rashid and Japhet claim that the water sources are no longer as safe as they used to be. They also stated that the situation used to be better when even stream water was safe to use, but this is no longer the case. They both say water is polluted and teacher Japhet perceives the growth of the population as a contributing factor to the destruction of water resources. Teacher Rashid also sees some changes, as environmental education has started in the area. Despite the fact that these three teachers come from the rural area, they have different views on the water issue.

Another teacher had a similar view on water pollution, but he also reported other issues regarding pollution. He observes different forms of pollution, such as water, land and air. He says that the use of industrial fertilizers and pesticides pollutes earth and water resources. His interview excerpt read:

> [….]. Second, water is not clean and safe. The water is contaminated since many people use a lot of pesticides and insecticides, industrial fertilizers in the farms. So they spray chemicals into the farms and when water runs off they contaminate the sources of water. So water is no longer pure due to human activities. People don't care at all. Industries also release a lot of dirty water and also interfere with sources and even kill aquatic creature. (Mr Jacob rs, 1. 39-44)
>
> […..]. Growth of population is a big challenge, people do not keep the water sources and the destruction of environment is 100% caused by human activities. (Mr Haroun, us, 9. 16-18)

Teachers Jacob and Haroun see human activities as the sole source of pollution and they feel that people don´t care about the environment. They indicate that care should be taken with the use of modern agriculture where a lot of chemicals are applied. Teacher Haroun also supports the idea that population growth contributes to the problem.

Only very few teachers have experienced positive changes in the environment and are expecting more positive changes to come. According to them, education plays a major role in these positive changes. They said:

> [….]. For example ten years ago we were not getting rainfall as today, why? Because the plant cover of the slopes of Mount Kilimanjaro were totally destroyed. But currently the environmentalists are doing afforestation and educate the people how to conserve the natural vegetation of Mount Kilimanjaro so that they can get rains and water. The weather on the slopes of Mount Kilimanjaro is now different from the past 3 or 4 years ago, people living in that area say today is better than in the past 10 years, because people are aware in the conservation of natural vegetation. People now are educated and don't only consider themselves but with the coming generation. (Mr Japhet, rs, 3. 49-56)
>
> [….] but after people were given education and read posters and flyers and listen to the media and hear from other people, they have now changed and have knowledge on conservation of the environment. On recent it has started raining and more reliable as it was before. This is because people are now conserving the environment. Mr Kisima, rs, 17. 6-10)

These teachers are convinced that education has protected the environment from further destruction. They confirm that the state of the environment was not good before, but currently they see positive changes and they believe this is thanks to education on how to protect and care for their environment.

The other category of perceived changes in the environment was the aspect of social environment. A few teachers talked about the way they perceive infrastructure such as roads, settlements and sewage systems. Teachers had different views, depending on whether they live in urban or rural areas. Some of the teachers from urban areas said:

> The environment has changed especially here in Dar es Salaam especially infrastructures like roads are much better, people are so many now from many areas

> come to the city. They come with different behavior which doesn't care the environment but I hope things will change for better. (Mr Alex, us, 12. 4-6)
> I think the environment in our surrounding where I live is not bad, our environment is good and we are trying to change every day… The infrastructure for now is not bad according to the situation we have now…but generally even in the country infrastructure is not bad, there is good improvement. (Mr Seki, us, 24. 13-24)

The above teachers are among very few teachers in urban areas who have experienced and noticed positive changes in the environment where they live. According to them, they see an improvement, particularly in road infrastructure. The former teacher sees a link between improving infrastructure and migration to the city. He believes that people migrate to the city with varying negative environmental behavior, but still holds hope that things will keep improving. The latter teacher also states that the environment is improving due to people's efforts to make their environment a better place. He observes that there is a general improvement in the country, as far as the infrastructure is concerned.

4.1.3 Summary

Suffice to say that teachers' responses show that they have observed and experienced a lot of changes and challenges in the last five to ten years. According to the frequency and intensity of occurrence in teacher's responses, one can conclude that changes and challenges are visible, since they are reported by almost every participant and they can be categorized as follows:

Climate change is an important general topic raised by the majority of teachers. Its severe consequences, such as extreme weather conditions, have led to changes in rainfall patterns, resulting in alternating drought periods and flooding. This coincides with the findings by Umar and Ozohu, (2015). The issue of climate change and global warming was raised, although it is clear that teachers could not make a clear link between the two, neither could they explain in detail which emissions cause the change in the atmosphere.

Besides that, the main changes and challenges differ for rural and urban environments. In the rural area of Kilimanjaro, deforestation appears to be the main environmental topic and issue for the teachers. For many, it is associated with soil erosion and land degradation leading to drought and, at its utmost, leading to desertification. Economic factors were seen as the main reason for the destruction of forests. For example, the need for timber, charcoal, firewood, honey and land for farming has accelerated deforestation. Teachers were also of the opinion that if the government subsidized energy costs for gas and electricity, people would have less need for charcoal and firewood, which in turn would reduce deforestation. However, the majority of the Tanzanian population depends upon wood for energy. Teachers also emphasized that if the poverty issue is not addressed, it is very difficult for people to conserve the environment, especially forests.

Only a few teachers reported having observed afforestation and the conservation of forests and they associated these positive changes with more reliable rainfall, especially around the Kilimanjaro forests. According to them the provision of EE to the community and enforcement of environmental by-laws has made the conservation of forests possible.

In the densely populated urban areas, waste management and pollution were the main issues mentioned. Here poor town planning and the lack of sound infrastructure are contributing to the situation. Teachers had varied perceptions on the causes of poor waste management. On the one hand, some teachers attributed the causes with irresponsible leaders and, on the other hand, some teachers perceived the problem as a result of lacking commitment among the citizens themselves. The majority of teachers viewed the prevalence of cholera in urban areas as a result of using contaminated food and water, which is also associated with poor management of waste. High rates of population growth and poor town planning are worsening the situation rapidly. A few teachers also talked about inorganic waste from plastic products like water bottles and nylon bags. Some teachers articulated that, despite the advantages they have for the community, inorganic waste does not decompose and, therefore, poses a threat to plant growth and animals.

Air pollution was also a major concern for teachers in both rural and urban areas. Industrialized countries were named as major contributors of emissions causing air pollution. The majority of the teachers believe that air pollution has contributed to the depletion of the ozone layer, causing a rise in cancer, especially skin cancer. The teachers rarely talked about air pollution caused by their own country or other developing nations, despite the fact that the trend of emissions, even in developing countries, is rising significantly. Other forms of pollution, like land and water pollution were discussed by a few teachers. They believe that toxins from industries and the use of pesticides and fertilizers are the main causes for land and water pollution. This indicates that, despite the development in agriculture, the use of chemicals needs to be well managed.

For further discussion, it should be noted that teachers mix up the issues of pollution by poisonous substances, ozone layer depletion and global warming due to GHG-emissions in their statements.

Environmental changes and challenges are generally perceived as resulting solely from human activities, driven by economic interests and poverty issues and also aggravated by rapid population growth. This observation shows that, teachers disregard or not well informed on natural causes of environmental changes like climate change.

Education is seen by the teachers as a major contributor to finding solutions for various environmental problems. They emphasized that EE, especially ‘learning by doing’, is essential and will contribute to solving these problems. They advised that the government should prioritize environmental issues, since a healthy life comes from a healthy environment. Teachers believe that education forms a very strong foundation in peoples lives, hence, environmental education should begin very early in life, even as early as preschool, so that it becomes part and parcel of life. This will develop responsible environmental behavior and a community that is well informed of its daily actions towards the environment. The next section explores in detail the rationale and importance of EE in the primary school curriculum.

4.2 Teachers' views and perceptions on EE content in the curriculum and on instructional methods and resources used in integrating EE into subjects

The responses of this second objective are divided into various themes and sub-themes. The first theme will cover teachers' views and perceptions on the rationale and importance of EE content and its integration into the curriculum. The second theme will be on the views of EE content adequacy and relevance. The third will present instructional methods and resources used by teachers to integrate EE into their subjects.

4.2.1 Teachers' views and perceptions on the importance of EE content integration into the primary school curriculum

The responses from teachers concerning the importance of EE in primary education were very positive. All the teachers were of the opinion that integrating EE at this level of education is very important. The majority of the teachers added that EE should be integrated even in early childhood education. They considered whether integrating EE at primary education is not early enough. Teachers believe that education is a powerful instrument, which plays a fundamental role in *building a strong societal foundation* and in *solving societal problems*. These two roles emerged as sub-themes, the first sub-theme being "*building a strong foundation",* which was characterized by features and categories like knowledge, skills and awareness leading to action taking and development of environmental behavior, other categories were personality development, responsible society, and knowledge transfer. The second sub-theme "EE a *solution to societal problems"* was explained by categories such as active/practical learning, government and societal commitment, coordinated efforts, and integration of EE into all subjects.

Education, a means to achieve a strong societal foundation

During data analysis the subject education emerged. It is believed to be a very powerful instrument towards building a strong nation. Providing EE to primary school learners is therefore an investment that will produce citizens, who are responsible for their own development and the development of the nation as a whole. This was verified when teachers responded to the question whether or not teaching EE is important in primary school education, by showing that the acquisition of knowledge, skills and awareness are very important and prerequisites for the development of positive environmental behavior.

Communication of knowledge, skills and awareness enhances action taking and develops environmental behavior.

Teachers who were concerned with these aspects responded:

> Among the aims of education is to enable learners acquire knowledge and skills so that they can develop thinking as well as problem solving skills which will enable them to make informed decisions of their daily actions. Teachers in this study have confirmed that providing EE to children is very useful to determine the future of a nation. During the interview session teachers had this to say: Yes it is important…even if they are small but they need to be taught about the environment. Children need to understand the environment they live in, and later you tell them how to conserve it and the benefits they get by doing so, so that when they grow up they do the same for their wellbeing. (Mr Kisima, rs, 17. 75-80)

This teacher discusses teaching ‘about’ environment, which means focusing on factual knowledge acquisition. He emphasizes the effects of familiarization with the environment and on environmental conservation. But his main focus is the cognitive domain. Similarly, teacher Annah stresses knowledge acquisition, which also targets the cognitive domain, but she also says the practical component is central. As she said:

> Absolutely, because that’s where the foundation is, they are supposed to know to care for their environment at this level. That’s why when we come in the morning we have to clean our environment first before going to class, and not only that sweeping but we also water our trees and remove the dry ones and put manure. They must know the advantages of conserving the environment and the side effects of living in unclean and not risk environment. Ms Annah, us, 10. 66-72)

Unlike teacher Kisima,, teacher Annah insists that both cognitive and psychomotor domains are important, where the latter focuses on learning ‘in’ or ‘through’ the environment. This is the practical aspect of learning. In her opinion, hands-on activities are more constructive in teaching EE. She suggests that showing them how to look after their immediate environment, like watering and tending to plants and trees, manuring and sweeping up the surroundings as part of their lessons will help children to create a sound understanding of the importance of conserving the environment. Learning ‘about’ EE ‘in’ or ‘through' the environment benefits from both classroom and field practices.

None of these teachers highlight the fact that teaching EE for the development of the affective domain is also very important in the development of human values. The knowledge, skills and values that learners acquire will not only benefit themselves as individuals, but teachers believe that they will be transferred to the society they live in.

Early EE enhances knowledge transfer

The knowledge of concepts and procedures are believed to be common in school learning. Those teachers who believe that the knowledge children acquire in schools will be imparted with the rest of society reflect on such types of knowledge. They believe that the conceptualization of environmental concepts and the procedures on how to act accordingly will be possible in their families too. The teachers who argued in this line said:

> […..]. And when they learn here it doesn’t end here they take it home and educate their parents and relatives by doing. When they grow up they will do more than this to protect their environment (MsAnnah, us, 10. 70-72).

Teacher Annah also believes that, due to the flow effect, knowledge the children acquire in school will be transferred to the parents and relatives. This teacher assumes that when children are taught EE they will pass this knowledge on to their family members and the entire community they live in. She believes that the practices and activities they carry out in school will help the children to transform their families.

Another teacher with a similar view had this to say:

> That is the best, because a primary school pupils most of them are not boarding so they are living with their relatives and parents at home, some are educated some are not. Even myself somehow I teach them how to conserve the environment, I remind

> them to tell their parents that we are not allowed to cut tree unnecessarily, we are not allowed to use bush fire, no illegal fishing by using poison or dynamite. They will tell their parents what are the consequences of doing that. These children are growing and they will remember these things I teach them today and will be good citizens. Mr Japhet, rs, 3. 92-98).

Like teacher Annah, teacher Japhet also emphasizes the effect of knowledge transfer. These teachers believe that once you educate children it will not end in school, instead, these children will influence the people they live with positively, with the knowledge they acquired about good stewardship towards the environment. Teacher Japhet also views forest and marine conservation as important environmental aspects children should learn about. As he teaches in a rural school, he sees bush fires are endangering the forest resources and marine biodiversity. He also believes that good citizenship is a result of long term memory, which is acquired early in life. However, for knowledge transfer to be most effective it requires the efforts of both teachers and parents to cooperate and make EE learning effective.

EE learning needs coordinated efforts

Teaching and learning of EE becomes effective when the teachers and the parents cooperate to educate the children. The interview responses revealed that parents were not supporting the efforts of teachers in this case. During the interview teachers had this to say:

> There are some primary schools which prepare their children very well. They clean the school compound despite the fact that parents see it as a punishment, but they do. This is the education that a child needs in his/her home environment, to make sure they clean and keep tidy their rooms. It has to become a behavior from childhood. We try to do that in the school environment too. We help them understand garbage separation, the decomposed and non-decomposed garbage (Mr Jamal, us, 8. 118-122).

Teacher Jamal, who teaches at an urban school, is trying to compare other schools with his own school. He thinks his school is not as good at providing EE as some other schools. However, he says that parents view EE as a punishment for their children, for example cleaning the school compound. This attitude of the parents can hinder the success of learning EE, but nevertheless, they keep teaching it. This suggests that parents are ignorant of EE and its importance in their children's lives. This teacher assumes that teaching children without the support of parents and the community will hinder the learning of EE. There must be a joint effort between the school and the community where the children live. The issue of personal cleanliness, as well as the cleanliness of their immediate surroundings seems to be important environmental elements the children should practice on a daily basis, with support and guidance from both teachers and parents. As a school they emphasize the necessity of assisting children to learn and practice, especially about garbage separation. He also insists that good environmental behavior is formed when EE is provided very early in a person's life.

Teacher Hadija, who is also from an urban school, emphasizes a similar issue as teacher Jamal. She had this to say:

> Environmental education is very appropriate to be taught in primary schools, because if you look the today's children are different from our children, and the parents

> contribute to this you may find that parents don't want their children to work. But when you teach a child that when you come out from the toilet you have to wash your hands, and before you eat is needed. They also need to be taught to throw garbage in the dustbins. This will stay in their memory in all their lives (Ms Hadija, us, 11. 81-85).

This teacher sees parents as a hindrance to the EE taught in schools and that parents are responsible for the negative environmental behavior of children today. In her opinion, previous generations were better behaved than children are nowadays. She also considers garbage separation to be an important environmental aspect to be emphasized and taught to children.

Another teacher from an urban school had different perspective, he said:

> [….] If you go back and look at many of us have gone to government school you could clean the compound, you could clean the class, water the garden and anything but as you see this we call them private, and they are private. So their parents have paid for it, the money paid have included many things. And basically most of them are the children of the rich. Even if you follow them at home it is even more, they don't do anything, there is sweeper, house girl so the only thing he does is to come home take soap the shoes, watch television so everything is done for them. I think with this part with private schools is their nature, the parents pay for the money they cannot expect them to do the sweeping at the compound because they paid (Mr Mwakasege, us, 19. 117-126).

According to him, people who attended public schools were much better at hands-on activities than those who attended private schools. He suggests that private school parents don't want their children to work because they pay a lot of money, compared to public schools. He insists that these children come from wealthy families and don´t have to do anything when they are at home. This teacher views wealth as an obstacle for children to be taught EE in a practical way. He is of the opinion that parents with children in private schools don't want to see their children spending time outside doing manual activities, instead they interpret these kinds of activities as punishment and a waste of time. Teachers Hadija, Jamal and Mwakasege are of the same opinion that parents hinder the efforts of EE. However, teacher Mwakasege also agrees that wealth is a contributing factor for children not to practice active learning in schools.

Teacher Mwakasege further narrated:

> Learners should be taught responsibilities when you say you are in a class you should sweep. If that starts from primary level going upward then we shall bring up people who are responsible to maintain the environment, but if we just teach and they go, you find that they are not doing what they are taught. Yes they just go there to pass exam and not transformed to a complete person. So it is both academically and also the other part of the life. People concentrate on exams they want this person to get ninety nine but there is also discipline, responsibilities, and needs. They have to be molded good so that they become good people socially (Mwakasege, us, 19. 298-306).

This teacher maintains that hands-on activities are an important way to make children learn responsibility. He says schools should not only put an emphasis on academia and passing

exams as a measure of learning, but also use discipline and social responsibility. He believes that personality development as a whole, rather than solely academic excellence, leads to the total transformation of a person. He also feels that public schools are better at active teaching than private schools. As he said earlier, the aspect of wealth plays a big role in the situation in schools.

On the one hand some teachers believe that when you provide EE to pupils, then the knowledge and skills acquired will be transferred to the parents and the community as a whole, making more people aware of, and encouraging responsibility towards environmental issues. On the other hand, some teachers also think the parents are a hindrance to EE learning in schools. Some parents have negative attitudes towards work or hands-on activities, which teachers believe is an effective way to teach EE. This suggests that parents are ignorant and they also need to be given EE and be taught of its importance. These teachers believe that for EE learning to be effective, teachers and parents must work as one and help the children to learn EE. This will enhance a sense of responsibility and good citizenship as an outcome of developed and shaped personalities.

Develop and shape personalities

When human personalities are developed and shaped this mainly manifests in the way they think, feel and the way they behave differently from each other. Teachers in this study have considered this very important when teaching EE. During the interview teachers responded:

> Yees, if you learn when you are still young you will continue with that habit, I think that is why it would be better now to start from primary schools (Mr Paul, us, 14. 84-85).
>
> It is important. Anything that starts in young age it becomes a behavior and it stays in your life. So they will grow with a habit of caring for the environment. So when we teach children they will see the advantage and they will be responsible and care for their environment. […] if the foundation is weak when you finish building the house will definitely collapse, just a little wind it will collapse. But if a child is trained in early years how to care for environment, and we start with little things like planting flowers, then water them and they see it grows and see it looks good. If they plant a tree and grow and hide under it when it's sunny they will see a benefit. So building a foundation to children is very important (Ms Faith, rs, 20. 103-113).

The responses from teachers indicate that providing environmental education for primary education is of vital significance. Teachers believe that personalities are shaped from a very early age and, therefore, it is best to provide it at this level. In this way teachers believe that positive environmental behavior will be developed and sustained. Teacher Faith emphasizes that learning through experimenting and by watching plants grow from germination onwards and nurturing them can help children develop a sense of loving and caring for their natural environment.

On a whole, the teachers argue along the same line and most of them emphasize the importance and the effects of learning EE at an early age. They strongly believe that the earlier EE starts in the lives of children, the greater the chance to change and shape their

values, attitudes and ultimately their personalities, which determines how the future generation will be.

Children are a future generation

Teachers have placed value in children and regard them as the future of their nation after they complete their school life. On this basis the teachers argue that it is very important that children are aware of their environment and this is best achieved by equipping them with skills and knowledge that will enable them become responsible citizens in the future. To emphasize this point teacher Jacob said:

> Yes very very crucial (*emphasis*), because school as a school consists of students, and we say children are the nation of tomorrow, so many children are in schools studying be it in primary, secondary or higher education those are places to educate the children about the importance of environment. So it is very important for this thing to begin in the grass roots which are schools, where the large population is and are the future generation. When I talk about grass roots I am talking about lower levels like this of primary education so that a child grows and knows the importance of keeping the environment, so that when they grow up they educate the others, or when they have children it is easy to educate them in a righteous way on how to keep the environment. So it must begin at the grass roots, here is where the strong foundation is, at the grass roots (emphasis) (Mr Jacob, rs, 1. 60-70).

This teacher emphasizes that children must be taught EE knowledge and educated on the importance of conserving the environment in primary education, since these children are the future generation, and primary school is a level of education that the majority of the population attends, compared to other levels of education. According to him providing EE in primary education is most appropriate. Therefore, most teachers agree that it makes sense to provide EE for children in primary education.

This teacher also considers the importance of having a strong foundation in environmental education, which, according to him, must begin at an early age for the best results. The results indicate that teachers view EE as crucial and its effectiveness will very much depend upon the age of the learners. However, since learning is a lifelong process and the majority of Tanzanians can only access basic education, this teacher considers lower educational level to be the best target for EE. He perceives formal education as the best channel for EE. This teacher does not consider the fact that the part of the population without the opportunity to access formal education and those who cannot continue beyond primary education will be disadvantaged. Other forms of education like informal and non-formal education are important to cater for those outside the formal system but this teacher's focus is on formal education.

However, teacher Rashid had a different perspective with regards to the age at which children should be taught EE. During the interview he said:

> …it should be given but according to levels. May be we should start with grade five because there are a lot of subjects and the children are small (Mr Rashid, rs, 5. 74-75).

He thinks that primary school children are small and only proposes that maybe it should be taught from grade five. He argues that the content of curriculum taught in primary school is

already very large, without adding other content. However, he agrees that EE is important, but argues that it should be taught according to levels and no lower than fifth grade. This teacher feels that children should not be taught a multitude of things. He is also of the opinion that the curriculum is overloaded and adding EE content is not worthy.

Moreover, teacher Suzan from a rural school is of the opinion that children are going to be the future victims of the outcome of environmental destruction and, therefore, they need to be given EE as early as possible to protect their future. During the interview she said:

> Yes it is important to give education at primary level because the children are the ones affected more. But when you give them education early enough, you are protecting them as they grow up. They will know about the environment and how to take care of it in their lives. Yes education should be given starting with children at primary schools. When these young children get education when they go to secondary schools they will be able to conserve the environment (Ms Suzan, rs, 2. 37-41).

She suggests that once they get education they will be responsible and care for their environment. She has the same opinion as other teachers that children need to be exposed to EE early enough to enable a better future and puts emphasis on the fact that children are more vulnerable to the effects of environmental degradation and, therefore, they should be prepared early enough to be responsible for their own actions.

In general, the majority of teachers believed EE to be very important, as it builds a strong foundation for the children and will, ultimately, lead to a stronger nation. Teachers see education as an important and powerful instrument *to communicate knowledge, awareness and skills***,** which will enhance action taking, and lead to positive environmental behavior. It is also a powerful instrument for enhancing *knowledge transfer, to develop and shape personalities*, which teachers associate with *responsible citizenship and building a strong future generation*.

Considering the teachers' responses on the importance of teaching EE in schools and how education would form a strong foundation, many teachers believe imparting knowledge and skills to pupils and raising their awareness is key in building a strong foundation. They believe that once children acquire knowledge and awareness it will lead to action and the protection of the environment. These teachers view the process of environmental education as a linear relationship between knowledge and the acquisition of skills and action taking. The teachers assume that once children acquire knowledge and skills and become aware of their environment they will automatically protect their environment and, by so doing so, protecting their environment will become a habit, as shown in figure 4.1

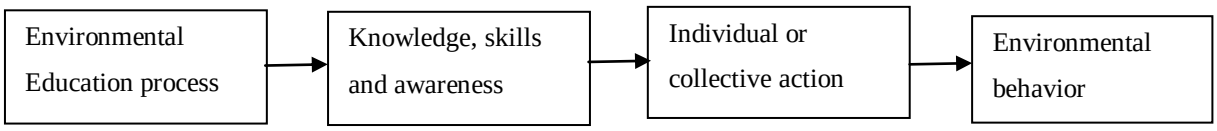

Fig. 9: Teachers' linear perception of the relationship between EE learning and development of individual practice and behavior

Teachers believe that when learners acquire environmental knowledge and skills it will enhance the ability to solve various problems they encounter in their daily lives. However this view has been criticized by various environmentalists as discussed in the next chapter.

Environmental education for solving societal problem

The other sub-theme on the rationale for EE in primary education was based on the ability of EE to solve societal problems. According to this study EE is believed to be one of the best solutions to a multitude of environmental challenges in society, because it equips people with knowledge and skills that will help them make informed decisions for their actions. *Active/practical learning approach as well as government and societal commitment were the categories that emerged under this sub theme.*

Active/practical learning approach

In order for EE to be successful and be able to solve the current global and local challenges, it must be done practically or should take the *learning by doing or active learning approach.* The provision of EE is considered very important but if it doesn´t actively engage learners then it will not be very successful. To emphasize this point, during the interview some teachers had this to say:

> Yes is the solution. I think it is the only way that we can make people to do it, you have to educate them but they need practical aspect. Practical means doing it and practice. You can educate someone on how to conserve and protect the environment but if they don't take it into action, you find that the problem remains the same so education is necessary but people have to practice (MrMwakasege, us, 19. 52-57).
>
> Yees, I think it can solve some of these problems because people need to be informed on how to take care of the environment. I think the practical part of it would be more helpful because when someone is taught through practice he has to know what is required to do because when you just teach someone theoretically he does not know exactly what is needed so I think the teaching should be more practical (Mr Emmanuel, us, 18. 45-56).

These two teachers both discuss the topic of learning by doing. They regard it to be a fundamental aspect of any effective education. They believe the theoretical part of education is also important, but omitting the practical aspect is problematic. For education to help people solve daily problems they encounter, it must be taught practically, so people can acquire helpful skills. This entails educational programs that provide information about conservation and environmental issues, exploring nature and providing opportunities to gain knowledge and skills that can be used to protect, defend, conserve and restore the environment. Another field excerpt from teacher Mwakasege added:

> I think so, they know, in fact the theory part of it is known to them. When you look at even the school, the media, radios they try to at least advertise and even to show, sensitize people about the need of keeping the environment clean. Even the municipal council I see them coming up with rules for guiding people on how to do this. They even give alternatives that; if you do this you will be given fine. The theoretical part of it is done more, even in schools people are taught they just ignore in a way.

> Someone can have a bottle of water or juice he just throws it but he knows that he should not do that (Mr Mwakasege, us, 19. 61- 68).

This teacher is convinced that a lot is done theoretically and what is really missing is the practical aspect of learning. He says, people can have knowledge, but that does not mean they will take action. The municipal setting rules, is one way to make people act by force, but this is an indication that there is something missing in people's character formation. This implies that if people are not given practical education it is less likely for them to willingly to do things, and that is why legal measures need to be exercised. According to these teachers learning by doing is more effective and will make children responsible citizens.

Another teacher from a rural school also supports the necessity to provide environmental by-laws and the need to provide EE in primary schools. However, he also sees poverty as an obstacle. During the interview he said:

> I totally agree with them because if I talk a little reference in our area here, when the regional commissioner when he passed the laws that, whoever is caught cutting down trees, serious measures will be taken upon him/her. For sure it has really helped and for now the rains have started resuming its trend and the Mount Kilimanjaro forest area is now a bit safe. So I agree with them that education should be given, but the poverty issue becomes really a barrier and I don't know how they are going to do it. People looking for their immediate needs and they totally depend on their environment for survival. To tell them that they should leave the environment, it is not possible because they live now not tomorrow (Mr Rashid, rs, 5. 37-44).

In his opinion, forest resources are a crucial aspect of environmental conservation. The forests of Mount Kilimanjaro have been seeing unreliable rain patterns and a scarcity of rain. This is due to immense and illegal deforestation, but since the regional commissioner passed a law that means all unauthorized deforestation will be penalized, the rain pattern has started to normalize. He identifies the issue of poverty to be the main obstacle in protecting the forests, as the majority of people depend on the forest for their livelihood. This teacher believes that setting and enforcing environmental bylaws has helped to secure the forests, but on the other hand he also believes that denying people access to their basic needs is not right. He is of the opinion that proving EE alone, without addressing the poverty issue, will make the conservation of forests impossible.

Another teacher who had a similar view on the importance of forests to the environment said:

> Of course environmental education is better, because people were not aware of what will happen after they destructed the forests of mount Kilimanjaro they realized that there is no rain, now after they preserved it even less than 10 years the forests now is thick. Now they realize the rains they are getting now is because of conservation of the environment. Of course, education is solving the problems. People were also educated how to get alternative source of energy than firewood and charcoal. There are now environmental friendly cookers that use simple raw materials (Mr Japhet, rs, 3. 60-67).

Teacher Rashid and Japhet are both from rural schools and to them forest resources are a vital part of environmental protection. They feel that the reliability of rainfall in their area has a

connection to the presence of forests. They both think that the scarcity of rain has been caused by deforestation. These teachers also see that people are entirely dependent on the forests as an energy resource. This is caused by poverty and people not having the capacity to afford energy resources like gas and electricity. They both acknowledge that education is important and can solve problems, but the poverty issue needs to be addressed first. Teacher Japhet adds that, with education, people are using environmental friendly cookers that use simple materials, but there is the issue of the cost of those cookers and the purchasing power of the majority seems to be low. These teachers show that they have a narrow understanding of the benefits of protecting forests resources. For them, the most important issue is rainfall reliability, which is largely connected to the presence of forests. This could be because it is a rural area where the main occupation of the majority of people is crop cultivation.

During the interview the majority of teachers supported the view that EE has the power to solve a lot of environmental challenges today. However, they raised a number of conditions for education to have the ability to solve day-to-day societal challenges. All the teachers supported the view that providing education to the children is crucial for current and future generations. The teachers have no doubt that education is an effective instrument to solve societal challenges, but they warn that if the current approach is not adapted, then its power to offer a solution for problems is lost. They were of the opinion that education is too theoretical and the focus is more on teaching factual knowledge through a traditional 'chalk and talk' approach, which does not guarantee action taking and, therefore, is less successful in to shaping children into responsible citizens in the future. In their opinion the best way to ensure this, is when both the government and society are committed.

Government and societal commitment

The government is an authority, whose commitment to environmental protection is paramount to receiving the same commitment from its society. Coordinated efforts between the government and all other levels of the society are crucial, if EE is to be successful. Interview responses concerning this aspect said:

> It is true that education helps but first of all we need to have environmental clubs from the village level, ward, district, and regional levels that are coordinated and have environmental strategy. These clubs should educate the people and they should also learn by doing it could help a lot. Yes learning by doing, and there should be working resources (Ms Annah, us, 10. 39-42).

This teacher emphasizes that for EE to be effective there should be an environmental strategy and coordinated efforts from the grass root level, such as village and regional levels. There should be environmental clubs at all levels, which will have the role to educate people. This teacher also sees working resources and active learning as an important aspect for effective environmental education. Teacher Annah also looks outside of the school context and thinks that the entire society should be involved. According to her, involving each individual in the society will enhance a sense of collective responsibility.

Another teacher raises the issue of the importance of providing resources. She narrated:

> It is very important; it is very important (emphasis), because our children do not know it, so it is important the children to be taught this education. And if the teachers were trained or given seminars I think we would teach this content very well. Teachers we

> are not given seminars even the books that we are using to teach is a problem, for example I have been using a single book for many years, in fact I don't have even its teacher guide. I just guide myself from my own experience. So this education is very important but there is no facilitation to do better. We just do more theoretically and not practically. So the children are just sitting there and receive whatever you feed them and no more (Ms Rachel, rs, 6. 82-89).

A similar argument was presented by teacher Faith. She narrated:

> What I can say is that every sector should stand in their positions when it comes to implementation. It shouldn't be the speaking of policy in public but nothing is done. The issue of environment each ministry should ensure its implementation and make sure the knowledge is taught in various levels. They should also provide resources. Those who are teaching must be trained. It is important also to give education to the general public especially on the effects of destroying the environment. We may be teaching children but they have parents who also need education about this so that it is more effective. It is difficult for children to tell parents what to do and sometimes parents ignore the school teaching. Curriculum specialists should guide and train its manpower on how to do it, whenever they introduce a new thing in the curriculum (Ms Faith, rs, 20. 214-223).

Teacher Rachel, like many other teachers, states that EE is very significant for school children. But in her opinion teachers are not facilitated and trained to teach EE. T/L materials, such as books, are also inadequate. Her opinion is similar to teacher Faith, who also sees the training of teachers and provision of T/L resources as paramount for the implementation of EE. Teacher Rachel and Faith are convinced that if teachers are facilitated by training and given materials for teaching, then EE teaching will be actively and effectively realized. Teacher faith thinks that the government introduces new reforms in the curriculum, without preparing man power for implementing such reforms. Teacher Annah says the same about the provision of working resources. These teachers identify this as a reason for ineffective teaching of EE in school. According to them, the role of the government is key in ensuring effective implementation of EE in schools; for example facilitation of training, provision of T/L materials and enforcement of environmental policies. Teacher Annah and teacher Faith are of the opinion that EE can be effective when the general public is involved and is given environmental knowledge and skills. In Teacher Faiths opinion, it is difficult for children to transfer the knowledge they acquire to their parents. This contradicts the view other teachers had earlier about knowledge transfer. Some teachers see children as a very effective channel to transfer knowledge to parents and the community. Teacher Faith argues that parents sometimes ignore what children learn at school.

With regard to teaching, teacher Rachel stresses that she just uses her own experience since even the teacher guide is not available. The teacher generalizes that teachers mostly use the lecture method, rather than a participatory method when teaching. The theory behind this approach is that children are seen as passive or empty slates and are simply recipients, in a sense that they are to receive what the teacher gives. Learning is not guaranteed with this method since it is does not take into account the individual needs, feelings or interests of pupils (MIE 2004).

In general, teachers acknowledged that education is an important instrument towards solving societal problems. They showed this by identifying EE contents integrated into their subjects and indicated their awareness of environmental issues.

4.2.2 Teachers' awareness of the integration of EE content into the curriculum

This is the second theme of the second objective. Teachers were asked to state whether EE contents were integrated into their subject curriculum or not. This served as a main category. Teachers gave their views on whether or not the content was adequate for the levels they were teaching. Moreover, they gave their views on the relevance of the curriculum and proposed relevant areas they considered important to be included in their subjects. These served as sub-categories.

Teachers' awareness on what EE content is integrated into their subjects is the ability of individual teachers to identify specific EE contents in order to teach them. The ability to identify them is very important, to be able to know how they can incorporate them during their teaching, as they do not stand alone as a subject. Failure to identify such content will lead to an inability to teach them. Teachers viewed some content as independent topics. The teachers who were of the opinion that EE content is an independent content or topic had this to say:

> They are topics complete. For example if you teach grade six, there is atmospheric environment, sources of water or rain. Yes like that. When we talk about the contents of environment in the primary education then I speak in the level that I understand. Environment as environment in primary education can be as a complete topic. Let's leave alone science, even in English subject still there are environmental aspects. Despite that it will only be in parts like the keeping of gardens, national parks, forests these are all about environment. So when each teacher touches some elements, at the end you achieve a big thing. So when they get to higher levels like form Four or form Six they will have something, but the beginning is here at this very lower level. So the students will be confident and informed in their actions (Mr Jamal, us, 8. 150-159).
>
> Yees, it's there. I think it's just an independent topic. Yees, like in science there is a topic about cleanliness of the environment Yees, things that make our environment, ways of keeping our environment clean, things that endanger our lives within the environment and some of the things that destroy our environment (Mr Emmanuel, us, 18.131-140).

Teacher Jamal and Emmanuel teach science. Teacher Jamal focuses on the general importance of EE being taught across the entire curriculum. He is convinced that EE will be effective and successful only when every teacher teaches it. He is aware that other subjects like English hardly carry environmental content, but still some aspects can be taught. He believes that learners will acquire more knowledge and skills as they advance to higher levels, but only if the lower levels played their role effectively. He is of the opinion that the natural environment is enough resource for teaching primary school learners. Teacher Emmanuel also teaches science in fourth grade. He also identified some environmental topics found in his subject. Results showed that the topics mentioned by teacher Emmanuel were found in the syllabus, like he said. This shows that the teacher is aware of the environmental

content integrated into the syllabus and it was also found as an independent topic, which is what he reported. These teachers show that they are well informed about what EE content is in their subjects and teacher Jamal emphasized that EE content need to be indispensable in all subjects in primary education, in order to achieve environmental literacy.

> In the syllabus, they are there. To my vivid experience I think they are direct very much direct in fact there is a topic called environment. It stands as its own, it talks about components, how it is polluted. All these things we are talking about are there. It is very much explicit (Mr Mwakasege, us, 19. 181-185).
>
> Yes there are. They are clear. In some classes they are clear. Myself I teach grade seven how to care for the environment. For example there is a topic of water harvesting, there is water pollution, sewage water, gas waste, hard and soft waste…… it talks about weather and it also talks about water resources, pollution of environment, population etc. (Ms Faith, rs, 20. 124-130).

These teachers have shown that they are aware of the integration of EE content into their subject curriculum and they could identify some of the topics in their syllabi. They are of the opinion that the contents integrated into their subject curriculum were placed as independent topics. The teachers showed that they had no problems identifying the content, since it was separated from other subject contents. Teacher Mwakasege and Faith teach geography in sixth and seventh grade, respectively, and they too give examples of environmental contents found in their subjects. Teacher Mwakasege talks about the topic named 'environment'; the actual topic reads: Environmental degradation. The other geography teacher mentions water harvesting, water pollution, sewage water, gas waste and hard and soft waste as topics found. However, it was found that 'water harvesting' is listed as a topic and the rest are covered under the topic ´waste management`. Teachers' responses, concerning environmental topics found in their syllabi, show that teachers are aware of them; however, they gave incomplete explanation concerning the topics found.

Some teachers responded that the content found in their subjects is not obvious, or independent and, therefore, not easy to integrate. However, they seemed to have no adequate information on what they teach as they replied briefly. They said:

> Yes there are environmental topics. Mmmmmm they are hidden, it will depend on the ability of the teacher (Ms Hadija us, 11. 100-102).
>
> Yees, but is just in other topics, not direct (Mr Paul, us, 14. 96).

The findings revealed that these teachers are aware of environmental contents found in their subject curriculum, but according to them the topics are not always obvious. However, they could not give further clarification of what content they thought was hidden. During the subject curriculum analysis, the researcher found obvious and complete topics concerning environmental issues for the various levels these teachers were teaching. For example, in the fifth grade science syllabus clear environmental content was found, contrary to what teacher Hadija reported. Topics like 'living things' was a main topic which had 'the balance of nature' as a sub-topic. Similarly, in fourth grade science, which teacher Paul was teaching, the subject curriculum showed main topics like 'living things'. Also there is a sub topic called 'cleanliness and neatness of the environment.' These findings contradict what these teachers

reported. It showed that they were not well informed about the EE content to be integrated into their subjects.

In summary, teachers' responses on this aspect showed that all the teachers are aware that EE is integrated into their subject curriculum. However, teachers had different opinions on the mode of integration it takes. On the one hand, some teachers said that EE content is integrated as independent content or topics into their subjects, which form a sub-category. On the other hand, some teachers said it is indirect content, which is merged within other major topics. Furthermore, responses from other subject teachers show that they could not give adequate information concerning environmental content found in their subjects.

It was found that all the content mentioned to be in the syllabi seemed to mainly cover one aspect of the pillars of sustainability (the ecology). Since education for sustainable development emphasizes the need to find a balance between ecology, economy and culture as the main pillars of sustainability, thus, it is also important for teachers to be aware of this as they incorporate them in their teaching.

4.2.3 Teachers' awareness of 'pillars' of EE in their subject curriculum

In this category teachers were asked to identify the pillars of EE or sustainability in the subjects they teach and, whether or not, a balance between the pillars is featured. This sub theme had a number of categories which emerged as teachers were giving out their views and perceptions. Categories like *interdependence of pillars* and *the role of education, the power of economy, the power of culture and ecology or environment is life* emerged.

Interdependence of pillars and the role of education

Responses from the interview show that teachers acknowledge the importance and interdependence of pillars and the need to strike a balance between them. During the interview some teachers said:

> We need to balance the three, because it is impossible to remove one of that. There is interdependence; they depend on each other to survive. Man is there to regulate, they can maintain it or destroy the environment (Mr Kizito, us, 16. 67-72).
>
> I think those three things you cannot separate, because as human we have to get our needs from the environment, so what is needed here is education how to keep, and how to use the environment in order to get our needs. Mmmm, no in our syllabus for example in science we just learn a small part about how to keep our environment clean. It is just how to keep our environment clean. That is why I said may be there should be a lesson (Mr Paul, us, 14. 73-81).

These teachers are of the opinion that each pillar cannot stand on its own. They interrelate and work in unison. Teacher Kizito places humans at the centre of the pillars and that humans ultimately have to make the decision to either maintain or destroy the environment. So to him humans, who are defined by the social cultural pillar, are the determinant factor whether other pillars survive or not. He emphasizes the role and power of human culture in determining the fate of the ecology and economy pillars. On the other hand, teacher Paul focuses on the importance of education. He says the environment is the main supplier of resources to cover most human needs; therefore, people need to be educated on how to utilize its resources sustainably. However, he is of the opinion that the content found in his subject is insufficient

to educate sufficiently and he proposes that EE should be treated as an independent subject, in order for it to be more comprehensive. He is of the same opinion as teacher Kizito that humans and their cultural practices must be at the centre of EE and he believes that if people receive the required knowledge and skills then a balance will be possible.

In a similar vein, another teacher states that education is a very important tool to change the social cultural values, in order to balance the pillars. He had this to say:

> First of all you must educate people of what is ecology in detail. Then secondly you come to the social cultural because they are disturbing the ecology. Then thirdly you come to economy. They will only balance after understanding them. For example people who burn crop remains in the farms for clearing them, don't know they are killing important insects in the soil. But now this is not allowed here (Mr Japhet, rs, 3. 85-89).

This teacher views education as a powerful instrument to shape human behavior, in order to see value in the environment and to protect it. He says many things are done out of ignorance. He names humans as the key factor to achieving a balance between ecology, economy and culture. According to him, it is important to equip people with knowledge and skills to shape their cultural values and help them recognize positive and negative practices towards the environment. He also stresses that each pillar needs to be clearly understood in order to achieve balance.

The issue of ignorance was also seen as a main obstacle in discerning the interrelationship between pillars, which makes finding a balance difficult. She commented:

> These three things depend on each other and in the environment there are various resources. Human beings also have got different behaviors in the struggle for economic reasons, and they will do anything possible for their economic development even if it is to destroy the environment. That's why I have said if education is given to this person he/she make use of their environment well and be able to enhance their economic situation without doing much harm to the environment. And they can develop behavior of protecting the environment and still get their needs (interference) (Ms Annah, us, 10. 56-61).

Teacher Annah believes that negative social cultural behavior towards the environment can only be changed, by passing on proper knowledge and skills through education. She adds that humans will do anything for their economic prosperity, at the expense of destroying the environment. However, she assumes that people do this out of ignorance and is convinced that people would cause less destruction if they had better knowledge. Therefore, she sees education as the only solution to create a balance between the three pillars. However, other teachers have different views and suggesting that socio-economic factors override mere ignorance.

The socio-economic influence

Some teachers believe that, besides ignorance, socio-economic factors are a significant cause of environmental destruction. The economic status and behavior of people has a strong influence on the protection or destruction of their environment. Some teachers who argued in this direction said:

> No I have never heard of it. Even if people get education like I have said they want a quick profit. If there will be no capacity building to people economically, then it will be so difficult to protect the environment. People want to plant short term trees so that they can sell them quickly, but if you say they plant trees to take 10 or 20 years they are not ready. Balancing is good but for now it is difficult because the motivation to care for the environment is not there at all, people are more profit oriented (Mr Rashid, rs 5. 61-72).

Concerning the importance and the role of education, which several teachers believe to be an important element to achieve balance, teacher Rashid has a different opinion. He believes that educating people, without empowering them economically, will not help to protect the environment or to encourage a mutual relationship between the pillars. This teacher believes that people may have knowledge and skills; these may not be a determining factor to protect and conserve the environment. He views the economic factor to be a driving force in the destruction of the environment, thus it is difficult to achieve a balance between the pillars. Therefore, in his opinion, people need to be empowered economically first, since they have daily needs that necessitate the utilization of the environment. He also sees human behavior as a determining factor for the protection of the environment, this is the cultural aspect. He said people's behavior is geared towards making a quick profit.

Other teachers supported the idea that humans are key to accomplishing successful protection of the environment and ecology, as a pillar of sustainability. They believe that the type of economic activities people decide to conduct in the environment determine its sustainability or destruction. These teachers see the importance of balancing the pillars and they believe man is key to its success. During the interview session they said:

> First of all let me begin with the natural behavior of people. Personally I believe that these things carry each other. It is true that economy is the environment and the environment is economy. For example people who live along the coast, these people have a tendency of not having latrines, do you think that is good? So what I believe is that man is the first stakeholder of the environment. So if we give these people environmental education they will keep it and it will boost their economy in return. The environment will also assist them. But when we come to town environment you must have capacity to maintain things. For example we have a garden because we have no water nearby so we have to buy water for keeping our garden. But also the people living in the village they depend totally on the environment to prosper economically, so if they destroy it is their own fate. For example those going to the ocean as their toilet, they contaminate the water. They fish, they swim and it is dangerous and they have high cholera chances. Instead of prospering they now put their effort in getting treatment instead of working. So I believe if the environment is kept well the economy prospers. So the economy and the behavior of the people they very much depend on each other (Mr Jamal, us, 8. 99-112).
>
> We should regard the environment as something that live with us and not something that just pass by. When people are doing economic activities they should take care of environment. When people farm along the water source and cut down trees they should think that if we destroy the environment there will not be rain and we cannot farm anymore. We should have a system of protecting the environment. Yes culture is the strongest (Mr Haroun, us, 9. 46-50).

These teachers are of the opinion that people should be responsible for their own actions in the environment. People need to be aware of their socio-economic and cultural practices, so they don't suffer the consequences of destroying the environment and ecology. Teacher Jamal gives an example of people who live along the coast, whose cultural behavior of polluting the water impacts them negatively. He holds a strong belief that the economy can only prosper when the environment is not destructed. He emphasized the necessity of providing education to people so they can make informed decisions about actions that impact the environment. To him the economy and culture, or people's behavior, are mutually inclusive. Teacher Haroun also emphasizes the point that people need to be aware of the socio-economic and cultural activities they carry out in the environment. He says for example when people destroy the sources of water by farming near them or cutting down trees, they must be ready to face the consequences. People need to make informed decisions and environmental sustainability is solely in the hands of mankind.

Other teachers who have a similar perception commented:

> There is a need to balance because like we said earlier man lives in the environment. Man can't live without the environment. When you talk about economy for example people are doing mining in the environment, they cut trees and get many cash crops. They get all these from the environment therefore they need to care and protect the environment so that it will also care for them. When you plant trees you will get money and do other things. There are some families have finished all the trees, they have no firewood or timber and stay poor. But if they planted trees they would sell some and solve their problems. So these things depend on each other and it is very important to balance (Ms Faith, rs, 20. 93-100).
>
> We just need to balance them because we can't separate them actually so we have to balance them. That is the only in fact ecologically aaaah ecology we define it as how living things interact in the environment so it's the living things in relation to the environment. I think these things can't be separated. Also the culture affects the environment (our needs and that is the economy we have to get everything from the environment…. Interviewer adding words) yes our needs is the economy so we have to balance as much as we need charcoal, you have to know that I am cutting a tree. So maybe if I have to cut a tree then I have to plant another one that is was we need to know they are balanced. If we say we don't, the economical part of it is going to be affected so we have to balance (Mr Mwakasege, us, 19. 87-95).

These teachers emphasize that there is no life without the environment; and people need the environment to fulfill their basic needs. Therefore, humans have the responsibility to ensure that the environment is well kept, for their own wellbeing. They both see the importance of reforestation to counteract the effects of deforestation. Teacher Faith adds that mining is also an important economic activity, but it is important to take care of the environment. Teacher Mwakasege feels that since the pillars are inseparable, people need to balance them to ensure sustainability.

In general, the analysis of data revealed that the majority of teachers were not aware of the term 'pillars' of sustainability or EE, until it was elaborated by the researcher. However, after becoming aware, all the teachers were of the opinion that the pillars are very important and that there is a grave necessity to balance them for the mutual wellbeing of the three pillars.

Teachers stated that humans play a key role in ensuring that both the economy and the environment can prosper. It is also apparent that teachers recognize the necessity to shape and influence society's social cultural behavior, to help balance the pillars. However, some teachers commented that it is difficult to keep the balance, if people are not economically empowered. Thus, poverty is seen as one of the main obstacles in balancing the pillars of sustainability. Not only did the teachers show the importance of pillars and the balance thereof, but they were also concerned about how much EE content is placed in primary school curriculum, to enable learners to become responsible citizens. This is covered in the next section.

4.2.4 Teachers' views and perceptions on the adequacy of EE content

This sub-theme focused on the adequacy of EE content in the teachers' subject curriculum. Teachers were asked to give their views on how they assess the EE content of the respective subject and class level they teach. Teachers had varying perceptions regarding the adequacy of content; during the interview sessions teachers said:

> It is not enough because it is too brief, they get very little. And there are no issues of ecology, economy and culture and how they relate to each other (Mr Jacob, rs,
> 1. 117-118).

This teacher teaches geography in fifth and sixth grade. In his opinion, the environmental content is inadequate, since it is too brief. He also adds that the interrelationship of pillars is not found in the syllabus. However, the researcher found that the topic of the pillars was mentioned. For example, there is a topic called 'interdependence in the environment' and the sub-topics 'Human beings and the environment', 'Animals, insects and plants in the environment' and 'Methods of environmental conservation' in the fifth grade syllabus p.48-49. Another main topic is 'Economic activities in East Africa and their effects on the environment' sub-topics include: 'agriculture, livestock keeping, mining, fishing, industries, energy and forests' p.40-47. In sixth grade the research showed that the topic 'Economic activities and their effects on the environment', with sub-topics industries, tourism, forests, energy harnessing, mining, agriculture, livestock keeping, harvesting marine and fresh water resources' can be found in the syllabus p. 60-72. It appears that there is EE content that shows the interdependence of pillars, but teachers are not aware of it.

Teacher Alex was teaching sixth and seventh grade geography and he had similar views as teacher Jacob when he responded:

> No, it is not adequate at all. Those with such content in their syllabi I don't know to what extent they have talked about it, but in my syllabus it is not adequate. If you have not understood that's it, because it is not clear and it is only a little content (Mr Alex, us,
> 12. 62-68

Teacher Alex highlighted that the stipulated content is inadequate for his classes. He also thinks that the content is not clear and depends on the ability of the teacher to understand or interpret it. The analysis of the syllabus revealed that the EE content is clear and it consists of

clear, complete topics. The response from this teacher may have a different explanation. It may be that his ability to identify EE content is low or he was not aware of the content in his syllabus at the time of interview.

Another teacher supported the views of the former two teachers; however, she had a different point of focus. She said:

> Personally, I see they are not adequate and shallow not well explained. Then it depends on individual experience, if you have more knowledge you go further explaining it. I don't know really if they considered that this are grade seven and what they need, but myself I see they are shallow, bearing in mind that environment is a broad thing, so they would add a little bit for them. The types of garbage, soft garbage, noise pollution, they are not explained properly it is too shallow. For example when you say this is hard garbage what does it mean? They should explain. (Interference) (Ms Annah, us,
> 10. 84-90).

Like Alex, teacher Annah also thinks that EE content for geography in seventh grade is inadequate and relies heavily on the teacher's experience and knowledge to teach it effectively. She recognizes that teachers' competence of the content is a crucial factor in making EE teaching effective and understands that EE content for the level she is teaching is not adequate, considering the breadth of environmental issues. She continued by giving examples of EE content, like waste management and pollution, which are inadequately represented in the syllabus. Moreover, she comments on the need for teachers to have adequate training and experience, to be able to teach EE content competently. According to her, this is also a contributing factor as to why environmental issues are not taught effectively in schools.

Another geography teacher who teaches at a rural school has a different focal point. She accentuates the importance of forest resources, while teacher Annah from an urban school focuses more on waste management and pollution. This indicates that teachers have different priorities when it comes to environmental content, conceivably in relation to where they live and their individual experience with their environment. Teacher Faith had this to say:

> I think it is not enough, but I don't know may be if there are lower levels where they are taught for example planting trees or… For the level I teach, I think it's not so adequate. It should have placed other things to be done practically, so that people would know if I do a project like planting trees in a valley area, children should plant or in a school environment (Ms Faith, rs, 20. 134-140).

According to teacher Faith, hands-on activities play a crucial role in learning environmental issues. She points out that learning by doing is poorly placed in the syllabus. Results show that the relevance of various environmental issues vary, depending on the location; like forest resources is an important content to be taught in rural areas, while issues of waste management and pollution are more meaningful in the urban areas. This is due to the fact that the majority of the rural population depends entirely on forest resources for energy and land for farming, which is causing extensive deforestation. On the other hand, due rapid

urbanization in the urban areas, issues of waste management and pollution are crucial, as this can lead to the spread of diseases.

A number of science teachers share the opinion of the geography teachers. They also mentioned that the EE content in their subjects was not adequate and suitable for the levels they were teaching. They also gave various reasons for their views. When interviewed they said:

> It is not adequate, for example in grade four and five the topics are not in details. May be because they are going to higher levels may be it will be more detailed. In grade five they are taught about interdependence of living things. For sure it is very difficult to teach environmental education without real things. It is very difficult for the children to understand the concepts of the things they are taught unless they see (Ms Suzan, rs,
> 2. 76-80).

Teacher Suzan emphasizes the importance of learning EE 'in' or 'through' the environment. This means that teachers need to teach EE by actually taking the children into the environment, children can experience what they are being taught. She believes that this facilitates the learning process, as they don't only hear about the issues, but also experience them. This teacher raises two points. Firstly, she believes the content to be inadequate because it is not detailed and secondly, she articulates, that the approach to learning is very theoretical, mainly utilizing the children´s sense of hearing. According to her, learning is more difficult with this approach. She believes that involving the visual senses makes learning more effective. She hopes that when the children progress to higher grades they will be taught more environmental content. In addition to the inadequacy of contents, this teacher also thinks that it is very difficult for children to understand environmental concepts without the use of practical learning. The interdependence of living things for example is a topic this teacher believes to particularly be in need of practical learning.

Another teacher emphasized the issue of the quality of T/L materials. She doesn't see a problem with the completion of the syllabus, her major concern is the quality of materials provided for T/L. During the interview she emphasized:

> Normally, we do complete it, but this books they change every day is what brings problems. You find that they bring the books that are very shallow. If you take a look on the book published by the institute of education in the former days it was very deep even the science book, they explain very well and in details. But the today's books are very shallow and the teacher has to really look for other sources, you need to read a lot. Now we have to look for lesson notes ourselves. So even now we use the recent books plus the old ones to add more content in it. So it is a problem (Ms Hadija, us, 11. 104-109).

Teacher Hadija believes that EE content was adequate in the past, but currently it is not. She does not refer directly to the syllabus, but she puts her emphasis on books, which are one part of the syllabus materials. She is of the opinion that the books used in the past had suitable content, compared to the books they currently use. She refers to the good quality of books published by the educational authority in the past, where curriculum specialists were responsible for publishing school textbooks and teacher guidance books. This teacher appears

to degrade the quality of books that had been recently published during the time of the interview. She also comments on the fact that teachers have to search for material in other books and combine the knowledge from old and new books to prepare their lessons, which is an unnecessary added strain on the teachers. This response indicates that this teacher and other teachers interpret the act of searching for materials in several books to prepare comprehensive content as a nuisance. These results suggest that teachers only rely on the provided books and that they don't show any effort to explore other material to make their teaching richer and more meaningful. The teachers' motivation to use their own initiative to enrich their teaching material seems very low and it shows that they consider teaching to be an obligation. This leads to the conclusion that they have no desire to seek more knowledge and truth, or enjoy what they are doing, which, according to philosophers, are some of the main characteristics of being a good teacher. Teachers should have these characteristics, as they are the main source of information for many school children.

The interview responses from another teacher revealed that he also supports the opinion of the majority of teachers who said the EE content is inadequate when he said:

> Not adequate, that is why I suggest a lesson (Mr Paul, us, 14. 100)

According to him, introducing an independent subject that deals with environmental issues is more ideal. In his opinion, integrating EE content into other subjects is what is causing the lack of adequate EE content. He replied in one simple sentence that the content is not adequate for his science subjects for the fourth grade, although he also teaches third grade.

Other science teachers responded differently to the ones who thought that EE content in their subjects was not adequate. These teachers believe that the EE content placed in their subjects is adequate. One of the teachers even comments that the content is too much for his pupils. He said:

> Yes it is very much adequate in fact it is even more adequate so I said it should be taken to the next level (interviewer and teacher laughing). They are overdosed, you overdose them because you talk a lot earthly words they don't keep in mind, that they are using difficult language, so they have to split it at take it even to secondary (Mr Mwakasege, us, 19. 187-192)

This teacher was teaching science in sixth grade, which is what he was interviewed on, but also taught seventh grade. He is the only teacher who perceived the EE content for his class as too much and he suggested that it should be reduced and placed in the next level or grade. This teacher is of the opinion that teaching a lot of concepts theoretically makes understanding and memorizing them difficult for pupils. This teacher also raises the issue of language difficulties. According to him, the language used in explaining environmental content is not simple for the children to understand. However, the syllabus analysis shows that there is no single topic that addresses environmental issues directly in sixth grade. There is only a sub-topic which is called 'changes in living things' p. 67, which is also not a straightforward EE topic. These results suggest that this teacher is either not aware of the content found in the syllabus or is confusing it with the concept that the science syllabus is generally overloaded, which is what some other teachers complained about.

A similar response from another teacher read:

> The content is adequate, but the way it is given weight time is a problem. It is just explaining in general how the economic activities interfere the environment (Mr Haroun, us, 9. 74-79).

Teacher Haroun thinks that the content is satisfactory for his class level, but his major concern is that EE issues in the syllabus are not given weight and, therefore, no adequate time allocation. He says issues are listed in the syllabus, but are not explained specifically; for example, how economic activities interfere with the environment. These two teachers are of the opinion that the content is adequate, teacher Mwakasege even believes it is too much, but they also emphasized different issues. While teacher Mwakasege emphasize, the issue of language difficulties, teacher Haroun highlighted the lack of weight given to EE issues, together with the inadequate explanation on how economic issues interfere with the environment.

Another teacher, who thinks the content is adequate, but also emphasized the economic aspect and how it is undermined in the curriculum, said:

> [….] That's why the government has begun with little things and they advance as levels advance. So I believe the government plans are friendly to pupils. I think the content is enough and the more they advance they get more. I speak about our Tanzanian schools not others, they deal so much with keeping the environment but they are very few elements that analyze the economic aspect. For example construction of houses. You will see in the skills development lesson (stadi za kazi) there are huts for keeping chicken, cows, or bees hives, you see this, it needs somebody who can elaborate clearly. It does not show the three exactly but it mostly depends on the teachers' ability to interpret and explain and also ability to transfer the knowledge to students. Sometimes you may find the syllabus is silent but you know you need to explain it to pupils (Mr Jamal, us,
> 8. 164-172)

Teacher Jamal believes that what the government has planned for pupils to learn is properly thought out and, therefore, the learning content is adequate. This teacher has a lot of trust in the plans of the government and seems to rely heavily on those plans, rather than to thinking for himself and reflecting on what is really required and what is in the curriculum for pupils to learn. However, this teacher also sees the lack of focus on economic issues as a weakness in the EE content. In general, he perceives the content as adequate, but he also raises the issue of the ability to interpret the curriculum and to transfer the knowledge to the pupils. He thinks this can pose a problem when it comes to the T/L. Teacher Haroun and Jamal have both discuss the lack of economic issues in their subject curriculum. After the teachers explained their views on EE content adequacy, they then gave their views on the best way to integrate such content into their subjects. This is explored in the next section.

4.2.5 How can EE be integrated best into primary school curriculum?

This question aimed to seek views and perceptions of teachers on how the best way to integrate EE content into the curriculum. The responses from teachers on this question varied.

Four categories were identified to answer this question. The first category of teachers was of the opinion that EE should be *integrated as a separate subject* to ensure effective implementation. The second category said EE needs to be *integrated in a few subjects* as *topics*, like geography and science. The third category proposed that EE be *integrated into all subjects* and the last category was EE be integrated as topics in subjects.

Integrate EE as a separate subject

During the interview some teachers suggested that to ensure effective integration of EE it has to be taught as a separate subject. They had their reasons for this suggestion. During the interview they supported their opinions and said:

> I think it should be a subject so that it is taught in details, if it put in the extracurricular is not given weight people just ignore it. It should be a subject and should use participatory methods. People who are concerned should be involved whether there are students, teachers, or departments. And if you are going in the national parks there should be people there to explain (Mr Jacob, rs, 1. 121-124)

Teacher Jacob believes that if EE is taught as an independent subject it will be taught in more detail and it will be given importance. However, he stresses that one should employ a participatory approach for best results. He thinks that if EE is defined as an extracurricular activity, it will be overlooked and ignored. He is also concerned about the involvement of important people like teachers, students or departments involved in the planning and implementation of environmental issues. Since the nature of disciplines in primary schools is the subject centered approach, he thinks that if EE is made a subject it will receive the same attention as other subjects. Teacher Haroun also had a similar view, he said:

> I saw in the previous syllabus there was a subject and it really explained about environment; it was called domestic science. It was a subject that was really touching the daily human lives. So this should be brought back and should a separate subject (Mr Haroun, us, 9. 83-85).

When teacher Haroun was asked if adding a new subject will not overload the syllabus, he had this to say:

> Yes, they are many; you can add either a subject or topics that will go stage by stage. For example there should be a package for class one, class two etc. when they reach grade seven they will be completing the whole package (87-89)

So in this response it can be said that teacher Haroun understands the importance of EE and wishes it to be a subject of its own, but at the same time he realizes that the curriculum already has many subjects and suggests the alternative of making EE a topic that is successive from one class level to the next, so, by the end of their studies, they will have satisfactory knowledge and skills on environmental issues. So he suggests two options; establishing a new subject for EE, or adding EE topics to the existing subjects.

These two teachers have shown that EE is an important content to teach in primary children, regardless of where they come from. These teachers are from rural and urban areas, but they all showed a need for environmental knowledge in primary school curricula.

Integrate EE as topics in a few subjects

A teacher who supported the idea of placing EE content as topics into existing subjects said:

> What I can advise is that there should be environmental content in the science subject from grade one to grade seven. But also those content should be elaborate they should explain in details about environmental contents according to their level. And not like how it is now. For example in grade one, they can talk about their personal cleanliness and the surrounding community etc. and as they go higher the contents should be more detailed (Ms Hadija, us. 11. 117-121)

Teacher Hadija is convinced that if there is a consistent and coherent placement of science content from first to seventh grade it will enable children to sufficiently learn EE, which is not the way it was done at the time of the interview. She says the level of content coverage should match the class level. She gives examples of areas she thinks are simple and relevant to first grade pupils; topics like personal hygiene and the surrounding community make more sense to her. This teacher is of the opinion that the first things children need to be aware of and take care of are personal health and their immediate environment. The further they progress, the more content on environmental issues is added. According to her, science subjects carry a lot of the environmental content and, therefore, she suggests this subject to be well structured to include EE content in a more adequate way.

Integrate EE into all subjects

Teachers' views and perceptions in this category were that EE should be integrated into all subjects for the most effective outcome. One interview response was:

> What I think we can do is that, since the concept of environment is so wide, yes, it is very wide. So other subjects should continue to touch some aspects. Environmental education should not be in one subject, each teacher should talk about it, and the teachers must be knowledgeable about this issue. I believe a lot of noise from teachers on the same issue will help our children to be knowledgeable on the issue. I'm glad about one thing; you know the schools that are using Kiswahili as medium of instruction if you tell them about the issue in English it is a big problem. But let each teach in the language they understand we will be so far. But when you mix them and talk about the environment they will all have something to tell. So I think every teacher to put a piece of environmental concerns in their mind (Mr Jamal, us, 8. 181-189)
>
> Another teacher added:
>
> I propose they should insert it even in other subjects, for example in Kiswahili subject or English you can insert this content. It is possible to place this content in vocational skills subject too because there we learn about self-confidence, harmful actions, so even environment can be taught (Mr Alex, us, 12. 70-74)

These teachers believe that EE cannot be taught only in some subjects. They suggest that EE content be integrated into all subjects. They believe that, if every teacher teaches this content, it will be more effective than if it is only taught in some subjects. In their opinion, the teaching of EE content should be the task of every teacher. Teacher Jamal emphasizes that it does not matter which language of instruction the pupils use, but he believes that when they

come together they can share their knowledge on environmental issues. These teachers believe that if all subject curricula contain EE content, then the impact will be more positive. They see environmental concerns as crucial and, therefore, they should be covered in all subjects at school.

In general, the analysis of this question shows that teachers had varying perceptions on how EE content should be integrated into the curriculum. Each category of teachers gave their reasons how they came up with their suggestions. However, the education and training policy states that EE should be integrated into other subjects and from what was identified in the studied subject curriculum, the approach of topic and sub-topic content integration has been taken. The question remains, whether what is integrated is sufficient to cover the contemporary environmental issues in a local and global context. This is explored in the next section, where teachers gave their views on what they think should be given priority to, when teaching EE.

4.2.6 Teachers' proposals of EE content to be integrated into curriculum

In this sub-theme teachers were asked their views on what EE content they thought to be very important for primary school children to learn. This question aimed to examine whether urban and rural teachers have different preferences on what should be taught and what is featured in their subject curriculum. Teachers from both areas proposed several subject contents, some of which were similar. Here are some responses:

> First of all I would like them to understand the importance of staying in a healthy environment. You see how good our school environment looks like? So they will do the same at home. A child should be taught everything in the environment, from their own cleanliness and their surrounding environment. The good use of water resource not to open the taps and leave water running. Those who stay close to water sources should be taught not to play near them (Ms Faith, rs, 20. 116-119).

This teacher points out that pupils need to be taught EE content that will enable them to understand the importance of the environment and a sustainable use of resources. She thinks that it is important for the children to be aware of their environment, themselves and an unpolluted environment. So, teacher Faith views environmental awareness as very important for pupils. She also assumes that once the pupils acquire knowledge, or are made aware of the importance of the environment, they will make informed decisions and take appropriate action. She also thinks that sustainable use of resources is possible with the right knowledge and environmental awareness.

Another teacher proposed:

> They should know, basically we teach some things but what I would like them to know is basically the components of our environment and the components about our environment we have two biotic and abiotic both living and nonliving they should know that. They should know how each component looks and of course how to maintain it, its properties and how to maintain it because some are not replaceable. When they finish they get finished they should know that. They should know that there is something which when you misuse it get finished you can't get it again. It is not renewable, so they have to know that (Mr Mwakasege, us, 19. 168-174)

This teacher's priority EE content area is knowledge of environmental components, especially living and nonliving things, or biotic and abiotic. He says pupils should also know the characteristic features of both and how to manage them, because some resources are non-renewable, which, once exhausted, cannot be replaced. Therefore, he thinks it is important for pupils to be educated on the consequences of the misuse of such resources, before they are depleted, as they will suffer the consequences. This teacher focuses on general environmental awareness and in his opinion, living and nonliving things should have equal importance for children. These two teachers are concerned about the sustainable use of resources and the general understanding of the environment and its components. These teachers show that they are not only concerned about the needs of the present population, but also the needs of future generations. However, teacher Faith also highlights the need to teach pupils the importance of ensuring personal hygiene and an unspoilt environment since there is a big relationship between a healthy environment and the health of its population. The results reveal that, despite the fact that the two teachers are not from the same area, they both see the need to ensure sustainable use of environmental resources.

Other teachers from urban areas proposed the following:

> You know the young kids it is so difficult to forget, do you understand? Yees. According to the primary level education the students or the kids they must know to keep their environment clean at school and home environment. Yees for this time we are trying to give them some work, to clean their classes themselves (Mr Kizito, us 16. 80-88)
>
> What I wish them to do is to learn by doing issues of environment. For example how to plant trees and care them and to know the importance of having green environment. Because such environment help us to get clean water and even make the life of living things possible. In the science subject we teach them about ecology, the interdependence of living things (Mr Haroun, us, 9. 59-62)

These two teachers focus on the need to teach pupils about the importance of their environment. However, teacher Kizito puts more emphasis on teaching pupils how to keep their immediate environment clean. To him, the school and home environment is crucial and should be the first area for pupils to keep clean. This teacher sees that the home and school environment are the places where pupils spend most of their time, therefore, it is important to start here. This teacher is from an urban school and it could be argued that his emphasis on cleanliness is also due to the problems with waste management in urban areas, while teacher Haroun emphasizes practical learning. In his opinion, teachers should take a practical approach when teaching EE; active learning practices and hands-on activities, like planting a tree, should be utilized whenever possible. He says that pupils should be taught the importance of greening the environment because there are many benefits in doing that. Such benefits include protection of water sources for water reliability. He stresses that there is no life without water. The issue of water availability and access to clean and safe water is also more critical in urban areas than in rural environment. Although teacher Haroun is from an urban area, he understands the importance of trees and reforestation, which is mostly a subject of concern in rural areas.

Some teachers from rural schools also have proposals. These were their words:

> First of all they should know what environment is and what it entails. Then they should also learn about their immediate environment, at home and school. I would be very happy if they learn that and be in their syllabus according to their levels. For example in my class this content is very shallow and at times it requires us to do practical but I have never done that. I don't have the materials (Ms Rachel, rs, 6. 110-113) .

This teacher insists on imparting knowledge to pupils about the concept of environment and what it is composed of. She also thinks pupils understanding their immediate environment is of great importance. Therefore, they need to be taught such content. She also proposes the sequential planning of EE content in the curriculum, according to the grade. She thinks the content is inadequate for the level she is teaching. She says explicitly that she does not practice learning by doing and the reason she gives is lack of T/L materials. This shows that this teacher is too dependent on the material provided by the school, instead of being creative and improvising with the materials, using available resources in the environment. The reluctant behavior of this teacher could be due to a number of reasons; firstly, it could be due to poor training in the area of EE, which all the teachers claimed not to have received; secondly, it could be a lack of motivation to teach this content, which can partially be linked to poor training, but could also simply be a lack of personal motivation; lastly, it could be due to work load and poor working conditions. All these have an impact on teachers' motivation.
Teacher Suzan has a similar proposal; that it is very important to teach pupils about the concept of environment and make them understand their immediate environment and its importance. Her interview excerpt read:

> The first and foremost thing they should know what the environment means, or is. There after they should know what things surrounds us and their importance and how to conserve them. For example if it is water resource, they should know how to take care of it and how to make it safe for example by boiling it because there are diseases. If it is a forest resource they should know how to take care of it for the current and future benefits. They should be told the side effects of destroying the forests (Ms Suzan, rs, 2. 61-66)

This teacher also sees the importance of pupils being taught sustainable use of resources to conserve them. This proposal is also similar to teacher Faith and Mwakasege. She gives the example of water resources, which, she thinks, is critical for pupils to be aware of and be taught to make use of sustainably. She is of the opinion that water contamination causes diseases; therefore, it should be boiled before use. Therefore, pupils need to understand that conserving the water sources is everybody´s responsibility, for their own wellbeing. She also proposes the issue of forest conservation, for the benefits of both present and future generations. Pupils also should know the consequences of destroying the environment so they can make informed decisions about their actions. Despite the difference in teachers' environmental contexts, they had some similar priorities they feel pupils in primary education should be taught.

Another teacher from a rural school made the same proposal as teachers Rachel and Suzan. She said:

> First of all you can't teach somebody to protect about the environment when you don't know what the environment is. So the very important thing to teach them the concept of the environment then later they should teach them the importance of protecting the environment in details and how to use it sustainably (Mr Jacob, rs, 1. 100-103)

All these teachers emphasize that there is a great need to teach pupils the proper meaning of environment, before advancing to other environmental issues. It is important to teach pupils the concept correctly, but it is another thing to be able to teach it properly. Results have shown that these teachers are poorly trained and the majority perceives the environment as consisting mainly of physical objects, which was presented in the first objective. This indicates that there is a need to train teachers, as they are key to successful implementation. Teachers need to possess both content knowledge, as well as pedagogical knowledge for professional standards. The content as well as pedagogical knowledge determine the ability to choose and utilize the appropriate instructional methods and resources, as explained in the next section.

4.2.7 Teachers' views on instructional methods and resources in teaching EE

In this category teachers were asked to explain what instructional methods and strategies they used to teach their pupils EE content. Along with the methods, teachers were also asked to identify the T/L resources they used. Teachers' responses varied, depending on the subjects, classes or the level they taught. This category was divided into two sub categories. The first was aimed at teachers, who teach through *teacher centered approach* or *direct transmission* and the second aimed to identify the views of teachers who use *participatory approach* or *active learning*. The researcher aimed to collect information from the teachers, on the various means and strategies they employ in their classrooms to disseminate and communicate EE knowledge to their pupils. The other target was to explore the resources they used for teaching EE content. Teachers were later asked to give reasons for the approaches to teaching they chose. The interview response of one teacher who practiced direct transmission was:

> You know let me give you one secret, we teachers we have words sometimes that are not helpful. You know you can say your father is a nice man but he is drunkard and yet careless. Your aim is just to hide reality ok? Let's talk now me and you, 128 pupils in a class, I don't mean that I'm complaining no, it is the reality. This means in a day I'm supposed to teach about 300 pupils. There are certain methods if you use them, you are wasting your time and the policy says the primary school period is 40 minutes. So you must know how to divide the time for theory and practical. Personally I like very much to teach practically so that a child forms the concepts correctly and faster for what she/he has learnt. If you ask them to write what they have learnt they write (Mr Jamal, us,
> 8. 213-219)

Teacher Jamal begins his views by saying that people may intentionally say things that do not reflect the reality, even if they know the truth, he points out that teachers sometimes hide the truth but he says this does not help to solve the problems. This teacher wanted to say the truth about his own situation in class, which is that he teaches a large number of pupils in one class. He admitted that he uses the direct transmission approach; however, having so many pupils in his class does not allow him to take an active learning approach to teaching. He acknowledges the importance of participatory T/L and wishes he could apply it, but he said the circumstances do not allow it. The conditions in this teacher's classes appear to be far beyond the teacher-pupil ratio of 1:44 (URT, 2016b). The standard time for a lesson is 40 minutes. Teacher Jamal struggles to find the right ratio between theoretical and practical teaching in these 40 minutes with such a large class. These results suggest that the teachers who work under such circumstances cannot focus on the quality of learning and the achievement of their pupils. The nature of EE teaching and learning is practice oriented, but in large classes it is almost impossible to do anything other than theoretical teaching, which focuses mainly on the transferring knowledge and facts about environmental issues, rather than active learning to inculcate environmental behavior. Under these circumstances, EE will struggle to succeed. The researcher discovered that teacher Jamal teaches at a public primary school that uses English as a medium of teaching, instead of Kiswahili. Nowadays, many parents want their children to be able to speak English, as it is an international language, therefore the school is very popular and the tuition fees are much cheaper than private schools that use English as language of instruction.

Other teachers who prefer to use similar teacher centered methods had this to say:

> No, we just do things theoretically. That is easy. The situation in our school there are people who are taking care of all the environment, cleaning compound and even classrooms so that is why our children we teach them theory. They are not practicing (Mr Paul, us, 14. 120-124)
>
> About environment I can use theory to teach them, you know here in Dar es Salaam we don't have forests. I can use theory because I can teach them about negative effects or about the importance of cleaning the environment that is theory. The practical maybe I can take them to show the effects of destroying the environment. We don't have enough time. The first thing is, we don't have resources, second time, we don't have enough time (Mr Kizito, us, 16. 117-124)

These two teachers use similar T/L methods as teacher Jamal. However, they had varying reasons for their choices. Teacher Paul admits to using the teacher centered method, because it is easier and in his reply he uses the term "we", suggesting that this is the method used by all teachers at his school. Teacher Paul teaches in a private school, where almost all maintenance work is done by people who were hired for that. This teacher appears to support the system of the school and he admits to liking the teacher centered method, because it is easy. He doesn't show any concern that the children are missing an important experience. His response also suggests that due to a busy schedule in schools, teachers tend to support any system that allows them to make time for other activities.

Teacher Kizito teaches theory based knowledge in some subjects, because knowing the negative effects of living in a dirty environment is important, but due to the location of the

school and a lack of resources, it is difficult to offer hands-on experience. He pointed out that because the school is located in an urban area, active learning is limited due to the absence of forests. This teacher assumes that active learning of EE requires proximity to a forest. This is a narrow minded perception of what environmental education really entails. Teacher Kizito highlights the issue of lacking T/L resources, but in general all the teachers seem to have a heavy work load for the time they have and in urban schools the number of pupils in many classes is very high.

Another category of teachers responded that they use a participatory approach in teaching. One of these teachers said:

> The technique I use many times is to teach in real environment or real things. For example I can take them outside a place where garbage is and we learn practically how to clean and dispose garbage in proper places. Yes it is different when you teach children theoretically and when you teach practically. For example, when you teach about protecting trees, or water resources, they will understand more easily when you do it. I like to encourage them, but time is not enough but I just guide them step by step slowly (Faith, rs, 20. 194-204)

Teacher Faith is of the opinion that T/L is most effective, when done hands-on. The incorporation of the actual environment is crucial for effective teaching, as it enhances the chances of understanding and, therefore, encourages the implementation of necessary changes. She claims to engage her pupils actively with hands-on activities in areas like waste management around the school compound. She also says the protection of environmental resources like forests and water should be a practical activity, so that it encourages behavioral changes towards the environment. Forests and water are very important environmental resources, especially in rural areas, which is where she taught. Despite all the efforts this teacher claims to make, she also acknowledge, that time has been an obstacle to the teaching environmental education.

Interview responses from another teacher from a rural school read as follows:

> The instructional methods are not the same and every teacher uses different methods depending on the nature of their subjects. Environmental education needs a lot of practical. The children need to see the real things. For example I take them outside and show them the things that surround us like forests, rivers, mountains etc. (Ms Suzan, rs, 2. 95-98)

The opinion of this teacher, regarding T/L methods, suggests that the choice of a particular method depends on the nature of the subject matter itself. However, she emphasizes that the nature of EE requires a lot of learning by doing, because children learn better while in the environment. She claims to take her pupils out, to ensure more meaningful learning and the fact that her school is surrounded by environmental resources such as forests, rivers and a mountain validates her claim. However, this teacher does not raise the issue of insufficient time being an obstacle for her style of teaching. Teacher Faith and Suzan identify forests, water and mountains as important resources to utilize when teaching EE content. Such resources are mostly found in rural areas, which is where both teachers are located.

The responses from teacher Rachel, who also teaches at a rural school, are a bit different: She said:

> Normally I teach them in groups, I take group A, I sit with them and explain slowly and carefully because I don't have materials. Then I take group B and do the same. Then I mix them depending on their ability to understand so that they learn from each other (Ms Rachel, rs, 6. 150-152)

This teacher uses a different approach to teaching than the other teachers above. She says, due to a scarcity of T/L materials, she divides her class into two groups. She explains the content to each group separately and later she forms groups with children of different abilities, encouraging peer teaching amongst them. According to her, this method helps her to reach her objectives, despite the lack of resources. However, the method sounds more like the transmission of responsibility from the teacher to the pupils. Teacher Rachel also mentioned the issue of poor resources for T/L.

An urban teacher who makes use of nature in her lessons said:

> In my subject science I have arranged my topics according to the seasons of the year. For example for Dar es Salaam I know the rains start in February until the mid of April, so I arrange my topics. So when I teach about living things and their interdependence in the environment, there is greenish so that when I talk about it I will take the children out for them to see what I mean. The children should know when I talk about the living and dead environment (Ms Hadija, us, 11. 132-136)

This teacher sounds very creative in her teaching. She emphasizes and teaches certain topics only when the natural environment is conducive to do so. She looks flexible and can accommodate change, in order to successfully accomplish her teaching goals. She makes use of the local environment to teach pupils about the symbiotic relationship between living things. However, she also distinguishes between the living and non-living environment. Despite the fact that many of the teachers from urban locations complained about not having sufficient resources, Hadija takes a different approach. She seems determined and motivated to do a good job with what is provided.

To get a clear understanding, teacher's general views on the main challenges in the successful implementation of EE in primary schools were explored in the next sub-section.

4.2.8 Teachers views on the challenges of teaching EE in schools

Teachers were asked to give their general opinion on what they think are the obstacles in the effective implementation of EE in their schools.

> First of all the teaching and learning resources. You may be teaching a concept and there is no real thing so it becomes difficult for children to get the concept. The children also have different understanding capacity, so you need to revise many times for them to understand. For example you have a 40 minutes lesson you want to teach them oral then take them out for practical it is not possible. Yet you write notes and mark their exercise books, even if it is 80 minutes it is still a challenge. For sure time is real a challenge (Ms Suzan, rs, 2. 101-106)

> The time is not enough and the subjects are many. You can leave here and find about 60 or 70 exercise books waiting for you to mark, then you do corrections, then you prepare lesson plan etc. for sure time is not enough (Mr Rashid, rs, 5. 112-114)

The responses from teacher Suzan and Rashid reveal that they see time allocation for EE as one of the main challenges, as the daily work load is already too much. However, teacher Rashid also complained about large class sizes. He emphasizes that the role of the teacher is not just to teach, teachers also have many other duties, like marking students' work, planning lessons, etc. He also feels that there are too many subjects in primary school and this is an obstacle for EE. Teacher Suzan adds that teaching without suitable materials makes the process more time consuming, because children struggle to form proper concepts in their minds, relying solely on their sense of hearing. These teachers are from rural schools but they had more or less similar opinion to urban teachers on the barriers for EE. Two teachers from urban schools had this to say:

> For sure time is still is challenge, may be you can just decide that in the two periods you just do practicals. For example I use a lot of time in the topic of energy. So you need to take them out do the first level, second etc. there are only four lessons per week so time is not enough, and as you know science is more practical talking is very little. Formerly it was six periods per week. When you do things practically even the lazy or slow learners in class participate very well, because it involves all senses like to see, smell, touch, hear and taste (Ms Hadija, us, 11. 151-156)
>
> […..] actually there are many practical lessons but they end up untaught you do not teach because of the time and other resources. If it has to be done, you know this is a town these things used to be far you can't walk to the cave maybe if there is something in Mtongani you have to go with a vehicle. So you find that you cannot go there and it ends up in class. If you ask how many comes from Mtongani, how many have seen this and this maybe two. So it is rarely but we try to give them the knowledge theoretically (Mr Mwakasege, us, 19. 285-292)

These two urban teachers reflected on similar issues as the rural teachers. They also perceive time as one of the main obstacles when teaching EE. Teacher Hadija adds that there aren´t enough periods per week to seriously engage in EE activities. Hadija, like Suzan from a rural school, also argued that children need visual aids to facilitate the learning process in EE. Teacher Mwakasege sees financing for educational tours as a hindrance to teaching EE. He said urban schools are at a disadvantage, because they need to make field trips to visit natural sights and they need funding for that.

> There are so many challenges, the first one, lack of money; you know sometimes we are supposed to take the children for the study tour somewhere, so we must have something in our pockets. Another challenge I think the time, the time is not enough to teach about the environment. The location of the school is also a challenge, this is urban school (Ms Kizito, us, 16. 134-137)

Mwakasege and Kizito agree that time, funding and the location of the school are the main obstacles that urban schools face.

Teacher Haroun, had this to say:

> Challenges are many because the government has ignored it and the society does the same. Children participation becomes difficult. You will be the first one to talk about the environment others have not (Mr Haroun, us, 9. 107-109)

Haroun is from an urban school, contrary to the other teachers, he thinks that the main challenge is the fact that the government does not give priority to environmental affairs and as a consequence society does not take the matter seriously. So, in his opinion, the government influences the public on the importance of environmental concerns. He doesn´t see lack of time, resources or the location of schools as the main challenges to EE, which is what the majority of teachers said.

> Books are really a problem and they are many books but very shallow. Things are just not stable. I think the ministry should give a strict guidance and they should inspect thoroughly those books from authors. Teachers should also be involved even in the evaluation of books because they are the ones teaching and know what the syllabus needs. If the content is adequate or not they know (Ms Annah, us, 10. 119-122)
>
> There are a lot of things that make me not to do well, first of all teaching resources. Even the education that I have is not adequate to teach the pupils well and the children themselves are not even ready since they don't understand from the beginning. There is a challenge in changing the textbooks and regular changing of syllabus. You may use a book this year, next year they change and they change for worse they bring very shallow books than before. For example the Kiswahili books used two years ago has been changed this year and this new books are very shallow indeed (Mr Alex, us, 12. 104-111)

These two teachers are from urban schools. They are also concerned about the lack of T/L resources, in particular textbooks. They complain that the text books are very basic. Teacher Annah said there are many books, but they are very basic and he urges the ministry of education to intervene, in order to improve the quality of textbooks published by private authors. In her opinion, teachers were not involved in the evaluation of textbooks and she emphasizes that teachers know the needs of the students and could give authentic feedback on the quality and adequacy of textbooks before purchasing them. Teacher Alex raises his concern about how often textbooks are changed. In his opinion, the newer versions are far less sophisticated than the old ones. This implies that the pupils receive lesser EE content than before. He goes on to say that the regular changing of syllabus also poses a challenge. The other concern he raises, is about professional training. According to him, his lack of training on teaching EE content adds to the many struggles that his pupils face. The teacher gave a genuine response, admitting, that he is not capable of teaching EE effectively, impeding the learning process of his pupils.

4.2.9 Teachers views on effective implementation of EE in primary schools

The interview responses from teachers show that teachers have a lot of proposals on how EE could be implemented to encourage sustainable utilization of the environment. Teachers seem to be so unsatisfied with the conduct of several issues and they discussed all of their

concerns. One major concern of all the teachers is the *governmental responsibility*. During the interview some teachers said:

> What I think these seminars and training should be done several times, teachers are staying very long time without any training. For example myself I have 11 years at work since 2004. If these trainings are done they help to update teachers. Teachers we are quite out dated in our work. If possible the schools should have budget for environmental education, so that teachers should not start to become politicians. I have been trained I' am not a politician. There should be a budget for resources needed, if for example students need to go for study tour, every teacher should be able to explain to the children according to their level. Then when back the pupils say and write what they saw or learnt. They could be two or one times in a year. For example myself I have never seen Mount Kilimanjaro. I just see it on pictures. Children should form the right concepts in their mind by seen things practically. I also advice that the government should lower the energy like gas and electricity so that the majority could afford. If it is cheaper people would not go for charcoal or fire wood. I think the government should help us for this. I really believe that when politicians decide to do something they do it. They can make a friendly environment in the whole environmental issue. I think the current president who is in power is just the same like the previous ones. Let's wait and see if what he is doing will be sustainable or is just because the chair is new? Although many are saying he is like that. I really admire to wait and see how the last whistle for President Magufuli. The politicians are not at all trustworthy people; you need to fear them more than you fear a leopard (Mr Jamal, us, 8. 243-260)

This teacher emphasizes a number of factors as necessary prerequisite for effective implementation of EE. The first one is giving suitable training to teachers. Teachers hardly receive on-the-job training and, as a result, they can't cope with the current changes and the needs of society. He used himself as an example: in the 11 years he has worked he never received any training concerning environmental issues. However, he is required to teach such content in his subject. He proposed that a budget should be allocated for environmental concerns to provide resources for schools, for example to take pupils on excursions. He says that he lives in Dar es Salaam but has never seen Mount Kilimanjaro, despite it being a UNESCO world heritage biodiversity site. He emphasizes that children learn better when they experience real scenarios hands-on. The other point he emphasizes is the provision of subsidies for energy resources like gas and electricity, so that people are able to protect the forests. He calls for the government to lower energy prices, since majority of the population depends on the forest resources for energy. He thinks that politicians are not trustworthy people, who make empty promises, but says they were capable of doing things if they want. This teacher seems to have lost faith in politicians and says they are all the same. He has no hope in anything changing, despite the new president, who has only been in power since 2015. He is interested to see how the new president will finish his term, because he is convinced that he is just as bad as all his predecessors. Lastly, this teacher showed his anger towards political leaders and urges people to fear them as they would fear a leopard. A statement like that shows that this teacher is disillusioned by what politicians do while in office and is not convinced that there will ever be a trustworthy leader again.

Another response:

> What I can say is that every sector should stand in their positions when it comes to implementation. It shouldn't be the speaking of policy in public but nothing is done. The issue of environment each ministry should ensure its implementation and make sure the knowledge is taught in various levels. They should also provide resources. Those who are teaching must be trained. It is important also to give education to the general public especially on the effects of destroying the environment. We may be teaching children but they have parents who also need education about this so that it is more effective. It is difficult for children to tell parents what to do and sometimes parents ignore the school teaching. Curriculum specialists should guide and train its manpower on how to do it, whenever they introduce a new thing in the curriculum. Books are there from different authors and each author speak differently. They should sit down and write a basic book to be used by all schools. Children are currently taught so different from school to school and teachers also teach depending on what authors they read. They should use a standard single publisher to write from lower levels to high levels, not to confuse teachers. Many books confuse teachers because they are so different in environmental content even for other subjects. We kindly ask you to advice the government to use and work on these researches you are doing. They should stop politics in sensitive matter like education (Ms Faith, rs, 20. 214-232)

This teacher has similar views to the former urban teacher. She also seems to be of the opinion that politicians preach about policies on stage, but that nothing actually happens in the end. Her attitude towards politicians is also negative. She urges all ministries to be responsible during the implementation of EE, because she believes that it is a crosscutting issue. Ms Faith also emphasizes the issue of training and provision of resources. EE makes sense if the general public is involved and made aware of the consequences of continuous destruction of the environment. She also believes that there has never been adequate preparation of manpower, whenever a reform of the curriculum was introduced. The free market policy for private publishers of school books is also a major concern of hers and she thinks books are now lower quality and the content causes more confusion than support for teachers. Several other teachers made the same complaint. She also suggests that there should be one book for all schools and feels that politics interfere with educational matters; urging the government to make use of research conducted to improve this sector.

> First of all we should be given enough time so that we can use the teaching aids, because the children learn more by seeing, it helps a child understand more easily and keeps memory and not only teach by hearing. Study tours should be given priority; some parents can't afford to pay for the study tours. May be only if the tour is a nearby but when we want to go far many parents can't afford. In my opinion environmental education should be given to be safe from outbreak of diseases. The shortage of rain is a result of deforestation and we are the ones to suffer the consequence. I believe when people are educated we shall withdraw for many negative effects which are a result of degrading the environment (Ms Suzan, rs, 2. 109-116)

Teacher Suzan also from a rural school is not far from the issues that the other two teachers raised. She also believes that there should be better provision of resources, including a budget

for field trips to facilitate active learning and provision of EE to the general public so that they can protect forest resources and eliminate diseases.

4.2.10 Summary

In general, the interview responses reveal that all of the teachers see the importance of providing EE in primary schools. The majority of teachers believe that EE is crucial for building a strong foundation and in solving societal problems. Some of the teachers believe that the acquisition of knowledge and skills will automatically lead to action taking and will eventually lead to pro-environmental behavior. This shows that teachers have the perception that the process of EE is a linear relationship.

Another category of teachers believes that effective EE is both theoretical and practical, in a sense that the acquisition of knowledge and skills is important, but outdoor activities will support the learning process. Results also show that some teachers are convinced that, once the children acquire knowledge and skills, they will transfer their knowledge to their home life and can influence parents and relatives. Some teachers also think that there should be coordinated efforts in order to make the learning of EE effective. Teachers and parents need to work together to help the children acquire the necessary skills and values, for them to become responsible citizens now and in the future. However, the majority of teachers in the urban private schools complained that parents did not want their children to do manual labor. These schools had children from higher income families, whose parents pay a lot of money for tuition fees. Schools like that hire people to do cleaning and gardening. Teachers said that parents perceive manual activities as punishment and a waste of time. This shows that parents have not understood the importance of EE and teachers recommend that parents also need to be educated. Some teachers complained that schools are too academic and that the quality of schools is only based on academic achievement. This problem was not found in the public schools, where the majority of children are from low income families.

The majority of the teachers are of the opinion that exposing young children to EE is crucial. Some argue that the development of personality depends on the age. They perceive that sustainable skills and values call for early age learning. They also believe that early EE can determine the type of citizens the nation will have in the future. They see that positive environmental behavior can easily be encouraged if children are taught about environmental issues at a young age. Many teachers believe that EE should begin as early as preschool education, in order to achieve the best possible outcome. However, they emphasize that teaching EE in primary education is definitely appropriate, since the majority of Tanzanians only have access to this level of education.

Many teachers believe that by providing EE to people many societal environmental challenges can be solved. However, some teachers emphasize that EE can only provide a solution to a problem, if it is also taught practically. To them, learning by doing is what helps to encourage change and support people in making informed decisions concerning the environment. However, one group of teachers highlights the importance of educating the entire society, since the majority of the population is not at school, but these people are the main actors on the environment. These teachers also suggested that the government as well as

society play an important role in how effective EE is in producing much needed changes. The government must show a commitment to coordinating EE activities on all levels of society; from local to national levels.

The results also show that a majority of teachers are aware of the integration of EE content into their subjects. Some teachers said the integrated content was independent and direct, however, other teachers were not aware of any EE content in their subjects, whilst others said the content was integrated into other topics and not easy to identify. It is obvious that some teachers were not aware of the environmental content found in their syllabus although it is very clear. Some complained that the content is unclear and is in need of further explanation to understand it.

It was also revealed that the majority of the teachers were not aware of the pillars of sustainability, which are ecology, economy and culture. However, they gave their opinion on the significance of the pillars, after being told what they are by the researcher. Teachers confirmed that the pillars are interrelated and, therefore, there is a need for balance. Teachers differed in their opinions on this; some thought culture is the strongest pillar, while others said economy is the strongest. In general teachers believed that humans play a central role and determine how successful environmental protection is. While the majority of teachers believed that EE has a greater chance to achieve a balance between the pillars, one group of teachers is of the opinion that it is very difficult to achieve a balance if people are not economically empowered, so they believe poverty needs to be addressed before environmental sustainability.

Moreover, the findings reveal that the majority of teachers, from rural and from urban areas, perceive EE content as inadequate to empower pupils to become environmentally literate individuals. However, it also transpires that some teachers were not aware of environmental issues included in their syllabi and they gave contradicting information concerning the clarity and independence of content found. For example, teachers complained that EE content is not clear and requires skills to interpret it in a way that one can then pass on this information. However, it has been proven that the content is clear and, in some cases, an independent subject. Some teachers, who are of the opinion that EE content is adequate, consider the approach to teaching as the most important factor. They argued that you could have a lot more content, but if it is not taught properly it will be meaningless; but the opposite is true. They think that the content is adequate, but it requires active T/L, which is where learners involve all their senses; for example on field trips and excursions. Also, the content needs to be given as much attention as other subjects. They believe that the government´s plans for the curriculum are suitable for each level of learning, but the way it is taught is of major concern.

Teachers also regard EE content as inadequate in newly published books, when comparing them to the previous ones. According to them, free market policy for textbooks allows private publishers to publish poor quality books.

Concerning the methods of integration, teachers had varying perceptions. One category of teachers proposed the best way to integrate EE into the curriculum is to introduce it as an independent subject. They suggested that EE should be an independent subject, because the curriculum is already full, leaving little time to teach EE effectively. They argue that if EE was an independent subject, it would receive the same attention as other subjects. Another

group of teachers is of the opinion that EE content should only feature as topics in a few subjects, like social studies and science, because these subjects relate to nature. These teachers consider other subjects like mathematics, or languages incapable to integrate EE content. The last category of teachers thinks EE should be integrated into all subjects in order to be effective. These teachers believe that every individual is a stakeholder in the environment and, therefore, all subjects should have this content.

Some teachers proposed that children need to be taught the importance of tidiness and the sustainable utilization of resources like water and forests in their immediate environment. Clear conceptualization of environmental protection is deemed necessary, together with the positive and negative consequences of protecting the environment. Teachers emphasized the need for teacher training for effective teaching.

The results reveal that the majority of teachers from rural and urban, public as well as private schools use direct transmission of knowledge in teaching. Despite the fact that private schools have lower numbers of students in their classes and more teaching resources are provided than in public schools, they all use teacher centered methods, which is where the teacher dominates the process of learning. Teachers complained that schools are too academic, with a heavy emphasis on the academic performance of learners. In order to save time, complete the syllabi and still have time to revise with the pupils, the emphasis needs to be on teacher centered teaching, rather than using the learner centered approach. Very few teachers reported that, despite the challenges, they show some sort of effort to use learner centered methods, despite the challenges.

The findings show that teachers face a number of challenges in an effort to effectively teach EE. Time was identified as the main obstacle for teaching EE. According to the teachers the allocated time for EE is not sufficient. Lack of T/L materials such as textbooks and other reference books also hinder effective learning. Teachers complained that text books are basic, unclear and in short supply. Regular changing of text books is a major problem in public schools as they are not able to purchase a variety of books. It also became clear that there is a lack of training for teaching EE content. Teachers declared they never got training on environmental issues and how to best teach them. The fact that the government doesn´t prioritize environmental affairs is also a major concern for teachers, as this is one of the reasons for poor funding. Moreover, because of the location some schools have limited chances to practice learning by doing, in particular urban schools.

The specific challenges that the teachers identified gave pace for the researcher to explore whether or not these challenges have an impact on the teachers' motivation and their professional development as explained in the third research objective below.

4.3 Teachers' views and perceptions on motivation and professional development on environmental education

This objective aimed to explore teachers' views on their motivation both internal and external to teach EE. The researcher wanted to know whether teachers were motivated to teach EE content by internal or external influences. Internal motivation is the self driven will to teach environmental issues, while external motivation depends upon outside forces or reinforcement to do something. Furthermore, the teachers were asked about the status of their

professional training, which determined their competence in teaching EE. The interview also captured the teachers' views on what is an ideal way to improve the implementation of EE in schools. There were two categories under teacher motivation; *internal or intrinsic motivation* and *external or extrinsic motivation*. Other categories were *teachers' professional training* and *ways to effectively implement EE content in primary schools.*

4.3.1 Internal or intrinsic motivation

In this category teachers claimed that they teach EE content because they like it and value the environment. Some interview responses said:

> Personally I love the environment because I was brought up in a school that taught us to value the environment (Tabora boys' school). It really irritates me when I enter a class and there is a lot of litter down, they must clean first (Mr Haroun, us, 9. 65-67)

This teacher connects his motivation to the experiences he had when in school. His passion for the environment was developed when he was young and that is how his inner motivation developed. His response shows that the environmental knowledge and experiences he gained at school helped him to form positive environmental behavior, which is why he gets irritated with litter in his class. This suggests a comparison between the school he attended and the one he is teaching at and it sounds like he feels the environment had higher value at his former school. However, it is difficult to prove his words since there was no observation carried out.

Another teacher shared what motivates her. She said:

> To be sincere I like very much to teach about environment with all my heart. I like gardening and planting flowers I like my children to know that, they should know these things from home and not from outside. There are some countries if a child drops garbage anyhow they know that child is new, not from that place, or to pass in the wrong side of the road where you are not supposed to pass. So if we give them education on how to dispose waste, how to cross the road, keeping themselves clean and their environment, this will stay for the rest of their lives (Ms Hadija, us, 11. 92-97)

Teacher Hadija strongly emphasizes the deep inner motivation she has for teaching about environmental issues. She has a passion for gardening and wishes her pupils could learn about gardening, preferably at home.

She deems the family to be the basic institution, where all good and bad behavior can be formed. She also expresses how important it is to train and teach children about environmental issues. She said that when such values form at an early age they become part and parcel of their lives. She gives the example of countries where environmental concerns are taken seriously and where it is easy to identify new comers from a country where environmental issues are not taught. She supposes that behavioral values need to be worked on and formed as early as possible.

To show how devoted he is, teacher Kisima emphasizes that he doesn't only cover what the syllabus prescribes but teaches anything current and significant for the children. During the interview he said:

> […] I really like to teach about it because it is the environment that I live and the children live, without regarding that it is in the syllabus. You must teach them even things that are not in the syllabus, because there are a lot of issues that are not in the syllabus and the experience them in their daily lives. For example you may find a pupil in school but when he/she home finds the farther is cutting a tree to burn charcoal. The pupil will tell the parent that is not good to the environment unless you first plant another tree and see it growing before you cut that one. So it is important. Or you find a pupil opens the tap and leaves water running , then you teach him/her that close it and when you go home and see something like this you do the same (Mr Kisima, rs 17. 90-100)

Teacher Kisima claims to go beyond the content that is stipulated in the syllabus, because he believes that the syllabus does not cover all situations that life has to offer. He mentions examples of daily life experiences like deforestation, which is a prevalent phenomenon in rural areas, and water mismanagement. He says that children need to learn, be aware and understand the consequences of destroying the environment.

The responses from these three teachers also represent the views of other teachers and show that they are intrinsically motivated to teach about environmental issues. However, it seems that they wish to do more than they actually do. This was revealed in the responses of the majority of teachers in former views, where they complained about the lack of resources like time and money, and even the lack of space to conduct environmental activities, especially in urban schools. This implies that the majority of teachers end up teaching theoretical knowledge about the environment, which has little impact on forming their character.

4.3.2 External or extrinsic motivation

Under this sub section, only one teacher declared that she acts solely on external motivation. This is what she said:

> Personally I teach because there are elements in the syllabus, but I have no personal motivation, I just teach it as a subject, but I like the subject because it is also a part of life and healthy (Ms Upendo, us, 23. 75-76)

This teacher declared that teaching EE content is an obligation for her. She openly admits that her motivation to teach EE comes from the fact that it is her duty and not because she likes the content. However, she later admitted to liking the subject, due to its importance in life. This shows that this teacher understands the importance of environmental issues, but she does not teach willfully. This implies that a person may have knowledge on some issues, but this does not guarantee that the person will take action.

The level of training is one of the factors that influence their motivation to teach. This is explored under the category “teachers’ professional training”, as presented in the next section.

4.3.3 Teachers’ professional training

This category was of great importance, in order to understand the status of teachers who are expected to teach EE effectively in schools. Teachers were asked if they were trained to teach

environmental content during their pre-service or in-service periods. Teachers' professional training determines the ability of teachers to teach and even their motivation. This particular aspect carries a lot of weight when it comes to the quality of teaching expected to change pupils' behavior from unwanted to more desirable behavior. Despite the results this aspect can bring, the majority of teachers responded negatively on it. Teachers were first asked if they had received any on-job or in-service training in the school where they are teaching. During the interview teachers said:

> No, I haven't. I think it is given low priority. There are some subjects the government puts more priority they forgot that we cannot go anywhere without valuing the environment. So they give training for other subjects like English, Maths, Science, but environment should go hand in hand with other subjects. A teacher needs to have a wide understanding so that he/she can help the children. Many teachers don't have wide knowledge of this issue, they need to be trained (Ms Faith, rs 20. 183-189)
>
> No for sure I have never, and I think they just don't give it priority, they just don't see the importance of it. There are things that they give priority but that one they just neglect it. And that's why the environment becomes poor and poor (Mr Jacob, rs, 1. 127-129)

These two teachers from rural schools have a similar argument; that the government does not prioritize environmental concerns. They emphasize that the government deliberately gives priority to other subjects. For example, teacher Faith mentions that subjects such as Mathematics and English valued higher and teachers receive training in those subjects. She says that ignoring environmental issues as a nation hinders the successful implementation of EE in schools and teacher Jacob added that ignoring such an important issue is a major reason for the ongoing deterioration of the environment. Teacher Faith wants the government to note that environmental concerns are crucial for the nations' wellbeing. She also pointed out that teachers will never do well unless they were equipped with knowledge and skills on EE. She declared that the majority of teachers are not trained on this particular subject. This claim is proven by the interview responses from the urban teachers too.

During the interview they responded:

> No, I have not got any. I'm just using experiences and use my primary and secondary education knowledge I got. So this is the real situation I use what I have and try to do things practically. I can't speak a lot about this you know issues of finance are critical and I have to just be polite on that issue. I just say that I have never been given any training I just use what I have and help others with the little I have. To take me to seminar now you need funds for that, and it's not true that funds is not available. It is available only that they have other priorities. So I think there are only few who are going to training and we cannot wait for those to come back and do, we just do what we can with the little knowledge that we have (Mr Jamal, us, 8. 192-200)
>
> Aaah, about environment no, I have not, I just teach through experience. I have got a workshop for science subject not for this. I just got about the teaching of science subject and road safety in Morogoro, the rest I have not got any (Ms Hadija, us, 11. 124-126)

The responses from these two teachers show that they teach EE using only their experience they have as teachers. Like other teachers, they are also of the opinion that they have never

received any form of training to enable them teach EE content effectively. Teacher Jamal emphasized that he uses his primary and secondary school knowledge to help him teach EE. For him to mention these levels of education and not the teacher training college he attended signifies that he did not receive training to teach environmental content. He also assumes that a lack of financial resources is the main obstacle for not receiving on-the-job training. However, he says he knows that funds are available, but the government gives priority to other subjects they perceive to be more important than environmental issues. Teacher Hadija says she attended a workshop to help her teach science. It shows that priority for training is placed on a few subjects. Teacher Jamal concluded that teachers rarely receive training and the best solution to this problem is to use the knowledge you have, instead of waiting for training that may never happen.

Teacher Annah has a different opinion as to why teachers are not given training. She said:

> I have never. I think they just think environmental issues are just normal things and known. They think the teachers will teach because they have the books (Ms Annah, us, 10. 114-117)

According to her the environment is taken for granted and, therefore, the educational authority just assumes teachers will teach EE, as long as they have books. She considers this assumption to be a major reason why teachers do not receive training and are not updated on current issues.

A few teachers responded slightly more positive, although the training they received was not sufficient to ensure competence. These teachers had this to say:

> I got training when I was in secondary school concerning wildlife and we started with environment. We have also an environmental club here. But I have not got trained as a teacher here (Ms Suzan, rs, 2. 88-89)

This teacher made a reference to her lessons she had in secondary school, which she thinks has helped her as a teacher. The environmental club at her school has also exposed her to environmental concerns, but she has not received training as a teacher. This answer corresponds to the responses of most of the teachers.

This teacher narrated:

> There was a time a guest from one NGO called floresta came to our school and gave us education on environmental issues. We got knowledge how to conserve the environment and we planted trees too. It was just like instructions that the area is destroyed and we live in a very important area around Kilimanjaro forests, and we were taught the importance of conserving the environment. So after that we had activities with our pupils to plant trees. They came with trees for us to plant (Mr. Kisima, rs, 17. 129-135)

The only support this teacher received on-the-job was the knowledge he gained from a guest speaker from a Non-governmental organization (NGO). The emphasis was on the conservation of forest reserves and their surroundings. He says the opportunity to practically participate in planting trees with the pupils was a great experience. However, this cannot be considered as training initiated by the school, but rather as an effort by the NGO to conserve the Kilimanjaro forests.

Teachers were asked to give their views on whether the training they received in teacher colleges had environmental content, or whether the knowledge they acquired there helped them to teach this component.

One responded:

> In those days people were not aware of the environmental degradation, actually the population was low. You know over population matters the human activities increases and high demand of resources. In the past the demand was low but now the demand is very high, people are cutting trees, constructing houses, infrastructure like roads and so on. Pollution from industries and vehicles. So environmental education is daily not to wait the syllabus (Mr Japhet, rs, 3. 125-129)

His response shows that environmental issues were not as critical as they are today, in part due to a lack of awareness and lower population. Therefore, he thinks that is the reason instructions in the colleges did not really cover that aspect. He sees the need for more environmental content now due to an increased population, which exerts pressure on environmental resources. According to him, challenges of deforestation, industrial pollution, infrastructure construction necessitate the need for EE. This teacher is of the opinion that EE is a lifelong process and not limited to certain times in our lives. This teacher has been working for 13 years and, according to him, environmental issues were not as critical before.

Another rural teacher commented:

> It is a long time I don't remember but we were planting trees. For now, it's not enough and there is too much politics in educational affairs, the politicians promise they will do this, they will do that and they do nothing. For example there is too much politics in determining the books to be used in schools. These 3 or 4 books I have given you is a political game, but all those who can prepare books for schools let them prepare, but there should be one basic book that covers the whole syllabus and be used in all schools in Tanzania. But currently they produce several books and the teachers are instructed to have them all at my own costs, and some of them are very shallow. You may find only one book suffice the need (Mr Rashid, rs 5. 97-105)

Teacher Rashid has 30 years' experience as a teacher and could not recall if they were taught about environmental issues in college but he does remember the tree planting activity. This shows that long term memory is enhanced by learning-by-doing. Over 30 years later he could still recall the act of planting trees in the college. This signifies the importance of active learning. However, he thinks that the knowledge they received was not sufficient for the current environmental situation. Then he shifted his attention from the things he learnt in college and pointed out that educational affairs are interfered by politics. He said politicians have a tendency to make empty promises on educational issues; he insists that they never fulfill their promises. He feels that the poor quality of school books is a result of a political game with private publishers. Moreover, he insists that there should be a uniformity of books used in all schools. He complained that asking the teachers to buy several books at their own expense increases the burden on teachers.

In general, almost all the teachers showed their concern of a serious lack in EE training and they suggested ways in which EE could be effectively implemented. This is covered in the following section.

4.3.4 Summary

In general, the majority of teachers showed that they are motivated to teach EE in their subjects, but there are also many challenges that do not allow them to teach effectively. The challenges that the teachers mentioned can affect their motivation to teach EE. One of these factors is their competence to teach such content.

Most teachers suggest that both pre- and in-service training are crucial to the successful implementation of EE. Training has to be given in tandem with the provision of T/L materials and the quality of books for learning must be ensured.

The majority of teachers have similar concerns on what they perceive to be the major milestones to be overcome, in order to facilitate successful implementation of EE. Many teachers are convinced that political leaders are irresponsible and play a role in the deterioration of the environment and in the unsuccessful implementation of EE in schools. Many teachers see politicians as irresponsible towards environmental issues and in general educational matters in the country. They don´t prioritize environmental issues, despite the fact that research has shown that the state of the environment is deteriorating. Consequently, the provision of resources like has been very poor and human resources have hardly received any training in this area. Teachers claim that the government gives priority to subjects like mathematics, English and science. The government appears to assume that teachers can teach as long as they have books. Unfortunately even the books are unavailable. Teachers use their own experience and some knowledge they acquired during their own school times to teach. Few teachers also received some support from non-governmental organizations. Teachers emphasize that times have changed and a lot of environmental challenges are increasing globally, therefore, the government needs to establish concrete strategies to provide quality teacher training to be able to cope with these challenges.

Teachers think that the provision of subsidies for energy resources such as gas and electricity would reduce the magnitude of deforestation. This needs to go hand in hand with public education.

4.4 Views and perceptions of heads of schools and curriculum specialists on integration of EE and their role in teacher motivation

The fourth objective explored the views of heads of schools, together with the curriculum specialists, on the integration of EE in primary schools. It also covered their role in how they motivate teachers to teach EE content effectively. The categories under this section included heads of schools and curriculum specialists' views on *the rationale of EE in primary schools, implementation and motivational strategies for the teachers, the challenges for effective integration of EE in schools* and *the best way to integrate EE in schools*. The results from all those categories are presented as follows.

4.4.1 Views of heads of schools on the rationale of EE in primary schools

Interview responses from the heads of schools revealed that all are of the opinion that EE is very significant in primary schools. They gave various reasons to justify their opinions. Here are some of their voices:

> Environmental issue is so much emphasized because it brings effects to us all, and we see how air pollution destroys the ozone layer; as a result we are affected by the direct sun rays that come to us, in our plants etc. so that's why this issue need to be more emphasized. (HoS 1. 3-5).
> She went on to say:
> To place environmental issues in the curriculum is very wise idea because we as a school we raise these children from young age. And when you teach them in young age they don't forget easily. But in the syllabus there is very little found to give them high understanding or make significant change in their lives. The importance of environment is for everyone, and because we have the great army with us. And we believe whatever we teach them in school they apply it at home and the community at large. So I think it's better to keep on teaching it in schools because these are our great ambassadors where they live. (HoS 1. 21-29).

This headmistress showed her perception on why EE is very important by pointing out some of the effects associated with environmental degradation. She says if we destroy the environment everyone will suffer the consequences. She emphasized that direct sun rays, due to ozone depletion, affect all living things, both humans and plants. Hence, teaching EE in primary schools is ideal. She believes that children's personalities develop at a young age and knowledge acquired at an early age is generally imbedded for life. However, she regrets that the content found in the syllabus is not sufficient to equip learners with the necessary knowledge and skills to deal with environmental issues. Pupils in primary schools are a potential human resource that can contribute a great deal towards environmental conservation, when empowered. She also believes in the trickledown effect, where the knowledge children acquire at school will be transferred to their parents and relatives. The majority of teachers had the same view as this head mistress on the topics of early education and knowledge transfer.

Another head of school said:

> In short I can just tell you that environment is life. Environmental pollution has a lot of side effects including healthy, economic and even social effects. We have seen how the temperatures are rising it is because of environmental pollution, destruction of water sources, as you know water is everything, mmmh. (HoS 2. 18-21).
> She added:
> Currently there is a lot of pollution, for example many water sources are destroyed due to the increase in factories and their use. Then we hear a lot of complains in the mining centers, they pollute water sources. Dirty water is left running and mix with clean water and people use this for their daily lives. When dirty water runs in water sources they kill the living things found, for example fish and others and when we drink, bath or even step on it, it is poisonous to our health. You should have started from the lower level, those children are small but there is something they learn. First of all to give them precautions, that if you use this dirty water this will happen. The importance of protecting or keeping our environment, why do we plant trees, why water them? And recently in the school council they wrote to me that they need water because the flowers are drying and water is not adequate. So they should know what should be done in such situation. So it should start in a very lower level (HoS 2. 34-49).

HoS 2 shows how significant the environment is to living things. His opinion is similar to the first HoS, that environment is life and if we cause destruction to the environment is to our own detriment. He also talks about the side effects of pollution and says it will impact all spheres of life; economic, social and health aspects. One of the effects he considers to be due to the destruction of the environment is the rise in temperature, of which he says pollution is the major cause. Destruction and contamination of water sources means destroying our own lives, because there will be no life without water. He points out that water pollution is a major issue and mining activity contributes to this pollution, which has serious negative effects. So he suggests that there is a dire need to educate children about environmental conservation, as well as the consequences of environmental destruction. His views on issues of pollution and the importance of early education are similar to HoS 1.

The interview excerpt from HS 3 further explained:

> […] aaaah you can see the effect of the climate change, you can see floods, drought, that is prolonged drought and severe floods as the effects of climate change and these are as a result of degradation of the environment, so I think what we hear today is the current campaign for environmental awareness is as the result of the effect that have start featuring now. (HoS 3. 36-46)
>
> He added:
>
> […] if we want change we have to change from this tender age they should be aware of the effects of whatever they do to the environment and they should know how to conserve it for their future. But if we don't teach them at the early age, if we don't train them at the tender age it will be very hard to change them at an advanced age. For instance today, the children we have today are not aware because their parents were not very enlightened, so if you want to train the children the parents don't know the importance of what you are training, because they were not trained in their tender ages, they did not learn this, to them it is something new, so when you bring something like that to their children they feel as if what you are bringing is a punishment or waste of time and not important, so it is very important for them to learn at this age for the future. If we real need transformation it has to start somewhere it has to start from home, and we should also apart from this young children we should also try to get the parents, the parenting group/age they should also be trained, they should also be enlightened with information (HoS 3. 75-88)

This HoS sees that climate change, and its associated impacts like floods and prolonged drought, are due to man-made environmental degradation. He is of the opinion that real change and a better environmental state will be achieved by educating the younger generations; and he says if they don't get the proper education at an early age, it will be very difficult to change their behavior in adulthood. He says one reason why many children are not aware of the environment is because their parents did not receive EE as children. Therefore, parents don't see the importance of EE for their children and perceive hands-on activities as a punishment and a waste of time. To achieve real transformation, parents should also be considered and be given EE, as they have a big influence on the education of their children. He sees the importance of educating both children and parents. This idea is different from other heads of schools, who said that once children are educated they will transfer this knowledge to family members at home.

An excerpt from the interview with HoS 4:

> It has been significantly kept in primary level and it helps but emphasis should be there. This environmental education is not in all subjects leaving out Kiswahili and Math but in Kiswahili there is environment in comprehension, composition. So I see it helps in relation to primary level. More emphasis should be made. They should find other things for teaching the children about the environment. The things should come from the environment. For example you are teaching a pupil about desert and he has never seen a desert in Marangu he does not know it. You have taught about a lake maybe until he sees it on the map, he has not seen it (HoS 4. 22-29).
> He further added:
> It has importance to primary level because when educating the pupils about environment they also go and teach their parents, grandparents, guardians and all those who stay with them at home so it has importance (HoS 4. 34-36).

The opinion of this head teacher on the significance of early education is similar to other heads of schools, but he emphasizes that EE should be integrated into all subjects to have the greatest impact. He also gives weight to active T/L; for example taking children field trips to make hands-on experiences. He agrees with HoS 1 that what the children learn at school will automatically be transferred to their families and communities around them.

The opinions of the heads of schools concerning the rationale of EE in primary school were quite similar to each other. Moreover, their opinions coincided with the opinions of most of the subject teachers. These results imply that the heads of schools, together with their teachers, place a great emphasis on the need to provide EE in primary schools, because it targets a huge human capital and their young age is ideal for effective training of positive environmental behavior. The heads of schools also explained the strategies they use to implement EE in their schools, as featured in the next section.

4.4.2 Views from heads of schools on the strategies used to implement EE

The strategies to implement EE are the ways teachers and students actively teach and learn about environmental issues. The HoS identified several ways in which they ensure EE is implemented. Some interview responses from HoS concerning the strategies they have implemented to ensure the successful implementation of EE read as follows:

> First of all we have a school motto that says “don’t litter the environment” So the students become watch dogs to one another, if they see them litter the environment. But then we have “mazingira club” which helps to motivate people in the school. We have kept dustbins close to classes so that it’s easy for children to throw things. But we also separate garbage, plastic ones with the rest. The plastics are taken by people who take them to the industries for recycling. The rest of garbage is taken by municipal trucks. When the trucks don’t come on time the school hires the private companies for that, in order to ensure that our environment is kept clean. We also have a gardener who helps to keep our gardens because the children are from the urban area and they take so long to arrive to school due to traffic. So when they arrive they go to class straight because there are people who are doing cleaning of the school and make it ever green (HoS 1. 33-42).
> She added:

> Yes that is the main reason why they are not doing a lot. Many of them stay far and the road infrastructure is not good especially in the morning. For sure we are trying even if it is for five minutes; we don't just leave them to do nothing. Activities like fetching water and likes they don't do them. But picking up litter and mopping some spilled water they do (HoS 1. 47-55).

This is an urban school where, according to the headmistress, they have several strategies in place, to ensure daily environmental activities in school. According to her, the school motto "don't litter the environment" encourages a sense of awareness in individual pupils, but it also makes them watch over each other, to ensure there is no littering on the school compound. Dustbins placed close to classrooms facilitate keeping the school environment clean. The Mazingira club is also a helpful strategy to encourage interest in environmental affairs. Moreover she said they manage their waste well by separating recyclable plastic materials from residual waste that is picked up by municipal trucks. She emphasized that when the municipal truck service is delayed they hire other trucks to ensure the environment is kept clean. However, pupils have little to do with keeping the compound clean or doing gardening, as the majority live far away and due to heavy traffic they have minimal time for hands-on activities. But she said the little time they get, they engage pupils in light activities like picking up litter and mopping. These results suggest that this head of school is aware of environmental concerns and she has tried to create strategies to implement EE in her school.

> Yes we have a general school motto, but we have rules that help us to keep our environment, conserving our environment. Aaaah, those rules are the ones that help us and guide us in what we are supposed to do. For example we talk of litter, plastic bottles, plastic papers, those are the ones that are not bio degradable/decomposed, that is the worst litter right now, so we have rules that if you find a bottle on the ground pick it up and put it in the right place, so that is our strategy (HoS 3. 91-97)

This HoS has some similar strategies to HoS 1. They also have a school motto; conserving the environment and garbage separation is one of the rules they have implemented. According to him, plastic waste is dangerous, as it does not decompose. These two heads of schools perceive the topics of littering and garbage separation as critical for EE. However, gardening is used more in school 1. Other heads of schools point out that the act of planting trees is an important activity in EE. During the interview they said:

> As a school we have plans of planting trees at the ground and open places. We plan to do this on the rainy seasons. As you know environment is not only about planting trees, we also have plans of keeping dustbins that will surround the school. We are using dustbins that are here, small dustbins or picking up the rubbish and taking them directly to the pit (HoS 4. 48-53)
>
> We implement environmental education first by cleaning our environment and planting trees so that they look attractive. We also cooperate with some NGO's which are outside for example 'give me a broom' NGO, there is another one from the University here, but forgotten the name. So we cooperate with those. Our pupils also have got their club and we have environmental teachers too (HoS 2. 57-61)
>
> She also commented on content adequacy and said:

> Mmmm in reality since it is only in few subjects, it is not adequate. When it is adequately placed in the curriculum them they will learn more but it is not at all adequate (HoS
> 2. 52-54)

The main activity these two heads of schools use is planting trees. School 2 is in a rural area, while school 4 is located in an urban area. Although planting trees appears to be an activity more suited to schools in rural areas, this head of school considers it to be important in urban area too. However, the majority of the teachers from urban areas complained that there is no space for environmental activities. Keeping the environment clean by sweeping and picking up litter is also practiced in these two schools.

Suffice it to say that, with their implementation of strategies, all HoS show that they understand the importance of EE in a, more or less, similar way. They have narrowed the perspective to the level of daily routine activities that are conducted in a school. Since they are leaders in primary schools, teaching children how to manage and keep their immediate environment clean is paramount. This implies that the HoS understand the value of teaching children in a clean environment, as there is a relationship between the status of the environment and human health. The majority of teachers also had similar views when they responded on the subject of things primary school children should learn in EE.

When asked to confirm whether it is true that children in private schools have to do less EE activities they had this to say:

> Yes that is very true, you know the children we have in private schools come from the middle and upper class and they are not used to manual work at home, even in school they don't do any manual work, so when you say that whatever need to be done to conserve the environment, some requires them to work manually, they are not exposed to that, their hands-on activity, they cannot do that. If parents find their children doing it they complain they take it as a punishment. So it is true that they are not doing enough. The little that we can do is to train them to see the importance of it. We actually try as much to make them appreciate the importance of that (HoS 3. 103-111)

This HoS confirms what the teachers reported. He supports the opinion that children in private schools hardly ever engage in environmental activities, since the parents interpret these as a punishment, or a waste of time. He claims that these children also do very little in their own homes. He also supports the view that high family income contributes to poor perception of EE activities. This shows that the parents have the power to decide what their children learn at school, as long as they pay for private education. This headmaster also shows that they don´t do anything significant to enable pupils to learn about environmental issues.

Another head of school had this to say:

> It is true teachers prepare children for exams and if there were no exams even the children would not work hard. So each teacher is striving to make sure that at the end of the day pupils pass exams, because it is the measure of performance we use (HoS 1.

This response shows that the emphasis is placed on enabling pupils to obtain academic achievements, rather than practical experience. This indicates that passing exams is the main priority for this HoS. This response also shows that teachers have a big task to ensure that pupils pass their exams. For teachers to be able to do this effectively, they must be motivated to do their job. This is revealed in the next section as HoSs explain the strategies they use to motivate their teachers.

4.4.3 Motivational strategies for teachers

Effective implementation of EE in school requires cooperation between the HoSs and the subject teachers. When asked about strategies they use to motivate their teachers on the topics of EE, like seminars, workshops, or any form of in-service training, HoSs had various opinions on how to motivate their teachers:

Teacher training

This is a one of the very important aspects that determines teacher motivation. Teachers who are not trained lack competence and self-efficacy, which affects their motivation to teach. The interview responses from heads of schools on this particular topic read as follows:

> For sure we don't have much we can do only if the municipal have prepared such training for environmental teachers or other departments. If not then we don't do anything for them……this school doesn't receive government funds to run its activities. May be curriculum guidelines only but the school is run by parents (HoS 1. 88-95)
>
> Actually to be sincere I have not motivated teachers but I motivate pupils, for their participation those who lacked in that, they are motivated and encouraged……. Nothing makes it difficult it is only that I have not had that policy (HoS 3. 137-142)
>
> Training more than the clubs I have told you, we don't have. Had it been it was taken seriously, then they would give training so that the effects are not so much. So train is very important they should be given, environmental education must be sustainable and effective (HoS 2. 73-81).
>
> She added:
>
> The difficulty lies in the capacity building, the government is always complaining of no funds. If you need to train teachers you need funds to pay them and transport, mmmm (HoS 2. 95- 97)

The responses from these school leaders show that they don´t have a strategy to train or update their teachers. The responses of HoS 1 and HoS 2 show a total reliance on the government to provide training for the teachers, because that is the government's job, although the school of HoS 1 is privately run. According to them the government is supposed to provide training for the teachers, but is not doing so. The main issue here is lack of funds which seems like a common issue for the government. Despite the fact that the school of HoS 1 is managed and run by parents and tuition fees are very high (300,000 Tshs) they do not have any plan in place to train or update their teachers. These leaders seem to understand the importance of EE and updating their teachers, but they do not show any effort to provide help.

HoS 3 declared that he never prioritizes the training of teachers, despite the fact that his school is owned and run privately and the tuition fees are more than one million Tshs (1 euro

is ~ 2500 Tshs). Usually, privately owned schools are expected to continuously train their teachers in order to ensure high quality teaching, as this is seen as a criterion for good education. So this response could mean that EE is not prioritized, as it is not a subject that is graded. This HoS decided to motivate pupils more than the teachers and he assumes that if they participate in environmental activities it will motivate the rest of the people around the school community.

These results show that there was no difference between private and public schools when it comes to efforts to motivate the teachers, despite the fact that they have different sources of finance for their schools. It shows that the assumption that teachers will teach, as long as they received pre-service training is everywhere. Teachers are not given any help to improve the quality of teaching in EE and this could lead to poor teacher motivation in this subject.

> Yes, it is important. If the headmaster encourages the teachers they will also go and encourage pupils about the environment. And also the pupils will go to the community and encourage others about environment. We motivate by telling them that there is a great significance by conserving the environment. In health, in mind and others (HoS 4. 57-63)

He added:

> It is not a must for the government to give funds because environmental conservation is of different kinds. There is planting trees, you can get them, they are available. If they are populated in one area you move to another area, sweeping the surrounding or shortening the grass. This does not require funds, you just bring slashes and you do the slashing (HoS 4. 70-73)

This HoS has a different opinion from the other leaders, despite the fact that it is a government school where there are no tuition fees. He does not seem to rely on the government as much for support. He thinks there are many forms of EE and, therefore, it was the task of headmaster to tell the teachers and pupils what to do. To him EE is a simple task that does not really require training. He sees EE activities like planting trees, sweeping and cutting grass as sufficient. This view appears to be a narrow understanding of EE. It sounds like the immediate environment is an important factor for this headmaster and the majority of the interviewed teachers too. EE is more than these activities. Teachers need to be trained and EE must be viewed in a broader perspective as presented in literature review. To explore more about effective environmental learning through hands-on activities and the importance of study tours in schools is examined in the next item.

Study tours

Study tours are very important to allow pupils to construct and share their knowledge and skills, as it allow all the senses to be used, helping them to develop positive environmental behavior and become responsible citizens in the future. When asked whether they plan and facilitate study tours to motivate their teachers and students to learn actively in nature, they said:

> As a school we planned that each grade will have two study tours per year. So normally we go every year but not necessarily for environmental education but all the

> things that they have learnt theoretically. For example there is a well that never dries up, yes there is, but we say they should go and observe nature. If there is a place they can go, they go but it takes 1 or 2 days. For grade seven for example we are used to go and see the lives of animals, but those ox-bow lakes we have never seen them. Currently also the parents have fear to let their children go for study tour, if they allow them may be we go and come back the same day (HoS 1. 110-119)
> The tours are important and they are required, our children need to see the effects of the real degradation of our environment, but we have limitations. The first limitation is time. How is time limited? These days schools are more academic we spend most of the time in class. Because what is measured is the academic performance not the knowledge that they have acquired. So if we take more time in learning outside then the academic work will pass, we shall fail in the academics and we shall be failures (HoS 3. 172-178)
> […] for now these tours will die completely because they were supported by parents, so when they are told education is free how will they do study tours? It is impossible, so now these study tours are dying totally (HoS 2. 101-103)

Interview responses from these HoSs varied significantly. While HoS 1 said they have scheduled study tours at least twice a year for each grade, HoS 3 is of the opinion that it is a waste of time, as schools are too academic based to consider study tours a priority. Even though he confirms the importance of study tours, as the headmaster he does not give them much value. Teachers usually obey what their leader tells them to do, even if at times it doesn't make sense to them. Therefore, if the HoS does not support the concept of study tours it is difficult for teachers to go on any. HoS 1 states that each grade goes on two study tours a year, but they don´t necessarily target EE. This shows that EE is not given much weight. Due to the nature of EE there is a lot to learn in the environment and man-made infrastructure like industries. This shows that the planned study tours are not adequate for effective learning of EE. HoS 1 also explains that they plan a long distance tour, which costs a lot of money and not all parents can afford to send their children . This shows that some children will not be able to have the opportunity to learn on such tours. Parents are also concerned about such long trips due to current world insecurities. HoS 2 fears that there will be no more study tours, as parents have been told that education is free and then they are supposed to pay for study tours. HoS 1 also used to organize study tours but they will probably not be able to go anymore.

These results indicate that government schools appreciate and have more time for study tours than private schools. HoS 3 suggests that this could be due to the argument that private schools need to prove their academic performance to attract more pupils and therefore spending time on study tours is considered a waste of time.

The responses from the majority of teachers show that there is a critical lack of T/L materials in their schools. To verify this finding, HoSs gave their views on the situation and these are presented in the next section.

Teaching and learning materials

The presence of T/L materials like text books, real objects and models can motivate the teachers to perform their teaching duties well. Heads of schools play a role in facilitating this. During the interview, the majority of teachers complained that there has been a tendency to change textbooks and guides for teachers regularly, and the biggest concern is that the quality of the new books is a lot poorer than the old ones. The issue of scarcity of T/L was also a big concern for a lot of teachers. For the aim of triangulating the information from teachers, HoSs were asked to explain their view of the situation. They had this to say:

> In our school is not a big challenge because we reference books which every student need to have them, and also we have extra books which the school buys so that the teacher does not rely in only one book. So we have several books to use and even if the teacher finds a very useful book then she/he can buy it and will be refunded by the school. So it's up to the teachers to bring forth their requirements and the school is ready to provide such materials. We have a lot of books (HoS 1. 137-141)

She added:

> I think that is a challenge to them because they receive very little money from the government for that. But as we are saying teaching is a 'calling' then one should use own resources to become better teacher to make your work good. Good teachers will not see this as a big issue they will look for materials to improve their work and give the children what they are supposed to get and not to just to complain (HoS 1. 144-148)
>
> We as a school go around shop around and look for the best books that we can use, we recommend ourselves. In the government they don't have variety; they don't have the freedom of choice. There is lobbying in the procurement and I think there is not enough consultation; they don't consult teachers on what they need, because of what they can provide. Government schools are not free, with us we decide on what we want, we shop around we look for the best books, we get samples of these textbooks we give the teachers then they discuss them and come with the best book that is in the market, and they recommend we need this we need that depending on what is in the books (HoS 3. 189-197)

These two HoSs are of the same opinion. They perceive the problems with school books to be a problem in public schools. Results show that teachers have the liberty to decide which books to use, but the situation is different in public schools. The issue of T/L materials especially books has been a concern for many public school teachers. There is a scarcity of books and the books are often of poor quality. What these two leaders say, confirms what teachers reported. Issues of poor funding and lobbying by private publishers appear to be the main problems. Teachers also complained that the books are very basic and that there is corruption in lobbying by publishers. These results show that government schools suffered from this problem more than private schools. HoS 1 added that teachers should not wait for the government to do everything; committed teachers will look for materials themselves. But according to the teachers their income is too low for them to buy materials for themselves.

HoS 2 confirmed that the issue of textbooks is a problem, but added that it is in the process of being solved. She said:

> This is a problem yes, but they have now started with the grade I pupils. So the government is issuing books again. It is a problem although it will be solved slowly, because they have started. I think until now may they have gone up to grade III (HoS 2. 113-116)

This school is a public school and the responses coincide with what the HoSs and teachers from private schools said concerning the problem with books. She also believes that the books published by the government are better than those from private publishers. The teachers agree on this. She hopes this problem is on the way to being solved, as the government has started to intervene in the free market policy, which is what the teachers reported to be precipitating the purchase of poor quality books. This HoS did not say how she attempted to solve this problem as the HoS, she simply confirmed that there is a problem.

These results show that teachers who teach at private schools are likely to be more motivated to teach EE than teachers at state schools. This reflects the opinion of some teachers who reported that the absence of T/L materials is one of the main obstacles in teaching EE effectively.

Teachers presented the main challenges they encounter during the implementation of EE and HoSs disclosed the challenges they face.

4.4.4 Challenges for implementing EE

The researcher also wanted to find out, whether the challenges that teachers face in the effective implementation of EE coincide with the challenges that HoSs face. Some HoSs also presented other challenges they encounter while implementing EE and performing their daily roles. These were their words:

> The major problem is the few rooms we have so the classes are congested and it becomes so difficult for the teacher to handle such a class or even mark their class work at a goal…… when the teacher is in class, that time is not enough to interact with individual pupil (HoS 1. 156-160)
>
> There is a need to change the mode of evaluation; I think the continuous assessment is better than the summative. Environmental activities need to be evaluated. The other limitation is finance, some of these places we are talking about visiting require funds, there are costs incurred, we shall have limited funds to visit all the areas we would like to visit, and there is no government subsidy anyway. If you ask parents to contribute every time is also a problem they think you are making business out of it (HoS 3. 181-186)
>
> In my opinion there are many things that hinder me and anyone, to encourage about environment For example people's behavior, I think I am understood. For example people's behavior, you tell someone stop cutting trees, he tells you, I have been cutting trees since I was young till today, where will I get fire woods. The environment; you find the environment is dry you tell someone not to cut trees he tells you how will I live? You tell them my elders if you cut trees it will result to desert. If you help him with alternative than destroying the environment he will stop destroying (HoS 4. 158-167).

He added:

> You are told not to rear cattle here then show them another place. Where will they rear cattle while you have not shown him another suitable place? (HoS 4. 189-190)

These HoSs have different concerns about the challenges they encountered. According to them effective T/L cannot be ensured as long as these challenges exist. HoS 1 thinks that if there are too many children in a class the quality of learning is affected and it is difficult to acquire necessary knowledge, skills and values to encourage positive environmental behavior. Therefore, school infrastructure is a major factor in promoting or hindering EE. She says that it is difficult to facilitate classroom interaction and individual attention if the class size and the teachers work load are too large. She considers the scarcity of school buildings to be an obstacle for effective EE. HoS 3 has other concerns; in his opinion the way evaluations are done at school increases the possibility of poor T/L of EE. He suggests that daily evaluations are better than only carrying out evaluations at the end of the study program. This method obscures what takes place in schools. He is of the opinion that EE would be effectively taught if the activities were evaluated regularly and added value to the final evaluation. This view concludes what this teacher reported previously; that study tours and environmental activities are a waste of time if they don´t add credit to pupils performance. Since private schools are more academic oriented, anything that doesn´t add value to students' academic performance will be ignored.

The other concern he raised was financial support. In his view the government needs to support both public and private schools to ensure effective implementation and enable academic tours. He says the financial burden should not only be put on parents, as they also tend to complain about that. The last head of school also sees challenges in the community. He thinks that people destroy the environment when struggling to cover their needs. He complained about people´s destructive behavior but he sees a connection to poverty and not being allocated proper places to obtain what they need for survival. He thinks that the government should subsidize energy resources so that people can afford to use energy resources like gas or electricity. He also thinks that ignorance is a problem; people do not see the immediate effects of destroying the environment and, as it has always been part of life, they continue to do so. Having identified the challenges that HoSs face, they gave their opinions on how EE can be well implemented in schools.

4.4.5 Strategies for effective implementation of EE in primary schools

Several opinions on how EE could be effectively implemented were offered by the school leaders. During the interview they had this to say:

> I think we should begin with teachers who are the key facilitators; they should be given that education. When they get this education it will be easy to educate others and you will see good results, many people will see the importance of keeping the environment in their daily lives. It is also good to use the media to motivate and educate people (HoS 1. 200-203)

She added:

> […..] These issues should be integrated into the curriculum to a greater extent. Then secondly, there should be rules as in mathematics that you may pass other subjects but if you fail mathematics your grade is lowered. So everyone will work hard so that they pass this subject so that it doesn't lower their performance (HoS 1. 210-213).

This headmistress thinks that teachers are the key agents in the implementation process; therefore, she suggests teachers should be the first people to receive training on environmental issues. According to her this approach could help reform society; because teachers teach many students and they will pass their knowledge to the entire community. She assumes that people will learn to be responsible and protect their environment. This view is similar to the majority of teachers. This leader acknowledges the importance of providing training for the teachers and adds that mass media are also a good medium to educate people, but she showed no effort to help her teachers attend seminars or workshops. This does not really reflect the behavior of an instructional leader who is devoted to empowering her teachers as explained under literature chapter. These results also support the earlier statements from teachers that they never received training. It also proves that many HoSs believe that teaching EE is a waste of time.

She also added that EE content needed to be increased in the curricula, and given weight like other subjects. She thinks that EE is not prioritized, because there are no concrete assessment procedures like there are for other subjects, therefore, pupils don´t put the necessary effort into this subject. This view proves that EE is not effectively taught, because learners respond to what they are taught. Place-based EE could be applied if the head of school gave it a priority; schools could design their own EE programs and co operate with the community and decide how to evaluate them, at least on a local level.

Another head of school said:

> Ok maybe teachers should be taken to trainings or they should expand the subjects to include more environmental issues, example I see vocational skills is the subject that is much related to environmental education. Almost 90% of the things they make are taken from the environment. You are sent to bring brooms, materials to make mats, soil to make pots. This help you to see how far has the teachers gone concerning environmental issues, because it has been seen that it is much in geography and little in science. Do we see it is enough? Does it have impact? It is closed in other subjects it is not seen and it will depend on teachers' ability to interpret (HoS 4. 107-114)

He added:

> More education should be given. The government has its portion in environmental conservation by adding resources and education. By giving out education and providing resources (HoS 4. 129-136)

This Headmaster also has a similar view on training teachers, providing T/L resources, and integrating EE content into all subjects, not only in Geography.

The interdependence of the pillars of sustainability and providing EE for all was given attention by another HoS. She said:

> Environmental education should begin from lower levels, and people should get adequate education. As I said environment is life and there is interdependence between economy, ecology and peoples' culture. The balancing of these three can't come just like a dream without education. When you give people education they get away false beliefs in their cultures that destroy the environment. But when people have education they will know what is wrong and get away with it and become less selfish (HoS 2. 86-92)

This leader has a similar opinion on providing training, however, she emphasizes the necessity of providing EE to lower levels, as well as the entire population. She believes that education is powerful and can shape people's behavior in a positive way. She thinks people need to be aware of the interdependence of the three pillars of sustainability and says education is the only instrument capable of making people respects that relationship. These responses are similar to what the teachers said about the power of education and the belief that EE will solve many environmental problems.

> One I will recommend that we have more practical approach to environmental issues. We have it stated in our curriculum but most of it is not practical. And second when you talk of practical approach we also need field to practice that, we talk of planting trees, do we have enough space to plant trees in schools? We don't have. Where will they plant the trees? How do we know that they are planting trees? The school is in a two hectare plot, where will you plant trees? When children go home they live in a quarter all their surface is cemented, some live in flats how will they plant trees? We talk of cleaning, the keeping our environment clean, and when we clean where do we take these litter? We talk of plastic for instance, plastic waste the solid waste which does not decompose, now we clean and sort them aside then from there where do they go? Are they recycled? Very little is recycled, those who are collecting these bottles for recycle, if you look at them you find they have given up in life. Apart from the school and the curriculum, I think the government also needs to do something, the government need to motivate and have incentives for the industries that are recycling the waste, if these industries are given incentives they will be able to buy more and consume more of these waste. (HoS
> 3. 145-161

This HoS emphasizes two major points; the first point is about the approach of T/L in schools, and the second point is waste management, specifically inorganic waste. He thinks that the preferred T/L approach is more theoretically based, while the curriculum puts an emphasis on practical learning. In his opinion, the government should provide a conducive learning environment for effective T/L of EE; for example, there should be sufficient space for environmental activities to take place. He considers it pivotal that activities can be carried out close to the school and assumes that if schools had enough space, they would practice hands-on activities. This response may have some valid points, since long study tours for EE have been considered a waste of time, maybe having sites nearby would help. However, activities like gardening and planting trees require time and the majority of teachers and HoSs declared that schools place a heavy emphasis on academic performance and their main focus

is to support pupils to pass exams. This implies that HoS 3 is simply making suggestions on how EE could be taught, but that he is not necessarily practicing them at his own school. He also emphasizes the government's role to collect and recycle waste, especially inorganic waste, which is more detrimental for the environment, because it does not decompose. He feels that incentives will encourage recycling factories to collect recycling.

These results show that the HoSs have various ideas how EE could be improved in schools and in society in general. Most of them believe in the power of education and, thus teacher training was suggested. Teaching and learning resources for active learning should be provided and EE should be integrated into all subjects. The provision of financial and material resources was suggested. Furthermore, waste management and recycling, especially of inorganic waste was mentioned as being crucial and having room for improvement.

For teachers and HoSs to effectively implement EE in schools they need a close cooperation with curriculum specialists, as they are responsible for planning school programs and curricula, and providing T/L resources like textbooks, teacher´s guides, etc. The researcher was interested in exploring the role of HoSs in motivating the teachers to effectively implement EE. Moreover, the researcher triangulated the information regarding the integration of EE into primary school curricula between the teachers, HoSs and curriculum specialists. Thus, the next section covers the views of curriculum specialists to gain more understanding, especially on the issues raised by teachers and HoSs.

4.4.6 Curriculum specialists' views on the integration of environmental education in primary education

Interview responses from curriculum specialists regarding the rationale for EE in primary education:

> The issue is that this is 'swalamtambuka'or emerging cross cutting issue and when you plan a curriculum, the curriculum must be able to address the needs of the community. So if you come across 'swalamtambuka' it is good for the community to get knowledge and skills about the issue, to be able to face that cross cutting issue 'swalamtambuka'. So if you fail to incorporate such issues in the curriculum that means that curriculum will not be helpful to the society. The issues that are arising in the society are bringing challenges to the society. So in order to be able to deal with the challenge then the curriculum must be able to accommodate such cross cutting issues (CS 1. 5-13)

Another one narrated:

> You know it is said that environment is one of the cross cutting issues. And these cross cutting issues have to be integrated into the curriculum. Sure, there is the national policy about environment which emphasizes the importance of environment for the sustainability of human life. That is only possible through environmental protection. If you harm the environment you harm your own life,…like with the ozone layer and the emission of carbon dioxide. As the national policy contains environment protection and therefore an economy that sustains the environment and

> human life, the curriculum has also to be transformed to reflect environment conservation and protection. There are issues of pollution, which come from industries, chemical depositions in rivers and natural water resources. There are problems with the waste management especially in cities and big towns. And so it started to be a topic by itself which also directly affects human life. Outbreak of diseases like cholera, dysentery and so forth so that has been the concern (CS 2. 4-20)

These specialists emphasize one major point; that EE is a cross cutting issue or to use a famous Swahili expression: 'swalamtambuka'. They say societal issues and challenges need to be addressed in the curriculum, because the curriculum addresses the needs of the society. Issues such as air and water pollution by industries and chemicals in water sources and poor waste management leading to diseases such as cholera and dysentery, especially in urban areas are considerable challenges for society. Thus, the curricula need to integrate such issues to allow pupils to acquire knowledge and skills on how to deal with these challenges for societal wellbeing. As a nation environmental sustainability is emphasized in the education policy and is translated into learning programs. They emphasized that people need to know that 'environment is life'; destroying it means destroying your own life.

These results indicate that these specialists appreciate the integration of EE into curricula as it addresses fundamental issues of environment. A curriculum that fails to address the needs of society is worthless. It shows that they are aware of the issues faced by society and, therefore, this can help them to design suitable learning programs. These findings coincide with the findings from the teachers and HoSs, which showed that all of them are aware of environmental issues and challenges on local and global levels. However, the majority of teachers exhibit a shallow knowledge on critical issues like climate change.

Regarding the importance of EE for learners one of them said:

> That's absolutely correct, and not only in the primary education even in the early childhood education level. At any level of education environmental education is needed. It is very important and for everybody. For example environmental education scientifically I can use it to when you want to research or do any discovery that has a scientific explanation is done in the environment. Everything is found in the environment. In the environment we find the needs for the living things. We can do a lot of research and discovery in the environment and know the needs. So it is not only for the primary education but at across all levels of education. Basically, the children at early childhood can learn environmental education because we place the knowledge in the curriculum according to levels. Personally I can talk about environmental education at early childhood level but the same goes in a spiral. Therefore I can also talk about environmental education at secondary school level up to higher learning institutions but the same concept. So you must place according to their level and age reflecting the learning theories (CS 1. 27-40)

Emphasizing the need for education in all levels starting in preschool and the notion that the environment is the source that covers all human needs shows a great similarity with the majority of responses from both teachers and heads of schools. This indicates that these educational stakeholders clearly understand the impact of providing education from an early age. This specialist suggests placing learning experiences in curricula that are in accordance with the level of learners and EE should be taught at all levels. According to him, the environment is the source for everything, such as human needs and technological discoveries.

These results suggest that stakeholders have the same perception regarding the importance of EE, which is a good indicator that they will cooperate to make the implementation of EE successful and the specialist could motivate the teachers by providing the necessary support for the implementation, for example by providing suitable T/L materials.

When asked about what T/L materials they offer to teachers to support their teaching, and whether the teachers´ reports about the issues with textbooks are valid, one of them said:

> You know there are two cases here: first of all teachers are teaching textbooks and not the syllabi. Because had it been that the teachers are teaching the syllabi the issue of in-details shouldn't be reflected, because it is the syllabus that detect what to be taught (CS 2. 169-171)
> He added:
> [.....] the first thing I have said that the teachers are teaching textbooks and that is not their problem the problem is their capacity. That is to say they can't go beyond the textbook and when they read the syllabus they can't interpret it the way is supposed to, because of their level of understanding. It is not their fault, these are grade A teachers, who really struggled even to attain that grade. The others even did not deserve, now you want them to interpret the syllabus so that they know the direction of the content. It's a big demand. So therefore, that is a gap, of quality of human resource that we have. But the other thing is that, we have imposed a lot of demand to teachers which are beyond their capacity. We have not trained the teachers in the textbook analysis and selection, they don't know. Then yet we tell them to be the ones to propose with the school committee the books to purchase. We have not controlled the market, we have liberalized it, and we made it like the market for tomatoes the same as the book market. So who takes the proper books where? Others just photocopy others books and pretend to be authors and take them in different places. So that was a gap in the policy which has really confused the teachers. It has allowed a lot of pillars and un-trusted individuals who lobby and you know good lobbyist usually don't have good materials. So they just give some percent to decision makers and they do business. Unfortunately the good books are not bought. That was a great failure of this multi textbooks policy. It gives us a lot of problems. When you conduct monitoring teachers are complaining they say there are numerous books and many having low quality. So that was a consequence of our free market in education. We have survived these ten years with a lot of difficulty (emphasis) (referring to the last presidency) (CS 2. 188-210)

This specialist appears to deny the concerns of teachers that textbooks are basic and of poor quality. Instead he says that the main problem is the poor quality of teachers who teach in primary schools and he wonders how some of them became teachers. According to him, those teachers could not interpret the syllabi clearly, so they just teach what is in the textbooks, without thinking outside the box. He sees the fault in the government for recruiting such poorly trained personnel. He says that teachers who were not well trained expect too much from others. He goes on to admit that they do not train teachers in skills like textbook analysis and selection and yet they expect teachers to be good at that. He also admitted that the free market policy for school books is a big problem and has resulted in the distribution of poor quality books, due to a lack of government control. He also mentioned the issue of corruption in lobbying by publishers. This is one of the main reasons good books are not bought. He admitted that this is a problem for teachers and that the teachers are not to blame for that. He concluded by saying they had worked under very difficult conditions for the past ten years, referring to the years 2005 - 2015.

These results show that the statements made by teachers and HoSs were valid. One teacher said that one 'should not expect a lot of milk from a cow you don't feed well'. As reported by teachers and HoSs the issues of poor quality textbooks and lack of teacher training are hindrances to effective teaching of EE. This suggests a dire need for the government to work on these issues, as they are fundamental in the meaningful T/L process.

Another specialist added:

> First of all we are doing a project concerning environmental issues, which entails even educational areas, road safety materials that show signs and pupils can use in the environment and identify areas with precautions, we provide all that. So there are banners or charts which we give them that shows a lot of precautions but especially targeting the learning. So if you combine with what is taken into the curriculum, but also with the project which we really covering even the road safety, we train the children (interference). The main things that we provide to the schools are the charts for road safety measures (CS 1. 106-113)

The other specialist described the T/L materials they provide for teachers, such as banners or charts for various projects. It seems important for him to mention which T/L materials are offered for EE. However, this seems to be unsatisfactory provision with regards to what teachers say they need for successful implementation.

When asked about the integration of EE into all subjects he responded:

> Subjects that carry this idea are called major subjects. Because not all subjects can carry it in its full width. But there are some which can transport the idea and their ability to do so can be seen from the activities and tasks. Like for example in mathematics when it comes down to life experience examples when we say statistics we can talk about wood cutting and compare the amount of cutting with the amount of replacement. And if we talk about cows which have died because of drought in a certain year and the lack of rain, then we can use these data to remind observers so that they get aware that environmental repercussions can be very wide. Like that we are somehow teaching mathematics but we are also reminding them of the impact of environment on the life of people. So it is integrated in the teaching and geography is

> carrying better than others, science is transporting well and social studies at the primary level do also carry a lot of environmental issues (CS 2. 41-51)
> He continued:
> So in primary school social studies and science are transporting very well and you see in mathematics some matters can be used. But also in parables, examples from environment and so on can be used (CS 2.62-64)

The response from this specialist is similar to that of the teachers who said that EE was only integrated into some subjects, for example geography and science. The opinion that EE could be integrated into all subjects to ensure the best possible implementation also seems to coincide with the opinion of many of the teachers. Though, like most of the teachers already implied, some subjects can carry EE content more than others, due to the nature of the subjects. This specialist suggests that even subjects like mathematics could contain EE content, such as the analysis of statistics of resources.
On the issue of integration, he added:

> [.....] and there are many ways of integration. There is direct content integration but there is also the pedagogical integration, meaning that the teacher can introduce during his teaching some elements either as examples or as talks about a suitable topic according to the local context. Now this last mentioned way needs a teacher who understands both the subject and the pedagogy. Someone who has not enough knowledge about the subject cannot integrate issues. So this one has limits for integrating but if the pedagogical knowledge base is shallow the situation is even worse (CS 2. 83-89)

The specialist considers competence in both subject content and pedagogy to be crucial in effective teaching of EE. He says at times EE content is not obvious in the syllabus and, therefore, it requires the ability to interpret it. According to him, poor content knowledge is an obstacle in the integration of EE, but acknowledging that lack of pedagogical knowledge is more critical to successful integration. Responses from teachers and HoSs coincide with this view. This also shows that the integration of EE has not been successful, as teachers declared that they did not receive any training on this content, and several of them declared that EE content was not clear and necessitated the ability to interpret it, which the majority of them lack. The specialist also mentioned that the quality of primary school teachers is very poor. Insufficient competence could have a serious impact on teacher motivation.
It can be concluded that these limitations, combined with the issues mentioned by teachers and HoSs, are hindering the integration of EE. This will become apparent in the following section on the challenges the specialists face in ensuring EE is successfully implemented in schools, which will help to understand the magnitude of the problems they encounter.

4.4.7 Curriculum specialists' views on challenges to successful implementation of environmental education

One interview excerpt said:

> The main challenge that I see it myself as an expert is the *standard resources* for curriculum implementation, standard resources for curriculum implementation,

> (emphasis). What does this mean? When you talk of standard resources means the material resource is a problem. Why do I say this? We may prepare a curriculum, we prepare teachers and train them, but the teaching and learning resources like books are not there. When you visit the schools teacher-pupil book ratio is a big problem, what do you expect? For example I, I am a science teacher, when I visit schools I find the laboratories are empty not equipped, so even my science which I am talking about is nothing, it will just hang. Because if the students will not be able to do practicals and see, then we are cheating ourselves. For sure we are wasting a lot of time. So what I am saying boldly is that standard resources in implementation is quite fundamental particularly material resource and is a big problem. This is a problem and a very big challenge. It's like what you said you went to the schools and saw the teachers. There are no resources eg books. When you enter a laboratory is just a room filled with tables and no more (shows annoyance). For sure it is a problem; it is a problem (emphasis). I'm telling you Tanzanians are very good planners but when it comes to implementation is a big problem (CS 1. 116-133)

This specialist is of the opinion that T/L resources are crucial when it comes to effective learning of EE. He says even if you prepare a good curriculum and employ good teachers, if material resources such as books, laboratory materials and equipment etc. are not provided, it is a waste of time. He confirmed this to be a fundamental challenge in implementing EE. This assessment coincides with what the majority of teachers and HoSs stated as one of the obstacles for effective teaching of EE. He praised Tanzanians as good planners, but says they struggle to implement their plans. This suggests that the curriculum planning was good but the problem lies in the realization of these plans.

From these results it can noted that the root cause of these limitations is a lack of financial resources, which has been reported by most participants in this study.

Another specialist added:

> The main problem of curriculum designing is that many people just see it as the end product such as syllabi, and books. So when they look at the syllabus and find that it's just a small book, it becomes so difficult for people to understand that to develop and obtain such a syllabus you need even more than 2 billion shillings. To design and write a syllabus needs a series of events. So this procedure they don't know it. They ask is this not what they been using before? What is so special then? This is a problem because many times we have constrain in funding, you see? When we say we want to introduce a new thing teachers must be trained, to be told what has changed and what should they do etc. They will also say these teachers have been trained for a number of years, why then should you incur a lot of costs 4 or 12 billion to train teachers? But TRA (Tanzania Revenue Authority) are simply allowed to take those billions eeeh. So we have a problem of conceptualization of curriculum development process, which needs a huge amount of money. But also people don't know the value of education; you don't need to develop education in haste, because this is the software of your citizens for years. So you must invest in education. So it is a big challenge. So we don't have priority (CS 2. 224-239)

This specialist identified a different challenge; however the root cause is still the lack of financing. He spoke about the entire process of curriculum planning and development and said it is a rigorous process, which requires a lot of funds. Unfortunately, the majority of

people only sees the end product, like curricula handbooks, and has no notion of what a complicated process it is. He is of the opinion that the government does not give priority to environmental issues the way it does to other sectors. They also lack conceptualization of the demanding curriculum development process. He added that if the government does not invest in education it causes problems for the nation and to its own development. He declared that it is very difficult to train teachers, because of reforms in the curriculum.

These results do not differ from what the teachers reported about the government assuming that teachers will teach anything, as long as they have books. Teachers and HoSs also said that the government does not prioritize environmental issues. This also suggests that EE content is shallow and inadequate, as a result of these problems.

These results indicate that if the curriculum is not thoroughly prepared, then what children learn may be irrelevant due to poorly developed programs. It also suggests that lacking curriculum reviews also cause problems and could lead to teaching outdated information at schools.

He added:

> But there is another challenge I have started seeing it recently, to be employed here formerly you must exhibit proven capacity, a bit extra than a normal teacher, but this time you can be one of the hopeless guys in the class and you be here, this is a challenge. To be employed here in the past was an issue, really an issue (emphasis) how do you get here? It was not easy. But now you don't even know the criteria to be here
> (CS 2. 269-274)

This response suggests that he questions the abilities of curriculum specialists, as he feels that recruitment procedures have loosened and the conditions of employment are not as significant as they used to be. He considers this to be a major problem, as it is a very important job to plan for the whole nation. The criteria for the selection of specialists are somewhat diluted and it sounds like qualifications are not strictly considered and there may even be elements of nepotism in the selection process. These results indicate that the importance of EE is not likely to be reflected in its weight, due to a number of problems.

This specialist concluded his interview on a desperate note. He said:

> You know what for now I'm totally desperate! I know hope is the last thing to loose. May be if the government will start to listen. I'm so desperate, if the quality of teachers we have at pre-primary and primary school level is this, then we cannot revolutionize education, we can't (emphasis). We must get to a point where we agree that we need teachers who are capable of teaching, because this is the foundation. I'm not saying all primary teachers are not good, but the majority is not good. I go to classes and listen as they teach, there is a big problem. There are people you wonder why are they teachers? How did she get there? So with such quality of teachers at the pre-primary and primary school level, it's hard to talk about environmental education, while other basic learning skills are not comprehended. So that why I said I'm desperate (CS 2. 290-299)

This specialist is also the leader of a department; for him to have such a desperate closing remark shows how dire the situation is and this attitude could influence other specialists. In

his opinion the government had not been listening to their needs as specialists. He only sees hope if the government begins to tend to them. He says education is in dire need of being revolutionized, but, given the quality of teachers, this is going to be an uphill battle. He also mentioned that EE cannot be effectively implemented, unless other basic learning skills are comprehended. According to him, teacher training is crucial, as they are key implementers of any educational reforms or innovations. This issue was also considered to be significant by the majority of teachers and HoSs.

4.4.8 Summary

In general, the responses from the HoSs concerning the rationale and importance of EE in the curriculum were very positive and significant for the primary level of education. They emphasized that early years are fundamental in learning and the entire human development. They argued that the world is facing enormous environmental challenges today, like climate change, pollution, deforestation, waste management, amongst others. Thus, equipping the younger generations with knowledge and skills will help preserve the future. Heads of schools suggested that EE content should be placed adequately in all subjects, to enable learners to become responsible individuals for their lives and their nation. They also argued that EE needs to incorporate hands-on activities; however, parents with children in private schools consider this to be punishment. The findings show that neither private nor public schools practicing EE actively. They mentioned lack of teaching time, overloaded curriculum, and lack of T/L resources to be the obstacles for active learning. They also complained that schools are too focused on academic performance and content knowledge, and that ensuring pupils pass exams is seen as an indicator for high quality education. Thus, the development of skills through EE activities is seen as a waste of time.

The strategies they use to implement EE aimed to motivate the learners rather than their teachers. For example, some schools have 'Mazingira club' which encourages activities like sweeping the environment, gardening, planting tree seedlings, garbage separation, etc. Lack of training for teachers and scarcity of T/L materials have a negative impact on teachers´ motivation. Generally, HoSs do not do enough to motivate their teachers to teach EE effectively. This is due to a number of factors, like lack of funding, which exacerbates the scarcity of professional training, T/L resources, and study tours. They recommend the provision of high quality teacher training to cope with the current local and global challenges.

Curriculum specialists also acknowledged the importance of EE to prepare younger generations to be good stewards of the environment and be able to face the challenges. This view is similar to that of teachers and HoSs. It shows that specialists agree with the issues raised by teachers and HoSs, such as poor funding and consequent lack of teacher training, lack of T/L resources. It was also reported that the issue of poor funding affects the entire process of curriculum planning and development processes. The specialists emphasized that the situation is dire and they are working under very difficult circumstances. It was concluded that, unless the government starts to prioritize the educational sector and EE in particular, the situation is expected to be even worse than what has been reported in this study.

CHAPTER FIVE: DISCUSSION AND INTERPRETATION OF FINDINGS

This chapter presents the discussion and interpretation of findings in relation to the four research objectives and questions. These were:

1. *Which views and perceptions do teachers have on the environment, environmental changes and challenges?*
2. *How do teachers perceive EE integration, content adequacy and relevance? And which instructional methods and resources do they use in integrating EE content into their subject curriculum?*
3. *How do teachers perceive their motivation and professional development on environmental education issues?*
4. *How do heads of schools and curriculum specialists perceive EE integration, and how do they motivate teachers to successfully integrate EE into their teaching?*

The main findings of the study are discussed in the light of the four research questions and presented in tandem to the reviewed literature. The first section discusses the views and perceptions Tanzanian teachers have on environmental experience, issues and challenges. The second section elaborates on the views and perceptions teachers have on EE integration into the curriculum, as well as their views about content adequacy and relevance; the discussion on the instructional methods and resources used to integrate EE into teaching also follows in this part. The third section covers the perception of teachers on their motivation and professional development. And the last section closes with the perception of other education stakeholders, i.e. heads of schools and curriculum specialists, on EE integration, but also discusses how these educational leaders motivate the teachers to successfully implement EE.

5.1 Teachers' views and perceptions on the environment, environmental changes and challenges

The findings in conjunction with the first research question revealed a number of issues, experiences and perceptions Tanzanian teachers have on environmental concerns. According to the structure of the research question they will be discussed in two parts.

5.1.1 Views and perceptions on the concept of 'environment'

The results showed that a majority of teachers have quite a similar perception of the concept. They view the environment as physical objects or as an entity, as Tani (2006) calls it, which entails both living and non-living things. Mainly observable objects were identified as parts of the environment by a majority of teachers. Many focused their descriptions on the physical nature of the environment, which is mainly bio-physical and encompasses living organisms and non-living things such as plants and animals, rivers, valleys, mountains, air, buildings and so on. Dreyer (1996) calls this a traditional view, whereby the environment is associated with nature and with ecology studies. According to Kimaryo (2011), such studies are a

foundation upon which other forms of environment can thrive, for example social/cultural, political and economic environments.

Although probably unintentionally, none of the teachers mentioned themselves as part of the environment in the first place. However, after the researcher's probing question, they all confirmed human beings to be an important part of the environment. They viewed the environment as a space which surrounds an individual and is referred to as an 'experienced phenomenon' (Tani, 2006). Some teachers attached the meaning of the environment to socio-cultural values and saw man as a key factor in shaping the environment. This view is supported by the social construction phenomenon whereby men are placed at the centre as they shape the environment through their socio-cultural behaviour (Tani, 2006). Only a few teachers considered invisible elements like the atmosphere as part of the environment.

Results imply that a majority of teachers had a narrow view of the concept 'environment', which has effects on their T/L. It is argued that teachers have a lot of authority over their classrooms and that their individual beliefs and values play a vital role in shaping the objectives, goals and instructional methods of schools. They also determine success or failure of any reform efforts imposed in schools or districts (Yero, 2010). The way teachers perceive things will influence their pupils likewise due to the authority they hold. Yero (2010, p. 1) says: "*Individual teacher control of classroom practice has existed from the earliest days of formal schooling, exist now and will continue to exist*."
Kiarie (2016) also argues that teachers' perceptions of EE play a key role on how students learn, retain and apply knowledge, attitudes and skills in changing their perceptions of their environment. Moreover, OECD study (2010) adds that 'teachers matter' and that they seem to be the prime axiom of educational discourse. Therefore, it is important for teachers to have comprehensive conceptualizations since they influence thousands of children. Kimaryo (2011) and UNEP (2005) emphasize that the environment has to be conceptualized as a whole so as to encompass all its bio-physical, socio-economic, cultural and political aspects, with man being the centre of it all. Similarly, Bhandari (1999) asserts that

> [e]nvironment' is a broad comprehensive term denoting all that surrounds us: air, water soil and light. [….] the houses we live in, water bodies, roads, plants, animals, rivers, mountains, villages, cities and the planet we live in are good examples of environment because they all surround us. [….] So we are part of this environment. (p. 1)

It can be concluded that a majority of teachers has a narrow view of the environment which is restricted to its physical meaning. This implies that their teaching cannot go beyond this knowledge and also determines the scope in which they can identify the changes and challenges in the environment, as presented in the next section.

5.1.2 Views and perceptions of the changes and challenges in the environment

This study shows that all the teachers, from both urban and rural schools, were able to identify changes that have been taking place in their environment over time. The described

changes are connected to a number of challenges found in the natural environment. However, the results showed that there are variations between rural and urban challenges. The majority of teachers associated these challenges with the influence of man's activities on the environment. They believed that man has influenced the environment a lot more in recent years than in the past with various activities such as farming, mining, construction, fishing, lumbering and more. This claim is in line with a UN (2010) statement which supports that human activities are causing the diversity of life on earth to be largely lost and difficult to reinstall, which has impoverished the life-support systems we rely on every day. Studies show that over the last 50 years, human socio-economic development has continued to compromise the biosphere's ability to support life on Earth through phenomena such as climate change, widespread chemical pollution, stratospheric ozone depletion, biodiversity and species loss, freshwater depletion, desertification and more (UNEP, 2017; World Watch, 2013; Ehrlich & Ehrlich, 2013; WWF, 2012). A study done O'Brien (2010) emphasizes that the issue of sustainable development is crucial as human beings interfere with ecological systems, causing serious impacts such as climate change, resource depletion and the extinction of species.

Climate change as a result of global warming was considered to be a major challenge and concern, identified by a majority of teachers, both rural and urban. They associated it with solely human activities and claimed that the increasing floods and prolonged drought conditions as well as diseases were consequences of climate change. This view coincides with a study by Milan et al. (2015) who state that climate change and its associated calamities are a global challenge and key drivers of migration and dislocation both now and in the future. An increasing number of people will be forced to move as a result of deteriorating environmental conditions, loss of habitat and livelihoods and extreme weather events. Data from Tanzania suggest that from 1980s to 2010, the country experienced recurrent floods and droughts affecting millions of people and their livelihoods across the nation, with substantial negative economic impacts (Mary & Majule, 2009; SUA, 2007). This has affected the whole spectrum of life such as the environment, human settlements, health, food security, wildlife migration, the physical infrastructure, economic activities and natural resources (Rwambali et al., 2012). From these findings, it can be said that the teachers were aware of climate change and its associated negative impacts, although they could not explain its causes and effects in detail. They seem to know only little about this issue, although it is widely documented in the literature. Moreover, the natural causes to climate change such as the natural occurrence of volcanic eruptions, ocean currents, the earth's orbital changes and solar variation (Umar & Ozohu, 2015) were not at all mentioned. This suggests that Tanzanian teachers are lacking comprehensive knowledge about such an important global issue.

Moreover, the literature also supports that increasing temperatures have caused the glaciers and snow cover of Mount Kilimanjaro to melt at an alarming rate. It emphasizes that 80% of glaciers has been lost since 1912 and are estimated to disappear completely 2025 if current climatic conditions persist (UNDP, 2011). Climate change has been recognized as one of the major issues to affect the future due to human activities such as burning fossil fuels for power generation from oil, gas and coal, which has led to a 30% increase in atmospheric CO_2 since

1800 (IPCC, 2007; Flannery, 2006; Lynas, 2004). As a result, evidence is manifold about melting glaciers and ice caps, changes in the seasons, greater hazards of flooding and extreme weather conditions. Climate change has also resulted in more adverse health impacts like malaria, dengue fever and diarrhoea; the impacts are most severe in low-income countries. The speed and intensity of climate change are outpacing the abilities of the poor majority to cope with its effects due to their low adaptive capacities (Nanduddu, 2011). Thus, climate change impacts are likely to hinder poverty reduction efforts (Ahmed et al., 2011).
This argument corresponds with the literature's claim that the United States has been the largest contributor to global warming, accounting for almost one quarter of global GHG emissions before recently having been overtaken by China (Harrison, 2010). Moreover, the PBL Netherlands Environmental Assessment Agency report (2015) states that China is now leading in CO_2 emissions: Its share of 30% was twice as large as in the United States at 15%, with the European Union being third at 10%.

Rural teachers identified deforestation as a major challenge in their locality. They admitted that forests were over utilized for economic reasons such as the need for timber, charcoal, firewood, honey and gaining land for settlement and farming activities. Teachers also associated the overutilization of forest resources with poverty, population growth and ignorance. This shows that people's lives in rural areas heavily depend on forests' natural resources for their daily needs. However, the teachers acknowledged that problems such as soil erosion as a cause of land degradation, droughts and even desertification are intensified. These findings coincide with those by Gibbs et al. (2010) and Rudel et al. (2009) that the demand for agricultural land has been a main reason for deforestation, together with an increasing population, the use of fuel wood and forest products. Boahene (1998) also found out that deforestation changes the balance of hydrological cycles and decreases rainfall. This is a challenge, as forests continue to be the main source of fuel wood in East Africa. Boahene also warns that clearing forests can also lead to habitat destruction of endangered species (of both plants and animals) and thus to a loss in biodiversity.
It was revealed that in order to avoid these problems and to enable people to conserve the forests, the issue of poverty must be addressed first. A majority of the rural population is poor and therefore has no other alternatives for fulfilling their survival needs but from natural resources. Thus, teachers are aware that teaching EE could be a solution to many environmental challenges, as also clarified by KACEE (2010) who found out that when EE is taught, it raises awareness and understanding of environmental issues, promotes critical thinking as well as problem-solving and decision-making skills. However, teachers argued that providing EE to people before their economic empowerment is not feasible and might not help protect the environment. These findings coincide with a study conducted by the government of Tanzania itself, which found that poverty is perceived by a majority as both a cause and an effect of environmental degradation and that people with inadequate resources have a tendency towards over utilizing environmental resources due to little alternatives (URT, 2005a). The results from this study indicate that there is a dire need for the government to empower its poor citizens. Teachers emphasized subsidizing energy costs for the sake of protecting the environment; then EE could have positive effects. However, this

suggestion also seems difficult for the government to achieve as alternative energy resources such as gas and electricity are expensive and majority population has no access (URT, 2017).
Many teachers believe that when people are taught EE, they might gain knowledge and become aware of protecting their environment. Knowledge acquisition is regarded as an important factor for the development of environmental behaviour and therefore for taking action. However, the literature has proved differently. Research by Hunger and Volk (1990) found that citizenship behaviour can be developed through environmental education; however, the challenge lies in the people's willingness to act or to do things differently than in the past. Other studies argue that when people gain knowledge about an issue, they will automatically take action; but it is also argued that to be concerned about and to act on something also depends on one's interest to do so (Chawla, 1999, 2006). These studies assume that although concern and interest could be a driving force for action, intention is assumed to guide actions. KACEE (2010) emphasizes that people need to have the necessary knowledge, skills, attitudes, motivation and commitment to work individually as well as collectively in order to treat their environment with empathy.
These rural teachers seemed to know about the importance of forests resources and the need to conserve them. However, the majority had a narrow view of this compared to what the literature documents. But if teachers are short of knowledge about environmental resources, this has an impact on the level of knowledge presented to learners. Agbogidi and Eshegbeyi (2008) emphasize that forests play an important role in the water cycle and in carbon sequestering as a genetic bank and a source of food; they stimulate rainfall, protect soil erosion and regulate the flow of water.

On the other side, in urban areas, issues of pollution and waste management were the main challenges. Air and water pollution were seen as very problematic for urban dwellers. Teachers did not see air pollution as being caused locally. They blamed industrialized countries for being major contributors to air pollution. However, URT (2014d) reports that air and noise pollution are among also modern issues in Tanzania, the city of Dar es Salaam in particular. Gaseous dust and particulate emissions from motor vehicles, industrial stack construction as well as mining activities contribute to air pollution. With fast growing population and high urbanization rates of 5 to 6% (World Bank as cited in Pauschert et al., 2012), Tanzania is likely to further increase its emissions. These findings imply that while less industrialized countries struggle to develop themselves and birth rates are rising, emission rates also increase. Therefore, their contributions to environmental pollution should not be ignored and control mechanisms are needed. Teachers need to understand that air pollution can be a local issue.
Teachers also associated diseases such as skin cancer with ozone depletion. Scientifically, the issue of ozone depletion is a separate phenomenon, as it is mainly caused by the widespread emission of chlorofluorocarbons (CFCs) which impact the ozone layer in the high atmosphere (Fahey & Hegglin, 2010). Nevertheless, the teachers argued with confidence that this was mainly a result of air pollution from industries, and toxins and skin cancer were mentioned as major effects. This shows that the teachers were somehow aware of these issues by having read or learnt about them to the media. However, they seemed to have half-baked knowledge,

hence mixing up causes and effects. This suggests that the teaching of such concepts will also purport a narrow view. These finding imply that teachers don't have adequate knowledge on environmental issues, and thus, there is a need for more intensive training.

Water pollution was another challenge identified in urban areas, which was connected to poor waste management. Not only was its pollution reported but also its scarcity. This problem was also seen as a challenge in rural areas, but to a lesser extent compared to urban areas. Moreover, poor waste management (both organic and inorganic) was a critical concern and associated with population growth as well as poor town planning and infrastructure. The city of Dar es Salaam has by far the highest population in Tanzania and was poorly planned. Teachers claimed, the prevalence of diseases such as cholera was a result of poor sanitation in water and food. Findings in 2016 proved that solid waste is a serious problem in Dar es Salaam as a main source of pollution and the cause of periodic cholera outbreaks. Waste production in Dar Salaam alone was estimated to be 2252 tonnes of solid waste per day (Membe, 2015), while the projections of the city's waste output increases at an alarming rate of 10% per year (Huisman et al., 2016). However, majority of teachers emphasized on solid waste. Although, majority of teachers emphasized on solid waste, liquid waste management seems also to be a severe problem as only 10 to 15% of urban population have access to the sewerage system. Moreover, electronic waste management is a growing challenge in Tanzania but none of the teachers mentioned it. It was estimated that by the year 2015, e-waste from computers alone will amount to 9500 tonnes (URT, 2013b as cited in Drakenberg, Ek, & Fernqvist, 2016). These results indicate that teachers are mainly aware of solid waste as it is bulky and produced on a daily basis or they may lack knowledge on other forms of waste.

The issue of waste management is not a challenge to Africa alone, but also in Europe, Asia and other regions (Ngoc & Schnitzes, 2009). Managing waste is costly and thus a big challenge for countries with poor economies.

Teachers had varying perceptions of how to deal with waste management. While some argued that this was solely a government task, others perceived it as a collective responsibility. This implies that teachers who think the issue of managing waste is not their business can hardly influence the children they teach to be responsible citizens. These teachers do not regard themselves to be part and parcel of their own environment. A study by Budvytytė (2011) emphasized that people should realize that they are part of the environment and that solving environmental problems is a collective responsibility for both the governments and themselves.

The findings from previous studies also support the view of teachers on water pollution and waste management. For example, World Bank data (2002) shows that more than 70% of the population in Dar es Salaam city live in poor, unplanned settlements. Water scarcity was also perceived by the teachers to be a result of population growth. They reported that not only the water was polluted, but it was also difficult to access it. A survey by Pauschert et al. (2012) found that urban water and sanitation in Tanzania is striking due to poverty. Data shows that 74% of the urban population lives in low-income areas. Although a study conducted by Asoka et al. (2013) emphasized that the solution to urban problems depends very much on

effective urban planning, infrastructure development and management, this sounds difficult to achieve in low-income countries like Tanzania.
The use of pesticides and industrial fertilizers was also reported to contribute to both water and land pollution. Moreover, dirty-water discharge from factories is uncontrolled and contaminates water sources for human consumption. This implies that people are using contaminated water and eat contaminated food, which will definitely impact their health negatively. Chivian and Bernstein (2008) argue that persistent organic pollutants (POPs) can mimic hormones and other biologically active molecules and may as a result affect reproductive capabilities, cause cancer, suppress the immune system and interfere with the development and function of the nervous system in many animal species, including humans. Another study by Oluseyi (2011) found that untreated industrial effluents contain chemicals and heavy metals that have direct negative effects on human health and indirectly affect human productivity. They also affect land productivity due to contaminated irrigation schemes with both surface and ground water. The study adds that wastewater discharge from industries is a critical problem in developing nations such as Tanzania.

The issue of safe and clean water has proved to be a critical issue in the researched areas and in Tanzania in general. This study showed that teachers were aware of the importance of water in their daily lives and the need to ensure clean and safe water for their livelihoods. Along with that, water scarcity is also seen as a critical concern. These problems are perceived as an urban rather than a rural phenomenon. With such problems, it is very difficult for Tanzania to have a healthy population which can contribute to its progress.

5.1.3 Summary

In summary, the study shows that there are a lot of changes and associated challenges in the society. Urban and rural contexts have different challenges due to a number of factors. Teachers were aware of these changes and challenges in their environment, although a majority had a narrow perspective on the causes and effects of issues such as climate change, global warming and ozone depletion. However, the issue of loss of biodiversity and marine depletion in the country were not mentioned as environmental challenges as shown in literature. This implies that teachers are not aware of these problems or they do not consider them as threats. Nevertheless, Chivian and Bernstein (2008) emphasize that human health depends to a larger extent on the health of other species as well as on healthy and functioning ecosystems. Despite the fact that ecosystems provide a multitude of benefits to humanity (such as food, clean water and flood protection, cultural heritage and a sense of place), such benefits are under severe threat due to man-made pressures (European Commission, 2015).
All the changes and challenges in the environment were solely associated with anthropogenic or human-induced factors. The study also shows that there are variations in magnitude of prevalence between rural and urban communities. However, climate change was a major and common issue at both localities. Other challenges identified included deforestation (mainly in rural areas), while air, water and land pollution were more prevalent in urban areas. Waste management was connected to population growth and poor town planning. The major effects

of these challenges were also narrowly understood by a majority of teachers – which is in line with the literature. This indicates that teachers need to be trained to better understand environmental issues and their associated impacts so that they can better deliver EE knowledge to the children they teach. The teachers emphasized that the provision of EE would help address many environmental issues and challenges. However, it was argued that EE can only be effective when the poverty issue is also addressed. It has been found that there is a significant relationship between poverty and environmental degradation (URT, 2006), as discussed in chapter two. Having identified a number of changes and challenges, the next section discusses teachers' views on the importance of EE, its content adequacy, relevance, instructional methods and resources they use in teaching.

5.2 Teachers' views and perceptions on the importance of EE content, adequacy, relevance and instructional methods and resources used

The effective implementation of EE by teachers will depend on a number of factors: first of all, the value and importance they attach to environmental affairs; their teaching competence in mastering both content and pedagogical knowledge, as well as the availability of teaching and learning resources. Issues of content adequacy and relevance are also important to determine whether what the children are learning is sufficient to turn them into environmentally literate citizens who are able to make informed decisions in their daily lives.

5.2.1 The importance of teaching EE in primary education

In order to understand the importance of teaching EE at this level of education, one must know what it aims at achieving in the lives of people. According to KACEE (2010), EE is a process of creating awareness and understanding about environmental issues; it promotes critical thinking, problem-solving and effective decision-making skills in individuals and groups. Moreover, this is also the main aim of sustainability education where the emphasis is on enabling pupils to develop the knowledge and skills, the understanding and values to participate in decision-making and on how we do things individually and collectively, locally and globally that will improve the quality of life without compromising the ability of future generations to meet their needs (DfEE, 1999; WCED, 1987).

The views of all respondents on the importance of EE in primary education were very positive. A majority argued that it should begin even earlier, at a preschool education level. Previous findings from Asian studies also show that teachers had positive attitudes on the importance of teaching EE in schools (Ko & Lee, 2003; Chapman & Sharma, 2000). Teachers were convinced that education is a powerful instrument with two fundamental roles: first for *building a strong foundation*; and second for *solving societal problems.* These had two subthemes. The former was categorized into the *development of knowledge, skills, awareness and action-taking*, which would enhance and develop qualities like the *development of environmental behaviour, personalities and a responsible society*. *Knowledge transfer* is also a result of the acquisition of knowledge and skills. The latter, which is a *solution to societal problems*, had the following categories: *active/practical learning, government and societal commitment*, *coordinated efforts* and the *integration of EE into all*

subjects. Literature supports the view of teachers on the importance of education and states that it is critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. (UNESCO, 2002)

Environmental education for building a strong foundation

Under the sub-theme education as a means to *building a strong foundation*, the teachers believed that when children are educated, they will acquire the necessary knowledge and skills to take action. This would lead to environmental behaviour, help develop personality and ultimately create a society which deals responsibly with its environment. This shows that teachers have the biased view that when people acquire the knowledge and skills to protect their environment, they automatically take action. They consider EE to be quite fundamental for primary school learners to lay a strong foundation for a strong nation. The Tanzanian Educational and Training Policy (ETP) of 1995 argues that primary school education is fundamental to strengthening higher levels of education by laying strong foundations in scientific and technological literacy and capacity, thus fostering the development of self-reliant personalities who contribute to national development. The perception of teachers that the acquisition of knowledge and skills will lead to action-taking reflects the linear process of teaching EE and the consequent behaviour formation, as shown in the figure below.

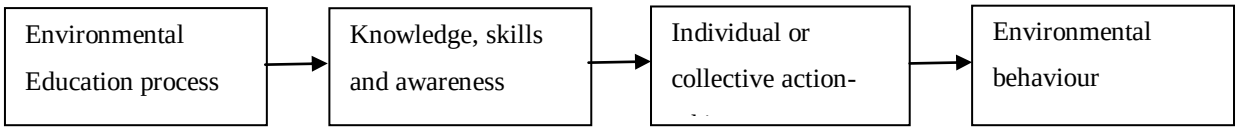

Fig. 9 (repeated): Linear process of teaching EE

This view is supported by several studies, arguing that the more people know about their environment, the more appropriately they will act (Hines et al., 1987; Schahn & Holzer, 1990; Maloney & Ward, 1973). As emphasized by Diaz-Siefer et al. (2015), knowledge about environmental problems, their causes and consequences is a significant determinant for people's environmental behaviour. Therefore, the role of the society is to equip children with the attitudes, values, knowledge and skills that are necessary to rethink and change current patterns of action and to strive for healthy, just and sustainable futures (Davis & Cooke, 1998). However, some studies came to different results, like Kollmuss and Agyeman (2002) as well as Hunger and Volk (1990) who say that knowledge does not necessarily lead to behavioural changes in the environmental dimension.

Moreover, it is argued that the focus on knowledge and skills acquisition covers only one dimension of teaching EE, which is teaching *about* EE. This emphasizes the cognitive domain and is regarded as a narrow dimension of teaching EE. Results from this and other studies show that a majority of teachers mainly teaches knowledge content (*about* EE), although they are aware of the other dimensions. Mtaita (2007) as well as Lee and Williams (2001) also regard this approach as being ineffective. Their studies show that the teaching and learning of EE must be holistic and include learning 'about', 'for' and 'in/through' the

environment, which emphasize both classroom and field practice in environmental education to cover the cognitive, psychomotor and affective domains respectively (Lucas, 1972).

The results of the present study revealed that providing EE at an early age, i.e. to primary school learners and younger, helps *develop and shape personalities* and leads to an *environmental behaviour*. Teachers are convinced that childhood is the best period to expose people to EE so that they can acquire knowledge, skills, values and attitudes to shape their personalities. Teachers strongly believe that the strength and development of any nation depends upon how much they have invested in educating their people. Therefore, providing education to young children determines which type of citizens the nation will have in the future. Thus, the teachers view EE as very important and its effectiveness to depend very much on the age of learners. These findings coincide with studies done by Kopnina (2013), Heimlich and Ardoin (2008). They found that EE is vital at an early age since it ensures positive attitudes towards the environment. Rutter (2002) also shows that the childhood years are critical and most significant development in a person's life; they are regarded to be the foundation upon which the rest of one's life is constructed. Rutter argues that early education results in an attitude of caring for the environment and for the development of an environmental behaviour. Research findings with teachers in England also revealed the view that children need to be taught EE at an early age for achieving a lifetime impact (Chatzfotiou, 2006). Veselinovska and Osogovska (2012) emphasize that,

> [s]tudents spend nearly a third of their life in schools, shaping their personalities that are harder to change later. Their integration into society later on depends on their personal qualities and skills that are largely the product of a well-organized and well completed education, including the warm atmosphere of mutual understanding and experience in all school subjects. (p. 5015)

Moreover, Hunger and Volk (1990) support that EE can develop citizenship or environmental behaviour, but the main challenge lies in the willingness to act. However, different results by Grob (1995) suggest that factual knowledge does not show effects on environmental behaviour. The study also found that the strongest effects in terms of environmental behaviour are based on personal philosophical values and emotions. A study by Dettmann-Easler and Pease (1999) found that content knowledge and skills are not as efficient in influencing attitude changes as when action is added to the programme. However, according to the teachers in this study, formal education in which knowledge and skills dominate is the appropriate channel to teach environmental issues since the majority of young people can be reached in formal schooling, especially in primary education (URT, 2012).

Concerning the sub-category of *knowledge transfer*, teachers believe that children can also be the change agents in their families if they are taught EE at school. They believe the large number of children who receive primary education can have an impact on the society they live in and influence the rest of its members to get a sense for protecting the environment. Children will carry the skills they learn from environmental activities at school out to their homes. These findings are similar to the study by Mandel (2005) who says that *"children have tremendous influence over their parents and can use the knowledge and skills learned through their participation in learning experiences to influence the attitudes and behaviours of their parents and other community members"* (p. 75). Vaughn et al. (2003) conducted a

study in Costa Rica to see how children learn and retain conservation principles and how they transfer them to their parents. They found that parents learned from their children, and both influenced their neighbours, resulting in snowball effect on community learning.

On the other hand, other teachers were of the view that it is difficult for children to transfer the knowledge they acquire to their parents as these tend to ignore what their children learn. This claim seems to be supported by a number of previous studies. For example, Davis-Kean (2005) and Hoff et al. (2002) argue that it is the parents' education that will influence the skills their children develop to model and influence their educational practices at home. Nordström (2006) is of the view that if the cultural beliefs and values of a certain society are different from what its children learn at school, it is very difficult for these children to change their practices or the community around them. This is referred to as 'place-based education' which is the framework for teaching and learning where the emphasis is put on practical skills, real-world experiences, helping learners develop strong ties to their local communities, enhancing partnerships between schools and communities as well as on their appreciation of the natural world (Yeshalem, 2013; Bruce, 2011; Duffin et al., 2004). In the same vein, McClaren and Hammond (2005) emphasize that in many cases, learners fail to apply the knowledge and skills from school in a different environment. Makundi's study (2003) in Tanzania confirmed this finding. She found that primary school leavers did not apply the EE they had learnt in agricultural activities at home. The influence of the community members was identified to be the main reason for failing to practise what they had learnt in school. From the researcher's life experience, this can be linked to poverty issues since a majority of parents in Tanzania entirely depend on natural resources to survive. Thus, issues such as deforestation for charcoal burning, fuel wood, timber for furniture and building materials are difficult to abandon even if children would tell their parents about the negative effects. This may imply that children have little chances to influence their society's environmental behaviour.

Teachers also believed that EE can be successful when there are coordinated efforts between the teachers/schools and the parents/communities. Results show that parents of children in private schools regard environmental activities as a punishment and a waste of time for their children. Therefore, they do not support teaching EE to their children. Public schools proved to be more successful with their EE activities in this respect. Teachers reported that parents of children in private schools primarily want their children to pass exams since they pay high school fees. Teachers are obliged to respond to parents' needs since the perception of the quality of these schools is solely based on academic performance. Teachers also felt that engaging in EE activities was a waste of time since EE is loosely placed in the curriculum, with no concrete criteria for assessment, especially in terms of practical skills. Since teachers have a high teaching load, they focus only on content knowledge. Other teachers complained that schools were too academic and passing examinations was the main incentive for learning. Learning, however, is more meaningful when issues of self-discipline and social responsibility are considered, which helps learners solve problems in their daily lives.

Environmental education for solving societal problem

Teachers argued that people's environmental literacy would help solve a lot of environmental problems. They believed in the power of education and were of the view that environmental problems are persisting because people lacked EE. These findings support a previous study by Venkataraman (2008), who also proved that EE is an important strategy in addressing environmental problems faced by communities around the world.

However, teachers made their point clear that for EE to have the power to bring solutions to environmental problems, *active or practical learning approaches* should be applied in teaching. Despite the fact that a majority of teachers admitted not to apply an active learning approach or learning-by-doing, they were aware of how beneficial it would be to do so. Chatzfotiou (2006) emphasizes that an active learning approach ensures active participation in learning and acquisition of knowledge, which are necessary to protect the environment. Analytical, cooperative, research and communication skills can be acquired only when active learning strategies such as active critical thinking and engaging in real issues are applied (Lotz-Sisitka & Raven, 2001). Active learning strategies and methods recommended in the teaching of EE include the following: investigation/experiential, group work, role play, presentations, active learning and demonstration (Ketlhoilwe, 2003). However, Taylor et al. (2009) argue that EE in schools is not transformative because it supports transmissive pedagogy, resulting in rote-learning.

Teachers declared that they were rather applying transmission approaches which mainly covered the dimension of educating 'about' the environment, which is passive and comes along with less pupil-teacher interaction. The majority of teachers were of the view that their common education methods were too theoretical, with the focus being on teaching factual knowledge through a traditional 'chalk-and-talk' approach, which does not foster action-taking, hence making it difficult to motivate children to become responsible citizens. These results support the findings by Wedin (2010), Vavrus (2009) and Mahenge (2004) who found that teachers in Tanzania apply the traditional approach despite the fact that they know active learning is better. Factors like the shortage of T/L materials, large class sizes, poor training and the like were attributed to this situation (Tharp & Dalton, 2007). However, Stevenson (2007) argues that historically and traditionally, schools are structured to transmit basic information so as to practise routine skills and to maintain existing social conditions and relations. Similarly, educational sociologists have described the contemporary role of schools as still being primarily concerned with the transmission of cultural knowledge, skills and values. Thus, teachers' classroom practices and decisions are mainly influenced by pedagogical beliefs which they acquired through training and which defined the role of teachers and learners. As the teacher curriculum was only changed to competence based approach, - which advocates learner-centred methods -, in 2005, majority of teachers in this study were trained before it was implemented.

The government and societal commitments were also a major concern for teachers as necessary requirements for the successful implementation of EE. They saw that EE is not only a school-learning issue, but that the entire society needs to be involved for broader impacts. They were of the opinion that the government does not give much priority to

environmental issues. They called upon the commitment of the government and the society to organize and coordinate EE clubs from the grass-roots and the village level up to regional levels. Teachers believed that if everyone was exposed to EE, they would become more responsible in protecting the environment. In Robottom (1987), Stevenson asserts that individual action is not sufficient for a sustainable enhancement of the quality of the environment, but that collective efforts of communities are necessary.

Teachers also complained that the government expects them to effectively teach EE in schools but does not provide sufficient training or teaching and learning resources to them. This implies that the government's commitment is deficient in this respect, expecting teachers to be responsible, but without building correspondent capacities. When the government introduces reforms and innovations in education without preparing man power accordingly, this can be interpreted as expecting a lot of milk from cows not well-fed. Teachers said they were instead using their own experiences in teaching EE. Under these conditions, it is obvious that EE cannot be implemented successfully. Previous studies have revealed the same results (Wedin, 2010; Vavrus, 2009; Abd-Kadir & Hardman, 2007; Mtaita, 2007; Lee & Williams, 2001). However, for effective teaching, educators need to apply more than just one strategy since learners are unique individuals and have thus diverse needs.

Teachers also pointed out that for EE to be effectively taught in schools, it has to be incorporated into all subjects. They reported that only Geography and Science subjects include clear environmental contents. The rest of the subjects contain either very little or no such topics at all. This claim was confirmed when the researcher wanted to include teachers of other subjects, for example Mathematics, English or Kiswahili, who said there was no EE content in their syllabi. These findings show that teachers have some awareness of EE content in the curriculum. See appendix 1. These results are not in line with what has been emphasized at a UN conference – that EE needs to be integrated at all levels of education and across the entire curriculum (UNESCO, 1977). Similarly, research reveals that the analysis of environmental problems cannot remain restricted to one segment of the curriculum but demands an overall and integrated approach due to its complex nature (Kiarie, 2016).

The next section explores this matter in detail. Because every individual is a stakeholder of the environment, all teachers and learners need to be environmentally literate in order to make informed decisions when utilizing environmental resources.

5.2.2 Teacher awareness about EE content integration into the curriculum

All teachers seemed to be aware of the EE content in their subject curriculum. This theme had two main groups. The first one entailed those teachers who said EE was integrated as independent content or topics in their subjects. The second group involved teachers who said EE content was integrated in other major topics. Some teachers, however, could hardly mention the environmental topics found in their curriculum. These results imply that teachers were aware of EE integration but could not state the contents explicitly. However, while some complained that EE topics were neither clear nor independent, the researcher came to different findings when analysing the syllabi. Several clearly independent EE topics were found, but some could not be identified clearly, as explained in chapter 4. On the one side,

this indicates that some teachers are not aware of what exactly is included in the syllabi, although they claimed that there is some EE content. Otherwise, teachers may not understand some environmental concepts and elements placed in their syllabi. This shows that it might be difficult for them to teach EE elements if they cannot identify them properly as important content to be taught in an integrated approach. Previous research also showed that teachers found it difficult to teach EE as a component integrated into their subjects (Hwang, 2009) and seemed to have no clear principles for its implementation (Drake, 2004). In the same vein, a study conducted in Tanzania found that teachers had no clear understanding of what EE was, with some declaring to have no EE content in their subjects, which proved to be wrong (Lindhe, 1999).

On the other hand, it was found that the EE contents were not clear enough for teachers to easily identify them. These topics were hidden within other major topics, and respondents said that it would need a competent teacher to appropriately interpret such content. Several respondents were not able to pinpoint the EE content found in their subjects. This implies that some of them recognize that they are not competent enough to interpret the syllabi and therefore suggests a need for additional training. It also suggests that the curriculum is not clearly designed to help teachers do their work with ease. This point was supported by the curriculum specialists who said that EE contents were not pointed out explicitly in the curriculum, but were rather implicitly placed. To one specialist, the main problem was the poor quality of teachers in primary schools who cannot correctly interpret the syllabi (CS 2, interview data, 2016). He said primary school teachers were poorly trained, which affected their ability to properly interpret the syllabi and to teach the pupils accordingly. He narrated:

> [...] the first thing I have said was that the teachers are teaching textbooks, and that is not their problem; the problem is their capacity. That is to say they can't go beyond the textbook, and when they read the syllabus, they can't interpret it the way it is supposed to, because of their level of understanding. (CS 2, 24. 188-191)

Since some curriculum specialists assert that the quality of teachers is poor, there is dire need to simplify the curriculum and to place EE content so clearly as to assist the teachers in teaching this knowledge, bearing in mind that EE is an extra content integrated into their traditional subjects, with different approaches and dimensions in teaching. It was also found that many teachers were not able to interpret the curriculum properly after the change from a knowledge-based mode of teaching to a competence-based one in 2005, because there was no proper orientation for teachers before its implementation in schools (URT, 2016). Shulman (1986) emphasizes that teachers need both content and pedagogical knowledge to assume their teaching role effectively. This will make them confident enough to teach EE as an integrated component which covers important pillars of environmental education, as will be examined in the next section.

5.2.3 Teacher awareness of pillars of environmental education in their subject curricula

According to UNESCO (2006, 2012), the pillars of sustainability and environmental education are the ecology, the economy and the culture or socio-cultural aspects. UNESCO considers these pillars to be key to sustainable development (UNESCO, 2006, 2012), and

education is regarded as an essential tool for the realization of sustainability. It is believed that the type of education that will bring about sustainable development is what allows learners to acquire the knowledge, skills, attitudes, capacities and values and will foster responsible citizenship to shape a sustainable future (UNESCO, 2006, 2014). Moreover, UNESCO (2012) emphasizes that sustainability is a paradigm for thinking about a future in which environmental, social and economic considerations are balanced in the pursuit of development and an improved quality of life; a healthy environment is seen as a prerequisite for a prosperous society.

In terms of sustainability, teachers in this study did not seem to be aware of these pillars in the first place. When the researcher explained them in a different way, they all seemed to have ideas about these pillars and could tell the relationships between them. Teachers said that each pillar is very important and that they cannot function individually (Drexhage & Murphy, 2010). Teachers placed human beings at the centre of the pillars and said man or cultural practices have the ability to bring about their sustainability. In this respect, teachers considered education to be key as it would shape the cultural practices and values that are environmentally sustainable. These participants were convinced that when people acquired the according knowledge and skills, they would balance the pillars. But some teachers had a different opinion and argued that human behaviour was hard to predict; so when people were struggling for their lives, they would not consider environmental protection at all, especially for economic gains, even if they had the necessary knowledge and skills. This view is supported by environmentalists, as discussed in earlier sections. They argue that people may have knowledge and skills but may still not be willing to take action due to their own considerations.

According to a majority of teachers, a sustainable balance of pillars requires people to be economically empowered. They disagreed that the provision of knowledge and skills to people should be a priority, but rather emphasized their economic capacity-building. They did not consider knowledge and skills to be determinant factors for balancing the above pillars. The teachers were convinced that economically empowered citizens were able to protect the environment. They added that human beings should be aware that destroying the environment means destroying their own lives, because ‘environment is life’. For learners to understand these important pillars, examining EE content in the curriculum is necessary. This is covered in the next section.

5.2.4 Teachers’ views and perceptions on EE content adequacy

Overall, the EE content integrated into the curricula was perceived to be inadequate by a majority of teachers. Only a few of them had a different opinion. However, it was noted by the researcher that some teachers who claimed that EE content was too poor and did not address the interrelationship of the pillars of sustainability were contradicting the syllabus information. After the syllabi analysis, the researcher found that there were in fact several EE topics with many sub-topics which could be clearly identified. These results suggest that content adequacy is a relative term. And what some think is adequate is contested by others. Some teachers argued that environmental issues are broad in nature, and therefore, more

content should be integrated into the curriculum. However, concerning the interdependence of sustainability pillars, results showed that teachers were either not aware of what their syllabi contained or they had no ability to interpret it properly, as argued in previous sub-sections.

For some teachers, the issue of EE content adequacy was connected to how it was taught. These teachers thought that teaching adequate content is very important, but if it is not taught well (in any of the three dimensions that is 'about', 'for' and 'in/through') it will not transform the learners' attitudes and values. This reflects the active learning approach where all senses are involved in learning. The majority of teachers considered EE teaching to be passive as is a theoretical rather than a practical approach. These results indicate that content adequacy does not only refer to the volume of content but also to the manner in which it is delivered. This suggests that these teachers would rather prefer a little but very well-taught content than teaching a lot of content poorly. Moreover, the availability of T/L was also regarded to be very important in determining the issue of content adequacy.

It was also argued that both old and new teaching and learning materials like books varied a lot in quality and content. Teachers were of the view that the old books had a higher quality in terms of content than the current books. The curriculum specialist in this study revealed that the adoption of the free-market textbook policy was the main cause for poorly edited books. The books formerly published by the Tanzania Institute of Education (TIE) were considered to be better compared to the ones of private publishers. This evidence from the curriculum specialist was in line with the claims of teachers. He said:

> We have not controlled the market, we have liberalized it, and we made it like the market for tomatoes, the same as the book market. […] So that was a gap in the policy which has really confused the teachers. It has allowed a lot and un-trusted individuals who lobby, and you know good lobbyists usually don't have good materials. So they just give some percent to decision-makers and they do business. Unfortunately, the good books are not bought. That was a great failure of this multi-textbooks policy; it gives us a lot of problems. (CS 2, 24. 196-205)

Despite the teachers' claim that textbooks were poor, the search for more knowledge from other sources was seen as very unfair to them. It showed that many teachers were not willing or motivated to search for more knowledge to supplement what was missing in their sources. Many of them claimed to have no money to buy supplementary books. This one reason cannot display the whole picture. It could also mean that teachers do not put much effort into teaching EE due to the workload they have – or even just because of a lack of interest.

On the other hand, some teachers had quite an opposite opinion concerning content adequacy. Some teachers said the contents were even more than enough. And one teacher even commented that children were overdosed. In this category, some teachers thought time allocated for EE learning was not enough to perform all the required activities. Others complained that EE was not given sufficient weight in learning as it was only integrated into other subjects. Moreover, some teachers pointed out that the curriculum is planned by specialists and assumed that therefore, it cannot have flaws. Hence, what is planned must be sufficient for all learners. They regarded the issue of syllabus interpretation as a more important point than the content itself. This means that teachers don't see the bigger picture

involved in the process of designing and developing a curriculum. One of the specialists reported that the curricula they produce were lacking quality due to funding problems.

According to these results, teachers feel that the children are overdosed, but this could also be due to the rather theoretical teaching approach. Teachers admitted to be using such passive methods and said it was difficult for learners to easily understand EE concepts. By nature, EE needs hands-on activities and learning in nature is time-consuming; besides, no concrete assessment is done. Furthermore, schools are found to be very academic, with the main emphasis being on passing examinations. This is mainly linked to the social and cultural role of education as discussed in the theoretical framework. Hence, teachers tend to concentrate on examined subjects and to perceive EE as a waste of time because it is not a subject on its own. Other studies have shown that when EE is integrated across the curriculum, it is not given enough weight and is often overlooked (Rusinko, 2010; Hwang, 2009; Drake, 2004). Many teachers tend to ignore such content since the curriculum is already overloaded.

The issue of poor competence could also be a reason why teachers complain about the content volumes. The assumption that whatever the government plans and designs for learners is flawless does not seems to be valid, since it depends on the level of awareness, priorities, commitment and goodwill to facilitate and implement EE. The curriculum specialists in this study also commented that the government lacks priority and commitment on environmental issues.

5.2.5 Methods of integrating EE into the primary school curriculum

On this sub-theme, teachers were asked their opinions on how EE could be best integrated into the curriculum. Their opinions varied and were grouped under three categories. The first group were of the view that EE should be integrated as a *separate subject or discipline*. The second group said EE should be integrated as *topics into some subjects*. And the last group suggested EE should be integrated *into all subjects*.

The first group of teachers thought that since the nature of the curriculum is subject-based, placing EE as a separate subject would receive a similar attention as other subjects. Therefore, the depth and scope of the content would be thoroughly examined and taught in order to equip learners with sufficient knowledge and skills on environmental issues. These teachers placed a strong emphasis on EE and stated that it needs special attention and should be independent in terms of syllabus, teacher guides, textbooks, assessment procedures, as well as being allocated a defined time in school timetables, just like other subjects. Teachers argued that it would be easy to employ participatory methods during T/L if EE was given enough time. UNESCO (1977) has criticized this approach and demanded that *"[e]nvironmental education should not be just one more subject to be added to the existing programmes but should be incorporated into programmes directed at all learners, whatever their age […]."* (p. 20).

However, when asked if they perceived the curriculum to be overloaded, most teachers agreed. Some refuted their proposal and – after realizing that there were already many subjects – suggested EE should be placed as a topic within other lessons. These results imply that these teachers understood how important EE is, but since it would add to their workload,

they amended their initial opinion to place it as a separate subject. Studies done by Kelani (2015), Barrett (2007), IDRC (1994) and Monroe (1991) also found that the school curriculum is often overloaded, teachers are not highly motivated and basic learning materials are lacking.

Literature has argued that integrating EE into the curriculum needs to be seen as a holistic contribution to knowledge in terms of including both social and natural sciences and helping learners understand their interrelationships (Tilbury, 1995; Palmer & Neal, 1994; WCED, 1987). Thus, treating it as a separate subject might lead to a fragmentation of knowledge, which would impede learners to see its relationship with other disciplines or real-life contexts. In a similar vein, Borg et al. (2014) observed that the concept of sustainability is multi-disciplinary and hence needs to be addressed from a holistic perspective.

The second group of teachers were of the opinion that EE cannot be integrated into all subjects. For example, one teacher thought the science subject is suited best to integrate EE contents. According to her, topics need to be well-structured and sequenced in accordance with the levels of learners. She suggested an approach for a spiral curriculum. This is applied when knowledge is systematically sequenced from known to unknown knowledge. Thus, she suggested learners should begin EE within their immediate environment. This teacher's viewpoint was similar to what the curriculum specialist commented in this study. He said EE is integrated into carrier subjects, for example Geography and Science. These results imply that not only teachers think that EE cannot be integrated into all subjects, but even a curriculum specialist who determines what children should learn at school. He said Social studies and Science were the main subjects for EE integration (CS 2, interview data, 2016). This is supported by the analysis of the curriculum (see appendix 1). Ferreira (2001) also found that there has been a tendency for EE to be primarily integrated into Science subjects and not into all disciplines, which would be necessary for effective EE integration. Results from an earlier study by Simmons (1989) adjoin that a more comprehensive treatment of environmental concerns can be accomplished by incorporating environmental education throughout the entire curriculum at every grade level. Literature proves that many countries have integrated EE only into some subjects, which supports what some teachers said in this study. A status report for EE in the European Union is in line with the views of these teachers. It shows that in countries such as Sweden, Greece, Italy, Ireland, Scotland and Belgium (especially in the Flemish community), EE is largely addressed in some subjects, including geography, science, social studies and technology (Stokes et al., 2001). Non-European countries in this respect include Uganda, Kenya, Botswana, Namibia, Nigeria, New Zealand, Jamaica and China (Mwendwa, 2017; Velempini, 2016; Kimiti & Kipkoech, 2013; Ferguson, 2008; Stapp, 1997).

The last group of teachers was convinced that EE can be taught in all subjects in school. They argued that it can only be effective and successful when addressed in all subjects. These teachers believed that every individual needs to be aware and have the knowledge and skills to make informed decisions on the sustainable use of environmental resources. Therefore, all teachers need to be trained to properly teach EE. Moreover, this group of teachers may be proposing EE to be integrated across the entire curriculum, although they are aware of the curriculum already being full and that adding a new subject would increase their own

workload. It was found earlier that adding more content to an already overburdened curriculum is problematic (URT, 2016; Monroe, 1991) and that expecting every teacher to become an expert on environmental issues is unrealistic (Monroe, 1991). While teachers think that every subject can integrate EE content, the literature objects to this view. The issue of overloaded curricula sounds like this has been a problem for many years, as Clacherty (1989) stated nearly 30 years ago that school curricula are already filled up to the brim and that the addition of EE as a subject must be ruled out completely.

The entire curriculum load encompassed ten subjects but is currently reduced to eight. These subjects are: Kiswahili, English, Mathematics, Science and Technology, Social studies, Civic and Moral education, Vocational skills and Religious education (which currently comes without national examination) (URT, 2016). The reduction indicates that the curriculum was overloaded and efforts are made to reduce the burden for both teachers and learners. Flaws and Meredith (2007) emphasize that this method of integrating EE across the entire curriculum was mainly adopted in order to avoid any additional load or fragmentation of knowledge. Drake (2012) and Hungerford et al. (1994) maintain that EE must be integrated into all subjects as environmental concerns have effects on every aspect of life. In general, collective responsibility is seen by the participating teachers to be the best way to integrate EE into the curriculum. This opinion supports the UNESCO (1978) view which emphasizes interdisciplinary approaches, drawing on the specific content in each discipline. Other researchers in support of this view include McClaren and Hammond (2005). Their results show that teachers view EE content as being indispensable for all subjects. They went on by proposing what they thought was very important for children: to learn in a way as presented in the next section.

5.2.6 Teachers' proposals to integrate EE content into the curriculum

Teachers were given an opportunity to suggest priority environmental issues they would wish their children to be aware of. Under this theme, teachers had varying opinions depending on the value they attached to such issues. Knowledge concerning the conceptualization of EE, its components and the importance of the environment (especially one's immediate environment) as well as the sustainable use of resources was suggested by a number of teachers. They wanted their learners to be aware that resources can be renewable or non-renewable. These teachers were convinced that there is a link between knowledge, behaviour and taking action. They assumed that once people acquire knowledge, they will protect their environment and use its resources sustainably. However, several studies have shown that this is not a guarantee. For example, Hunger and Volk (1990) were opposed to this view, but studies by Gough (1997), Palmer (1998), Hines et al. (1987) as well as Schahn and Holzer (1990) support it. These EE content proposals were in line with an internationally agreed definition of sustainability which emphasizes an awareness of the present needs without compromising the ability of future generations to meet their needs (WCED, 1987).

Moreover, issues of environmental health are very important for learners as teachers emphasize that human health depends very much on the health of the environment they live in. Therefore, people must learn to keep themselves and their environment clean. This view

suggests that learners should begin with the daily activities at home and at school. However, teachers need to understand that the health of learners does not depend only on their immediate environment but also on a broader scope where issues of industrial pollution are critical and cause a number of health problems.

According to the teachers, water resources are also a priority for learners. Water is life, they said. Thus, teaching learners the sources of water and about how to protect them is fundamental. Teachers saw a link between water and forests, and they believed that the greening of the environment and the protection of forest resources is indispensable. Water contamination and its associated diseases, such as cholera, need to be taught to learners for them to be able to make informed decisions. Literature review has proved that the issue of water availability and safety is a critical problem in Tanzania and deforestation aggravates the problem.

What teachers proposed to be important for the learners was very similar to what the syllabi indicates to be learnt at different levels. This implies that teachers acknowledge what the syllabi considered to be important for learning. But it can also imply that the teachers' levels of environmental knowledge are too low due to lack of training for them to be able to think beyond the syllabus. Results from both previous studies and this study indicate that teachers are not trained in environmental issues. The issue of training, however, is critical as it affects their ability to select and use appropriate T/L methods, as discussed in the next theme.

5.2.7 Teachers' views on instructional methods and resources used in teaching environmental education contents

One of the factors determining the success of EE in schools is 'how' such knowledge is taught to learners. The literature adds that the teaching and learning process is an important parameter in measuring the quality of education (Chacha & Zhong, 2013). This stage is critical and determines the success or failure of implementing any curriculum reform or innovation in schools. A curriculum may have a very sound content, but if the implementers have no skills or competence on how to apply the strategies for active T/L, the intended goals of education are difficult to attain. Therefore, the issue of training is critical for any educational endeavour. However, at times, teachers can be competent but may fail to teach effectively due to a number of factors, as will be discussed under this theme.

Teachers' views on which instructional methods they used were explored, and the reasons for their choices of methods were given. They also explained which T/L resources they used. There were two sub-categories under this theme. The first one covered teachers who used *direct transmission or teacher-centred approaches*; in the other category were teachers who declared to use *participatory or learner-centred approaches*, also known as active learning approaches.

The majority of teachers said they used the transmission approach in teaching for a number of reasons such as: lack of T/L resources, large class sizes (which lead to a high teacher workload, especially in urban areas) and a lack of adequate time allocated for EE activities. Moreover, some teachers asserted that it was easy to teach with the transmission approach in order to cover the syllabus contents on time and without a lot of work. Similar findings were

identified by Chi-chung Ko and Chi-kin-Lee (2003) in Hong Kong where teachers applied more traditional methods like lectures when teaching EE, and outdoor activities were uncommon. These teachers had the same opinion as the teachers in this study who said that they used such methods so that they could cover the curriculum. Since academic performance is strongly used to determine the quality of education, teachers tend to apply the methods which will help them cover the syllabus and ensure that their pupils pass examinations (Barrett, 2007). However, in the Tanzanian context as well as many African countries, the T/L environment is almost similar, for example issues of large class sizes and poorly developed human resources. Thus, the use of the teacher-centred approach like lecturing serves this purpose. Additionally, teachers' professional and pedagogical beliefs also determine the choice of teaching approach as explained in chapter two.

Participatory methods require a small number of pupils in a class, but a majority of primary schools in Tanzania has large classes, especially in government schools which are free of charge. For example, the class sizes in this study ranged from 30 to 120 pupils. The schools with the least class sizes were private schools. Similar findings were presented by Vuzo (2008) as well as Galabawa and Lwaitama (2008) who found that private schools had small class sizes of a maximum of 25 pupils. The teachers in private schools in this study also preferred teacher-centred methods, despite smaller classes. This implies that all teachers struggle to complete their syllabi on time and opt for the easier methods.

The problem of large class sizes has been persistent over a long time, and the government effort is to reduce the class pupil ratio (CPR) to 1:40. National statistics show that CPR has improved from 1:92 in 2006 to 1:66 in 2010/11 and declined again to 1:70 in 2012 (URT, 2014a). The scarcity of the classroom infrastructure was among the main causes for large class sizes. Research shows that the overall national shortage of classrooms was at 41.9% in 2013, but with varying magnitudes in individual regions. For example, within the same years, the regional shortages were as follows: Dar es Salaam 41.8%, Kilimanjaro 14.8%, Geita 62.2%, Katavi 58.5%, Rukwa 67.4% and Mwanza 55.3% (URT, 2014a). These results show that the first two regions included in this research were by far better off in terms of school capacities than many other regions. This implies that the situation in many other regions is worse. These results indicate a dire need to orient teachers with skills and strategies to effectively teach large classes as the problem seems to be too difficult to be solved in a near future. The findings also suggest that there is a range of varying quality issues in schools and also calls for quality improvement initiatives.

Literature shows that using teacher-centred methods does not necessarily mean learners take on a passive role – it depends on the ability of the teacher to apply it (Tabulawa, 2003). Despite the fact that the learner-centred approach is best for learning, it originated in the global north where the T/L environment is more conducive in terms of infrastructure, resources, class sizes, manpower and more. Thus, for its adoption in the global south, i.e. in countries like Tanzania, it needs to be re-contextualized to fit the specific local school contexts (Vavrus, 2008; Barrett, 2007).

Some teachers also considered limited areas for learning in nature in urban locations. One teacher said that quite often, teachers were not honest when interviewed about what they actually practised in their classrooms. This indicates that teachers were aware that using the

transmission approach is limiting the pupils in their capability to learn EE in all its dimensions, i.e. in the cognitive, psychomotor and affective domains. This type of approach mainly focuses on education 'about' topics, which emphasizes the cognitive domain where the acquisition of knowledge is fundamental; but it does not promote taking action or the development of environmental behaviour to learners. Several studies conducted in Tanzania and other countries had similar findings that the teacher-centred approach dominates teaching and learning, resulting in rote-learning and recitation (Wedin, 2010; Vavrus, 2009; Abd-Kadir & Hardman, 2007; Tabulawa, 2003; Osaki & Agu, 2002). As has been argued before, this approach is preferred by many teachers due to a number of factors they encounter in their work environment; but the nature of their subjects also encourages this approach. Unfortunately, the nature of EE requires more outdoor activities and projects where the learner-centred approach is suited best.

On the other hand, teachers who used the participatory approach said that the importance and nature of EE requires an active approach to learning if the target is to transform learners' behaviour. According to Mortari (2003), this approach is based on the constructivist view of learning which enhances the learners' capacity of constructing their own knowledge. It enables them to develop a teamwork spirit and to be free to share their ideas (Tabulawa, 2003). Teachers were of the opinion that protecting the environment requires practical measures and experiences such as waste and water management or planting and caring for trees and other plants. Environmental behaviour is a product of active engagement in learning and does not happen by chance. These teachers believe that meaningful learning requires the involvement of all human senses in order to promote values, skills and knowledge to learners. As emphasized by Vavrus (2008), participatory learning stimulates the development of higher-order thinking skills and enhances independent learning skills. Therefore, an active involvement in learning with the aid of audio-visual materials and real-life experiences enhances the ability to memorize information long-term. Similarly, a study by Fullan (2007) pointed out that participatory methods such as fieldwork help the learners establish a link between school learning and daily life in order to eventually develop an action competence due to developing and shaping knowledge, skills and experiences. As they engage in real-life experiences, it helps them integrate social and economic factors, gain much expertise about the subject matter and improve their interests and curiosity (Rogan, 2007). And according to Duffin et al. (2004) place-based education is the best way to learn EE as it cultivates a sense of connection to local places among students, which can also enhance partnerships between schools and communities. It is mainly characterized by interdisciplinary learning, team teaching, hands on experiences that center on problem-solving projects, learner-centred education that adapts to students' individual skills and abilities (Bruce, 2011).

These responses indicate that raising responsible citizens in the future who have the ability to make informed decisions can only be achieved by allowing pupils to learn in the real environment and to engage in various environmental activities when they are still young. This approach develops their personalities in a holistic manner. Research supports this view and shows that visualization is the best tool for making teaching effective and to disseminate knowledge; this can contribute 83% of what is learned. Only 11% is contributed by teacher-centred learning (Cuban, 2001). Moreover, the findings from teachers resonate the UNESCO

(2006) report that sustainability education should be based on concrete experiences to promote learners' behavioural skills and values for a sustainable future.
Some teachers commented that they opted to use transmission approaches because they did not feel competent enough to be creative and to improvise with T/L materials. The majority of urban teachers complained about large class sizes, but only few of them seemed to feel competent with techniques to manage such big classes. However, they all acknowledged the scarcity of T/L resources. This has also been proven by Chacha and Zhong (2013) who found that teachers in Tarime in Tanzania hardly used any teaching aids. This shows that teachers often lack the necessary skills and knowledge. It also implies that this incompetence could have implications on their motivation, too. A study done from Macedonia by Veselinovska and Osogovska (2012) on the engagement of pupils in environmental activities emphasized that change was necessary in some T/L environmental contents, especially in methods for the holistic development of the rational, emotional and value spheres of pupils' personalities. In order to exhaust the discussion on the challenges and limitations teachers encounter in implementing EE in schools, the following section provides a clearer picture.

5.2.8 Teachers' views on the challenges of teaching EE in schools

As revealed in this study, the implementation of EE is not effective according to what the participating teachers reported. Teachers shared their views on what they thought were the major barriers for effective EE teaching. Ko and Lee (2003) categorized two barriers: logistical and personal barriers. The former include barriers such as a lack of teaching materials, textbooks, science laboratories and equipment, sufficient funding and access to outdoor learning. Others include unqualified and under qualified teachers, overcrowded classrooms, heavy teacher workload and an overloaded curriculum. Barriers focusing on teacher traits, such as the teachers' attitudes towards teaching EE, are personal barriers. In this study, many barriers were associated with logistics, and even those found to be personal barriers were based on logistical barriers. For example, the issues of teacher training and the provision of teaching and learning resources have an impact on teachers' attitudes and motivation in teaching EE.
Teachers in this study made clear that teaching is not the only task they have. It is just one aspect out of many. So they thought that the amount of time and effort needed for EE is too big considering the other duties they have. The workload associated with large class sizes was said to be a reason for not having sufficient time to engage fully in EE learning. Activities like marking pupils' work and correcting, planning for lessons and giving grades are time-consuming. According to the literature, schools are very academic, which was also confirmed in this study. Teachers are struggling to complete their syllabi for academic achievement, and the teaching of EE was seen as a waste of time, as it requires learning in nature and engaging in hands-on activities. Moreover, since EE is integrated into other subjects and there are no concrete measures for assessment, it can easily be overlooked. This could also be a reason why teachers did not teach it effectively. Findings from Gitlin and Margonis (1995) declare that *"until fundamental injustices in the character of teachers' work*

are addressed, meaningful reform is unlikely. […] Teachers' workloads should be addressed to allow time for planning, curriculum development, and innovative pedagogy" (p. 403).

Both rural and urban teachers said the lack of T/L materials resulted in a poor conceptualization of environmental concepts in learners and is also time-consuming due to theoretical teaching. Visual aids and study tours were highly limited in the T/L of EE. Urban schools had more problems when it comes to sightseeing, since many were located far from nature, making study tours very expensive for schools and parents.

The problem with insufficient T/L resources is confirmed to be a major challenge by curriculum specialists; during the interview, one of them said:

> The main challenge that I see myself as an expert is the standard resources for curriculum implementation, *standard resources for curriculum implementation*, (respondent's emphasis). We may prepare a curriculum, we prepare teachers and train them, but the teaching and learning resources like books are not there. When you visit the schools, teacher-pupil book ratio is a big problem, what do you expect? I'm telling you Tanzanians are very good planners but when it comes to implementation, there is a big problem. (CS 1, 23. 114-130)

Similar findings were reported in a study conducted in Tanzania by Chacha and Zhong (2013) who found that textbook availability was only at 10.7%, the availability of extra books was at 0%. Moreover, findings reveal that T/L materials for teaching EE have been a critical problem in Tanzania for a number of years (Chacha & Zhong, 2013; MoEVT, 2006).

Some teachers based their complaints on the quality of EE textbooks on the circumstance that they and teacher guides are regularly being changed. They reported that the newly published books brought into school were poorer in quality than the old ones which had been abandoned. Issues of depth and scope of content as well as uniformity were major concerns for teachers. They said the new books were shallow and lacked uniformity between schools. According to them, this led to confusion in the teaching of environmental concepts. They said a major cause for this was the free-market textbook policy by which the government had handed over the task to private publishers. This allowed corruption in lobbying for publishing, so that the best publishers could not compete.

These complaints were verified by a curriculum specialist who participated in this study. He supported the teachers' view by saying that the quality of books had been diluted when the government had allowed private publishers to do the work without proper supervision. He also confirmed the claims of corruption and lobbying to be true. Due to this, he said, the government has re-started to publish especially basic books for schools, which is supposed to address the issue of content quality and uniformity and will leave only supplementary books to private publishers.

Some teachers considered the major obstacle for EE to be the lack of government priorities on environmental issues. According to them, this is the reason why the society is not valuing environmental issues sufficiently. They said the government acts as a role model for the citizens and believed that the environmental condition of the country would be better if the government put more emphasis on it. These results imply that teachers view the government as the top authority, and therefore, EE could only be effectively implemented if the government regarded environmental issues as a priority. This claim was supported by the

curriculum specialists involved in this study. They pointed out that funding for EE is very poor. Hence, there is an absence of standard resources in terms of T/L materials and corresponding skilled human resources. Herzog (2008) also proves that lacking government priority is one of the factors that hinder innovations and reforms in developing countries.

Teachers' competence was also considered to be an important factor for the T/L of EE. Some teachers declared themselves to be obstacles for learning EE due to their own poor competence. This shows that they were aware that not only external factors prevent them from effective teaching, but that their poor competence is also a major factor. They were also aware that their training was very crucial for teaching EE successfully and of the consequences this has for the children. Although this handicap may have an influence on teachers' attitudes towards teaching EE, there is a great association with teacher training. Together with many other limitations stated in this study, the issue of poor EE teacher training has been reiterated by several previous studies; for example, Kimaryo (2011) found that the obstacles teachers are facing when implementing EE seem to be common in many countries. However, many of the identified limitations are associated with the teachers' own theories or beliefs about schooling, knowledge, teaching, pupils and learning (Stevenson, 2007). Study findings by Kanhasuwan and Webb (1987) propose that no new trend in a curriculum can be effectively implemented without an adequate preparation of teachers. Karrian (1994) also emphasized that in order to facilitate the integration of EE into the school curriculum, issues related to *'where', 'what'* and *'how'* to teach need to be addressed. This can only be achieved through thorough teacher training.
Numerous studies have been conducted on this issue, and evidence shows that in many countries, the barriers to the implementation of EE were similar to what the teachers in Tanzania are facing, and most of these barriers fall under the logistical category. These studies include research conducted by UNEP (2017), Velempini (2016), Kelani (2015), Kelani and Khourey-Bowers (2012) as well as Mutisya (2011). Others include Ajiboye and Silo (2009) as well as Salih and Yahya (2009). The following theme sheds more light on the discussion of how teacher training is connected to their motivation and professional development.

5.2.9 Teachers' views on effective implementation of EE

This theme encompassed five main issues of focus as a priority for the successful implementation of EE. These sub-categories were: *teacher training*, the *provision of T/L resources*, *education to the public*, the *provision of subsidies to energy resources* and *making use of already existing research results.*
Under the sub-category of teacher training, teachers focused mainly on in-service training. They thought that it was very important to be contemporary in their jobs so as to fit the dynamic world and to be able to address societal needs. A majority reported that they were not trained for EE in both their pre- and in-service training. They declared to be incompetent in this area and emphasized a need for additional training, as EE is a broad and evolving issue. Lack of proper knowledge and skills in this area leads to a failure in understanding the complex relationships between the main pillars of sustainability, namely ecology, economy

and socio-cultural issues. Thus, teachers need to receive proper in-service training and to be updated on the job in workshops, seminars and short courses in order to enhance their efficiency. Similar results were reported by Chatzfotiou (2006) who also found that teachers did not receive any training for EE, which made it difficult for them to teach this content. In general, the results show that teachers lacked trust in political leaders and deduced or at least suspected that the poor status of their professional training was due to low priorities given to environmental issues in politics.

As the literature emphasizes, teachers are the main determinants for the success or failure of any educational endeavour, and their ability to teach is therefore one of the most important factors in education. This, in turn, can only be attained through good teacher training (Hanushek & Rivkin, 2012). This calls for both subject content and pedagogical knowledge, which are also main determinants for teacher efficacy. Teachers are also expected by the society to provide solutions for a number of issues, including environmental challenges, and to enhance the attainment of sustainable development (Kavenuke, 2013; Bennell & Mukyanuzi, 2005).

In the provision of T/L resources, teachers emphasized the need for study tours and quality textbooks as well as audio-visual materials for active EE learning. Outdoor and hands-on activities were also considered to be very useful. Research also shows that learners acquire very little when taught only addressing their sense of hearing; but when combined with their sense of sight, they achieve the best in learning (Cuban, 2001). Moreover, other findings showed that pupils prefer activities in nature in which they are direct participants and where they feel a direct involvement in preserving the environment, e.g. by maintaining green areas around their school, reforestation and planting crops (Veselinovska & Osogovska, 2012). Thus, academic tours were considered to be very important as far as meaningful EE is concerned. The majority of teachers stated that they needed to do study tours, but many of the sites were far from schools and therefore not affordable. For example, a teacher from a rural school said it was difficult to visit factories and to show learners how they pollute the environment through smoke or toxic wastes. Even covering a distance of only some 40 km (Marangu – Moshi Town) was not affordable. In urban areas, it was difficult to find nearby forest reserves or agricultural activities for children to practise outdoor learning. They called for government intervention for support; however, the teachers had also lost faith in political leaders concerning EE and educational matters in general. They condemned politicians for being irresponsible and related the current poor environmental status of Tanzania to poor political leadership. The results reveal that this loss of faith had been developing over time, and they were not confident about the new government either which has been installed in 2015. They saw all politicians as liars who had never fulfilled their promises.

The issue of textbooks also seemed to be relevant for the teachers. The poor quality, regular changing and scarcity of textbooks were major concerns. They reported that the quality of newly published textbooks was worse than in the old ones. Authors often lacked uniformity in explaining concepts, which confused teachers in choosing the correct books. Due to their poor EE training, teachers said they had to totally rely on their textbooks for teaching. Similar findings were revealed by a study by Morris and Marsh (1991) who found out that the

situation at the lower primary level is dominated by teacher-centred pedagogy and a heavy reliance of textbooks, despite the introduction of activity approaches.

Findings also showed that a majority of teachers had no tendency to look for teaching materials themselves. This was seen to be a result of poor-quality teachers, which in turn led to poor self-efficacy and motivation. Poverty was also reported to contribute to the problem, as some teachers complained that they were not able to purchase their own books. An uncontrolled market policy was condemned to be a major reason for the deterioration of the quality of textbooks. Corruption worsens the process to obtain quality books for schools. This was supported by curriculum specialists in this study, as will be presented in further sections.

The sheer scarcity of textbooks was also considered to be a severe problem. Some teachers reported to have only one book, and that there were no books for learners, or only very few. The Ministry of Education had set a standard pupil-book ratio (BPR), but this sounded impractical. The Primary Education Development Programme evaluation report found that the BPR had been 1:20 in 2001 had improved to 1:5 in 2007/08 and further improved to 1:3 in 2008/09. The goal of the Education Sector Development Programme (ESDP) of ensuring that no child was deprived for lack of teaching materials by the year 2015, qualified teachers, adequate space and other school facilities has been missed by far (URT, 2014). A study by Baganda (2008) found that the BPR in the Mbeya district was 1:2, but higher in regions and varying between subjects. For example, in Science, it was 1:12, while in Mathematics, it was 1:8 respectively. In another study in the Morogoro district, Kimaryo (2011) had very similar findings to Baganda; here, the BPR for Science was 1:12, while English was at 1:10. These results are not different from what the teachers in this study reported. This implies that there is a significant problem with the availability and affordability of textbooks as a learning resource and indicates that T/L cannot be effective. In support of this, study findings from the SACMEQ II project of 2000–2004 found that a conducive learning environment – including the availability of qualified teachers and teacher resource centres as well as teaching and learning materials – are key factors for improving the quality of education (URT, 2014).

Education to the entire public was also emphasized to be an important factor for the successful implementation of EE. Teachers thought that environmental issues concern everyone, and therefore, the entire society needs to be equipped with the necessary skills and knowledge to enable them to make informed decisions when utilizing environmental resources. Teachers pointed out that parents are utilizing resources for their needs every day, and they claimed that relying on children's education alone is impractical as parents tend to ignore what their children have learnt. However, some studies have shown a positive knowledge transfer from children to their parents, as discussed in former sections. UNESCO (1977) recommends that in order to achieve environmental sustainability, EE needs to be taught in all forms of education (such as formal, non-formal and informal approaches) so as to embrace all kinds of people in a society.

The other concern teachers uttered was the provision of subsidies for energy resources such as electricity and gas. They viewed poverty as a major issue and a threat to the success of EE. As the majority of the Tanzanian population is poor, they tend to over-exploit environmental resources for their daily needs. Teachers reported that a majority of the population cannot afford electricity and gas for domestic uses; therefore, they urge the government to intervene

so that people can stop or reduce this over-utilization, especially of forests. However, teachers also reported repeatedly that the government has no priorities on issues of the environment. These findings coincide with a study in Hong Kong where teachers reported that the support for EE implementation by government departments and environmental organizations was inadequate (Lee, 2000).

This indicates that this subsidy proposal cannot be of much value unless the government decides to act. However, it is not easy to implement as the government capacities are still low. It sounds rather easy to keep using forest resources than to use electricity or gas. According to the energy access situation report of 2016, only 16.9% of rural and 65.3% of urban households on the Tanzanian mainland were connected to electricity (URT, 2017). Despite the fact that the government has made efforts towards environmental laws in order to sustain environmental resources like forests, it is difficult to enforce them without addressing the poverty issue, which also needs a long-term solution.

The last issue emphasized by teachers was for the government to make use of research results on environmental issues. They were convinced that the knowledge obtained from research could inform the authorities on the status of the environment and on the steps that could be taken. These results indicate that teachers were sceptical on whether or not the government was utilizing the knowledge from various empirical research projects. They assumed that if this knowledge was utilized, the status of the environment could be improving.

5.2.10 Summary

In general, these results can be summarized by pointing out that the role of the government was seen as a major factor for any success of EE. The issue of financing education in general and EE in particular was also critical and was solely viewed to be a government responsibility. The poor financing of education was seen to result in a number of challenges in teacher training, T/L resources such as textbooks, building infrastructures, public education as well as the failure to subsidize energy resources and utilize the knowledge obtained in empirical research. All these issues were associated with an irresponsibility of political leaders. This shows that teachers did not see any good in the government in terms of educational matters – although the government has passed a number of reforms in education to ensure its quality, for example the Primary Education Development Programme which started in 2001 and is currently in phase 3. An expansion in enrolments, school infrastructures and teacher housing, teacher training and so on are part of this programme. HakiElimu (2014) states:

> Over the past two decades, Tanzania has invested significantly in the education sector with notable outcomes in several aspects, including the rapid expansion of the education sector at all levels, from primary to higher education. (p. iv)

This implies that the government has been working towards improving the expansion of the education sector despite the country's weak economy. However, issues of quality remain a challenge to be solved, as proven by studies done by Hardman et al. (2012), UNESCO (2010) and John (2009), which show that the quality of primary education is still poor despite impressive enrolment rates. In a similar vein, a recent study found that the tremendous

success in enrolment numbers has resulted in overcrowded classes, thus making teaching a big challenge (Matete, 2016). This shows that the government is trying to make progress despite the shortfalls that are coming along with it.

5.3 Teachers' views and perceptions of their motivation and professional development in EE

This objective aimed at exploring teachers' views on their motivation to teach EE and on their professional development. Two categories were established, namely intrinsic and extrinsic motivation. The former has an internal driving force, while the latter is externally driven. It is argued that when individuals are intrinsically motivated, they are more likely engage in activities because they enjoy and have interest in them. Conversely, when people are extrinsically motivated, they engage in activities mainly for instrumental or other reasons, such as to receive a reward (Sansone & Harackiewicz, 2000).

5.3.1 Teachers' views on their motivation for teaching EE

Teachers who claimed to be self-motivated to teach EE gave reasons for their claims. Some said early education received at schools about environmental issues helped them develop their self-desire and motivation. This shows that early education is very important for the development of attitudes and values, which will help develop an environmental behaviour. This view was widely supported by a majority of teachers in this study as well as in the literature, as discussed in the above sections. Some teachers thought that home education was best because it is the first environment children experience. Therefore, parents should teach their children about their immediate environment so that it becomes part and parcel of their lives, as early age has shown to be the foundation upon which the rest of life is constructed (Mustard, 2000; Rutter, 2002). One teacher in the rural area declared to be so motivated that he thought the syllabus was missing a lot of environmental content; thus, he was topping up his teaching from daily life experiences. He thought issues of water management and forest conservation were very important for pupils to be aware of, as they use these resources daily. The relationship between forests and water sources for rural children is essential. Pupils also need to know the consequences of their own actions. Teachers thus suggested that early experiences determine one's willingness to engage in environmental affairs and to ultimately develop an environmental behaviour. However, in practice, it was difficult to determine if at all these teachers were practising what they said, since there were no classroom observations. But from what they reported as challenges they encountered in teaching EE – and as majority of teachers declared to use teacher-centred methods to complete their syllabus –, teaching beyond the syllabus seems to be unfeasible . One teacher commented that sometimes, teachers tend to say things they don't really practice. A majority declared that their teaching was very theoretical and they could hardly engage with learners actively, especially in terms of outdoor activities.

In general, these results suggest that teachers are willing and ready to teach EE, as a majority of them declared to be self-motivated; but there is very little evidence to prove their claims. Evidence from earlier discussions, however, reveals that teachers hardly taught by engaging

learners into active learning. This prevents hands-on outdoor activities. These results imply the rhetoric-versus-reality phenomenon, as teachers seemed to know what teaching was supposed to be like, but in reality, they did not practise it accordingly. According to (Grace and Sharp (2000), Palmer (1998) and Walker (1997), the 'rhetoric-reality gap' can be caused by a number of factors and is expected to occur depending on the traditional purpose and structure of schooling (Stevenson, 2007). These results also indicate that the official curriculum may sound very good and may include a lot of things for pupils to learn in theory. However, in practice, it is in the hands of teachers. They decide what and how to teach in the classrooms. As argued by Dahlberg and Moss (2005), curricula, standards and guidelines act as regulatory frameworks; they only provide external norms that may be reinforced through the process of inspection, but practitioners also have their own internal norms, which are definitely very vital for determining their conduct.

The above-mentioned obstacles also have an impact on the teaching motivation, as found out by HakiElimu (2014) that poor T/L as well as poor working and living environments de-motivate teachers; they may feel no impetus or inspiration to act, while motivated teachers are energized or activated towards an end.

On the other hand, only one teacher boldly and genuinely said that she was teaching EE because she was obliged to do it by the syllabi and not because of her own will. However, she declared to like it due to its importance to human wellbeing. These results imply that this teacher was not motivated to teach EE due to mentioned obstacles. It also sounds like the EE content in the syllabi is too loosely placed and assessed, so teaching it was regarded as a waste of time, as reported by many teachers in the previous discussion. Teacher motivation is believed to be connected to their competence in teaching, as will be discussed next.

5.3.2 Teachers' professional training

Teachers are main determinants for the success or failure of any education endeavour, and therefore, their ability to teach is one of the most important factors in education, which can only be attained through good teacher training (Hanushek & Rivkin, 2012). Both academically and professionally qualified teachers are regarded as a pre-requisite for the provision of high-quality and relevant education at all levels (Sifuna & Sawamura, 2010). Literature has also established that teacher quality has a direct effect on pupil achievement (Sumra & Katabaro, 2014; HakiElimu, 2014; Dobbie, 2011). Moreover, it is argued that teachers are most influential in educating children and teenagers to be the future leaders in protecting the environment (Esa, 2010), as they spend most of their time in school.

Under this category, the majority of teachers in this study, both from rural and urban schools, responded very negatively regarding their professional training. They said that they never received in-service training since they had started working. They associated this problem with a number of reasons. First of all, they thought the government did not prioritize environmental affairs. They said teachers of other subjects like Science or Mathematics at least received some on-job training, but environmental issues were not given priority at all. The teachers believed that the deterioration of the environment is mainly due to ignoring environmental issues. They reported using their own experience in teaching EE and

complained that the government took things for granted and assumed that teachers are able to teach as long as they have books. However, the issue of books was also reported to be critical in terms of the poor availability and control due to the multi-text books policy, as elaborated upon above.

Some teachers reported that the little experiences they had gained in their secondary education assisted them to teach EE. One teacher reported having had the chance to gain EE knowledge from a guest speaker from an NGO who talked about environmental protection, particularly on the forests surrounding Mount Kilimanjaro. The majority of teachers declared that they were not competent both in content and in pedagogy due to a lack of training. However, research emphasizes that teachers' content knowledge as well as pedagogical skills are very essential for the T/L process (Shulman, 1986).

Concerning pre-service training, a majority of teachers said that they were not trained to teach EE. On the one hand, the ones who had taught EE for many years claimed this topic had not been a priority in teacher training in the past at all, because back then, the status of the environment had been good. Issues such as population pressure had not been alarming. On the other hand, teachers who had gathered less teaching years did not have a different opinion from long-experienced teachers.

Problems of poor teacher training have also been widely reported by numerous scholars both in Tanzania and other developing countries. Both pre- and in-service teacher training are judged to be of poor quality since many trainers for pre-service teachers lack experience and expertise in primary education (O'Sullivan, 2010; Mattson, 2006; Cutter-Mackenzie & Smith, 2001; Tilbury, 1992). It is also argued that poor-quality education in Tanzania and many other African countries has been pointed out to be a limiting factor for development (UNESCO, 2010). Therefore, this suggests that there is a dire need for teacher training, particularly on environmental issues, in order to improve the quality of teaching in primary schools and to achieve a good education for sustainable development. These results imply that teachers' motivations (both internal and external) relate to their respective level of competence, which has an impact on their self-efficacy. According to Mosha (2004) and Rogan (2004), the efficacy of a teacher depends on his/her capability (academically and pedagogically) and efficiency (ability, workload and commitment), T/L resources, T/L methods as well as the support by education managers and supervisors. Studies have also shown that teachers' professional development has evident positive impacts on their beliefs and in turn on their practices both inside and outside their classrooms (Kettle & Sellars, 1996). As emphasized by Blömeke and Delaney (2012) in chapter two, teacher competence is embedded in two vital elements: the cognitive abilities which comprise professional knowledge and the affective motivational characteristics which involve professional motivation and beliefs.

5.4 Views and perceptions of heads of schools and curriculum specialists

These educational stakeholders are considered to be very important in this study, since they work closely with teachers in order to ensure the successful implementation of educational innovations and reforms. The information obtained from these leaders was triangulated to

what the teachers had reported on various issues regarding the integration of EE. This contributed to unfolding a comprehensive picture and the roles of various stakeholders.

5.4.1 Views of heads of schools on the rationale of EE in primary schools

The aim of this theme was to compare if what the teachers perceive about EE was in line with their school leaders. This is important because differences in their perceptions may have effects for the implementation of EE in schools. Teachers expect their supervisors to be role models in facilitating the T/L process for the achievement of their school as well as of national educational goals (Hungi, 2011). Literature shows that a school principal's ability to influence the structure, culture and mission of the school is well recognized and that creating a vibrant and successful learning community is a collaborative venture among all the staff of any school (Bredeson, 2000).

The findings reflect that all the HoSs appreciated and saw a great significance of EE integration into primary education. The majority also saw a need to begin with EE in pre-primary education. They had similar arguments to most of the teachers and said that investing into early childhood influences the entire development of the personality of a person, as has been presented in earlier sections. They saw the environment as life and destroying it would be to destroy one's own life. Furthermore, the large number of children in primary schools was seen as a very significant human resource for future awareness of sustainability issues, as well as being able to influence the rest of the society. They also associated environmental problems solely with human activities and thought that proper EE would be a solution, provided active learning and availability of T/L resources.

One would assume that since the teachers and their leaders had similar views on the importance of EE in primary education, its implementation should be successful. However, a number of factors were reported to hinder its success, as discussed in the teacher section. Later sections will compare if HoSs had the same view on the challenges they faced. However, as HoSs, they need to establish various strategies to ensure EE is implemented successfully at school level; this topic is covered in the next section.

5.4.2 Views of heads of schools on the strategies they use to implement EE

These HoSs had almost similar strategies they used to implement EE in their schools. These included topics such as 'don't litter the environment', the 'Mazingira club'[17], 'conserving the environment by garbage separation' and 'greening the school by planting trees'. These strategies show that they are targeting their pupils to acquire the very basic skills and behaviour to ensure their immediate environment is always kept clean. Schools have large numbers of pupils, and if, for example, their management of waste is poor, this would possibly result in diseases, as discussed in previous sections and chapters. When children have a tendency to clean their environment at young age, this might become a steady behaviour for the rest of their lives. Since human beings produce a lot of waste, teaching children how to manage and separate it is crucial for their well-being. However, garbage

[17] Swahili word for 'Environmental club'.

separation was only practised in private schools because they could afford to buy waste bins. This implies that teachers in public schools are not motivated and therefore cannot improvise even for locally made bins.

The strategy of tree-planting was practised in two schools, one in the urban and one in the rural area. This indicates that even urban schools can plant trees, provided they have enough space to do so. This head of school saw the importance of trees in urban environment.

Although these school leaders reported and claimed to be engaged in several environmental activities, this was partly reported differently by the teachers, especially those in private schools. When asked to confirm what the teachers said, they admitted that to be true. This implied that school leaders tended to tell only about the good side of their schools in order to protect their image. The discussion below covers their strategies to ensure the teachers are motivated to teach EE.

Motivational strategies for teachers

Motivating teachers is a very crucial aspect in education as they are the main implementers of educational reforms or innovations. It was observed that there was no intention by the HoSs, both private and public, to train or update their teachers in any way. They confirmed not to do so deliberately as they did not get any support from the government. These leaders also confirmed not to place EE as a priority in school; instead, they concentrated on teaching the subjects that were examined. These results indicate that teachers were only lowly motivated, which could have negative effects on their teaching of EE. The teachers in this study also confirmed not to be trained in EE during both pre- and in-service training. This implies that it is difficult for them to teach EE as they lack both subject matter and pedagogical knowledge. It is evident that very little is done by school leaders to ensure the successful implementation of EE despite the fact that motivation has been proven to play a key role in defining policies to attract, maintain and develop teachers' careers (Claudia, 2015).

One HoS from a public school had a different opinion. He said that HoSs should not wait for the government to do everything. He also did not see a need for on-job training, as teachers already got pre-service training in colleges. This contradicts what the majority of teachers reported about the lack of EE even in pre-service training. This head of school also narrowed EE down to only cleaning and planting trees and said teachers did not need training to do that. This leader did not seem to be aware that EE is a broad, evolving field with a lot of scientific concepts which need competent teachers to teach them. Research has shown that despite the fact that primary education forms the foundation of all other levels of education, teachers do not receive in-service training to cope with changes (Chacha & Zhong, 2013).

In general, it can be said that there were no concrete efforts to help teachers implement EE successfully in schools. This has a negative implication on teacher motivation and on the global efforts to achieve environmental sustainability. These findings are similar to other studies which found that most teachers felt that school administration lacked the commitment to support teachers who might possibly come up with issues or projects to enhance EE (Mwendwa, 2017; Kiarie, 2016). However, it is possible that the social and cultural purpose of schooling which emphasizes on academic achievement of learners compel HoSs not to encourage EE.

Study tours

Study tours are very important in the T/L of EE as they give an opportunity to learners to engage with nature directly and to acquire skills that will enable them to be active citizens in terms of environmental affairs. However, there were very little or no efforts to foster this in these schools. The HoSs did not really give it a priority due to a range of reasons. The majority thought it was a waste of time, while others mentioned the large distance to field-trip destinations and resulting high costs as the main obstacles. HoSs felt like the government was not supporting this movement. Only parents were left to contribute to study tours, but only a few could afford that. This led to a separation of the haves and the have-nots, denying many children equal rights to learn. The situation suggests that learning EE in schools is very theoretical and passive, as teachers have to mainly rely on knowledge transmission. These findings coincide with what teachers reported about study tours. The exception was one school which reported that each class goes on study tours at least twice in a year. However, these tours do not target only EE issues. The majority of teachers and HoSs commented that academic performance was significant to them and that study tours would just waste the teaching time to complete the syllabus, which was named as the main goal.

Teaching and learning materials

Textbooks were regarded as the main T/L materials in this case. Results show that private schools were far better off in terms of school textbooks and other reference books compared to government schools. HoSs in private schools made efforts to ensure teachers participate in the whole process of book selection and purchase. In contrast, government school teachers did not have the opportunity to participate in this important exercise. Two main problems were reported by government teachers and heads of schools: First, the scarcity and second the quality of books, whereby the latter was a result of the above-discussed poor textbook liberalization policy. However, teacher participation in determining which books are best for learners is crucial; they know the needs of their learners better than others. As supported by Chin and Benne (in Bennis et al., 1969), people who have been excluded from decision-making processes do not 'own' decisions or the philosophies on which they are based, and they will have little reason to support the outcomes. In a similar vein Ajiboye and Silo (2009) found that teacher participation in issues of curriculum development and reforms is poor. These study results confirmed what teachers and curriculum specialists reported. This implies also that teachers in private schools were more likely to be motivated to teach EE than government teachers. These findings coincide with research by Vuzo (2008), as well as Galabawa and Lwaitama (2008), according to whom private schools were well-resourced compared to government schools.

It can be concluded that the government had good intentions with the multi-textbook policy, because it was supposed to help learners gain knowledge and skills from a variety of books and publications – by fostering the development of a textbook industry and competition among publishers and suppliers (URT, 2014). However, the modalities and supervision were weak and affected the whole exercise negatively, as reported by teachers, HoSs and even curriculum specialists. The situation of T/L materials in Tanzania is not impressive. A study conducted in primary schools confirmed that this is a central problem (Chacha & Zhong,

2013). It found that there is a critical shortage of textbooks, extra books, and chemicals in laboratories as well as libraries in schools.

5.4.3 Challenges for implementing EE

Results show that HoSs encounter a range of challenges that jeopardize the effective teaching of EE. School 1 faced the problem of an inadequate infrastructure, which has led to large class sizes where teacher-pupil interaction is difficult. Teachers reported that some classes consisted of more than 100 pupils, and the head of school confirmed that these class sizes were too large to teach any subject effectively. This implies that time and classroom management is also difficult for teachers. The issue of poor government support and a lack of funding were reported to be other main barriers which affected the implementation process. These findings are similar to what the teachers reported.

Community education was considered to be very important, because due to their ignorance and poverty, rural community members over-utilize environmental resources for their daily survival. EE needs to be taught to every individual in the society so as to get to the best results. This calls for formal, informal and non-formal education to be provided to all population levels, and efforts to do so have already begun in the National Environmental Management Council (NEMC) (Mtaita & Eames, 2009). The use of media such as radio, television and printed media for educating on different levels is also recommended (URT, 2009). These findings are also similar to what the teachers reported. This implies that both teachers and their superiors regard the entire community education on environmental issues as being very important to have a large impact. Proposals for the government to subsidize energy resources were also a concern for HoSs. However, in a low-income country like Tanzania, it would be difficult for the government to provide such subsidies for the entire population. Empowering people economically and ensuring the sustainability of resources such as forests could be the best way to overcome their over-utilization and to protect the environment. Any challenges reported by HoSs coincided with the teachers' responses. This may imply that these are the real challenges they strive to overcome for an effective implementation of EE.

5.4.4 Views on the effective implementation of EE in primary schools

Professional development through teacher training was seen as the solution to many environmental problems, both local and international. Global efforts towards sustainability will be achieved mainly by providing education at all levels, as emphasized in international forums on the environment. Maintaining the balance between the three main pillars (ecology, economy and culture) is only possible with the power of education. However, it has been argued by both teachers and school leaders that this balance is difficult if people are not economically empowered. As teachers are key implementers, school heads think that it is important to equip them with the necessary knowledge and skills in content and pedagogy to be able to teach effectively, as emphasized by Bertschy et al. (2013) as well as Shulman (1987). Results show that teachers mainly rely on teacher-centred approaches, which is also

related to poor training and a lack of priorities in EE in general. These results are quite similar to what the teachers reported.

Teachers in primary education address a large number of people, which will impact the entire society. However, it was also shown that HoSs were reluctant to come up with strategies to motivate their teachers, for example through EE seminars or workshops. They just expected the government to do so. Even in private schools, the situation was not much different: Even here, HoSs did not make any efforts to train their teachers. The issue of teacher training on EE, both pre- and in-service, was lacking, which was confirmed by the teachers themselves.

In general, it has been shown that teacher training for primary education is still poor and faces a number of challenges. It comprises the largest human resource volume in the education sector in Tanzania. The literature has also emphasized that poor teacher training results in unsatisfactory teaching standards, which leads to poor products. This has been identified to be a limiting factor to development (UNESCO, 2010).

Content adequacy was also a point of concern for HoSs. According to them, EE is not adequately represented in the curriculum to enable pupils to become literate enough in environmental issues. The mode of evaluation also needs to be more concrete, like in other subjects, so that EE can be valued by all school members: teachers, pupils and HoSs. Moreover, the provision of both financial and material resources such as books and spaces for EE activities is fundamental for its effective teaching. Teachers reported to having the same concerns.

The issue of waste management, especially garbage separation and recycling, was highlighted to be critical, and the HoSs urged the government to establish and emphasize that topic for effective EE results.

It can be concluded that the HoSs and the teachers had very similar suggestions on the areas they considered to need improvement so that EE could be effectively taught in schools. However, integrating EE across all curricula without any concrete evaluation procedures contributed a lot to the poor teaching of this topic in schools. Teachers and their leaders declared that schools were too academic and that performance was the only measure of quality education in schools. Anything they proposed seemed to be important, but without placing the same weight on EE as on other subjects, it would be difficult to be taught effectively.

In general, results showed that very little efforts were made by HoSs to improve and motivate their teachers to effectively teach EE. The literature emphasizes that motivating the workforce needs to be a continuous process as this determines the success or failure of organizations (Cronje et al., 2000). These HoSs do not seem to possess the qualities of (IL) as explained in the literature review. Instructional leaders (IL) should go beyond the traditional roles of a head of school (such as normal administrative issues), become a general overseer of what goes on in the classrooms and be determined to develop the capacities of the teachers in order to support their career development (Jita, 2010; Spillane & Zuberi, 2009). They spend

more time focusing on developing the knowledge and implementation of the curriculum, as well as instruction and assessment together with the teachers. However, studies have proved that HoSs in Tanzania and many countries in Africa rarely practice IL despite its importance in promoting teachers' instructional practices and students learning (World Bank, 2010; Spillane & Zuberi, 2009; Lwaitama & Galabawa, 2008). This suggests that HoSs also require leadership training to perform their duties well. Results also indicate that a majority of teachers were not making significant efforts to improve their teaching because their HoSs (as their role models) were neither emphasizing the T/L of environmental issues. Despite the challenges mentioned, instructional leaders would try their best to fulfil the vision and mission of the school.

5.4.5 Views of curriculum specialists on the rationale for environmental education in primary education

The curriculum specialists argued along the same line with teachers and HoSs. They said EE is regarded as a cross-cutting issue, which is the main reason for its placement in the curriculum. They added that environmental challenges and problems are global, which every individual in the society needs to be aware of so that they can find solutions and treat the environment with less harm. The curriculum specialists viewed EE as a vehicle for bringing solutions to many environmental challenges that are present today. They said the curriculum has to address the needs of the society, and since it is affected by environmental problems, it needs to equip people with the necessary knowledge to find solutions for their daily challenges. The literature supports that the provision of education is the key to sustainable development (Shohel & Howes, 2011).

The issue of early education was emphasized by the curriculum specialists in the same way teachers and HoSs did. This suggests that these stakeholders clearly understand the need for and impact of providing EE to all age levels in the society. The general opinion of the majority of participants was that every individual is a stakeholder of the environment, and therefore, the task of protecting it is a collective responsibility.

Teaching and learning materials

The main issue under this category was the provision of textbooks. The teachers reported that the textbooks were inadequate and of poor quality in terms of content. The curriculum specialists also blamed the authorities to be responsible for the supply of material in schools. When they were asked to comment on the concerns of teachers, they had varying perspectives on this. One specialist confirmed that textbooks were a problem especially in terms of availability, while another one said the main problem was the poor quality of recruited teachers. The latter considered that teachers were literally teaching 'textbooks' because they could not interpret the syllabi due to a lack of competence. However, he acknowledged that the problem with the textbooks had been caused by shoddily implementing the multi-textbooks policy. He acknowledged that curriculum specialists did not help the teachers enough to effectively teach EE. These results show that the evidence of there being a serious issue concerning textbooks, since this was reported by all participants.

Despite the fact that private schools did not seem to have this problem, it was equally reported by representatives of the government schools.

The issue of poor training was given weight by all participants. This shows that the magnitude of this problem is huge and requires urgent action if the T/L in schools is to improve. Both pre- and in-service training is needed to master skills in subject content as well as pedagogy. The results imply that there are some efforts from curriculum specialists to support and motivate teachers to teach EE. They reported a number of challenges they encountered in facilitating the implementation of EE in schools, as explained in the next section.

The challenges to a successful implementation of EE

It has been revealed that the challenges specialists identified have a direct impact on daily teaching activities. For example, they said that T/L resources were quite a major obstacle to effectively implementing EE. These findings were similar to what the teachers and HoSs reported.

The other challenge mentioned by curriculum specialists was the ignorance towards the value of education and the curriculum planning process. It was reported that the government priorities in education matters were little and have led to a poor curriculum development process. This implies that the content planned for learners may not undergo a thorough process of designing a user-friendly curriculum which adheres to contemporary local and global demands. They also confirmed that the lack of financial resources was the root cause of many challenges mentioned by a majority of participants in this study. The results reveal that the government provides a very little budget for the education sector, which results in many areas such as curriculum planning or human resource development being half-baked – and thus in poor education. Even the quality of current specialists was reported to be questionable due to a deterioration of quality in many areas. It was concluded that the lack of government priorities on environmental issues is what aggravates the situation in Tanzania. Unless the government decides to be determined in valuing this field, the situation of EE will keep deteriorating, as various studies have shown. If the key implementers are not well-prepared and motivated, effective EE in primary schools will be impossible. The literature also suggests that people with power and influence can prevent or support an innovation depending on the priority they attach to it and the different ideologies they hold about change (Herzog, 2008).

The findings imply that teaching EE in schools is not effective at all and that no concrete efforts are made to improve the situation. It has been noted that hope was lost among the teachers and planners who declared that the teaching of EE cannot be effective as long as even the other core subjects were poorly taught due to ill-trained teachers and a scarcity of materials.

In general, results revealed that the teachers' statements were quite similar to what HoSs and curriculum specialists reported. They sounded very negative almost in every aspect that was researched, since even the specialists did not seem to have any hope that the situation would improve in the near future. The results paint a general picture that improving EE in schools and among the general public in Tanzania is facing a number of challenges and that most of

this deficiency is due to the top authorities not giving priority to environmental issues, as well as a severe lack of resources due to poor funding.

5.5 Summary of discussions

Suffice it to say that the conceptualization of the term 'environment' is narrowly viewed and focuses on mainly one perspective. Although man is among the observable objects, the teachers did not mention themselves as being part of the environment. The invisible elements, like the atmosphere and air, were also disregarded by a majority of respondents. The holistic conceptualization of environment with its 'three pillars' ecology, economy and culture was far from its realization among all teachers.

Teachers were aware of the environmental changes and challenges within and outside their communities. However, these vary between rural and urban dwellers. The issue of increasing climate change is critical and was regarded by all teachers to be a main challenge. Man's activities were perceived to be the sole source of these changes and challenges. This view is highly supported in the literature. Moreover, the concepts, causes and effects of issues like climate change and global warming seemed to be unclear among them. This indicates a lack of competence among teachers, which is likely to affect the T/L of environmental concepts in schools. This study has proven that teachers are not at all trained to teach EE but obliged to do so as this topic is integrated into their subjects. This implies an ineffective teaching of EE in schools.

EE is seen as a remedy for environmental protection only if poverty is also addressed. This seems to be a big challenge because the majority of the Tanzanian population is poor and depends mainly on natural resources to survive. Challenges such as air and water pollution as well as waste management seem to be common in urban areas. Water is both scarce and unsafe for human consumption. Teachers are of the view that these challenges need to be addressed by good town planning and population control, so that EE can have promising effects. Although the issue of population growth was not mentioned by a majority of teachers, it is a significant problem, especially in urban areas. If it is not controlled, it will endanger the sustainability of natural resources, both renewable and non-renewable.

Teachers acknowledge the importance of EE, yet they could not teach it effectively due to both logistical as well as personal limitations, as has been discussed. The same is valid for the choice of teaching methods. Teachers mainly used the teacher-centred approach, although they knew that participatory learning is more appropriate. A lack of training was also mentioned as a factor for the choice of methods.

The discussion reveals that not all teachers were aware of the EE content in their syllabi. The mixed views on which subjects should incorporate EE contents indicate that some teachers feel EE should only be taught in particular subjects, although international agreement emphasizes the integration of EE across the entire curriculum. It is astonishing that all teachers acknowledged the importance of EE in primary schools and even in pre-school but still thought it was the duty of just a few to teach it. This reasoning could be a result of some subjects missing EE contents such as Mathematics and language subjects. Views on content adequacy also varied depending on their subjects and the levels of learners. However, due to

poor training on EE and a large workload, these responses may not be reliable for the evaluation of content adequacy.

Concerning the issue of motivation, teachers seemed to be willing and ready to teach EE effectively only if teacher training, sufficient T/L resources, education to the public, subsidies for energy resources and the use of empirical research were provided. However, the fulfilment of these conditions may not be a guarantee for effectively teaching EE, as it has been shown that the willingness to act is more than just having knowledge, skills and resources.

The HoSs also acknowledged that EE is crucial to be learnt in schools. However, they showed no commitment to implement it or to motivate their teachers.

Despite a number of challenges mentioned, it was shown that EE was not given a priority as it lacks concrete criteria for assessment.

Curriculum specialists also supported the views of teachers and HoSs on the rationale of EE in schools and on challenges encountered. As planners, they have lost hope that the situation might improve in the near future as the government gives a low priority to EE and education matters in general.

On the basis of this discussion, it can be concluded that very little efforts are done to ensure the effective implementation of EE by all participants. Teachers require more support from their superiors, but unfortunately, these also complained about a number of challenges – without showing any efforts to solve them. They totally counted on government support, even for simple things they could in fact initiate themselves. Teachers, who are key implementers, largely viewed EE as an additional workload and a waste of time as they were supposed to teach this topic without having been trained for it. The discussion also reveals that there is poor communication and interaction among the participants at various levels of authority. This indicates failure in implementation as explained in the theoretical framework. Different actors in education must network and fulfil their roles effectively for successful reforms. Moreover, the goals of traditional education and EE must align to allow effective teaching of EE.

CHAPTER SIX: SUMMARY AND CONCLUSIONS RECOMMENDATIONS AND PROPOSALS FOR FURTHER RESEARCH

This study is contextualized with the integration of EE into the Tanzanian primary school curriculum. The study aimed to explore the views and perceptions of teachers, heads of schools, and curriculum developers on the integration of EE into primary education. Exploring their awareness and understanding of environmental issues and challenges is paramount, as literature confirms, EE will be taught how the teachers understand or perceive it (Ajiboye & Silo, 2009). The study also explored the instructional methods used to integrate EE in relation to teacher motivation and professional training. The role of heads of schools and curriculum specialists towards teacher motivation and development for enhancing effective EE implementation was also explored. In order to understand why teachers implement EE the way they do, it is necessary to explore the barriers that teachers, heads of schools and curriculum developers encounter in their daily activities. Teachers work very close with their school leaders and curriculum specialists and collectively they can play a significant role to enhance the implementation of EE. Based on thematic findings, this study proposed key ideas and a model to enhance effective integration and teaching of EE in primary education in Tanzania.

6.1 Summary of the study and major findings

In chapter one, the study covered the context and the background of the study, where the origin and rationale of EE and its placement in Tanzanian schools was explained. The study justified why there was a need for research in primary education. Alongside, the purpose, objectives and questions that guided the study were formulated. Chapter two covered relevant literature, together with the theoretical framework that informed and guided the study. All important aspects needed to explain the phenomenon under inquiry were presented including debates between EE and ESD. Discussion of theories as well as various studies conducted related to the inquiry were covered and the research gap identified. The methodology which explained the research process, the methods for data collection together with strategies to ensure quality or credibility of the study were captured in chapter three. Research findings were then presented in chapter four. The analysis and discussion as well as the interpretation of findings were covered in chapter five. The last chapter gave a concise summary of the study, conclusions and recommendations for future research endeavors as presented in the sections below.

Tanzania is a signatory to international conventions on the environment. Agenda 21 was one of the notable conventions that acknowledged and championed EE/ESD as an integral part of the move to sustainable development. This convention influenced various policy documents to feature environmental issues in the nation as explained in chapter two.

Environmental education has been integrated into the education system in Tanzania at all levels as a response to national and international concerns since 1990's (MoEC, 1995; MoEVT, 2007; URT, 2004; URT, 2012). Despite the fact that EE was integrated for more

than two decades still its teaching encounters a number of challenges which hinders its effective implementation leading to environmentally illiterate citizens. It is assumed that if EE was effectively taught since 1990's at least in primary education where majority population had access to, it would make people knowledgeable and would take action to improve the status of the environment in Tanzania, (currently basic education extends to junior secondary education (Form IV) which is now fee free with effect from 2016). Many studies have proved that the status of environment is still deteriorating (Mwendwa, 2017; Kimaryo, 2011; Mtaita, 2007), despite the efforts to integrate EE content at all levels of education. It is evident from the literature that the government of Tanzania has made significant efforts to integrate environmental issues in many policy documents and sectors as shown above but the main challenge lies in its implementation. One curriculum specialist in this study commented that Tanzania is very good in planning but when it comes to implementation it is very poor. This statement seemed valid due to the findings obtained in this research.

From the findings it can be concluded that the issue of poor finance, lacking government commitment and low value attached to EE have been main obstacles which make other requirements for effective teaching to fail. Requirements such as trained personnel, provision of teaching and learning resources are quite fundamental in implementing EE. Other challenges include large class sizes, little emphasis on teaching EE due to lacking concrete assessment procedures. As schools are too academic, engaging in EE was seen as waste of time. However, content was also said to be inadequate and unclear. It should be noted that EE takes an interdisciplinary approach different from what teachers are used to, the traditional single subject centered-approach with well defined syllabi and materials to use like textbooks and teacher guides. Thus, teachers face challenges in teaching EE as the content is not so clear and they have not been trained to integrate it. By nature EE requires more time to learn outdoors. These challenges were reported by majority of participants in this study.

Literature shows that the long traditional cultures and structures of schooling do not align with goals and principles of teaching and learning EE (Stevenson, 2007; Powers, 2004; Tilbury, 1991). This situation creates a gap between what was anticipated and the real scenario of what actually takes place in the classroom. This is what Grace and Sharp (2000) refers to rhetoric-reality situation. It was reported in this study that sometimes teachers have a tendency of hiding the reality of actually what they do in the classroom when interviewed.

6.1.1 The research purpose

This study aimed to explore stakeholders' (teachers, heads of schools and curriculum developers) views and perceptions on the integration of EE for sustainability into primary school curriculum. These three levels of authority in education are supposed to work very closely together and the perceptions and roles of heads of schools and curriculum developers towards EE can be a motivation or a hindrance factor for teachers to effectively implement EE in schools. Empirical evidence has shown that the implementation of EE is poor and the status of environment is deteriorating. By exploring their views and perceptions in a number of aspects the results will shed light as to why EE implementation does not bring much positive effect despite the fact that it has been integrated in schools with emphasis since

1990's (ETP, 1995). Research evidence shows that perceptions can influence the way people do things (Chi-chung Ko & Chi-kin Lee, 2003). Results from this study will bring to light how these stakeholders perceive EE and its challenges in their respective zones of authority which altogether promote or hinder EE implementation.

6.1.2 Theoretical reflections

In order for EE to be effective and bring positive impacts towards the achievement of sustainable development it needs to be taught beyond content knowledge. It must be holistic in approach to address education *about, for* and *in/through* the environment (Lucas, 1979; Palmer, 1998; Osaki, 1997; Tilbury, 1995). This means that it needs to cover both theory and practice and be participatory in approach. When learners engage actively in environmental activities and projects they become enthusiastic and develop thinking skills and power to make informed decisions. Education for sustainable development also needs to embrace and balance the interrelationship between the major pillars to sustainability which are ecology, economy and social and cultural values.

On the one hand school culture and traditions are complex and therefore making it difficult to make reforms and innovations in education (Stevenson, 2007). The principles and goals of EE require integrated approach together with outdoor learning. This may confuse teachers as they are used to single subject curriculum where mainly direct transmission is prevalent. EE integration has taken different forms such as EE treated as a separate subject, or integrated across the curricula as topics organized around important issues. However, in a subject-centered official curriculum, pedagogy focuses on the acquisition of concepts and ideas associated with discrete disciplines and assessment uses explicit subject derived criteria to measure students' degree of mastery of pre-specified knowledge and skills. The curricula are predefined, discipline-based and emphasize on abstract theoretical problems. In contrast, EE is problem-centered and/or interdisciplinary in its approach (Bernstein, 1975). As argued by Cuban (1984), ideas about how children develop, the role of the school, classroom authority, and the place of the subject matter in instruction determine teaching practices. Therefore, given school conditions such as class size, teacher load, time schedule and so on it is not surprising that teachers fail to engage students in critical and reflective analyses of environmental issues

On the other hand, educational innovations/changes/reforms require a collective responsibility of all the actors in the system in order to be effectively implemented. The theory of diffusion of innovation in education according to Klitgaard (1973) identifies four important factors or levels involved and responsible for either success or failure of innovations or reforms in education. These are: Objectives, implementation, production possibilities and evaluation. Policy makers set the objectives which need to be clear and feasible. Then institutions, bureaucracies and individual actors transmit policy choices into practice for implementation. Techniques available to obtain desired ends and their efficiency would determine production possibilities. Therefore implementers need to be supported to have proper knowledge and skills to implement the change. Lastly, responsible authorities evaluate educational outcomes and provide feedback to the higher authorities for improvement or review of objectives. It is argued that success or failure of an innovation

cannot be attributed to only one factor among the four. Each one is an important part of the system and for the innovation to be successfully implemented all the parts need to fully function and cooperate with other actors. However, the top-down structure in managing educational institutions (Tanzania in this case) is associated with exercising power to lower level/actors in a hierarchy which endangers the interaction and sustainability of innovation/change (Chin & Benne, 1969). Moreover, involving all the actors in decision making is paramount in educational change and reforms. People (teachers in this case) who are left out in decisions will not have a sense of ownership and therefore may not support the change.

6.1.3 Methodological approach

This research study adopted a part of grounded theory approach as well as qualitative methods approach. Grounded method (Straussian perspective) was chosen due to its ability to interpret complex phenomena, its ability to accommodate social issues and appropriateness for socially constructed experiences. (Corbin & Strauss, 2015; Glaser & Strauss, 1967). Thematic approach as well as content analysis were also employed.

The study was guided by four research questions which were:

5. What views and perceptions do teachers have on environmental experiences, issues and challenges?
6. How do teachers perceive EE? And what instructional methods and resources do they use in integrating EE content into their subject curriculum?
7. How do teachers perceive their motivation and professional development on environmental/sustainability education?
8. How do Heads of schools and curriculum specialists perceive EE integration and how do they motivate teachers to successfully integrate EE into their teaching?

These questions were answered mainly by individual interviews and information from official documents. Data from interviews were inductively collected whereby the researcher was open and allowed theories to emerge from the field data. The researcher applied the first steps advocated by Strauss in identifying important concepts or codes. Along with coding the researcher constantly wrote analytic notes called memos about the codes, comparisons and any other ideas about the data (Strauss & Corbin, 2015, 2008; Charmaz, 2006). These concepts or codes were placed under a broader heading to form categories which are referred to as themes. Thematic analysis was also employed concurrently and helped the researcher to identify, analyze and report patterns or themes. Moreover, thematic maps were constructed and helped to see the relationships between codes, themes and sub-themes. The themes inductively emerged since they are strongly linked to the data. This study aimed to apply a thorough grounded theory under Straussian perspective; however, the realities and technical limitations of research obliged the researcher to adopt only few steps involved in grounded theory. As a complement thematic analysis approach by Braun and Clarke (2006) was applied.

Document data were analyzed through conceptual content analysis and description. The main focus was on looking at the occurrence or existence of selected terms within a text such as EE

aims and goals, as well as content in policy documents and in subject curricula. Selected steps developed by Carley 1992 guided the coding and analysis.

6.1.4 Major findings

The findings from this study reveal that there are many changes and challenges in the environment today. However, they are more prevalent in urban environment than rural. Despite the fact that there are natural and man-made causes to changes and challenges, the participants in this study associated all the changes with solely human activities. These include global warming and its associated effects such as climate change, extreme weather changes causing floods or severe drought. The issue of climate change was reported as a major challenge by both rural and urban participants. This indicates the severity of the problem according to their perception.

Air, water and land pollution were associated with industrial emissions, poor waste management and utilization of pesticides and fertilizers was also a main concern especially in urban areas.

Deforestation was mainly a rural change experience. Overexploitation of forest resources was mainly due to growth of population and poverty of majority rural and urban inhabitants as verified in (URT, 2005). The need for energy resource such as firewood, charcoal, area for farming, settlement and building materials was the main source for overutilization of forests. Majority of participants propose EE as a possible solution to these environmental challenges. However, it was seen that it was impossible to protect the environment without addressing the poverty issue first; therefore economic empowerment is paramount as far as environmental sustainability is concerned. It can be concluded that unless poverty issue is addressed, it is difficult to have citizens who are environmentally responsible.

Education is fundamental to achieving sustainability. All the participants acknowledged the teaching of EE in primary education even prior to this level. It was well argued that personality development begins with young age. Thus, in order for people to inculcate a sense of value to the environment, they should have environmental behavior to promote environmental sustainability. However, this will also depend on active process in T/L by ensuring teachers are adequately trained and motivated, and integrating EE in all subjects at all levels of education. Currently, EE is mainly featured in Geography, Social studies and Science subjects (MoEC, 2005, 2006), also in the current Civic and Moral education syllabus (MoEVT, 2016). In the rest of the subjects EE issues are marginalized or even non-existent as shown in appendix 1. Coordinated efforts from both the government and society are highly commended to ensure environmental sustainability. It was strongly commented by majority of participants that the government has placed very little priority on environmental concerns.

Majority of participants were aware of EE integration into their subjects. Some EE content was direct others indirect and teachers complained that in some syllabi EE is not clear and needs interpretation. Hence, teachers find it difficult to identify the EE content to integrate into their teaching. However, the poor quality of teachers was seen as a major reason for failure to interpret the syllabi.

Teachers were not aware that ecology, economy and culture form the main 'pillars' to sustainability. When asked in a more elaborate way, they seemed to be aware and tried to show how they interrelated. They acknowledged them but complained that they were not clearly featured in their syllabi to make learners understand their connectedness. Man was seen as the main determinant for sustainability. Ecology and economy will depend very much on the social cultural values and practices of people towards the environment. Although the political aspect is not featured in the three pillars but it remains an important factor for sustainability as they set laws and policies to govern societies as shown in chapter two.
In general EE content was reported to be inadequate by majority of participants, but few others thought it was more than adequate but not comprehensive enough to cover education *about, for* and *in/through* the environment. Moreover, it was reported that the T/L materials provided were of poor quality and mainly textbooks. However teachers relied heavily on them and were not motivated to look for supplementary books. Government schools suffered more than private ones in this aspect.

Majority of teachers declared not to use participatory methods in teaching EE such as field tours or projects despite the fact that they knew its importance. They applied non-participatory methods such as lectures or just question and answers. EE as part and parcel of ESD proposes that the T/L of EE needs to apply active approaches which are action-oriented (UNESCO-UNEP. 1992; UNESCO 1978). It was revealed that teachers wished to apply participatory methods but a multitude of barriers encountered hindered them.
Regarding methods for integration, teachers had varied opinions. Some thought EE needs to be treated as an independent subject, some thought it needs to be only in few subjects mainly Social studies and Science similar to findings by (Velempini, 2016). Others considered EE as indispensable and cross cutting which needs to be integrated into all subjects. As emphasized by the ESD goals that, sustainability education needs to be incorporated across the entire curriculum and re-oriented to all levels of education (UNESCO, 1977/1978).Tanzania however, has integrated EE mostly in Social studies and Science subjects, although the aim is to integrate it as a content to be learnt in all subjects.
The important areas proposed by most teachers as indispensable for pupils to learn were: the proper conceptualization of environmental concepts, renewable and non renewable resources as well as sustainable utilization of these environmental resources.

Teachers in this study seemed to be motivated as majority claimed to be self motivated and used participatory methods. However, when asked to give examples of such active learning methods, they frankly admitted not to use them. This suggests a gap between what they said and what they actually practiced. They listed a number of barriers they encountered which hindered them from active teaching and learning. This may hinder learners from developing critical thinking and decision making skills (Velempini, 2016; Kimaryo, 2011). Lack of both pre-service and in-service training together with scarcity of T/L resources was reported to affect teacher professionalism and motivation greatly. It also affects their beliefs and their practices both inside and outside the classroom.

Teachers proposed a number of ways to improve the teaching of EE in primary schools. Teacher training was the first priority for teachers as they felt incompetent in integrating and teaching EE content as recommended. They acknowledged to not teaching EE as required due to lack of training. This suggests that teachers require both content and pedagogical knowledge and skills to effectively teach EE. Provision of T/L materials like textbooks was highly emphasized as they relied heavily on them especially textbooks, because they view the textbooks as a source of approved knowledge. This was more a problem to public schools. They also suggested content quality control for private text books publishers. Concerning outdoor activities, urban schools compounds should be large enough to allow environmental activities. Teachers knew that if they are well trained and don't have the T/L resources it would not work.

Apart from school education, teachers also recommended community education as they are the main users of environmental resources. Poverty was regarded a critical issue when it comes to environmental sustainability. Teachers, urge the government to subsidize energy resources like gas and electricity to avoid over exploitation of environmental resources especially forests. However, this proposal seems more expensive for the government to fulfill due to its low economy. Ensuring sustainability of forests resources would be an ideal option.

It was revealed that the heads of schools together with curriculum specialists could not do much to assist the teachers to effectively teach EE as they also relied on resources from the government. They also had a similar view that the government was not giving priority to environmental issues. These school leaders admitted not to have any concrete plans to motivate their teachers, they just waited for the government to plan and finance the small and large training scales. It was commented by one head of school that school leaders should not wait for the government to do everything. Schools could organize some short training to assist teachers. As reported by majority of participants that schools are too academic and the curriculum is already overloaded therefore the main focus was to complete the syllabi and make sure students excel in their exams as this is regarded as a measure for quality of education and individual teachers. Thus, EE was marginalized in teaching as it has no specific guidelines for evaluation and it does not stand as an independent subject. EE activities and academic tours were regarded as a waste of time. In general, majority of participants in this study viewed the issue of financing education especially EE was very poor and almost all the challenges they encountered in implementation were connected to poor funding and lacking of government commitment. These challenges escalate the rhetoric-reality gap in the implementation of EE (Grace & Sharp, 2000; Palmer, 1998; Walker, 1997). These challenges are categorized and summarized in figure 9.

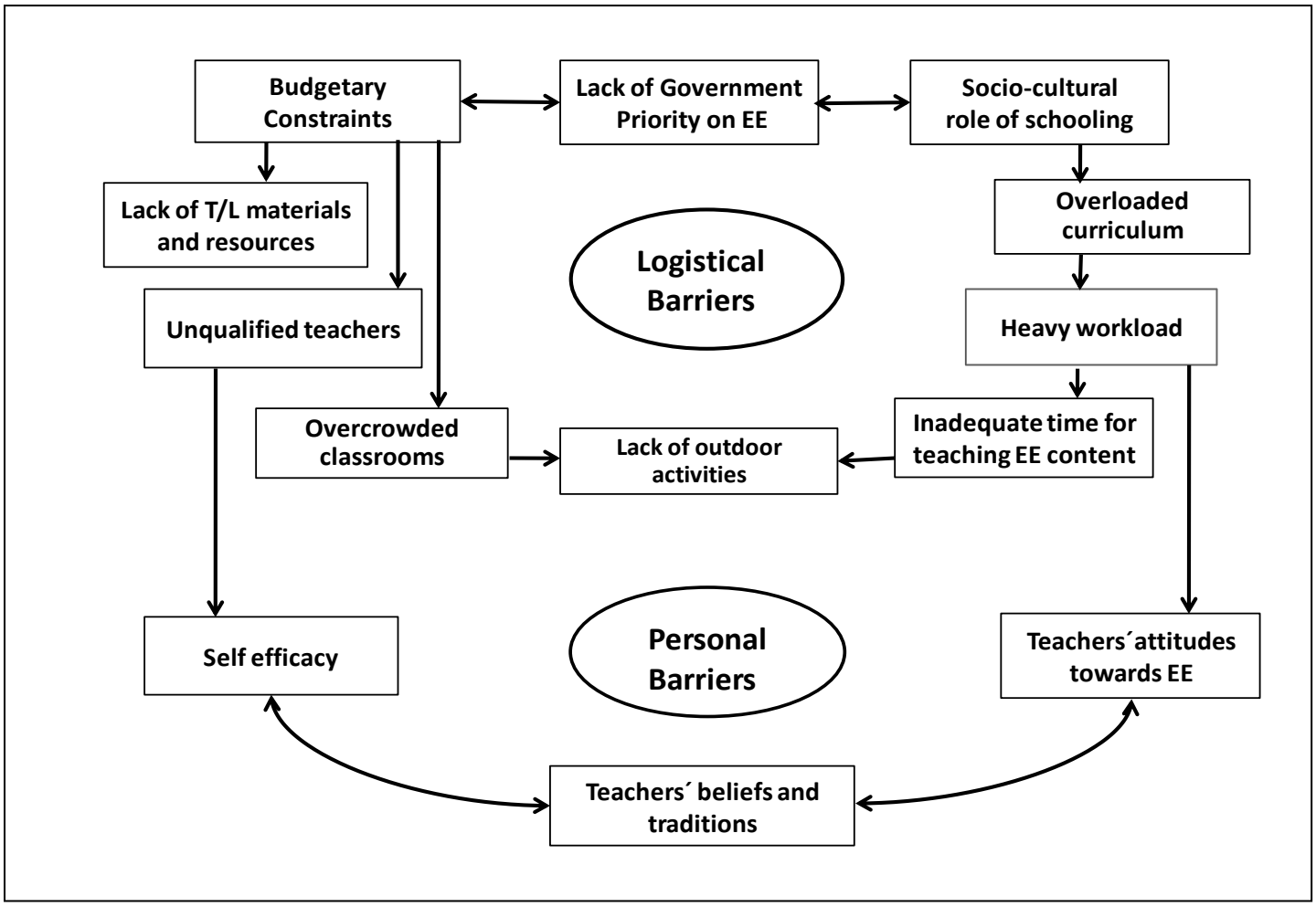

Fig. 10: Summary of challenges for EE in primary schools

As shown in this figure there are two main categories of barriers to effective teaching of EE in primary schools. The logistical barriers cover a multitude of factors that hinder teachers to perform their teaching tasks well. Teachers have very little power at their level to effect positive changes in these factors. As Klitgaard (1973) explains the diffusion of innovation in education, the structure is usually hierarchical and each level of actors has authority and responsibilities to make other levels function. The logistical barriers mainly originate from the top authority which is the government. It is revealed that the government has placed low priority in environmental issues and therefore little is to be expected in the success of EE. Besides low priority placed on EE, the government also suffers budgetary constraints which incapacitate its function as the main actor to help other levels to perform their tasks. Inadequate funding in education leads to lack of: proper teacher training which has impact on teachers' self efficacy (personal barrier) which is determined by capability (academically and pedagogically) and efficiency (ability, work load and commitment), T/L resources, T/L methods and support from education managers and supervisors (Mosha, 2004; Rogan, 2004). Poor budget also results in poor school infrastructure such as classrooms and cause overcrowding. On the other side low government priority on EE could be a result of the social and cultural purpose of schooling. Traditionally, the role of education does not fit well

to the role and purpose of EE as explained in theoretical framework in chapter two. Therefore, integrating EE to an already overloaded curriculum and without clear content and pedagogical knowledge as well as evaluation procedures marginalizes the teaching of EE. Due to heavy workload it is difficult to have enough time to thoroughly teach EE and engage students in outdoor activities or study tours.

Teachers' personal barriers may also emanate from logistical barriers for example when teachers have heavy work load it may affect their attitudes towards EE. Teachers' beliefs and traditions may also be influenced by the traditional purpose of schooling, for example the professional beliefs acquired during their pre-service training on content and pedagogical approaches. On top of that the culture and traditions they have acquired from their societies shape their way of conduct. All these factors influence the way EE is implemented. In order to address the barriers reported in this study the researcher has proposed a number of recommendations that can help to ensure effective teaching of EE in primary schools.

6.2 Policy recommendations

Based on the findings from this study the researcher has identified key policy areas that require adjustments to ensure the T/L of EE in primary schools is successful and capable to achieve the expected aims and goals of EE/ESD for societal wellbeing.

6.2.1 Professional training on environmental issues

The study reveals that teachers lack adequate knowledge and skills to effectively integrate and teach EE in their subjects. This implies lack of training in both subject content and pedagogical knowledge. It was proved by teachers both with many years of experience in teaching and those with less, that they did not receive any training concerning environmental issues or how to teach them. The study also reveals that there has not been any effort to provide in-service training to assist teachers. Thus, teachers used only their little experience they had to teach under very difficult conditions where T/L materials were seriously lacking. This indicates that very little impact can be expected from school learning. Literature emphasizes that in order for teachers to teach according to EE or ESD principles and approaches teachers need to have extensive understanding of these issues (Borg et al., 2014). This can only be achieved through quality teacher training in both pre and in-service training. This situation implies a dire need for curriculum re-orientation in teacher training. Proper training enhances teachers' competence and influences their self efficacy and motivation to actively teach and engage on EE activities. As majority of teachers are already on-job without training, then there should be special programs that will assist them to teach EE. Such programs must be continuous in order to update teachers regularly, as sustainability issues are lifelong and evolving. This will ensure the quality of service delivered by teachers and enhance social transformations and the achievement of education for sustainable development (WCED, 1987).

6.2.2 Establish standard measures for EE assessment

Since EE is integrated into other subjects across the curricula, teachers have a feeling it is just an additional load to what they have already. Due to the fact that teachers are not trained on how to integrate it, majority of teachers do not give it weight in general and especially with respect to hands on activities or learning by doing. As they struggle to complete their syllabi anything not well elaborated is likely to be left unattended. On this basis, the curriculum developers and National Examination Council of Tanzania (NECTA) should design a mode for skills evaluation that will be compulsory for learners to undertake for example projects or excursions and so on. This will motivate the teachers to embark in EE as they do in other examined subjects. If there are no clear defined goals for EE teaching and commitment, it will likely continue to yield poor results. All the same, teachers load need to be considered for efficiency.

Tanzania understood that the goal of education is not only to make learners acquire knowledge and skills but to apply them to solve their daily challenges. Therefore school curricula were changed to competence based approach since 2005. Despite this effort, however, it was revealed that EE and education in general is still more content oriented. Competence based learning helps learners to develop the ability to learn and perform activities to a prescribed standard as it contains specific outcome statements that show the competencies to be attained (Mosha, 2012). Studies show that teachers have not been implementing competence based teaching as they found it complex (Kimaryo, 2011; Tilya & Mafumiko, 2010) and as they lacked necessary knowledge and skills, T/L resources and working in overcrowded classrooms. These findings are not different from what was reported in this study. Setting clear standard measures for EE competence assessment would make teachers obliged and teach EE seriously as other subjects.

6.2.3 Teacher participation in curriculum planning, development and reforms

The study revealed that teacher participation in planning, developing and reforming what to learn is very little. Teachers are key implementers for any educational endeavors. If they cannot comprehend what the content is and how to implement, the curriculum cannot achieve its desired goals. Teachers, heads of schools together with curriculum specialists confirmed that teacher involvement in these important steps was minimal. This implies that teachers will not be able to integrate EE into their subjects to the standards and principles of ESD. Hence, teachers' involvement is very critical as they determine the success or failure of any curriculum reforms and innovation like EE in this case. In the similar vein, a study by Carl (2005) argued that teachers participation is essential not only for institutional and curriculum development but also for fostering the personal and professional growth of the teacher. However, the study adds that this principle is not adhered to and jeopardizes the status of teachers' professionalism. Hence, there should be focused strategies for meaningful involvement of teachers. As Chin and Benne (1969) emphasize that people who have been left out from decision processes, do not 'own' decisions or the philosophies on which they are based, and they will have little reason to support the outcomes.

Curriculum developers also must make sure that the syllabi are explicit and clearly define the teaching methods and activities in learning as well as material resources needed. Moreover, concrete assessment procedures must be clearly defined to assist teachers integrate EE into their subjects. As emphasized by the UN 'Earth Summit' in Rio (1992) that sustainable development is referred to social and economic development, in tandem with environmental protection. These are three interdependent and mutually reinforcing pillars of sustainable development. Thus, curriculum developers should design the curriculum and pedagogic practices that promote sustainable actions with respect to each of the pillars (Siraj-Blatchford et al., 2010).

6.2.4 Financial provision to support school based environmental activities, academic tours and projects

It is evident from this study that lack of finance is a major of setback in the effective implementation of EE. The study revealed that schools could hardly carry out study tours which are very vital as far as EE is concerned. EE was mainly about teaching knowledge which majority said it was insufficient to make learners environmentally literate citizens. The part of skills development through active engagement of all the senses through sightseeing and excursions were missing. Rogan (2007) emphasize that study tours enable learners to integrate the socio-economic factors as they learn to engage in real life. It is evident that learners do not benefit from learning in the nature; this suggests that the goals and aims of ESD are far from being achieved. UNEP (2012) emphasizes that *"[t]he challenges that the country faces like climate change, resource shortages, poverty and uneven distribution of both the benefits and impacts of development will most likely be solved with the full participation of educated and motivated citizens having informed decisions."* (p. 5). Thus, it is highly recommended that the government makes efforts to invest in EE and finance these study tours so that learners engage actively in environmental activities which will make them enthusiastic about environmental issues, have a sense of responsibility and make informed decisions. As emphasized by many participants, to destroy the environment is to destroy own life. When learners do not have opportunity to learn by doing, it is difficult to establish a relationship on how the entire ecosystem works. The significant relationship between ecology, economy and the culture as main pillars of sustainability needs to be clearly understood by learners to be able to establish a balance between them for their own and future well-being. The main goal of ESD is to provide a vision for education that seeks to balance human and economic well being with cultural traditions which are in line with respect for the environment (Siraj-Blatchford et al., 2010). The government also can enable schools to acquire more land around their schools to allow environmental activities in schools. Teachers also need to be motivated and be made aware that study tours can be carried out around the school premises, and only when necessary can involve long distance tours. This also helps to save T/L time.

6.2.5 Establish and enforce school-based environmental policies.

Educational authorities need to encourage schools to establish their local policies to ensure effective implementation of EE. Rural and urban schools have different needs and priorities thus, environmental activities depend on the challenges they encounter in their daily lives. Clear and context based policies will guide schools and make them committed to environmental issues they experience in their communities. The formulation of such policies must be in tandem with enforcement. It was reported that planning is not a problem to Tanzania but the problem lies in implementation of such plans. Schools need to establish their local policies from the National Environmental Policy (NEP) of 1997 which states among other objectives: *"to ensure sustainability, security and equitable use of resources for meeting the basic needs of the present and future generations without degrading the environment or risking health or safety."* and *"to raise public awareness and understanding of the essential linkages between environment and development, and to promote individual and community participation in environmental action."* (NEP, 1997, p. 9 -10). Environmental policy is in line with education for sustainable development as it emphasizes the utilization of resources in a sustainable way and the need to balance environment and development. The study revealed a number of challenges stakeholders encountered during implementation. However, some challenges can be associated with the absence of school based environmental policies.

Proposed model for effective implementation of EE in schools.

The researcher proposes a model based on a number of challenges that have been revealed to hinder effective T/L of EE. The study shows that the teaching of EE in the investigated schools is not effective. Similar situation is proved by other various researchers as shown in earlier chapters. The suggested model is based on ideas from literature and the findings from this study.

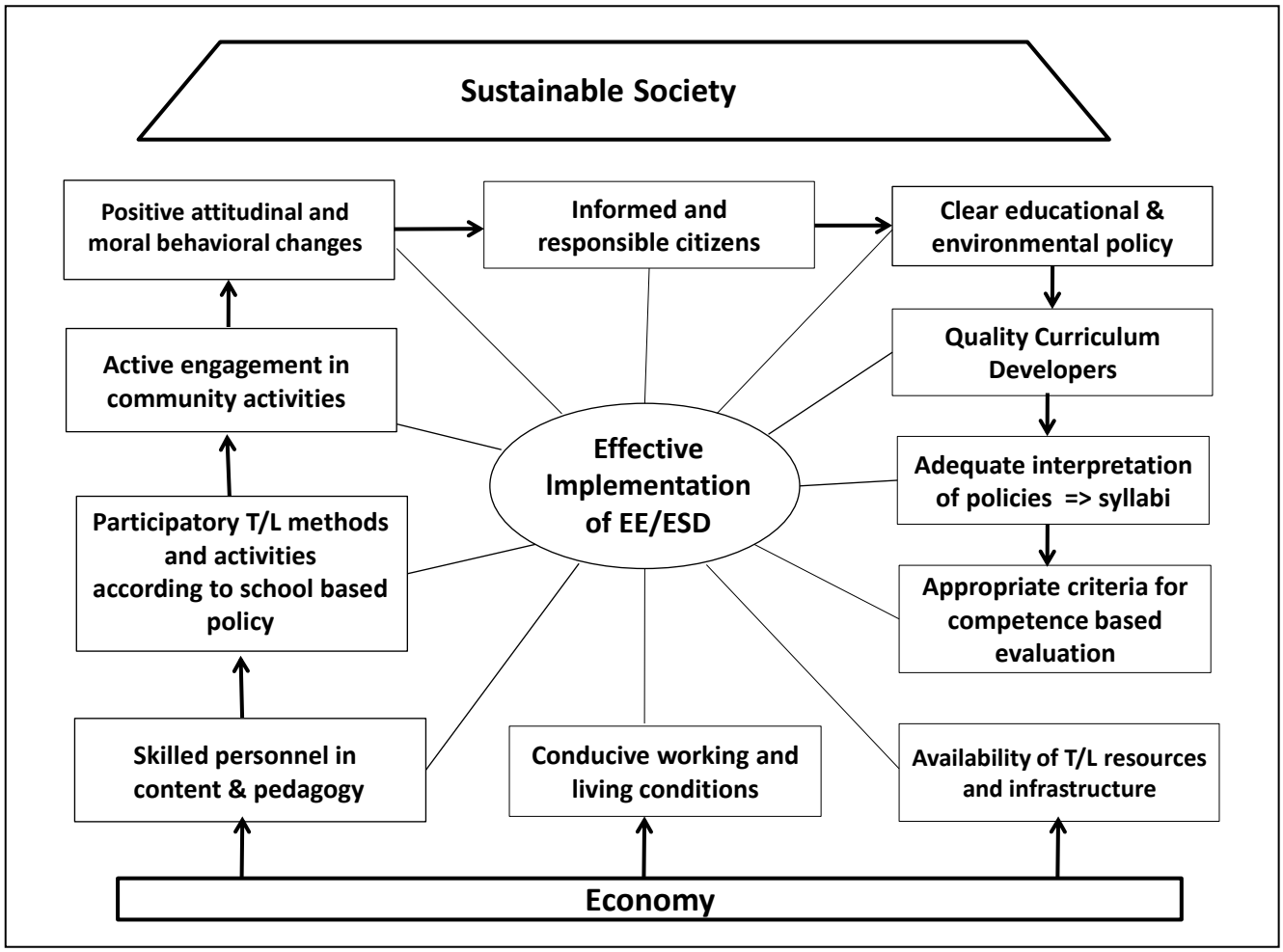

Fig. 11: Effective implementation of EE/ESD

As shown in figure 6.2 in order to have a sustainable society we need to have a strong foundation which is capable to sustain the multiple requirements. The economy of a country in this case is regarded as the foundation and an important determinant factor towards sustainability. In reference to diffusion of innovation in education different actors work in varying levels and have different roles and influences on other actors and levels. First, the government has the role to set a clear and feasible educational policy. Then second, curriculum specialists have the role to interpret the policy and design quality curriculum and set criteria for assessment and evaluation. At the centre of curriculum implementation teachers are key and that is why they form an important part of the foundation. If the economy of a country is poor it affects the quality of teacher training, the working and living conditions of teachers as well as the provision of T/L resources and infrastructure. The figure suggests that when teachers are properly trained, and equipped with conducive working and living resources, then it becomes possible for them to apply participatory learning and together with their learners actively engage in community matters. In this way learners acquire positive attitudes, change in moral behaviors and become informed and responsible citizens. Therefore, the government, curriculum specialists, heads of schools and teachers

need to cooperate and fulfill their responsibilities well, as the success or failure of EE implementation is determined by all actors and levels involved in education.

6.3 General recommendations

The delivery of formal education in Tanzania has been improving especially in recent years where basic compulsory education which is free education has been extended to junior secondary education (Form IV) since 2016. However, majority populations were left out for many years before this change. These people also utilize environmental resources for their daily needs but they hardly have environmental education. The government needs to strengthen and develop new partnerships with the private sector. As environmental issues are vast and evolving the government needs to strengthen the cooperation with other institutions like NGO's, media, religious institutions and even international organizations for collective efforts. These institutions work very close with the society and can easily reach the majority population. They can render EE in various forms for example formal, informal and non formal channels. Non-formal education is characterized by flexible and diversified learning programs which are responsive to learner and environmental needs while informal education generally covers the interactions with friends, family and work colleagues (URT, 2012c).

The government needs to evaluate and control the free market policy for textbooks publishing and other curriculum materials like reference books and teacher guides. This was reported by majority of participants to be a big problem except for the private schools. There is a need to establish a firm supervision for the sake of quality control which was revealed to be a critical issue. The government is urged to publish uniform guide basic textbooks for the entire country, while ensuring thorough control on supplementary and other reference books from private publishers. It was reported that the government has resumed the role to publish basic books, however, the process was said to be slow. The government also needs to improve the provision of T/L resources. It was not only the issue of quality of textbooks, but availability was also a critical concern.

Poverty was reported to be the most contributing factor for deterioration of the environment. This is because poor people have no many alternatives than to exhaust their natural environment for their daily needs. The government has made some efforts in the fight against poverty. For example the National Strategy for Growth and Reduction of Poverty famously known as 'MKUKUTA' in Kiswahili language, but needs to devise new strategies to eradicate poverty and augment the achievement of sustainable development.

6.4 Future research endeavors

This study investigated the views and perceptions of education stakeholders mainly primary school teachers, heads of schools and curriculum specialists, on the integration of EE into primary education. Moreover, it explored the views on why EE implementation has been unsuccessful despite its integration into all levels of education since 1990's. The study revealed that primary school teachers are not at all trained to teach EE despite the fact that EE

has got different principles and approaches in teaching. Teachers are used to the traditional system of subject-centered teaching. EE is required to be integrated into other subjects which also requires teachers to be competent both in content and pedagogy, something that was not achieved. This suggests research to be conducted in teacher colleges to investigate whether or not teachers' curriculum contains adequate and relevant EE content which is competence-based and that emphasizes the balance between ecology, economy and social cultural aspects to achieve education for sustainable development. Research can be done to investigate the quality of tutors who are teaching EE content and pedagogy in teacher colleges so as to ascertain the quality of the educational personnel.

This study was mainly focused on perceptions of primary school teachers on the integration of EE into their subject curriculum. Majority of participants recommended that EE is very crucial for young ages and emphasized that it needs to start with pre-school children. EE at young age has been proved to help learners develop environmental behavior. Through research and experience young children are capable of developing sophisticated thinking in relation to social environmental issues, and the earlier ESD ideas are introduced the greater their impact and influence can be (Siraj-Blatchford et al., 2010). Similar research can be conducted to investigate on views and perceptions of pre-school teachers on EE integration. Research at this level will shed light on how EE is perceived and integrated into curriculum and make specialists' intervention possible.

6.5 Contribution of the study to the body of knowledge

This study has shed light on what perceptions do teachers, heads of schools and curriculum planners have on the EE and its integration into primary education. The study has also put to light that teachers have no appropriate knowledge to teach EE, they only used their experiences and the beliefs they hold towards environmental issues. This is manifested in teachers understanding of important environmental concepts such as climate change, global warming and pillars of sustainability. The conceptualization of climate change and global warming seem confusing to teachers. They were not sure about the relationship between cause and effects. The pillars of sustainability i.e. ecology, economy and culture were also not clear to teachers. This is a good feedback to educational authorities of what is on the ground and enable them to plan or re-orient teacher training programs. Curriculum developers also need to simplify and clarify in each subject syllabus issues like; stating performance objectives, content to be taught, teachers and learners activities, proposed methods and strategies to use, T/L materials as well as clear assessment procedures to assist the teachers to perform their role with ease.

The study has also enlightened on the value teachers and heads of schools have attached to EE. Majority of participants see the value of EE and the need to teach young learners. However, in practice they did not do what they said. The main reason given was lack of training on EE, poor value asserted on EE content evaluation and lack of clear syllabi. As it was integrated across the curricula teachers felt little sense of ownership. The findings of this study put to light that schools are too academic and the quality of education is measured

solely by academic achievement. Evaluation is mainly knowledge based and teachers were focused on completing their syllabi. Thus, EE has little chance to be taught as it requires more outdoor activities. These results will also inform the educational authorities like the examination council and curriculum developers to design learning programs that will measure competence more than knowledge for acquisition of life skills and ability for critical thinking to solve complex problems.

Finally, the study puts to light the issue of poverty to be critical to the achievement of sustainable development. This is a major hindrance to sustainable utilization of resources since majority populations are poor and solely depend on natural resources for survival. Issues like poor training and lack of T/L resources also reflect the little capacity of government to provide such important requirements as far as quality education is concerned. The government was also urged to subsidize energy resources like gas and electricity for the majority of people to afford but it also seems a difficult task for the government due to its low economy.

6.6 Closing remarks

On one hand, an effective and successful implementation of EE in primary education in Tanzania is impeded by numerous socio-cultural, economic, political and also geographical/locational factors. Despite the fact that the government has a big role to play in ensuring availability of resources and training, all other actors in education in their various levels of authorities must also play their roles effectively and sincerely to ensure effective implementation of EE in schools. It should be noted that success or failure in implementation cannot be attributed to teachers only as shown in the theoretical framework. Teachers need a lot of support from other higher educational authorities to perform their tasks effectively. On the other hand, the roles and objectives of traditional education are not congruent with those of EE. Thus, proactive measures need to be taken in all the mentioned aspects in theoretical framework (under school theory) in order to make EE effective.

Environmental literacy is significant as about 80% of the population depends on agricultural activities for survival. More importantly the primary education level is accessed by the majority population who will surely engage in various economic activities such as farming, fishing, lumbering, mining and so on. These activities can have serious negative impacts on the environment if they are not carried out sustainably. Moreover, to achieve sustainability of environmental resources, cultural practices that are environmentally friendly are demanded, so that a culture of valuing and protecting the environment can flourish right from home.

The general and astonishing finding from all the levels of participants in this study is that, they seem to have completely lost hope if at all EE can be a success story, and none felt obliged to make it successful. They all hide behind the government´s failure to train and provide resources for implementation (trained personnel, finance and time), even when they could locally improvise from what was available. This has been used as a good excuse for not emphasizing the teaching and learning of EE in schools. Teachers also complained of unclear syllabi, heavy workload and large class sizes. From a close observation of the findings

obtained, it is obvious that EE cannot be successfully implemented in schools for the following reasons:

- First, EE is loosely placed and integrated into various subjects curricula and does not belong to any particular teacher. Teachers are trained to teach single subjects with well prescribed procedures for assessment and evaluation. Integrating EE into other subjects without training and defining concrete assessment procedures is a good excuse for not teaching EE.
- Second, as the curricula are already loaded teachers and their heads of schools struggle to complete the syllabi in order to ensure high academic achievement for the learners as this is generally used as a criteria for quality education. The nature of teaching and learning EE requires outdoor activities which are time consuming, and therefore is regarded as a waste of time. Unless the government is determined through its responsible ministry and makes a thorough intervention, EE implementation will not yield success for a long time ahead.

It should be noted that the issue of climate change as a result of global warming is also a reality in Tanzania. This issue needs to be clearly conceptualized by both teachers and learners to be able to reduce its causes and also be able adapt to its severe impacts like drought, floods and diseases. Although it sounds a new aspect for primary education but it is high time to emphasize it at all levels of education. Despite the fact that the economy of the country is still low, environmental issues need to be given a special attention both in schools and in the general society. Poor economy also contributes to low enforcement of laws and policies. It is also high time now for the government to look for new contemporary strategies to improve their economy as it has been argued that when people are poor they have little alternatives, thus, tend to over utilize the natural resources for their survival needs. Hence, pushing back the realization of environmental sustainability both at local and global levels.

References

Abd-Kadir, J., & Hardman, F. (2007). The discourse of whole class teaching: A comparative study of Kenyan and Nigerian primary English lessons. *Language and education*, *2*(1), 1-15.

Abid, S. (2006). *Teaching for quality education in environmental education: Challenges and possibilities. Quality in education teaching and leadership*. Karachi: Aga Khan University.

Agbogidi, O. M., & A. U. Ofuoku (2009). Forestry extension: Implications for Forest Protection. *International Journal of Biodiversity and Conservation*, *1*(5), 98-104.

Ahmed, S. A., Diffenbaugh, N. S., Hertel, T. W., Lobell, D. B., Rios, A. R., Ramankutty, N., & Rowhani, P. (2011). Climate volatility and poverty vulnerability in Tanzania. *Global Environmental Change*, *21*, 46-55. doi:10.1016/j.gloenvcha.2010.10.003

Ajiboye, J. O., & Silo, N. (2009). Environmental education in Botswana: Issues, problems and prospects. *International Journal of Environment and Science Education*, *3*(3), 137-148.

Akyeampong, A. K., Pryor, J., & Ampiah, J. G. (2006). A vision of successful schooling: Ghanaian teachers' understandings of learning, teaching and assessment. *Comparative Education*, *42*, 155-176.

Al-Samarrai, S., & Peasgood, T. (1998). Educational Attainments and Household Characteristics in Tanzania. *Economics of Education Review*, *17*(4), 395-417. doi:10.1016/S0272-7757(97)00052-6

Allen, W. (2008). *The Relevance of Secondary School Curriculum on Environmental Education and Awareness in reducing Environmental problems in the Nile Basin: The case of Makelle in Ethiopia* (Master's Thesis). University of Dar es Salaam. Dar es Salaam.

Altheide, D. L., & Schneider, C. J. (2013). *Qualitative media analysis*. Los Angeles: Sage Publications.

Andamon, M. M., & Iyer-Raniga, U. (2013). *Innovation in integrating sustainability education into engineering and built environment curriculum: The case for Asian-Pacific.* (Sustainable building in education).

Apple, M. W. (1982). *Education and power*. Boston, Mass: Routledge & Kegan Paul.

Asoka, G. W. N., Thuo, A. D. M., & Bunyasi, M. M. (2013). Effects of Population Growth on Urban Infrastructure and Services: A Case of Eastleigh Neighborhood. *Journal of Anthropology & Archaeology*, *1*(1), 41-56.

Aziz, F., Akhtar, M. S., & Rauf, M. (2014). Relationship between teachers' competencies and motivation at higher education level in Pakistan. *Pakistan Annual Research Journal*, *50*, 163-174.

Baker, C., Wuest, J., & Stern, N. (1992). Method slurring: The grounded theory/phenomenology example. *Advanced Nurs*, *17*, 1355-1360.

Ball, S. J., & Bowe, R. (1992). Subject departments and the ‘implementation’ of National Curriculum policy: An overview of the issues. *Journal of Curriculum Studies, 24*(2), 97-115.

Ballantyne, R. (1999). Teaching environmental concepts, attitudes and behavior through geography education: Findings of an international survey. *International Research in Geographical and Environmental Education, 8*(1), 40-55.

Ballantyne, R., & Packer, J. (1996). Teaching and learning in environmental education: Developing environmental conceptions. *Journal of Environmental Education, 27*(2), 25-33.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior*, (pp. 71-81). New York: Academic Press.

Barraza, L., Duque-Aristizabal, A., & Rebolledo, G. (2003). Environmental education: From policy to practice. *Environmental Education Research, 17*(4), 395-417. doi:10.1016/S0272-7757(97)00052-6

Barrett, M. J. (2007). Homework and fieldwork: Investigations into the rhetoric-reality gap in environmental education research and pedagogy. *Environmental Education Research, 13*(2), 209-223.

Bednarz, S. W., & Van der Schee, J. (2006). Europe and the United States: the implementation of geographic information systems in secondary education in two contexts. *Technology, Pedagogy, and Education, 15*(2), 191-205.

Bennell, P. & ., P., & Mukyanuzi, F. (2005). *Is there a teacher motivation crisis in Tanzania?* (Dar es Salaam, Tanzania). Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.547.9534&rep=rep1&type=pdf

Bernstein, B. (1975). *Class, codes and control*. London: Routledge & Kegan Paul.

Bertschy, F., Künzli, C., & Lehmann, M. (2013). Teachers’ competencies for the implementation of educational offers in the field of education for sustainable development. *Sustainability, 5*, 5067-5080. doi:10.3390/su5125067

Best, J. W., & Kahn, J. V. (2006). *Research in Education*. Boston: Allyn and Bacon.

Bhandari, B. B. (1999). *Environmental Education at IGES: Conceptual Framework and Methodological Approaches* (Paper prepared for the Workshop on Media and the Environment in the Asia and Pacific Region, Kanagawa, Japan, 16-17 February 1999 organized by IGES (the Institute for Global Environmental Strategies) and the Japanese Forum of Environmental Journalists.).

Bitso, C. (2006). Environmental education and networking in Mafeteng primary schools: A participatory approach. *Turkish Online Journal of Distance Education-TOJDE, 7*(1), 30-40.

Blanchet-Cohen, N., & Reilly, R. C. (2013). Teachers’ perspectives on environmental education in multicultural contexts: Towards culturally-responsive environmental education. *Teaching and Teacher Education, 36*, 12-22.

Blewit, J. (2009). Sustainability literacy: A problematic concept? 'In' A. Stibbe (Ed.), *The handbook of sustainable literacy*. Dartington*:* Green Books. Retrieved from Available at http://arts.brighton.ac.uk/stibbe-handbook-of-sustainability/additional-chapters (accessed 8 October 2009)

Blömeke, S., & Delaney, S. (2012). Assessment of teacher knowledge across countries: A review of the state of research. *ZDM*, *44*(3), 223-247.

Boahene, K. (1998). The challenge of deforestation in tropical Africa: Reflections on its principal causes, consequences and solutions. *Land Degradation & Development*, *9*, 247-258.

Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods*. Boston: Pearson.

Bondar, R., Dudar, E., Foster, A., Fox, M., Mahler, C., & Schwartzberg, P. (Eds.). (2007). *Shaping our schools, shaping our future: Environmental education in Ontario Schools*. Toronto: Queen's Printer for Ontario.

Bonnett, M. (2003). Education for sustainable development: Sustainability as a frame of mind. *Journal of Philosophy of Education*, *37*(4), 675-690.

Borg, C., Gericke, N., Höglund, H. O., & Bergman, E. (2014). Subject-and experience-bound differences in teachers' conceptual understanding of sustainable development. *Environmental Education Research*, *20*(4), 526-551.

Boudah, D. J. (2011). *Conducting educational research: Guide to completing a major project*. Thousand Oaks: Sage.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101.

Braus, J. (1993). *Environmental education in the schools: Creating a program that works*. Washington, DC: Peace Corps Information Collection and Exchange.

Bredeson, P. V. (2000). The school principal's role in teacher professional development. *Journal of In-Service Education*, *26*(2), 385-401. Retrieved from http://dx.doi.org/10.1080/13674580000200114

Brown, S., & McIntyre, D. (Eds.). (1993). *Making sense of teaching*. Buckingham: Open University Press.

Bruce, H. (2011). Green (ing) english: Voices howling in the wilderness. *English Journal*, *100*(3), 12-26.

Brudtland Commission. (1987). *Our common future: The world commission on environment and development*. Geneva, Switzerland: Oxford University Press.

Bryman, A. (2012). *Social research methods* (4th Ed.). New York: Oxford University Press.

Buddy, J. W. (2006). Adoption of innovations in library media programs. *School Library Media Activities Monthly*, *22*(8), 56-58.

Budvytytė, A. (2011). *Environmental education at secondary school system in Lithuania (Using Šilutė as a case)* (Master's Thesis). Lund University. http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1961765&fileOId=1961769

Bush, T., & Glover, D. (2003). *School leadership: concepts and evidence*. Nottingham: NCSL.

Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D.C. Berliner, & R.C. Calfee (Eds.), *Handbook of Educational Psychology* (pp. 709–725). New York: Macmillan.

Carl, A. (2005). The "voice of the teacher" in curriculum development: A voice crying in the wilderness? *South African Journal of Education*, *25*(4), 223-228.

Carley, (1992). Content analysis. Writing guide. https://writing.colostate.edu/guides/guide.cfm?guideid=61

Chacha, G., & Zhong, Y. (2013). The challenges of primary education Level in Tanzania. Case study Tarime district. *Journal of Humanities and Social Science*, *16*(3), 01-06.

Chandler, G. R. (2017). *Deforestation contributing to climate change, extinction*. Retrieved from http://garychandler.com/deforestation-contributing-to-climate-change-extinction/

Chapman, D., & Sharma, K. (2001). Environmental attitudes and behavior of primary and secondary students in Asian cities: An overview strategy for implementing an eco schools programme. *The Environmentalist*, *21*, 265-272.

Chapman, D. A. (2011). Environmental education and the politics of curriculum: A national case study. *The Journal of Environmental Education*, *42*(3), 193-202. doi:10.1080/00958964.2010.526153

Charlesworth, C. H., Burts, D. C., Hart, C. H., & Hernandez, S. (1991). Kindergarten teachers' beliefs and practices. *Early Child Development and Care*, *70*, 17-35.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. London: Sage Publications.

Chatzfotiou, A. (2006). Environmental education, national curriculum and primary school teachers. Findings of a research study in England and possible implications upon education for sustainable development. *The Curriculum Journal*, *17*(4), 367-381.

Chawla, L. (1999). Life paths into effective environmental action. *The Journal of Environmental Education*, *31*(1), 15-26.

Chawla, L. (2006). Research methods to investigate significant life experiences; review and recommendations. *Environmental Education Research*, *12*(3-4), 359-374.

Chin, R., & Benne, K. D. (1969). General strategies for effecting changes in human systems. In W.G. Bennis, K.D. Benne, & R. Chin (Eds.), *The planning of change* (pp. 32-59). New York: Holt, Rinehart & Winston.

Chivian, E. M. D., & Bernstein, A. M. D. (2008). *Sustaining life: How human health depends on biodiversity*. New York: Oxford University Press.

Clacherty, A. J. (1989). *Towards an environmental education programme for the training of primary school teacher*. Cape Town: University of Cape Town.

Claudia, V. (2015). The role of motivation in the development of school teachers' career. *Procedia - Social and Behavioral Sciences, 180,* 1109-1115.

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education* (5th Ed.). London: Routledge.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education* (6th Ed.). London: Routledge.

Conde, M. C., & Sanchez, J. S. (2010). The school curriculum and environmental education: A school environmental audit experience. *International Journal of Environmental and Science Education, 5*(4), 477-494.

Cotton, D. R. E. (2006). Implementing curriculum guidance on environmental education: The importance of teachers' beliefs. *Journal of Curriculum Studies, 38*(1), 67-83.

Creswell, J. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (3rd Ed.)*. Upper Saddle River, NJ: Pearson Education, Inc.

Creswell, J. W. (2012). *Educational research: Planning, conducting and evaluating quantitative and qualitative research (4th Ed.)*. Boston: Pearson.

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice, 39*(3), 124-130.

Cuban, L. (1984). *How teachers taught: Constancy and change in American classrooms, 1890-1980 (1st Ed.)*. New York: Longman.

Cuban, L. (1995). The hidden variable: How organizations influence teacher responses to secondary Science curriculum reform. *Theory into Practice, 34*(1), 4-11.

Cutter-Mackenzie, A., & Smith, R. (2001). Gauging primary school teachers' environmental literacy: An issue of "Priority". *Asia Pacific Education Review, 2*(2), 45-60.

Dachi, H. (2010). Primary School Leadership for Education Quality in Tanzania. A Research Programme Consortium on Implementing Education Quality in Low Income Countries https://www.edqual.org/publications/browse%3Fcountry=tanzania.html

Darkoh, M. B. K. (1992). Towards sustainable development and environmental conservation in African dry lands. *Journal of Eastern African Research and Development, 23,* 1-23.

Dasilva, C. M. (1995). *Divergence or convergence? Local environment knowledge, secondary schools and environmental education in Tanzania* (Canada: Ottawa).

Davis, J. (2009). Revealing the research 'hole' of early childhood education for sustainability: A preliminary survey of the literature. *Environmental Education Research, 15*(2), 222-241.

Davis, J., & Cooke, S. (1998). Parents as Partners for Educational change: The Ashgrove healthy school environment project. In B. Atweh, S.Kemmis & P. Weeks (Eds.), *Action research in practice: Partnerships for social justice in education.* London: Routledge.

Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology*, *19*(2), 294-304.

De Graaff, E., & Cowdroy, R. (1997). Theory and practice of educational innovation through introduction of problem-based learning in Architecture. *International Journal of Engineering Education*, *13*(3), 166-174.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development*, *19*(5), 289-300.

Denzin, N., & Lincoln, Y. (2008). *Collecting and interpreting qualitative materials*. Thousand Oaks: Sage.

Depoy, E., & Gitlin, L. N. (2005). *Introduction to research: Understanding and applying multiple strategies (3rd Ed.)*. St. Louis: Elsevier Mosby.

Dettmann-Easler, D., & Pease, J. L. (1999). Evaluating the effectiveness of residential environmental programs in fostering positive attitudes toward wildlife. *Journal of Environmental Education*, *31*(1), 33-39.

DfEE. (1999). *The National Curriculum*. London: Department for Education and Employment.

Disinger, J. (1993). Environment in the K-12 curriculum: An overview. In R. Wilke (Ed.), *Environmental Education Teacher Resource Book: A Practical Guide for K-12 education, (pp. 21-43)*. Millwood, NY: Kraus International Publications.

Dobbie, W. (2011). *Teacher characteristics and student achievement: Evidence from teach for America* (Harvard University). Retrieved from http://blogs.edweek.org/edweek/teacherbeat/teachercharacteristicsjuly2011.pdf

Drake, L. (2004). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.

Drake, S. M. (Ed.). (2012). *Creating standards-based integrated curriculum: The common core state standards edition* (3rd Ed.). London: SAGE Publications.

Drakenberg, O., Ek, G., & Fernqvist, K. W. (2016). *Environmental and Climate Change Policy Brief Tanzania* (Sida's Helpdesk for Environment and Climate Change). Retrieved from http://sidaenvironmenthelpdesk.se/wordpress3/wp-content/uploads/2013/04/Environmental-and-Climate-Change-Policy-Brief-Tanzania-160530.pdf

Drexhage, J., & Murphy, D. (2010). *Sustainable Development: From Brundtland to Rio 2012* (Background Paper*prepared for consideration by the High Level Panel on Global

Sustainability at its first meeting, 19 September 2010. September 2010 United Nations Headquarters, New York).

Dreyer, J. (1996). *The origin and development of EE*. Pretoria: UNISA, Muckleneuk.

Duffin, M., Power, A., & Tremblay, G. (2004). *Place-based education collaborative (PEEC): Report on cross-program research and other program evaluation activities 2003 – 2004*. Retrieved from Retrieved from http://www.seer.org/pages/research/PEEC%202004.pdf

Duran, D. C., Artene, A. E., Gogan, L. M., & Duran, V. (2015). The components of sustainable development - A possible approach. *Procedia Economics and Finance*, *26*, 806-811.

Díaz-Siefer, P., Neaman, A., Salgado, E., Celis-Diez, J. L., & Otto, S. (2015). Human-Environment System Knowledge: A Correlate of Pro-Environmental Behavior. *Sustainability*, *7*(11), 15510-15526. doi:10.3390/su71115510

Eames, C., Cowie, B., & Bolstad, R. (2008). An evaluation of characteristics of environmental education practice in New Zealand schools. *Environmental Education Research*, *14*(1), 35-51. doi:10.1080/13504620701843343

Ehrlich, P. R., & Ehrlich, A. H. (2013). Can a collapse of global civilization be avoided? *Proceedings of the Royal Society of Biological Sciences*, *280*, 1754-1763.

EP-Nuffic. (2015). Education system in Tanzania: The Tanzanian education system described and compared with the Dutch system. https://www.nuffic.nl/en/publications/find-a-publication/education-system-tanzania.pdf

Ernest, P. (1994). *An introduction to research methodology and paradigms. Educational Research Monograph Series*. Exeter: University of Exeter.

Erol, G. H., & Gezer, K. (2006). Prospective of elementary school teachers' attitudes toward environmental problems. *International Journal of Environmental and Science Education*, *1*(1), 65-77.

Esa, N. (2010). Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*, *19*(1), 39-50.

Esland, G. (1971). Teaching and learning as the organization of knowledge, In: M. F. D. Young, *Knowledge and control: New directions for the sociology of education*. London: CollierMacmillan.

European Commission. (2015). *Report from the commission to the European parliament and the council the mid-term review of the EU biodiversity strategy to 2020*. Retrieved from https://ec.europa.eu/transparency/regdoc/rep/1/2015/EN/1-2015-478-EN-F1-1.PDF

Everhart, R. B. (1983). *Reading, writing and resistance: Adolescence and labor in a junior high school*. Boston, MA: Routledge & Kegan Paul.

Fahey, D. W., & Hegglin, M. I. (2013). *Twenty Questions and answers about the ozone Layer: 2010 update* (Scientific Assessment of Ozone Depletion: 2010). Retrieved from http://www.atmos.umd.edu/~rjs/class/spr2013/readings/WMO_Ozone_2010_QAs_lecture02.pdf

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research*, *38*(1), 47-64.

Ferguson, T. (2008). 'Nature' and the 'environment' in Jamaica's primary schools curriculum guides. *Environmental education research*, *14*(5), 559-577.

Ferreira, J. G. (2001). *Teaching and learning Strategies for Environmental Education*. Pretoria: UNISA.

Fien, J., Abe, O., & Bhandari, B. (2000). 'Towards education for a sustainable future in Asia and the Pacific'. *Prospects*, *30*(1), 41-56.

Finnish National Board of Education. (2004). *National core curriculum for basic education*. Retrieved from http://www.oph.fi/info/ops/pops_web.pdf.

Flambaum, P. (2008). *The effect of biodiversity on ecosystem functioning: The Patagonian steppe as a model* (Doctoral dissertation). Brown University, Providence, Rhode Island.

Flannery, T. (2006). *The weather makers: The history and future impact of climate change*. London: Allen Lane.

Flaws, M., & Meredith, K. (2007). A wind of shift: Integrating curriculum for education for education for sustainable development. *New Zealand Geographer*, *63*, 55-61.

Flick, U. (2007). *Managing quality in qualitative research*. London: Sage.

Flick, U. (Ed.). (2014). *An introduction to qualitative research (*5th Ed.*)*. Los Angeles: Sage.

Flick, U. (Ed.). (2015). *Introducing research methodology*. Los Angeles, CA: Sage.

Frowe, I. (2001). Language and educational research. *Journal of Philosophy and Education*, *35*(2), 175-186. doi:10.1111/1467-9752.00219

Fullan, M. (1989). *Implementing educational change: What we know. PHREE Background Paper Series, Document No. PHREE/89/18*. Retrieved from Retrieved from http://wwwwds. worldbank.org/external/default/WDSContentServer/WDSP/IB/1989/07/01/000009 265_3960929042553/Rendered/PDF/multi_page.pdf

Fullan, M. (2007). *The new meaning of educational change*. Oxon: Routledge.

Galabawa, J. C. J., & Nikundiwe, A. M. (2000). "Why Ugandan secondary schools do well" In J. C. J. Galabawa et al., *Quality of education in Tanzania: Issues and experiences*. Dar es Salaam: University of Dar es Salaam.

Gayford, C. (1996). Environmental education in schools: an alternative framework. *Canadian Journal of Environmental Education*, *1*, 104-120.

Gemeda, D. O., & Sima, A. D. (2015). The impacts of climate change on African continent and way forward. *Journal of Ecological and the Natural Environment*, *7*(10), 256-262. doi:10.5897/JENE2015.0533

Gibbs, H. K., Ruesch, A. S., Achard, F., Clayton, M. K., Holmgren, P., Ramankutty, N., & Foley, J. A. (2010). Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. *Proceedings of the National Academy of Sciences*, *107*(38), 16732-16737.

Gitlin, A., & Margonis, F. (1995). The political aspect of reform: Teacher resistance as good sense. *American Journal of Education*, *103*(4), 377-405.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded theory: Strategies For qualitative research*. New York: Aldine de Gruyter.

Goodlad, J. I. (1984). *A place called school*. New York: McGraw-Hill.

Gough, A. (1997). *Education and the environment: Policy, trends, and the problems of marginalization*. Melbourne: The Australian Council for Educational Research.

Gough, A. (2002). Increasing the value of the environment: a "real option" Metaphor for learning. *Environmental Education Research*, *8*(1), 61-72.

Gough, N. (1992). *Blueprints for greening schools*. Melbourne: Gould League.

Gow, L., & Kember, D. (1993). Conceptions of teaching and their relationship to student learning. *British Journal of Educational Psychology*, *63*, 20-33.

Grace, M., & Sharp, J. (2000). Exploring the actual and potential Rhetoric-reality gaps in environmental education and their implications for pre-service teacher training. *Environmental Education Research*, *6*(4), 331-345.

Grob, A. (1995). A structural model of environmental attitudes and behavior. *Journal of Environmental Psychology*, *15*(3), 209-220.

Gruenewald, D. A. (2004). A foucauldian analysis of environmental education: Toward the socioecological challenge of the earth charter. *Curriculum Inquiry*, *34*(1), 71-107.

Guba, E. G., & Lincoln, Y. S, Y. S. (1994). Competing Paradigms in Qualitative Research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105-117). London: SAGE.

Guerriero, S. (Ed.). (2017). *Pedagogical knowledge and the changing nature of the teaching profession*. Paris: OECD Publishing.

Guskey, T. (2002). Professional development and teacher change. *Teachers and Training: Theory and Practice*, *8*(3), 381-391.

Habermas, J. (1971). *Knowledge and human interests*. (Boston, MA: Beacon Press.

HakiElimu. (2014). *Teaching Effectiveness in Primary and Secondary Schools in Tanzania*. Dar es Salaam, Tanzania: HakiElimu.

Hanushek, E. A., & Rivkin, S. G. (2012). The distribution of teacher quality and implications for policy. *The Annual Review of Economics*, *4*, 131-157.

Hardman, F., Abd-Kadir, J., & Tibuhinda, A. (2012). Reforming teacher education in Tanzania. *International Journal of Educational Development*, *32*, 826-834.

Harrison, K. (2010). The United States as outlier: Economic & Institutional challenges to US climate policy. In L. M. Sundstrom, *Global commons, domestic decisions: The comparative politics of climate change*. London: The MIT Press.

Havelock, R. G., & Huberman, A. M. (1977). *Solving educational problems: The theory and reality of innovation in developing countries*. Paris, France: The United Nations Educational, Scientific and Cultural Organization.

Heimlich, J. E., & Ardoin, N. M. (2008). Understanding behavior to understand behavior change: A literature review. *Environmental Education Research*, *14*(3), 215-237. doi:10.1080/13504620802148881

Herzog, J. D. (2008). Situated learning and compagnonnage formation: Implications for the education systems of poor (and rich) nations. In P. R Dasen and A. Akkari (Eds.), *Educational theories and practices from the Majority World* (pp. 98-122). New Delhi, India: Sage.

Hines, J. M., Hungerford, H. R., & Tomera, A. N. Ž. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education*, *18*, 1-8.

Hittleman, D. R., & Simon, A. J. (2006). *Interpreting educational research: An introduction for consumers of research (4th Ed.)*. Upper Saddle River: Pearson.

Hoff, E., Laursen, B., & Tardif, T. (2002). Socioeconomic status and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting* (2nd Ed.) (pp. 23 1-252). Mahwah: NJ: Lawrence Erlbaum Associates.

Hooper, D. U., Chapin III, F. S., Ewel, J. J., Hector, A, A., Inchausti, P., Lavorel, S., . . . Wardle, D. A. (2005). Effects of biodiversity on ecosystem functioning. *Ecological Monographs*, *75*(1), 3-35.

Huisman, H., Breukelman, H., & Keesman, B. (2016). *Expert mission on integrated solid waste management (ISWM) to Dar es Salaam*. Retrieved from https://www.rvo.nl/sites/default/files/2016/11/Tanzania%20Report%20Expert%20Mission%20Solid%20Waste%202016.pdf

Hungerford, H., & Volk, T. (1990). Changing learners' behavior through environmental education. *The Journal of Environmental Education*, *21*(3), 8-21.

Hungi, N. (2011). *Characteristics of school heads and their schools* (Working paper.SAQMEC). Retrieved from

http://www.sacmeq.org/sites/default/files/sacmeq/publications/03_schheads_final_24nov2011.pdf

Hwang, S. (2009). Teachers' environmental education as creating cracks and ruptures in school education: A narrative inquiry and an analysis of the teachers' rhetoric. *Environmental Education Research*, *15*(6), 697-714.

IDRC. (1994). *Environmental education in Africa* (Resolutions of a Workshop held in Naivasha, Kenya, September, 1994).

IPCC. (2007). *Summary for policy makers. In Climate change 2007: Impacts, adaptation and vulnerability.* (Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate change, ed. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson, 7–22. Cambridge, UK: Cambridge University Press.). Retrieved from https://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf

IUCN. (2004). *Education for sustainable development*. Retrieved from http://www.iucn.org/themes/cec/education/whatis.htm

IUCN. (2008). Learning to change the future: A bird's-eye view of the history of the IUCN Commission on Education and Communication. file:///C:/Users/dell/Downloads/IUCN_2008_see_page_7_for_definition_of_EE_cec_history_30sept08_draft.pdf

Jensen, B. (2002). Knowledge, action and pro-environmental behaviour. *Environmental Education Research*, *8*(3), 325-334.

Jensen, B. B., & Schnack, K. (2006). The action competence approach in environmental education. *Environmental Education Research*, *12*(3-4), 471-486.

Jita, L. C. (2010). Instructional leadership for the improvement of science and mathematics in South Africa. *Procodia–Social and Behavioral Sciences*, *9*(2), 851-854. doi:10.1016/j.sbspro.2010.12.247

John, J. C. (2009). *What is the difference in the quality of education provided by Government and Private Primary schools in Tanzania?* (Master's thesis). Retrieved from https://www.duo.uio.no/bitstream/handle/10852/31124/3/THESISx-xJULITHAxCECILIAxJOHN.pdf

KACEE. (2010). *Kansas environmental literacy plan*. doi:http://www.kacee.org/files/ELP%20for%20KS%20Final.pdf

Kadji, C. (2002). *Evaluation of whole school environmental education, Kansas association for conservation and environmental education*. Retrieved from Available at: www.kacee.org Accessed October 2014.

Kagan, D. M. (1992). Implication of research on teacher belief. *Educational Psychologist*, *27*, 65-90.

Kanhasuwan, L., & Webb, J. (1987). Project for elementary and secondary schools level. In A. V. Baez, G. W. Knamiller, & J. C. Smyth (Eds.), *The environment and science and technology education*. New York: Pergamon Press.

Karrian, M. E. (1994). *Curriculum and instructional design for the integration of environmental education* (Paper presented at the American Vocational Association Conference, Technology Education Division(Dallas, TX, December 9, 1994).

Katz, E., Levin, M. L., & Hamilton, H. (1963). Traditions of research on the diffusion of innovation. *American Sociological Review, 28*(2), 237-252.

Kavenuke, P. (2013). What is it that keeps good teachers in the teaching profession: A reflection on teacher retention. *Social Sciences and Humanities, 4*(1), 165-175.

Kebritchi, M. (2010). Factors affecting teachers' adoption of educational computer games: A case study. *British Journal of Educational Technology, 41*(2), 256-270.

Kelani, R. R. (2015). Integration of environmental education in science curricula in secondary schools in Benin, West Africa: Teachers' perceptions and challenges. *Electronic Journal of Science Education, 19*(3), 1-24.

Kelani, R. R., & Khourey-Bowers, C. (2012). Professional development in sub-Saharan Africa: What have we learned in Benin? *Professional Development in Education, 38*(5), 705-723.

Kember, D. (1997). A reconceptualisation of the research into University academics' conceptions of teaching. *Learning and Instruction, 7*(3), 255-275.

Kessler, S. (1991). Alternative perspectives on early childhood education. *Early Childhood Research Quarterly, 6*, 183-197.

Ketlhoilwe, M. (2003). Environmental education policy implementation in Botswana: The role of secondary education officers and school heads. *Southern African Journal of Environmental Education, 20*, 75-84.

Kettle, B., & Sellars, N. (1996). The development of student teachers' practical theory of teaching. *Journal of Negro Education, 68*(3), 426-432.

Kiarie, S. M. (2016). Effects of teachers' perceptions on students' perceptions and achievement in environmental education in secondary school Biology in Gilgil SubCounty Nakuru County, Kenya. *International journal of environmental & science education, 11*(12), 5736-5761.

Kideghesho, J. R. (2015). Realities on deforestation in Tanzania — Trends, drivers, implications and the way forward. In: Zlatic, M. (Ed.), *Precious Forests - Precious Earth.* (pp. 21-47), Serbia:InTech.

Kim, C., & Fortner, R. W. (2010). Issue-specific barriers to addressing environmental issues in the classroom: An exploratory study. *The Journal of Environmental Education, 37*(3), 15-22.

Kimaryo, L. A. (2011). *Integrating environmental education in primary school education in Tanzania: Teachers' perceptions and teaching practices.* Abo: Abo Akademi University Press.

Kimiti, P. R., & Kipkoech, L. C. (2013). The need to integrate themes of environmental education in the school curriculum in Kenya. *International Journal of Academic Research in Progressive Education and Development*, *2*(1), 51-57.

Kirui, O. K. (2016). Economics of land degradation and improvement in Tanzania and Malawi. In E. Nkonya, A. Mirzabaev, & J. von Braun (Eds.) *Economics of land degradation and improvement – A global assessment for sustainable development*. Cham: Springer International Publishing

Klitgaard, R. E. (1973). *Models of educational innovation and implications for research*. California: The Rand Corporation.

Ko, A. C. C., & Lee, J. C. K. (2003). Teachers' perceptions of teaching environmental issues within the Science curriculum: A Hong Kong perspective. *Journal of Science Education and Technology*, *12*(3), 187-204.

Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239-260.

Kopnina, H. (2013). Evaluating education for sustainable development (ESD): Using Ecocentric and Anthropocentric Attitudes Toward the Sustainable Development (EAATSD) scale. *Environment, Development and Sustainability*, *15*(3), 607-623.

Krishnamurti, J. (1989). *Think on these things: The matter of culture*. New York: Harper &Row Publishers, Inc.

Kuckartz, U. (2014). *Qualitative text analysis*. London, UK: SAGE.

Kuwahara, V. S., Kubo, K., Toda, T., Slamet, A., & Trihadiningrum, Y. (2017). Primary school children and teachers' perceptions of environmental education in Surabaya, Indonesia. *Bulletin of Soka Educational Studies*, *68*(3), 113-135.

Kvale, S. (2007). *Doing interviews*. Los Angeles: Sage.

Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing*. Los Angeles: SAGE Publications.

Lane, J. (1993). *An Assessment o f teachers ' perceived competencies in, attitudes toward, and amount o f class time devoted to teaching about the Environment* (Master's thesis). University of Wisconsin-Stevens Point.

Lashway, L., Mazzarella, J., & Grundy, T. (1997). 'Portrait of a leader.' In C.S. Smith and P.K. Piele (Eds.), *School leadership: Handbook for excellence (3rd Ed.).* Eugene, OR: ERIC Clearinghouse on Educational Management.

Lassa, P. N. (1996). *A forward in teachers' education. An imperative for national development (ED)*. Kaduna: National Commission for Colleges of Education.

Lee, J. C. K. (2000). Teacher receptivity to curriculum change in the implementation stage: The case of environmental education in Hong Kong. *Journal of Curriculum Studies, 32*(1), 95-115. doi:10.1080/002202700182871

Lee, J. C. K., & Dimmock, C. (1998). Curriculum management in secondary schools during political transition: A Hong Kong perspective. *Curriculum Studies, 6*(1), 5-28.

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

Leveson, L. (2004). Encouraging better learning through better teaching: A study of approaches to teaching in accounting. *Accounting Education, 13*(4), 529-548.

Lichtman, M. (2010). *Qualitative research in education: A user`s guide* (2nd Ed.). Thousand Oaks: Sage.

Lieberman, A., & Miller, L. (1992). *Teachers- their world and their work: Implications for school improvement*. New York: Teachers College Press.

Lindhe, V, V. (1999). *Greening education, prospects and conditions in Tanzania* (Doctoral Thesis). Uppsala University.

Lotz-Sisitka, H., & Raven, G. (2001). *Active learning in OBE: environmental learning in South African schools.* (Research report of the National Environmental Education Programme — GET Pilot Research report. Pretoria: Department of Education).

Lovejoy, T. E., & Hannah, L. (2005). *Climate change and biodiversity*. New Haven: Yale University Press.

Lucas, A. M. (1972). *Environment and environmental education: Conceptual issues and curriculum implications* (Doctoral Thesis). Ohio State University.

Lucas, A. M. (1979). *Environment and environmental education: Conceptual issues and curriculum implications*. Melbourne, Victoria: Australian International Press and Publications.

Lucas, U. (2002). Contradictions and uncertainties: Lecturers' conceptions of teaching introductory accounting. *British Accounting Review, 34*(3), 183-203.

Lumpe, A. T., Haney, J. J., & Czerniak, C. M. (1989). Science teachers' beliefs and intentions to implement science-technology-society (STS) in the classroom. *Journal of Science Teacher Education, 9*(1), 1-24.

Lundgren, U. P. (1981). *Education as a context for work. Report on Education and Psychology no. 1* Stockholm, Department of Educational Research, Institute of Education.

Lwaitama, A. L., & Galabawa, J. C. J. (2008, 21st October). *"Community secondary schools: How long is their journey to quality education."* Paper presented as a contribution to the on-going national education debate, (Dar es Salaam: Tanzania Education Network (TEN).

Lynas, M. (2004). *High tide: How climate crisis is engulfing our planet*. London: Harper Perennial.

Mahenge, S. T. (2004). Creating an environment of critical thinking in classroom teaching. In N. Mtana, E. Mhando and G. Höjlund (Eds.), *Teaching and learning in primary education in Tanzania* (pp. 94 – 108). Dar-es-Salaam: Ecoprint Ltd.

Makhoba, A. J. (2009). *Implementation of Environmental Education in Senior Phase: A Survey of Cluster Schools* (Master's Thesis). University of Zululand. Retrieved from http://uzspace.uzulu.ac.za

Makundi, E. (2003). Environmental education curriculum policy in Tanzanian schools. *Southern African Journal of Environmental Education, 20,* 135-141.

Malekela, G. A. (2004). *Report of the assessment on the impact of participation of head teachers in the three month certificate course in management skills on their schools.* Report submitted to the Agency for the Development of Educational Management (ADEM), (April, 2004). Bagamoyo.

Maloney, M. P., & Ward, M. P. Ž. (1973). Ecology: Let's hear from the people. An objective scale for the measurement of ecological attitudes and knowledge. *American Psychologist, 28,* 583-586.

Manaseh, A. M. (2016). Instructional leadership: The role of heads of schools in managing the instructional programme. *International Journal of Educational Leadership and Management, 4*(1), 30-47.

Mandel, P. (2005). *Children as change agents: The influence of integrating environmental education into home learning projects on families and community members*. Retrieved from http://digitalcommons.fiu.edu/cgi/viewcontent.cgi?article=1098&context=sferc

Manjengwa, J. M. (1998). EE for sustainable development in secondary schools in Zimbabwe: A focus on gender difference. *The International Journal of EE and Information, 17*(1), 17-25.

Mansour, N. (2009). Science teachers' beliefs and practices: Issues, implications and research agenda. *International Journal of Environmental & Science Education, 4*(1), 25-48.

Marais, P., & Meier, C. (2004). Hear our voices: Student teacher's experience during practice teaching. *African Education Review, 1*(2), 220-233.

Marchese, C. (2015). Biodiversity hotspots: A shortcut for a more complicated concept. *Global Ecology and Conservation, 3,* 297-309.

Marshall, H. H. (1992)., H. H. (1992). *Reconceptualizing learning for restructured schools.* Paper presented at the annual meeting of American Educational Research Association, San Francisco, C.A.

Mary, A. L., & Majule, A. E. (2009). Impacts of climate change, variability and adaptation strategies on agriculture in semi arid areas of Tanzania: The case of Manyoni District in Singida Region, Tanzania. *African Journal of Environmental Science and Technology, 3(8), 206 – 218*.

Mastrilli, T. (2005). Environmental education in Pennsylvania's elementary teacher education programs: A statewide report. *Journal of Environmental Education*, *36*(3), 22-30.

Matete, R. (2016). Challenges facing primary education under decentralisation of primary school management in Tanzania. *International Journal of Humanities and Social Science*, *6*(1), 175-184.

Matsoga, J. T. (2009). Waste management and disposal in Botswana: The need for a public education curriculum. In Taylor et al., *Environmental education in context: An international perspective on the development of environmental education* (pp. 215-227). Rotterdam: Sense Publishers.

Mattson, E. (2006). *Field-Based Models of primary teacher training: Case studies of student support systems form Sub-Saharan Africa.* London: Department for International Development.

McCain, M., Mustard, F., & Shanker, S. (Eds.). (2007). *Early years study 2: Putting science into action*. Toronto: Council for Early Child Development.

McClaren, M., & Hammond, B. (Eds.). (2005). Integrating education and action in environmental education. In E. Johnson and M. Mappin (Eds.), *Environmental education and advocacy. changing perspectives of ecology and education* (pp. 267 – 291). Cambridge: Cambridge University Press.

McIntyre, D. (1985). A school-based development programme? In S. Brown & P. Munn (Eds.), *The changing face of education 14 to 16: Curriculum and assessment*. Windsor: NFER

McKeown-Ice, R. (2000). Environmental education in the United States. A survey of pre-service teacher education program. *Journal of Environmental Education*, *32*(1), 4-11.

McKeown, R., & Hopkins, C. (Eds.). (2009). EE and ESD: Two paradigms, one Crucial Goal. In B. Chalkley, M. Haigh & D. Higgitt (Eds.), *Education for sustainable development. Papers in Honour of the United Nations Decade of Education for Sustainable Development (2005-2014)* (pp. 221 – 224). Abingdon Oxon: Routledge.

McMichael, J., & Lindgren, E. (Eds.). (2011). *Climate change: present and future risks to health, and necessary responses.* The Australian National University, Canberra, Australia, and 2 Institute of Environmental Medicine. Stockholm,Sweden.

Mellado, V., Ruiz, C., Bermejo, M. L., & Jiménez, R. (2006). Contributions from the philosophy of science to the education of Science teachers. *Science and Education*, *15*(5), 419-445.

Membe, M. P. (2015). *Power point presentation on solid waste management in Dar es Salaam, Tanzania* (held in Belgium Antwerp - 07th -09th September).

Merriam, S. B. (1998). *Qualitative research and case study: Applications in education*. San Francisco: Jossey-Bass Publishers.

MIE. (2004). *Participatory teaching and learning : A guide to methods and techniques*. Domasi, Malawi: Malawi Institute of Education.

Milan, A., Gioli, G., & Afifi, T. (2015). Migration and global environmental change: Methodological lessons from mountain areas of the global south. *Earth Systems Dynamics, 6*, 375-388. doi: 10.5194/esd-6-375-2015

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.

Millennium Ecosystem Assessment. (2005). *Ecosystems and human well-being: Biodiversity synthesis.* Washington, DC: World Resources Institutehttp://www. millenniumassessment.org/documents/document.356.

Mills, J. C., Mills, H., Bratton, J., & Forshaw, C. (2006). *Organizational behaviour in a global context*. Canada: Broadview Press.

Ministry of Education and Vocational Training (MoEVT) (Ed.). (2005). *Science syllabus for primary schools standard I-VII*. Dar es Salaam: Tanzania Institute of Education.

Ministry of Education and Vocational Training (MoEVT) (Ed.). (2005). *Muhtasari wa stadi za kazi kwa shule za msingi*. Dar es Salaam: Tanzania Institute of Education.

Ministry of Education and Vocational Training (MoEVT) (Ed.). (2005). *Social studies syllabus for primary schools standard I-VII*. Dar es Salaam: Tanzania Institute of Education.

Ministry of Education and Vocational Training (MoEVT) (Ed.). (2006). *Geography syllabus for primary schools standard III-VII*. Dar es Salaam: Tanzania Institute of Education.

Ministry of Education and Vocational Training (MoEVT) (Ed.). (2014). *Education and Training Policy (ETP)*. Dar es Salaam: MoEVT.

Ministry of Education and Culture. (1995). Education and Training Policy (ETP). Retrieved March 17, 2009, from http://www.tzonline.org/pdf/educationandtraining.pdf.

Molapo, J. (1999). *Enabling EE: Guidelines for environmental education policy and strategy processes in the SADC states*. Howick: ShareNet.

Monroe, M. (1999). Meeting the mandate: Integrating environmental education. *Clearing, 71*, 8-11.

Moon, B. (2007). *Research analysis: attracting, developing and retaining effective teachers: a global overview of current policies and practices*. Paris: UNESCO.

Morris, P., & Marsh, C. (1991). Patterns and dilemmas. In C. Marsh and P. Morris (Eds.), *Curriculum Development in East Asia*. London: Falmer.

Morrison, S. A. (2013). *Environmental Education: Toward a theory of ecologically minded teaching* (Doctoral Dissertation). University of North Carolina.

Mortari, L. (2003). Educating to think in environmental education. *Southern African Journal of Environmental Education, 20*, 111-123.

Mosha, H. J. (2004). New direction in teacher education for quality improvement in Africa. *Papers in Education and Development, 24*, 25-68.

Mosha, H. J. (2012). *A case study of learning materials used to deliver knowledge and skills or competency-based curricula (in Tanzania).* Association for the Development of Education in Africa (ADEA). Ouagadougou, Burkina Faso.

Mtaita, U. Y. (2007). *Stakeholders' perception of their participation in environmental education in Tanzania* (Master's Thesis). Waikato University, New Zealand.

Mulkeen, A, A. (2010). *Teachers in Anglophone Africa: Issues in teacher supply, training and management*. Washington, DC: The World Bank.

Mustard, F. (2000). *Early childhood development: The base for a learning society.* Paper presented at the HRDC/OECD Meeting, December 7. Ottawa, Canada.

Mutisya, S. M., & Barker, M. (2011). Pupils' environmental awareness and knowledge: A springboard for action in primary schools in Kenya's Rift valley. *Science Education International, 22*(1), 55-71.

Mwanza, Z. N. (2016). *Teachers' and pupils' perceptions of environmental education in selected primary schools of Chipata District of Eastern Zambia* (Master's Thesis). University of Zambia.

Mwendwa, B. (2017). Learning for sustainable development: Integrating environmental education in the curriculum of ordinary secondary schools in Tanzania. *Journal of Sustainability Education, 12*, (not found). http://www.susted.com/wordpress/wp-content/uploads/2017/02/Mwendwa-JSE-Feb-2017-General-Issue-PDF.pdf

Myers, G. A. (2005). *Disposable cities: Garbage, governance and sustainable development in urban Africa*. Hampshire: Ashgate Publishing Company.

Nanduddu, S. (2011). Coping with climate change- Is East Africa ready? *Development News, 9*(1), 47.

NCLI. (2008). 110TH Congress 2nd session, House of Representatives. Report 110-754. https://www.congress.gov/110/crpt/hrpt754/CRPT-110hrpt754.pdf

Ndeskoi, T. T. (2007). *Relevance of environmental education content in Geography towards solving environmental problems in Tanzania* (Unpublished Master's Thesis). University of Dar es Salaam.

Nel, P. S., Van Dyk, P. S., Haasbroek, G. D., Schultz, H. B., Sono, T., & Werner, A. (2004). *Human resources management. (6th Ed.).* South Africa: Oxford University Press.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19*, 317-328.

Ngoc, U. N., & Schnitzer, H. (2009). Sustainable solutions for solid waste management in Southern Asian Countries. *Waste Management*, *29*, 1982-1995.

Niang, I., Ruppel, O. C., Abdrabo, M. A., Essel, A., Lennard, C., Padgham, J., & Urquhart, P. (2014). *Africa. In: Climate change 2014: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

Nigatu, T. (2009). Qualitative data analysis. Retrieved October 10, 2013, from http://www.slideshare.net/tilahunigatu/qualitative-data-analysis-11895136

Nkyabonaki, J. (2013). The space of politics in Tanzania`s curriculum. *Scholarly Journal of Scientific Research and Essay (SJSRE)*, *2*(7), 109-117.

Nsamenang, A. B., & Tchombe (Eds.), T. M. S. (2011). *Handbook of African Educational Theories and Practices: A Generative Teacher Education Curriculum*. Bamenda, North West Region, Cameroon: Human Development Resource Centre (HDRC).

Ntemana, T. J., & Olatokun, W. (2012). Analyzing the influence of diffusion of innovation attributes on lecturers' attitudes toward information and communication technologies. *An Interdisciplinary Journal on Humans in ICT Environments*, *8*(2), 179-197.

OECD. (2009). *Creating effective teaching and learning environments. First results from TALIS* (Teaching and Learning International Survey. Paris: OECD). Retrieved from http://www.oecd.org/education/school/43023606.pdf

OECD. (2006). *Starting strong 2: Early childhood education and care*. Paris: Organization for Economic Co-operation and Development.

OECD. (2010). *Teachers' professional development: Europe in international comparison*. Retrieved from https://publications.europa.eu/en/publication-detail/-/publication/7454deec-f2ec-4537-845c-ce01f8c1317b/language-en

OECD. (2016). *Supporting teacher professionalism: Insights from TALIS 2013* (ISSN 2312-9638 online). Retrieved from http://dx.doi.org/10.1787/9789264248601-en

Olshansky, E. F. (1996). Theoretical issues in building a grounded theory: Application of an example of a program of research on infertility. *Qualitative Health Research*, *6*, 394-405.

Oluseyi, A. (2011). Perceived Effect of Industrial Water Pollution on the Livelihood of Rural Dwellers in Yewa Area, Ogun State,Nigeria. *European Journal of Social Sciences*, *22*(1), 66-75.

Osaki, K. M. (1995). *Environmental education as an interdisciplinary subject* (Paper presented at the EE workshop at Morogoro, December 1995, Tanzania).

Osaki, K. M., & Agu, A. O. (2002). A study of classroom interaction in primary schools in the United Republic of Tanzania. *Prospects*, *32*(1), 103-116.

O' Brien, K. J. (2010). *An ethics of biodiversity: Christianity, ecology and the variety of life*. George Town, USA: George Town University Press.

O'Donoghue, R. (1993). . *Environment, development and environmental education: An environmental policy and curriculum initiative in formal education*. Howick, South Africa: Share-net.

O'Donoghue, R., & Russo, V. (2004). Emerging patterns of abstraction in Environmental Education: A review of materials methods and professional development perspectives. *Environmental Education Research*, *10*(3), 331-351.

O'Sullivan, M. C. (2010). Educating the teacher educator. A Ugandan case study. *International Journal of Educational Development*, *30*, 377-387.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, *62*(3), 307-332.

Palmer, J. (1998). *Environmental education in the 21st Century: Theory, practice, progress and promise*. London: Routledge.

Palmer, J., & Neal, P. (1994). *The handbook of environmental education*. London: Routledge.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd Ed.). London: Sage.

Pauschert, D., Gronenmeier, K., & Brueback, K. (2012). *Urban water and sanitation poverty in Tanzania.* (Gesellschaft für nternationale Zusammenarbeit (GIZ) GmbH). Retrieved from Retrieved June 6, 2017 from https://warrington.ufl.edu/centers/purc/docs/resources_UrbanWaterAndSanitationPovertyInT a nzania.pdf

Pedretti, E., & Nazir, J. (2014). Tensions and opportunities: A baseline study of teachers' views of environmental education. *International Journal of Environmental & Science Education*, *9*, 265-283.

Penuelas, J., & Filella, I. (2001). Responses to warming world. *Science*, *294*, 793-795.

Peterson, P. L., Fennema, E., Carpenter, T. P., & Loef, M. (1989). Teachers' pedagogical content beliefs in mathematics. *Cognition and Instruction*, *6*(1), 1-40.

Philander, S. G. (Ed.). (2008). *Encyclopedia of global warming and climate change*. New York: Sage.

Plumwood, V., & Routley, R. (1993). World rainforest destruction: The social factors. *Eastern and Southern Africa Geographical Journal*, *2*(1), 22-26.

Pontefract, C., & Hardman, F. (2005). The discourse of classroom interaction in Kenyan primary schools. *Comparative Education*, *41*, 87-106.

Popkewitz, T. S. (1983). *Change and stability in schooling: the dual quality of educational reform.* Victoria, Australia: Deakin University.

Popkewitz, T. S., Tabachnick, B. R., & Wehlage, G. (1982). *The myth of educational reform: a study of school responses to a program of change*. Madison, WI: University of Wisconsin Press.

Potsi, A. (2013). *Pre-primary education from the perspective of the capability approach: An Empirical Investigation of Teachers' Beliefs and Self-reported Practices* (Doctoral Dissertation). Retrieved from file:///C:/Users/dell/Downloads/Dissertation_Potsi.pdf

Powers, A. (2004). Teacher preparation for environmental education: Faculty perspectives on the infusion of environmental education into pre-service methods courses. *The Journal of Environmental Education*, *35*(3), 3-11.

Prawat, R. S. (1992). Teachers' beliefs about teaching and learning: A constructivist perspective. *American Journal of Education*, *100*(3), 354-395.

Pressoir, E. (2008). "Preconditions for young children's learning and practice for sustainable development"In I. Pramling-Samuelsson, & Y. Kaga, (Eds.). *The contribution of early childhood development for sustainable societies (*pp. 57-62). Paris: UNESCO.

Pulkkinen, K. (2006). Teacher thinking and practice in environmental education: Finnish North Carelian primary school teachers as environmental educators. In S. Tani, (Ed.), *Sustainable development through education*. Proceedings of the International Conference on Environmental Education. 14 June 2005 (pp. 143 – 154.). Helsinki.

Pérez-Soba, M., & Dwyer, J. (2016). *Expansion of social-ecological systems (SES) science: robust basis. DG AGRI Workshop, 5-6 December 2016*. Wageningen University

Ramsey, J., Hungerford, H., & Volk, T. (1989). A technique for analyzing environmental issues. *Journal o f Environmental Education*, *21*(1), 26-30.

Ramsey, J. M., Hungerford, H. R., & Volk, T. L. (1992). Environmental education in the k-12 curriculum: Finding a niche. *Journal of Environmental Education*, *23*(2), 35-45.

Rauch, F., & Steiner, R. (Eds.). (2005). *University course: Education for Sustainable Development-Innovation in Teacher Education (BINE): reasons, concept and first experiences.* Conference paper, International conference. (April 20 – 23, 2005). Graz.: "Committing Universities to Sustainable Development".

Rickinson, M. (2001). Learners and learning in environmental education: A critical review of the evidence. *Environmental Education research*, *7*(3), 207-320.

Robottom, I. (1987). Two paradigms of professional development in environmental education. *The Environmentalist*, *7*(4), 292-298.

Robottom, I., & Hart, P. (1993). *Research in environmental education: Engaging the debate*. Geelong, Victoria: Deakin University.

Robottom, I., Malone, K., & Walker, R. (2000). *Case studies in environmental education: policy and practice*. Geelong: Deakin University Press.

Rogan, J. (2004). Professional development: Implications for developing countries. In K. Osaki, K. Hosea & W. Ottevanger (Eds.), *Reforming Science and Mathematics education in sub-*

Saharan Africa: Obstacles and opportunities (pp. 155-170). Amsterdam: Vrije Universteit Amsterdam).

Rogan, J. M. (2007). An uncertain harvest: A case study of implementation of innovation. *Journal of Curriculum Studies, 39*(1), 97-121.

Rogers, E.M., E. M. (2003). *Diffusion of innovations.* (5th Ed.). New York: Free Press.

Rowe, K. J. (2004). In good hands? The importance of teacher quality. *Educare News, 149*, 4-14.

Rudel, T. K., Schneider, L., Uriarte, M., Turner, B. L., DeFries, R., Lawrence, D., . . . Lambin, E. F. (2009). Agricultural intensification and changes in cultivated areas, 1970–2005. *Proceedings of the National Academy of Sciences, 106*(49), 20675-20680.

Rusinko, C. A. (2010). Integrating sustainability in higher education: a generic matrix. *International Journal of Sustainability in Higher Education, 11*(3), 250-259.

Rutter, M. (2002). The interplay of nature, nurture and developmental influences: The challenge ahead for mental health. *Archives of General Psychiatry, 59*(11), 996-1000.

Rwambali, M., Gronemeier, K., & Pauschert, D. (2012). *Climate change stakeholder survey: Stakeholders and activities in the water and neighbouring sectors in Tanzania* (Final Draft February 2012.). Retrieved from https://www.tnrf.org/files/GIZ%20Climate%20Change%20Stakeholder%20Survey.pdf

Salih, M., & Yahya, N. A. (2009). Environmental education in Malaysia: Current practices and future possibilities. In Taylor et al., *Environmental education in context: An international perspective on the development of environmental education* (pp. 215-227). Rotterdam: Sense Publishers.

Sansone, C., & Harackiewicz, J. M. (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance*. New York: Academic.

Sarabhai, K. V., Pandya, M., & Namagiri, R. (2007). *Tbilisi to Ahmedabad- The journey of Environmental Education*. India: International Center for Environment Education-ICEE.

Sauvé, L. (1996). Environmental education and sustainable development: A further appraisal. *Canadian Journal of Environmental Education, 1*, 7-34.

Sauvé, L. (1999). Environmental education between modernity an postmodernity: Searching for an integrating educational framework. *Canadian Journal of Environmental Education, 4*(1), 9-35.

Schahn, J., & Holzer, E. Ž. (1990). Studies of individual environmental concern. The role of knowledge, gender, and background variables. *Environment and Behavior, 22*, 767-786.

Schoenfeld, A. H. (2002). How can we examine the connections between teachers' world views and their educational practices? *Issues in Education, 8*(2), 217-227.

Schrag, F. (1988). *Thinking in school and society*. New York: Routledge & Kegan Paul.

Schrag, F. (1988). *Thinking in school and society*. New York: Routledge & Kegan Paul.

Schreuder, Y. (2009). *The corporate Green House: Climate change policy in a Globalizing world*. London: Zed Books Ltd.

Schumacher, E. F. (1999). *Small is beautiful, economics as if people mattered, 25 years later.... with commentaries*. Point Roberts: Hartley & Marks Publishers.

Schweisfurth, M. (2011). Learner–centred education in developing contexts: from solution to problem. *International Journal of Educational Development*, *31*, 425-432.

Scott, D., & Morrison, M. (2006). *Key ideas in educational research*. London: Continuum International Publishing.

Scott, W., & Oulton, C. (1999). Environmental Studies: Arguing the case for Multiple Approaches. *Educational Studies*, *25*(1), 89-97.

Scott, W., & Reid, A. (1998). The revisioning of environmental education: A critical analysis of recent policy shifts in England and Wales. *Educational Review*, *50*(3), 213-23.

Selby, D., & Kagwa, F. (Eds.). (2009). *Education and climate change. Living and learning in interesting times*. London, UK: Routledge.

Shalash, R. (2017). *Theoretical and methodological approaches of environmental education within primary schools in the Israeli Arab sector* (Doctoral Dissertation). Moldova State University.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*(2), 63-75.

Sheridan, M. (2004). The environmental consequences of independence and socialism in North Pare, Tanzania, 1961-1988. *Journal of African history*, *45*, 81-102.

Shohel, M. M. C., & Howes, A. J. (2011). Models of education for sustainable development and non formal primary education in Bangladesh. *Journal of Education for sustainable development*, *5*(1), 129-139.

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

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Research*, *15*(2), 4-14.

Sifuna, D. N., & Sawamura, N. (2010). *Challenges of quality education in Sub-Saharan Africa-Some key issues*. New York: Nova Science.

Simmons, D. (1989). More infusion confusion: A look at environmental education curriculum materials. *Journal o f Environmental Education*, *20*(4), 15-18.

Siraj-Blatchford, J. (2009). Editorial: Education for sustainable development in early childhood. *International Journal of Early Childhood*, *41*(2), 9-22.

Siraj-Blatchford, J., Smith, K. C., & Samuelsson, I. P. (2010). *Education for Sustainable Development in the Early Years*. Retrieved from Göteborg, Sweden, OMEP: Author

Snape, D., & Spencer, L. (2003). The Foundations of Qualitative Research. In J. Richie, and J. Lewis, *Qualitative Research Practice* (pp1-23). London: Sage.

Sofou, E. (2010). Recent trends in early childhood curriculum: The case of Greek and English National curricula. In D. Mattheou (Ed.), *Changing educational landscapes: Educational policies, schooling systems and higher education -a comparative perspective* (pp. 227 – 240). Dordrecht, Netherlands: Springer.

Spillane, J. P., & Zuberi, A. (2009). Designing and piloting a leadership daily practice log: Using logs to study the practice of leadership. *Educational Administration Quarterly*, *45*(3), 375-423. doi:10.1177/0013161X08329290

Spodek, B., & Saracho, N. (2005). *International perspectives on research in early childhood education*. Greenwich, Connecticut: Information Age Publishing.

Stake, R. E. (2010). Qualitative research: Studying how things work. *The Canadian Journal of Program Evaluation*, *25*(2), 88-91.

Stapp, W. (1997). *The concept of environmental education*. Michigan: University of Michigan.

Staub, F., & Stern, E. (2002). The nature of teachers' pedagogical content beliefs matters for students' achievement gains: Quasi-experimental evidence from elementary Mathematics. *Journal of Educational Psychology*, *94*(2), 344-355.

Stevenson, R. B. (2007). Schooling and environmental education: Contradictions in purpose and practice. *Environmental Education Research*, *13*(2), 139-153.

Stevenson, R. B., Brody, M., Dillon,, J., & Wals, A. E. J. (Eds.). (2013). *International handbook of research on environmental education*. New York: Routledge.

Stokes, E., Edge, A., & West, A. (2001). *Environmental education in the educational systems of the European Union.* Centre for Educational Research London School of Economics and Political Science.

Stralin, F., & Wiman, J. (Eds.). (2009). *Environmentally Sustainable Development in Tanzania Education: Values of Teachers. Examination Paper*. Linkoping: Linkopings University.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques* (2nd Ed.). Newbury Park, CA: Sage.

Strauss, A. L., & Corbin, J. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Los Angeles: Sage.

SUA. (2007). *Managing risk and reducing vulnerability of agricultural systems under variable and changing climate.* Country Report, Tanzania: Sokoine University of Agriculture. Retrieved from http://www.scirp.org/(S(351jmbntvnsjt1aadkposzje))/reference/ReferencesPapers.aspx?ReferenceID=949281

Sumra, S., & Katabaro, J. K. (2014). *Declining quality of education: suggestions for arresting and reversing the trend. The Economic and Social Research Foundation (ESRF)* (Special THDR Issue: ESRF Discussion Paper 63). Retrieved from http://www.economics-of

Sutter, W. N. (2006). *Introduction to educational research: A critical thinking approach*. London: Sage

Tabulawa, R. (2003). International aid agencies. Learner centered pedagogy and political democratization: a Critique. *Comparative Education, 39*(1), 7-26.

Tani, S. (2006). Multiple meanings but limited visions: the Concept of the environment in environmental education. In S. Tani (Ed.), *Sustainable Development through Education – Proceedings of the International Conference on Environmental Education. 14 June 2005. Research Report 268*. Helsinki: Department of Applied Sciences of Education, University of Helsinki.

Taylor, B., Sinha, G., & Ghoshal, T. (2007). *Research methodology : A guide for research in management and social sciences*. New Delhi: Prentice-Hall.

Taylor, B. C., & Lindlof, T. R. (2011). *Qualitative communication research methods* (3rd Ed.). Thousand Oaks: Sage.

Taylor, N., Littledyke, M., Eames, C., & Coll, R. K. (Eds.). (2009). *Environmental education in context: An international perspective on the development of environmental education*. Rotterdam: Sense Publishers.

Tharp, R. G., & Dalton, S. S. (2007). Orthodoxy, cultural compatibility and universals in education. *Comparative education, 43*(1), 53-70.

The Sutton Trust. (2011). *Improving the impact of teachers on pupil achievement in the UK – interim findings*. Retrieved from April 27, 2012 from http://www.suttontrust.com/public/documents/1teachers-impact-report-final.pdf

Tilbury, D. (1995). Environmental education for sustainability: Defining the new focus of environmental education in the 1990s. *Environmental Education Research, 1*(2), 195-212.

Tilbury, D. (2003). The summit, sustainable development and environmental education. *Australian Journal of Environmental Education, 19*, 109-113.

Tilbury, D., Colema, V., & Garlick, D. (2004). *Environmental education and its contribution to sustainability in Australia: Formal education.* Report prepared by the Australian Research Institute in Education for Sustainability (ARIES) for the Department of the Environment and Heritage, Australian Government. Sydney: ARIES.

Tilya, F., & Mafumiko, F. (2010). The compatibility between teaching methods and competence-based curriculum in Tanzania. *Papers in Education and Development, 29*, 37-56.

Towse, P., Kent, D., Osaki, F., & Kirua, F. (2002). Non-graduate teacher recruitment and retention: some factors affecting teacher effectiveness in Tanzania. *Teacher and Teacher Education, 18*(6), 637-652.

Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education, 37*(1), 57-70.

Trochim, W. M. (2006). *The research methods knowledge base* (2nd Ed.). doi:Retrieved from http://www.socialresearchmethods.net/kb/

Trombulak, S. C., Omland, K. S., Robinson, J. A., Lusk, J. J., Fleischner, T. L., & Domroese, M. (2004). Principles of conservation biology: Recommended guidelines for conservation literacy from the Education Committee of the Society for Conservation Biology. *Conservation Biology, 18*(5), 1180-1190.

Tshabangu, I., & Msafiri, A. (2013). Quality education in Tanzania: perceptions on global challenges and local needs. *International Journal of Asian Social Science, 3*(3), 800-813.

Tsuma, O. G. (1998). *Science education in the African context*. Nairobi: Jomo Kenyatta Foundation.

Tyack, D., & Tobin, W. (1994). The "Grammar" of schooling: Why has it been so hard to change? *American Educational Research Journal, 31*(3), 453-479.

Tyler, R. W. (1949). *Basic principles of curriculum and instruction*. Chicago: University of Chicago.

Umar, O. J., & Ozohu, O. A. (2015). *Impact of climate change on agricultural production and food supply in Africa.* Paper presented at international conference on latest trends on food, Biological & Ecological Sciences, Dubai). Retrieved from http://dx.doi.org/10.17758/IAAST.A1015057

UN. (1992). *United Nations Conference on Environment & Development*. Rio de Janeiro, Brazil: United Nations Division for Sustainable Development.

UN-HABITAT-UNEP. (2005). *The sustainable cities programme in Tanzania 1992-2003: From a city demonstration project to a national programme for environmentally sustainable urban development*. Retrieved from https://unhabitat.org/books/the-sustainable-cities-programme-in-tanzania-1992-2003-the-scp-documentation-series/

UNCED. (1992). *Rio Declaration on Environment and Development*. Retrieved from http://www.un.org/esa/sustdev/agree d.htm

UNDP. (2011). *Climate change adaptation.* Retrieved from http://www.adaptation-undp.org/explore/eastern-africa/united-republic-tanzania

UNEP. (1990). *The State of the Environment: Children and the Environment.* Nairobi: Kenya.

UNEP. (2005). *UNEP strategy for environmental education and training: A strategy and action planning for the decade 2005 - 2014*. Nairobi: Division of Environmental Policy Implementation.

UNEP. (2012). *Institutional strengthening of education for sustainable consumption (ESC): Advancing ESC policy and implementation strategies, mapping opportunities*. Dar es Salaam: National Environment Management Council (NEMC).

UNEP. (2012). *GEO5 Global Environment Outlook*. Retrieved from http://web.unep.org/geo/sites/unep.org.geo/files/documents/geo5_report_full_en_0.pdf

UNEP. (2017). *Africa environmental education and training Action Plan 2015–2024: Strengthening sustainable development in Africa*. Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/14063/Africa%20Environmental%20Education%20and%20Training%20Action%20Plan%202015–2024.pdf

UNESCO. (1977). *First intergovernmental conference in environmental education. Final Report* (Tbilisi, USSR. Paris: UNESCO.). Retrieved from http://unesdoc.unesco.org/images/0003/000327/032763eo.pdf

UNESCO. (1978). *Final report of the intergovernmental conference on environmental education*. Paris: United Nations Educational, Scientific, and Cultural Organization.

UNESCO. (1994). *An environmental education approach to the training of elementary teachers: A teacher education programme*. Retrieved from http://unesdoc.unesco.org/images/0013/001304/130452eo.pdf

UNESCO. (2000). *Dakar Framework for Action (2000). Education For All: Meeting Our Collective Commitments* (World Education Forum Dakar April 26-28). Retrieved from http://unesdoc.unesco.org/images/0012/001211/121147e.pdf

UNESCO. (2002). *Education for sustainability from Rio to Johannesburg: Lessons learnt from a decade of commitment*. Retrieved from http://unesdoc.unesco.org/images/0012/001271/127100e.pdf

UNESCO. (2006). *Framework for the UN DESD International Implementation Scheme [Online]*. Retrieved from Available from http://unesdoc.unesco.org/images/0014/001486/148650E.pdf. Accessed on 29 September 2013).

UNESCO. (2007). *The UN Decade of Education for Sustainable Development: 2005-2014: The First Two Years*. Retrieved from Paris, UNESCO: Author

UNESCO. (2010). *Reaching the marginalized. EFA global monitoring report* (Oxford University Press). Retrieved from http://unesdoc.unesco.org/images/0018/001866/186606E.pdf

UNESCO. (2012). *Education for sustainable development: Source book*. Paris, France: UNESCO.

UNESCO-UNEP. (1975). *The UNESCO/UNEP environmental education programme*. Retrieved from http://unesdoc.unesco.org/images/0001/000161/016188EB.pdf

UNESCO-UNEP. (1978). Connect. *Environmental Education Newsletter, III* (1), 1-8.

UNESCO-UNEP. (1992). *Environmental education activities for primary schools: Suggestions for making and using low-cost equipment*. Paris: UNESCO.

URT. (1997). *National Environmental Policy (NEP)*. Dar es Salaam: Vice Presidents Office Tanzania.

URT. (2004). *The Environmental Management Act (EMA)*. Dar es Salaam: Government Printers.

URT. (2005a). *National Environmental Education and Communication Strategy (NEECS) (2005 – 2009)* doi:https://de.scribd.com/document/187535150/NEECS-October-05

URT. (2005). Vocational skills syllabus for primary schools (Muhtasari wa Stadi za kazi). Dar es Salaam: Tanzania Institute of Education.

URT. (2005). *Education and Training Policy (ETP)*. Dar es Salaam: Ministry of Education and Culture.

URT. (2006). *MKUKUTA. National Strategy for Growth and Reduction of Poverty (NSGRP). Status Report 2006: Progress towards the goals for growth, social well-being and governance in Tanzania*. Retrieved from https://www.imf.org/external/pubs/ft/scr/2011/cr1117.pdf

URT. (2008). *The development of education National report of the United Republic of Tanzania*. Retrieved from http://www.ibe.unesco.org/National_Reports/ICE_2008/tanzania_NR08.pdf

URT. (2010). *Environmental education strategy (2010-2014)*. doi:www.tzdpg.or.tz/fileadmin/.../education/Environmental_Education_Strategy.doc

URT. (2011). *Tanzania education sector analysis: Beyond Primary education, the quest for balanced and efficient policy choices for human development and economic growth*. Retrieved from http://unesdoc.unesco.org/images/0021/002152/215247e.pdf

URT. (2012). *Basic Education Statistics in Tanzania (BEST) (2008-2012*. Dar es Salaam: National Data.

URT. (2012b). *Poverty and human development report 2011. National strategy for growth and reduction of poverty* (Dar es Salaam, Tanzania: REPOA). Retrieved from http://www.repoa.or.tz/documents/Poverty_and_Human_Development_Report_2011.pdf

URT. (2012c). *Tanzania Education Sector Analysis: Beyond Primary education, the quest for balanced and efficient policy choices for human development and economic growth* (Dar es Salaam, Tanzania). Retrieved from http://unesdoc.unesco.org/images/0021/002152/215247e.pdf

URT. (2014a). *Basic Education Statistics in Tanzania*. Dar es Salaam: MoEVT.

URT. (2014c). *Education and Training Policy (ETP)*. Dar es Salaam: Tanzania Institute of Education.

URT. (2014b). *Education for all (EFA) report for Tanzania mainland*. Dar es Salaam.

URT. (2014d). *The Environmental and Social Impact Assessment report (ESIA) of the proposed local roads subprojects in Ilala municipality (25.5 km)*. Retrieved from http://documents.worldbank.org/curated/en/350351468305678367/pdf/E47070V40AFR0E00Box385405B00PUBLIC0.pdf

URT. (2016a). Pre-primary, primary and secondary education statistics in brief. MoEVT: Dar es Salaam.

URT. (2016c). *Basic education curriculum standard III – VI*. Dar es Salaam: Tanzania Institute of Education.

URT. (2016b). *Basic Education Statistics in Tanzania*. Dar es Salaam: MoEVT.

URT. (2017). *Energy access situation report, 2016 Tanzania Mainland*. Retrieved from https://www.nbs.go.tz/nbs/takwimu/rea/Energy_Access_Situation_Report_2016.pdf

Valente, T. W., & Davis, R. L. (1999). Accelerating the diffusion of innovations using opinion leaders. *The American Academy of Political and Social Science Annals*, *566*, 55-67.

Van Rooyen, H., & De Beer, J. (2006). *Teaching Science in the OBE Classroom*. Pietermaritzburg: MacMillan.

Vanderheiden, S. (2008). *Political theory and global climate change*. London: The MIT Press.

Vanderslice, S. (2000). Listening to Everett Rogers: Diffusion of innovations and WAC. *Language and Learning Across the Disciplines*, *4*(1), 22-29.

Vare, P., & Scott, W. (2007). Learning for a change: Exploring the relationship between education and sustainable development. *Journal of Education for Sustainable Development*, *1*(2), 191-198.

Vaughan, C., Gack, J., Solorazano, H., & Ray, R. (2003). The effect of environmental education on schoolchildren, their parents, and community members: A study of intergenerational and intercommunity learning. *The Journal of Environmental Education*, *34*(3), 12-21.

Vavrus, F. (2009). The cultural politics of constructivist pedagogy: Teacher education reform in the United Republic of Tanzania. *International Journal of Educational Development*, *14*(1), 65-73.

Velempini, K. M. (2016). *The Integration of Environmental Education in the Secondary School Curriculum: A Case Study of a 10th Grade Junior Secondary School Curriculum in the Okavango Delta, Botswana* (Doctoral Dissertation). Ohio University.

Venkataraman, B. (2008). Why environmental education? *Environment*, *50*(5), 8-11.

Veselinovska, S. S., & Osogovska, T. L. (2012). Engagement of students in environmental activities in school. *Procedia - Social and Behavioral Sciences*, *46*, 5015-5020.

Volk, T. (1993). Integration and curriculum design. In R. Wilke (Ed.), *Environmental Education Teacher Resource Book. A Practical Guide for K-12 Education* (pp 45-75). *Millwood,*. NY: Kraus International Publications.

Vuzo, M. S. (2008). *Teaching and learning resources in private and government primary school. Paper presented at the Launch Workshop of Language of Instruction in Tanzania and South Africa- LOITASA* -Oslo, Norway.

Walker, K. E. (1997). Challenging critical theory in environmental education. *Environmental Education Research*, *3*(2), 155-162.

Walsh-Daneshmandi, A., & MacLachlan, M. (2006). Toward effective evaluation of environmental education: Validity of the children's environmental attitudes and knowledge scale using data from a sample of Irish adolescents. *Journal of Environmental Education, 37*(2), 13-23.

WCED. (1987). *Our common future*. Oxford: Oxford University Press.

Wedin, A. A. (2010). Classroom interaction: potential or problem? The case of Karagwe. *International Journal of Educational Development, 30*, 145-150.

Weinert, F.E. (2001). Concept of competence: A conceptual clarification. In D.S. Rychen, & L.H. Salgnik (Eds.), *Defining and selecting key competencies* (pp. 45-66). Seattle, WA: Hogrefe & Huber.

Wells, W. D., Sandra, M., & John, B. (2007). *Advertising: Principles and practice,* (7th Ed.). Upper Saddle River, NJ: Prentice Hall.

Westbrook, J., Shah, N., Durrani, N., Tikly, C., Khan, W., & Dunne, M. (2009). Becoming a teacher: Transitions from training to the classroom in North West frontier Province, Pakistan. *International Journal of Educational Development*, *29*(4), 437-444.

Wheeler, I. (1975). *The genesis of environmental education. Insights into environmental education.*. Britain: Oliver & Boyd.

WHO & UNICEF. (2006). *Meeting the MDG drinking water and sanitation: The urban and rural challenge of the decade.* Joint monitoring programme report. Retrieved from http://www.who.int/water_sanitation_health/monitoring/jmpfinal.pdf

Williams, M., & Burden, R. L. (1997). *Psychology for language teachers: A social constructivist approach*. Cambridge: Cambridge University Press.

Wilson, E. (2009). *School-based research: A guide for education students*. London: Sage.

WMO. (2016). *Causes of climate change* ([160322]). Retrieved from [https://www.wmo.int/pages/themes/climate/causes_of_climate_change.php].

World Bank. (2010). *Recruiting, retaining, and retraining secondary school teachers and principals in Sub-Saharan Africa*. Washington DC: The World Bank.

World Bank. (2015). *The state of the global clean and improved cooking sector*. Washington: World Bank.

World watch. (2013). *State of the world 2012: Is sustainability still possible?*. Retrieved from http://www.worldwatch.org/bookstore/publication/state-world-2013-sustainability-still-possible. Accessed 20 Aug 2013.

Wright, T. S. A. (2002). Definitions and frameworks for environmental sustainability in higher education. *International Journal for Sustainability in Higher Education, 3*(3), 203-220.

WWF. (2012). *Living planet report. Gland: World Wildlife Fund*. Retrieved from http://www.wwf.org.uk/what_we_do/about_us/living_planet_report_2012. Accessed 20 Aug 2013.

WWF. (2015). The Tanzania Wildlife Authority is in. wwf.panda.org/wwf_news/?256831/TAWA---The-Tanzania-Wildlife-Authority-is-in

Wyk, C. V. (2011). *Evaluating motivational levels of employees in a contemporary South African organization* (Master's Thesis). Nelson Mandela Metropolitan University.

Xi, X., Fan, L., & Deng, X. (1998). *"Public environment awareness in China: An analysis of the results of public surveys,"* Paper prepared for the center for the integrated study of the human dimensions of global change, Carnegie Mellon Universit). Retrieved from https://www.researchgate.net/publication/267238282_Public_Environment_Awareness_in_China

Yanda, P. Z. (2013). *Coastal and marine ecosystems in a changing climate: The case of Tanzania. (Climate Change Adaptation Series: Document 1* (Coastal Resources Center, University of Rhode Island). Retrieved from www.crc.uri.edu/download/TZ2010CC001_Yanda_508.pdf

Yero, J. L. (2010). *Teaching in mind: How teacher thinking shapes education*. City Hamilton, USA: Mind Flight Publishing.

Yeshalem, A. D. (2013). *Environmental education about, in and for the environment: The case of two secondary schools in Ethiopia.* (Master's Thesis) University of Oslo. Retrieved from https://core.ac.uk/download/pdf/30898019.pdf

Yin, R. K. (2012). *Application of case study research* (3rd Ed.). London: Sage.

Young, R. E. (1981). A study of teacher epistemologies. *Australian Journal of Education*, *25*(2), 194-208.

Zais, R. (1976). *Curriculum: Principles and foundations*. New York: Harper & Row.

Appendices

Appendix 1: EE content found in subject curricula

Subject Year	Class grade	EE components found
Geography 2006	**III**	The concept of environment, Things that constitute the environment, The importance of the environment, Environmental conservation,
	IV	Components of the environment: Physical features, The atmosphere, Vegetation Economic activities: Agriculture, Livestock keeping, Mining, Fishing, Industries, Trade, Tourism and Transport Weather: Elements of weather, Measuring and recording the elements of weather
	V	Economic activities in East Africa and their effect on the environment: Agriculture, Livestock keeping, Mining, Fishing, Industries, Energy and Forests Interdependence in the environment: Human beings and the environment, Animals, insects and plants in the environment, Methods of environmental conservation
	VI	Economic activities and their effect in the environment i.e. Industries, Tourism, Forests, Energy harnessing, Mining, Agriculture, Livestock keeping and Harvesting marine and fresh water resources. Disasters and their types, Effects of disasters and prevention measures Water and their sources, Uses of water, Destruction and pollution of water sources
	VII	Weather and its elements, Measuring weather, relate weather change with seasons Water harvesting: Rain water Environmental degradation: Waste management Population and settlements: Human population, Human settlements
Science 2005	**III**	Health and prevention of diseases: Body cleanliness, Cleanliness and neatness of clothes, Nutritious food, Dental health, Water safety, Air safety, Care for toilets. Safety precautions into our living environment: First aid Living things: Habitat of living organisms, Locomotion among plants and animals
	IV	Health and prevention of diseases: Principles of health and living, Body cleanliness, cleanliness of clothes, Food quality, Cleanliness and neatness of the environment, Safety measures in our living environment, Prevention of infectious diseases Living things: Basic needs for survival and growth of plants, Essential needs for the survival and growth of animals, Reproduction in plants and animals
	V	The essentials of health living: Body health and safety, Food hygiene and quality Living things: The balance of nature, Changes and adaptation of living things Water properties: Soft and hard water
	VI	
	VII	Living things: requirements for a seed to germinate, pollination

Subject Year	Class grade	EE components found
Social Studies 2005	**III**	Recognize different events occurring in his/her environment - To conserve the environment of the surrounding society - Use knowledge of weather conditions in daily activities
		Apply the knowledge of maps and - Use maps in different environments - Recognize the solar system
		Apply economic principles in production activities - To appreciate and protect national resources
	IV	Recognize different events occurring in his/her environment - To conserve the environment of the surrounding society - Use knowledge of weather conditions in daily activities
		Apply economic principles in production activities - To appreciate and protect national resources - To recognize production activities in the society
	V	Recognize different events occurring in his/her environment. - To preserve the environment of the surrounding society - To use the knowledge of weather conditions in daily activities
		Apply knowledge of maps and the solar system in daily life
		Apply economic principles in production activities - To appreciate and protect the country's resources
	VI	Recognize different events occurring in his/her environment. - To preserve the environment of the surrounding society - To use the knowledge of weather conditions in daily activities
		Apply knowledge of maps and the solar system in daily life
		Apply economic principles in production activities - To value and protect the resources of the country

Subject Year	Class grade	EE components found
Civics and moral education 2016	**III**	Respect the community - Caring for the environment
		Be responsible - Protect resources and interests of his/her country - Obey laws and regulations in doing his/her daily activities
	IV	Appreciate the community - Protect the environment
		Be responsible - Protect resources and interests of the country - Obey laws and regulations in doing daily activities
	V	Appreciate the community - Protect the environment
		Be responsible - Protect resources and interests of the country - Obey laws and regulations in doing daily activities
	VI	Appreciate the community - Protect the environment
		Be responsible - Protect resources and interests of the country - Obey laws and regulations in doing daily activities
Personality Development and Sports 2005	**IV**	Inventing new ideas and ways of promoting performance, good leadership as well as using natural resources to maintaining productivity
	VI	Creating new ideas and ways of promoting performance, good leadership as well as using natural resources in maintaining entrepreneurship
	VII	Inventing new ideas and methods of promoting performance, leadership and using natural resources in maintaining entrepreneurship
History 2005		NONE
Kiswahili 2005		NONE
Mathematics 2005		NONE
English 2016		NONE

Appendix 2

Questions for document analysis:

1. When and by whom was the official document published?
2. Do the educational policies of 1995 and 2014 in Tanzania articulate clearly the integration of EE in the school curriculum?
3. Does the curriculum of primary school education contain EE content at equal footing?
4. Does the content reflect three pillars of the sustainable development model i.e. ecology, economy and society? Is EE content placed as separate topics or as part in other topics in the curriculum?
5. Do the syllabi show concrete criteria for EE skills assessment?
6. What are the aims and goals of integrating EE into primary education?
7. Is EE content integrated into all subjects equally? And does it reflect the three pillars of sustainability?

Appendix 3

Interview guide for teachers

A. Personal information

School.....Subject.....Class.....

Gender.....Age..... Teaching experience.....Education level.....

B. Interview guide questions

1. Can you share your experience of how you see the environment today and in the past? For example 5 or 10 years ago? Do you think there are any significant changes?

2. Do you think there are any environmental challenges/problems around your community and outside your community? Mention if any.

3. There are people who think environmental education is a solution for today's environmental challenges/problems other people think it is not. What is your position in this?

4. So in your view what does the word environment mean?

5. What views do you have about the integration or teaching off environmental education in primary schools? Do you think it is important at this level of education?

6. The teaching of Environmental education is categorized into; education about the environment, education for the environment and education in, from or through the environment. What can you say about these categories?

7. Do you have an idea about the three pillars or fundamentals of environmental education or Education for sustainable development? How do you perceive their importance?

8. Do you think the pillars are reflected in your subject curriculum? If Yes, Do you think they are balanced?

9. In your opinion, what environmental topics or aspects do you think are important for learners to be taught? Or you would prefer to teach for this level?

10. Is there sustainability/ environmental content in your subject curriculum? If YES, Are they separate topics or found within other topics?

11. a). In your opinion, do you think the content adequately cover important elements of sustainable development like ecology, economy and social cultural aspects?

b). Is it easy for you to identify and integrate such content into your subject curriculum? If no, why?

12. How do you normally integrate EE into your daily teaching? What particular instructional methods (if any) do you normally use in teaching such content?

13. In your views, what do you think is the best way to integrate environmental education into primary school curriculum?

14. Have you attended any training regarding environmental issues and how to integrate and teach such content? If yes, for how long? If no, why?

15. Do you think what you learnt in teacher training program is adequate enough to make you competent in instructional methods?

16. What do you think motivates or does not motivate you to teach sustainability/environmental issues in your lesson?

17. Can you consider yourself intrinsically or extrinsically motivated to teach environmental issues?

18. What are the main challenges you face in teaching environmental education content?

19. What practical initiatives do you use to involve students in learning environmental issues despite classroom teaching?

20. In your opinion, what should be done to improve the teaching and learning of environmental education in primary education?

Appendix 4:

Interview guide for Heads of schools

1. Sustainability issues are quite an emphasis in the global scale for more that 40 years now. Why do you think it is so much emphasized?

2. Do you think the status of our environment is changing for the better despite the emphasis?

3. At the school level, you are the chief supervisor to ensure the successful implementation of the curriculum. How do you see the placement of environmental issues in the curriculum?

4. In your opinion, is it important to include EE content in primary education?

5. Do you have any particular strategies to implement environmental education in your school?

6. What perception do you have about pillars or fundamentals of sustainability?
   How are they reflected in the curriculum?

7. Do you think it is necessary to motivate teachers to teach SE?
   If Yes, How often do you motivate your teachers?

8. What strategies do you use to motivate your teachers in implementing EE in school?

9. Do you conduct any training/workshop to teachers to effectively teach this content?

10. Do you ensure availability of teaching and learning materials for teachers?

11. What challenges do you encounter in implementing EE in your school?

12. In your opinion, how best can EE be implemented in primary schools?

Appendix 5:

Interview guide for curriculum specialists

1. You are an important pillar in determining what our children should and should not learn in schools. How did you came about to include environmental issues in the curriculum?

2. Do you think there is a need for knowledge and awareness of these issues in primary school?

3. Is environmental education integrated through the entire curriculum on equal footing?

4. How do you motivate teachers to effectively teach environmental education?

5. What kind of teaching and learning materials do you render to teachers to facilitate their teaching?

6. What barriers do you encounter in the planning/designing and implementing EE content for the primary schools?

7. In your opinion, what do you think needs to be done for successful implementation of SE in primary schools?