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DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

# ENVIRONMENTAL EDUCATION IN TANZANIAN SECONDARY SCHOOLS

An Exploratory Case Study from Teachers'  
Perspectives

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# Abstract

**Aim:** The purpose of this qualitative study is to examine the concept of Environmental Education (EE) in Tanzanian secondary schools from the teachers' perspective. The results of this study will help schools evaluate and implement the goals of the EE curriculum and understand the challenges and opportunities for teachers and school administrators.

**Theory:** Theory of experiential learning by David Kolb in 1984, whose foundation is based on the work of other scholars such as John Dewey, Kurt Lewin, and Jean Piaget. This theory posits the relationship between learning and experience, perception, cognition, and behaviour. Teachers assist learners in developing their experiences while teaching/learning EE, interacting with their environment. As students age, through experiential learning, they become environmentally aware and responsible citizens who act, participate, and behave.

The conceptual framework is used to explore the conceptualization of EE and explain the roles of teachers in driving their journey of discovery to achieve the goals of EE and observed outcomes related to school culture, student achievement, teaching/learning approaches, action, and participation in environmental issues.

**Method:** Data was mainly collected by a semi-structured interviews instrument. Two focus groups with a total of 6 participants were obtained through purposive sampling (Group A included 2 geography teachers and 2 biology teachers. Group B included 2 school administrators, i.e., the Head of school and the academic teacher). Each group was interviewed for approximately one hour. Subsequently, the collected data were analyzed thematically.

**Results:** Teachers need training and sufficient resources to effectively implement environmental education in schools. EE is urgently needed and actively implemented, apart from the challenges teachers face. They perceive EE positively, have the attitude and enthusiasm to design and facilitate EE with their knowledge despite their abstract conceptualisation of EE being constrained by a lack of specific trainings. By enhancing students in acquisition of environmental knowledge through experiences they develop from EE learning, they convey a message to parents, most of whom are ordinary community members whose neighbourhoods are often characterized by fire outbreaks and anti-environmental practices. The teachers also use platforms such as parent meetings at school to educate the community on how to value, preserve, and properly and profitably use the environment by promoting the spirit of planting trees both for environmental protection and economic reasons, while avoiding bushfire outbreaks and all other environmentally destructive practices. As a sign of their commitment to EE, the teachers and their students plant timber and avocado trees at the school each year, from which they extract avocado fruit for food and timber for economic purposes. The school's fire club helps students learn, discuss, and engage in fire safety activities at school and at home. Aside from these successes, teachers face the significant challenge of a lack of in-service and professional development on EE. Schools also do not receive enough funding from the central government to smoothly implement all school plans, including EE projects and outdoor activities that give students a hands-on understanding. It is also suggested that EE could be promoted as an independent subject.

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## Preamble

Readers are cordially invited to read this study report as it covers the most important area of global interest, which is the survival of life in the world through the manipulation of our minds to increase attention to the care and protection of the environment. Educating society by providing skills and knowledge related to environmental education is an obligation for every agency, organization or individual in both forms: formal and informal systems. We are obligated to participate in the fight against the prevailing environmental threats and make the world a better place for everyone now and in the future.

The study conducted sheds light on what is happening in the formal education system of Tanzania (secondary schools) through an examination of the concept of environmental education from the perspective of teachers as it relates to their teaching experiences at the school where the study was conducted. The study is intended to symbolically represent the real situation that teachers and school administrators encounter as they play their roles in implementing the environmental education program in schools. Yet, there are challenges and attempts to overcome that teachers outlined in the interviews while the environmental education program is underway in their schools. You will learn much more as you continue to read this report and gain their insights on how to implement this approach according to the secondary curriculum goals.

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## Acronyms

MoEVT	Ministry of Education and Vocational Training (of Tanzania)
PO-RLG	Prime Minister's Office–Regional Administrations and Local Governments (of Tanzania)
NEMC	National Environmental Management Council (of Tanzania)
IRB	Institutional Review Board
WORLD VISION	A Non-Governmental Organization working with Educational and Health projects
NGO	Non-Governmental Organization
NBS	National Bureau of Statistics (of Tanzania)
TAMISEMI	Tawala za Mikoa na Serikali za Mitaa (meaning; Regional Administration and Local Governments)
MOEC	Ministry of Education and Culture
TIE	Tanzania Institute of Education
US-EPA	United States - Environmental Protection Agency
URT	United Republic of Tanzania
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environmental Programme

## Introduction

The reason why societies need knowledge, skills, information and awareness about environmental education (EE), both in the formal and informal education system, is to provide opportunities for each individual to engage and raise awareness about the environment, develop attitudes towards environmental protection, participate in actions and be part of the problem solvers to respond to the environmental threats that exist in the world. The United Nations Educational, Scientific and Cultural Organization (UNESCO) uses education, science and culture to inform, inspire and engage people around the world to promote understanding and respect for each other and for our planet (UNESCO). Thus, in promoting knowledge to understand the environment, EE is central, and learning remains a platform to enhance this understanding.

Indeed, the commitment of any individual or institution to participate in such a global urgent call aims to address the world's problems and find solutions to make the world a safer place to live. Learning improves knowledge about the course someone is committed to or wants to have or do. Engagement itself only prepares someone to do something. But knowledge gained through learning perfects a person's readiness to do a particular thing. In this regard, learning is inevitable for people and the planet to sustain the lives of present and future generations, and the right time to learn and act for our planet is now (UNESCO: Berlin Declaration, 2021), as we seek solutions to the prevailing environmental problems that threaten the planet and people. EE is a concept that gives us knowledge about environmental issues; what we should know, what we should pay attention to, what we should or should not do when thinking about our environment and the nature of the threats that are coming our way. And in reality, these environmental threats are often human-caused or are the result of human actions in the environment that can therefore be controlled or minimized so that their effects are less harmful. Delors (2001) identifies four pillars of knowledge (from the report at UNESCO): Learning to know, learning to do, learning to live, and learning to be. In the context of environmental education, learning is needed to understand what surrounds us, what actions to take in that environment, how to act, and how to become. Ultimately, these learning pillars signalize a sense of experiential learning across generations. Macroscopically, EE is a learning content designed to prepare younger generations in particular to become the future they want to be.

The "societies around the world are establishing educational systems to develop citizens who will behave in desirable ways" (Hungerford & Volk, 1990. p.8). This means that the knowledge and skills acquired through educational systems help societies shape their thinking in terms of understanding, practice, experience, and behavior. As Sachs et al. (2019) noted; universal high-quality primary and secondary education is the backbone of the education systems in which societies anchor their initial cognitive developments and understandings. Through learning; experiences, perceptions, cognitions and behaviors related to various facts are shaped, aligned and transformed.

Following the global call made, schools were, therefore, directed to include EE as part of the learning programs in accordance with the prescribed curriculum objectives as one of the platforms for efforts to teach society about the importance of caring for our environment and the urgent search for solutions to environmental problems. This expectation perhaps dictates that various researches be conducted in the field of education. "We are convinced that urgent action is needed to address the dramatic, interconnected challenges facing the world, in particular the climate crisis, massive biodiversity loss, environmental pollution, pandemic diseases, extreme poverty and inequality, violent conflicts, and other environmental, social, and economic crises that threaten life on our planet" (UNESCO: Berlin Declaration, 2021). Nevertheless, the contribution of individual education systems to address environmental problems has not been sufficient to eliminate existing problems, although they contribute to slowing current and future environmental threats. This study addresses this historical juncture, and the results will help schools evaluate and implement the curriculum goals of EE and understand the challenges and opportunities for both teachers and school administrators.

Attention to study in this area stems from the call for every individual or organization, including schools, to play a role in the struggle to protect the environment and solve conspicuous environmental problems. According to the World Bank (2019), some of the known environmental threats to the entire world are: land degradation, deforestation, pollution, climate change, drought, floods, poor sanitation, lack of clean and safe water, and poor agricultural practices (see Table 1). All of these factors threaten the environment's life support system. We are connected to the world through the concept EE, it teaches us about both the natural and man-made environment, their interactions and outcomes (Toth, 2016). In addition, Toth emphasizes that EE promotes awareness and sensitivity to problems that affect the environment we all depend and actions we can take to improve and preserve it. EE raises people's awareness to use resources properly and to think about what tomorrow's life will be like, depending on the kind of life societies have chosen today. Thus, EE has many benefits for youth, educators, schools, and communities in general.

In developing countries like Tanzania, they are still plagued by environmental problems despite the efforts to address them. The environmental analysis conducted by the World Bank in 2019 for Tanzania, identifies the country as vulnerable to critical environmental threats such as pollution, land degradation, and climate change. The situation needs to be rescued at all levels, with the provision of EE in schools among the efforts. However, it has been noted that EE in schools, apart from being embedded in the curricula, has not contributed significantly to the overall struggles and strategies to eradicate environmental problems. Henceforth, it has resulted in lowering global efforts to eliminate tangible environmental problems. The main reason for this assertion is the failure of teachers to provide learners with the knowledge and skills of EE as stated by (Kimaryo, 2011). It is also claimed that theory and research on EE have overlooked the children who are the subjects of environmental education (Rickinson, 2001, cited in Payne, 1998a). Now, while the latter is based on the evaluation of the EE program, this study draws on the aforementioned main assertion and explores the perceptions of teachers in a secondary school in Tanzania on the concept of EE to explore it and find out the successes and challenges faced by teachers and school administrators in implementing EE in the school context.

This study is being conducted in Tanzania, where the situation described above is a major reason for selecting this country to conduct the research on EE in secondary schools. In addition to that, the researcher's self-motivation and background, having previously worked as both a teacher and a school administrator in various secondary schools in Tanzania, contributed to the selection of the research area, and he intends to share with the world the experiences of teachers in perceiving, conceptualizing, and implementing the goals of the EE curriculum in schools. Readers are guided through a total of seven chapters to this report that seek to uncover the exploration of environmental education as a concept and how secondary school teachers open "doors" of perceptions to allow the "inside" of the conceptualization of EE. "I am interested in exploring teachers' perceptions and practices because it is assumed that understanding teachers' perceptions is important for the successful implementation of curriculum change" (Kimaryo, 2011, p.22; as cited in Chikin Lee, 1996). Moreover, the reader will learn how relevant EE is in influencing overall understanding and transformation of experiences upon interaction with the environment, and how teachers and students can collaborate in active experimentation by planning and implementing extracurricular activities related to EE, develop and transform concrete experiences as they interact with their surroundings to improve the school grounds and promote economic activities to help the school combat some challenges.

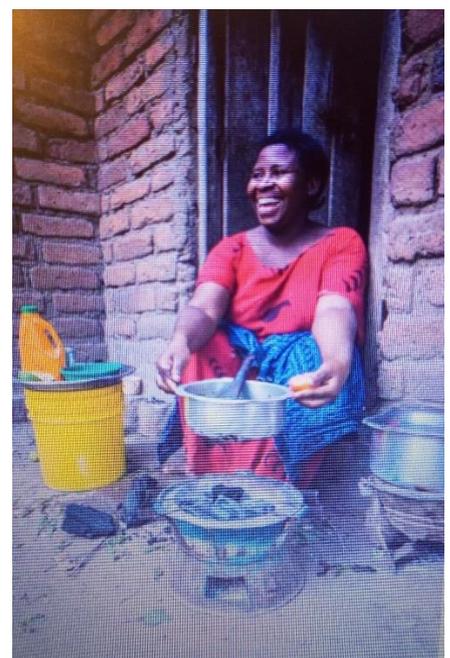
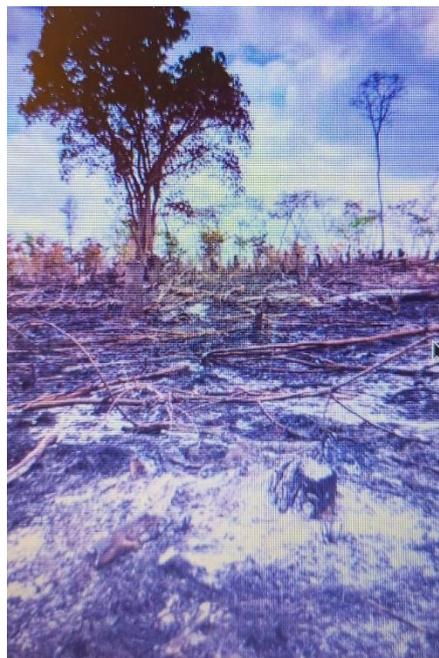
# Chapter one

## The Background of Research Problem

**Overview:** In this chapter, I present the research problem that necessitated the formulation of a research purpose for the study of environmental education and disclose the research questions that guided my in-depth interview with respondents to collect data.

### 1:1 The Research Problem

According to the World Bank (2019), 70 percent of Tanzania's population lives in rural areas and relies on natural resources for food, fuel, and fodder. These natural resources are under serious threat due to degradation: rapid population growth, economic growth, increasing urbanization, and climate variability and change. The impacts of these factors are geographically differentiated and amplified, resulting in ecosystem loss, competing demands for land and water, and pollution. (See Picture 1A, B, and C).



Picture 1A showing part of deforested area in Tanzania	Picture 1B showing part of burnt area in Tanzania	Picture 1C showing a woman enjoying cooking by charcoal stoves which is common in Tanzania
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*(Photos: Tanzania Environmental Analysis – World Bank (2019). p.40,27,44 consecutively)*

Tanzania is facing serious environmental threats due to human intervention in the environment, and the impact is not only felt locally, but contributes to global environmental threats. An urgent need to stop the high rate of deforestation, land degradation and pollution can save the disaster. For this reason, UNESCO has issued a global call to fight environmental threats. One can ask whether these human actions are carried out by populations that are well informed about environmental issues. To answer such a question, one can relate the population in question to education in environmental issues. In this case, therefore, environmental education was formulated and carried out in schools, where young people could learn about and understand the environment, propose solutions to environmental problems, and take action in schools and their communities, in the belief that all of society would eventually be well informed and responsible for environmental issues.

With Tanzania having introduced EE in schools as early as 1990, I was convinced to examine the implementation of the EE concept based on teachers' perceptions. But, Kimaryo (2011) states that "the implementation of environmental education was not successful" (p.16). Should this mean that the EE program was not well planned or that it faced a number of challenges? The answers to questions like these

may be explained in the project findings in Chapter Six. Indicators of the unsuccessful implementation of EE are the persistent environmental threats in Tanzania, where "a national analysis identified six main problems that need urgent attention: Land degradation, lack of accessible good quality water for both urban and rural populations, pollution, loss of wildlife habitat and biodiversity, degradation of water systems, and deforestation." (URT, 1997. P.6). These environmental problems affect human health as well as the economic prosperity of the people and the country.

KEY ENVIRONMENTAL CHALLENGES IN TANZANIA		
ISSUE	MAJOR CAUSES	MAJOR CONSEQUENCES
Deforestation and forest degradation	<ul style="list-style-type: none"> <li>•Agricultural expansion</li> <li>•Fuelwood harvesting and charcoal production</li> <li>•Increasing demand / population growth</li> </ul>	<ul style="list-style-type: none"> <li>•Reduced environmental services</li> <li>•Loss of ecosystem services</li> <li>•Soil erosion, water loss, and water pollution</li> </ul>
Land degradation	<ul style="list-style-type: none"> <li>• Agricultural expansion</li> <li>• Inefficient farming practices</li> <li>• Overgrazing</li> <li>• Deforestation</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of soil fertility</li> <li>• Reduced food production</li> <li>• Desertification</li> </ul>
Degradation of water resources	<ul style="list-style-type: none"> <li>• Excessive agricultural use</li> <li>• Uneven distribution</li> <li>• Increasing competing water demand / population growth</li> </ul>	<ul style="list-style-type: none"> <li>• Water scarcity</li> <li>• Reduced water quality</li> </ul>
Loss of biodiversity	<ul style="list-style-type: none"> <li>• Habitat loss and degradation</li> <li>• Poaching</li> <li>• Overexploitation</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of tourism income</li> <li>• Reduction of food supplies</li> <li>• Loss of ecosystem services</li> </ul>
Fresh water and marine fisheries depletion	<ul style="list-style-type: none"> <li>• Overfishing</li> <li>• Degradation of aquatic environment</li> <li>• Destructive fishing methods</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced food production</li> <li>• Economic losses</li> <li>• Unemployment</li> </ul>
Climate change	<ul style="list-style-type: none"> <li>• Worldwide increase in emissions of greenhouse gases</li> <li>• Deforestation (removing carbon reservoirs)</li> </ul>	<ul style="list-style-type: none"> <li>• More frequent extreme weather events</li> <li>• Reduced food security</li> <li>• Environmental and human health issues</li> </ul>

Table 1. Showing Tanzania Key Environmental Challenges. *Source; World Bank (2019. P.38)*

Environmental education in school should be an area within the subjects that provides the school society with the opportunity to develop an awareness of the environment, take action, and assume responsibility for the environment. If children learn and understand the concept of environmental education early, they can play a positive role in protecting the environment when they are adults (Pirzado, 2018). This is because EE is about learning the environment in which we live (Pirzado, 2018). It is suggested that "environmental awareness makes a student learn better and develop a creative attitude towards his/her surroundings" (Ng'ang'a, 2010, p.12). As mentioned earlier, this goal is not well implemented, especially in developing countries like Tanzania. If this were to realistically work, countries and/or the world could have eventually produced well-informed and responsible citizens, in addressing the challenges of environmental problems. "There are millions of people negatively affected by the environment. Through the awareness about the environment around, people can minimize the harms to our environment and thus reduce any negative impacts." (Pirzado, 2018, p.7). The environment should support life. If there are consequential damages caused by human actions to the environment, it is the will of the world to either reduce or eliminate them.

Efforts to find solutions to environmental problems are still needed. Tanzanian schools have not served the purpose of environmental education well. An examination of the concept of EE provides teachers with an opportunity to identify challenges. The urgency to address environmental education stems from the fact that this field is characterized by a paradox and that we want to learn to live in a sustainable way, and that the concept is not nearly a priority in formal schooling around the world (Palmer, 1998).

## 1:2 The Research Purpose

Since the implementation of EE in Tanzania is claimed less effective and its purpose not clearly realized, the need arises to question the abstract conceptualization of EE in schools to know the challenges and successes of its implementation. If EE is to be implemented by secondary school teachers as integrated subject, their perceptions and understanding of teaching EE as an integral part must be examined (Mwendwa, 2017; Hart, 2003). Similarly, the aim to understand the concrete experiences that learners develop as they interact with their environment as an outcome of the experiential learning facilitated by EE educators. I, therefore, decided to focus my research on exploring the concept of EE from teachers' perspectives because teaching and learning are strongly influenced by individuals' perceptions and actions (Mwendwa, 2017). "The understanding of teachers' perceptions and teaching practices can help in finding ways in which the implementation of environmental education within formal education can be enhanced or improved" (Kimario, 2011, p.18).

This study addresses the perspectives of teachers in a secondary school in Tanzania on EE. The purpose of this qualitative study is to explore this concept and teachers' attitude about the current implementation of the EE program in schools. Understanding the challenges and opportunities for both teachers and school administrators will help schools evaluate their plans, strategies, and commitments to implementing the goals of the environmental education curriculum.

The study has its origin in the global struggle to find solutions to environmental problems and the pursuit of sustainable living. Although, every citizen is responsible to environmental protection, formal education plays important role in the formation of broad coverage of global societies, as students can acquire knowledge in schools and take it home, where other people can also learn including households. It is believed that teachers' perceptions provide responsible educational authorities and stakeholders with the opportunity to understand how mandated curricular goals are achieved through the implementation of concepts involved, and the use of proper learning styles as the "individuals learn better when subject matter is presented in a way that is consistent with their preferred learning style" (Healey and Jenkins, 2000, p.6; Kolb, 1984). This is because, "the particular choice of learning style reflects the individual's abilities, environment, and learning history" (Healey and Jenkins, 2000, p.4; Nulty & Barrett 1996).

## 1:3 The Research Questions

In considering the Kolb's experiential learning cycle which emphasizes a cyclic learning in four stages and the learning transitions between stages. The following questions that the research attempts to answer provide the opportunity in light to the transformation of learning experiences mainly between abstract conceptualization of EE by the teachers and the development of concrete experiences. Subsequently, between reflective observation and active experimenting along the complete experiential learning cycle.

- (a) How is the Environmental Education conceptualized by teachers in Tanzanian secondary schools?
- (b) What roles do teachers and school administrators play to make EE beneficial to the students?
- (c) What are the successes and challenges of implementing EE, and
- (d) How do school administrators and teachers deal with those challenges in making EE practical?
- (e) In what school activities is the EE program reflected in daily school life to make it work and be sustained?

It is expected that the results of this research present the reality of teachers working environment in relation to the prescribed outcome of learning experiences and, therefore, through teachers' perceptions a way is paved for what schools need to effectively implement the EE curriculum goals. Setting of these questions was not easy, I used two thoughts to arrive at such five questions; First, I reminded myself, if some teachers claimed not to implement effectively the EE because it was a new concept to them then, how do they perceive and conceptualize EE? Second, I eager to know teachers' roles in commitment by practice towards a global call to deal with environmental threats. What actions have they undertaken to sustain EE? I further set a number of pilot questions that could guide me in leading the interviews with the participants in getting the answers that respond to aforementioned research questions.

## Chapter Two

### The Background of Environmental Education and its scope in Tanzania

**Overview:** In this chapter, I present the demographic data of Tanzania, the structure of secondary education in Tanzania, the concept of environmental education in general, the social goals of environmental education, and the scope of environmental education in Tanzania.

#### 2:1 The Demography of Tanzania and the rationale of the research area

According to the United Republic of Tanzania - National Environmental Policy (URT-NEP), (1997), "Demographic factors and trends have a synergetic relationship with the developmental and environmental issues" (p.11), and the impact is seen in the use and management of land, water, energy and other natural resources. Tanzania is one of the East African countries with a population of about 45 million according to the 2012 census. The climate is tropical and agriculture is the main economic activity of the majority, especially those living in rural areas. The table below shows a summary of Tanzania's characteristic population.

AREA	DETAILS		
Population and Agriculture	Rural population involved in Agriculture as it was in 2007/2008 31,013,026 (69%)	Total country population as it was in 2012 44,928,923	Percentages of households using the following as their main Farm implements in 2007/2008 <ul style="list-style-type: none"> <li>• Hand hoe, 97.6%</li> <li>• Oxen Plough, 14.1%</li> <li>• Tractor, 0.8%</li> </ul>
Education and Agriculture	Percentage of heads of agricultural households with formal education 72%	Percentage of heads of agricultural households without formal education 28%	Rate of Involvement on Agricultural activities on full time basis 48%
Sources of energy	Percentage of households and Sources of Energy for Lighting; <ul style="list-style-type: none"> <li>• Wick Lamp 67%</li> <li>• Hurricane Lamp 24%</li> <li>• Pressure Lamp 4%</li> <li>• Firewood 2%</li> <li>• Mains Electricity 2%</li> <li>• Candles 0%</li> <li>• Solar 1%</li> <li>• Gas(Biogas) 0%</li> </ul>	Percentage of households and Sources of Energy for cooking; <ul style="list-style-type: none"> <li>• Firewood 95%</li> <li>• Charcoal 4%</li> <li>• Crop residues 1%</li> <li>• Kerosene 0%</li> <li>• Mains Electricity 0%</li> <li>• Bottled gas 0%</li> <li>• Solar 1%</li> <li>• Livestock dung 0%</li> <li>• Gas(Biogas) 0%</li> </ul>	

Table 2. Showing a Summary of Tanzanian demographic details: (Source; [https://www.nbs.go.tz/nbs/takwimu/references/Tanzania\\_in\\_figures2012.pdf](https://www.nbs.go.tz/nbs/takwimu/references/Tanzania_in_figures2012.pdf))

Basically, the above data show the impact of rural life on the environment and the type of life characterized by high poverty and illiteracy. The nature of agricultural practices and the energy sources used for lighting and cooking indicate numerous environmental problems such as soil degradation, pollution, deforestation, etc. On the other hand, the situation highlights the need to seriously address how the environment is managed and controlled. "Tanzania hosts one of the largest poor populations in Africa, with approximately 21.3 million Tanzanians living below the global poverty line (World Bank, 2017b), many of which depend on natural resources for their livelihoods" (World Bank, 2019, p.16). Unless natural resources are freed from this risk and the environment is well managed, the poverty that exists in many African countries will not be solved. Therefore, "Tanzania is highly vulnerable to climate change due to its reliance on natural resources" (World Bank, 2019, p.18).

Total population characterized by; high population rate (45M in 2012, 60M is projected in 2022 and 130M is projected by 2050), household poverty, use of unreliable and non-environmental friendly energy sources, mal-agricultural practices. As a result; Global warming, climate change, pollution etc. (environmental threats)

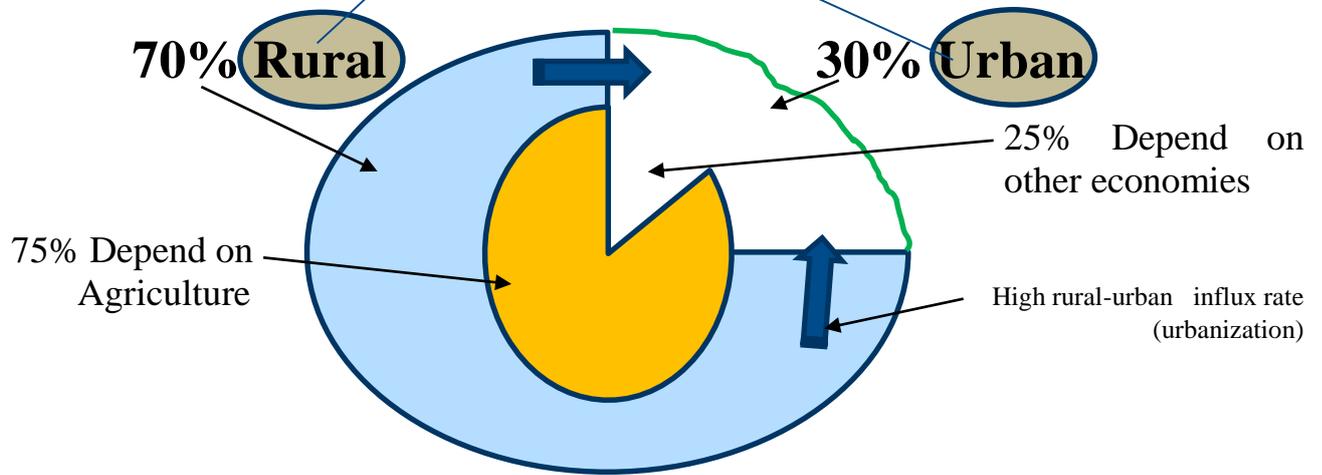


Figure 1. Showing an illustration of demography in Tanzania. Source; Researcher, 2022

Adolescents and young adults in Tanzania make up a large portion of the total population, and these groups largely constitute a student population. (See Table 3 below). Therefore, it is essential that the population be exposed to EE during their school and university years so that knowledge of environmental issues spreads throughout societies as this population grows up. The goal is for all members of society to be well informed about environmental protection, the problems, and how to participate in finding solutions.

2012 Population and Housing Census Tanzania		
Total Population (million)  44.9	Children Population <5years (percentage) 15.2	
	Young Population <15years (percentage) 44.1	The young and youth populations constitute largely to school and college population
	Youth Population 15-35years (percentage) 35.1	
	Working Age Population 15-64years (percentage) 52.2	
	Elderly Population >60years (percentage) 5.5	
	Elderly Population >65years (percentage) 3.8	
Number of primary schools 16,331		
Number of secondary schools 4,528		

Table 3. Showing a Summary of Tanzanian population by percentages: Source; ([https://www.nbs.go.tz/nbs/takwimu/references/Tanzania\\_in\\_figures2012.pdf](https://www.nbs.go.tz/nbs/takwimu/references/Tanzania_in_figures2012.pdf))

## 2:2 Secondary Education in Tanzania

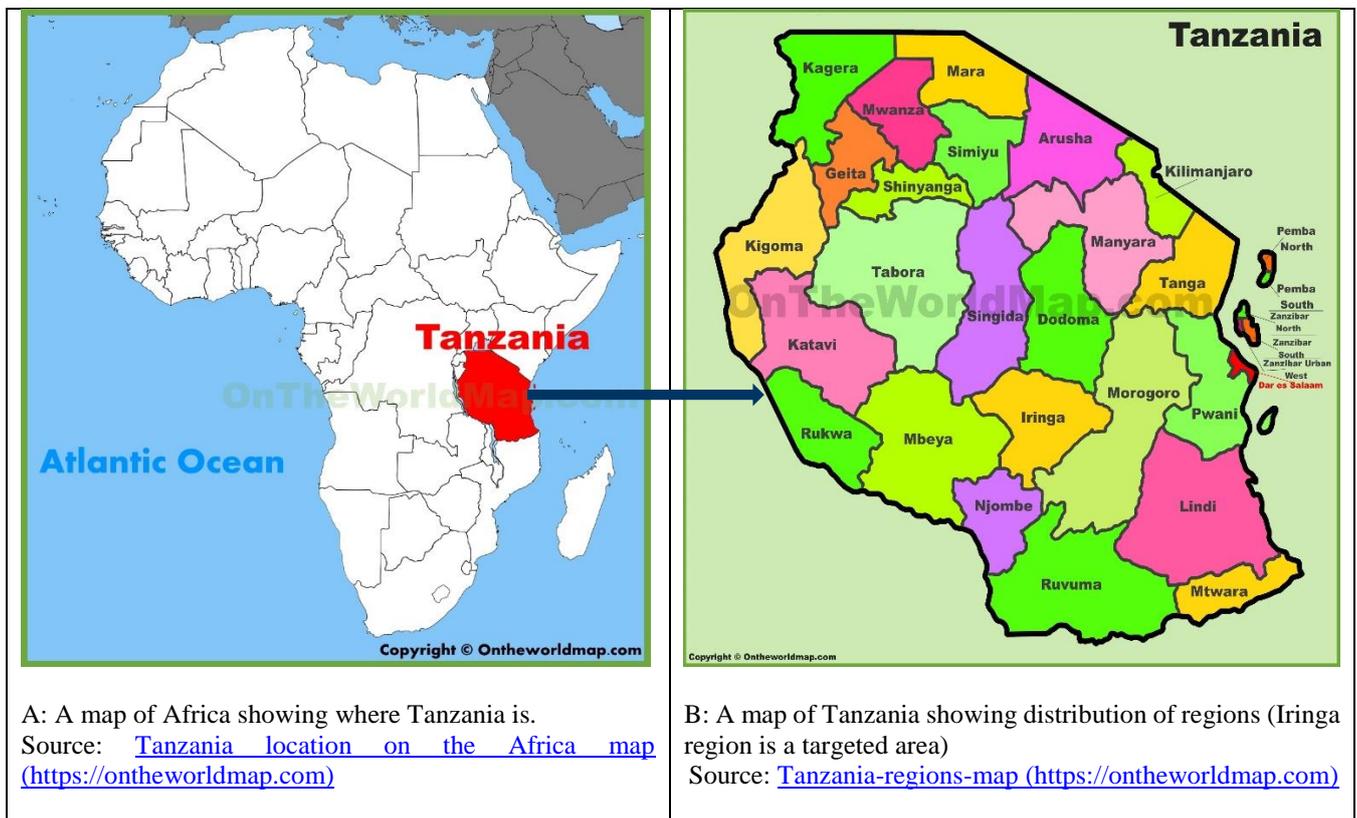
According to the Tanzania Institute of Education (TIE) (2007), the structure of formal education in Tanzania follows the formula “2-7-4-2-3+” meaning that; 2 years of pre-primary education (average age range 3-5 years), 7 years of primary education (average age range 5-12 years), 4 years of Ordinary Secondary Education (O-level, with an average age range 12-16 years), 2 years of Advanced Secondary Education (A-level, with and average age range 16-18 years) and a minimum of 3 years of tertiary education (average age range 18-21 years). Thus, secondary education (both Ordinary and Advanced) covers a total of 6 years with an average age range of 12-18 years. This means, primary and secondary education in Tanzania constitute largely to a young and youth population whose investment in EE is deemed to support a production of a well environmentally responsible population in the coming future. The general subjects taught in Tanzanian secondary schools are well represented in the following table;

AREA/SUBJECT				
Languages	Natural sciences	Social sciences	Business studies	Aesthetics
Kiswahili English French Arabic	Biology Chemistry Physics Mathematics Computer Technical Education Agriculture Economics	History Geography Civics	Commerce Book-keeping	Fine arts Theatre arts Physical Education Music

Table 4. Showing subjects taught in secondary schools in Tanzania. Source; TIE (2007. P.18-19)

Public schools in Tanzania are run on a cost-sharing basis, meaning that the central government pays the salaries of teachers and non-teaching staff and provides monthly grants to schools for tuition-free education; in addition, local governments, in collaboration with communities, are responsible for the construction and maintenance of school infrastructure. Meanwhile, parents are responsible for providing their children with uniforms, books, and stationery. Private schools in Tanzania, on the other hand, are run by private individuals or organizations, and parents are responsible for school fees and all school requirements. However, they follow government circulars and guidelines. The Ministry of Education, formally abbreviated as MOEC, then MoEVT, and now MoE, is responsible for teacher education and training, as well as the production and distribution of teaching and learning materials and equipment (Mtaita, 2007; URT, 1995). Under the Ministry of Education, there are other important bodies such as the Tanzanian Institute of Education (TIE), which is responsible for curriculum design, development, review, updating, dissemination, implementation monitoring, and evaluation (Mtaita, 2007; URT, 1995). In addition, there is another ministry that collaborates with the Ministry of Education in the management of schools, especially public schools. This is the Ministry of Regional Administration and Local Governments, abbreviated PO-RLG or commonly referred to as TAMISEMI. This ministry is responsible for building and maintaining school infrastructure, paying staff salaries, and closely monitoring schools.

The school selected for the study (Kiponzelo Secondary School) is one of the public community schools in Iringa District Council, one of the five councils in the Iringa region of Tanzania. Since the council in question is mainly rural, the school under study is also located in a rural area (*see figure 2 p.16*).



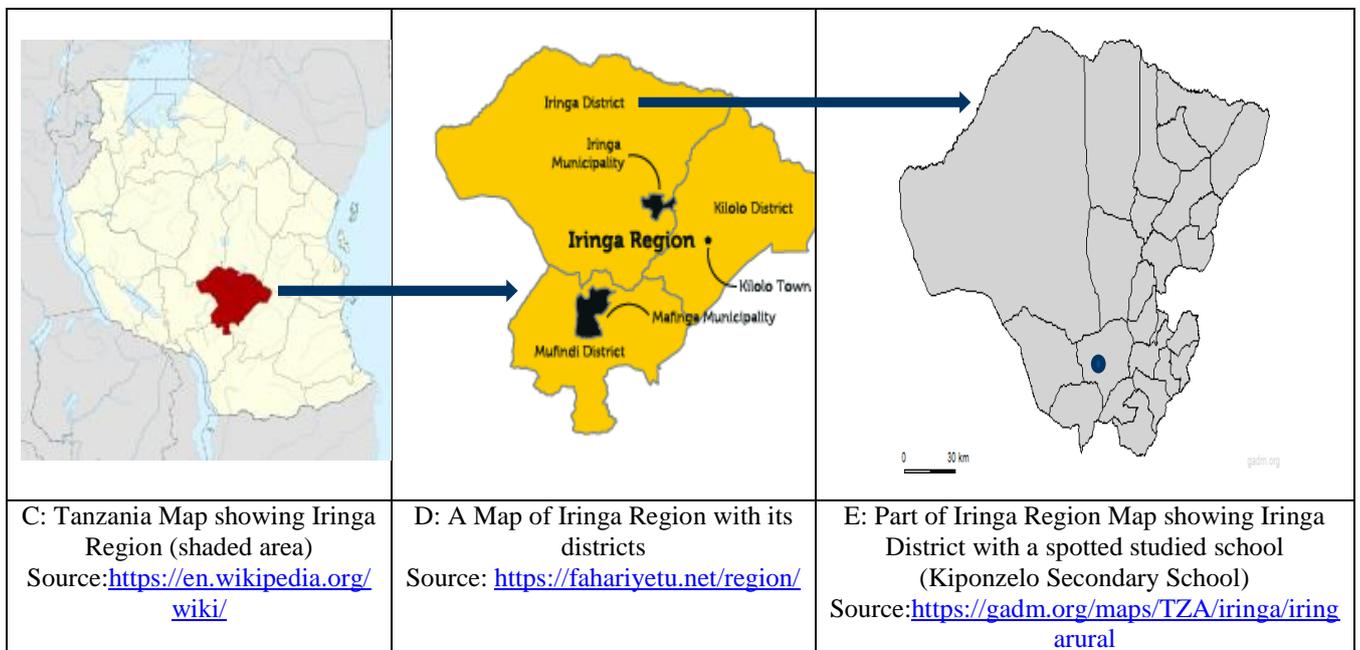


Figure 2 (A, B, C, D & E) Showing different maps as explained in each category

The criteria for this preference were that rural areas are characterised by many challenges and problems that pose a threat to the environment. Fire outbreaks, bushfires, and deforestation are frequently reported in rural areas. Tanzania (mainland) has a total of 26 administrative regions: Arusha, Coast, Dar es salaam, Dodoma, Geita, Iringa, Kagera, Katavi, Kigoma, Kilimanjaro, Lindi, Manyara, Mara, Mbeya, Morogoro, Mtwara, Mwanza, Njombe, Rukwa, Ruvuma, Shinyanga, Simiyu, Singida, Songwe, Tabora, and Tanga. Each region has an average of 3-5 councils. The Iringa region has an area of 35,503 square kilometres and a population density of 27. The region accounts for 941,238 of Tanzania's total population of 44,928,923. It is alleged that the grants provided by the central government to enable free education in public schools are insufficient to cover current school budgets including funding for EE projects. The statistics below show details for the Iringa region only to illustrate the level of capitation grants provided to public schools.

<b>President's Office - Regional Administration and Local Government Fee Free Basic Education - Capitation Grants Disbursed to Secondary Schools 2019/2020</b>				
REGION	COUNCIL	NUMBER OF PUBLIC SECONDARY SCHOOLS	TOTAL GRANT IN 12 MONTHS	
			(in TSHS)	(Approx. in USD)
Iringa	Iringa District Council	37	212,441,162	91,411.88
	Iringa Municipal Council	20	116,393,092	50,083.10
	Kilolo District Council	28	121,470,874	52,268.03
	Mafinga Town Council	11	58,596,645	25,213.71
	Mufindi District Council	40	169,553,130	72,957.47
	<b>Sub-total</b>		<b>678,454,903</b>	<b>291,934.19</b>

Table 5. Showing Central Government grants to Secondary schools in Tanzania. Source; TAMISEMI ([https://www.tamisemi.go.tz/singleministers/summary\\_secondaryschools-capitation-grants-2019-2020](https://www.tamisemi.go.tz/singleministers/summary_secondaryschools-capitation-grants-2019-2020))

Although Tanzania has used traditional teaching methods in the past, namely the teacher-centred approach, which in practice constraints facilitative experiential learning. The learner-centred approach is now a teaching approach that is emphasised more than the teacher-centred approach in Tanzania. When teaching subject matter, it promotes learning by doing; both teacher and students actively participate. The teacher becomes a facilitator, motivator, and promoter (TIE, 2007). In other words, this type of pedagogy forms "an integrative approach to teaching that is based on both philosophy and practical experience. It is generally an approach that purposefully brings together knowledge, skills, attitudes, and values from different subject areas to develop a better understanding and linkage of key ideas" (Verma & Dhull, 2017, p.4; Kadji, 2002; Stapp, 1997). It is therefore, more preferable in enhancement of EE curriculum goals to learners through experiential learning.

In the curriculum for secondary schools in Tanzania, as specified by the TIE (2007), secondary education in Tanzania aims to provide opportunities for the acquisition, enhancement, and development of knowledge, skills, attitudes, and understanding in various areas of study. According to the Tanzanian government, environmental education is one of the areas necessary for civic responsibility and engagement, as it touches on understanding the environment and how to support life. "Every person living in Tanzania has an interest and a duty to protect and improve the environment and to inform the relevant environmental authority of any activity or phenomenon that may significantly affect the environment" (Tanzania Environmental Management Act, 2004. p.23). Perhaps this is one reason why EE has been embraced in Tanzanian education as an important learning field in enhancing learners develop concrete experiences from knowledge, understanding, and attitudes about environmental issues.

## **2:3 The concept of Environmental Education**

Over the years, the term environmental education and its components have been defined by various scholars, forums, and organizations. Many countries have adhered to environmental agreements within the framework of the United Nations (UN) and have developed individual strategies for dealing with environmental management and protection. The concept of EE emerged after the UN Conference on the Human Environment, held in Stockholm-Sweden in 1972. It stated that EE must be used as a tool to manage environmental problems (Pirzado, 2018; UN, 2018a). It encompasses environmental knowledge, attitudes, awareness, responsibility, participation, and also covers human rights, focusing on issues of population growth, poverty, urbanization, health, water supply, and sanitation (Pirzado, 2018; Agenda 21, 1992).

The UN agencies have made a series of statements on the environment and sustainability to draw the attention of the whole world to participate in the global efforts for the environment. Yet, environmental problems are still not solved. Generations are constantly changing, the new are getting old and the old are perishing. It should be a recurring process to motivate the public to take action for the environment. For this reason, EE has been made a learning field in schools. According to Pirzado (2018), "the term generally relates to the formal education within the school system, however, sometimes includes raising awareness to the public and other audiences through various means such as print materials, websites, media campaigns" (p.6., as also cited in UNESCO, 2014).

The United States - Environmental Protection Agency (US-EPA) describes EE as a process that enables individuals to address environmental issues, solve environmental problems, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and are empowered to make informed and responsible decisions. The website US-EPA also describes the basic components, also referred to by Vega & Melchor (2004) as categories of EE, as follows;

*"Awareness: to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.*

*Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associate problems.*

*Attitude: to help social groups and individuals acquire a set of values and feelings of concern for the environment, and the motivation for actively participating in environmental improvement and protection.*

*Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.*

*Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems" (Vega & Melchor, 2004, p.11-12; as cited in UNESCO, 1978, p.26-27).*

I can categorize these components of EE into 2 parts; awareness and knowledge take the first part which relies on teachers' roles to enhance the learners' understanding of EE. Meanwhile; attitude, skills and participation make a second part which relies on the learners' ability to generate their concrete experiences as they interact with their surroundings. However, teachers themselves too have their own duty, as part of social group, to develop an attitude that will enhance a proper abstract conceptualization of EE in order to effectively and efficiently implement EE in both theoretical and practical manner. Until the entire population is knowledgeable and willing to fully participate in certain activities aimed at solving the prevailing environmental challenges, we will continue to suffer from the environmental problems associated with a remarkable increase in world temperature, melting of ice, diseases, etc. EE connects us to the environment, teaches us about the natural and man-made environment, and about our actions in relation to the environment, both beneficial and non-beneficial actions. It also raises awareness of issues that impact the environment. (Web source: Project Learning Tree (PLT), 2019; Toth, 2016).

The concept of EE is an urgent need for all people. We get a sense of it through our daily interactions as humans with the environment in which we live. We face many environmental problems, especially pollution and global climate change, and we feel the effects of our interactions with the environment. Resources are being depleted for our present needs without considering our future needs. Since we are causing environmental problems, we need to be problem solvers and take care of the environment to sustain our lives. Referring to the definitions of the concept as defined by many scholars, I will use the following definition as adopted by the global environmental education communities, including the *Tbilisi conference (1977)* that;

*“Environmental Education is a process aimed at developing a world population that is aware of and conceived about the total environment and its associated problems, and has the attitudes, motivations, knowledge, commitment and skills to work individually and collectively towards solutions of current problems and the prevention of new ones” (Stapp, 1969, pp.26).*

This is a very broad definition of EE. In response, there are new topics to deal with. For example, one can find out the extent to which a country's population is prepared to become informed, engaged, and fully responsible for protecting the environment. This study highlights the school population in Tanzania and aims to obtain informative engagement from teachers by exploring their perceptions of the concept EE. Apart from the introduction of EE in schools, Tanzania has always taken other measures to address environmental issues through various strategies by formulating environmental policies, enacting environmental laws, and establishing the National Environmental Management Committee (NEMC), which is responsible for addressing environmental issues. In education, environmental education is to begin in schools. The aim of all these initiatives is to sensitize the Tanzanian population to environmental issues and to help find solutions to existing environmental problems and prevent new ones.

## **2:4 Objectives of the Environmental Education**

In highlighting the importance of EE in Tanzania, Mwendwa (2017) mentions the main objective of EE, as also stated in the Tanzania Education and Training Policy (2005), is to enable rational use, management and conservation of the environment. The idea emerged due to the increasing vulnerability to climatic variability (Kalungwizi et al., 2020) as a result of mismanagement of the environment by increasing human activities; land degradation, deforestation, pollution, and poor agricultural practices (World Bank, 2019) that attack the natural ecosystem within the environment. Moreover, the subsequent objective of EE as observed by Kalungwizi et al. (2020); United Republic of Tanzania (1995, 2010, 2014) is to enable the application of knowledge from EE for proper management and conservation of limited natural resources in the environment. "Environmental Education is not only education to inspire environmental stewardship and responsible citizenship, but also to protect today's "de-natured", increasingly unhealthy society" (Verma & Dhull, 2017, p.2). The problems we cause on Earth, which ultimately affect the natural balance and stability of the climate, threaten the survival of living things. Therefore, "there are millions of people negatively affected by the environment--if protected, the environment fosters and safeguards people, but if violated the environment can cause harms as well" (Pirzado 2018, p.7).

The United Nations exists to coordinate all activities in consideration of a safe, clean, healthy, and sustainable environment as one of the most important human rights obligations (Pirzado 2018). Humans have a role to play by seeking knowledge and actively caring for and participating in the overall care, conservation, and management of the environment. At the macroscopic level, the following are the goals of EE, as mentioned by Vega & Melchor (2004), when referring to the recognized EE goals of the "UNESCO-UNEP Tbilisi Intergovernmental Conference on EE;

- a. *To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;*
- b. *To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;*
- c. *To create new patterns of behaviour of individuals, groups and society as a whole towards the environment" (Vega & Melchor, 2004, p.11; Palmer, 1998)*

Looking at these goals, it can be deduced that schools should be made a facilitating environment for EE learners to acquire knowledge and sensitization of environmental issues which will guide them develop, upon their attitudes and interests, concrete experiences as they interact with the environment. The learners should be able to reflect on the experiences already acquired, a reflexive observation will lead into abstract conceptualization of the theories and concepts involved in EE before exercising the actual experimenting (planning) for the new experiences. In this way, we can expect an outcome of newly behaved societies.

## **2:5 The Scope of Environmental Education in Tanzania**

"Tanzania took an active part in the preparations for and during the United Nations Conference on Environment and Development which enshrined the integration of environmental concerns and economic development in the Rio Declaration on Environment and Development and Agenda 21" (URT, 1997. p.3). However, this step was preceded by the integration of EE into Tanzanian curricula. Mwendwa (2017) reports that in the 1990s, Tanzania formulated EE courses through the Ministry of Education and officially included them as integrated subjects in the curriculum for secondary schools at all levels. There was a need to save the country from environmental problems. Therefore, it was assumed that this integration would have a significant impact on environmental protection even among the younger generations in schools. According to Kimaryo (2011), schools are part of the surrounding community, so it is expected that what students learn in school will be reflected in their society. As argued by Pirzado (2018), "if these concepts are taught and understood at early stage, then children can play a positive role to protect the environment when they grow up" (p.7).

However, as in many countries, environmental problems still exist in Tanzania, regardless of the various environmental initiatives that have already been put in place, "although environmental education has been included in the school curriculum in Tanzania - also emphasized in the Education and Training Policy - the condition of the environment has not improved" (Kimaryo, 2011, p.16). As a result, "scholars are now questioning whether education can help to meet environmental sustainability challenges in such countries" (Kalungwizi, et al., 2020, p.96; cited in Wals & Benavot, 2017; Sterling, 2010; Rickson, 1999). I would argue that the issue is not the inclusion of EE in curricula, but a practical meaning of it. How it is taught and how the learning processes operate under cyclic manner (stated in chapter 4). In addition, teachers should have a knowledge base that facilitates their delivery of EE (Kimaryo, 2011), and they should commit to act accordingly.

In Tanzania, research on EE has been conducted mainly at the secondary school level (Kimaryo, 2011; cited in Hogan, 2007; Lindhe, 1999; Mtaita, 2007; Osaki, 1995), focusing on teaching and learning and stakeholders' perceptions of their involvement in EE (Kimaryo, 2011). This study draws on secondary school teachers' perceptions and assumes the weak implementation of EE in schools, which ultimately contributes to ineffective addressing of environmental issues.

# Chapter Three

## Literature Review

The literature was selected based on the criterion for articles and journals on environmental education. The reading was searched in google scholar and other search engines, finding more than 500 articles and books. The search was later narrowed down to obtain articles/journals or book chapters on environmental education in secondary schools in 1990 - 2021. Later, the following phrase was used as the main search query: "environmental education in Tanzanian secondary schools". The search criterion included all search results written in English within the specified time period. To obtain more reviews, the search was expanded to include studies on environmental education in secondary schools in developing countries. On the other hand, relevant documents such as Tanzania secondary school curriculum and education policy were searched online and used to examine EE and its implementation in Tanzania

The interest in studying EE was based on the current environmental issues facing societies and the world, with global climate change being one of the most important consequences. I wanted to know how the school population is informed about environmental knowledge and skills through EE and how teachers perceive EE according to the secondary school curriculum in Tanzania I selected the literature sources that could explore this question before embarking on the research in the field. The literature contains controversial accounts of the implementation of EE in the formal sector. Some books discuss the challenges and opportunities of implementing EE in schools, others focus on teacher competency in relation to EE, others on whether EE should be taught as an integrated or stand-alone subject, and others on whether EE should be taught outdoors or indoors.

### **3:1 The role of teachers in Tanzania secondary schools, qualification and competence**

To teach in Tanzanian secondary schools, a teacher must have either a two-year diploma in education or a three-year bachelor's degree in education. Once hired, the teacher teaches either one or two subjects (see Table 2, page 16), depending on the subject(s) learned at the training school or university. As described in chapter two, EE is taught as an integrated learning field in some subjects in Tanzania. Mtaita (2007) summarized the roles of teachers who teach EE as follows: They "allow students to have a role in determining their own learning; assist the students to discover the symptoms and real causes of environmental issues; develop students' critical thinking and problem-solving skills; arrange collaborative action projects in negotiation with students and community; focus on one or two issues in depth; ensure projects are multidisciplinary; take part in the learning alongside students and community members; utilize a facilitative teaching style" (Mtaita, 2007, p.32; Mclean, 2003, p.5). Teachers are expected to open students' awareness of the environment and are held to an environmental, individual responsibility to care about, participate in, and act on environmental issues. The roles represent a learner-centred approach to teaching that gives students more room for their own engagement in learning. It is likely that this paradigm shift has contributed to the learner-centred approach moving away from the usual teacher-centred approach that was dominated by lecturing and memorization (Kalungwizi et al., 2020). The learner-centred approach provides opportunities for learners to be involved in the teaching and learning process.

Apart from the role of teachers, effective teaching is inevitable. Effective teaching acts as a catalyst for the functioning of the roles held by an effective teacher who, according to Kimaryo (2011), must have an adequate knowledge base in a particular area. What type of knowledge base do teachers need to facilitate instruction from EE? Pedagogical content knowledge (PCK), which is influenced by subject knowledge (specific subject content whose EE is presented), pedagogical knowledge (teaching/learning activities), and contextual knowledge (EE as integrated across subjects) (Kimaryo, 2011; Shulman, 1986).

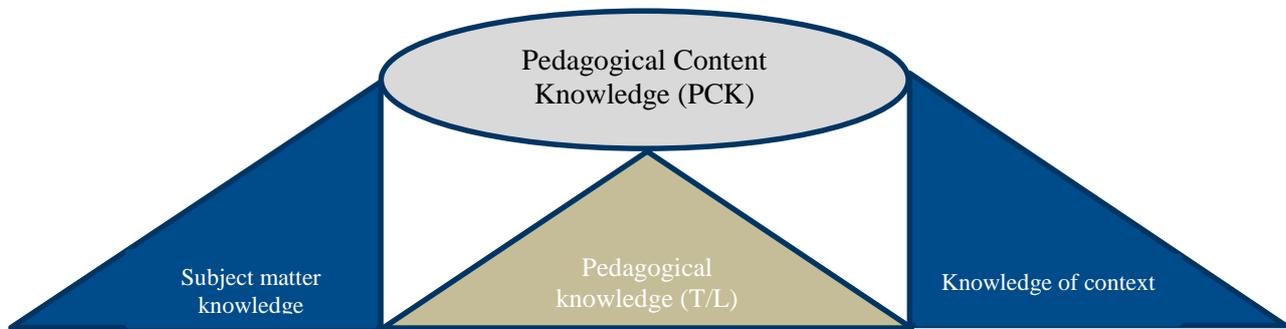


Figure 3. Showing an illustration of aspects of PCK. Source; Researcher, 2022

Knowing the interrelation between these aspects helps in exploring the qualities of teachers in their general context. These aspects lead to a homogeneity of the teaching body. This homogeneity counteracts the misunderstandings of teachers that may occur among teachers with the same subjects. "Therefore, pedagogical content knowledge refers to teachers' understanding of how they can help learners understand the subject matter. This kind of knowledge is what distinguishes teachers from subject matter specialists, because knowing the subject matter is not a sufficient condition for teaching it" (Kimaryo, 2011, p. 57, as cited in Abell, Rogers, Hanuscin, Lee & Gagnon, 2009). Teachers receive PCK from educational institutions and through in-service training.

### 3:2 Awareness, implementation, challenges and opportunities of EE in schools

Curriculum planners and implementers attempt to achieve the goal of "awareness, knowledge, concern for the environment, and skills" (Hungerford, et al., 1990. p.437). According to Jose et al. (2017), the main goals of EE include raising awareness of environmental issues, motivating action through this awareness, and developing a commitment to solving and preventing local and global problems (also cited in North American Association for Environmental Education, 2004; UNESCO-UNEP, 1978, 1976). From these scholars, I learned that planning to raise awareness of environmental issues among school populations was not a major problem. I became convinced that it is important to think about how these plans are implemented, i.e., how EE is taught in schools. I found that teaching EE to the school population so that they become fully informed and environmentally aware faces some challenges, as noted by Kalungwizi et al. (2020), who pointed out the weakness in implementing a policy that has not been put into practice by either policy makers or implementers due to an ingrained tradition of learning by rote EE (cited in Bhalalusesa et al., 2011; National Council for Technical Education, 2014). On the other hand, Jose et al. (2017) argue that a variety of teaching strategies must be employed to help environmental educators achieve the goals of EE.

In terms of teaching, a concept may involve a variety of teaching methods if it is to be understood. Hungerford & Volk (1990) noted that environmental educators typically assume that if they simply taught students' knowledge, responsible action would follow (Chawla & Cushing, 2007). On the other hand, Ng'ang'a (2010) extracts from the 1977 Tbilisi Intergovernmental Conference (EE) that education has a critical role to play in the world's efforts to solve environmental problems. Despite the inclusion of EE in the Tanzanian curriculum and the emphasis on the topic in education and training policies, the state of the environment has not improved (Kimaryo, 2011).

The contention was made that "teachers are not sufficiently prepared to teach environmental topics in practice schools and in their future teaching jobs. Based on the scenario dominated by lecturing and memorization as teaching and learning methods in Tanzania, and in many other parts of the world" (Kalungwizi et al., 2020, p.96; also cited in Wals & Benavot, 2017; Sterling, 2010; Rickson, 1999). Thus, it is necessary to inquire about teachers' knowledge of environmental issues. This is because, according to Kimaryo (2011), environmental literacy refers to a person's ability to understand, care for, perceive, interpret, and take action to appropriately manage, restore, and/or improve the state of environmental systems (cited in Roth, Orr, 1992). This aims to create a better relationship between people and the natural environment (Kimaryo, 2011), in a sense that learners use their environmental basic understanding to generate their new experiences (literacy) as they interact with theoretical knowledge in classrooms.

The study now addresses the areas of awareness of the aforementioned concept EE, understanding its importance and relevance through skills and knowledge, and building an attitude of participation in action (practice). In this case, teachers can help learners have experiences from the environment that become part of their experiential practice. However, the implementation of EE in Tanzania seems to be less effective and its purpose is not nearly achieved. There is a need to explore the development of EE in the school context by considering teachers' perceptions of EE. Teaching and learning are strongly influenced by the perceptions and actions of individuals. Therefore, if EE is to be successfully implemented, teachers' perceptions and understandings must be elicited (Mwendwa, 2017, as cited in Hart, 2003).

Kimario (2011), in conjunction with MoEVT (2007, 2005) and URT (2004), identifies problems related to the environment, i.e., the impact of natural and human activities on the environment such as drought, floods, poor sanitation, lack of clean and safe water, land degradation, unsustainable methods of using natural resources such as mining, forests, and fisheries, pollution, loss of biodiversity, etc. Raising awareness among learners aims to prepare them to acquire knowledge that will lead them not only to suggest the best ways to overcome these threatening environmental situations, but also to act accordingly. The investment of EE in the younger generation is an expression of the continuing succession in the fight against environmental problems.

Stapp (1969) reminds us that the problems facing our communities are subject to the legitimacy of government officials and national planners, but that citizens have an obligation to find solutions and create awareness so as not to exacerbate the problems. The problems identified in Tanzania related to environmental issues such as climate change, pollution, erosion, and degradation require a chain of leaders, government planners, policy makers, policy implementers, community involvement and participation, and input from other stakeholders. EE Teachers are among the policy implementers who work closely with communities (parents). Stakeholders here refers to any entity or organization that has an interest in contributing their knowledge, efforts, and resources to environmental remediation strategies.

Teachers play an important role in implementing many government policies in schools, including environmental policies. Therefore, they need to continuously improve their knowledge and skills to teach and implement all policies that fall within the scope of education. According to Kimario (2011), "the basic training which they get in teaching in Tanzania does not provide teachers with the necessary theoretical and practical issues in environmental education" (p.21). This hinders the effective implementation of EE in schools and necessitates curriculum revision, "in a teacher education program, pre-service and in-service courses should focus on the upgrading of teachers' environmental knowledge, skills and attitudes and building the capability for proper selection and effective utilization of teaching-learning strategies" (Ng'ang'a, 2010, p.22).

The integration of EE into curricula aims to engage teachers in implementing environmental plans for the entire school context. Teachers' readiness (which can be measured by teachers' attitudes), students' action and practice (which can be inquired by daily school practice) can lead to successful implementation of the school program or plan in a similar situation. However, the method of EE delivery is also questionable. Mwendwa (2017) points out the limitations of integrating EE into different subjects as it poses some challenges to education systems (also cited in Johnson, 2005 and Palmer, 1998), learners do not develop a clear understanding of what different disciplines or forms of knowledge contribute to understanding an environmental topic (cited in Kadji, 2002).

The transmission of knowledge about environmental issues from teachers to students is uncertain, and the integration of such knowledge and skills is doubtful because EE does not explicitly indicate their essentiality. As a matter of fact, teaching was seen as a knowledge transfer and was dominant among teachers in Tanzania, with learners listening to the teacher and then only answering the teacher's questions either individually or in chorus (Kimario, 2011; cited in Barrett, 2007; Mahenge, 2004; O-Saki & Agu, 2001). Against this backdrop, Tanzania made a paradigm shift in which participatory learning methods were introduced to replace teacher-centred learning methods that were "referred to as good practices" (Kimario, 2011, p. 54; cited in Barrett, 2007). It is important to examine the transition from teacher-

centred learning to learner-centred learning methods, as some teachers may have been slow or reluctant to embrace the paradigm shift. Also, other challenges that might arise from the adoption and/or implementation of learner-centred methods, as observed by Kimaryo (2011), "it is questionable whether teachers will be able to employ them, given the classroom context and conditions under which they operate, where the class size is big, teaching and learning resources are scarce, and there is pressure to cover the syllabus" (p.54).

As long as EE applies interdisciplinary approaches, familiarity with interdisciplinary and multidisciplinary approaches may be fraught with uncertainty for EE educators, as EE is a relatively new discipline and the trend in teacher education is increasingly toward specialisation (Ng'ang'a, 2010; cited in Otiende et al, 1991) and integration into the curriculum is simultaneously a new approach to teaching and learning in schools (Kimaryo, 2011).

# Chapter Four

## Theoretical and Conceptual Frameworks

**Overview:** In this chapter, I mention and explain the two frameworks I used in this study. In addition, I present a model that represents the connection between EE as a concept and the frameworks that illuminate the picture of this concept at the school level. The model reflects the "inputs" and "outputs" of environmental education in the school context.

### 4:1 Theoretical Framework

David Kolb's 1984 experiential learning theory (ELT), based on the work of other scholars such as John Dewey, Kurt Lewin, and Jean Piaget, is a very useful framework for learning (McCarthy, 2016; Kolb & Kolb, 2005). In this theory, the author lays out how learning is linked to innovative experiences. In contrast to previous research, which assumed that learning is influenced by the following aspects, among others: Educational specialization, career choice, and cultural influences (McCarthy, 2016; Kolb & Kolb, 2005; Kolb, 1984). I chose ELT to be used in this study in a context that it merges learning and experience. ELT was developed to integrate the common themes into a systematic framework that can address the problems of learning and education (Kolb, 1984). In his second version, Kolb articulates his intention was to design a theory that could describe a theoretical perspective on the individual learning process that applied in all situations and arenas of life. As it was noted earlier, the problem with EE is the mode of delivery and the nature of learning. That's why we seek to understand from teachers' perspectives, the learning modes involved during their teaching EE and how they connect with students' environmental experiences when interacting with their surroundings. For example, students experiencing the use of firewood as a fuel source at home, or being surrounded by a deforested area, getting to connect such problems with EE theoretical knowledge during classroom sessions on the effects of deforestation.

"ELT is intended to be a holistic adaptive procession learning that merges experience, perception, cognition, and behaviour" (McCarthy, 2016, p.92). The emphasis of Kolb's theory, according to Healey & Jenkins (2000) is the consideration of "different learning styles of individual students and the necessity for teachers to use a wide range of teaching methods to meet their needs"(p.3). The theory reveals a cyclical pathway model for knowledge creation that includes four learning phases: Experiencing (grasping a concrete experience), Reflecting (reflexive observation), Thinking (abstract conceptualization), and planning (active experimenting), as described by, among other scholars (McCarthy, 2016), (Sharlanova, 2004) and (Healey & Jenkins, 2000).

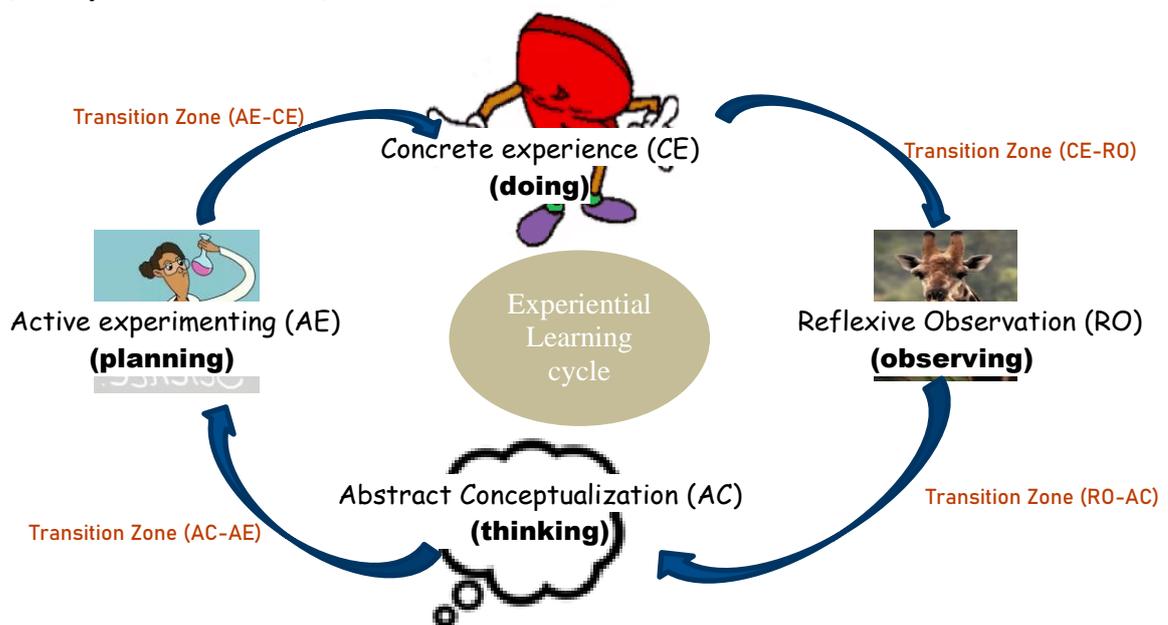


Figure 4. Showing an illustration of Kolb's Experiential Learning cycle model (Modified from Sharlanova, 2004, p.37)

In paraphrasing Healey & Jenkins (2000) the description of each learning stage is as follows;

*Concrete Experience* (CE): this is a stage where the individual is actively experiencing an activity (e.g. planting trees, gardening). *Reflective Observation* (RO): this is a stage where the individual is consciously reflecting back on that experience (e.g. the experience of planting trees). *Abstract Conceptualization* (AC): this is the stage where the individual is being presented with/or trying to conceptualise a theory or concept or model of what is observed in RO (e.g. the theory dictating afforestation). *Active Experimentation* (AE): this is a stage where the individual tries to plan how to test a model or theory or plan for a forthcoming experience (e.g. applicability of theory underpinning afforestation in the essence of planting trees).

To understand easily the above illustration in terms of the learning cycle, imagine a child through reflexive observation (RO) clearly watching other children riding bicycles. Then, the child goes through the transition zone RO-AC to understand what riding a bike is all about (AC), he thinks about the applicable theory, and so on. The child goes through the transition zone AC-AE to plan for learning and test riding (AE). In the long run, the child will eventually enter the concrete experience (CE) through the transition zone AE-CE, where he enjoys (does) riding. However, completing the learning cycle doesn't mean that the child knows everything about cycling at this stage, because there might be some conflicting theories about cycling that keep on bringing the child back to the cycle. So, the concrete experience may lead the child in generating new desirable ways and the learning about cycling goes over and over in cyclical manner.

According to Sharlanova (2004), a learner can enter the cycle at any phase, but must go through all phases to include all phases. In the first phase (doing) - the learner does something, showing active participation. In the second phase (observing), the learner shows conscious reflection on the experience gained in the first phase. In the third stage (thinking), the learner develops a theory or model of what he/she observed in the second stage. In the fourth stage (experimenting), the learner actively tries to plan how to test the theory or model he/she conceived in the third stage in order to have a concrete experience. Therefore, "learning is a process in which knowledge is created through transformation of experience" (McCarthy, 2016, p. 92; Sharlanova, 2004; Kolb, 1984).

Healey & Jenkins (2000) outline the important feature of the theory being the different stages shown above are associated with distinct learning styles, as a result of individuals differences in their preferable learning styles and, "recognizing the first stage in raising students' awareness of alternative approaches and helping them to be more flexible in meeting the varied demands of learning situations" (Healey & Jenkins, 2000, p.2; Gibbs 1988). The authors add, "teachers also need to recognize their own individual learning styles as a basis for the development of effective teaching and learning strategies. Learning may suffer where a marked mismatch occurs between the style of the learner and the approach of the teacher" (Healey & Jenkins, 2000, p.2; Fielding 1994).

The model favours learner-centred educational innovations in which the teacher acts as a facilitating agent. This is because "experiential learning requires the development of technical, intentional, person-centred and critical facilitation skills" (Kalungwizi et al., 2020, p.98; Thomas, 2005). In the context of learning EE, according to Kalungwizi et al. (2020), "the role of the facilitator is to strengthen and elaborate the connection between participants' inner motivation and involvement in and obligation towards the environmental learning activities throughout the learning cycle" (p. 98).

In Healey & Jenkins (2000) statement, Kolb suggested that students develop a preference for learning in a particular way, and may also adopt different learning styles in different situations, although, they tend to favour some learning behaviours over others. This was the basis for Kolb's foundation of four learning styles, where by each of them is associated with a different way of solving problems (Healey & Jenkins, 2000). Teachers are therefore tasked with planning and utilization of appropriate learning tasks that allow learners to generate concrete experiences with their environment upon completing the cyclic learning model, as it is widely known that individuals learn better through experience, and from these experiences learners develop meanings (Kimaryo, 2011). She adds more that, in order to better reflect ELT,

"environmental education is equated with outdoor education" (p.52). This means that a concrete experience is the result of a transformative process that involves active experimentation with actions that reflect outdoor education (what surrounds the person) at a particular stage of the learning cycle. "When emphasizing the use of experiences and outdoor activities in the teaching of environmental education, teachers are obliged to teach their learners about the environment and how to conserve it for future use by using different activities which will give learners different experiences in the environment" (Kimaryo, 2011, p.52; Schatz, 1996).

In this regard, the driving forces in this priority task should be environmental awareness, knowledge, and commitment to achieve environmental protection and remediation. And the public must have a basic understanding of the experience of environmental problems (Vega & Melchor, 2004; Madsen, 1996). This study also sheds light on the role of school administrators in implementing EE in schools, because "leaders in the field of environmental education must not only have extensive knowledge and understanding of environmental problems, but must have environmental awareness to solve these problems. They must be committed to initiate action based upon knowledge and understanding" (Vega & Melchor, 2004. p.2; Madsen, 1996).

## 4:2 Conceptual Framework

The study considers the areas of awareness of the named concept of EE, understanding its meaning and relevance by acquiring skills and knowledge, building attitude and participating in action (practice). In this case, students develop experiences that become part of their experiential practices. The perception of teachers on EE is an opening mindful to the conceptualization of EE, which acts as a medium of learning. Through this medium, the experiences referred by McCarthy (2016) are transformed to the knowledge developed in learners.

## 4:3 The Frameworks model

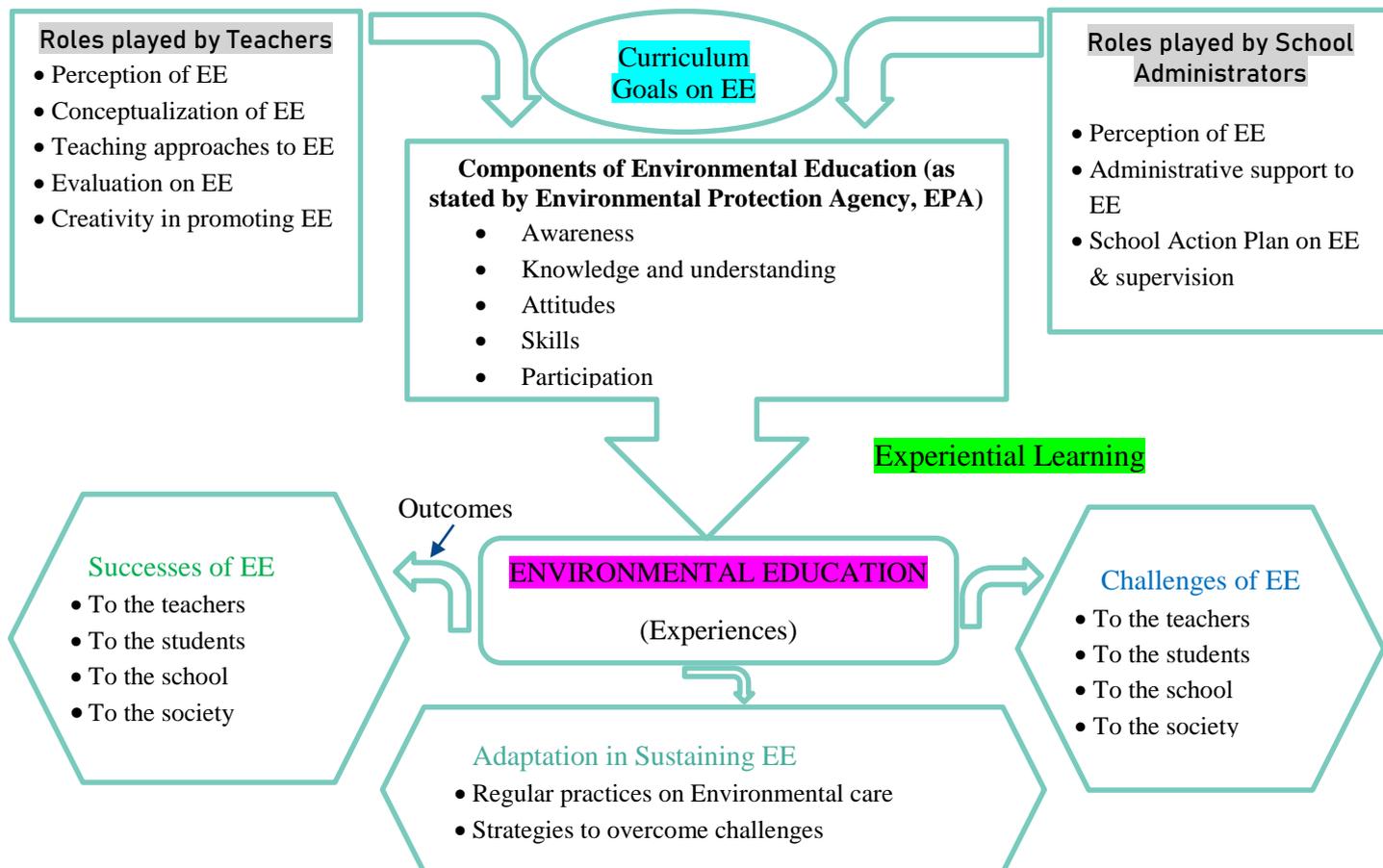


Figure 5: A model of Environmental Education in connection to Theoretical and Conceptual frameworks  
Developed by the researcher, 2022.

Using the model, the study explicitly highlights the "inputs" for implementing EE in schools. When I use the word inputs here, I am referring to a set of activities that help facilitate or create a medium for implementing EE in schools. These activities include: the role of teachers and school administrators in implementing curriculum goals; the support and interventions of educational authorities and government in terms of financial, pedagogical, and school frameworks; the input of educational stakeholders, etc.). All these factors are examined in terms of the components of EE, i.e., attitude, awareness, knowledge and understanding, skills, promotion, and agency. The focus is on how the inputs through experiential learning contribute to the implementation of EE in schools and to its realization through the so-called "outputs" (experiences). Similarly, by "outputs" I refer to a set of experiences or curriculum outcomes developed by learners from the invested inputs to facilitate the implementation of EE - these may include: active participation, action plans, EE projects, etc.

"Inputs" to consider that facilitate the implementation of EE in the school include the following;

- Teachers' attitudes and perceptions of EE in schools
- Teachers' ability to grasp the concept of EE
- Teachers' awareness of EE
- Teachers' willingness to teach EE and the teaching methods used
- Teachers' support of EE in collaboration with school administrators
- Teachers' evaluation of EE

In performing their role, teachers can appropriately translate the curriculum into the learning experiences developed by learners, taking into account the components of EE and the learning outcomes prescribed in the curriculum objectives (Kimaryo, 2011). As learners progress through the learning cycle, which includes doing, observing, conceptualizing, and experimenting (Sharlanova, 2004), they interact with the environment and develop "experiences" that relate to "presumably meaningful events with presumed learning potentials that occurred during the programme" (Cincera et al., 2020, p.734). The curriculum of EE refers to all experiences that learners have to develop environmental literacy, skills, decision-making, and active participation in actions for the environment (Verma & Dhull, 2017, also Kimaryo, 2011; cited in Palmer, 1998). Therefore, teachers should create a classroom environment that allows learners to conceptualize the issues of EE and have their own experiences as they interact with what surrounds them (environment), thus becoming part of experiential learning.

"Outcomes" (experiences) that are intended to reflect the image of EE in the school include successes of EE (for teachers, students, school, and community)

- Implementation of EE (classroom presence, training and funding, etc.)
- Active participation in EE programs (teachers, administrators, and students)
- Viable action plans (or projects) related to EE
- Presence of extracurricular activities related to the environment in the school day
- Involvement of parents and communities in environmental issues
- Challenges in implementing EE (for teachers, students, school, and community)
- Adaptation strategies to sustain EE in schools (the way forward)

NB: The research questions formulated in chapter one were posed in the mirror of the above inputs and outputs to allow for a general examination of EE

- Based on the "inputs" the roles of teachers and school administrators are examined in relation to the research questions (a) How is environmental education conceptualized by teachers in Tanzanian secondary schools? and (b) What is the role of teachers and school administrators in making EE beneficial to students?
- Based on the "results" the experiences are related to the research question (c) What are the successes and challenges in implementing EE, (d) How do school administrators and teachers deal with these challenges to put EE into practice? and (e) In what school activities is the EE program reflected in daily school life to make it work and sustain it?

# Chapter Five

## Method and Design

**Overview:** In this chapter, I present the rationale for choosing a case study for my research, explain how the data were collected, and outline the sampling procedures and participants.

### 5:1 The Qualitative Research Approach (Case Study)

According to Alpi & Evans (2019), a "case study research is defined as a qualitative approach in which the investigator explores a real-life, contemporary bounded system (a case) or multiple bound systems (cases) over time through detailed, in-depth data collection involving multiple sources of information and reports a case description and case themes" (p.2). A case, according to Gillham (2000), is an individual, group, organisation, or community. However, a case can also be a phenomenon. One phenomenon that will be examined in this study is environmental education, guided by the question of "how" it is implemented in secondary schools and how it contributes to reducing environmental problems. Therefore, a case study is the right approach because it is a way to explain, describe, or explore a phenomenon (Alpi & Evans, 2019).

Choosing an approach is consistent with Creswell & Creswell (2018) advice that a qualitative approach can be used when exploring a concept or phenomenon. "Since the study seeks to find the perceptions that teachers attribute to their understanding of environmental education, the study has adopted the qualitative approach" (Kimaryo, 2011, p.65). Furthermore, the use of a qualitative approach in this study follows the need to explore teachers' perceptions and experiences. Exploring teachers' perceptions means exploring their understanding of the phenomenon. In this regard, the phenomenon of environmental education was studied in its natural setting (Mwendwa, 2017). In other words, the study gets "get under the skin" (Gillham, 2000, p.11) of a school context to look at "the informal reality which can only be perceived from the inside out-to view a case" (Gillham, 2000, p.11) of EE from the perspective of teachers involved in its implementation.

### 5:2 Data collection and Instruments

Qualitative methods are descriptive and inferential, focusing primarily on the kind of evidence (what people say they do) that allows us to understand the meaning of what is going on (Gillham, 2000). To understand the evidence of the phenomenon under study, case studies use the following data sources: "interviews, documentation, archival records, direct observations, participant observation, and physical artifacts" (Alpi & Evans, 2019, p.3). Among these sources, the interview is cited as the primary source of data in a qualitative case study (Alpi & Evans, 2019, p.3; cited in Yin, 2009 and Creswell, 2014).

Data were collected by semi-structured interviews in two groups. It was conducted online through WhatsApp calls. During the exercise, the researcher listened carefully, paid attention to the topics, and recorded the participants' responses while asking additional or new questions after the respondents' answers. The semi-structured interview is one of the three types of interviews, which include the structured interview and the unstructured interview. The semi-structured interview, as used in this study, provides the researcher with the flexibility to ask participants for more information on specific points to explore the themes more fully (Gibson & Brown, 2009). Fully open-ended (unstructured) interviews were not preferred here because they are time consuming, allow for a lot of information, and are not consistent (Cohen et al., 2000). Unstructured interviews therefore require highly skilled interviewers.

Each group interview was conducted via telephone call and lasted approximately 60 minutes, with the researcher assuming the role of interviewer with the guiding questions and all relevant materials for the interview. Without impurifying the quality of interview, the time was considerably kept as short as possible to avoid losing the respondent's concentration as Gillham (2000) advises that if the telephone interview is long, it may be more difficult to sustain the conversation and respondents may become

impatient. He adds that the interviewer should also clearly describe the interview process. Based on the research objectives, interviews enhance information gathering through interaction between the researcher and the respondents (Cohen et al., 2000). Respondents are free to express what motivates them, what they care about, and in a kind of "listening conversation." The way that allows the interviewer to ask and respond to the respondent. Interviews also allow for interruptive dialogue. "Using interviews as a data collection method is that they have been shown to provide high quality data because through interviews the participants' descriptions can be explored, illuminated, and probed" (Kimario, 2011, p. 73; as cited in Kvale, 1996). Interviewees are fully engaged and motivated in the process. On the other hand, interviews can be time-consuming, especially face-to-face interviews, as they may require travel and arranging meeting places.

### 5:3 Sampling and Techniques

**5:3:1 The Study Population** – All teachers at the chosen secondary school in Tanzania as a case study centre. The criteria for choosing this secondary school has been explained in the previous chapters.

**5:3:2 Research Sample** – A few teachers were interviewed as representatives of other teachers at that particular school.

**5:3:3 Sample techniques** – Purposeful sampling (Criterion Sampling) was employed as the aim of the study was to focus on a few group of teachers and get their perceptions on EE.

**5:3:4 Criteria** – Experienced Geography and Biology teachers were designated as Group A - Teachers. These subjects were selected because they have a strong connection to environmental issues. According to Kimario (2011) EE is integrated into various subjects in the curriculum in many countries (cited in Böhn, 1997) but in practise teachers integrate it mainly into Biology and Geography subjects (cited in Pulkkinen, 2006). In addition, the Head of school and the Academic teacher were also involved, and referred to as Group B - Administrators. (See Table 6 below).

### 5:4 Participants

A total of 6 participants from Kiponzelo Secondary School in Tanzania, including 2 Geography teachers, 2 Biology teachers, and 2 school administrators (Head of school and academic teacher).

Participants								Total
Group A				Group B				
Teachers				School administrators				
Biology		Geography		Head of school		Academic teacher		
Female	Male	Female	Male	Female	Male	Female	Male	
1	1	-	2	-	1	-	1	6

Table 6. Showing a summary of participants

### 5:5 Case study centre

<b>Country:</b> Tanzania		<b>School:</b> Kiponzelo Secondary School		<b>Total Area:</b> 97,000sq. meters	
<b>Region:</b> Iringa		<b>Reg. No.</b> S1533		<b>Type:</b> Community School (Public) – Ordinary Level	
<b>District:</b> Iringa District		<b>Latitude:</b> -7.980293		<b>Longitude:</b> 35.402148	
<b>Council:</b> Iringa District Council		<b>Total no. teachers:</b> 28		<b>Total no. Students:</b> 466	
Subjects taught	No. of teachers	Classes	No. of students in each class	Percentage of school performance in National exams in 5 years	
Civics	3	Form One	172	2017	75%
History	4	Form Two	99	2018	79%
Geography	4	Form Three	92	2019	88%
English	4	Form Four	103	2020	89.3%
Kiswahili	4	<b>TOTAL</b>	<b>466</b>	2021	96.4%
Mathematics	3				
Physics	2				
Chemistry	2				
Biology	2				
<b>TOTAL: 9</b>	<b>28</b>				

Table 7. Showing a detailed case study centre (Source of info: School administration)

# Chapter Six

## Data Analysis and The Results

**Overview:** In this chapter I present the data analysis method used and the results obtained from the collected data.

### 6:1 Data analysis

In this qualitative study, I used Thematic Data Analysis. This is a widely used method of qualitative data analysis. It is a useful and accessible tool for qualitative researchers (Kiger & Varpio, 2020). The selection of this method was based on the data collection method (semi-structured interview) and the intended approach to capture teachers' views and perceptions (semantic approach) at EE. In the semantic approach, we try to extract meaning from the texts (Wolff, 2020). This process can be done manually or by machine. I chose the manual analysis because it allowed me to understand the language and interpret the emotional responses of the respondents to EE. Respondents' phrases, words, and sentences were analyzed to obtain meaning in relation to the context EE.

I also used a deductive approach from the framework model (see chapter four, p. 25) to gather teachers' opinions based on the pre-determined themes to examine how participants' responses related to the existence of EE in schools. For example, the themes included: teachers' attitudes, conceptualizations, participation, and opportunities for action. Also, successes and challenges in implementing EE in schools. In the thematic analysis, I explored commonalities and differences in responses to the interview questions (see Appendices 1 and 2). The applicability of this method, as used here, relies on the ability to analyze data according to commonalities, relationships, and differences, as suggested by Gibson & Brown (2009) In creating themes using codes, the following series of steps were taken;

Familiarization with the data. Since the data was collected through WhatsApp audio calls, at this point I had to sit down and listen to the recorded audio. I then transcribed the audio responses by hand and translated all responses given in the local language of Tanzania (Swahili) into English, as both languages were used during the interview. I then read the notes I had taken during the interview to obtain texts that reflected the voice of the participants.

Generating and organizing codes. After familiarizing myself with the texts, I identified and organized codes that could help me deductively organize the responses according to the previous themes. Several codes emerged, e.g., roles, environment, education, fire outbreaks, trees, avocado, approach, education, responsibility, participation, action, problems, challenges, and successes.

Formulation of themes. In this phase, I developed themes that emerged from the identified codes. For example, themes such as awareness and conceptualization of EE, environmental issues, challenges and successes, community participation and action in EE and training. The themes were useful in gaining insight into teachers' opinions on the topics mentioned (see also Table 8, p. 38).

Reviewing the themes and forming phrases. This involved reviewing the themes and linking some of the themes to capture key phrases and sentences to be presented in the results. From the two groups, the correlation of responses is of high degree since the interviews were conducted in grouping. This makes easier in finding the commonalities among the respondents. Likewise, the backup of participants' responses is referenced to both teachers and school administrators following their cohesion in responding to the interview questions.

## 6:2 The results

### 6:2:1 Perceptions of the concept of EE

Teachers showed their positive perceptions on EE and have a positive attitude toward teaching it in schools regardless of the challenges they face. They collectively support the idea of introducing and incorporating EE into the curriculum and recognise its potentiality in school context. In responding to the question of perceptions on EE (see Question no.7 in Appendix 2), one participant replied as follows;

*“I perceive it positively” and, “I like this EE, it helps students to acquire skills for taking care about our environment and in a sustainable manner”.*

They even acknowledge that EE is indispensable both in school and in society. They, therefore, suggest that EE should be promoted by educational authorities as an important subject in its own right that can benefit students, teachers, schools, and society. In their argument, they suggest that EE should be taken seriously and empowered to be taught not only in schools but also in informal community programs to save lives from the effects of environmental problems. During the interview, two participants added one after the other (see Question no.16 in Appendix 1) that,

*“EE is very good to be emphasized in education systems and other fields. As a country altogether are eager to sensitize the societies about the importance of environment, enact bylaws and open understandable environmental slogans”*

*“As an advice to the world, EE should be an independent subject so that all communities take it more seriously than the way it is embedded with other subjects”*

Teachers have the attitude and enthusiasm to teach EE using the little knowledge they already have to teach the skills of EE. This means that teachers are willing to take action and participate in collaboratively addressing environmental issues and finding solutions to the environmental problems that threaten the world. They also understand their role in promoting EE, as in (Question no.10 in Appendix 1) responded;

*“..... In case we receive no support we teachers must be creative to use locally available materials to use in facilitating the teachings.”*

### 6:2:2 Conceptualization of the concept of EE

They conceptualize EE as the integration of knowledge about the environment with environmental problems and opportunities to solve those problems through participatory learning and action. When asked how teachers conceptualize in (Question no.7 in Appendix 1) two participants replied;

*“Integration of students knowing environment with environmental problems”.*

*“It facilitates learners to consider about environment and how to solve environmental problems.”*

They use participatory methods to engage students in the learning process. They divide students into classes according to their learning abilities and thus choose teaching methods accordingly. Participants were asked the question, "Can you explain what strategies you use in your teaching subjects?" (see Question no.4 in Appendix 1), and the response was as follows;

*“We group students according to their levels of understanding so that we know which class need more or less teaching efforts. E.g. we have class A which use all methods esp. participatory and group discussions. Class B needs more efforts.”*

### 6:2:3 Successes of implementing Environmental Education in Schools

Apart from the challenges of implementing Environmental Education in schools. Teachers are comfortable to explicate the relevance of EE in schools and its contribution to the change of the individuals' mentality towards the environment. Still the environmental problems are experienced but, the environmental mal-functional activities are slightly slowing down. One participant responded during interview (see Question no.13 in Appendix 2), that

*“Attitudinal behaviour of students towards environment has changed. They now see the importance of conserving our environment. From the trees planted in previous years, students now are harvesting avocados and use them for diet and sell the rest, also we produce timber from timber trees. All these influence our students to develop a good attitude to the environment”.*

Through educating students, they deliver a message to the parents to value, conserve and use the environment profitably by avoiding ignition of fires, promote spirit of planting trees for both protections of environment and economic reasons. The responses from the questions (see Question no.15 and no.13 in Appendix 1 respectively), were as follows;

*“In times we get parents meetings we also introduce some elements of EE to them as far as fire outbreaks and forest burning have been common”.*

*“Students are aware of pollution and they know how to reduce, they can easily identify good sources of energy, and also they are involved in planting trees and are encouraged to educate their parents and society members to plant trees and care about the environment. Also the community learns from the school projects when they visit or pass nearby school.”*

As a sign of their commitment to EE, the teachers and their students have created a project in which they plant wood and avocado trees at the school each year, from which they obtain avocados for food. The wood production is for economic use. So far, they have planted 900 timbers and 402 avocado trees in the school yard and countless flowers for the school garden to beautify the school grounds. All activities are carried out by the students in collaboration with their teachers and under the coordination of the environmental teacher, who has been appointed by the school administration to supervise the environmental activities at the school.

The school has also a ‘shamba darasa’ for maize. (meaning in local sense, ‘learning by doing’). They have a maize farm where students practise the indoor knowledge by growing maize. They also run a project of keeping rabbits. As proclaimed by one participant here under when responding to the question; “Do you have any school action plans for implementation of the EE in your school?” (see Question no.10 in Appendix 2),

*“Yes, we have “maize shamba” meaning maize farm and we cultivate and run it with consideration of environment care. And, also we are keeping rabbits for sale”*

There is a fire club at school to help the students learn, discuss and engage in fire controls at school and at home. And, through the fire clubs, the school is linked to other governmental authority (the ministry of internal affairs – department of fire) which provides some trainings for special teachers appointed to deal with fire rescue in schools and being guardians to the fire club. A response to the question (see Question no.11 in Appendix 2), was that,

*“Students can transfer knowledge of EE to outside, e.g. planting trees. They have fire club and can deal with fire outbreaks (which are common in rural areas). Students are good EE ambassadors, and enjoy to learn what they commonly experience at school or at home”*

Each week they have school and extracurricular activities related to EE. These include, for example, watering and caring for flowers, debates on environmental issues, fire club activities, and so on. All this has led to the outdoor school culture through the application of EE and physical education.

#### **6:2:4 Challenges faced by teachers and school administrators in implementing EE**

Apart from a successful implementation of EE in schools, teachers face a big challenge of lacking in-service/refresher training on EE. They only use their little knowledge they have to facilitate the teachings of EE in classes grouped in accordance to the levels of the students for appropriate teaching approaches to employ. When they were asked if they receive any training pertaining EE (see Question no.11 in Appendix 2), they jointly replied; “No trainings, it is unfortunate!”

The schools receive inadequate funds from the central government to run EE projects and other outdoor activities for students to practically understand and transformation of experiences. They only do whatever budgetary possible. This is vindicated by the participants’ response in (see Question no.14 in Appendix 1), that

*“Insufficient funds to offer more outside fields and projects to students.”*

Along the way some trees die before harvest. For example, the school has a total number of planted trees 1302. Among these, 1003 survived and 299 died. The survival rate is though, 77%. Some of the main reasons to the death of trees and some school garden flowers include; scarcity of water at school. Students have to walk a far distance to fetch water for watering the flowers. On the other hand, a few trees died because of unconducive weather conditions happening sometimes and some forest burning actions which are still experienced. (Question no.14 in Appendix 2), was responded that,

*“..... fire outbreak especially during summer (hunters), bad weather condition, and scarcity of water sources at school. Students walk far distance to fetch for water”*

The socioeconomic status of the community members, most of whom are ordinary farmers, is another major challenge. Fire outbreaks are frequent in their rural homes, likely due to ignorance caused by high illiteracy rates, as well as poor hunting, harvesting, and farming practices. The use of non-environmentally friendly fuels such as wood and charcoal for cooking is widespread in most communities because they are cheap and readily available, while gas, solar energy, and electricity are costly or unavailable. Evidence of this is a response to (Question no.14 in Appendix 1), which states;

*“..... the economic status of most society members does not allow for them to use gas for example, as an alternative to fire wood/charcoal.”*

### **6:2:5 Measures taken by teachers and school administrators to mitigate challenges in implementing EE (Identifying opportunities to facilitate EE)**

Teachers contextualize EE with real incidences, they use some problems as their teaching evidences. They use challenges such as burnt forests to lead the students to observe the effects. They can seat down and discuss what caused fire and how they could rescue in case they were around and what should be done to prevent more fire outbreak. In doing so, students have been able to remember easily what is taught in theoretical part can be observed in day to day lives. Students also can suggest ways to prevent next similar problems. Two participants replied these questions, “Are your students given opportunities to understand and practise EE at school or at their homes? Are they able to relate to the environmental problems threatening the world?” (see Question no.15 in Appendix 1), as follows;

*“True, through the school projects. They can also relate to the problems because they can sometimes identify and differentiate climatic condition of areas where trees are planted from that of the open or less trees areas”*

*“Sometimes we can take our students to the areas affected by bush fire or global warming for the cases that appear in close to the school.”*

Teachers look for "stakeholders" (according to their local meaning; the term refers to "any individual or organization that can voluntarily participate in collaborative plans and activities aimed at reducing or eliminating any challenge in the school"). For example, World Vision is an NGO that partnered with the school on the Avocado Project and provided 402 avocado seedlings that were planted in the school for nutritional and economic purposes. A community member from the village brought 300 wood seedlings to the school and planted them. The teachers are still hoping for more stakeholders to support their action plans at EE and funding for trainings

Teachers and school administrators have a tendency to invite environmental experts from other governmental departments to provide more skills, however, this happens not often to successfully get such experts. One participant responded (Question no.14 in Appendix 1) that;

*“We normally advice school administration to search for funds to facilitate school projects and also to invite the environmental experts to come at school and provide more skills”.*

NB: The table below summarizes the results alongside the research questions to show how the research questions were answered by the respondents. Generally, the respondents' answers clearly express the purpose of the study and indicate an investigation of EE in schools from the teachers' perspective.

EXPLORATION OF IMPLEMENTING ENVIRONMENTAL EDUCATION IN TANZANIAN SECONDARY SCHOOLS (Teachers' Perspectives)		
SUMMARIZED FINDINGS		
AREA OF CONCENTRATION	FINDINGS	RELATED RES. QUESTION
<b>Perception</b>	<p>Teachers perceive EE which generally their responses portray their positivity towards the EE. Although they lack trainings, they accept it.</p> <p>They have attitudes and enthusiasm to teach EE at school. This signifies that, the teachers are ready to take actions and participate in dealing with the environmental issues together with finding solutions to the environmental problems that threat the world.</p> <p>They even recognize the essentiality of EE in both schools and societies. They further understand their roles in facilitating EE.</p> <p>Their attitudes and self-motivations to teach EE act as opening “doors”</p>	<i>How is the Environmental Education conceptualized by teachers in Tanzanian secondary schools?</i>
<b>Conceptualization</b>	<p>Teachers play roles and take responsibility in implementing the concept in which they have idea regardless of the surrounding challenges. They are “inside” the room of the concept. They are aware of what it means by EE and how it can benefit them, their students and the societies.</p> <p>They equate what stated in the contents (topics) of EE and the real scenery at school and that of the neighbouring community and, do declare that the topics depict the reality of environmental issues.</p> <p>They even suggest that EE be considered to be a separate subject as it richly contains environmental issues and more practical.</p>	
<b>Successes</b>	<p>EE is still implemented and, it has helped students to understand their environment and practise EE at school and at homes. Students have helped their parents in fire-fighting controls and advising them to apply good agricultural practises in order to conserve the environment.</p> <p>Through EE, teachers educate parents and community members to avoid fire outbreaks and bush burning which are common in their residential areas and they do advise them to use alternative sources of fuel/energy apart from fire wood and charcoal.</p> <p>Teachers collaborate with the department of fire from Ministry of Internal Affairs in fire clubs (the department trained one teacher to supervise fire club and rescuing), and organizations like WORLD VISION (an NGO) in afforesting the school compounds.</p>	<p><i>What roles do teachers and school administrators play to make EE beneficial to the students?</i></p> <p><i>What are the successes of implementing EE?</i></p>
<b>Challenges</b>	<p>The major challenges teachers face is the lack of teachers' trainings and insufficient funds to run smoothly the school plans including projects of EE.</p> <p>The school infrastructural challenges.eg. no water at school until far distance. This hinders some of the projects.</p> <p>Poverty within the community. The socio economic status of parents in failing to sponsor their children to participate in outside school education (eg. study tours) also,</p> <p>The gap between policy makers and implementers and, the unstable/weak communication among Government departments (a good communication is seen only between schools and fire department through fire clubs. What about between schools or Ministry of Education and other Ministries like the Ministry of Environment, Agriculture, Natural resources, Forestry, Water and Livestock in which environment is an integral element in their Ministerial work?)</p>	<i>What are the challenges of implementing EE?</i>
<b>Adaptation</b>	<p>Teachers create opportunities out of the challenges; They engage students in decorating the school compound by preparing flower gardens, growing avocado, planting timber trees and practising firefighting and rescue activities in school fire club. Once the students get a share of avocado fruits for nutrition purposes they develop attitudes to plant again at school and at homes with their parents</p> <p>Teachers use the school and the neighbouring open lands characterized by winds, shrubs, fire outbreaks to teach the students through EE and change the topography by planting trees and tell the students to take note of the differences in climate before and after planting trees.</p> <p>Teachers use platforms like parents' meetings and in community gatherings to remind the community about effects of fire and bush burning, environmental destructions through their agricultural practises etc., which all these are essential in the facilitation of EE.</p> <p>Teachers keep on seeking for various stakeholders who are interested in helping the school to facilitate the EE at school.</p>	<p><i>How do school administrators and teachers deal with those challenges in making EE practical?</i></p> <p><i>In what school activities is the EE program reflected in daily school life to make it works and sustains?</i></p>

Table 8. Showing a Summary of Findings

### 6:3 Deductions from the study results

The image of EE at that particular school can be viewed by illuminating the role of teachers and the outcomes of learning objectives. The figure below illustrates the interaction among these components which are indicated in the subsequent table;

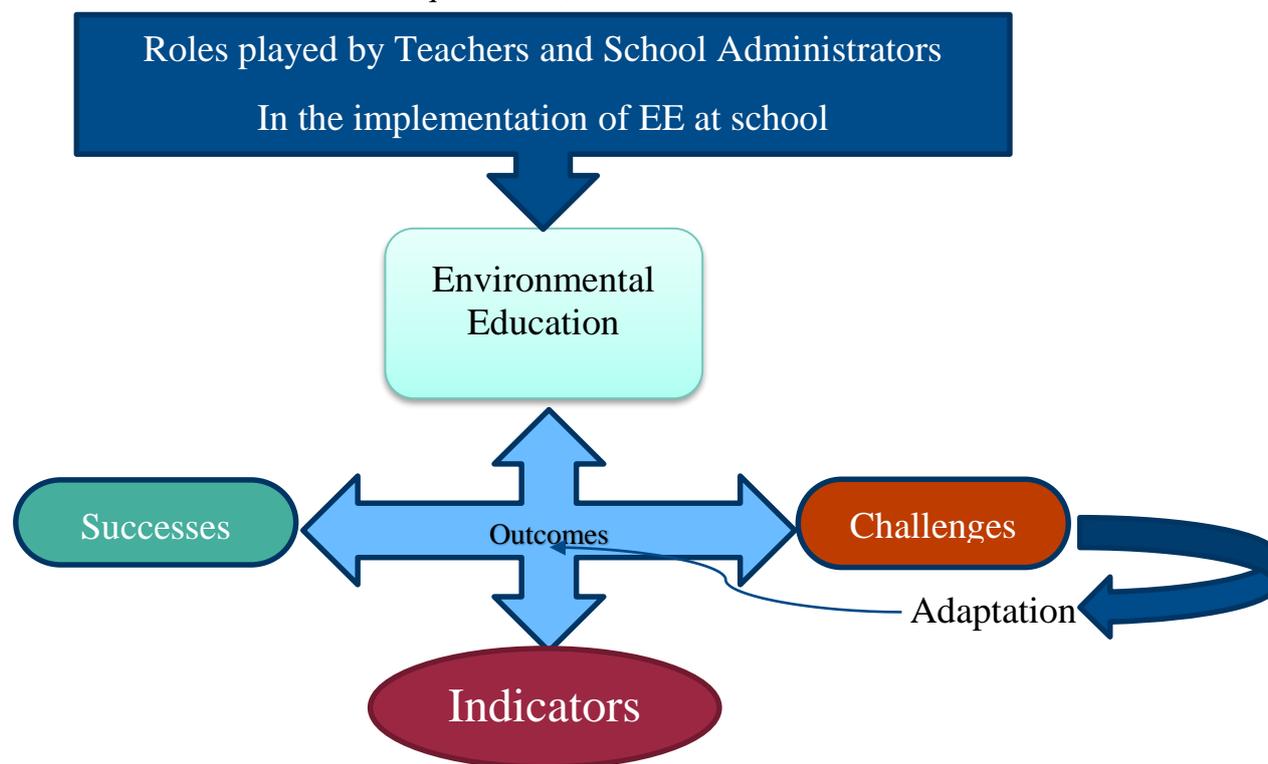


Figure 6. A diagram showing how EE is defined by the outcomes of implementing it at school, (by researcher, 2022)

The figure mirrors an earlier model (Figure 5 on p. 27) that aims to link the role of teachers to specific outcomes in terms of successes, challenges, and overcoming them (adaptation) to achieve positive results. The indicators here represent tangible school culture/extracurricular activities that are a result of the EE projects implemented in the school. The role that teachers and school administrators play in implementing EE in schools can be seen in their perceptions, attitudes, and enthusiasm. The way teachers perceive and conceptualize the concept and how they participate in promoting EE in the school context. Their ability to plan and implement various projects is also an indicator of the permanence of EE in the school setting.

Implementation of Environmental Education in Secondary schools				
Roles played by teachers and sch. Administrators	Outcomes			
	Successes	Challenges	Adaptation	Indicators
Perceptions Conceptualization Facilitation Action plan	-EE is still taught -Teachers collaborate well with students in EE -Teachers eager to educate parents and society about EE -Implementable Action plans (EE projects) -Fire club and cooperation between schools and department of Fire -Enhanced school compound	-No trainings of EE -Poor Infrastructure -Poverty in the society -Gap between EE policy makers & implementers -Weak communication among the Government Authorities	-Teachers creativity -Teachers maintaining attitudes towards EE regardless of challenges -Involving stakeholders like NGO, community members etc. -Using the climatic challenges and bush fire outbreaks as opportunities to teach students and afforesting the school open areas	-Presence of EE projects at school. Eg. Trees planted at school, fruits, vegetable and flowering gardens -Enhanced school topography -Reduction in the previously experienced climatic problems around the school and within the communities eg. fire outbreaks -Change of mentality on environmental issues

Table 9. Showing a Summary of Themes emerging from the findings

### *Perceptions as "doors"*

As we may know, a door primarily creates a space through which an object or person can enter and exit when it is "open" and restricts them when the door is "closed" Perceptions act like "doors" in the sense that they can permit or restrict actions in certain areas. Perceptions are determined by one's attitude, vision, and sensation. Perceptions are preceded by actions. They determine what actions must follow. Thus, they may open to allow actions or close to restrict them. Perceptions determine the possibility or impossibility of creating a space that permits certain actions. "Therefore, how teachers perceive environmental education will influence their practise" (Kimaryo, 2011, p.22; cited in Chi-chung Ko & Chi-kin Lee, 2003). Perceptions depend on readiness and acceptance. From the findings, teachers show their acceptance and willingness to support EE in schools through their positive perceptions. They open "doors" to facilitate the conceptualization of EE (see perception results in Table 8, p.35).

### *Attitudes as "impulses."*

They cause something to happen. In this context, they make a "medium" of "perceptions" work. The "feeling" about something welcomes "emotional reactions" that create a space for "critical thinking". By "feeling" here I mean "attitudes," by "emotional reactions" I mean "perceptions," and by "critical thinking" I mean "conceptualizations." Therefore, these terms work together. The teacher's feeling on EE stimulates a situation of acceptance to open doors for conceptualizations of the concept. (See also the results of perception in Table 8, p.35).

### *Conceptualizations as "insides"*

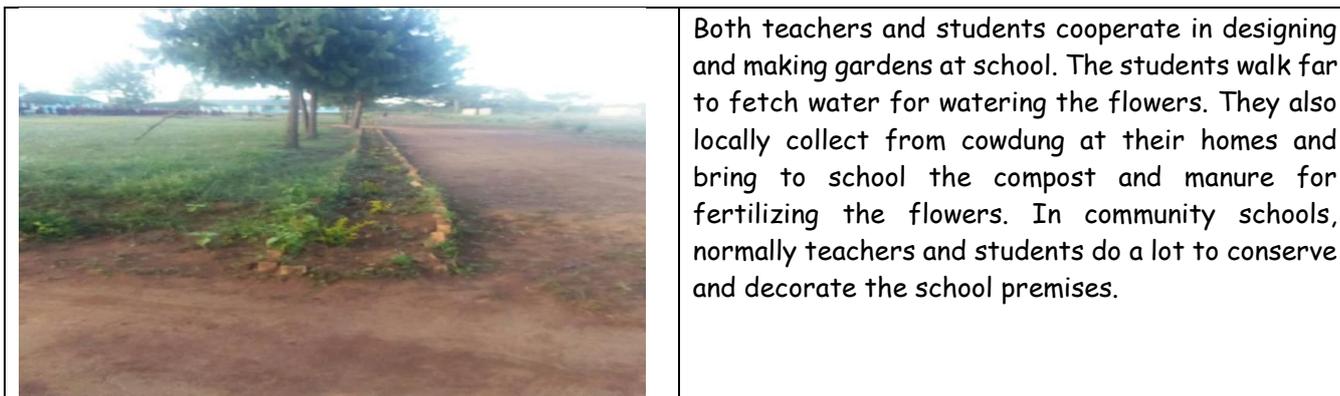
"Although there are many studies on understanding EE and its implementation, the aspect of how the environment is conceptualized is often not considered" (Kimaryo, 2020, p.24; cited in Tani, 2006). By the term "inside," I refer to theoretical functioning. Conceptualizations are "insides" that can also be considered "critical thinking." Facilitation and critical thinking vis-à-vis EE in schools depend on the above terms. All of these terms summarize the role of teachers in implementing EE in schools. The purpose of defining these terms is to explore, as scholars, the concept of EE so that we understand what we see, read, and hear about the functionality of implementing EE in schools. (See conceptualization results in Table 8, p.35)

EE connects learners to their environment from which they can develop behavioral experiences that can lead them to environmental literacy as they grow up and continue to interact with their environment. In the school studied, teachers work with students to improve the topographical features of the school by planting trees and creating flower gardens. This is a great step for students and teachers to work together on environmental issues.



Picture 2. Part of the school compound showing the garden of flowers and timber trees (source: From the school understudy)

According to the study's findings, positive perceptions, attitudes, and enthusiasm are essential for both teachers and school administrators to accelerate the success of EE implementation. They motivate learners to feel part of those doing something for the environment.



Both teachers and students cooperate in designing and making gardens at school. The students walk far to fetch water for watering the flowers. They also locally collect from cowdung at their homes and bring to school the compost and manure for fertilizing the flowers. In community schools, normally teachers and students do a lot to conserve and decorate the school premises.

Picture 3. Part of the school compound showing the flowers and trees along the road to school, behind are the teachers, students and some school buildings (source: From the school understudy)

On the other hand, negative perceptions, lack of morale and commitments excel at demoralization.

### 6:4 Aspects of EE found in this study

The exploration of EE in schools emerge with some aspects that can be considered important outputs following the implementation of EE in schools, as summarized in the table below;

Exploration of Environmental Education in schools			
Importance of EE	EE as Independent subject vs Integrated	Behavioural experiences on EE	Emerged Themes from the exploration of EE
-EE is a tool to prepare the society to value, conserve and protect the environment -EE comes with mechanisms in taking actions to the problems threatening the environment	-EE is argued to be an independent subject rather than being integrated	-All people are indebted to awareness and transformation of the acquired skills and experiences to keep environmental care generations to generations -People's daily interactions with the environment determine how their actions (experiences) affect the environment	-Teachers involvement during the curriculum formulation and improvement -Teachers in-service and refresher trainings - Selection of appropriate teaching approaches -Importance of co-extracurricular activities -The school-home relation -Engaging the community in school actions -Communication between education policy makers, implementers, supervisors, monitors and evaluators. Also the communication among governmental authorities towards common agenda

Table 10. Showing a Summary of Aspects of EE as explored in schools

#### 6:4:1 Importance of EE in schools

From the results, it appears that EE is valued as an important learning field in the school context (formal), but also at the social level (informal). The importance of EE described by Toth (2016) is related to the results of the implementation of EE in a studied school. Teachers and students conduct outdoor EE projects to care for the environment, including earning money from the wooden trees they plant, producing food with the avocados they grow, and beautifying the school environment/garden. These activities, done entirely by the students and teachers, signal that they have embraced the value of EE and motivate students to address environmental issues at school and at home. It is possible that EE has an impact on the consistent increase in school performance reported in Table 7 on page 31. Due to Tanzania's increasing vulnerability to climate variability, EE has become an important topic in elementary school curricula and teacher training (Kalungwizi et al., 2020; cited in Kidegesho, 2015; URT, 2013). A summary of the benefits of EE can be found in PLT (2019), cited in Toth (2016): EE is interactive learning that stimulates imagination and

encourages creativity to improve student achievement. EE provides opportunities for experiential learning outside the classroom.

#### **6:4:2 Environmental Education as an independent subject vs integrated**

It has been suggested that EE should be upgraded to a separate subject. Their reasons are apparent; either teachers would like to see EE is upgraded due to its importance stated above or teachers have encountered inadequacies when integrating EE with other subjects, which may devalue the importance of EE or necessitate interdisciplinary teaching approaches. In citing Otiende et al (1991), Ng'ang'a (2010) stated that educators may not be familiar with the variety of interdisciplinary and multidisciplinary approaches available to address environmental issues. Also, Mwendwa (2017) in citing Johnson (2005); Kadji (2002); Palmer (1998) support teachers' observation that EE should be a separate subject by pointing out that integrating EE into different subjects creates a number of limitations and challenges for education systems and learners do not develop a clear understanding of what different disciplines or forms of knowledge contribute to understanding an environmental topic. On the other hand, there are arguments against establishing EE as a separate subject (Verma & Dhull, 2017). It is clarified that, "environmental education should not be just one more subject to add to existing programs, but should be incorporated into programs intended for all learners, whatever their age" (Kimayo, 2011, p.35; cited in UNESCO, 1977).

#### **6:4:3 Behavioural experience developed during the implementation of EE in schools**

From the study, it appears that participation in environmental issues is a necessity for all. Teachers and students work together to develop and implement school action plans that address the care, protection, and preservation of the environment so that it continues to support the existence of life on Earth. EE helps students gain experiences that then lead to the acquisition of skills. "These experiences will help pupils interact with the natural environment, understand the ecological processes, and the human impact on the environment" (Kimaryo, 2011, p.52; as cited in Meyer, 2006). They can easily transfer these skills to their homes. For example, if students enhance the school garden and grow avocados, they are likely to do similar projects at home with their parents. This can only happen if students are also engaged and show a positive attitude toward EE. "The ultimate aim of education is shaping human behaviour" (Hungerford & Volk, 1990. p.8) and it builds human capital, which in turn promotes the economic growth of individuals and society (Sachs et. al., 2019, as cited in Hanushek & Woessmann, 2012).



The cooperation between teachers and students in doing school outside activities is also shown here, they conserve the area by planting avocado trees from which they get fruits for nutrition and for for sale. Once they get money from selling avocado fruits they use the money in solving some of the school challenges for both teachers and students. They also do so in school maize farm.

Picture 4. Part of the school open area where teachers and students take opportunity to cover the area with avocado trees.  
(source: From the school understudy)



Teachers and students taking initiatives to change the topographical view of the formally open area characterized by blowing wind to productive land covered by trees for economic purpose.

Picture 5. Part of the timber trees planted by teachers and students around the school compound. (source: From the school understudy)

#### **6:4:4 The need for teacher trainings and refresher courses**

It is necessary for teachers to attend seminars and trainings to familiarise themselves with new concepts, theories, and learning dynamics and to refresh their knowledge of pedagogical content (PCK) for effective teaching. The Tanzanian government explicitly states that "in-service training and retraining are mandatory to ensure the quality and professionalism of teachers" (Ministry of Education and Culture (MOEC), 1995, p.50). However, teachers claim that they have not received in-service training since the introduction of EE into schools, which may have contributed to ineffective teaching. The intellectual implications of this are discussed in the next chapter.

#### **6:4:5 Teaching approaches**

Some studies show that traditional (teacher-centered) teaching does not enable effective implementation of EE or other programs in schools because the traditional teaching approach is based on imparting knowledge and cannot help learners develop the skills and action competencies needed to take action to protect the environment (Kimaryo, 2011; Spiropoulou et al., 2007). The interviewees under study also disclosed their teaching styles;

*"we use participatory teaching methods and grouping classes according to the levels of learners in order to choose an appropriate approach during teaching and learning activities."*

*"We group students according to their levels of understanding so that we know which class need more or less teaching efforts."*

Although, Verma & Dhull (2017) remark that, there are no standardized methods for the teaching of EE. "Teachers need to be exposed regularly to new methodologies and approaches of teaching-with the ever changing environment" (MOEC, 1995. p.50). This regular shift of approaches, can also be regarded as "paradigm shift - a complete change in the way we understand or theorize about what we are studying" (Gillham, 2000, p.19). Appropriate teaching and learning methods are needed as learners will be able to develop the learning experiences, skills and action competencies as they are actively involved in activities related to the environment and the teachers just facilitate the learning (Kimaryo, 2011; Spiropoulou et al., 2007).

#### **6:4:6 Outdoor programs (co-curricular activities)**

Outdoor school programs are generally about reinforcing the application of knowledge and skills acquired in school. As stated in TIE (2007), extracurricular activities include all activities that take place outside the regular curriculum and aim to provide students with opportunities to develop all aspects of their character and to provide a variety of options within the school environment so that all students can find educational paths that match their individual preferences and abilities. In most cases, outdoor activities help to enhance learners' intellectual abilities and provide hands-on experiences. It is suggested to implement EE as outdoor education because it prepares learners to practice and act on environmental issues. The results show that outdoor activities allow teachers

and students to actively participate, although they are limited by funding sources and the socioeconomic status of most parents. "Through participating in the co-curriculum, students are able to learn to live together and contribute to academic development and expand their interests and skills" (TIE, 2007, pp.36-37). EE can be a way to awaken students' interests and potential for environmental issues and bring about a change in mentality in communities. Out-of-school activities can be imprinted in the memory of those who do them and become a medium for future life changes.

#### **6:4:7 *School - home relation***

A connection between teachers and parents, either through direct communication or through their children (students), is essential for the dissemination of some information that can be mutually beneficial. For example, from the study, teachers educate parents during parent-teacher conferences about important issues related to the environment, conservation, and the importance of planting trees while avoiding bushfires and farming practices that harm the environment. Students also take the knowledge home from school and can slowly pass it on to their parents.

#### **6:4:8 *Community and stakeholders' involvement in school activities and plans***

The school belongs to the community, and the students belong to the parents who are part of the communities. Therefore, community participation in school planning in collaboration with teachers paves the way for sharing information, successes, and challenges for the school. We have seen how the school works with the community. For example, with WORLD VISION, a non-governmental organisation that provided trees for the school to plant. Also, a member of the village community volunteered avocado seedlings to the school, which were planted at the school.

# Chapter Seven

## Discussion and Conclusion

**Overview:** In this chapter, I discuss the results presented in chapter six in relation to the frameworks used. I situate my findings within the relevant literature as described in my literature review. In addition, this chapter explains ethical and sustainability considerations, limitations of the study, and recommendations for future similar studies.

### 7:1 Discussion

"Introduction of environmental education, particularly in primary and secondary school curricula, created an enduring awareness by inculcating values that support responsible environmental care and discourage attitudes that are incompatible with sustainable ways of life" (URT, 1997. p.15). This research is important in identifying environmental awareness in school communities and the role of teachers and school administrators in finding solutions to mitigate environmental problems. Initially, it was found that EE is not successfully implemented in schools, resulting in less contribution to the fight against environmental threats. Therefore, the aim of this research was to select a secondary school to investigate teachers' perceptions of the EE concept. The research questions were posed in this direction. The application of experiential learning theory (ELT) aimed to investigate learning styles and teachers' ability to play a supportive role during instruction EE, so that students can have concrete experiences through interaction with their environment. It is possible that the results will provide a different picture of how schools deal with EE and highlight the important contribution to addressing environmental issues.

Teachers and school administrators expressed positive attitudes toward EE. Teachers associated the concept with environmental knowledge and its scientific relevance. These were the main aspects in answering the first research question, "How do teachers conceptualize EE". This formed the basis for the other four research questions. Attitude and conceptualization open the doors to willingness to take on a particular role. According to experiential learning theory (ELT), learners go through a cyclical learning process with four phases to complete the learning phase. Kolb and other scholars who built on Kolb's learning cycle model mention four important learning phases, namely concrete experience, reflective observation, abstract conceptualization, and active experimentation. In my opinion, it is the individual attitude that acts as the heart pump for the cycle of the four learning phases. This attitude comes from both the learners and the teachers involved in the learning process. The attitude that does not consider challenges or weaknesses. The attitude that focuses on opportunities. This argument forms the basis for the second research question, which examined the role of teachers and school administrators in promoting EE. It is not just about making people aware of environmental issues, but rather how they express attitudes about their involvement in environmental issues. It follows that students are able to generate learning experiences from EE when their perceptions of environmental issues are stimulated by their concerns at EE. This is supported by Healey & Jenkins (2000) "the first is how we perceive or grasp new information or experience, and the second is how we process or transform what we perceive (Smith and Kolb 1986). The way we perceive experience ranges from immersing ourselves in the experience-using our senses and feelings in a "concrete" way-to thinking "abstractly"- using logic and reason" (p.4).

The reason given by Kimaryo (2011) that environmental problems are still escalating because teachers are failing to provide learners with the knowledge and skills of EE is uncertain. It could be that some teachers do not recognise the relevance of EE, as it was found in the results of this study, and they also lose their attitude towards EE. The question of whether all teachers are able to identify and categorise learners based on their learning characteristics so that teachers can choose appropriate instructional approaches is also of great importance. Kolb (1984) proposed the four learning styles, each of which is associated with a different way of solving problems that allows students to adapt in different situations, so some students tend to prefer certain learning behaviours over others (Healey & Jenkins, 2000). Therefore, teachers need to know their students well when performing their role in the classroom EE so that students can catch up well with the knowledge and skills and be able to use the hands-on experiences

they have in their environment. This may have contributed to the success of the implementation of EE in the school studied, as we have seen some concrete EE projects where teachers and students have worked intensively on environmental issues. Also, the paradigm shift in teaching that took place in Tanzania, where participatory learning methods (referred to as good practises) were introduced to replace teacher-centred learning methods (Kimaryo, 2011; cited in Barrett, 2007), was a necessity in response to the study of the nature of learners and how they want to develop their future. "So environmental education teachers need to know what their learners need to know and the areas which they find difficult or have misconceptions" (Kimaryo, 2011, p.58).

The unwillingness of teachers to offer EE in schools, as noted by some researchers, may be due to a lack of training and resources for teachers to implement EE programs in schools. It is important that teachers themselves have a common understanding that goes beyond doubts and misunderstandings regarding EE. Therefore, they need in-service training. Moreover, EE is a dynamic interdisciplinary learning field that requires regular refresher training. Nevertheless, teachers have developed self-motivation and enthusiasm as they are encouraged by the importance of EE not only for students but also for the community. The actual transition from observation to critical thinking (abstract conceptualization) (AC) faces this challenge, as stated in the answers to research question "c" (see p. 13), where the lack of teacher training and insufficient resources hinder the transformation of theories and principles from EE into practical experience through the most important abstract conceptualization (AC) - concrete experience (CE). As a result of lack of training, teachers conceptualize EE as they can in terms of their subject knowledge from other subjects and include EE. Training is also important to sharpen teachers' PCK so that they can deliver instruction in an effective manner. Training for EE teachers is important to eliminate misunderstandings among them because research has shown that science and geography teachers, for example, have many misunderstandings about atmospheric phenomena even though they have learned how to teach these subjects in their training (Kimaryo, 2011). In-service training also helps to familiarize teachers with new dynamic technologies. And one more thing: It is about commitment. A determined teacher must not only be qualified (well-trained), competent, and effective, but also committed to the role of the teacher EE to achieve curriculum goals. "In emphasizing the importance of teachers in effectively implementing environmental education, it is suggested that teachers must be committed" (Kimaryo, 2011, p. 56; cited in Robottom et al., 2000). In addition, "individual commitment by the teachers had an important component with respect to the implementation of EE" (Ng'ang'a, 2010, p.20; cited in Cutter, 2001).

According to MOEC (1995), education and training matters have been decentralized to various authorities, such as regions, districts, municipalities, and educational institutions, which manage and administer education in Tanzania. Teachers work under these authorities. If they lack training on EE as observed by Kalungwizi et, al (2020) (cited in Wals & Benavot, (2017); Sterling, (2010); Rickson, (1999), teachers are not well prepared to teach environmental issues whether in school or in their future profession, the authorities are responsible to remove these doubts. In fact, it is clearly stated that "the government and local authorities shall ensure that appropriate infrastructure, facilities, equipment, instructional materials, and teachers necessary for optimal and effective implementation of the curriculum are available by: a) setting standards; and b) providing the appropriate resources" (TIE, 2007. p.22). Thus, the lack of training and inadequate funding to support the implementation of EE may be an important reason for the disparate results of research on EE in the different education systems in Tanzania.

## **7:2 The Ethical issues**

In realization to the ethical consideration, the study was conducted by following all research steps, in accordance to humanity, relevance, integrity, responsibility, freedom participation, and by ensuring that the intended purpose is fulfilled. Adopting Creswell & Creswell (2018) and De Vaus (2001), the researcher;

- Submitted a Research Proposal to IRB - Gothenburg, through the University Portal to seek for permission to do this research as a partial execution of the Master's Degree program.

- Emailed the gatekeeper (School administration) to ask for an opportunity to conduct this research in a chosen Tanzanian secondary school. And, the Head of School positively responded in writing to the student researcher. He further arranged for interview schedules.
- Contacted participants by the help of school administration, informed them the purpose and scientific novelty of conducting this research. The participants were given chance a week before the interview to read the form of consent and the interview guide questions. They were assured with confidentiality, no harm and no forms of deception. Moreover, the participants were informed about their right to voluntary participation, withdrawing from the participation any time they would feel so. They were also told that their all responses would mean correct answers and neither one was taken as a wrong answer.
- Well looked after trust-ship, while reporting what only true findings. At the same time protecting data which was collected and recorded. A promise was made to share the research report with the participants if they would like to.

### **7:3 The sustainability issues**

The concept of SD focuses on the consideration of environmental protection to meet current and future needs. Through the goals of SD, societies are encouraged to take action and participate in finding solutions to the environmental problems that prevail worldwide. In achieving the common goal of SD, every individual should be committed to the environmental management agenda, not just government experts, and this commitment should arise from the interests and actions of individuals (URT, 1997). Raising society's awareness, skills, actions, attitudes, and participation in environmental issues are fundamental components of environmental education. And the urgency and relevance of learning sustainable lifestyles maintains the primacy of environmental education in formal schooling worldwide (Palmer, 1998). One of the goals of Tanzania's National Growth and Poverty Reduction Strategy is to "increase access to clean water, affordable and safe water, sanitation, decent shelter, and a safe and sustainable environment." (Kimaryo 2011, p. 16; cited in URT, 2006, p. 20). In terms of the Sustainable Development Goals, "they recognize that ending poverty and other deprivations must go hand in hand with strategies that improve health and education, reduce inequality, and spur economic growth-all while tackling climate change and working to preserve our oceans and forests, the world's problems, and seeks to make the world a safer place to live" (UNESCO)

The concept of environmental education is also an integral part of Education for Sustainable Development (ESD). The areas of the Sustainable Development Goals targeted by this study include: Goal 12 (Responsible Consumption and Production), Goal 13 (Climate Change Mitigation), and Goal 15 (Rural Living). As stated by Kimaryo (2011), natural and man-made environmental problems such as drought, floods, poor sanitation, soil degradation due to poor agricultural practices, unsustainable methods of using natural resources such as mining, forests, and fisheries, pollution, and loss of biodiversity threaten the ecosystem and the natural balance of the universe. Thus, implementing EE in schools means recognizing the problems around us and finding a way to solve them and ensure the prosperity of people and the planet for the present and future by pursuing sustainable goals. In conjunction with the school projects, the annual planting of trees, the production of avocados, and the improvement of the school gardens, as described in the "Results" section of Chapter Six, the school aims to meet Goals 12, 13, and 15

This study was conducted in a rural area where ordinary citizens are usually farmers who depend on perennial production with the use of less advanced agricultural equipment. The areas are characterized by fire outbreaks, forest fires, water pollution, degradation and more. However, in most cases, these citizens are the parents and relatives of students in the communities. Since most of the elderly in Tanzania, especially in the rural areas, are illiterate, they depend on their children to go home after school with certain knowledge and skills, some of which can be passed on to their parents. Therefore, it is considered necessary to instill in students an awareness, sensitivity, and attitude toward environmental stewardship and to find solutions to current environmental problems (Kimaryo, 2011). Furthermore, in this study, data collection was conducted remotely online. The participants were divided into two groups, and the participants in each group were interviewed together. The researcher successfully conducted the study

online, which saved costs and unnecessary materials if the study had been conducted physically. It is expected that the result of this study will arouse the interest of the participants of the studied center and many other readers to think more and play a role in environmental protection, so that everyone can create a safe and sustainable world together.

#### **7:4 Limitation of the Study**

This is an exploratory study whose aim was to investigate a case of environmental education in secondary schools in Tanzania. Nevertheless, the results and conclusions of this study may reflect the actual situation in all secondary schools in Tanzania or in all developing countries. Since the school studied is from rural areas, the question arises as to what it could have done in urban areas where there is no experience with bushfires and agricultural practices. The economic status of residents in rural areas is more diverse than in urban areas, and therefore parents or communities in urban areas may use alternative fuel sources such as gas, solar energy, and electricity, but pollution from industry and other economic activities is strong.

Finally, this study only aimed to find out teachers' opinions and perceptions about environmental education, and the results discussed are based on the given objective. This means that the results and the discussion could have been different if the group of participants had been somewhat broader, e.g., students, parents, education officials from state education agencies at the ministerial, regional, or district level, or if many topics had emerged that were not addressed in the survey of teachers only. Nevertheless, I can guarantee that the results of this study reflect the opinions of teachers in secondary schools.

#### **7:5 Recommendations for Future Research**

As a student researcher, my goal with this thesis is to complete the master's degree program. However, I am interested in conducting more research on environmental education in the future, broadening the topics and comparing as many studies as possible that have been conducted in different regions of the world to determine people's engagement and involvement in environmental issues and care. Therefore,

As discussed in the limitations above, future studies in a similar area of environmental education, especially in schools, should broaden the range of participants. For example, teachers from subjects other than geography and biology, teachers from private schools and private schools, teachers from rural and urban schools.

Future studies could provide information on the evaluation of the environmental education program and whether the desire expressed by teachers to upgrade the subject as a stand-alone subject is relevant and the extent to which curriculum objectives have been missed in the implementation of EE in embedded subjects.

Future studies could try to find out how government bodies communicate with each other about the common and important subject of environmental education as it is implemented in schools. For example, how the Ministry of Education works with the Ministry of Environment or the Ministry of Interior's Fire Prevention Department, etc., in implementing EE in schools. "Since environmental management is a multi-sectoral, multi-disciplinary undertaking, its success depends on the cooperation of Government agencies responsible for the various environmental aspects of environment" (URT, 1997. pp.37-38).

#### **7:6 Conclusion**

The existence of life is guaranteed if the environment supports it. In order for the environment to support life, it is necessary to take care of the environment and the problems associated with it, and to take appropriate action. This is not a local responsibility, but a global concern, as life in the world and the balance of the systems of the universe are at risk. "Environmental problems are real and are not someone else's problem" (URT, 1997. p.1). Referring to the Tbilisi Declaration, the ultimate goal of EE is the active participation of people in finding solutions to environmental problems (Verma & Dhull, 2017; Intergovernmental Conference on Environmental Education, 1977). The world needs every individual to be aware of their responsibilities in addressing environmental issues to prevent present and future environmental problems for the sake of making the world a better place for all. Because "our survival and

that of our future generations depends on the harmonious relationship with the natural elements" (URT,1997. p.1). The sustainability goals that we want to achieve by 2030 are in line with the awareness of all individuals who take responsibility for the components of EE. Thus, if we strive to live, we should strive to protect our environment.

The approach to environmental problems should not depend only on one strategy i.e. EE. There is also an aspect of the nature of governments and their real commitments to solving problems. Stapp (1969) reminds us that the problems facing our communities are subject to the legitimacy of government officials and national planners, but that citizens have an obligation to find solutions and create awareness so as not to cause further problems. Communication between the different government bodies to make joint efforts for environmental issues is inevitable. Poverty in many developing countries, high illiteracy rates, increasing urbanization, and unbalanced population densities put pressure on limited resource use. Therefore, EE is urgently needed in these countries as millions of people are negatively affected by the environment (Pirzado, 2018). EE provides children with an awareness of the environment, as they grow up, they can eventually play roles in protecting their environment. A variety of learning styles in EE are needed to accommodate the students at their diversity of understanding. A connection between what studied indoor to practical outdoor learning programs can help in building learning experiences in accordance to experiential interaction with the surroundings. Teachers and school administrators must appropriately fulfil their role vis-à-vis EE. A well-informed society about the environment will help combat environmental threats worldwide. Together, we can bring global change if everyone can abide by the global call to solve global challenges.

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## Appendices

1. The Interview questions for teachers
2. The interview questions for school administrators
3. The Form of Consent to the Participants
4. The letter of Researcher to the Gate keeper (Head of School)
5. The letter of Response from the Head of School to the Researcher
6. The Researcher's Notes

## Appendix 1

### The Interview Questions (Teachers Focus Group)

#### General information

Teacher's Group Name: ..... Age range ..... Genders ..... Teaching subject(s)  
..... Teaching experience (in years) range.....

#### Interview questions

##### **A: Introductory Questions**

1. How do you feel about the teaching profession?

##### **B: Questions related to the perceptions of teachers in their teaching subjects**

2. How do you position your teaching subject(s) in comparison to the other teachers' teaching subject(s) within the same teaching class (s)?

3. How do your students speak about your teaching subject(s)?

4. Can you explain what strategies you use in your teaching subject(s)?

5. Have you ever taught the same teaching subject(s) in the same classes (students) for different class levels (for example, you might have been teaching one subject to the same students when they were in Form one, two, three and, or four).

6. In case your answer in Q5 above is "Yes", under the stated situation, how do your students learning subsequently progress from one level to the next? Please, feel free NOT to respond to this Q6 if your answer above is "No"

##### **C: Questions related to the perceptions of teachers about Environmental Education as a concept**

7. How do you conceptualize the concept of Environmental Education?

8. Were you involved during the introduction of Environmental Education in the curriculum by the concerned authorities? If your answer is "Yes", How were you involved? And, how do you feel about your involvement?

##### **D: Questions related to the perceptions of teachers on the topics of Environmental Education**

9. Let's go deeper into your teaching subject (s), how comfortable are you to explain that the topics related to Environmental Education embedded in your subject syllabus portray the concept of Environmental Education?

10. Do you receive any pedagogical support from the school administration or related authorities to facilitate the teachings of such topics related to the Environmental Education in order to make it easier for students to capture knowledge from it? (If yes/no. Can you explain about it?)

11. How do your students explain about Environmental Education as a concept or about its topics, based on your teaching self-reflections (feedback)?

12. Are your students fully updated/informed about the importance of Environmental Education in being environmentally alerted or taking part to finding solutions of the environmental problems threatening life in the world?

**E: Questions related to the successes and challenges in the implementing Environmental Education**

13. What would you say are the successes of implementing Environmental Education so far?
14. What challenges do you meet in general when you are implementing Environmental Education in your school?
15. Based on the question (14) above, how do you overcome challenges as a teacher? What strategies do you undertake to make Environmental Education successively implemented?
16. Are there any additional opinions you wish to express as far as Environmental Education is concerned?

## Appendix 2

### The Interview Questions (School Administrators)

#### General information

School Administrators titles: ..... Age range ..... Genders ..... School administrating experience (in years) range.....

#### Interview questions

##### **A: Introductory Questions**

1. How do you feel about your supervisory duties as far as your school is concerned?

##### **B: Questions related to the views of school administrators about academic supervision**

2. Basing on your supervisory experience, how do you position the performance of Geography and Biology subjects in comparison to the other subjects?

3. How do your students speak about Geography and Biology subjects in general?

4. Can you explain what strategies you usually undertake to make the teaching/learning successful in terms of all subjects you have in your school?

5. Basing on your regular exam performance analyses, which subjects do students find harder or more difficult than others? What are their reasons?

6. Again, based on your regular exam performance analyses, which subjects do students find simpler or less difficult than the other? What are their reasons?

##### **C: Questions related to the views of school administrators about Environmental Education in general**

7. How do you perceive the implementation of Environmental Education as embedded in the topics of some subjects like Geography and Biology? (Are you aware of it?)

8. Since its introduction to the Curriculum of Secondary Education, how far have you gone as a school to realize the objectives of including Environmental Education in the curriculum?

9. How can you explain the involvement and sensitization of teachers before, during and after the introduction of the Environmental Education in schools by the Authorities?

##### **D: Questions related to the response of school administrators in the implementation of Environmental Education in schools**

10. Do you have any school action plans for implementations of the Environmental Education in your school?

11. Are your teachers who are teaching subjects with Environmental Education given opportunities for training or refresher courses about this concept at regular intervals?

12. Do you provide necessary pedagogical supports to the teachers to facilitate the teachings of such topics related to the Environmental Education in order to make it easier for students to capture knowledge from it? (If yes/no. Can you explain about it?)

13. What are the successes of implementing Environmental Education so far you have acquired at your school?

14. What are the challenges of implementing Environmental Education so far you have encountered at your school and how do you respond to them?

**E: Questions related to the sustainability of implementing Environmental Education at school**

15. Are your students given opportunities to understand and practise Environmental Education at school or at their homes? Are they able to relate to the environmental problems threatening the world?

16. Does the School have any extra-curricular activities which aim at facilitating the implementation of environmental education? If any, can you mention. How far they are active?

17. Do you recommend that the global strategies against environmental threats can be achieved if everyone can take responsibilities right from school level? And, that the implementation of environmental education is one those strategies?

18. Are there any additional opinions you would like to express as far as Environmental Education is concerned?

## Appendix 3

### The Form of Consent

Dear Participant,

You are invited to participate in the research undertaken by Frank Christopher Mnyagani, a student researcher from the University of Gothenburg Sweden, studying International Masters in Educational Research (IMER 2020-2022). The current research looks at the perspectives of teachers from a Secondary School in Tanzania on the concept of Environmental Education. The aim being to explore the Environmental Education with reference to the perspectives of the teachers.

The intention to study this area originates from the strategies of all stakeholders in the world in the struggle to find solutions to environmental problems such as drought, floods, poor sanitation, lack of clean and safe water, land degradation due to poor agricultural practices, unsustainable ways of harvesting natural resources such as mining, forests and fishing, environmental pollution and loss of biodiversity. All these are threatening the life support system of the environment. It is expected in schools, therefore, Environmental Education, since its introduction in the curriculum some years back, with reference to its implementation, to be among the struggles to educate the society on the importance of taking care about our environment. The results of this study will support schools to evaluate and deliver environmental education curriculum goals and understand challenges and opportunities both for teachers and school administrators.

As a Participant in this study, your rights to voluntary participation will be observed and you can withdraw at any time you wish to do so to participate in this study. Your privacy will be preserved under confidentiality commitment of the researcher and your responses will be accessible only to the concerned parties for the sake of producing the research report which will offer the benefits of its aim. This project is conducted in English, though, you as Participant will be allowed to use English or any language you find that you are more comfortable with, and the researcher understands. In the case of alternative languages, your responses will be recorded and translated to English before analysis of the results. This project receives no monetary support and therefore no monetary benefits will be available for the Participants. Thank you very much for your understanding and being ready to participate in the interview which will last **no more than 60min**.

Signing below shows that you have read and agree to what has been written in this consent. Should you have any questions about the research, do not hesitate to contact the researcher at this email address: [gusmnyfr@student.gu.se](mailto:gusmnyfr@student.gu.se)

Signed by Participant ..... Date .....

## Appendix 4

### The Letter of the Researcher to the Gate keeper

**From:** Frank Christopher Mnyagani, Student of GU Sweden

**To:** Head of School, Kiponzelo Secondary School, Tanzania

**Date:** 04 March 2022

#### **Re: Request to Conduct a Research at your School**

I am a student researcher from the University of Gothenburg Sweden, studying International Masters in Educational Research (IMER 2020-2022). I am looking at the perspectives of teachers from Secondary Schools in Tanzania on the concept of Environmental Education. The aim is to explore Environmental Education with reference to the perspectives of the teachers.

In my research, I am choosing only one of the Tanzanian Secondary Schools, of course, with accessibility to it for the sake of conducting my research in form of a case study. And, your school is preferably chosen to meet my purpose. It is my hope that you will be happy to offer me this opportunity.

In your school, I beg to meet with a few teachers that I will group into two groups for conducting an Interview on WhatsApp video call. **Each group will spend no more than 60 Minutes on Interviews.**

**Group 1.** Comprises of 4 teachers (2-Geography teachers, 2-Biology teachers)

**Group 2.** Comprises of School Administrators (1-Head of School, 1-Academic Master)

So, in total, my study involves 6 teachers (as stated in the groups above). Geography and Biology subjects are chosen as they richly offer topics of Environmental Education as per the Curriculum of Secondary Schools in Tanzania and their syllabuses. Please, find the attachment to get prepared for the interviews (**Appendix 1 - Interviews for teachers, Appendix 2 - Interviews for School Administrators. Also, you will find a form of consent to be distributed to all participants**)

I propose to have one week of preparation for interviews after you receive this email and share it with your teachers in the groups stated above. Then, in accordance with your regular school timetable, and of course with the availability of all teachers named above, will you please plan for a meeting time for both groups and let me know about it? (**Remember, each group on WhatsApp video call will spend about 60mins. In your plan, both groups can be interviewed in one day but in different time slots or may also be done on different days depending on your available time for me I am flexible, I will be ready any time any day**). I will be grateful if we can conduct our interviews before **20 March 2022** so as to offer a good time for me to analyze the results and write a research report.

Should you or your teachers have any questions pertaining to interviews please, ask me through my email address ([gusmnyfr@student.gu.se](mailto:gusmnyfr@student.gu.se)) or my WhatsApp number (+255755708869).

Looking after your response!

Best regards

Frank Christopher Mnyagani

Student – Gothenburg University, Sweden

Appendix 5

**The Letter of Response from the Gate keeper to the Researcher**

**IRINGA DISTRICT COUNCIL**

P.O BOX 2278,  
**IRINGA.**  
10<sup>TH</sup>. 03. 2022.

FRANK CHRISTOPHER MNYAGANI,  
GOTHENBURG UNIVERSITY.

Dear Sir,

**RE: PERMISSION TO CONDUCT RESEARCH**

Refer to the captioned heading above.

The institution received your letter with a request to conduct research dated 4<sup>th</sup> March 2022 with a title "The Perspectives of Teachers from Secondary Schools in Tanzania on the Concept of Environmental Education" at my school. I am highly delighted to inform you that your request has been granted for academic activity asked. The institution has already arranged the schedule in a manner that you will successfully conduct your research. Given the working schedule of the participants, the institution would like you to conduct an interview for your study on Monday 14<sup>th</sup> March 2022 at any time you feel it is convenient.

I wish you all the best in your studies.

Regards,

Emille Emilius Dallu  
The Headmaster  
Kiponzelo Secondary School

## Appendix 6

### The Researcher's Notes:

- **Project title** – Environmental Education: An Exploratory case study from the Tanzanian Secondary teachers' perspectives.
- **Study centre** – Kiponzelo Secondary School, A community School from Iringa District Council, Tanzania
- **Interviewees** (Participants) - 4 Teachers from Geography and Biology subjects and, 2 School administrators; Head of school and the Academic teacher
- **Interviewer** - A Student of Master's Degree program, IMER – Gothenburg University, Sweden. Background, the interviewer was once a Secondary teacher in Tanzania teaching Biology and Chemistry in various schools for about 8 years. Also he became Head of School in two Secondary schools for 5 years. He is interested in the Environmental Issues not because he has sorts of experience in teaching but also the concept of EE itself is a vital global topic which seeks to finding solutions to environmental threats and sustainable living
- **Data collection** – done by semi-structured interview to 2 focus groups by means of WhatsApp audio calls (teachers and sch. administrators). Data was collected same day on Monday 14, March 2022 at the stated time; teachers 10:00–10:55am Tanzanian time. And, Sch. Administrators at 12:00–12:52pm Tanzanian time. The interviewer made WhatsApp calls from Sweden and the interview Swedish time was 08:00 – 08:55am and 10:00 –10:52am respectively
- **Language use** – The participants were given opportunities to use either English/Swahili as mostly used languages in Tanzania and the interviewer was able to understand both languages.
- **Preparation** - Before interview, the participants were fully informed, consented and given interview questions at least one week before. The gate keeper was consulted by email and replied to accept the conduction of the research at his school of supervision.

Research Qns	Targeted Group	Specific Interview Qns	Participants Responses	Category of responses/ Themes
a) How is the EE conceptualized by teachers in Tanzanian secondary schools?	Teachers	7.How do you conceptualize the concept of EE?  9. Let's go deeper into your teaching subject (s), how comfortable are you to explain that the topics related to EE embedded in your subject syllabus portray the concept of Environmental Education?	Integration of students knowing environment with environmental problems  It facilitates learners to consider about environment and how to solve environmental problems  EE is compatible with the topics. In Geography the topic of environmental issues like Pollution tells the reality of issues happening in the day to day life	Awareness/Sensitivity  Conceptualization
	School Administrators	7.How do you perceive the implementation of EE as embedded in the topics of some subjects like Geography and Biology?	I perceive it positively  I declare that through Geography and Biology EE helps my students to understand well about the environment	Perception
b) What roles do teachers and school administrators play to make EE beneficial to the students?	Teachers	4.Can you explain what strategies you use in your teaching subject(s)?  12.Are your students fully updated/informed about the importance of EE in being environmentally alerted or taking part to finding solutions of the envir. problems threatening life in the world?	We group students according to their levels of understanding so that we know which class need more or less teaching efforts. E.g. we have class A which use all methods esp. participatory and group discussions. Class B needs more efforts.  Students are well informed; they are taught how to practice EE outside class. E.g. where to safely deposit trashes/garbage, how to use alternative energy sources which are environmental friendly like use of gas for cooking instead of charcoal and wood which are commonly used in their communities. In Biology also there is a topic of balance of nature	Teaching/learning methods  Effectiveness of diff. teaching approaches  Participatory learning (learner's centred)  Outside class projects  Connecting between what is learnt and what is experienced
	School Administrators	8.Since its introduction to the Curriculum of Secondary Education, how far have you gone as a school to realize the objectives of including EE in the curriculum?  15.Are your students given opportunities to understand and practise EE at school or at their homes? Are they able to relate to the environmental problems threatening the world?	School projects on the environmental issues (we are planting 300 trees each year) We are looking for stakeholders to provide us with a variety of tree species so that we can plant more and more trees.  True, through the school projects. They can also relate to the problems because they can sometimes identify and differentiate climatic condition of areas where trees are planted from that of the open or less trees areas	

c) What are the successes and challenges of implementing EE?	Teachers	<p>10. Do you receive any pedagogical support from the school administration or related authorities to facilitate the teachings of such topics related to the EE in order to make it easier for students to capture knowledge from it? (If yes/no. Can you explain about it?)</p> <p>13. What would you say are the successes of implementing EE so far?</p> <p>14. What challenges do you meet in general when you are implementing EE in your school?</p>	<p>Sometimes YES, sometimes NO. It depends on financial status of the school. In case we receive no support we teachers must be creative to use locally available materials to use in facilitating the teachings.</p> <p><b>Successes:</b> Students are aware of pollution and they know how to reduce, they can easily identify good sources of energy, and also they are involved in planting trees and are encouraged to educate their parents and society members to plant trees and care about the environment. Also the community learns from the school projects when they visit or pass nearby school.</p> <p><b>Challenges:</b> Insufficient funds to offer more outside fields and projects to students. So, in some topics, students only learn by theories. Teachers are not good experts in environmental education but they try to teach according to little basic knowledge they have. Additionally, the economic status of most society members does not allow for them to use gas for example, as an alternative to fire wood/charcoal.</p>	<p>School – home skills transfer</p> <p>Sense of creativity to use locally available materials in teachings</p> <p>Action taking and problem solving</p> <p>Knowledge transfer</p> <p>A need of teachers in-service and/or refresher course trainings</p>
	School Administrators	<p>13. What are the successes of implementing EE so far you have acquired at your school?</p> <p>14. What are the challenges of implementing EE so far you have encountered at your school and how do you respond to them?</p>	<p><b>Successes:</b> Attitudinal behaviour of students towards environment has changed. They now see the importance of conserving our environment. From the trees planted in previous years, students now are harvesting avocados and use them for diet and sell the rest, also we produce timber from timber trees. All these influence our students to develop a good attitude to the environment. We have an organization which partner with schools (World Vision) has provided us with some tree siblings to plant</p> <p><b>Challenges:</b> Shortage of materials and stakeholders to help us in launching huge projects like vegetable and flower gardens, farms, facilitate teachers' trainings and to fund students field trips. In addition, some trees die or are burnt by fire outbreaks which are still prevailing though we have tried to educate the societies not to start fires. Fire outbreak especially during summer (hunters), bad weather condition, and scarcity of water sources at school. Students walk far distance to fetch for water.</p> <p><b>Overcoming the challenges by:</b> we are seeking to invite stakeholders and experts from the government and outside to help us in trainings, funds and advices.</p>	<p>Attitude towards EE</p> <p>Participation</p> <p>Challenges of implementing EE</p> <p>Seeking for partnership in problem solving</p>
d) How do school administrators and teachers deal with those challenges in making EE practical?	Teachers	<p>15. Based on the question (14) above, how do you overcome challenges as a teacher? What strategies do you undertake to make EE successively implemented?</p>	<p>We normally advice school administration to search for funds to facilitate school projects and also to invite the environmental experts to come at school and provide more skills.</p> <p>We are still educating students and advise them to still forwarding to their parents and community members about awareness on environmental issues.</p> <p>In times we get parents meetings we also introduce some elements of EE to them as far as fire outbreaks and forest burning have been common.</p> <p>We have students fire club which deals with sensitizing, educating and preventing fire outbreaks at school.</p>	<p>Sharing problems to seek for mutual engagement in solution findings</p>
	School Administrators	<p>12. Do you provide necessary pedagogical supports to the teachers to facilitate the teachings of such topics related to the EE in order to make it easier for students to capture</p>	<p>Yes, depending on the availability of funds. This is a pure public school owned by the community. So some challenges when we impose to the community they get chance to solve. E.g. fund raising etc.</p>	<p>Pedagogical support needed to facilitate EE</p>

		<p>knowledge from it? (If yes/no. Can you explain about it?)</p> <p>14.What are the challenges of implementing EE so far you have encountered at your school and how do you respond to them?</p>	<p>We are seeking to invite stakeholders and experts from the government and outside to help us in trainings, funds and advices.</p>	
<p>e) In what school activities is the EE program reflected in daily school life to make it works and sustains?</p>	<p>School Administrators</p>	<p>10. Do you have any school action plans for implementations of the EE in your school?</p> <p>11.Are your teachers who are teaching subjects with EE given opportunities for training or refresher courses about this concept at regular intervals?</p> <p>16.Does the School have any extra-curricular activities which aim at facilitating the implementation of EE? If any, can you mention. How far they are active?</p>	<p>Yes, each year we plant 300 trees of variety species around the school compass. After three years we will have many plants. Avocado will give diet and money too. One stakeholder has supplied our school with 402 avocado siblings for us to plant. Fire club is active and students practise class teachings with day to day fire outbreak control</p> <p>No trainings, it is unfortunate!</p> <p>Yes, we have “maize shamba” meaning maize farm and we cultivate and run it with consideration of environment care. And, also we are keeping rabbits for sale</p>	<p>Participatory Action plans</p> <p>Teachers trainings</p> <p>Importance of having “shamba darasa” a local common name to mean “training farm”</p>
<p>Additional points (overlooked)</p>	<p>Teachers</p>	<p>2.How do you position your teaching subject(s) in comparison to the other teachers’ teaching subject(s) within the same teaching class (s)?</p> <p>3.How do your students speak about your teaching subject(s)?</p> <p>11.How do your students explain about EE as a concept or about its topics, based on your teaching self-reflections (feedback)?</p> <p>16.Are there any additional opinions you wish to express as far as Environmental Education is concerned?</p>	<p>It is difficult to say what position</p> <p>There are those who understand lessons fast, others slow</p> <p>Students can transfer knowledge of EE to outside, e.g. planting trees. They have fire club and can deal with fire outbreaks (which are common in rural areas). Students are good EE ambassadors, and enjoy to learn what they commonly experience at school or at home</p> <p>EE is very good to be emphasized in education systems and other fields. As a country altogether are eager to sensitize the societies about the importance of environment, enact bylaws and open understandable environmental slogans</p> <p>As an advice to the world, EE should be an independent subject so that all communities bare it more seriously than the way it is embedded with other subjects</p>	<p>Teacher’s reflections</p> <p>Evaluation (Performance analysis)</p> <p>Making follow ups (monitoring)</p> <p>Teacher relation with students and school administration</p> <p>Community responsibilities</p>
	<p>School Administrators</p>	<p>18.Are there any additional opinions you would like to express as far as Environmental Education is concerned?</p>	<p>I like this EE, it helps students to acquire skills for taking care about our environment and in a sustainable manner</p> <p>I welcome you to visit our school and see how we are dealing with EE plans.</p>	