COLLEGE OF DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

THE PRACTICE OF ENVIRONMENTAL EDUCATION AND ITS IMPLICATIONS FOR ENVIRONMENTAL SUSTAINABILITY AWARENESS: THE STUDY OF ARADA SUB CITY HIGH SCHOOLS STUDENTS

BY

TEGEN ACHAMYELEW DESTA

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DECLARATION

This thesis is my original work and has not been presented for MA/MSC degree in any other university and that all the sources and materials used for the thesis have been properly acknowledged.

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APPROVAL SHEET

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As supervisor of the thesis, we certify that we have read and evaluated the thesis prepared by Tegen Achamyelew entitled "The Practice of Environmental Education and Its Implications for Environmental Sustainability Awareness: The Study of Arada Sub City High Schools Students 'and recommend for open defense as fulfilling the requirement for the degree of Master of Arts Degree in Environment and Sustainable Development.

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Final approval and acceptance of this thesis is contingent upon the candidate's submission of the final copy of the thesis, incorporating all the comments by Examining Board, to the Council of Graduate Studies (CGS) through the Academic Committee (AC) of the center.

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Abbreviations

BEACON	Building Energy Awareness Conservation
CCES	Climate Change & Environmental Consulting Services
CRGE	Climate Resilience Green Economy
CSA	Central Statistics Agency
EE	Environmental Education
EESP	Ethiopian Education System Profile
EFCCC	Environment, Forest and Climate change Commission
EPA	Environmental Protection Authority
ESD	Education for Sustainable Development
ESDP	Education Sector Development Program
FBE	Fana Broad Cast Corporate
FDRE	Federal Democratic Republic Of Ethiopia
GoE	Government of Ethiopia
MIWE	Ministry of Irrigation Water and Energy
MoE	Ministry of Education
N CCES	National Climate Change Education Strategy
NGO	Non-Governmental Organization
PACCIFY	Program for Awareness on Climate Change Issues Featuring
SDGS	Sustainable Development Goals
SWISS	Sensitization on Water Issues for School Students
UN	United Nation
UNEP	United Nations Environment Protection
UNESCO	United Nations Educational, Scientific and Cultural organization
UNFPA	United Nations Fund for Population Activities

Abstract

Fundamentally, the main objective of this thesis was to study the practices of environmental education and its implications on environmental sustainability awareness in Arada Sub City High Schools. The research was designed to identify challenges that secondary schools confronted while environmental education was executed. Moreover, to explore the level of environmental sustainability awareness among secondary schools under the study,the survey was conducted on 387 respondents of government and private high schools in Arada Sub City. In Arada sub city, the practices of environmental education were poor. Basically the study implies that in the study area environmental protection clubs were not effective in practicing environmental education. Accordingly students' involvement in the environmental related activities was very limited. In the practice of environmental education six major problems were identified. The seriousness of the challenges were as follows. Hence relative majority of students 42.7% replied absence of resource in secondary schools was found to be very serious problem. On the other hand 37.5% of the respondents answered low school administrative support was ranked as 2nd level problem to practice environmental education. Moreover, the curriculum related issues was the 3rd level problem with M=3.48 average rating to the problem. Furthermore teachers' commitment and methodological issues were ranked as fourth major problem and low student interest rated as sixth level problem. The overall qualitative and quantitative analysis of the results of the study revealed that students have moderate level of environmental sustainability awareness. The ANOVA test result was indicated lack of significant difference among students with different age levels and class level. It is also important to highlight that sex, grade level and age had no significant relation with environmental awareness. Special attention has to be given for environmental education in the new education system road map. Environmental conservation should be incorporated as 13th code of conduct. Environmental education must be given as autonomous subject in high schools. Ministry of education should allocate environmental education grant for high schools to overcome shortage of resources and greening school compounds.

Key Words: Environmental education, environmental awareness

CHAPTER ONE

1.1 Background of the Study

There is interdependence between human creature and the environment. The environment comprises of resources which are vital not only for survival but also imperative for feasible advancement and quality of life .However, at worldwide level, the environment is degraded, natural resources are harmed and contaminated. This occasion proceeds at an alarming rate without critical changes. Energy and bio diversity resources diminish soil as natural resources declines and all these harm human life itself (Yusup, 2019).

Sisitka, et al.,(2015) stated that Africa faces a number of issues that affect adversely the environment .Some of these challenges include expanded climate change, desertification of dry regions; deforestation; fast urbanization, over population, decrease of bio diversity, degradation of coastal and marine territories and contamination, expanded water shortage and poor quality financial execution, illegal trade, food insecurity and insufficient innovation base to full fill existing request to development. Numerous of these challenges have complex roots that are primarily related to insufficient environmental education as a driver for economical advancement and flexible ecosystems.

Hence the need for the establishment of the 17 Sustainable Development Goals (SDGs), among these goals, SDG4 is ‘’the education goal’’ .It aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. This is in line with Agenda 2063 of the African Union, which calls for action on catalyzing education and a skills revolution to build knowledge, human capital, capabilities and skills to drive innovations on the continent, improving quality of education, building capacity at all levels and enhancing public understanding and awareness of the sustainable development agenda (KMoE, 2017).

Academicians, intellectuals, scientists, policymakers, and governments all around the world are concerned about the environment. Environmental concerns have become more widespread and systematic over the world. The United Nations World Conference on the Environment in Stockholm in 1972, the Earth Summit in Rio de Janeiro in 1992, the Global Forum in 1992, and international NGO activities all indicate that environmental education is the vital schedule of international community (UN, 1997).

In recent years, increased environmental concerns have coincided with the rise of environmental education. In addition to school, family plays an important role in the development of positive environmental behavior in children. Environmental education may improve environmental literacy and offer information that goes beyond environmental knowledge (Spiropoulou, 2005).

Over the last 10 years, worldwide governments, legislators and education ministers have urged that their citizens' environmental literacy should be improved. Environmental education is regarded as one of the most effective means of instilling environmental knowledge, understanding and attitudes in students as early as elementary school in order to foster civic participation in the pursuit of sustainable development. The school inculcate students to increase new manner of social existence effectively form the society in sustainable manner and construct students' to behave as a role model (Edsand and Broich, 2019).

As a result, environmental education has been prioritized at international level. Environmental issues are being integrated into numerous disciplines at all levels of education in order to provide learners with appropriate information and skills for safeguarding and conserving the environment. It is one of the updated brand mechanisms to deal with the diverse effects of climate change and the various forms of environmental degradation that exist now. Environmental education is understood and emphasized as one of the handiest and rising concept to coupe up the complex demanding situations of the environment. The significance of environmental education in the educational device is to enhance the development of environmentally literate citizens who protect the environment where in they stay and in which future generation will also have to stay. Environmental education reveals its formal root in the United Nations Conference on the Human Environment in Stockholm of 1972 (Crompton and Kasser, 2009 cited in Bueno,et al.,2018).

As one guiding principle, Ethiopian Environment Protection Authority (EPA) clearly stated that each citizen has the right to stay in a neat and unpolluted environment that at once drawn from the constitution of FDRE (1995). Environmental duty and objective of the government, article 92/21(EPA, 1997).Moreover, the government of the Federal Democratic Republic of Ethiopia launched the Climate-Resilient Green Economy (CRGE) as a multi-sect oral initiative to protect the country from the adverse effects of climate change and build a green economy that will help to switch to a more sustainable development model by 2025. Accordingly, the country has launched a new national climate change education strategy that

seeks to create environmentally conscious citizens by2030. Every school in the country should be champion to build a climate-resilient green economy (CRGE, 2011).

The Ethiopian Ministry of Education emphasizes the importance of integrating environmental and sustainable development themes into the curricula at all levels of education. This strategy is backed up by the government's Climate-Resilient Green Economy (CRGE) project, which aims to protect the country from the negative consequences of climate change while also developing economy that will encourage and realizing its objective of reaching middle-income status before 2025 (Taye and Dereb,2015).

Furthermore, Degu (2013) claimed that Ethiopia is one of the most vulnerable countries to climate change as well as one of the most vulnerable to future repercussions of climate change and related disasters such as land degradation, deforestation, drought, rainfall variability, and climate-borne diseases. Therefore, education served as one of the tools to tackle a variety of environmental problems and schools have embraced their responsibility in integrating environmental and sustainability education into their curricula as well as community participation.

1.2. Statement of the Problem

The rationale and essence behind this study was the existing environmental challenges in which our planet faced. According to Praveen and Nasreen(2016) in the future the number of consumers will rise. This will have enormous impact on the world's existing resource base which is already under severe stress and dwindling at a faster rate than ever before as a result of rising population and ever-expanding human desires. By 2050, the human population will be expected to reach 9.07 billion, with 62 percent of the population living in cities of Africa and Southern Asia.

Likewise, major economic, environmental and social issues confront metropolitan regions preventing long-term development. One of the key factors impeding long-term urban growth is a lack of understanding about current environmental problems. Due to the fast industrialization, humanities are rapidly urbanizing and it is estimated that by 2030 more than 60% of the world population will be living in the cities (UNFPA, 2007).

Previous scholars (for example World Bank, 2019: Engida and Areaya, 2009: FAO, 2009 and UNESCO, 2016) found that over population, garbage disposal, pollution, soil erosion,

flooding, deforestation, and climate change are still serious environmental concerns. Moreover, Aschalew,et al., (2013): Gemeda (2015) and Yimam (2016) explained key environmental concerns in Ethiopia include overpopulation, waste disposal, pollution, soil erosion, flooding, deforestation, and climate change. The above-mentioned crises, in turn necessitate universal environmental education and research-based solutions to address these issues.

Many experts throughout the world, such as Hassa, et al., (2010): Ziadat, (2010) and others have researched the degrees of environmental awareness among various groups of people in different countries. So that everyone agreed on the importance of environmental education at all levels.

In the same way Shuite (,2017) argued that lack of environmental awareness is one of the primary causes of serious environmental degradation in Sub-Saharan African countries which is exacerbated by a violent of environmental challenges many of which are influenced by local, national and international economic factors. Ethiopia's economy like others in Sub-Saharan Africa is in a state of flux. To this end environmental education is one of the least studied fields in Ethiopia, despite the fact that the country is one of the victim countries that has suffered the most from the direct and indirect impacts of environmental problems (Damtew, 2008).

In line with, many of previous studies on environmental education were carried out of Ethiopia. Most of the researches conducted in Ethiopia focus on elementary schools. For example (Abshu.2002; Hailu, 2007; Damtew 2008; Belaynesh; 2010 cited in Degu 2013) and (Hussen, 2018). Majority of these studies were concentrating on content analysis. A few studies focus on tertiary level for example Belaynesh (2010). Even researches conducted on secondary schools were not representative like Degu (2013). Many of the studies have some common conclusions that the level of attention paid to environmental education is insufficient.

Researchers have also come to the same conclusion that the amount of attention given to environmental education is insufficient. Curricula from primary through tertiary levels place a greater emphasis on knowledge acquisition than practical activities. The majority of schools are still far away from being green schools, as a place where sustainability is no longer

observed. The schools are still restraining with challenges and problems related to environmental education (Degu, 2013).

In the practice of environmental education in Arada Sub City high schools, there were a low degree of student involvement in environmental related activities and difficulties in implementing environmental education. In this research there was interest to see how well students understood environmental sustainability and what factors influenced their awareness.Overall, these are the driving forces behind the study. Therefore, this study focuses on "The Practice of environmental education and its implications for environmental sustainability awareness of students in high schools of Addis Ababa, with special emphasis on "Arada" Sub City high schools students.

1.3 Research Questions

1. What are the challenges for the practice of environmental education in 'Arada' Sub City high schools in relation to the level of students' engagement in environmental related activities?
2. What is the level of environmental sustainability awareness of students in "Arada" Sub City high schools?
3. Do socio-demographic factors influence environmental sustainability awareness of students while environmental education practices are implemented in "Arada" Sub City high schools?

1.4. Objectives of the Study

1.4.1. General Objective

The general objective of the thesis was to study the practices of environmental education and its implications for environmental sustainability awareness.

1.4.2. Specific Objectives

1. To analysis challenges in the practices of environmental education in secondary schools in relation to the level of students engagement in environmental related activities.

2. To investigate environmental sustainability awareness level of students in “Arada” Sub city high schools.
3. To examine socio-demographic factors influencing environmental sustainability awareness of students in relation to environmental education practices.

1.5. Significance of the Study

This thesis aimed to study environmental education practices and its implication for environmental sustainability awareness. The thesis analyzed the challenges in the practice of environmental education and level of students’ involvement in environmental related activities. Moreover, the study also investigated the extent of environmental sustainability awareness of students. Furthermore, the thesis examined socio demographic factors influencing environmental sustainability awareness of students in eleven high schools of Arada Sub City in Addis Ababa. The study gave feedbacks to concerned environmental actors of the city in general and high schools in particular to evaluate past environmental education practices in high schools and identify further intervention areas. The study helped policy makers to draw lessons to environmental sustainability. The thesis served as a baseline data for researchers to strengthen the application of environmental education in high schools.

1.6. Scope of the Study

In terms of the scope of the study, Ethiopia's educational system encompasses a wide range of environmental education. It covers all grade levels from primary to tertiary education. It would be hard to evaluate each one individually in this thesis. As a result, the study focused on environmental education practice in high schools and its implications for high schools students’ environmental sustainability awareness in Addis Ababa, focusing on Arada Sub City high school students. As the core concern of the study analyzed the challenges in the practices of environmental education, the level of students’ involvement in environmental related activities, level of environmental sustainability awareness of students and examined socio demographic factors influencing students’ environmental sustainability awareness in the schools under discussion.

1.7. Limitation of the Study

The study’s major problem was the ease with which data was collected as well as some students' and school administrators' reluctance and unwillingness to complete the

questionnaires. Because of the Covid19 epidemic, conducting interviews was very difficult. Furthermore, the study had to deal with practical difficulties such as time restrictions and cost constraints.

1.8. Ethical Considerations

From the beginning to the end of the study, ethical issues were taken into account to safeguard the respondents' protection, integrity, anonymity, permission (for instance to dispatch questionnaires and to conduct interview) and other human factors, for example, the following research ethics were taken into account. To begin, first the researcher received letter from Center for Environment and Development, College of Development Studies, AAU, and gave a letter of support for Arada Sub City Education Office to obtain permission and command from the school directors and other relevant agencies. Second the researcher took eleven high schools as samples from twenty two high schools and spoke with the respondents' about their readiness to participate. Third, the study purpose was conveyed to the study participants in such a way that they understood it was purely for academic purposes and that their responses and names would be kept anonymous. Fourth, informed permission was obtained through oral approach.

1.9. Organization of the Study

The thesis was organized into five chapters. The first chapter covered the study's background, statement of the problem, basic research questions, objectives, significance, scope and limitations of the study and ethical considerations. The second chapter dealt with the literature review, which included conceptual and theoretical explanations concerning environmental education practice and awareness, empirical literature review, and research gaps in the study of environmental education practice in high schools. The study's methodology, which includes the research philosophy, sampling procedure, data sources, and research sample size and data collection tools were highlighted in the third chapter. In the fourth chapter data analyses and result interpretation were discussed. The study's fifth chapter focused on summary and conclusions as well as recommendations for improving environmental education and increasing students' environmental sustainability awareness in high schools.

CHAPTER TWO

2. Review of Related Literature

2.1. The Concept of Environmental Education

There is no commonly accepted definition of the word ‘’environmental education’’. Scholars on the other hand, defined the term environmental education in a variety of ways. For example, according to, Schmieder (2018) environmental education is concerned with the dynamic relationship between mankind and nature and it is geared towards improving the quality and existence of the environment.

Other scholars defined environmental education as a constructive and problem-solving teaching learning approach that improves people's knowledge, awareness, and attitudes resulting in behavior change. It fosters motivations, and commitments to make rational decisions and take responsible action toward the environment (Atlhopheng, et al., 1998 cited in Kennedy,2016 :Borah, 2007 cited in Muneer, 2016 : UNESCO, Tbillsi Declaration 1978 and Aklilu, 2010 cited in Shuite,2017).

Moreover, as a multidisciplinary institution, environmental education uses task-based learning mechanisms such as role modeling, direct field experience, collaborative, group debates, and role modeling to drive behavior change and master environmental sustainability. In other words, environmental education makes learning more concrete rather than abstract (Cited in Kanene, 2016).

According to Degu (2013) environmental education can be described in terms of objectives (what should be taught), technique (how it should be taught), and output to(for what effect it is intended to be taught).

Furthermore, it aids in the development of awareness and knowledge. Schools and other educational institutions serve as a focal point for raising environmental awareness. The school teaches students how to effectively develop new ways of social life and shape society in a sustainable manner as well as how to be role models (Bradley, Waliczek, and Zajicek cited in Edsand and Broich, 2019).

2.2. The Concept of Environmental Awareness

The word "environmental awareness" has a broad definition. The notion was observed by several researchers in various ways. Environmental awareness, for example, is defined as familiarity with an environmental subject combined with a true comprehension of its deeper causes and consequences (UNEP 1992). This shows how environmental understanding has a significant impact on environmental stewardship attitudes. It also has an impact on ecologically conscious behavior. The fundamental benefit of extensive environmental knowledge is that it contributes to popular support for government environmental policy and management initiatives (Fote, 2012).

According to Ziadat (2010), awareness refers to a level of empirical knowledge gained through one's perceptions, but it can also be considered synonymous with cognizance, which is the recognition of something sensed or felt. As a result, when it comes to the environment, assessing environmental awareness is the first step in determining the level of knowledge that various groups of people have about the severity of environmental problems and how they respond to or interact with their surroundings.

In the same way environmental awareness is described as being aware of and actively observing and comprehending one's surroundings. We create an awareness of environmental issues by analyzing various types of information. To be aware means to be aware of all the information we are currently exposed (Kamaruddin, et al., 2015).

Environmental awareness, on the other hand, is the ultimate driving force that initiates action. Basic attitudes about an environmental problem, factual and scientific information and a commitment to solve environmental problems. According to Hansman(2009) and Shobeiri (2005) resolving the current environmental issue necessitates environmental awareness and correct comprehension both of which should be thoroughly rooted in the educational system at all levels of school education (cited in Dhanya and Pankajam, 2017).

Environmental awareness is defined as understanding of the interrelationships between issues/problems and human life as well as how that information influences one's feelings, thoughts, behaviors and actions. Furthermore, environmental awareness can be considered a precursor for environmental literacy which is defined as a contextualized and nuanced grasp of topics and situations that enables one to address and make judgments in the capacity of a citizen. (Michael, et al., 2013).

Over and above it is possible to generalize that the term environmental awareness can be seen as integrated whole. The term has no common definition. Different researchers explained the term in various ways. But for the sake of this paper the concept can be described as critical observation of environmental problems and internalizing those challenges to develop environmental concerns. To the end it is about increasing environmental behavior and sensitivity.

2.3. Theories in Environmental Education

A. Place Attachment Theory

Pace attachment theory is linked to the concept of ‘'place identity” The concepts of ‘sense of community' and ‘sense of place' are regarded to have more relevance and implications for environmental education. This is due to the fact that studies have shown a link between a sense of place and ecologically responsible conduct (Degu, 2013).

There are four main assumptions of place attachment theories. According to the first assumption, "how you regard a landscape is determined by how you engage with it." However, communal as well as individual events shape one's sense of location. This means that strong ties to a location develop as a result of responsibilities and expectations. A hunter, for example, sees the landscape differently from a real estate developer.

Power is wielded in subtle ways here: our perceptions of a landscape are influenced by what other people say about it. That is to say, our personal judgments about a location are influenced by our education and other perspectives. The second assumption is that our sense of place is shaped not only by our interactions with landscapes but also by our social relationships with them. To put it another way, the environment has an impact on us. For example, creating meanings of "wilderness" in a polluted landscape where trees have been logged. The third assumption is that, while attachments and meanings to a location are subjective, they follow a predictable pattern. The use of sense of place methods can demonstrate how groups of people have a similar attachment to a location. The fourth assumption is that these attachment and meaning patterns might assist forecast specific forms of behavior, particularly during times of change or crises. This means that people's attachment to a location does not guarantee that they will seek to enhance it in the same way. Strong commitment to a location might also act as a deterrent to change (Masterson, et al,.2017).

According to Katsamagka (2013) place attachment entails personal growth as a result of the formation of a sense of place. Moreover, outdoor education experiences that include interaction, team-building activities, and cooperation are helpful in achieving social bonding as a dimension of place attachment. By spending quality time in nature, interacting with it and increasing knowledge of natural processes, the environmental approach to outdoor education can lead to nature bonding. Outdoor education is concerned with a location where children can spend time and obtain experiences in order to develop personally and socially. Furthermore, outdoor education provides students with a direct connection to natural places as well as opportunities for exploration and use of local places. Teaching in the outdoors involves using a specific location to achieve specific learning outcomes. Place-based education suggests incorporating the local community and environment into the school curriculum. In this way, schools can not only provide students with interdisciplinary and experiential learning but also encourage them to participate in their local community. Teachers can play an important role in providing a good education and a sense of place by taking students outside to experience whatever natural processes are available.

A stronger sense of environmental responsibility may result from place attachment. Integrating significant natural surroundings into cities can make residents' environmental stewardship more instinctual and linked to personal gain. People who have an emotional connection to nature and see natural surroundings as restorative, for example, are more likely to safeguard natural spaces and participate in pro-environmental activities. Visitation to a natural area on a regular basis may boost place identity as well as a sense of environmental responsibility. Individuals can develop a can-do attitude and feeling of self through volunteering and advocating for environmental restoration (Krueger and Flora, 2014).

B. Curriculum Theory

Curriculum's primary meaning is encapsulated in its Latin etymology from a course or path to be followed. According to Marsh and Stafford (1988) the word curriculum comes from a Latin root that means "racing course." He emphasized three aspects of the curricular concepts. To begin, they stated that a curriculum contains not only a syllabus or a list of materials but also a complete study of other factors such as goals and objectives, learning experiences and evaluation as well as recommendations for how to connect them for maximum effect. Second, curriculum refers to learning that is planned or intended and experiences that are unavoidably likely to occur in the classroom practices. Third, curriculum and instruction are inextricably linked. As Lovat and Smith (2003) asserted that curriculum is

an integral aspect of teaching, not something separate from it. The most widely accepted definition of curriculum is that it relates to a learning strategy. They pointed out, the main concern is not to arrive at a specific definition of curriculum rather, it is more important to be aware that curriculum means different things to different people (cited in Bediako, 2019**).**

According to Besong(2017) the degree of sustainability embedding in the curriculum might then be assessed using sustainability indicators, which represent how well the curriculum design incorporates the various parts of the green curriculum. The Green Curriculum Model combines content from several sources that is the sustainability thematic areas to be taught or the disciplinary themes that incorporate sustainability. Sustainability-related competences that allow students to achieve the required indicators competencies pedagogical methodologies principles such as aptitudes, attitudes, abilities, and knowledge to become change agents for sustainability in their communities and at work life. The Green Curriculum Model's central goal is to enable educators to infuse sustainability in a way that allows learners to: gain the knowledge, skills, and aptitudes to become sustainability minded citizens; understand the complex sustainability issues and challenges confronting human society at local and global levels; and take action to find solutions to the numerous sustainability issues.

Hence, Novo (1995) stated that greening the curriculum entails regularly aligning it with the ethical, intellectual, and methodological concepts underlying environmental education rather than just "adding" environmental topics to existing subject. Moreover, Garca (2000) suggests a greening of the curriculum, in which environmental issues are addressed in all decision-making processes as an educational premise… Competency in understanding and engagement with the physical world as well as social and civic competence are most closely associated to environmental education. To prepare our students to be citizens of the twenty-first century, we must look for example of effective projects that incorporate environmental education.

In addition, Jensen and Schnack (2006) the goal of environmental education is to empower students to conceive alternative forms of development and to participate in actions that support those goals. This necessitates a method of instruction that instills in students the confidence,. Furthermore, Pujol (2003) used the metaphor of infusion to explain the various ways in which environmental education can be introduced into the curriculum and daily life of the schools (cited in Conde&Sánchez ,2010).

Subsequently, Brown (2010) pointed out that learning outdoors can provide an educational atmosphere that encourages children and young people to create experience connections, resulting in a greater understanding of curricular topics and addressing learner needs. Outdoor learning will enrich the curriculum and make learning exciting, engaging and relevant for children and young people when employed in a variety of ways. Working to improve biodiversity in the school grounds, visiting the local woods, exploring and engaging with the local community and developing a school travel plan are all examples of how outdoor learning can deliver sustainable development education. Outdoor learning takes place in a variety of settings, including school grounds, historic grounds, local parks, national parks, villages and cities.

C. Constructivist Theory

The constructivist teaching approaches when employed in the teaching of environmental science can give students a broader perspective on the ways in which the various parts of our human environment interact with each other and equip students with the necessary skills and talents to become tomorrow's successful environmental managers which are sorely needed (Muradova 2009).

Individual students actively explore their surroundings by constructing cognitive structures or schemas based on their prior knowledge. Learning occurs through assimilation when these schemas are adequate to deal with a new object, circumstance, or difficulty. When a current schema is insufficient to cope with a new item, situation, or problem, a process of accommodation is necessary in which learners modify their previous schema to deal with the new object, situation, or problem. Constructivists' approaches identify activities that build on children's current knowledge match their developmental stage and push them so that they continue to learn through the process of accommodation and they continue to make progress. Individual and group problem-solving and project-based works are both appropriate. Younger pupils are given priority in concrete tasks whereas older students are given priority in symbolic and abstract activities (Westbrook, 2013).

Furthermore, according to Robottom (2004) "constructivism" as a set of theories about how learners learn focuses on how each of us constructs our own reality through a process of interpreting perceptual experiences of the external world in ways affected by our own biographies. By focusing on learners' misconceptions of scientific knowledge at least in its earliest conceptual transformation formulations, research on constructivism in science

education has implied the existence of an autonomous ontology of scientific subject at least in terms of learners' misconceptions of scientific knowledge. In general, current environmental education theoretical approaches aim for proactive, interdisciplinary, critical, holistic action-oriented and participatory inquiry.

In line with, constructivism is an essential theory of learning that is used to influence the creation of novel teaching approaches; particularly in scientific education…The essence of constructivism is that students actively construct knowledge. To put it another way, knowledge acquisition is a process of knowledge creation (Cunningham 1992). The essential tenet of this premise is that learners evaluate incoming information using previously learned knowledge. Learners use their past knowledge to connect new material to what they already know. Understanding subject matter becomes a function of knowledge building and transformation, rather than just information intake and accumulation… Constructivism is a school of thought that sees learning as a dynamic, contextualized, and constructive process. Constructivism is a reaction to behaviorism and programmed instruction as teaching methods. The learner takes on the role of information creator. Learners develop knowledge based on personal experiences and environmental theories. Learners develop or form their own subjective or objective reality on their own volition. Learners constantly test their assumptions and develop new information, rectify past knowledge or validate current knowledge through social bargaining. The learner connected new information to previous knowledge (Toddand Whitney, 2009).

2.4. Approaches of Environmental Education

So far Sobel (2004) elaborated that place-based education is a way of teaching concepts in various educational disciplines (e.g., language, mathematics, science, social studies and so on) by utilizing the local community and the biophysical environment as a teaching resource in order to provide learners with ‘hands-on', ‘real world experiences.' This method is thought to have a good impact on students' academic performance as well as their interpersonal relationship with the community, the natural world or the environment. Place-based education is a type of education that encourages students’ to actively participate and engage in various areas of their community such as social, cultural and environmental issues and challenges through various school topics (cited in Degu, 2013).

Apparently, cross-curricular approaches can be used to address environmental education. As a result, some components of environmental issues are included as examples or main topics

in the curriculum of several subjects whether in primary or secondary education. However, the objectives of these items may not meet the goals of environmental education and the environment. This method may not cover all necessary components to be addressed. Because the goals of these items may not align with the goals of environmental education and the amount of time allotted to those issues is limited.

Another way to give environmental education is to make it a separate subject in lower school or a course in higher education that is generic or common to all students in both lower and higher education. This method is preferable since it avoids the two issues described above. This means that if environmental education is taught as a full course, there will be enough time and space to present environmental issues, convey the importance of sustainable development, raise awareness of diverse sociopolitical and environmental interconnections and propose solutions to environmental problems as well as learners participating in environmental activities with their own consent because they would have sufficient understanding. But in both circumstances, mainstreaming environmental components through cross-curricular approaches should help the second approach in terms of environmental education principles (Shuite,2017).

In general from the above explanation one can simply understand that two main approaches used to infuse environmental perspectives. The first one is interdisciplinary approach, this is a mechanism where in concepts from different fields or subjects will be utilized to outline environmental perspectives. The second one is multi-disciplinary approach; here environmental topics are dispersed or infused into various single disciplinary courses. In other words environmental perspective is integrated into other field of studies.

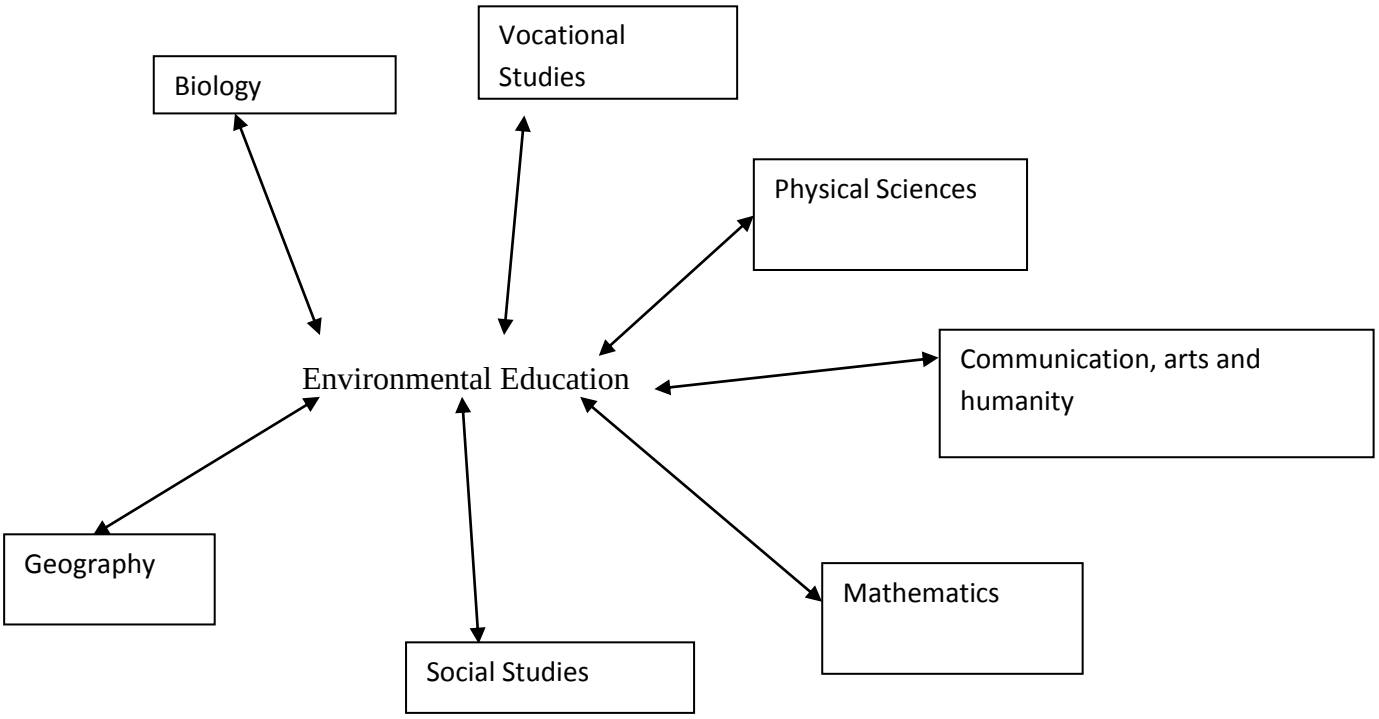

Figure 1: Multi-disciplinary and Inter disciplinary approaches of Environmental Education

Source: modified by researcher

2.5. Environmental Education Practices in Ethiopian High Schools

At a global scale, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) 2030 agenda, which also serves as the foundation for Goal 4 (Education Goal) of the Sustainable Development Global Goals (Global Goals, 2015), emphasizes the importance of integrating sustainability and global citizenship concerns into education in unique and innovative ways. According to UNESCO (2015), incorporating sustainability considerations into education at all levels should be regarded a fundamental component of quality education (Mandikonza and Sisitka, 2016).

Within the same angle of discussion, studies (example MoE 2010; Damtewu; 2007; Aklilu, 2012) emphasized that environmental concerns are currently expanding and becoming more complex. Despite the fact that environmental education is intended to be integrated into all school subjects in Ethiopia as a response to environmental challenges. However, the way it is conceptualized, planned and implemented does not provide sufficient support for appropriate environmental understanding and conservation. Ethiopian secondary school curricula are of

poor quality with few opportunities to incorporate vital environmental concerns. Curriculum restrictions and methodological faults have also been recognized as roadblocks to environmental education efforts (Hussen, 2018).

Given that environmental education requires more than just finding a place in a traditional academic-oriented school-based syllabus to achieve its goals which go beyond the mere acquisition of cognitive information to include practical skills and participation in environmental protection and development. The non-formal approach should be given as much attention as formal education.(Bangay, 2002).

Sundar (2010) believed that environmental education should be taught in a way that instills compassion, respect for living and non-living organisms, whole systems thinking, appropriate living habits and critical reflection. He said that environmental education necessitates a holistic, preferably interdisciplinary approach to teaching with possibilities for a wide range of learning and experiences with a focus on direct experiential learning. (Cited in Kanene, 2016).

Similarly, Hailu (2007) asserted that Ethiopia has included environmental education in its ongoing school curriculum since the 1980s in response to recurring environmental concerns and to raise public awareness of and care about environmental issues. Nonetheless, the country's environmental challenges remain severe. The current environmental education has been delivered using an infusion strategy with a concentration on the ‘’chalk and talk’’ system which emphasizes on root memorization of environmental facts. Schools parents and other adults have all made substantial contributions to providing pupils with the required information regarding environmental circumstances. The majority of students in the areas of Geography, Biology, Civics, and Ethical Education were aware of environmental knowledge. Environmental Education is not supported by the informal education system in all government schools and is frequently seen as secondary. Students on the other hand, expressed a greater concern for local and urgent concerns than global issues and they expressed a desire to learn more about local issues and difficulties. Furthermore, they are enthusiastic in collaborating with groups or clubs in their schools and localities to do things that benefit the environment. Nonetheless, a substantially higher percentage of students are unaware of any community or school-based environmental groups with which they can collaborate.

Furthermore, Hailu explained hurdles such as inefficient school environmental clubs, relatively limited roles of school environmental clubs, perceived difficulties in associating with clubs or groups and a lack of financial and skilled manpower hampered students' full engagement in environmental activities.

Previous studies such as Ferguson,(2007); Stevenson(2007); MoE (2010); Lydia (2011); Cheruto (2013) pointed out that environmental education is fraught with difficulties in developing countries including Ethiopia. Secondary school disciplines lacked appropriate substance that encouraged students to participate in fieldwork and practical activities with the community. Environmental education has not addressed all aspects of urban and rural life as well as technological, political, economic, social, aesthetic and ethical concerns. In addition the studies also investigated that the integration of teaching strategies such as lecture, guest speaker (direct) and question and answer, group discussions, problem solving, field trip and project method (indirect) which were supplemented by co-curricular activities such as club meetings, religious societies meetings is not properly implemented. Moreover, the studies indicated barriers include the effect of traditional schooling systems (e.g., promoting test achievement, standards and so on), a lack of teacher education and capacity to environmental education and unequal weighting of environmental education components in various disciplines. They also discovered that integrating environmental education into school subjects is unproductive.

Moreover, formal, informal, and non-formal education all play important roles in addressing environmental issues. Environmental clubs, for example, raise awareness of interdependence of people and the environment. Youth could be involved in community-based activities focused at conserving and promoting the natural environment through clubs. (cited in Hussen,2018),

With respect to this a civic association called Environment and Development Society of Ethiopia (LEM) is attempting to develop such environmental clubs in schools. In comparison to the extent of its potential, the influence achieved thus far is very insignificant. In India, experience has shown that a range of methods can be implemented in schools. There are "eco clubs," for example, that do activities connected to water conservation. Environmental assessments known as the GREEN Olympiad (an examination comprising of objective type questions that gauge the level of environmental awareness amongst studentsissues related to water, waste, energy, air, agriculture, urban landscapes, biodiversity, health climate change and sustainable development) Examinations are designed for middle and senior high school

students with higher ranking winners receiving scholarships. On national television, there is a quiz show called "terra quiz" that focuses on environmental issues. There is an organization called "Environ-Club" which started Internet-based environmental clubs. BEACON (Building Energy Awareness on Conservation) and PACCIFY (Program for Awareness on Climate Change Issues Featuring Youth) are also available. SWISS (Sensitization on Water Issues for School Students); National Green Corps (an environmental youth movement); Air quality monitoring and education etc… (Wheater and Dunleavy, 1995; Kneale, 1996., Cited in Daniel, 2009).

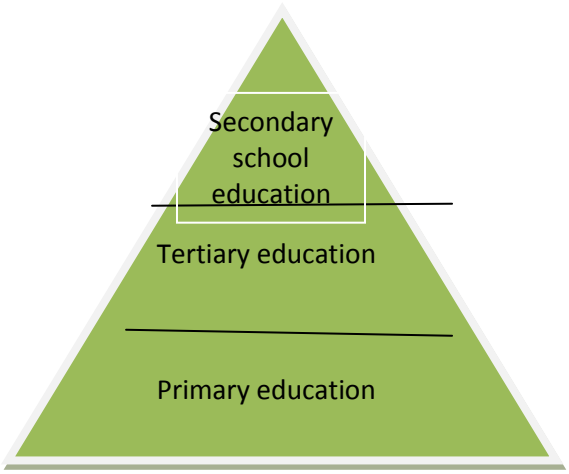

Figure 2： Environmental education implementations in Ethiopian education system

Source; designed by researcher, 2021

2.6. Major Challenges of Environmental Education Practices in High Schools

Environmental Education has raised many unanswered questions concerning environmental education programs, including concerning environmental education as part of the school curriculum. Most schools are still dissatisfied with environmental education which is only implemented through cross curriculum. Many teachers were given insufficient training in instilling environmental education in their students. In addition to having insufficient expertise in the sector, instructors' belief and willingness to infuse environmental education in classrooms were still low. Furthermore, teacher qualification is a challenge since teachers produce pupils who are environmentally literate. Several studies have also found that teachers do not use creative teaching strategies to teach environmental education. The lecture

approach is the most often utilized method, which they believe is the only method ideal for teaching environmental education to a big audience (Dhull, 2017).

Molosiva (2010) investigated outdoor learning which is the best way for teaching environmental education was not used by the teachers. Even though, 'environment as a subject has been introduced in some form or another in most school curricula, environmental education training has not yet find a meaningful position in the curriculum of teacher training courses. As a result, teachers are ill-equipped to deal with the new subject.

Furthermore, despite the fact that environmental education has been presented as an optional or elective subject in teacher training courses. Students do not believe it is as valuable as other subjects such as educational technology and multimedia education. Hence, it should be made a mandatory subject. Moreover, lack of resources and support from institutional management and other key agencies may limit teachers' access to training opportunities, resource and reference materials and ongoing support in implementing environmental education methodologies and activities in their classrooms.(Hasasn and Ismail 2011).

In line with Ethiopian reality also indicates one of the underlying causes of Ethiopia's significant environmental degradation is a lack of environmental awareness. Assessment of college curricula should reveal insight on the opportunities they offer to develop capabilities to address environmental degradation as teachers' colleges are a seedbed of such awareness (Daniel, 2009).

In parallel vein, Papadimitriou (1995) asserted that teachers confront the following challenges while using environmental education: 1) their fear of disrupting established timeframes; 2) negative attitudes from colleagues; 3) lack of experience with novel approaches; 4) lack of assistance; and 5) lack of confidence working in an unstructured process.(Paredes -Chi 2015).

In other studies (example Goldman andPe'er, 2009 ;McKeown and Hopkins 2002; Waktola, 2009)explained that pre-service teacher education is insufficient to provide prospective teachers with environmental education,. Teacher trainees lack adequate knowledge. They did not appreciate environmental policies and programs, Teacher education is critical in ensuring that instructors have sufficient knowledge of and favorable attitudes toward environmental issues (Artun ,et al.,2017).

In addition, studies in secondary schools (example Taiwan) asserted that environmental education were not prioritized in many secondary schools Therefore, there was no systemic

environmental education curriculum (Yueh 2010). In Tanzania research that was done by Mwendwa (2017) discovered that there was weakness in the curriculum when it came to implementing Environmental Education.

Similarly, Okoth (2014) carried out research in secondary schools in Siaya County, Kenya, in the study the role of head teachers in providing environmental education instructional materials in secondary schools were investigated. The study looked at the amount of instructional tools available in environmental education. National parks, museums, labs, computers, projectors, video/films, radio, charts, and textbooks were among the tools used. The study discovered that having these materials available aided learning and enhanced students' environmental behavior (Gilbert, 2019).

According to Bekalo and Bangay (2002) people should be equipped with the essential information and skills to face development challenges. Academics in Ethiopia say that any type of responsive education cannot ignore the wider and more painful socio-demographic realities and issues, in a largely subsistence agrarian country like Ethiopia, where environmental degradation has a significant influence, It is predicted that environmental education will play a vital role in enabling the general public to make informed decisions and practices that will lead to more sustainable lifestyles. It must be recognized that increasing educational offerings alone, as is customary, will not be adequate to attain the aim of universal basic education. Education must also be practical and meaningful to the learner to publicize their accomplishments, particularly for those living in hardship... The curriculum does not appear to be capable of preparing students for a meaningful and constructive community life. Local knowledge is especially important in environmental education since there is nearly always a wealth of local expertise to draw from. Therefore, teachers and students attitude, administrative support and curriculum design are major challenges that influence the implementation of environmental education.

2.7. Environmental Sustainability Issues Awareness Level of High School Students

Environmental education assists students in identifying the symptoms and root causes of environmental issues as well as developing critical thinking and problem-solving abilities and employing a variety of teaching methodologies (Kedir, 2010). In addition Shuite (2017) explained that every country of the world should create environmentally literate citizens

who are equipped with environmental knowledge, skills, attitudes, behavior and ethics; these can be addressed through environmental education.

Moreover, Shuite underlined the importance of incorporating environmental education for sustainable development within the country's curricula in order to improve environmental knowledge, skills, attitudes, and behaviors .Environmental education is advocated not only for a single country but for all countries around the world whose educational systems do not include environmental education as part of their environmental literacy curriculum. For this reason, the ministry of education, higher education institutions and other stakeholders such as environmental NGOs can work together to develop environmental education.

In the case of environmental pollution, man is causing great damage on the atmosphere, water, land, and numerous parts of the environment as well as the ecosystem itself. In respect to students' awareness level about environmental pollution Kedir's (2010) stated that the majority of students at Kombolcha Secondary School in South Wollo, Amhara region, were becoming more aware of industrial waste contamination.

Our atmosphere is extensively contaminated on a global and regional basis. Greenhouse gas emissions will cause significant changes in weather patterns in the near future resulting in global warming. The destruction of the ozone layer and continued warming of the earth's surface threaten catastrophic consequences such as the emergence of tropical diseases, disruption of the ocean's food chain, rising sea levels, submersion of many islands, melting of small land-based glaciers, flooding in many low-lying coastal areas and harvest loss, among other things(Appannagari,2017).

Regarding pupils' awareness of the effects of global warming on climate change, even though students' awareness of the effects of global warming on climate change is growing, researches indicate that students do not have a thorough understanding of climate change (Oruonye,2011; Rahman,2014 cited in Arega,et al.,2019).

Essentially Conservation awareness education, as part of a broader sustainability strategy is crucial to the success of conservation activities around the world. It teaches people of all ages around the world how to appreciate and comprehend natural resources as well as how to preserve them for future generations. In this regard, research findings on forest conservation revealed that, despite the fact that secondary school students have a strong desire to protect the environment, they are unable to do it (Orimaye, 2015).

Eco-Clubs are student-run organizations that strive to raise environmental awareness among high school and college students. They work under the assumption that learning is more permanent and improved during childhood. Studies focused on the activities of Eco-Clubs indicate their importance in instilling environmental awareness (Gupta**,**et al.,2014).

Provided that biodiversity resource conservation is viewed as a critical component of sustainable development and an important aspect of biodiversity education. The loss of biodiversity is mostly caused by a lack of information and societal attitudes toward biodiversity conservation. To address the issue of biodiversity conservation, education can play a critical role in influencing public opinion. However, due to a number of issues, it may be stated that present education has not resulted in the predicted shift in knowledge and opinions about biodiversity conservation among students in secondary schools (grade 10) in the research region Fenetahun and Eshetu, 2018).

As far as green long-term energy is concerned, alternative energy from renewable sources such as wind, geothermal, solar, biomass and energy efficiency measures will be a key part of Ethiopia's energy mix and will be integrated with the country's new Climate Resilient Green Economy (CRGE) Strategy which has the ambitious goal of transforming Ethiopia into a climate resilient green economy by 2025 (FDRE MWE, 2012).

Up on these studies for example, Salih and Turanre(2018) revealed students' understanding of renewable energy sources was intermediate with a substantial link between cognitive and affective awareness. Moreover, in order to increase students' awareness level, it would be beneficial to prioritize student-centered teaching approaches and enhance field trips to regions where renewable energy sources and their applications may be viewed as a solution to the energy challenge that we will undoubtedly confront in the future. In contrast to these studies secondary school students had a low level of awareness about renewable energy sources and saving (Aktamis, 2011).

Consequently, FDRE MWE (2012) clearly underlined many aspects of the current energy supply and use pattern are unsustainable. The energy crisis in Ethiopia is caused not by an over-reliance on non-renewable energy sources but by the fact that the population's primary source of energy, fuel wood is being consumed at an unsustainable rate. Despite the vast potential of other renewable energy sources (solar, wind, geothermal and hydroelectric) sustainable energy remains virtually undeveloped.

In general secondary schools should teach pupils about the advantages and disadvantages of renewable energy technology in order to ensure that energy development is both economically and environmentally sustainable.

2.8. Empirical Literature Review

Previous studies such as (Wolwick, 2014; Mutisya and Baker 2011) underlined that environmental education's significance and value as a tool for increasing awareness and understanding of the evolving social and physical environment, encompassing natural, manufactured, cultural and spiritual resources. The conservation of these resources is useful for national development. This means environmental education empowers people to make informed judgments. Environmental education is one of the solutions to the world's growing environmental problems. It allows students to gain knowledge and skills that will help them develop a positive attitude towards environmental conservation. The majority of governments have adopted environmental education in order to promote environmental literacy among their citizens, in response to proposals made at the Tbilisi and Moscow summits in 1977 and 1987respectively (Glackin 2001, cited in Gilbert, 2019).

According to Sulaiman and Natarajan (2009) environmental education at the school level is one of the ways to instill a concern for environmental protection and conservation in the next generation. However, environmental education policies in schools have not progressed beyond the chalkboard. Ethiopia is not immune to such environmental issues and school-based environmental education has not produced the desired results.

In similar vein of discussion empirical researches such as Yustina et al. (2010); Roswita (2010) and Manurung (2011) demonstrated that incorporating environmental subjects into the learning model can help students develop a positive attitude toward the environment. Moreover, teachers are encouraged to use their creativity when creating learning media. Using the constructivism learning methodology, students can develop a positive attitude toward the environment. Students' environmental awareness and attitudes should be improved. Extracurricular activities encourage students to be environmentally conscious. Furthermore, extracurricular activities such as garbage collection, plant cultivation, energy and water conservation training and other social activities with local communities can effectively motivate students to be actual problem solvers on environmental issue. However, the creation of environmental-based curricula is still incomplete, ineffective and inefficient (cited in Musthofiyah and Lailiyah, 2015).

On the other hand, Suhadi and Parker(2020) stated that although most students identify as environmentalists and value the environment, their environmental behavior is heavily influenced by their home lives. Both schools and students must deal with a broader socioeconomic framework that is pro-development and concerned about the environment. Students have a limited comprehension of complicated global environmental issues and their causes.

In the same way, the former Ethiopian Environment Protection Authority (EPA) formulated a new environmental education and awareness policy. It was one of the cross-sect oral strategic policies in the 2002 strategy. In that section, special attention is paid to fostering the integration of multi-disciplinary environmental education across a variety of educational disciplines at all levels of education...The Environmental Protection Agency (EPA) devised a system for inspection and monitoring that included multiple tiers of offices. The agency works at multiple levels to monitor and inspect various ecologically related activities that are taking place at the school level (especially the environment club activity), the institution level and the city level... In order to be prioritized in the curriculum building process, the EPA collaborated with the MOE (Degu, 2013).

As a principle, the government has accepted essential international frameworks for combating climate change including those that promote climate change education as a major instrument in the fight to minimize global warming. Since 2011, UN CC Learn has worked with poor nations such as Benin, Burkina Faso, the Dominican Republic, Indonesia, Malawi, and Uganda on climate change education projects. The program has been running since 2014. Following increased funding from the Swiss government, the program has grown even more allowing support to be extended to a number of other nations, including Ethiopia. Several current international frameworks like the UNFCCC, Kyoto Protocol, ESD, SDGs and the 2015 Paris Agreement support the desire to integrate climate change teaching into formal education with the schools as entry points is a strategy that is also relevant to Ethiopia (CCES, 2017).

Accordingly, Ethiopia is also taking serious initiatives to include climate change education in school curricula. The Ethiopian government led by the Ministry of Education, announced a curriculum reform process in the beginning of 2019, shifting from the previous "8-2-2" system which has been in existence for well over two decades to the "6-2-4" system...with the development of the new “Ethiopian Education Roadmap”. The organization has been

modified to primary (Grades 1-6), junior secondary (Grades 7-8) and secondary (Grades 9-12) with the curriculum being updated accordingly. In Ethiopia as in most other countries, the general education curriculum is based on a set of educational priorities that represent macro-level relationships between education and the economy as well as national development policy objectives. To this purpose, it aims to bring together the government's broad national vision and general development goals with the more specific demands of various interest groups, local communities and learners' development ambitions and needs (UNCC 2020).

It is crucial to highlight that Ethiopia has made various attempts to establish environmental education initiatives. However, according to Degu (2013) several challenges obstruct Ethiopia's efficient implementation of environmental education. Among them include a lack of practical activities and direct touch with the natural environment. Environmental Education receives very little attention in terms of teaching approaches and contents.

Awan and Abbasi (2013) explained that the power of awareness can be broken down into three categories. Environmental beliefs, factual and scientific knowledge and a dedication to solving environmental problems are all required. Students will become more knowledgeable as a result of their increased awareness. Environmental awareness and attitudes among students have been studied in a variety of ways as part of environmental education.

According to Ziadat, (2010) education, age, sex and income/wealth levels are socio-demographic characteristics that influence customer perceptions and attitudes about "Sustainable Development Strategies" like climate change education. In terms of education, higher-educated people are more likely to be aware of climate change education and to support sustainable practices than lower-educated people. Education plays an important role in raising environmental awareness.

In the similar vein, Appannagari (2017) argued that the greater one's education, the greater one's environmental knowledge, cognitive abilities and attitude. Adult education, short-term training and workshops are alternatives to the formal education system for increasing environmental awareness.

According to Abdul-Wahab and Abdo(2010) environmental awareness was also found to be related to sex. There was, however, a distinction between male and female. Males were found to have a higher level of environmental knowledge than females. Males were also more concerned about the environment and engaged in more environmental behaviors than females. Sex has also been extensively researched as a factor influencing environmental

attitudes with females being more inclined to protect the environment than males. Studies on the influence of sex on environmental perceptions and attitudes have been inconclusive (Dlamini,et al.,2020).

Moreover, Degu (2013) pointed out that there was a difference in environmental awareness between male and female students as well as the age of the students. In contrast, research on environmental awareness such as Parwati1(2020) found that sex has no impact on pupils' environmental literacy. Similarly, Kedir (2010) argued that there was no significant variation in environmental awareness among students based on sex.

Furthermore, earlier researchers such as Kedir (2010) have shown that age differences may have their own implications on students' overall environmental awareness. To this end, other researchers have also found out that age has a strong correlation with environmental attitudes. Younger people are thought to have less stringent environmental views and lower levels of environmental concern. Moreover, Honnold (1984) discovered decreased levels of environmental concern in almost all age groups since the 1970s in a study of cohort group differences in environmental concern.

Similar studies conducted in secondary schools found a statistically significant effect of age on pupils' general environmental awareness. The findings revealed that as one's age and degree of education rises, so does one's environmental knowledge and attitude (Aminrad, et al.201). Only 10% of Ethiopian youths in the proper age cohort engage currently participated in the upper education begins at 17 years old (EESP, 2018).

Therefore ,this study sought to document the practices of environmental education , challenges in the practices of environmental education , the level of students engagement on environmental related activities, socio demographic factors influencing environmental sustainability awareness and students' environmental sustainability awareness level in Arada Sub City high schools and made recommendations on environmental education practices and its implication for environmental sustainability awareness based on the results under discussion.

2.10: Research Gaps

In 1994 Ethiopia launched its education and training policy which includes the following general and specific objectives for the environment in general and environmental education in particular: Cultivating citizens' cognitive, creative, productive and appreciative potential by

appropriately relating education to environmental and societal needs and providing education that can meet those needs and offering education that may develop individuals with national and international environmental perspectives as well as conserve the country's natural resources and historical heritages Transitional Government of Ethiopia/(TGE, 1994).

As a result of this policy, new curriculum for Ethiopia's educational systems various levels were developed. The environmental science course, which is provided throughout the first cycle of elementary school, is one of these curricula (i.e., Grades 1 to 4). This policy action is reinforced by Ethiopia's environmental protection apparatus which has been in effect since 1994.A three-stage approach focusing on constitutional reforms, policy measures, and legislative measures distinguishes this system. Articles 44 and 92 of Ethiopia's 1994 Constitution, for example, provide that all citizens have the right to live in a clean and healthy environment. Ethiopia's environmental policy and conservation strategy have been approved. Ethiopia enacted an environmental policy and conservation strategy in 1997 that recognizes and addresses environmental challenges holistically. Environmental protection laws provide strength to Ethiopia's environmental objectives set forth in the constitution, environmental policy, and conservation plan, as well as those set forth in international environmental conventions (UNEP, 2008, cited in Temechegn and Solomon,2009).

In general researches indicate that Environmental Education is least studied area in Ethiopia (Damitew, 2008; cited in Degu, 2013). Thus, this study targets to investigate the practices of environmental education and its implications for environmental sustainability awareness. The study was conducted in eleven selected private and government secondary schools of Addis Ababa in Arada Sub City.

2.11. Conceptual Framework:

It demonstrates how the independent and dependent variables are related. Marshall and Rossman (2016) defined conceptual framework as "the study's rationale." In the form of a schematic diagram, graph, or narratives, the conceptual frame work explains the factors, concepts, or variables under investigation (Cited Craw ford, 2020). To put it to the point, it is the entire image of the research.

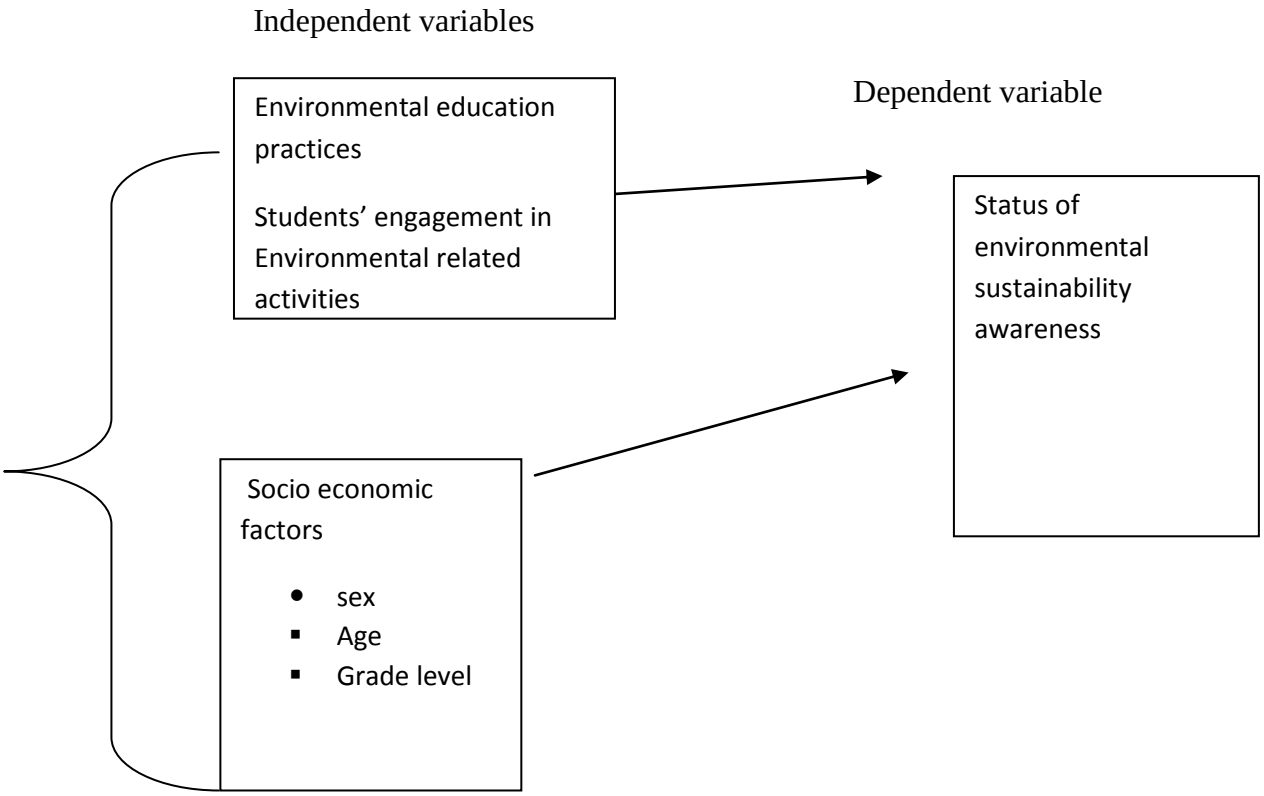

Figure 3: Conceptual frame work of the study, designed by the researcher.

CHAPTER THREE

3. Research Methodology

This chapter covered the following topics: study area description, research Philosophy, study population, sampling procedures and study sample size. It also included data gathering tools and procedures as well as data analysis methodologies. The study focused on high schools because this is where the majority of the youth population resides and where they are most active. According to CSA (2013/14), statistics data, around 56 percent of Ethiopia's population is under the age of 22. As a result, improving environmental education in general and climate change education in particular is critical to Ethiopia's goal of becoming a green and resilient economy by 2030 and beyond (UNCC,2020).

3.1. The Study Area

Arada is one eleven sub cities of Addis Ababa, the capital of Ethiopia. Since it was constructed recently 20 October 2020, the additional one named "Lemi Kura" is not included in the map.

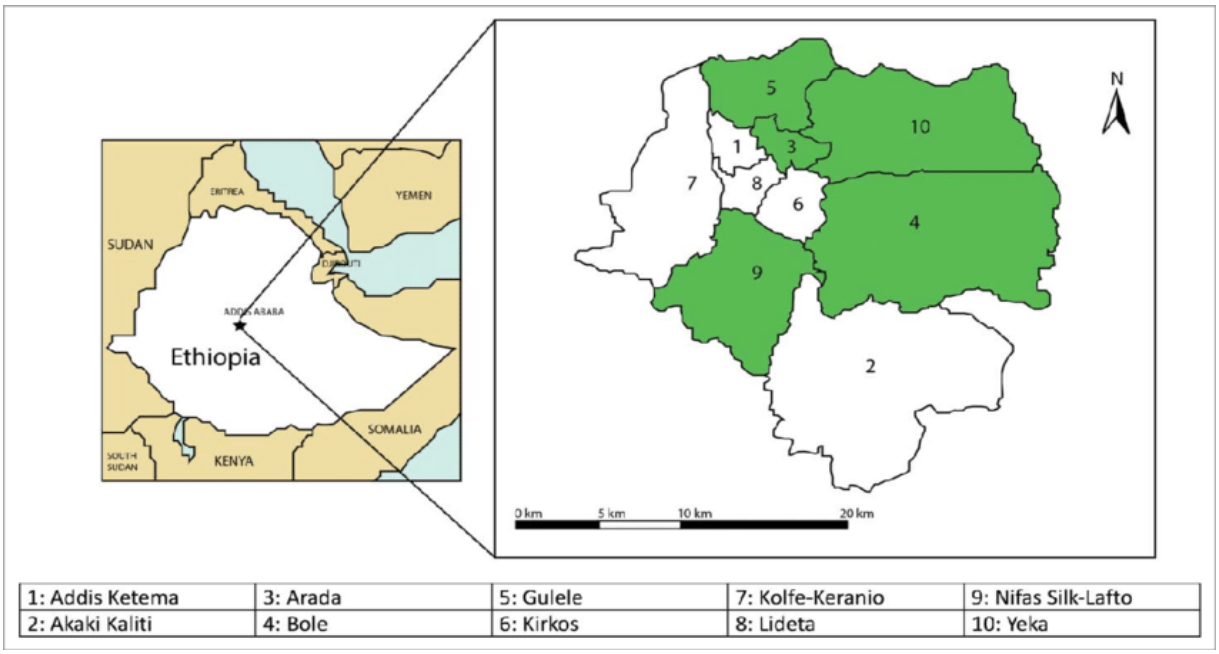

Figure 4: Geographic Map of Sub Cities of Addis Ababa

Source: Boulton, 2018

Figure 5: Photograph of Addis Ababa City, Overview

Source: Fana Broad Cast Corporate (FBC, 2020)

Arada Sub City is located in the northern part of the city, close to the center. Gullele, Yeka, Kirkos, Lideta, and Addis Ketema are its neighboring sub cities. Arada is known as the cultural, social and urban epicenter of both the old and new generations. Arada Sub City is selected among eleven sub cities purposely, because it is the place where early urban settlement took place and ``environmental metamorphoses" occurred. In the sub city there are seven governments and fifteen private high schools (9-12), a total of 22 High schools. Regarding number of teachers, administrators and supervisors, number of female=153 and number of male=614 total=767 in both private and government high schools. As far as the number of students is concerned, there are about 9785 students .Out of the total figure , the number of male students =4786 and female students =4999 (51%).

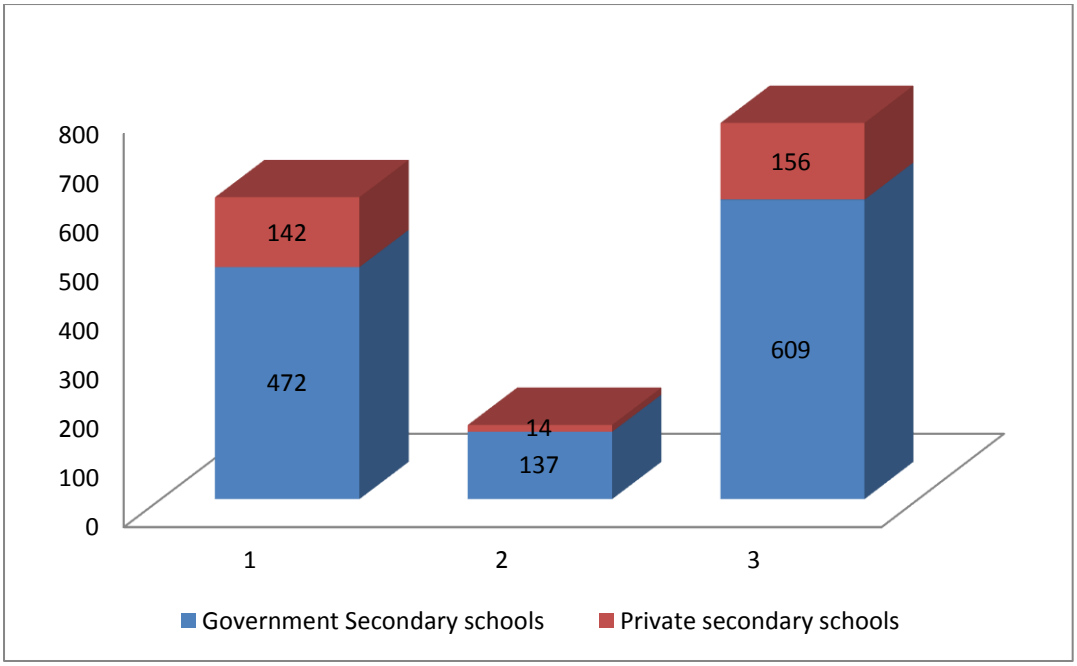

Figure 6: Summarized data of Arada Sub City government and private high schools administrators, teachers and supervisors

Source: Arada Sub City Education Office (2020/21 data)

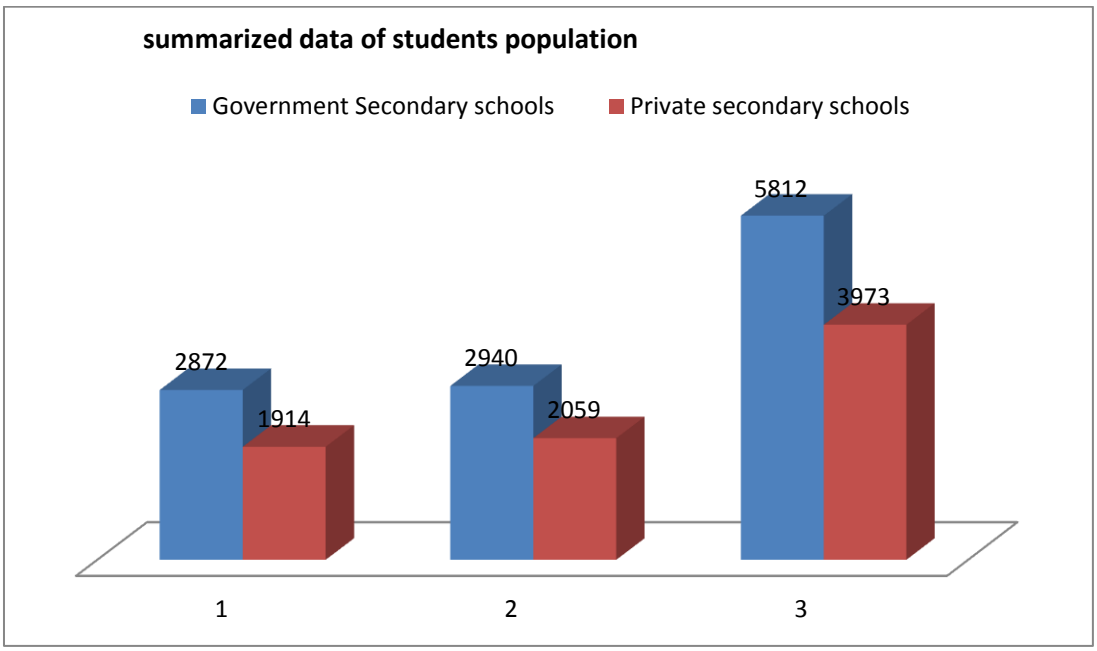

Figure 7: Summarized data of students' population

Source: Arada Sub City Education Office (2020/21 data)

3.2. Research Philosophy

The study took the form of a descriptive survey. This was useful in establishing the relationship between preconceived environmental practices; challenges influence the implementation of environmental education, and implications for high school students' environmental sustainability awareness in Arada Sub City. In addition, the survey design was chosen because it is a popular method.

3.2.1. Sources of Data

The purpose of the study was to gather data from students, environmental patron teachers and principals in government and private high schools in the study area. The use of primary data sources was implemented. Questionnaires for high school students and semis structured interviews with environmental protection club patron teachers and school principals were used as primary data sources.

3.2.2. Population Sample Size

Data was collected in eleven government and private high schools. Then from the total number of twenty two high schools, eleven high schools were selected randomly by employing a lottery system. That is the names of all the twenty two high schools were written on separate papers, rolled out and put in a bowl. Then twenty two draws were made to select the eleven high schools. Data was collected in all eleven government and private high schools. Then from the total number of high schools eleven high schools were selected randomly. Sample size was determined statistically using Slovin’s formula in determine sample size. This formula is used when the researcher have no enough information about a population's behavior.

$N=N/1+n(e)2$

Where N= the population size

E= margin of error denoted the allowed probability of committing an error in selecting a small representative population.

The following figure shows students population data obtained from 11 government and private high schools and determined sample size of the research i.e 387

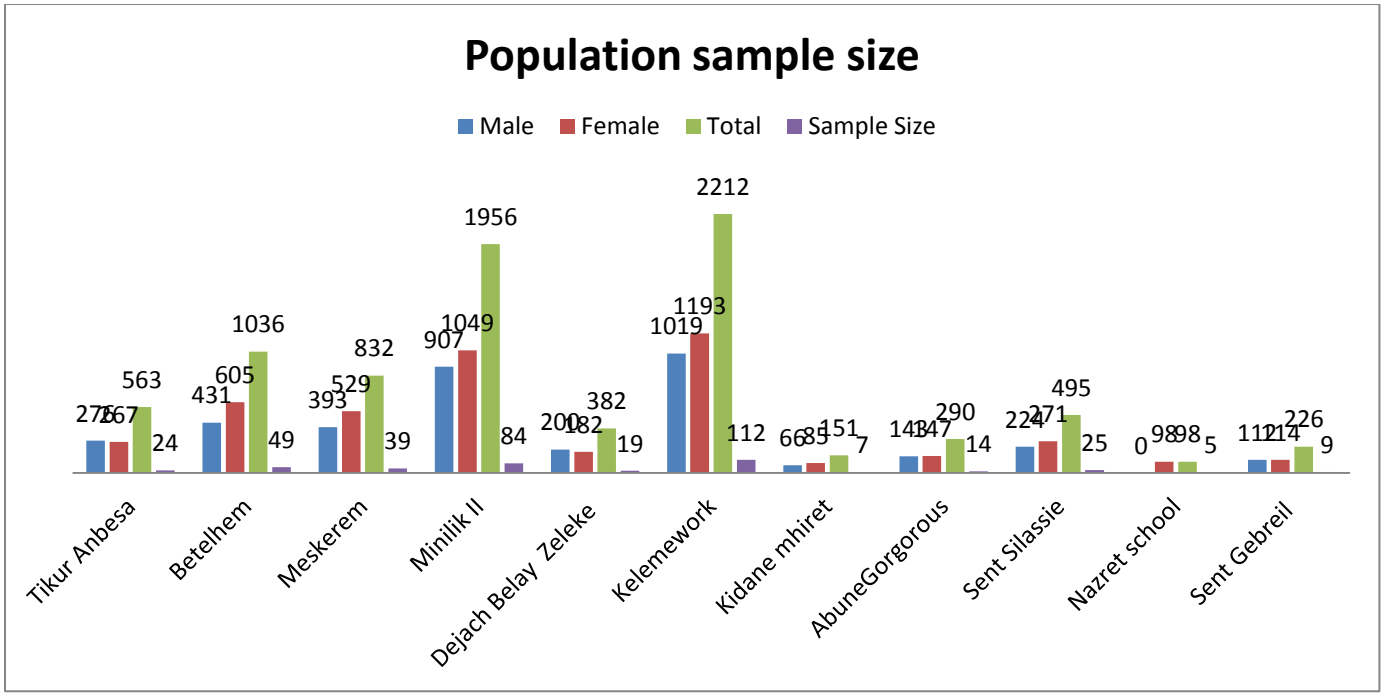

Figure 8: Population Sample Size

Source: Arada Sub City Education Office (2020/21 data)

3.2.3. Research Instruments

The study's goal was to gather data from students, environmental patron teachers and principals in public and private high schools in the area under consideration. The use of primary data sources was introduced. Questionnaires for high school students and semis structured interviews with environmental protection club patron teachers and school principals were used as primary data sources. Advisor framed, reviewed, and approved the questions. The questions were written in such a way that they would elicit responses that would reliably answer the study questions. A scale was provided in the questionnaire which consisted of a set of items with no right or wrong answers. The Likert scale was a 1 to 5 scale. Then the English version of the questionnaire was then translated into Amharic to make it more understandable and appropriate for the target population. In translating, the researcher used advisor's views and recommendations as well as professional assistance from peers. Moreover, pilot studies were conducted in Menilik II high school. Finally, the researcher devised a semi-structured interview for school principals and patron teachers of environmental protection clubs to investigate responses.

3.4 .Sampling Procedure

Sampling is the process of selecting a subset of the population on which to conduct research in order to ensure that the study's findings can be applied to the complete population. I used simple random sampling, when I select students' respondents to complete the questionnaires .This is a method of probability sampling. One of the finest probability sampling approaches for saving time and money is simple random sampling. It is a reliable method of obtaining information where every single member of a population is chosen randomly, merely by chance (Taherdoost, 2020).

3.5. Data Analysis

The research used a combination of quantitative and qualitative data analysis methods. In the instance of quantitative research data was collected and analyzed using descriptive statistics and the Statistical Package for Social Science (SPSS version 20) .The underlying study variables were subjected to descriptive statistical analysis to extract frequencies, percentages, means, and standard deviations. Environmental education practices, students' involvement in environmental related activities, obstacles impacting environmental education practices and socio economic factors influencing environmental sustainability consciousness of students are some of the underlying study variables. For sex, an independent sample t-test and for age and grade level one-way ANOVA were used respectively. To present the data, tables were employed. The interview data analysis result which is supplemented by the descriptive statistics analysis findings, explicitly addresses the study issues.

Moreover, Cronbach's alpha was used as part of this data analysis, to examine reliability test. Cronbach's alpha is the most often used internal consistency metric ("reliability"). It is most typically used when a survey/questionnaire contains numerous Likert items that build a scale and to see if the scale is dependable Whitley, 2002 and Robinson, 2009 (cited in Taherdoost, 2016).

In the pre test to determine the survey instrument's internal consistency and confirm the sample's suitability a total of 40 people were chosen at random. Then, for each group of questions in the survey instruments, Cronbach's alpha was calculated. The Cranach's alpha statistic was computed as shown in the figure below.

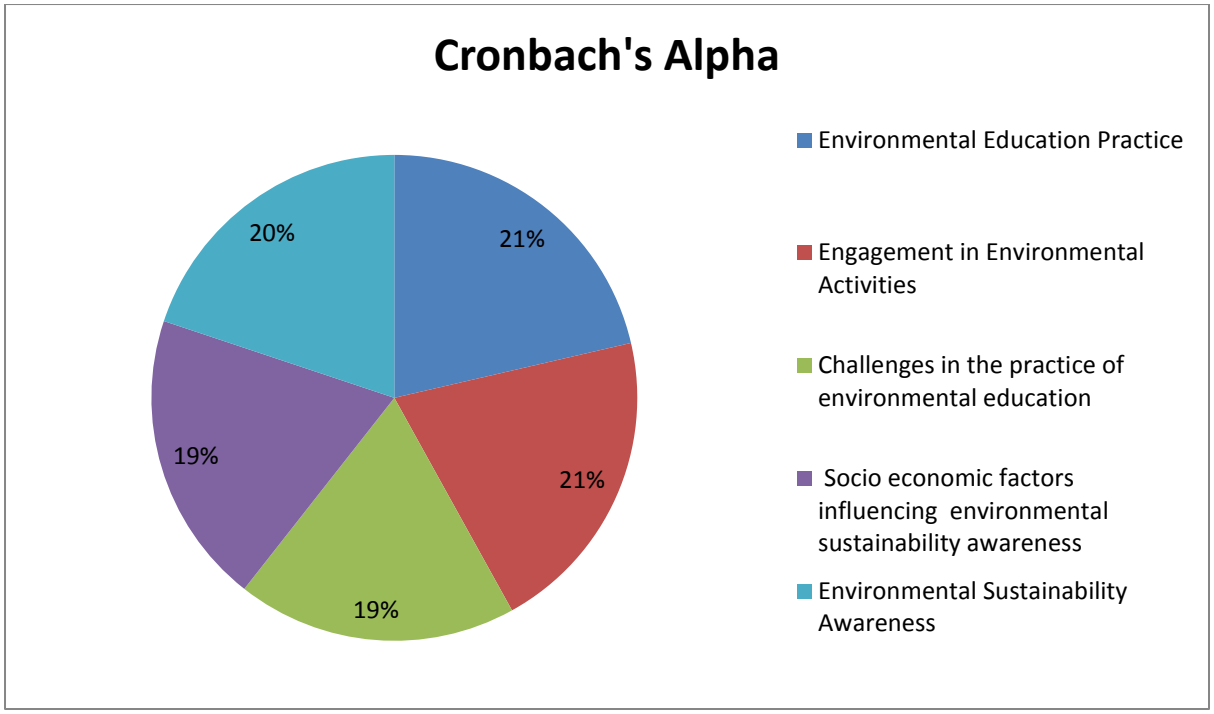

Figure 9: Reliability Analysis

Source: (Own survey, 2021)

Cronbach's alpha statistic had to be greater than 0.70 to be considered acceptable. As a result, the survey instruments' internal consistency was satisfactory. Hence, the Kaiser-Meyer-Olkin(KMO) test was used to determine the sampling appropriateness of data for factor analysis. This test was designed to confirm that the variables used to assess a specific idea were indeed measuring that concept.

Table 3.1. KMO and Bartlett's Test Result

Statements	KMO	Bartlett's Test of Sphericity		
		Approx. Chi-Square	Df	p-value
Environmental education practice	0.807	73.830	10	0.000
Engagement in environmental related Activities	0.767	49.157	6	0.000
Challenges in the practice of environmental education	0.706	47.653	15	0.000
Socio economic factors influencing environmental sustainability awareness	0.636	32.873	3	0.000
Environmental sustainability awareness	0.750	67.150	21	0.000

Source: (Own survey, 2021)

The KMO test allows us to assess whether or not the data we have is suitable for running a factor analysis. The calculated statistic is a scale of 0 to 1. The statistic is simple to interpret; the closer it gets to 1, the better to run frequency distribution analyses in SPSS.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Introduction

The analysis, interpretation, and presentation of data were the focus of this chapter. This thesis data analysis and interpretation part has six primary components. The respondents' socio economic information was presented in the first section of the study. Secondly, the practice of environmental education and engagement of students in environment related activities. Thirdly challenges impacting environmental education practices. Fourthly, students' environmental sustainability awareness level. Fifthly, socio-demographic aspects (sex, age, and grade level) that influence students' environmental sustainability awareness. The final portion compared environmental education practices, students' in involvement in environmental related activities, and environmental sustainability awareness level with socio economic factors that influence students' environmental sustainability awareness. As a result, the data for the analyses came from a questionnaire that 387 students were asked to fill out and return. Among 387 students who took part in the survey only 379 students were completed and return the questionnaires. Thus the questionnaire response rate was 97.9%, which was high enough to allow the data analysis to proceed.

4.2. Socio-Demographic Profiles of the Respondents

The respondents in this study were high school students who were selected from eleven government and private high schools of Arada Sub City. The sample consisted of 387 students participated in the survey. The sex, age and grade level distribution of the respondents were presented in figure 4.10 below.

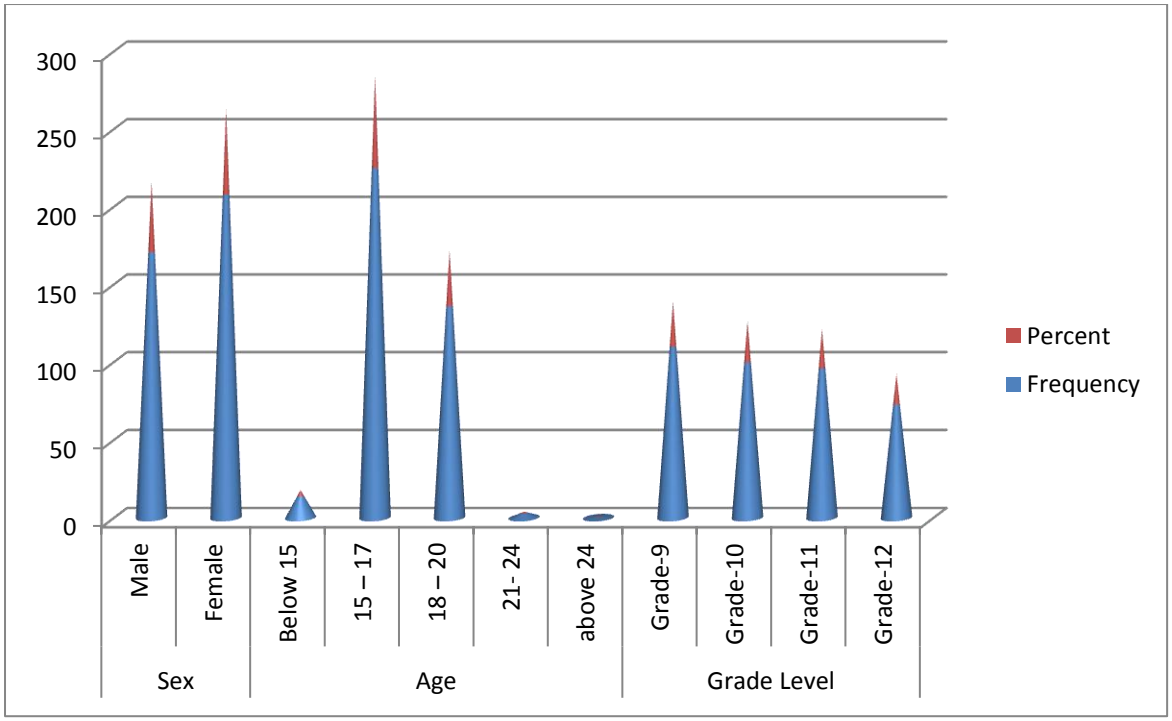

Figure 10: Socio-demographic background of the Respondents'

Source: own survey (2021)

The sex distribution of students (figure 10) was composed of 171 (45%) boys; while the relative majority 208 (55%) were female students. The sample was found to have the representation of both sex groups and was used to make comparison of students' opinion on environmental sustainability awareness and environmental educational practice in their high schools.

In addition figure 4.10 also depicted the age distribution of students who participated in the survey. Students below 15 years of age was 14 (3.7%) in the sample. Most of the high school students 225(59.4%) were within the age group of 15-17 years of age. Students in the age group of 18-20 represent the 2nd majority group representing 136 (35.9%) in the sample. Students above 20 years of age was represented by 4(1.1%) in the sample.

The age distribution, in figure 10 identified that about 95% of high school students were within the age range of 15 – 20 years old. While students out of this age range were very few about 5%. The age category of students was used in the comparison of environmental sustainability awareness and environment education practice in the selected high schools

In terms of age, in general, the analysis result was direct indication of the characteristics of the Ethiopian population, which is dominated by young people. This finding was in line with

CSA statistics from 2013/14 which revealed that around 56 percent of Ethiopia's population is under the age of 22. It is obvious from this outcome that providing environmental education that empowers and protects Ethiopia's youth will be difficult without wider access to the country's youth. Significantly the study was directed to high schools. As a result, improving environmental education in general and climate change education in particular is critical for the success of the campaign.

More specifically, in the above finding it is possible to understand that there were students to mean students whose age were out of secondary school age or different from the majority of students (including three students in the age range between 21—24) who were categorized as out of high school age students (ages of 20years and above).This was most likely due to late entry into the formal education system or late enrolling as well as poor attendance and academic performance. Furthermore, out of ages may be linked to socioeconomic and educational characteristics; the same is true for pupils who were extraordinarily old (age 24). Hence, the explanation addressed the fact that just 10% of Ethiopian youth were educated until recently and participated in the upper education begins at 17 years old .

Moreover, in the figure 10, about 54.9% female students implied that today, more girls than ever before are pursuing a secondary education.. However, they continue to be disadvantaged in many African countries. When females receive support such as uniforms, stationary materials, gender sensitivity training, and the like, they make the most of these opportunities to complete lower secondary education and advance to upper secondary education. (EESP,2018).

Furthermore, the above figure also clearly indicates the students' grade level distribution in the sample. Students from grade 9 to grade 12 were participated in the survey. The sample comprised 110 (29%) of students from Grade 9. Grade 10 students were represented by 100(26.4%) of the total sample size. Grade 11 and Grade 12 students were represented by 96(25.3%) and 73(19.3%) of the sample, respectively. The grade level distribution had represented all the grade levels (9-12) and was used to analyze the grade level as the factor for environmental sustainability awareness.

4.3. Environmental Education Practice

Table 4.2, below presented frequency and descriptive analysis of the environmental education practice in high schools

		Strongly Disagree	Disagree	Undecided	Agree	Strongly agree	N	Mean	Std. Deviation
1. The school arranges suitable conditions for students to practice school environmental education effectively (example, provide training for school environmental protection club).	Fre.	149	87	57	64	22	379	2.27	1.29
	%	39.3	23.0	15.0	16.9	5.8			
2. The school is significantly contributing in providing necessary information for students about current environmental problems.	Fre.	128	92	33	79	47	379	2.54	1.45
	%	33.8	24.3	8.7	20.8	12.4			
3. The School environmental protection club is most effective in practicing environmental education	Fre.	141	101	63	45	29	379	2.26	1.28
	%	37.2	26.6	16.6	11.9	7.7			
4. Most subjects have adequate environmental education contents that invite students for fieldworks and practical activities.	Fre.	168	86	46	49	30	379	2.17	1.33
	%	44.3	22.7	12.1	12.9	7.9			
5. Most of the time the teaching method of Environmental education in your school is supported by direct field work practices (for example school compound observation, field trip and the like).	Fre.	197	73	45	42	22	379	1.99	1.27
	%	52.0	19.3	11.9	11.1	5.8			
Practice of Environmental Education							379	2.2475	0.90762

Source: own Survey (2021)

Five statements were used to assess the practice: the 1st statement, assessed whether the schools have arranged suitable condition to effectively deliver environmental education. 39.3% of the students strongly disagreed the statement while 23% have mentioned their disagreement to the statement. Only 16.9% of the students were in strong agreement and 5.8% of the students were agreed to the statement. The result indicated that majority of the students (62.3%) believed lack of suitable condition to promote environmental education in the schools.

The overall average agreement to the statement was with M=2.27 rating with considerable variation (SD=1.29) among the students' rating response. The average rating indicated that students had disagreed to the statement. Hence, majority of 'Arada' Sub City high schools didn't create suitable conditions for students to practice school environmental education effectively.

It is apparent from the above first statement evidence that high schools under the study did not create conducive settings for students to engage in successful environmental education at school (example, provide training for school environmental protection clubs). The finding was consistent with Hailu's (2007) study which found that environmental education was not supported by the informal education system in all government schools and was generally deemed secondary. The same can be said for private schools.

As to the 2nd statement, in table 4.2, students had overall disagreement to the statement with low level average rating of M=2.54. That is high schools were not contributing in the provision of necessary information that would have contributed to students' awareness to problems related to environment. The statement was strongly disagreed by 33.8% of the students while additional 24.3% of the students still disagreed to the schools' contribution in sharing environmental related information to students. Only 33.2% (20.8% + 12.4%) of the students were in favor of the statement; against the opinion of 58.5% of the students.

Hence, the finding was in consistent with the study of Hailu (2007) who claimed that while Ethiopia has included environmental education in its ongoing school curriculum since the 1980s in response to frequent environmental challenges and to make its people aware of and concerned about the environment and related issues The content of environmental education has been delivered using an infusion strategy with a primary focus on the lecture style which emphasizes basic memory of environmental facts. Moreover, the result was also did not go in line with theoretical framework of the Green Curriculum Model's that enable

educators to infuse sustainability in a way that allows learners to: gain the knowledge, skills, and aptitudes to become sustainability minded citizens; understand the complex sustainability issues and challenges confronting human society at local and global levels and take action to find solutions to the numerous sustainability issues (Besong, 2017).

The 3rd statement, which claimed the school environmental protection club is most effective in practicing environmental education was not accepted by 37.2% and 26.6% of the students who strongly disagreed and simply disagreed to the statement. Relatively fewer students, 11.9% and 7.7% were found to have acknowledged the practice. In general, the statement was denied by 63.8% of the students, who were in contrary to 19.6% of the students who were in favor of the schools practices. The average rating to the 3rd statement was computed with M=2.26 which was far below the moderate level rating (i.e. 3) and imply that the environmental protection clubs were not effective in practicing environmental education.

In this respect a much higher percentage of students were unaware of any community or school-based environmental groups with which they may collaborate. Furthermore, there are limitations such as ineffective school environmental clubs, limited functions of school environmental clubs, perceived difficulties in associating with clubs or groups and a lack of financial and trained manpower further hampered the full participations of students to work on environmental activities. Thus the finding was coincided with (Hailu, 2007).

Majority of high school subjects were expected to have adequate environmental education contents that invite students for fieldworks and practical activities. This was the 4th statement in table 4.2 above which was highly disagreed with M=2.17 average rating to the statement. The statement was disagreed by 67% of the students while only 21.8% of the students appreciated the schools' practice. In general, however, the practice of incorporating environmental related contents that allow students to engage in fieldworks were not adequate. Furthermore, data gathered from majority of interview respondents substantiated these results. They told that even though there were efforts to incorporate environmental education contents vertically and horizontally into different subjects most of the contents were not task based.

The result was disagreed with prior studies such as (Gilbert, 2019) who found difficulties in the curriculum when it came to the implementation of environmental education. Furthermore, Dessalegn (1998) as reported in Hussen (2018) discovered that despite the existence of important sources of environmental education, our high school subjects lack adequate

contents that invite students to fieldwork and practical activities with the surrounding community in his study area. This means that education must be capable of preparing pupils for life in their community. The result was also mismatched with theories of curriculum with basic assumption that sustainability-related competences allow students to achieve aptitudes, attitudes, abilities, and knowledge to become change agents for sustainability in their communities and at work life (Besong, 2017).

The practice of environmental education required teaching methods supported by direct field work practices like school compound observation and field trips. This practice was assessed in the 5th statement, in the table 4.2. According to 52% 19.3% of the students, who were against the statement witnessing absence of the required environmental education practice in high schools. Only 16.9% of the students had appreciated the practice. The average rating to the 5th statement was M=1.99 which indicated overall disagreement to the statement.

Hence, in Arada Sub City high schools environmental education was not properly encouraged by real life situations. The overall assessment of the environmental education practice in the schools was assessed by an aggregate rating to the five statements in table 4.2 above. The resulting overall practice was rated with M= 2.25 average agreement The result indicated that in the high schools environmental education was not adequately supported by observation and field trips.

The finding indicated that most of the time, environmental education teaching methods including direct fieldwork operations were discouraged in high schools. Place-based education, on the other hand was characterized by Sobel (2004 cited in Degu, 2013) as a method of teaching concepts in various school topics (e.g. language, mathematics, science, social studies, and so on) by utilizing the local community as well as the biophysical surroundings as instructional aids i.e using the environment around as a teaching resource to provide students "hands-on" and "real-world" experiences. In respect to this idea, Hasasn and Ismail (2011) also cited Dhull (2017) discovered that teachers did not use outdoor learning which is the most effective method of imparting environmental education. Moreover, place attachment theory emphasized that outdoor education provides students with a direct connection to natural places as well as opportunities for exploration and use of local places. Teaching in the outdoors involves using a specific location to achieve specific learning outcomes (Katsamagka, 2013).

4.4. Students Engagement in Environmental Related Activities

Table. 4.3. Students' engagement in environmental related activities in high schools

		Never	Rarely	Some-times	Most Often	Always	N	Mean	Std. Dev.
1. How often do you engage in activities that aimed conserving a natural environment (example, tree conservation)?	Freq.	237	83	39	8	12	379	1.61	0.98
	%	62.5	21.9	10.3	2.1	3.2			
2.How often do you engage in Environmental issues Questioning and Answering program that conducts in the school	Freq.	258	59	42	15	5	379	1.55	0.93
	%	68.1	15.6	11.1	4.0	1.3			
3. How often do you conduct activities related to water conservation?	Freq.	246	51	44	21	17	379	1.71	1.15
	%	64.9	13.5	11.6	5.5	4.5			
4. How often do you involve in field trip program arrange for students?	Freq.	257	53	44	13	12	379	1.60	1.03
	%	67.8	14.0	11.6	3.4	3.2			
Engagement in environmental related activities							379	1.6194	0.70857

Source: own survey (2021

Environmental related activities in the high schools were assessed with four statements analyzed with frequency distribution of students' responses and mean descriptive statistic.

Statement 1 required rating of the frequency of engagement in activities that aimed conserving a natural environment (example, tree conservation). Majority of the respondents, 237(62.5%) of the students, assessed total absence of such engagement. While 21.9% of the students observed rare activities of environmental related activities in the school. The overall mean rating, M=1.61, was computed representing the level of engagement in environmental related activities in the schools which is almost a very rare engagement. In this regard the

interview evidences also showed that sometimes students could not properly identify kinds of trees. Thus the schools should create conducive condition that invite students to participate in tree conservation and school compound greening practices.

It was imperative from the above evidence that even though school environmental protection clubs were established at Arada Sub City high schools. Students were not compelled to engage in the groups' environmental protection projects. In this context (Daniel, 2005, cited in Hussen, 2018).suggested that young people might be active in community-based activities aimed at maintaining and promoting the natural environment. In comparison to the extent of its potential, the influence achieved thus far is very insignificant.

Statement 2, students engage in environmental issues questioning and answering program that conduct in the high school .The average rating to this statement was M=1.55 which was a rare (or not at all) engagement to deal with environmental issues. The majority of the respondents, 68.1% of the students, replied no such type of engagement. Some, 15.6% of the students, did observe a rare level of questioning and answering activities regarding environmental issues. Moreover interview participants agreed with this result and explained that high schools in the "Arada" Sub City did not conduct environmental issues questioning and answering program.

In this connection the finding was in contradict with experiences of other counties like India that indicated environmental examinations called "GREEN Olympiad"(annual environmental examination designed to assess students' environmental knowledge and, as a result, raise awareness about green skills) which are intended for middle and senior level school students where winners at higher rank receive scholarships. In addition a quiz program called "terra quiz", on environmental issues is telecast on national television. There is also "Environmental -Club", which initiated internet-based environmental clubs (Hussen, 2018).

The engagement in water conservation was one aspect of environmental protection activity. This aspect was assessed in statement 3 in table 4.3. It was found that 64.9% of the students, who have not any level of recognition to this practice. Some 13.5% of the students had observed a very rare activities regarding water conservation. The average rating to the statement was M=1.71, which indicated that water conservation practice in high schools were almost none .During interview majority of the respondents answered high schools did not encourage students to engage in water conservation related activities.

In contrast to this result studies like in Hussen(2018) addressed that in India there are “eco clubs”, which conduct activities related to water conservation. More over the result contradicted the theoretical foundation of curriculum theory that enhance competency of students in understanding and engagement with the physical world as well as social and civic competence most closely associated to environmental education (Conde& Sánchez ,2010).

Statement 4 assessed the practice of field trip program arrange for students with regard to environment protection. The very large majority of students, 82.4%, replied absence (or very rare level) of field trips conducted in their high schools. The practice stated in statement 4 was rated with average practicing level of M=1.61which indicated that the practice was not observed in the schools.

The overall engagement in environmental protection activities in high schools was rated with M=1.62 level. Thus, the result indicated that high schools in the study area were not observing and engaging themselves to the protection of the environment. Interview informants were on the side of these finding and gave ideas that most of high schools did not deliberately plan field trip for students.

The results contradicted with research conducted by Wiley and Humphreys (1985) and Kern and Carpenter (1986) which stated that abstract themes and higher-level concepts are simpler to teach in the field than in the classroom. Similarly, McElroy (1981) and Haigh (1986) supported the concept by arguing that fieldwork allows students to relate theory to real-world experience (cited in Hussen 2018). The result was also against the place attachment school of thought that stated people who have an emotional connection to nature and see natural surroundings as restorative, for example, are more likely to safeguard natural spaces and participate in pro-environmental activities. Visitation to a natural area on a regular basis may boost place identity as well as a sense of environmental responsibility. Individuals can develop a can-do attitude and feeling of self through volunteering and advocating for environmental restoration (Krueger and K Flora, 2014).

4.5. Challenges in the Practice of Environmental Education

Table 4.4.Challenges in the Practice of environmental education

		Not at all problem	Minor Problem	Moderate Problem	Major Problem	Very serious Problem	N	Mean	Std. Dev.
1.Appropr%iateness of Teaching methods in addressing environmental issues	Fre.	36	50	87	93	113	379	3.52	1.30
	%	9.5	13.2	23.0	24.5	29.8			
2.Students interest to know more about environmental issues	Fre.	56	60	93	75	95	379	3.25	1.38
	%	14.8	15.8	24.5	19.8	25.1			
3.Access of Resources (example finance, skilled man power and others) in the practice of environmental education	Fre.	29	39	86	63	162	379	3.77	1.31
	%	7.7	10.3	22.7	16.6	42.7			
4. Environmental Education Integration into Secondary school subjects.	Fre.	39	50	97	75	118	379	3.48	1.33
	%	10.3	13.2	25.6	19.8	31.1			
5.Teachers' commitment and capacity to teach Environmental Education	Fre.	55	58	73	80	113	379	3.36	1.42
	%	14.5	15.3	19.3	21.1	29.8			
6.School administration supports for effective practice of Environmental Education.	Fre.	56	57	66	58	142	379	3.46	1.48
	%	14.8	15.0	17.4	15.3	37.5			
Challenges for environmental education practices							379	3.4723	0.87693

Source: own survey (2021)

Environmental education in high schools cannot be delivered effectively without tackling certain factors that challenge its success. In this study students were asked to rate the level of

influence of six factors (table 4.4 above) that could hinder environmental education practice in high schools.

The appropriateness of teaching methods in addressing environmental issues as a problem to promote environmental education in high schools (#1). Nearly 30% of the students found the teaching method was very highly inappropriate while 24.5% found the teaching method being a major problem to deliver environmental related education.22.7% of the students found the teaching method being not a problem (or a minor problem). The majority (77.3%) of the respondents, however, rated the appropriateness of teaching methodology being moderate to extreme level problem. Thus, the teaching methods in the high schools were not appropriate to practice environmental education. Among the six factors, teaching method was relatively the 4th most challenge with M=3.52 average rating that hinder the practice of environmental education.

In this case there was attempt to triangulate the evidence obtained from interview participants of school principals, environmental protection clubs patron teachers with the data. The interview respondents commonly agreed there was no appropriate methodology that properly addressed environmental education contents in high schools under the study.

The investigation revealed that there were methodological deficiencies in high schools. The finding was significantly linked to studies (for example, Aklilu, 2012; MoE, 2010; reported in Gilbert,2019) indicated that teaching technique limitations were a barrier to effective environmental education implementation in Arada Sub City high schools. The finding was against the theoretical explanation Jensen and Schnack (2006) the goal of environmental education is to empower students to conceive alternative forms of development and to participate in actions that support those goals. This necessitates a method of instruction that instills in students the confidence, dedication, and desire to participate in social causes related to environmental challenges (cited in Conde and Sánchez, 2010).

This strategy is thought to improve students' academic achievement while also increasing their relationships with their community, environment, or nature. Place-based education is a type of education that encourages students to actively participate and engage in various elements of their community, such as social, cultural, and environmental issues and problems.(Degu, 2013).

Further studies such as Kanene (2016) identified The term "environmental education" is often used to refer to both formal and informal education systems within and outside of the school

with formal education ranging from primary to post-secondary. All efforts to teach the public and other audiences including media such as print materials, websites and campaigns and so on are included in the informal system of education. There are also various methods that environmental education is practiced outside the traditional classroom such as aquariums, zoos, parks, and nature centers all have ways of teaching the public about the environment. Furthermore, environmental education, as a multidisciplinary entity entails task-based learning mechanisms such as role modeling, direct field experience, cooperation, group debates and group talks to drive behavior change and master environmental sustainability challenges.

Students' interest to know more about environmental issues (statement 2) was one of the challenges that have impact in the practice of environmental education in the high schools. This student related problem was not found to have only minor (or no) impact on environmental education according to 30.6% of the respondents. However, students' lack of interest in environmental education was found a moderate level problem (24.5%), or major problem (19.8%) or very serious problem (25.1%) while the majority (75.5%) of the students were responded that student related problem was relatively the least level problem(5^{th}) in comparison with other challenges with M=3.25 average rating. Moreover, interview results elucidated that most of the students were negligent and did not show good feeling towards the environment.

The implication of the evidence obtained was that students' interest was one of the challenges in secondary schools for the implementation of environmental education. The result was contradict with previous researches like Aschalew (2013) who stated that knowledge and a favorable attitude toward the environment are essential for a country's long-term growth. This is especially critical for nations like Ethiopia which have fragile ecosystems. Another researcher like Boiyo (2014) examined high school students' attitude towards environmental issues in Kenya, the researcher found out that there is a difference in students' knowledge and perception towards environmental education (Gilbert, 2019).

In statement (#3), resource related problem to deliver environmental education was assessed. The statement assessed the extent of problem with regard to access of resources (example finance, skilled man power and others) in the practice of environmental education. Relative majority of students, 42.7%, found absence of resources in the schools was a very serious problem. While 22.7% and 16.6% of the students identified resource limitation as a moderate level and major problem that hinders practicing environmental education in high schools.

Resource related problem with M=3.77 rating was relatively the 1st factor for practicing environmental education.

During interview there was attempt to get information from my interviewee, it was noticed from their explanation that there was shortage of resources to put environmental education in to practice. Moreover, during interview, the respondents suggested the government and other concerned stakeholders should allocate environmental education grant to high schools.

The result conveys that resources are basic and fundamental for enhancing environmental education in high schools. For instance findings indicated that crucial audio-visual resources for high school students studying environmental education, national parks, museums, labs, computers, projectors, video/films, radio, charts, and textbooks were among the tools used. The study discovered that having these materials available aided learning and increased students' attitudes toward the environment (Gilbert, 2019).

Statement 4 claimed lack of environmental education contents integration with high school subjects as a problem to the environmental education practice in high schools. The majority of students identified the absence of sufficient environmental education contents integration with (syllabus, textbooks, etc…).About 30.1% of students replied the absence of adequate environmental education contents integration with curriculum as a very serious problem; while 19.8% and 25.6% of students rated this problem as a major and moderate level problem respectively. This curriculum related problem was the 3rd level challenge with M=3.48 average rating to the problem.

Essentially Ethiopia has made several attempts to initiate actions geared towards environmental education. The country took the following important measures. In the year 1994 Ethiopia formulated Education and Training policy with clear objective of producing citizens who possess national and international outlooks on the environment and protect natural resources and historical heritages of the country Transitional Government of Ethiopia(TGE), 1994 (cited in Temechegn and Solomon,2009). The former Ethiopian Environment Protection Authority (EPA) formulated a new environment policy in 2002 within which ‘environmental education and awareness policy’ was one of the cross-sect oral strategic policies. In that section, special attention was paid to fostering the integration of multi-disciplinary environmental education across a variety of school courses at all levels of education (CCES, 2017).

Moreover, the quest for integration of climate change education into the formal education is underpinned by several existing international frameworks including the UNFCCC, Kyoto protocol, ESD, the SDGs, and the 2015 Paris Agreement. The framework brings nations together to strengthen climate change response and strengthening countries' resilience to the adverse effects of climate change. In 2011, the Federal Democratic Republic of Ethiopia's government launched the Climate-Resilient Green Economy (CRGE), a multi-sect oral initiative to protect the country from the negative effects of climate change and build a green economy that will help the country transition to a more sustainable development model by 2025 (CCES,2017).

In this regard, Ethiopia is then taking concrete initiatives to include climate change education in school curricula. The Ethiopian government led by the Ministry of Education announced a curriculum reform process in the beginning of 2019, switching from the "8-2-2" system which has been in existence for well over two decades to the "6-2-4" system. (Grades 1-6) and junior high (Grades 7-8) and Secondary level (Grades 9-12) where the curriculum will also be redesigne*d* (UNCC 2020).

Consequently incorporating environmental education into the school curriculum entails connecting all school topics through the integration of environmental education (contents, issues, and problems) that can reinforce one another in terms of adding to students' environmental knowledge, skills, and values to train our students to be citizens of the twenty-first century(Conde and Sánchez ,2010).

However, despite of all these efforts, there is a problem in greening the curriculum means consistently aligning it with the ethical, conceptual, and methodological principles underlying environmental education. Previous studies (e.g. Damtew, 2007; MoE, 2010;Aklilu, 2012, cited in Hussen, 2018) revealed the prevalence of poor quality Ethiopian secondary school curricular materials with little opportunity to integrate main environmental contents and curriculum-related limitations and the curriculum does not appear to have the capacity to prepare the learner for a meaningful future. Local knowledge is especially important in environmental education since there is nearly always a wealth of local expertise to draw from.

Finally interview participants reported that environmental education should be given as an independent subject. The perspectives of the interviewees differ from those of Shuite (2017) who suggested that environmental education may be addressed through cross-curricular

approaches. As a result, different disciplines in the curriculum, whether primary or secondary integrate some components of environmental issues as examples or significant topics and environmental education is taught as a separate subject in lower education systems or course in higher institutions should be generic or common for all learners both in lower and higher education. Here Shuit ignored secondary education.

As interview respondents' suggested the autonomy of environmental education as independent subject is more important. This means when environmental education is given as a separate subject in high schools there would be sufficient time and space to present environmental issues, to impart importance of sustainable development. In other words interdisciplinary approach is preferable to deliver environmental education as a subject.

In statement 5, the commitment and capacity of teachers was assessed for being a problem in environmental education practice in the high schools. About 29.8% of students identified a very serious problem as teachers were not committed to practicing environmental education. This teacher related problem was found a major problem by 21.1% of students, while 19.3% of the students as a moderate level problem. Teachers' related problem was relatively ranked as 5th level problem. Consequently data gathered from interviewee realized that the aforementioned challenges are practical problems at the grass root level that hindered the implementation of environmental education in the high schools of 'Arada 'sub city.

The finding was consistent with studies like Dhull (2017) who identified challenges teachers encounter varieties of problems in their professional development including teaching environmental education in particular. One of these issues is a lack of basic skills to instill environmental awareness in students. Low expectations, a lack of understanding and difficulties in putting novel teaching approaches into practice Furthermore, teachers did not engage in outdoor learning which is the preferred method of teaching environmental education. As a result, it is reasonable to conclude that teachers are a critical component of good environmental education, as they have the ability to affect students' perspectives, attitudes, and interactions with the environment (Artun ,et al., 2017).

School administration related problem (low support, less attention, poor facility, low financial and material support) was assessed in statement #6. According to 37.5% of students, low school administration support was found to have presented very serious problem in practicing environmental education in high schools. About 15.3% of students rated administration related problem being a major level problem; while 17.4% of the students identified moderate

level problem associated to school administration problems. The average rating to this category of problem was M=3.46 that identified school administration problem being the 4th ranked problem in the practice of environmental education.

Overall, practicing environmental education in high schools was encountered with several problems. The aggregate rating to the level of problems in high schools was rated with M=3.4723 average rating that entailed moderate to major level problems in the high schools. Interview participants substantiated that less attention was given for environmental education in high schools.

Corresponding with the result it has been realized that the school administration did not prioritize environmental education in high schools where the research was conducted. The school administration had not created means for teachers to incorporate environmental education issues into the subjects they were teaching (Gilbert, 2019).

Parallel with this evidence environmental education in Ethiopia encounters numerous challenges. Several issues obstruct Ethiopia's effective implementation of environmental education. Some of these factors include a lack of hands-on activities and direct interaction with nature, a lack of attention dedicated to environmental education and instructional approaches and curricula (Degu 2013).

4.6. Environmental Sustainability Awareness Level of High School Students

High school students were asked to rate their level of environmental sustainability awareness using seven statements, as presented in table 4.5 below.

Table 4.5.High school students' awareness level of environmental sustainability

		Not aware at all	Low aware	Moderately Aware	Highly Aware	N	Mean	Std. Dev.
1.What is your level of awareness about environmental education	Fre.	54	45	220	60	379	2.75	0.888
	%	14.2	11.9	58.0	15.8			
2.To what extent do you aware about causes of environmental pollution?	Fre.	42	42	212	83	379	2.89	0.873
	%	11.1	11.1	55.9	21.9			
3.To what level do you aware about climate change effects of global warming?	Fre.	40	50	208	81	379	2.87	0.868
	%	10.6	13.2	54.9	21.4			
4.To what extent do you aware about methods of conserving the environment?	Fre.	50	43	205	81	379	2.84	0.911
	%	13.2	11.3	54.1	21.4			
5.To what extent do you aware about the function of School environmental club?	Fre.	108	73	139	59	379	2.39	1.060
	%	28.5	19.3	36.7	15.6			
6.What is your level of awareness about environmentally friendly green energy building (energy comes from water, wind and sun)?	Fre.	60	62	179	78	379	2.73	0.964
	%	15.8	16.4	47.2	20.6			
7.To what extent do you aware about Loss of bio diversity?	Fre.	72	53	189	65	379	2.65	0.976
	%	19.0	14.0	49.9	17.2			

Source: own survey (2021)

High school students were asked to rate their level of environmental sustainability awareness using seven statements, as presented in table 4.5 above.

From their reply to statement #1,high school students awareness level was moderate rating evaluated with M=2.75 level of average awareness. Whereas there were about 15.8% students whose awareness level was either high or very high. In contrary 26.1% of the students found

themselves unaware or having low level awareness of environmental sustainability. The relative majority, 58.0% of students, were found to have moderate level awareness. Moreover, interview participants explained even though the implementation of environmental education has its own problem students were not that much ignorant about the concepts and ideas of environmental education.

As it was observed from answers of the respondents, most of the students have medium level of awareness about environmental education. The result was more or less similar with Kedir(2010) and Shuite (2017) who emphasized environmental education is important because it gives students with the knowledge, skills and experiences they need to become successful community leaders and make informed decisions about the management of their general environment and natural resources. As a result, the authors argued that environmental education is vital not only for a certain country but also for the entire world, whose education system not addressing environmental education for environmental literacy.

According to constructivist theory, current environmental education theoretical approaches aim for proactive, interdisciplinary, critical, holistic action-oriented and participatory inquiry (Robottom, 2004). Moreover, curriculum theory assumed that infusion is important to explain the various ways in which environmental education can be introduced into the curriculum and daily life of the schools (Conde& Sánchez ,2010). In my opinion high schools should work hard to excel the environmental education awareness of their students. For this matter they should collaborate with stakeholders to maximize environmental education awareness level of students and work together to achieve the goal "environmental education for all.''

The awareness level of students about causes of environmental pollution was summarized in statement #2. About 11.1% of the students were totally unaware of causes of environmental pollution; equally about 11.1% have low level of awareness. In contrary 21.9% of the students' awareness on the causes of environmental pollution was at high level. Whereas the majority of students, 55.9%, were found to have moderate level of awareness. The overall average rating to the statement was evaluated with M=2.89 level which was nearly moderate level awareness of high school students. In addition interview respondents also stressed now a day students are on the way towards developing appropriate knowledge how to protect school compound from pollutant substance like paper or plastic materials.

The findings was interfaced with argument of Kedir (2010) who suggested that the majority of the students in Kombolcha high school ,South Wollo , Amhara region had moderate level of awareness about industrial waste contamination.

In statement #3, the students' awareness level about climate change effects of global warming was assessed. The relative majority of students, 54.9% were found to have moderate level awareness on climate changes and global warning. Whereas, 10.6% of the students rated their lack of awareness and 13.2% of students were found to have low level awareness regarding climate change and its effects on environmental sustainability. Whereas, 10.6% of the students rated their lack of awareness and 13.2% of students were found to have low level awareness regarding climate change and its effects on environmental sustainability. About 21.4% of students have either high level or very high level awareness. The mean average rating level of students' awareness was rated with M=2.87 which was not far from the moderate level awareness.

In the same way interview data substantiated this evidence and claimed that even if high school students of Arada Sub City had informed about climate change, their awareness level about the main effects of global warming such as the overall rise in sea level, change in the present world pattern of winds, rainfall, floods and drought is not so high.

The result was mismatched with studies about climate change effects of global warming (example Oruonye, 2011; Rahman, 2014;Arega,etal.,2019) who commonly agreed that students did not have sufficient knowledge about climate change.

Therefore, despite students moderate awareness level of impacts of climate change high schools should give special concern to climate change education. Schools should design ways to deliver climate change in formation by establishing climate change awareness club.

The awareness level of students' on the methods of conserving environments was summarized in statement #4. The mean average level of awareness, M=2.84 indicated that students have overall moderate level awareness of environment conserving methods. Those students with no or low level of awareness about conservation methods were 24.5%. However, there were 21.4% of the students with high or very high level awareness of the methods for conserving the environment. The majority of the students, 54.1% were found to have rated their moderate awareness level of methods for conserving the environment. As interviewee respondents information those high school students in Arada Sub City ,mostly

environmental protection club members indicated tendencies towards developing awareness of conserving school compound trees

The finding was in opposition with Jacob Orimaye's findings on forest conservation that showed secondary school students' perception towards environmental conservation of natural resources and opinion to detrimental activities was generally not encouraging. Hence in my observation I noticed that most high schools are degraded. There is no sign of conservation of trees and greening of school compounds. Thus high schools should take the initiative to maximize their students' resource conservation awareness level.

Awareness level of students, about the function of school environmental club(#4) in majority of students (47.8%) were unaware or have low level of awareness about the function of school environmental club. There were 36.7% of the students with moderate level awareness of club's functions. Relatively fewer students have high level awareness (of 15.6% students). The overall students' average awareness was computed with M=2.39 which was a low level awareness of the functions of their own school environmental club. Additional information from interviewee elaborated many of the students were not aware about the duties and responsibilities of school environmental protection clubs.

The result was mismatched with the idea of Gupta**,**et al.,(2014) who pointed out that Eco-Clubs can help to guarantee that resources are managed sustainably and that young people act responsibly. Their study focused on the activities of Eco-Clubs and their importance in instilling environmental awareness. However as it was clearly observed from most of the students' response, the role and the function of school environmental protection club in the high schools under discussion was limited.

High school students awareness about green energy (statement #6) was found to be moderate level with rating, M=2.73. From the result 32.2% (i.e. 15.8% and 16.4%) of the students have no or little knowledge regarding environmentally friendly green energy building. Whereas, about 20.6% of the students have high level of awareness about green energy that none polluting energy sources like water and wind. The relative majority of students, 47.2%, were found to have moderate level awareness. Equally, with students response, interview respondents also stated that 'Arada' sub city high school students have know how about renewable energy sources.

The result was aligned with Altuntaş(2017) who revealed that the students' awareness of renewable energy sources was at an intermediate level. Alternative energy sources such as wind, geothermal, solar, biomass, and energy efficiency measures will be a key part of Ethiopia's energy mix and will be integrated with the country's new Climate Resilient Green Economy (CRGE) Strategy which has the ambitious goal of transforming Ethiopia into a climate resilient green economy by 2025(MWE, 2012).

Therefore, in spite of students' moderate level of renewable energy awareness, high schools should advocate benefits and impacts of renewable energy technologies for students practically since, renewable energy development are economically and environmentally sustainable.

Arada Sub City high school students awareness on the causes for the loss of bio diversity (Statement# 7) was assessed with a low level awareness with M=2.65 level. The relative majority number of students, 49.9% was found to have moderate level agreement about the causes of bio diversity losses. There were 3.0% of students with little or none aware of bio diversity losses. While students with high level awareness represented by 17.2% of the students. In the same angle of argument information obtained from interviewee supported the evidence and justified that students' knowledge of biodiversity conservation increase from time to time.

The finding was the idea of Fenetahun and Eshetu (2018) who pointed out that conservation of biodiversity resources is viewed as a key instrument for long-term development and an important aspect of biodiversity education. In line with this argument, students in Arada's sub-city high schools were found to have a moderate awareness of biodiversity loss.

4.7. Comparison of Environmental Education Practices and Environmental Sustainability Awareness by Socio-demographic Factors

To assess the impact of sex on environmental education practices and environmental sustainability awareness, independent sample t-tests and one-way ANOVA were performed as presented below.

The opinion of students regarding the practices of environmental education was analyzed using independent sample t-test comparing male and female students' opinion.

Table 4.6.1.Comparison of environmental education practice by sex

		N	Mean	Std. Dev.	95% Confidence Interval for Mean		t-value	p-value
					Lower Bound	Upper Bound		
Practice of Environmental Education	Male	171	2.23	0.912	2.092	2.367	0.355	0.723
	Female	208	2.26	0.906	2.139	2.386		
	Total	379	2.25	0.908	2.156	2.339		

Source: own survey (2021)

Assessing the practice of environmental education in high schools, the rating by male students (M=2.23) and female students (M=2.26) were not significantly different (p-value=0.723>0.05). That is the two groups of students had observed similar level of environmental education practice (M=2.25), which was a low level practice.

Table 4.6.2 Comparison of environmental education practice by age

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Practice of Environmental education	Below 15	14	2.96	1.263	2.228	3.686	3.855	0.004
	15 - 17	225	2.31	0.908	2.187	2.426		
	18 - 20	136	2.07	0.815	1.934	2.210		
	21- 24	3	2.27	1.419	-1.258	5.791		
	Above24	1	2.80					
	Total	379	2.25	0.908	2.156	2.339		

Source: own survey (2021)

In assessing the practice of environmental education, students in different age group were found to have significant difference (p-value=0.004<0.05) in their average rating to the practice. Students' below-15 age group rated the practice with M=2.96 average rating which was relatively the highest compared to students in other age groups. While students in the age groups15-17 and 21-24 had rated the practice with M=2.31 and m=2.27 average rating.

Students under the age group 18-20 had experienced the least level of environmental education practice in high schools, M=2.07.

Table 4.6.3. Comparison of environmental education practice by grade level

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Practice of Environmental education	Grade-9	110	2.69	0.953	2.513	2.873	14.280	0.000
	Grade-10	100	2.15	0.901	1.969	2.327		
	Grade-11	96	2.04	0.800	1.878	2.202		
	Grade-12	73	1.99	0.737	1.814	2.158		
	Total	379	2.25	0.908	2.156	2.339		

Source: own survey (2021)

In assessing the practice of environmental education, students in different grade level were found to have significant difference (p-value=0.000<0.05) in their average rating to the practice. As can be seen in table 4.6.3 the average rating for the practice was decreasing as the grade level increases. Grade-9 students agreed with M=2.69 average rating followed by the average rating M=2.15 by grade-1o students. The average rating decreases as in grade -11 students (M=2.04) and grade-12 students (M=1.99). Hence, the assessment of the environmental education practice had significantly varied at different grade level.

Table 4.7.1 .Comparison of level of engagement in environmental related activities and environmental sustainability awareness by sex

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t-value	p-value
					Lower Bound	Upper Bound		
Engagement in Environmental Activities	Male	171	1.66	0.720	1.551	1.768	0.996	0.320
	Female	208	1.59	0.699	1.491	1.682		
	Total	379	1.62	0.709	1.548	1.691		

Source: own survey (2021)

As to the engagement in environmental related activities the male students level of engagement (M=1.66) and the female students' level of engagement (M=1.59) were significantly low level engagement; with no significant difference between the two groups of students (p-value=0.320>0.05). The overall engagement in environmental activities in the high schools were evaluated with M=1.62 average level engagement; which was a poor level of engagement

Table. 4.7.2. Comparison of level of engagement in environmental related activities and environmental sustainability awareness by age

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Engagement in Environmental Activities	Below 15	14	1.68	0.696	1.277	2.081	1.218	0.303
	15 - 17	225	1.66	0.685	1.566	1.746		
	18 - 20	136	1.54	0.737	1.414	1.664		
	21- 24	3	2.00	1.146	-0.846	4.846		
	above 24	1	2.50					
	Total	379	1.62	0.709	1.548	1.691		

Source: own survey (2021)

The level of engagement in environmental activities were not significantly different (p-value=0.303>0.05) among different age groups. However, students above 20 years of age believed moderate level of engagement; while students below 21 years of age had strictly exhibited significantly low level engagement in environmental activities. Even though, there was slight difference in the level of engagement by age, engagement in environmental related activities in general was not affected by the students' age group.

Table 4.7.3. Comparison of level of engagement in environmental related activities and environmental sustainability awareness by grade level

		N	Mean	Std. Dev.	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Engagement in Environmental Activities	Grade-9	110	1.83	0.717	1.692	1.963	5.067	0.002
	Grade-10	100	1.55	0.734	1.399	1.691		
	Grade-11	96	1.58	0.642	1.453	1.714		
	Grade-12	73	1.46	0.686	1.295	1.616		
	Total	379	1.62	0.709	1.548	1.691		

Source: own survey (2021)

The level of engagement in environmental activities were also found significantly different (p-value=0.002<0.05) among different grade levels. The level of engagement by grade-9 students was M=1.83; which was relatively the highest compared to grade-10 students (M=1.55), grade-11 students (M=1.58) and grade-12 students (M=1.46). The result indicated that the engagement in environmental related activities varied among different grade levels in that the practice of engagement was decreasing as students progressed to higher level grade.

Table 4.8.1.Comparisons of challenges in the practice of environmental education and environmental sustainability awareness by sex

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t-value	p-value
					Lower Bound	Upper Bound		
Challenges of Environmental Education	Male	171	3.44	0.865	3.312	3.573	0.599	0.549
	Female	208	3.50	0.888	3.375	3.618		
	Total	379	3.47	0.877	3.384	3.561		

Source: own survey (2021)

Rating the challenges of environmental education, male students had M=3.44 average rating; while female students had rated the challenges with M=3.50 average rating. The two groups were indifferent (p-value =0.549>0.05) in revealing the high level challenges that significantly hinder (M=3.47) the practice of environmental education in high schools.

Table 4.8.2.Comparisons of challenges in the practice of environmental education and environmental sustainability awareness by age category

		N	Mean	Std. Dev.	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Challenges of Environmental Education	Below 15	14	2.99	0.846	2.500	3.477	1.719	0.145
	15 - 17	225	3.44	0.873	3.325	3.554		
	18 - 20	136	3.58	0.880	3.430	3.729		
	21- 24	3	3.28	0.585	1.824	4.732		
	above 24	1	3.67					
	Total	379	3.47	0.877	3.384	3.561		

Source: own survey (2021)

In rating the challenges in environmental education practice, different age group of students were not found to have significant difference (p-value=0.145>0.05) in their average rating. The rating by students with below-15 age group were moderate (M=2.99), as in the rating M=3.28 by students in the age group of 21-24. Whereas, the ratings by students in the age groups 15-17 and 18-20 were above moderate level rating with M=3.44 and M=3.58, respectively. Overall, the significance of the environmental education challenges were high with M=3.47 average rating.

Table 4.8.3. Comparisons of challenges in the practice of environmental education and environmental sustainability awareness by grade level

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Challenges of Environmental Education	Grade-9	110	3.18	0.901	3.005	3.346	6.431	0.000
	Grade-10	100	3.61	0.822	3.447	3.773		
	Grade-11	96	3.63	0.807	3.470	3.797		
	Grade-12	73	3.52	0.907	3.307	3.730		
	Total	379	3.47	0.877	3.384	3.561		

Source: own survey (2021)

Students in different grade levels were also found to have significantly different average rating to the challenges of environmental education (p-value=0.000<0.05). Students of grade-9 were found to have the least rating, M=3.18, to the factors while higher grade level students had realized very significant factors that hampers the practice of environmental education. The rating by grade-10 students were M=3.61 which was as high as the ratings by grade-11 students (M=3.63) and grade-12 students (M=3.52). Thus, students in different grade level were found to have different level of assessment to the challenges of environmental education.

Table 4.9.1. Comparisons of Socio demographic Factors Influencing Environmental Awareness by Sex

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t-value	p-value
					Lower Bound	Upper Bound		
Socio -demographic factors influencing environmental sustainability awareness	Male	171	3.31	1.117	3.145	3.482	0.099	0.921
	Female	208	3.33	1.132	3.171	3.480		
	Total	379	3.32	1.124	3.207	3.434		

Source: own Survey (2021)

Students had also evaluated socio demographic factors influencing environmental sustainability awareness in high school students. Male students assessed with M=3.31 average rating that environmental awareness was affected by sex, age and grade level. Female students had M=3.33 average level of assessment to the factors on environmental awareness. The two groups were indifferent (p-value=0.921>0.05) in evaluating the factors with overall rating of M=3.32.

Table 4.9.2.Comparisons of Socio demographic factors Influencing Environmental Awareness by Age Category

		N	Mean	Std. Dev.	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Socio --demographic factors influencing environmental sustainability awareness	Grade-9	110	3.23	1.135	3.016	3.445	0.924	0.429
	Grade-10	100	3.35	1.145	3.123	3.577		
	Grade-11	96	3.26	1.134	3.031	3.490		
	Grade-12	73	3.49	1.063	3.245	3.741		
	Total	379	3.32	1.124	3.207	3.434		

Source: own survey (2021)

Regarding the factors influencing environmental awareness, students at different age groups were not found to have significant difference (p-value=0.429>0.05) in their average rating. The rating by grade-9 students was M=3.23, and the rating by grade-10 students was M=3.25. The ratings by grade-11 and grade-12 students were M=3.26 and M=3.49, respectively. Overall, the significance of the environmental awareness factors were indifferent among grade levels, and were high with M=3.32 average rating.

Table 4.9.3.Comparison of Socio demographic Factors Influencing Environmental Awareness by Grade level

		N	Mean	Std. Dev.	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Socio- demographic factors influencing environmental sustainability awareness	Grade-9	110	3.23	1.135	3.016	3.445	0.924	0.429
	Grade-10	100	3.35	1.145	3.123	3.577		
	Grade-11	96	3.26	1.134	3.031	3.490		
	Grade-12	73	3.49	1.063	3.245	3.741		
	Total	379	3.32	1.124	3.207	3.434		
	Total	379	3.21	0.851	3.123	3.295		

Source: own survey (2021)

Regarding the factors influencing environmental awareness, different grade level of students were not found to have significant difference (p-value=0.429>0.05) in their average rating. The rating by grade-9 students was M=3.23, and the rating by grade-10 students was M=3.35. The ratings by grade-11 and grade-12 students were M=3.26 and M=3.49, respectively. Overall, the significance of the environmental awareness factors were indifferent among grade levels, and were high with M=3.32 average rating.

Table 4.10.1.Comparison of Environmental Sustainability Awareness level by Sex

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t-value	p-value
					Lower Bound	Upper Bound		
Environmental Sustainability Awareness level	Male	171	3.23	0.912	3.095	3.371	0.495	0.621
	Female	208	3.19	0.799	3.080	3.299		
	Total	379	3.21	0.851	3.123	3.295		

Source: own survey (2021)

As can be read from table 4.10.1, the awareness level of male students was rated with M=3.23 level; which was slightly above moderate level rating as indicated in the 95% CI range, 3.095-3.371. Female students were also found to have an average awareness level of M=3.19 in the 95% CI range of 3.08- 3.299. Thus, six of students was not a factor that determines the students' awareness level on environmental sustainability awareness level.

Table 4.10.2.Comparison of Environmental Sustainability Awareness level by Age Category

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Environmental Sustainability Awareness level	Below 15	14	3.11	0.803	2.649	3.576	0.398	0.810
	15 - 17	225	3.17	0.863	3.061	3.287		
	18 - 20	136	3.28	0.848	3.137	3.424		
	21- 24	3	3.14	0.143	2.788	3.498		
	Above24	1	3.00					
	Total	379	3.21	0.851	3.123	3.295		

Source: own survey (2021)

Students below 15 years of age had average awareness level of M=3.11. Students' with subsequent age categories have average awareness level of 3.174, 3.280, and 3.143. The 95% CI of the average awareness level of each category were found to have overlapped that indicated lack of significant difference among age groups. Moreover, the ANOVA test result with p-value=.81 >0.05 indicated lack of significant difference among students with different age levels. Hence, age of students was not a significant factor to determine their awareness level on environmental sustainability.

Table 4.10.3.Comparison of Environmental Sustainability Awareness Level by Grade of students'

		N	Mean	Std. Dev.	95% Confidence Interval for Mean		F-value	p-value
					Lower Bound	Upper Bound		
Environmental Sustainability Awareness level	Grade-9	110	3.09	0.932	2.913	3.266	1.897	0.130
	Grade-10	100	3.33	0.794	3.175	3.490		
	Grade-11	96	3.15	0.704	3.005	3.290		
	Grade-12	73	3.30	0.952	3.079	3.523		
	Total	379	3.21	0.851	3.123	3.295		

Source: own survey (2021)

Grade -9 Students' awareness level was M=3.09; and Grade-10 students assessed their awareness level with M=3.33 level. Senior classes, Grade-11 and Grade-12 students, awareness level on environmental sustainability was evaluated as m=3.147 and M=3.301, respectively. The 95% CI of the average awareness level of each grade level were found to have overlapped that indicated lack of significant difference among grade levels. Moreover the ANOVA test result with p-value=.13 >0.05 indicated lack of significant difference among students in different grade levels.

Over all the above findings were summarized as follows. In the case of students' sex, the result was contradicted with Degu(2013) finding who stated that there was a difference in the level of environmental awareness between male and female. But coincided with other researchers such as Kedir (2010) and Parwati1,et al.,(2020) who indicated that sex does not have effect on students' environmental literacy. Correspondence with these authors' interview participants explained the difference between male and female students regarding environmental awareness was not significant. Thus it is possible to conclude that the relationship between sex and environmental awareness varies with different context.

As to age of students it seems clear from the above findings that the result was not equivalent to the idea of researchers' example Kedir (2010) and Aminrad, et al.,(2011) who verified statistical significance effect of age on overall environmental awareness of students .However the result was consistent with Hailu (2007)who stated the overall influence of age was not

much. Thus to reconcile the above contradictory findings the relationship between environmental awareness and age level varies with different circumstances.

In the case grade level the result was coincided with Hailu (2007) who found that the effect of grade level on environmental awareness of students was not strong. In some cases increase in grade level does not necessarily mean increase in environmental awareness. So far learning should be meaningful and bring behavioral change. In this context to mean learning should help students to develop critical thinking and problem-solving skills; and utilize diverse educational approaches to be environmentally sensitive and responsible citizens. Hence, grade level of students was not a significant factor to determine their awareness level on environmental sustainability. Moreover, interview participants outlined no clear difference was observed in terms of environmental sustainability awareness of students at different grade level .In general, socio economic factors such sex, grade level and age influence on environmental awareness were not significant.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary

Fundamentally the study geared to high schools because these are where we have energetic and youth population who constituted a majority and most active group of the community. Hence enhancing environmental education in general and climate change education in particular is important to the achievement of goal of the country to build a green and resilient economy by 2030 and beyond.

The study implied that high schools fail to create favorable conditions for students to practice and engage themselves in environmental related activities. As majority of the students (62.3%) replied in their schools there was no suitable condition to promote environmental education.

Given the opinion of students (58.5%) and interview participants' responses, high schools did not provide relevant information for their students about current environmental problems.

About 63.8% of the students' response and opinion of interview informants implied that the environmental protection clubs were not effective in practicing environmental education.

Only 21.8 percent of students appreciated the schools' practice, based on 67 percent of students' responses. to include environmental information that allows students to participate in fieldwork Furthermore, the replies of interviewees revealed that high school subjects are lacking in information that encourages pupils to be task-oriented. This implies that education must be capable of preparing students for the future life.

Provided that 52 percent 19.3 percent of students' replies as well as data from interview respondents, the conclusion was that environmental education in high schools was not effectively supported by observation and field trip.

The research attendants' reflections both from quantitative and qualitative aspect (students' questionnaire and interview with school principals and environmental protection club patron teachers) indicated that students' involvement in the environmental related activities was very limited. To prove this argument statically figures justified, the number of students who participated in tree conservation, water conservation and questioning and answering

activities are 237(62.5%),68.1% and 64.9% respectively. The implication was therefore severe water loss, low vegetative cover, and low environmental concern.

Regarding challenges that hindered the implementation of environmental education in the respective high schools the following problems were identified through statistical analysis and data gathered from interview subjects. According to primary data analysis result, lack of resource was found to be the first major problem that high schools were faced.

Additionally .lack of support from the school administration was considered to be the second critical challenge followed by curriculum issues. Thus contents of environmental education in the curriculum should be revised by including contents that are decent, recent and interestingly presented. In the same angle of discussion teacher related problem was stood fourth overlapped with methodological problem .Finally students' interest was analyzed as the fifth major problem. Correspondence with their rank it is possible to express in statistically figure as 42.7, 37.5, 31.1, 29.8, 29.8 and 25.1respectively.Therefore all the above aforementioned challenges have quality implication i.e. ''Quality Environmental Education for All.''

The relative majority (58.0%) of students' were found to have moderate level of awareness. about environmental education .Only 26.1% of the students found themselves unaware or having level of awareness. In the same way the awareness level of students about causes of environmental pollution was summarized as the majority of students (55.9 %,) were found to have moderate level of awareness.

As to climate change effects and global warming the results about 54.9% were found to have moderate level of awareness on climate change and global warning. Whereas, 10.6% of the students rated their lack of awareness and 13.2% of students were found to have low level awareness regarding climate change and its effects on environmental sustainability. In the same vein of discussion majority of the students, 54.1%, were found to have rated their moderate awareness level about methods for conserving the environment.

The overall students' average awareness was computed with M=2.39 which was a low level awareness of the functions of their own school environmental club.

On the other hand most of the students about (M=2.73) i.e. nearly, 47.2%, reported that they have an intermediate level of awareness about green energy development. Similarly, the relative majority of students, 49.9%, were found to have moderate level of agreement about the causes of bio diversity losses.

Regarding, comparison of environmental education practice and environmental sustainability awareness by socio demographic factors statistical analyses the t-test result indicated that the awareness level of male students was rated with M=3.23 level; which was slightly above moderate level rating as indicated in the 95% CI range, 3.095-3.371. Female students were also found to have an average awareness level of M=3.19 in the 95% CI range of 3.08- 3.299. Thus the awareness level of male and female students was not differing significantly and sex factor in assessing the environmental awareness at high schools was not a significant factor.

In the same way, male and female students had also similar level of evaluating environmental education, engagement and awareness in the high schools. Moreover, the ANOVA test result with p-value=.81 >0.05 indicated lack of significant difference among students with different age levels. Hence, age of students was not a significant factor to determine their awareness level on environmental sustainability.

Similarly the ANOVA test result with p-value=.13 >0.05 indicated lack of significant difference among students in different grade levels. Hence, grade level of students was not a significant factor to determine their awareness level on environmental sustainability.

5.2. Conclusion

The study indicated that currently the practice of environmental education was given less attention in Arada Sub City high schools. It was also found that lack of resources was a hindrance for implementing environmental education in high schools. Moreover, students' interest and teachers' dedication, methodological and curriculum issues were discovered as major challenges in the practice of environmental education in the high schools of Arada Sub City. In the high schools under the study environmental protection clubs were not efficient. The overall qualitative and quantitative analysis of the result of the study revealed that students have moderate level of environmental sustainability awareness. Even though students had "moderate" level of environmental awareness, they felt so difficult to act and practice some attitudes in making their surrounding better. Students were least engaged in environmental related activities, practice of environmental education was poor at high schools. Students were not even showed more interest in joining environmental protection club and engage in environmental related activities in their high schools. It was also important to highlight that students' sex, grade level and age had no significant relation with environmental awareness.

5.3. Recommendations

The Ministry of Education must make sincere efforts to provide environmental education as an independent subject in high schools. Environmental education must be given special consideration in the new education system's road map.

This study advised that the EFCCC, Ministry of Education, Higher Education Institutions, NGO and religious community leaders, the mass media, and other stakeholders should educate the young generation and other members of society about current environmental issues.

In the case of integration of components of environmental education, concepts and ideas dealing with Current environmental problems and awareness must be adequately introduced into high school syllabus and subjects.

To optimize the overall efficiency of school environmental protection clubs, it is vital to maintain consistency and continuity of training for those clubs.

The Ministry of Education collaborated with university intellectuals, educational specialists, environmental scientists and experts, should improve the present environmental education content in the new education system road map.

Environmental education should be prioritized in the textbooks, laboratory manuals, instructors' guides, and other teaching–learning resource materials at high school levels and beyond.

The Ministry of Education should take the lion's share to fund the implementation of environmental education in high schools. Because resource is critical for effective implementation of .environmental education.

To overcome resource shortages and implement greening school compound program, the Ministry of Education should allocate environmental education grants to high schools as soon as possible.

The practice of environmental education was not possible without knowledgeable workforce. Therefore, teachers should seek long-term and short-term in-service training to strengthen their methodological capacity in their particular fields.

High schools should design mechanisms to encourage pupils to acquire environmentally friendly attitudes and form climate change awareness club.

To protect the environment, strong laws, regulations, and standards must be developed at all levels.

In addition to existing 12 code of conduct, “environmental conservation “should be incorporated as the 13th principle of code of conduct. Finally the study served as a base line for further research in the field of environmental education.

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APPENDIX I

Addis Ababa University

College of Development Studies

Department of Environment and Sustainable Development

Questionnaire for High School Students

General Direction

Dear Students, in the first place, I would like to say, thank you for your willingness to participate in the study. The objective of the research is for partial fulfillment of the requirements for the degree of Master of Arts in Environment and Sustainable Development in the Center of Environment and Development, College of Development Studies, Addis Ababa University. Entitled with ‘’The Practices of environmental education and its implications for environmental sustainability awareness.’’ The study of Arada Sub City high schools.

The questions in this questionnaire are for research purpose only and the finding of this study will be treated with utmost confidentiality. Hence, your assistance in answering the questions truthfully and accurately is highly appreciated.

Thank you in advance for your Cooperation!

Questionnaire for High School Students

Please, don‘t write your name. Write only your school name

School name _____

Socio-Demographic information

A. Gender 1. Male 2. Female

B. Age 1. Below 15 2. 15---17 3. 18----20 4.21---24 5. Above 25

C. Grade level 1. Grade 9 2.Grade 10 3.Grade 11 4. Grade 12

Section One: Questions focusing on the practice of environmental education

Direction: Read the statements in the following table carefully and rate the degree to what extent environmental education is practiced in the school.. Please put a tick mark ‘’√’’ on your respective best choice. Rate 1. Strongly disagree 2. Disagree 3. Undecided 4. Agree 5. Strongly agree.

		1	2	3	4	5
1	The school arranges suitable conditions for students to practice school environmental education effectively (example, provide training for school environmental protection club).					
2	The school is significantly contributing in providing necessary information for students about current environmental problems.					
3	The School environmental protection club is most effective in practicing environmental education					
4	Most subjects have adequate environmental education contents that invite students for fieldworks and practical activities.					
5	Most of the time the teaching method of Environmental education in your school is supported by direct field work practices (for example school compound observation, field trip and the like).					

Section Two: Questions focusing on the frequency of students' engagement in environment related activities. Please indicate the frequency that you engaged in the following environmental activities in your school shown in the table below. Please put a tick mark''√'' on your respective best choice. Rate: 1. Never 2. Rarely 3.Sometimes 4.Most often 5.Always.

Roll number	Questions	1	2	3	4	5
6	How often do you engage in activities that aimed conserving a natural environment (example, tree conservation)?					
7	How often do you engage in Environmental issues Questioning and Answering program that conducts in the school					
8	How often do you conduct activities related to water conservation?					
9	How often do you involve in field trip program arrange for students?					

Section Three: Questions focusing on Factors influencing the practices of environmental education

Direction: Rate the following challenges in the table below. Please put atick "√ " mark under your best choice using the following rating scale 1. Very seriously problem 2.Major problem 3.Moderate problem 4. Minor problem 5 Not at all problem

Roll number	Questions	1	2	3	4	5
10	Appropriateness of Teaching methods in addressing environmental issues					
11	Students interest to know more about environmental issues					
12	Access of Resources (example finance, skilled man power and others) in the practice of environmental education					
13	Environmental Education Integration into Secondary school subjects.					
14	Teachers' commitment and capacity to teach Environmental Education					
15	School administration supports for effective practice of Environmental Education.					

Section Four: Questions focusing on Environmental Sustainability Awareness

Direction: Rate your awareness level on the following environmental issues listed in the table below. Please put a tick mark under your best choice using the following rating scale. 1. Very highly aware 2. Highly aware 3.Moderately aware 4.Low awareness 5. Not aware at all and put a tick "√" mark on your respective choice.

Roll number	**Questions**	**1**	**2**	**3**	**4**	**5**
16	What is your level of awareness about environmental education					
17	To what extent do you aware about causes of environmental pollution?					
18	To what level do you aware about climate change effects of global warming?					
19	To what extent do you aware about methods of conserving the environment?					
20	To what extent do you aware about the function of School environmental club?					
21	What is your level of awareness about Environmentally friendly green energy building (energy comes from water, wind and sun)?					
22	To what extent do you aware about Loss of bio diversity?					

Thank you for your Participation!

Appendix III

Semi structured interview questions for school Environmental club patron teachers

Dear teacher, first I would like to say thank for taking time to assist me in this research endeavor .Participating in this MA thesis Survey is strictly voluntary. Thank you in advance for your cooperation.

School Name:

1. What seem the practices of environmental education in your school
2. How do you explain the effectiveness of environmental protection clubs in your school?
3. How do you evaluate school administrative support to enhance student's awareness for environmental sustainability?
4. What are the challenges that hinder the practices of environmental education in your school?
5. Do you believe environmental education should be given as separate subject in secondary schools?
6. What is expected from school administration to improve the current performance of environmental clubs at secondary schools?
7. Do you observe pedagogical problems in the teaching learning process of environmental education in your school?
8. How do you evaluate environmental sustainability awareness of students?

Thank you!

AppendixIV

Semi structured Interview questions for school principals

School Name: ———————————

Dear principals, first I would like to say thank for taking time to assist me in this research endeavor .Participating in this MA thesis Survey is strictly voluntary. Thank you in advance for your cooperation

1. What seem the practices of environmental education in your school ?
2. What are the challenges that hindered the implementation of environmental education in your school?
3. How do you evaluate environmental awareness of students in your school?
4. How do you support environmental protection club in your school?
5. Do you believe environmental education should be given as separate subject in secondary schools?
6. What is expected from school administration to improve the current performance of environmental clubs at secondary schools?
7. Do you observe pedagogical problems in the teaching learning process of environmental education in your school?
8. How do you evaluate environmental sustainability awareness of students?

Thank you!

Appendix VI

Photo graphs taken from Sent Gebreil and Meskerem high schools during data collection