

**CONTRIBUTION OF SECONDARY SCHOOLS VOLUNTARY
ENVIRONMENTAL CLUBS TO BEST ENVIRONMENTAL MANAGEMENT
PRACTICES IN SOUTH – ALEGO WARD, SIAYA COUNTY**

Jackline Awuor Okumu

**A Thesis Submitted in Partial Fulfilment of the Requirements for the
Award of the Degree of Masters of Science in Environment and Natural
Resource Management in the Department of Environment and Natural
Resources Management and the School of Science and Technology of
Africa Nazarene University**

August 2020

DECLARATION

I declare that this document and the research that it describes are my original work and that they have not been presented in any other university for academic work.

Jackline Awuor Okumu
15MO4DMEV001

This research was conducted under our supervision and is submitted with our approval as University supervisors

Dr. Mark Ndunda Mutinda

Dr. Victor Kiprotich Boiyo

Africa Nazarene University
Nairobi, Kenya

DEDICATION

This work is dedicated to my family for their unending support in my academics. Special thanks to Rev. Sr. Edith Smao Akinyi, Martin Ouma Okumu, Kevin Ajuul and Meaghan Edith Hawi. God bless you abundantly.

ACKNOWLEDGEMENT

This work was not possible without the support of many people that stood with me all the way. First and foremost I want to appreciate my God, who made everything possible, it was by his grace, mercy and love that I come this far. Special thanks to my two supervisors: Dr. Mark Ndunda Mutinda and Dr. Victor Kiprotich Boiyo for guiding me through the whole research process, May the almighty God bless you. My colleagues

TABLE OF CONTENTS

DECLARATION	i
DEDICATION.....	ii
ACKNOWLEDGEMENT.....	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	ix
LIST OF FIGURES	xii
ABSTRACT	xiii
DEFINITION OF TERMS.....	xiv
ABBREVIATION AND ACRONYMS	xv
 CHAPTER ONE	
INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Background of the Study	1
1.3 Statement of the Problem.....	4
1. 4 Purpose of the Study	5
1.5 Objectives of the Study	5
1.6 Research Questions	6
1.7 Significance of the Study	6
1.8 Scope of the Study	7
1.9. Delimitation of the Study.....	7
1.10 Limitations of the Study.....	8
1.11 Assumptions of the Study	8
1.12 Theoretical Framework.....	8
1.3 Conceptual Framework.....	9

CHAPTER TWO

LITERATURE REVIEW	12
2.2 Environmental Education in Kenya	12
2.3 Service-Learning Concept	13
2.4 Best Environmental Management Practices by Students in Schools.....	17
2.4.1 Creation of Environmental Awareness and Increased Knowledge.....	19
2.5 Contribution of Environmental Awareness to Management of Environmental Resources	22

CHAPTER THREE

RESEARCH METHODOLOGY	24
3.1 Introduction.....	24
3.2 Research Design.....	24
3.3 Research Site.....	25
3.4 Target Population.....	27
3.5 Study Sample	28
3.5.1 Sampling Procedure	28
3.5.2 Study Sample Size	28
3.6 Data Collection	29
3.6.1 Data Collection Instruments	29
3.6.2 Pilot Testing of Research Instrument.....	30
3.6.3 Instrument Reliability	31
3.6.4 Instrument Validity	31
3.6.5 Data Collection Procedures.....	31
3.7 Data Analysis	32
3.8 Ethical considerations	32

3.8.1 Respect to Participants' Autonomy	33
3.8.2 Confidentiality	33
3.8.3 Possible Risks	33
CHAPTER FOUR	
DATA ANALYSIS AND FINDINGS.....	35
4.1 Introduction.....	35
4.2 Characteristic of Secondary Schools in South Alego Ward	35
4.2.1 Name of Schools and Number of students Sampled.....	35
4.2.2 Length of Period the Schools were in Existence	36
4.3 Characteristics of Secondary Students in South Alego Ward.....	37
4.3.1 Age Distribution of the Secondary Students in Alego Ward.....	37
4.3.2 Sex of the Respondents.....	38
4.3.3 Level of Formal Education	39
4.4 Level of Best Environmental Management Practices among Secondary School Students in South Alego.....	39
4.5 Contribution of School Administration Policies on Environmental Management to Best Environmental Management Practices	42
4.5.1 School Administration Policies on Environmental Management.....	42
4.5.2 Determining the Contribution of School Administration Policies on Environment to BEMP.....	44
4.6 Characteristics Environmental Clubs Leadership and Best Environmental Management Practices	45
4.6.1 Characteristics of Environmental Club Leadership for Secondary schools in South Alego	46

4.6.2 Determination of the Contribution of Club Leaders Characteristics on Best Environmental Management Practices	48
4.7 Contribution of Student Awareness of Environmental Problems to Best Environmental Management Practices	53
4.7.1 Student Awareness of Environmental Problems.....	53
4.7.2 Determining the Contribution of Student Awareness of Environmental Problems to BEMP in South Alego Ward	54
4.8 Contribution of Student Environmental Knowledge to BEMP	56
4.8.1 Student Environmental Knowledge	56
4.8.2 Determination of the Contribution of Student Environmental Knowledge on Best Environmental Management Practices	57
4.9 Contribution of External Assistance to Best Environmental Management Practices	59
4.9.1 Level of External Assistance to Environmental Management.....	59
4.9.2 Assessing the Contribution of External Assistance on BEMP	62
CHAPTER FIVE	
DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS	64
5.1 Introduction.....	64
5.2 Discussions	64
5.2.1 Characteristics of the Secondary School Students in South Alego.....	64
5.2.2 Contribution of School Administration Policies to Best Environmental Management Practices	66
5.2.3 Contribution of Leadership Characteristics to Best Environmental Management Practices	67

5.2.4 Contribution of Environmental Awareness to Best Environmental Management Practices	68
5.2.5 Contribution of Environmental Knowledge to Best Environmental Management Practices	70
5.2.6 Contribution of External Assistance to Best Environmental Management Practices	72
5.3 Conclusions.....	72
5.4 Recommendations.....	73
5.5 Recommendations for Further Studies.....	74
REFERENCES.....	75
APPENDICES	82
Appendix A: Questionnaire for Students	82
Appendix C: Consent Forms.....	93
Appendix D: Consent Forms for Students	96
Appendix E: Letter of Approval from ANU.....	99
Appendix F: Research Permit from NACOSTI.....	100

LIST OF TABLES

Table 3.1: Summary of Data Analysis and Statistical Tools	34
Table 4.1: Schools and Number of students Interviewed	36
Table 4.2: length of Period Schools Have been in Existence	37
Table 4.3: Descriptive Statistics and Frequency Distribution for the Age of Secondary Students in Alego Ward	38
Table 4.4 Sex of the Respondents.....	38
Table 4.5: Frequency Distribution of Students in the Four	39
Table 4.6: Descriptive Statistics for the Indicators Forming the Level of Best Environmental Management Practices Undertaken by Students in South Alego Ward.....	40
Table 4.7: Level of Best Environmental Management Practices Undertaken by Secondary School Students in South Alego.....	41
Table 4.8: Chi-square Test for the Equality of Categories for the Level of BEMP Undertaken by Students in South Alego	41
Table 4.9: Mean Differences between the Male and Female Students using t-test	42
Table 4.10: Descriptive Statistics and Frequency Distribution of Input of School Administration to Environmental Management.....	43
Table 4.11: Regression Model Summary for School Administration Policy and Best Environmental Practices undertaken by Students.....	44
Table 4.12: ANOVA Table for the Regression Testing the Fit of the Model	44
Table 4.13: Regression Coefficients for School Administration Policy and Best Environmental Management practices Undertaken by Students	45
Table 4.14: Sex of Environmental Club Leaders.....	46
Table 4.15: Formal Education Level of the Environmental Club Leaders	47

Table 4.16: Area of Professional Specialization for Environmental Club Leaders	47
Table 4.17: Mean Comparison between the Male and Female Club Leaders	48
Table 4.18: Descriptive Statistics for BEMP for the Level Education	49
Table 4.19: ANOVA Table for Mean Comparisons Showing the F-test.....	49
Table 4.20: Pairwise Comparisons	50
Table 4.21: Descriptive Statistics for BEMP for the Professional Specialization.....	51
Table 4.22: ANOVA Table for Mean Comparisons showing the F-test	52
Table 4.23: Pairwise Comparisons	52
Table 4.24: Descriptive Statistics and Frequency Distribution of Level of student Awareness in Alego Ward	54
Table 4.25: Regression Model Summary for Student Awareness and Best Environmental Management Practices undertaken by Students	55
Table 4.27: Regression Coefficients for Level of awareness and Best Environmental Management Practices Undertaken by Students.....	56
Table 4.28: Descriptive Statistics and Frequency Distribution of the Variable Student Knowledge of Environmental Management in South Alego.....	57
Table 4.29: Regression Model Summary for Student Awareness and Best Environmental Management Practices Undertaken by Students	58
Table 4.29: ANOVA Table for the Regression Testing the Fit of the Model	58
Table 4.30: Regression Coefficients for Level of Knowledge and Best Environmental Management Practices Undertaken by Students.....	58
Table 4.31: Descriptive Statistics for the Indicators Forming the Level of External Assistance in South Alego Secondary Schools.....	60
Table 4.32: Level of External Assistance in Environmental Management Provided to Secondary Schools in South Alego Ward.....	61

Table 4.33: Organizations Providing External Assistance to Environmental Management in South Alego Secondary Schools	61
Table 4.34: Regression Model Summary for External Assistance and Best Environmental Management Practices Undertaken by Students	62
Table 4.35: ANOVA Table for the Regression Testing the Fit of the Model	63
Table 4.36: Regression Coefficients for Level of External Assistance and Best Environmental Management Practices Undertaken by Students	63

LIST OF FIGURES

Figure 1: Conceptual framework showing the contribution of voluntary environmental clubs to best environmental management practices undertaken by secondary school students in South Alego, Siaya County	11
Figure 2: Influence of Environmental Clubs on Students.....	17
Figure 3: Map of Siaya County showing the study site	27

ABSTRACT

Environmental resources are key in supporting life systems and their destruction can lead to adverse effects on human wellbeing. In the management of environmental resources several intervention measures and strategies have been considered. Among these are the use of the school curriculum to enhance public awareness of the need for environmental preservation and protection. This study seeks to investigate the contribution of secondary school environmental clubs to best environmental management practices (BEMP) in South Alego ward, Siaya County. The objectives of the study were to determine the contribution of the following factors: (i) school administration policies on environmental management, (ii) characteristics of leadership of environmental clubs, (iii) student knowledge of environmental management, (iv) student awareness of environmental problems and (v) assistance from external agencies to BEMP. A descriptive research design was used. A Stratified random sample of 168 secondary school students who were members of environmental clubs were selected and interviewed using a structured questionnaire. The data were analysed using descriptive (means, median, mode and frequency distributions and inferential statistics (regression and *t*-test). The results showed that BEMP of students had a mean score of 2.64 on a scale of between 0 and 7 with 44 % of the students falling between 4 and 7. Positive statistical significant contributions to best environmental management practices undertaken by secondary students were found to exist between; school administration policy on environmental management ($\beta=0.336$, $t=4.58$, $p<0.001$), student awareness of environmental problems ($\beta=0.785$, $t=16.31$, $p<0.001$), student knowledge in environmental management ($\beta=0.802$, $t=17.28$, $p<0.001$) and external assistance from organizations ($\beta=0.698$, $t=12.54$, $p<0.001$). Leadership of environmental clubs (age, sex, professional specialization) had no significant contributions, while level of formal education had positive contribution to BEMP. A comprehensive integrated environmental management plan was recommended which will involve: training students to enhance their knowledge, creating awareness of environmental problems and providing assistance to environmental practices. The findings from this study will be useful in advising the education stakeholders on the way forward in developing best environmental practices among students in the south Alego ward, Siaya County.

DEFINITION OF TERMS

Ecosystem Services (ES): Defined as benefits provided by the ecosystem to society, are essential to human well-being

Environmental Education: Is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among humans, their culture, and their biophysical surroundings (International Union for Conservation of Nature, 2010).

ABBREVIATION AND ACRONYMS

BEMP Best Environmental Management Practices

JICA

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The study was an assessment of the contribution of secondary schools voluntary environmental clubs to best environmental management practices in South – Alego ward, Siaya County. The five (5) independent variables that were covered in this study, included: school administration policy on environmental management, leadership of voluntary environmental clubs, Student awareness of environmental problems in their locality, student knowledge on Best Environmental Management Practices (BEMP), and external assistance received by the environmental Clubs. The dependent variable was the level of Best Environmental Management Practices undertaken by the voluntary environmental club members. This chapter introduces the study under the following sub-headings: background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, scope of the study, delimitation of the study, limitations of the study, assumptions of the study, theoretical framework, and conceptual framework.

1.2 Background of the Study

Environmental challenges have become a major concern that need redress using various approaches and at multiple levels. The environmental degradation we see today is due to increased human consumption of natural resources that began during the industrial revolution (Toili, 2007). As the population increases, human needs also increase leading to extensive exploitation of environmental resources. Some of the major environmental problems in Kenya today include: air and water pollution, soil erosion, unmonitored garbage disposal, deforestation, endangered wildlife species,

drought, famine and floods (JICA, 2002). Environmental resources are key in supporting life systems and continuing in the destruction path can lead to adverse effects on human life.

Consequently, several intervention measures and strategies have been considered. Among these are the use of the school curriculum to enhance public awareness of the need for environmental preservation and protection (Alshuwaikhat & Abubakar, 2008). Schools as training grounds can be used to sensitize and educate people on natural resource conservation and environmental management best practices. Education in all its forms and at all levels is not only an end in itself but one of the instruments for initiating changes required to achieve sustainable development (UNEP, 2002). Environmental conservation and protection is not a topic easily confined to school hours (Falk, 2005). This is because people's knowledge and understanding of environmental processes are ever changing. Also, the present school curriculum in Kenya cannot be relied upon wholly to teach environmental issues because in most parts the curriculum introduces the topics but does not give details on the issues raised (Mbwesa, 1996; Perrot, 1977).

Nonetheless, Kerlinger (1986) observed that the development trends were not sustainable and that public awareness, education and training were required to move the society towards sustainability. As such, apart from introducing environmental education in schools' curriculum, co-curricular Clubs (CCC) in secondary schools were introduced. The co-curricular clubs emphasized on awareness, knowledge and environmental ethics and with some participation in local community based environmental activities (Mwangangi, 2007). Therefore, environmental education,

both in and outside of the classroom, aims to facilitate adoption of sustainable practice by school students (Ballantyne & Packer, 2005). In Kenya, the co-curricular clubs have been dubbed different names depending on the primary area of focus: agro-forestry club, Kenya Wildlife Club, 4K club and Environment club. The disaggregation of clubs with a similar aim of conserving the environment can be related to the era before harmonization of Acts that protected natural resources. Despite the varied approaches and targets to environmental conservation, some of the clubs have been observed to benefit schools by saving energy and cost, promote use of natural manure without much cost, recycling of waste, recycling of water and reduction in pollution (Wanjiru, 2011).

There is scanty information about the environmental clubs but a few that exist posit that the environmental clubs provide opportunity to champion for environmental responsibility and sustainability among the members. In addition, the clubs offer critical life skills such as confidence building, problem solving, creativity and critical thinking, skills that are necessary to enhance environmental education (Ndaruga, 2004; Mbwesa, 1996). Furthermore, it is observed that school based clubs instill environmental education using an interdisciplinary approach (Muthoka et al, 1998). These are positive impacts; however, it is not known whether environmental clubs in Siaya sub-county offer similar benefits. The objective of this research study is to evaluate and assess contributions of secondary school environmental clubs to environmental management best practices. Presently, there is little information regarding whether these environmental clubs are useful in addressing the present environmental challenges.

1.3 Statement of the Problem

Environmental problems in Kenya are growing with the increased population size and economic growth. The current reactive approaches to conservation and protection of natural resources are inadequate. As a result, heaps of solid wastes are increasing in urban areas, rivers are getting polluted, forests are getting depleted, and water towers are drying up, increased human wildlife contact, altered rainfall pattern and soil erosion. Much of the environmental degradation we see today is the result of increased human consumption of natural resources.

Creating awareness and educating young Kenyans in environmental conservation is one of the pro-active measures that have been introduced in schools since 1985. Despite the existence of environmental education for more than two decades, concern has been raised that students do not adequately participate in protecting and enhancing environmental quality. Some of the challenges with these school environmental clubs include: lack of commitment by the school administration to support club activities, lack of champion teachers to nurture the clubs, lack of financial support from parents, inadequate tools for conservation activities and limited school hours to engage in club activities. Although there are numerous challenges, some schools have voluntarily established environmental clubs to promote environmental awareness, impart conservation skills and enhance environmental management best practices. While the concept of environmental clubs introduces service learning components in environmental education, the stated challenges potentially discounts benefits that could be gained from the establishment of the environmental clubs. In addition, little information exists regarding the objectives and organizational structures of the environmental clubs in Siaya sub-county secondary schools. This study therefore was

designed to study the contribution of these environmental clubs on the best environmental management practices in Alego ward Siaya County

1.4 Purpose of the Study

The purpose of this research study was to examine the extent to which environmental clubs in secondary schools contribute to the best environmental management practices in Siaya County.

1.5 Objectives of the Study

The objectives that guided this study were:

- (i) To determine the contribution of school administration policies to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County
- (ii) To examine the contribution of environmental clubs leadership characteristics (age, sex, education level, area of specialization) to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County
- (iii) To determine the contribution of student awareness of environmental problems to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County
- (iv) To assess the contribution of students environmental knowledge to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County
- (v) To assess the contribution of external assistance on best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County

1.6 Research Questions

This study sought to answer the following research questions:

- (i) What are the contributions of school administration policies to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County?
- (ii) What are the contributions of leadership characteristics to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County?
- (iii) What are the contributions of environmental awareness to best environmental management practices undertaken by secondary school students in South Alego, Siaya County?
- (iv) What are the contribution of student environmental knowledge to best environmental management practices undertaken by secondary school students in South Alego, Siaya County?
- (v) What are the contribution of external assistance on best environmental management practices undertaken by secondary school students in South Alego, Siaya County?

1.7 Significance of the Study

School environmental clubs provide a platform to sensitize and offer a practical experience to young citizens on best environmental management practices. This is because the environmental club activities not only enable continuity of the classroom lessons but also provide opportunities to interact with the real-world/environment. Involvement of students in environmental conservation activities presents an opportunity to the students to develop positive attitudes, acquire knowledge and eventually grow into responsible environmental conscious citizens. Despite the possible benefits from the school environmental clubs, there are

hindrances/limitations to establishing effective school environmental clubs in the present Kenyan school system.

This research study was set to determine contributions of the voluntary secondary school environmental clubs that is, whether the environmental club activities improve students' awareness, knowledge and eventually transform their environmental behaviors. Further, the research study gathered information on factors that limit and also those that enhance effectiveness of the school environmental clubs. Consequently, research study findings will be useful in improving the effectiveness of the school environmental clubs, which in turn also inculcate positive environmental attitudes among students.

1.8 Scope of the Study

This study was conducted in 23 mixed secondary day schools in South Alego ward in Siaya County, Kenya. Half of the schools had environmental clubs, while the rest did not have. Siaya County covers land area of 2,530 km² and water surface of 1,005 Km².

1.9. Delimitation of the Study

The study covered only one ward in Siaya County, due to time and logistical constrains. The study covered only four independent variables that were considered to be relevant to the students and this locality. The independent factors selected included: school administration policy on environmental management, leadership of voluntary environmental clubs, Student awareness of environmental problems in their locality, student knowledge on Best Environmental Management Practices (BEMP),

while the dependent variable was level of BEMP undertaken by the members of voluntary environmental clubs in secondary schools in South Alego ward.

1.10 Limitations of the Study

The schools used in this study were scattered all over the rural areas of South Alego ward and the researcher had to travel using motorbikes along dusty, rural roads. To the schools.

1.11 Assumptions of the Study

The study assumed that the student respondents were truthful and that the responses they provided were true

1.12 Theoretical Framework

The Theory of Planned Behavior Icek Ajzen's (2002) Theory of Planned Behavior (TPB) serves as the theoretical framework for this study. The TPB is a widely used explanatory model for predicting behavioral intentions and subsequent behaviors (Armitage & Christian, 2004). The TPB is an extended model of Ajzen and Fishbein's (1980) Theory of Reasoned Actions (TRA). Both theories state that an individual's attitude toward a behavior and the perceived attitudes of others relate to their behavioral intentions. The TPB goes beyond the TRA in that it includes an individual's perception that they have the ability and/or choice to engage in the behavior under study. This additional element of the TPB is especially important to our study of principals' behavioral intentions because principals typically must lead within broader district and state policy guidelines. Therefore, it may be possible that a school leader would have positive attitudes regarding green school practices (attitudes); and would have the support of students and faculty to engage in green school practices (subjective norms); but not believe that the decision making power to

do so was his/hers (perceived behavioral control). According to the TPB, to predict whether a person intends to do something, we need to know (i) whether the person is in favor of doing it (attitude); (ii) how much the person feels social pressure to do it (subjective norm) and (iii) whether the person feels in control of the action in question (perceived behavioral control) (Francis et al., 2004). These three predictors: attitude, subjective norm and perceived behavioral control, are the 3 main determinants of behavioral intentions. Modal salient beliefs influence each of these three direct determinants of behavioral intention (Lee, Cerreto & Lee, 2010). This elicitation study collected these modal salient beliefs from a diverse group of school leaders across the United States.

1.3 Conceptual Framework

The study will be guided by the following five (5) independent factors: school administrative policies, club leadership characteristics, student awareness of environmental problems in their locality, student knowledge on environmental issues and external assistance provided to the environmental club which were hypothesized to have a direct effect on the dependent variable, best environmental management practices of students in South Alego ward. It was also recognized that climatic factors could intervene in the whole relationship. The variables and their relationships are shown in Figure 1.1.

The independent variable school administration policy on environmental management referred to all the administration was providing to enable the environmental club to undertake best environmental practices. The activities included provision of inputs such as tree seedlings, school garden or enclosures, equipment and tools, and provision of environmental education. External assistance for environmental practices

included all activities that were performed by organizations, companies and industry, these included: sponsorship of activities such as environmental debates, purchase of trophies for competition, printing of literature, environmental projects and other interventions such as buying water tanks and green schools concept. Environmental club leadership was the characteristics of the club patron, who was a teacher in the school appointed by the administration to guide the students. Two variables related directly to the student's knowledge on environmental management and awareness of environmental problems were also considered. The dependent variable, best environmental management practices, was defined as all activities undertaken by the students to improve the environment, this included nine activities that were common within the environmental clubs.

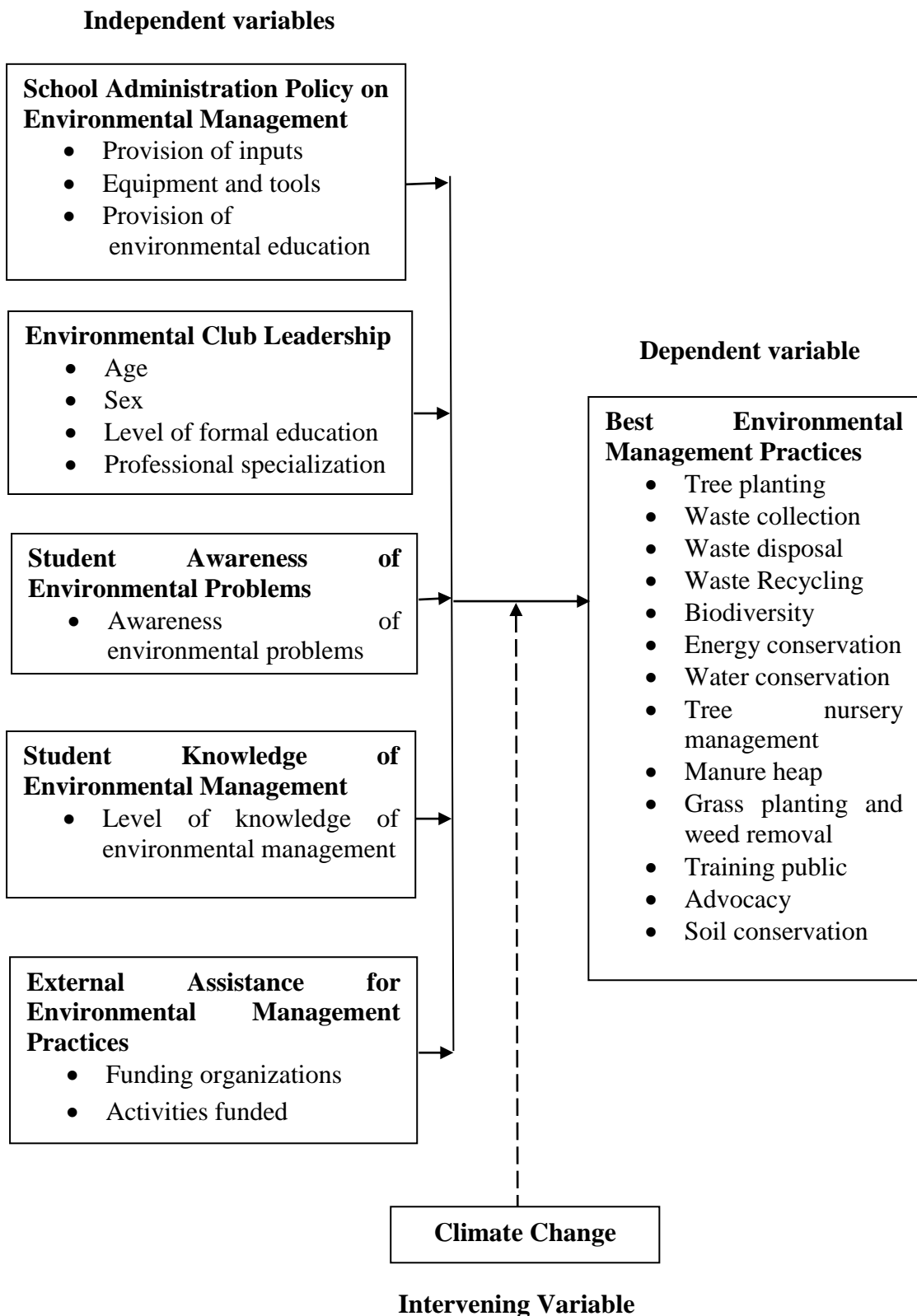


Figure 1: Conceptual framework showing the contribution of voluntary environmental clubs to best environmental management practices undertaken by secondary school students in South Alego, Siaya County

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter deals with a review of literature on the study variables. The variables formed the sections and sub-sections of this chapter.

2.2 Environmental Education in Kenya

Environmental education is important to prevent environmental degradation. According to Johnson-Pynn and Johnson (2005), environmental education programs for youths that include service learning components have great potential to impact the psychosocial development of youth and enhance their life chances. In 1972, the United Nations Conference on the Human Environment held in Stockholm urged all countries of the world to incorporate environmental education in their curricula at all levels of education (Toili, 2007).

In Kenya, environmental education has been incorporated in form of subjects such as Geography and Biology, and in 1990s, colleges and Universities started offering environmental art and science courses. Environmental education should provide individuals and social groups with an opportunity to be actively involved at all levels working towards the resolution of environmental problems. For secondary school students to develop into leaders who can champion environmental management best practices, they need a holistic learning approach. Researchers seem to agree that leadership development is a nonlinear process that involves cognitive (i.e., engaging in activities that build intellectual awareness and knowledge); affective (i.e., enhancing emotional awareness and affective growth), and behavioral (i.e., building skills and changing behavior) elements (Pless & Maak, 2011).

Therefore, through environmental education, school children are obliged to participate actively in guarding the quality of the environment. This is because environmental education should not just inform but inculcate some sense of responsibility (Altin et al., 2014). Ingredients needed to achieve the goal of people's ability to identify and address environmental problems include: awareness, knowledge, concern for the environment, and skills (Chawla & Cushing, 2007). While environmental education can impart knowledge and skills, it is not obvious that environmentally sensitized/educated individually automatically swings to actions to protect the environment. The antecedents to action are much more complex than acquisition of knowledge and skills (Chawla & Cushing, 2007).

2.3 Service-Learning Concept

The concept of service-learning was coined in 1967 by Robert Sigmon and William Ramsey at the Southern Regional Education Board (Sigmon, 1990). Service-learning, which advocates for acceptable/agreeable experience is imperative in enhancing application of the classroom knowledge. Service-learning pedagogy focuses on interacting with the environment within the context of real-world experiences (Johnson-Pynn & Johnson, 2005). According to Dewey, service-learning has two important principles: (i) Principle of continuity, which requires that all experiences occur along a continuum called the experiential continuum. (ii). Principle of interaction, which is the lateral dimension of experience where the internal and objective aspects of experience interact to form a situation. This principle emphasizes that learning results from the transaction between the individual and the environment (World Bank, 2012). Therefore, for knowledge to be usable through recall and application it has to be acquired in a situation; otherwise it is aggregated from experience and is forgotten or not available for transfer to new experiences (Giles Jr.

& Eyster, 1994). Involving school-aged youth in service learning facilitates recognition of the collective power to effect positive change in communities and enhances the likelihood that civic responsibility will sustain into adulthood.

Research has shown that gaining environmental knowledge through service learning cultivates positive attitudes toward the environment (Bradley, Waliczek, & Zajicek, 1999). Service learning concept describes learning as a process, not an outcome; learning is rooted in experience; learning requires the learner to resolve the tension between dialectically opposed demands; learning is a holistic process; learning involves the interplay between a person and the environment; and learning results in knowledge creation (Kashyap, Mir, & Iyer, 2006; Kayes, 2002). Service learning emphasizes on assignments for moral development (Boss, 1994; Markus, Howard, & King, 1993).

Secondary school students are usually receptive and strongly motivated and are capable of understanding the implications of environmental destruction and of trying to take preventive action (UNEP, 1990). Through subjects such as Geography, Biology, Home science and Economics; environmental education has been delivered in the Kenyan secondary schools for decades. The measure of responsible environmental behavior in environmental education focuses on private actions such as: turning off unneeded lights, recycling, composting, green purchasing, sorting solid wastes, sensitizing others on natural resource conservation, participating in soil conservation activities such as planting trees and attending environmental workshops/campaigns (Chawla & Cushing, 2007).

In order to promote application of environmental skills in daily lives of the Kenyan secondary school students, environmental clubs with objectives of addressing environmental problems were introduced in schools. The clubs provide opportunities for the students to exercise skills gained in classrooms in the real life situation. For example, through environmental clubs students have visited various places of environmental interests such as Dandora solid waste dumping site in Nairobi and Moi stadium solid waste dump site in Kisumu, protected areas such as national parks, Menengai crater, and Kakamega forest (McDuff, 2010). Through such visits, students are sensitized on the importance of resources and problems that they are facing. In addition to being exposed to sites of interests, clubs provide practical learning opportunities to students, which can in turn impact on their environmental behaviours when at home. One such practical learning opportunities is planting trees to protect eroded soils. It is assumed by some that increased knowledge about the environment promotes positive attitudes (Arcury, 1990). Some researchers have reported that junior high and high school students exposed to environmental courses demonstrated an increase in responsible environmental behavior and an increased awareness of environmental issues (Jaus, 1984; Jordan et al., 1986; J. M. Ramsey, 1993; C. E. Ramsey & Rickson. 1976).

In the preschool and elementary school years, small-scale actions at the level of the classroom, the school yard and the local environment are most appropriate. Young people's environmental attitude is important because they are affected by and will need solutions to environmental problems arising from present day actions. Young people's attitudes towards the environment start to develop at an early stage (Bryant & Hungerford, 1977). However, there are challenges to environmental education in

schools that include lack of time, resources and funding (McDuff, 2010; Ozer, 2007). These challenges have deterred introduction of environmental clubs in some schools and also limited benefits of the clubs in schools that have introduced them. Nonetheless, given the conservation activities of the environmental clubs in schools, there are benefits to students and to the schools. McDuff (2010, p. 384) reported: Conservation organizations for students can provide experiences in outdoor settings, increase knowledge environmental issues, identify roles for youth in conservation action, and develop responsible environmental behavior among youth.

The statement presents key elements for students to cultivate interest in resource conservation. Further, these elements are most likely obtained from participation in school environmental clubs. In 2010, McDuff reported that many leading conservationists in Kenya were wildlife club members when they were students. Through environmental clubs such as wildlife club established in 1968, communities and the nation as whole have gained from the conservation initiatives such as anti-poaching campaigns and re-afforestation. In this sense, the school environmental club activities, where effective have the potential to achieve benefits illustrated in Figure 2.

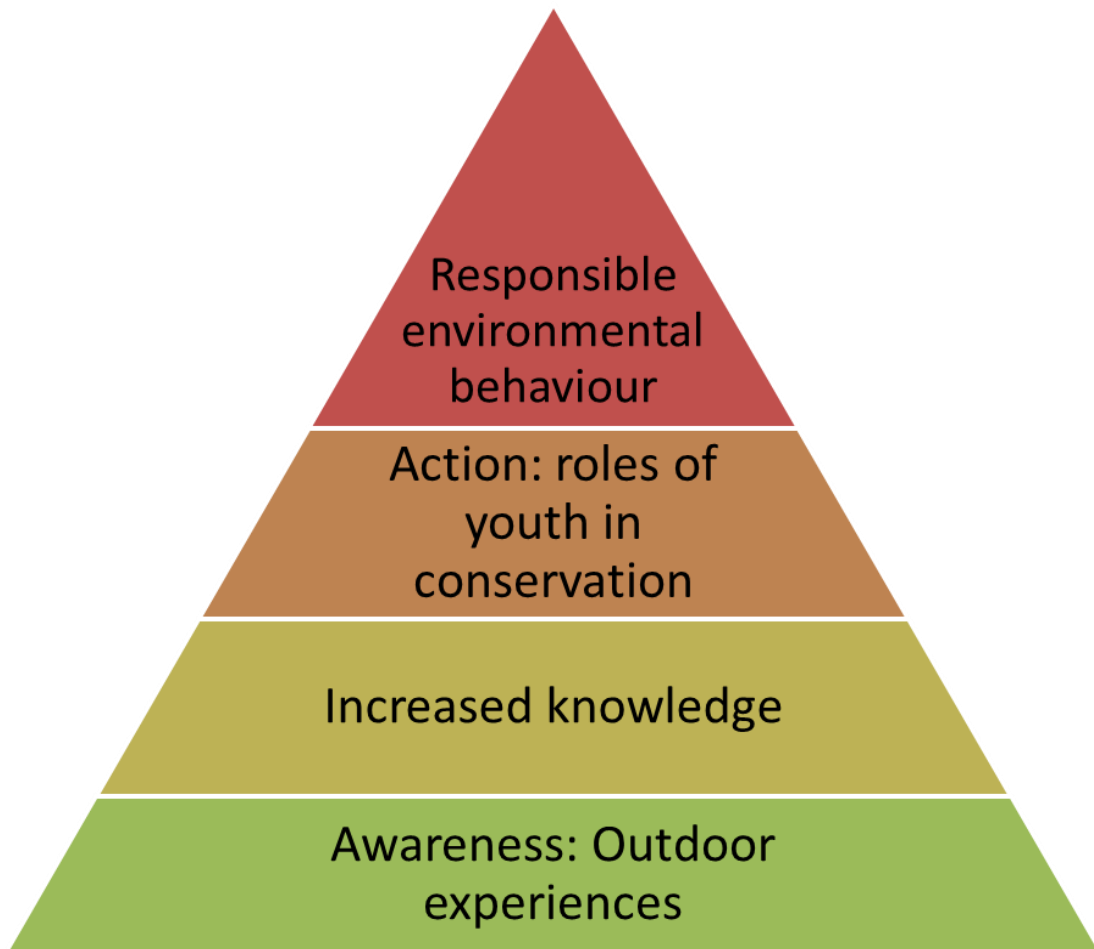


Figure 2: Influence of Environmental Clubs on Students

The focuses of some environmental clubs such as wildlife club have been on: conservation activities and institutional structures (McDuff, 2010). The conservation activities target wildlife/environmental awareness, anti-poaching, exposure to national parks, local environmental action, pollution, women and environmental lobbying. Besides, institutional focus activities have targeted creating networks, and teacher and student training.

2.4 Best Environmental Management Practices by Students in Schools

The term best environmental practice (BEP) means the application of the most appropriate combination of environmental control measures and strategies. In making

a selection for individual cases, at least the following graduated range of measures should be considered:

- (i) the provision of information and education to the public and to users about the environmental consequences of choice of particular activities and choice of products, their use and ultimate disposal;
- (ii) the development and application of codes of good environmental practice which covers all aspect of the activity in the product's life;
- (iii) the mandatory application of labels informing users of environmental risks related to a product, its use and ultimate disposal;
- (iv) saving resources, including energy;
- (v) making collection and disposal systems available to the public;
- (vi) avoiding the use of hazardous substances or products and the generation of hazardous waste;
- (vii) recycling, recovery and re-use;
- (viii) the application of economic instruments to activities, products or groups of products
- (ix) establishing a system of licensing, involving a range of restrictions or a ban

Best environmental management practices should address holistic environmental concerns such as different resource commitments, and should target a wide range of goals and objectives. These environmental management practices are undertaken by the government as laws meant for firms to undertake or are applied voluntary by some firms and for the management practices to enhance sustainable development there must be harmonization of the laws across all sectors of the economy (Nyirenda & Ngwakwe, 2014). Scroufe, Narasimhan, Montabon, and Wang (2002) after a review

of literature, classified the Best Environmental Management Practices into three major categories to encompass all the practices as follows: (i) Operational practices, composed of three waste management dealing with reduce, recycle, and reuse of wastes, (ii) Tactical practices, involving life cycle assessment, supply chain management, and environmental performance, and (iii) Strategic practices; involving aspects such as Corporate social responsibility, environmental strategies, policies and programmes.

2.4.1 Creation of Environmental Awareness and Increased Knowledge

Environmental clubs, provide opportunity for service learning that enhances text book knowledge that students acquire within the limits of classroom walls (Shumer, 1993). Most environmental club activities are conducted outside the classroom where students interact with nature and are able to apply their classroom knowledge in the real world. For example, the 4K clubs in Kenya provided opportunities to students to practice planting crops while observing soil conservation techniques. In Tanzania and Uganda, environmental clubs were reported to have increased conservation knowledge, fostered members personal and social development and raised community awareness (Johnson-Pynn & Johnson, 2005). The model of school gardens in the United States of America (USA) was viewed as outdoor “learning laboratories” (Ozer, 2007). The school gardens were further used to teach and practice sustainable waste management techniques such as composting and recycling.

Through environmental clubs, workshops and conferences are organized where students get opportunity to share ideas and learn about specific environmental issues of concern. For such environmental awareness activities to take place there is need for a champion teacher, support from the school administration, availability of funds and a network of environmental organizations interested in working with school environmental clubs (Flannery, Sugai, &

Anderson, 2009). In Kenya, World Environment Day on 5th of every June provides opportunity to students to join with others to celebrate and get sensitized on current environmental concerns (Ndaruga, 2003). One of the annual environmental clubs' activities in Kenya is joining with other interest parties to conduct a cleaning or conservation activity such as sweeping streets, cleaning polluted rivers and planting trees. Environmental day themes have relevance to social issues in Kenya. Consequently, active environmental club members get an opportunity to learn current environmental concerns.

Recent studies have conveyed the importance of value-based leadership through the construct of authentic leadership. These studies define authentic leadership as promoting a positive internalized moral perspective and show that authentic leadership is positively related to key organizational outcomes such as job satisfaction and work performance (Bird, Wang, Watson, & Murray, 2009, 2012; Leroy, Palanski, & Simons, 2011; Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008).

Avolio, Gardner, Walumbwa, Luthans, and May (2004) describe authentic leaders as follows: "They know who they are, what they believe and value and they act upon those values and beliefs while transparently interacting with others" (p. 801). George, Sims, McLean, and Mayer (2007) reported that authentic leaders "develop self-**awareness** from their experiences; act on that awareness by practicing their values, sometimes at substantial risk; balance their motivations with both internal and external drives; keep a strong support team around themselves; and, live integrated, grounded lives" (pp. 131-132). Preliminary efforts to implement authentic leadership (Gardner, Avolio,

Preliminary efforts to implement authentic leadership (Gardner, Avolio, Luthans, May, & Walumbwa, 2005; Kermis, 2003; Walumbwa et al., 2008) have revealed certain characteristics required of authentic leaders: (a) self-awareness—a heightened awareness of the world they live in, awareness of their strengths and weaknesses and awareness of their impact on other people, and how other perceive them; (b) relational transparency—exercising behaviors that promote trust, such as openly sharing information, true thoughts and feelings while minimizing displays of inappropriate emotions; (c) balanced processing—being able to objectively analyze all relevant data and solicit sufficient opinions and viewpoints of others before making a decision; and (d) internal moral perspective—having internal moral standards and values when facing group, organizational, and societal pressures, reflecting the extent to which they are willing to fight for high standards of moral and ethical conduct. Authentic leadership

2.4.2 Responsible Environmental Behavior

For decades, man's desires for physical comfort, mobility, relief from labour, enjoyment, power, status, personal security and maintenance of tradition and family have resulted in adverse environmental impacts (Stern, 2000). The concept of sustainability is relatively new and is yet to be fully understood and applied in daily practice. Sustainability requires that man evaluates his/her actions to ensure that his/her behavior has an intention to benefit the environment (Stern, 2000). As a group, individuals can engage in responsible environmental behaviors as: petitioning on environmental issues, joining and contributing to organizations, support of public policies such as environmental regulations (Dietz, Stern, & Guagnano, 1998). Secondary school students, through such group actions, are able to cultivate positive environmental behaviors (Flannery et al., 2009).

Experiences in secondary schools and colleges have assisted some people identify their career path early in life (McDuff, 2010). This is because as individuals participate in conservation or other activities, they continuously develop interest/positive attitude and also acquire knowledge and skills, which eventually facilitate their life-long career. Individuals whose behaviors have been transformed to be environmentally conscious can be identified even through simple behaviors like: switching off lights when not needed, turning off taps when water is leaking, plant trees, avoid unnecessary packages, sort wastes, recycle materials and avoid littering/pollution of water bodies. These are some qualities that could be visible among students who are members of the environmental clubs. Environmental clubs enhance awareness, knowledge and environmental ethics, and promote participation in local community based environmental activities (Mwangangi, 2007). Environmental education aims to facilitate adoption of sustainable practice by school students (Ballantyne & Packer, 2005).

2.5 Contribution of Environmental Awareness to Management of Environmental Resources

Environmental awareness is referred as awareness to the environmental issues and active involvement in environmental organizations (Altin et al. 2014). It means being aware of the natural environment and making choices that benefit--rather than hurt--the earth. Environmental awareness is a trigger to nurture positive attitudes and affection towards positive environmental behaviour (Karatekin, 2014).

Environmental awareness has three (3) concepts that include emotional, attitude and practice of sustainability awareness. With the motivating of psychological factors and

emotional forces, the intention to conduct the series of environmentally friendly actions is driven (Hassan, Noordin & Sulaiman, 2010).

In order to avert environmental disasters, the public has to first be made aware of the problem for them to react positively to it. This means that best environmental behaviour among individuals in a population tends to follow awareness, especially when addressing the determinants of the environmental issues (Klößner, 2013). The government in planning of policies aimed at protecting the environment must take into consideration of the people's awareness of the same. Environmental behaviour is not solely established but predicted by environmental awareness and values that considered might influence the specific behaviour or commitment. Apparently, the fact that poor environmental behaviour can degrade environmental quality has increasingly gained attention among researchers and policy makers (Klößner, 2013).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focused on the methodology used in this study. The chapter discussed research design, study area, target population, sample size determination, sampling procedures, and data collection instruments, data collection procedures which entailed pre-testing of study instruments, validity and reliability. Data analysis, logical and ethical considerations were also discussed.

3.2 Research Design

A descriptive research design was used in this study. Descriptive research design can be defined as a process of collecting data in order to answer questions in the study (Kothari, 2010). The purpose of descriptive research enables one to become more familiar with phenomena and gain new insights (Hopkins & Mckeown, 2002). Descriptive research involves gathering of data that describes events and then organizes, tabulates depicts and describe the data collected. A survey method was used to collect data where patrons of clubs, administration and students using a structured questionnaire.

A research design is a plan that is used to generate answers to research problems (Orodho, 2003). The design provides numeric descriptions of some part of the population. Quantitative data collection methods were employed. The use of quantitative research has several advantages in that both supplement each other and could check each other against biasness (Mugenda & Mugenda, 2003).

Quantitative data collection methods aimed at identifying the contribution of the school administrations, leadership characteristics and students' knowledge to activities learners engage in during environmental club activities. This information was derived from, interaction with school administrators, club patrons, and the members of the environmental clubs. The purpose of quantitative procedures in the study were to understand the contributions of the environmental clubs to environmental best management practices in schools and to derive meaning from the information provided by the respondents.

The quantitative analysis focused on the dependent variable, environmental best management practices as promoted by the activities in the environmental clubs. Quantitative procedures describe and compare attributes causality through numerical measures and give mathematical analysis and differences in those measures (Oso & Onen, 2009).

3.3 Research Site

The study was conducted in South Alego Ward of Alego Usonga constituency in Siaya County in Kenya. South Alego ward covers approximately 194.50 square Kilometres with an estimated population of 56,453 persons. South Alego ward is divided into seven administrative divisions namely Mur- Malanga, Nyajuok, Bar-ding, Bar-Olengo, Randago, Pap-oriang', and Bar-Osimbo.

Alego Usonga constituency experiences a bi-modal rainfall, with long rains occurring between March and June and short rains between September and December. However, due to climate variations, there was a non-conformity to this rainfall pattern in 2019, where long rains were delayed until May. The rainfall ranges between 800

mm and 2,000 mm on highlands while low lands receive a range of 800 mm to 1,600 mm (County Government of Siaya, 2018).

A survey conducted by UNICEF (2014) reported that Siaya County had 217 public and four private secondary schools. By gender, there were 18 boys and 21 girls' secondary schools. The majority of schools (177) were mixed secondary day schools. The population of secondary school age group was estimated at 98,324 of which 49.6% were females, in 2018 (County government of Siaya, 2018). The location of the ward in Siaya County is shown in Figure 3.



Figure 3: Map of Siaya County showing the study site

3.4 Target Population

The target population for this study consisted of all secondary school students within Siaya County, with or without voluntary environmental clubs within the schools. Siaya County had 217 public and four private secondary schools. By gender, there were 18 boys and 21 girls' secondary schools. The majority of schools (177) were mixed secondary day schools. The population of secondary school age group was

estimated at 98,324 of which 49.6% were females, in 2018 (County government of Siaya, 2018). In South Alego ward

3.5 Study Sample

The study sample was composed of both male and female secondary school students from south Alego ward in Siaya County. This sample was derived from 30 secondary schools in South Alego ward in Siaya County.

3.5.1 Sampling Procedure

A stratified random sampling procedure was used to select the respondents for this study. The thirty (30) schools in South Alego ward were first divided into two strata (a stratum consisting of schools with environmental clubs and another without), this formed the sampling frame for the study. A total of fourteen (14) schools were then randomly selected, seven (7) secondary schools with environmental clubs and another seven without. In each school ten to twelve (10-12) respondents were randomly selected to provide the sample. Equal representation of the sexes was ensured by selecting equal number of boys and girls in each school.

3.5.2 Study Sample Size

A total of 168 students were randomly selected from 14 secondary schools in South Alego ward for this study. Ten to twelve (10-12) respondents were selected per school. The sample was found to be representative of the situation within the study area as all the schools in the area were mixed schools having both boys and girls. Equal representation in the sample was ensured by selecting equal number of boys and girls as respondents in each school (Fraenkel & Wallen, 2000).

3.6 Data Collection

A cross-sectional survey was conducted to collect data for this study. Cross-sectional surveys are completed mostly by a single respondent at a single point in time (Sedgwick, 2014). Cross sectional surveys are conducted over a short period to estimate the prevalence of the outcome of interest for a given population. Cross-sectional surveys are used when the purpose of the study is descriptive, often in the form of a survey. Also, it can be used to investigate associations between risk factors and the outcome of interest (Levin, 2006). This research aimed at evaluating contributions of environmental clubs in secondary schools by comparing best environmental management practices among students in schools with environmental clubs and those without. A cross sectional study was therefore suitable for estimating prevalence of best environmental behavior in a population (Sedgwick, 2014). Data collection is discussed under the following sub-sections: data collection instruments, questionnaire, pilot testing of research instruments, and instrument validity

3.6.1 Data Collection Instruments

A structured questionnaire was used to collect information from the participants. The Questionnaire (appendix A) with closed ended questions was divided into five sections as follows: characteristics of the participants, where information on the age, form, sex and membership to environmental clubs was elicited; the information on school administration policy on environmental management was asked, where the students explained the different support they received from the school administration; environmental club leadership, information was gathered about the patron leading the environmental club such as age, sex, experience in teaching, level of academic qualification and area of specialization; student awareness of environmental problems was the next category, here information of how aware the student was of the

environmental condition of the area gathered; student knowledge of environmental management practices was determined; and finally a section on external assistance provided by public and private sector to the environmental club. The level of the different variable were rated using a rating scale of 1 to 7, 1 being very low and 7 being very high.

A semi-structured questionnaire will be administered to 15 head teacher/deputy head teacher/a senior teacher in schools without environmental clubs. The aim of the interviews will be to determine: reasons for not considering establishing environmental clubs, means of addressing environmental issues in school, environmental activities that students engage in, existence of environmental management policies and strategic plans in the school (see Appendix B).

3.6.2 Pilot Testing of Research Instrument

The study instruments were pre-tested among students in Siaya Township and Karapul secondary schools in adjacent Siaya Township ward of Alego Usonga outside the study area. The learners in these schools are comparable to the learners in the study schools in terms of socio-economic, demographic characteristics as well as environmental conditions. In Siaya Township secondary school a functional environmental club was existing and none at Karapul secondary school. The pre-testing was conducted to establish accuracy of questions in the questionnaire and their clarity. During the pretesting an effort was made to check for consistency in the interpretation of questions and to identify ambiguous items. After a review of the instruments all suggested revisions were made before being administered in the actual study.

3.6.3 Instrument Reliability

The data obtained during the pre-test was used to calculate the Cronbach's alpha (α) a measure of internal reliability of an instrument. An alpha of 0.085 was realized, which was found to be acceptable for the study. All the indices created in this study their reliability were evaluated using the Cronbach's alpha and acceptable alpha values of between 0.07 and 0.087 were realized.

3.6.4 Instrument Validity

The validity of the instrument was determined by having all the questions scrutinized by a panel of experts in the School of Science and Technology at Nazarene University. The questions were also evaluated after the pretest and changes were made where problems were identified. The use of a structured format with the same set of questions and responses for all respondents produces comparable information across people and facilitate detailed comparisons across individuals and groups (Kothari, 2004).

3.6.5 Data Collection Procedures

Permits were first collected from the National Council for Science, Technology and innovation (NACOSTI) and from the education office at the County to enable the researcher to be allowed to collect data from the students. A visit was then made to the head teachers of the selected schools and permission was also sought to allow the researcher to meet the participants. The selected participants in each school were then given the questionnaires to fill.

In addition to the information collected from the students, the head teacher for schools without environmental clubs and the environmental club Patron for schools with environmental clubs. Self-completion questionnaires have the advantage of being

cheap but are more suited to issues where there are only a few questions that are relatively clearly and simple in their meaning and the choice of replies can be limited to fixed categories.

3.7 Data Analysis

The self-rating scale used in this study was found to be suited for exploration of the perceptions and opinions of respondents regarding complex issues and it enables probing for more clarification and answers (Barriball & While, 1994). Thematic analysis will be used to assess reported issues (Galletta, 2013).

Descriptive and inferential statistics were used to analyse the collected information in a Statistical Package for the Social Sciences (IBM SPSS version 26). Descriptive Statistics (mean, median, mode, standard deviation and frequency distributions) were used to describe the various variables of this study, while the inferential statistics (regression, t-test, and chi-square) were used to analyse the relations between the independent variables and the dependent variables.

3.8 Ethical considerations

This study involves participation of human subject, therefore, human subject protections measures as described in the Belmont report will be observed (The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). Therefore, ethical approval from the University Ethical Review Committee will be sought based on the following measures:

3.8.1 Respect to Participants' Autonomy

After obtaining approval from the University's ethics committee, permission will be sought from the school head teachers. Thereafter, potential participants (teachers and students) will be consented before being enrolled into the study. A consent form (see Appendices IV and V) will be used to assist in the consenting process and potential participants will be asked to sign the consent form after they have understood about the study, their concerns adequately addressed and have made a voluntary decision to participate in the study. The consenting and interview procedures will be conducted in private areas according to the choice of the interviewees but within the school compound.

3.8.2 Confidentiality

All information provided by the study participants will be kept confidential using the following measures: i). Participants' identifiers will not be used on the questionnaires, instead codes will be used. Consent forms will be kept separate from the completed questionnaires in a locked up cabinet. Data in the computer will be protected using two layers of passwords, i.e., a password to log on to the computer and another password to open a data set. Finally, reports will be written using averages without a description from individual participants and no participant names will be used in the reports.

3.8.3 Possible Risks

There are minimal risks in this research study as the information to be collected is less sensitive. Nonetheless, caution will be taken to guard access of participants' information by those not involved in the research study.

Table 3.1: Summary of Data Analysis and Statistical Tools

Objectives	Variables	Method of Data analysis
(i) To determine the contribution of school administration policies to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County	Independent variable: school administration Dependent: best environmental management practices	Descriptive, regression linear
(ii) To examine the contribution of environmental clubs leadership characteristics (age, sex, education level, area of specialization) to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County	Independent variable: environmental clubs leadership Dependent: best environmental management practices	Descriptive, linear regression
(iii) To determine the contribution of student awareness of environmental problems to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County	Independent variable: student awareness Dependent: best environmental management practices	Descriptive statistics Linear regression
(iv) To assess the contribution of students environmental knowledge to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County	Independent variable: Level, Training Dependent: best environmental management practices	Descriptive statistics Linear regression
(v) To assess the contribution of external assistance on best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County	Independent variable: external assistance Dependent: best environmental management practices	Descriptive , linear regression

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents results and their interpretation on how environmental clubs in schools best environmental management practices undertaken by students in Alego ward, Siaya County. The chapter is divided into the following sections: (i) characteristics of the schools in South Alego ward, (ii) characteristics of secondary school student in South Alego, (iii) contribution of school administration to best environmental practices, (iv) contribution of environmental clubs leadership characteristics to best environmental practices in South Alego, (vi) contribution of student awareness to environmental problem to best environmental practices in South Alego. (vii) contribution of student environmental knowledge to best environmental practices in South Alego, and (viii) contribution of external assistance to .best environmental practices.

4.2 Characteristic of Secondary Schools in South Alego Ward

The characteristics of the secondary schools in South Alego Siaya County are described under the following sub headings: name of schools and number of students sampled, the length of period school has been in existence

4.2.1 Name of Schools and Number of students Sampled

The names of schools and the number of students sampled in each school were recorded and analysed and the results are shown in Table 4.1.

Table 4.1: Schools and Number of students Interviewed

Schools	Frequency	Percent
Upanda mixed secondary school	10	6.0
Ojwando mixed secondary school	10	6.0
Uyoma-Kobare secondary school	12	7.1
Nyajuok Mixed secondary school	10	6.0
Kogela senator Obama secondary school	12	7.1
Bar- Olengo secondary school	12	7.1
Ambrose Adeya mixed secondary school	12	7.1
Karapul secondary school	10	6.0
Nduru mixed secondary school	12	7.1
Ngiya Girls High Sec secondary school	12	7.1
Mulaha Mixed secondary school	12	7.1
Agoro- Oyombe secondary school	12	7.1
Usingo secondary school	12	7.1
Matera mixed secondary school	20	11.9
Total	168	100.0

There were fourteen (14) secondary schools that were selected for study in South Alego, Siaya County. The schools were chosen as they had registered environmental clubs. In each of the schools selected an average of 12 students were randomly selected and interviewed.

4.2.2 Length of Period the Schools were in Existence

The length of period the schools were in existence was determined by asking the administrator to state the date the school was started. From the year of establishment the length of the school existence was determined and the information is presented in Table 4.2.

Table 4.2: length of Period Schools Have been in Existence

Years	Frequency	Percent
4.00	10	6.0
5.00	10	6.0
6.00	12	7.1
10.00	12	7.1
11.00	10	6.0
12.00	22	13.1
15.00	44	26.2
32.00	24	14.3
39.00	12	7.1
57.00	2	1.2
97.00	10	6.0
Total	168	100.0

Mean 21.6±1.69, median 15, mode 15, Std. dev. 22, minimum 4, maximum 97

The majority (73.8 %) of the schools in South Alego ward had been in existence for more than ten (10) years. The mean length was 21.6 years with a minimum of 4 years and a maximum of 97 years. The schools were not new but had been in existence for a long time.

4.3 Characteristics of Secondary Students in South Alego Ward

The characteristics of secondary school students in South Alego are presented under the following sub-headings: age distribution, sex and the level attained.

4.3.1 Age Distribution of the Secondary Students in Alego Ward

The student were asked to state their age and the information was analysed and is presented in form of descriptive statistics and frequency distribution in Table 4.3.

Table 4.3: Descriptive Statistics and Frequency Distribution for the Age of Secondary Students in Alego Ward

Age	Frequency	Percent
14.00	5	3.0
15.00	17	10.1
16.00	50	29.8
17.00	43	25.6
18.00	29	17.3
19.00	21	12.5
20.00	1	.6
21.00	2	1.2
Total	168	100.0

Mean 16.8 ± 1.06 , median 17, mode 16, std. dev. 1.37, minimum 14, maximum 21

The majority (57.2 %) of the students were above 17 years. The average age was 16.8 years.

4.3.2 Sex of the Respondents

The sex of the respondents was noted during the interview and the information was analysed. The frequency distribution of the sex of respondents is shown in Table 4.4.

Table 4.4 Sex of the Respondents

Sex	Frequency	Percent
Male	83	49.4
Female	85	50.6
Total	168	100.0

The male students formed 49.4 % of the respondents, while the female respondents were 50.6 %

4.3.3 Level of Formal Education

The study sample was spread across all the four forms of secondary schools in south Alego. The frequency distribution of the four classes is shown in Table 4.5.

Table 4.5: Frequency Distribution of Students in the Four

Class	Frequency	Percent
Form One	18	10.7
Form Two	37	22.0
Form Three	77	45.8
Form Four	36	21.4
Total	168	100.0

The form threes formed 45.8 % of the sample, while form four was 21.4 %, form two 22 % and form one 10.7 %.

4.4 Level of Best Environmental Management Practices among Secondary School Students in South Alego

The dependent variable for this study was the level of Best Environmental Management Practices (BEMP) undertaken by secondary school students in South Alego, Siaya County. The variable was developed as an index involving 14 indicators, which included: (i) tree planting, (ii) solid waste separation, (iii) solid waste collection, (iv) recycling of wastes (3 Rs-recovery, recycle, reuse), (v) environmental cleanups, (vi) manure heaps, (vii) tree nursery management, (viii) soil conservation, (ix) water conservation, (x) energy conservation, (xi) biodiversity conservation, (xii) advocacy, (xiii) teaching others (public and peers) of environmental problems, and (xiv) removal of weeds and grass planting.

The respondents were asked to rate themselves (self-rating) using a semantic differential scale with scores ranging from 1 to 7, whereby 1 denoted very low level

of performance and 7 very high level of performance. The scores for all the fourteen indicators were then summed up to form the index of level of best environmental management practices undertaken by the student. The indicators for the dependent variable and their descriptive statistics are shown in Table 4.6.

Table 4.6: Descriptive Statistics for the Indicators Forming the Level of Best Environmental Management Practices Undertaken by Students in South Alego Ward

Indicator	Mean	Std. dev.	Range
Tree planting	4.04	2.36	7
Solid waste separation	1.79	1.82	7
Solid waste collection	3.61	2.42	7
Recycling of waste (recovery, recycle, reuse)	2.22	2.30	7
Environmental clean ups	3.44	2.65	7
Manure heaps	2.38	2.06	7
Tree nursery management	2.97	2.45	7
Soil conservation	3.21	2.18	7
Water conservation	3.85	2.53	7
Energy conservation	1.69	1.79	7
Biodiversity conservation	1.55	1.80	7
Removal of weeds and grass planting	2.88	2.38	7
Advocacy	1.46	1.86	7
Teaching the public and peers	1.92	2.18	7

n=168

The resulting index was grouped into seven (7) categories, as follows: 0-1 extremely low, 1.01-2 very low, 2.01-3 low, 3.01-4 moderate, 4.01-5 high, 5.01-6 very high and 6.01-7 extremely high. The descriptive statistics and frequency distribution of the index and its categories are shown in Table 4.7

Table 4.7: Level of Best Environmental Management Practices Undertaken by Secondary School Students in South Alego

Category	Scores	Frequency	Percent
Extremely low	0-1	-	-
Very Low	1.01-2	28	16.7
Low	2.01-3	28	16.7
Moderate	3.01-4	38	22.6
High	4.01-5	44	26.2
Very High	5.01-6	24	14.3
Extremely high	6.01-7	6	3.6
Total		168	100.0

Mean $2.64 \pm .113$, median 2.78, mode 0, Std. dev. 1.47, minimum 0, maximum 5.57

The results in Table 4.7 indicate that the mean of the level of best environmental management practices undertaken by students was 2.64 on a scale of 0 to 7. The data indicates 44.1 % of the students rated their level of BEMP as between high and extremely high.

A chi-square test for equality of categories for the level of best environmental management practices undertaken by students was conducted and the results are shown in Table 4.8.

Table 4.8: Chi-square Test for the Equality of Categories for the Level of BEMP Undertaken by Students in South Alego

Categories	Observed N	Expected N	Residual	Statistics
Very low	28	28.0	.0	$\chi^2 = 30.571$ $df = 5$ $p < .001$
Low	28	28.0	.0	
Moderate	38	28.0	10.0	
High	44	28.0	16.0	
Very High	24	28.0	-4.0	
Extremely High	6	28.0	-22.0	
Total	168			

The chi-square test revealed a statistical ($p < .001$) significant differences among the different categories of student practices. The category of high (4-5) was significantly ($\chi^2=30.57$, $df = 5$, $p < .001$) higher than the other categories, indicating that the majority of the students had a high level of best environmental management practices.

A comparison was done to compare the levels of BEMP for male and female and no statistical ($p < .05$) significant differences were realized between the two groups of students as shown in Table 4.9.

Table 4.9: Mean Differences between the Male and Female Students using t-test

Sex	n	Mean	Std. Deviation	Std. Error	<i>p</i>
				Mean	
Male	83	2.6213	1.42	.156	$t=-.231$, $df=166$
Female	85	2.6739	1.52	.165	$p=.818$

4.5 Contribution of School Administration Policies on Environmental Management to Best Environmental Management Practices

The first objective of this study was to determine the contribution of school administration policies to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County.

4.5.1 School Administration Policies on Environmental Management

The independent variable for objective one was school administration policies related to environmental management. This variable was operationalized as an index which combined all the inputs that the school administration provided the environmental clubs to enhance their managerial capacity and encourage their participation in environmental activities.

The inputs provided by the administration included : (i) provision of tree seedlings for planting, (ii) transport of materials and students to environmental functions, (iii) provision of environmental training, (iv) provision of needed tools and equipment (hoe, rake, spade), (v) payment for registration of the clubs, (vi) knowledge provision by planning for trips and provision of materials for learning, (vii) making available a teacher to act as a patron to guide the students, (viii) providing linkage of club with other clubs in the country, and (ix) provision of storage places and halls for meeting.

The nine (9) indicators were assessed by the students using a dummy variable or a 0, 1 variable, where a score of 1 was given to the administration if they provided and a score of 0 if they did not provide. The scores were then summed up to provide an index of administration input. The descriptive statistics and frequency distribution of this index are shown in Table 4.10.

Table 4.10: Descriptive Statistics and Frequency Distribution of Input of School Administration to Environmental Management

Scale	Frequency	Percent
.00	4	2.4
1.00	6	3.6
2.00	2	1.2
3.00	16	9.5
4.00	87	51.8
5.00	12	7.1
6.00	24	14.3
7.00	7	4.2
8.00	10	6.0
Total	168	100.0

Mean $4.3 \pm .12$, median 4, mode 4, Std. dev. 1.62, minimum 0, maximum 8

The majority (51.8 %) of the school administration scored 4.0, while 10.2 % scored between 7 and 8. The index ranged between 0 and 8.

4.5.2 Determining the Contribution of School Administration Policies on Environment to BEMP

The contribution of school administration policy on environmental management towards best environmental management practices was determined using bivariate linear regression.

The independent variable was school administration policy on environmental management and the dependent variable was best environmental management practices. The results of the regression model are presented in Table 4.11.

Table 4.11: Regression Model Summary for School Administration Policy and Best Environmental Practices undertaken by Students

R	R Square	Adjusted R Square	Std. Error of the Estimate
.336 ^a	.113	.108	1.39402

Predictors (constant): School Administration Policy

Dependent: Best Environmental Management Practices undertaken by students

The model indicates an adjusted R^2 value of 0.108, this means that the independent variable school administration policy on environmental management explained approximately 10.8 % of the variation in dependent variable level of best environmental management practices undertaken by students. The F test for the regression model is shown in Table 4.12.

Table 4.12: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	df	Mean Square	F	p.
Regression	40.897	1	40.897	21.045	.001
Residual	320.644	165	1.943		
Total	361.541	166			

Dependent Variable: best environmental management practices

Predictors: (Constant), input supplied by school administration

The results for the ANOVA test indicates that the overall regression model was significant ($F(1, 165) = 21.04, p < .001$).

The regression coefficient of the model showing the *beta*, *t* statistics and the collinearity statistics is shown in Table 4.13.

Table 4.13: Regression Coefficients for School Administration Policy and Best Environmental Management practices Undertaken by Students

	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity Statistics
	B	Std. Error	Beta			VIF
(Constant)	1.318	.311		4.241	.001	
School policy	.305	.066	.336	4.587	.001	1.000

The regression analysis shows that school administration policy on environmental management has positive significant influence ($\beta = .336, t = 4.58, p < .001$) on the level of best environmental management practices undertaken by students. This indicates that as the input by school administration increases it increases the level of best environmental management practices of the students.

4.6 Characteristics Environmental Clubs Leadership and Best Environmental Management Practices

The second objective of this study was to examine the contribution of environmental clubs leadership characteristics (age, sex, education level, area of specialization) to best environmental management practices undertaken by secondary school students in South Alego ward, Siaya County

4.6.1 Characteristics of Environmental Club Leadership for Secondary schools in South Alego

The four leadership characteristics assessed in this study were sex, age, level of formal education and area of specialization of the leaders of the environmental clubs within the secondary schools of South Alego, Siaya County. The leaders of these environmental clubs or patrons were teachers in the school who were appointed by the school administration to lead these environmental related groups.

The sex of the Leaders of Environmental Clubs (the patrons of the club) was noted during the interview and the information was analysed and the results are shown in Table 4.14.

Table 4.14: Sex of Environmental Club Leaders

Sex	Frequency	Percent
Male	132	78.6
Female	36	21.4
Total	168	100.0

The majority (78.6 %) of the leaders were male, while the remaining 21.4 % were female.

The education level of the environmental club leaders in South Alego secondary school were noted and analysed and the results are shown in Table 4.15.

Table 4.15: Formal Education Level of the Environmental Club Leaders

Education Level	Frequency	Percent
Diploma	58	34.5
Bachelor degree	96	57.1
Master degree	14	8.3
Total	168	100.0

The majority (57 %) of the environmental club leaders had attained the level of a bachelor's degree, while the ones who had attained the diploma level were 34 % and the ones with master degree were 8 %.

The area of professional specialization of the environmental club leaders were noted and analysed and the results are presented in Table 4.16.

Table 4.16: Area of Professional Specialization for Environmental Club Leaders

Area of Specialization	Frequency	Percent
Agriculture	79	47.0
Biology	28	16.7
Geography	26	15.5
Education	24	14.3
Environment	8	4.8
Science	3	1.8
Total	168	100.0

The results (Table 4.16) show that the environmental club leaders were in six (6) areas of professional Specialization, these included agriculture 47 %, Biology 16.7 %, Geography 15.5 %, education 14.3 %, environment 4.8% and science 1.8 %.

4.6.2 Determination of the Contribution of Club Leaders Characteristics on Best Environmental Management Practices

The contribution of **sex of the environmental club leaders** on best environmental practices undertaken by secondary school students were tested using the independent t-test and the results are shown in Table 4.17.

Table 4.17: Mean Comparison between the Male and Female Club Leaders

Sex	n	Mean	Std. Deviation	Std. Error Mean
Male	132	2.5563	1.53093	.13325
Female	36	2.9841	1.20508	.20085

The female environmental club leaders had higher mean of BEMP (2.98) compared to the male leaders (2.55), these differences were not statistically significant ($t=1.550$, $df= 166$, $p=.122$). It was therefore concluded that sex of the environmental club leaders had no statistical ($p>.05$) significant contribution to BEMP of secondary school students in South Alego.

The best environmental management practices was analysed in relation to the **three levels of formal education** of the environmental club leaders found in this study (diploma, bachelors and masters). The analysis was done to determine which of the three levels had the highest mean. An ANOVA was conducted to compare the means of the level of formal education. The descriptive statistics (means, standard deviation, standard error and minimum and maximum values) of the three levels of formal education are shown in Table 4.18.

Table 4.18: Descriptive Statistics for BEMP for the Level Education

	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Diploma	58	3.24	1.352	.177	.00	5.57
Bachelor	96	2.43	1.429	.145	.00	5.50
Masters	14	1.62	1.395	.372	.00	3.64
Total	168	2.64	1.474	.113	.00	5.57

n=number of samples, std. dev =standard deviation, min =minimum, max =maximum

The results (Table 4.18) show that of the three education levels Diploma level had the highest BEMP, followed by Bachelors level and finally masters level. The main purpose of running the one-way ANOVA was to establish whether there were any statistically significant differences on the dependent variable (best environmental management practices) among the three independent variables (diploma, bachelors, and masters). The research question that was addressed was whether the independent variables were significantly different statistically. The result of the one-way ANOVA for the mean comparisons is shown in Table 4.19.

Table 4.19: ANOVA Table for Mean Comparisons Showing the F-test

	Sum of Squares	df	Mean Square	F	p
Between Groups	39.340	2	19.670	10.027	.001
Within Groups	323.696	165	1.962		
Total	363.036	167			

The F-test (Table 4.19) results indicate that there was a statistically significant difference in BEMP for the three education levels, $F(2, 165) = 10.02, p < .001$). We can therefore conclude that statistically significant differences do exist in the BEMP

for the different levels of education (diploma, bachelors and masters) in South Alego secondary schools.

A post hoc test was then conducted to determine the means that were statistically significant from the others. Post hoc analysis was performed using Bonferroni post hoc tests. The comparison of the mean pairs for diploma (I) and bachelors (J) and masters (J) the 95 % confidence interval for the difference between group I and J, statistical significance value (p value) and standard error are shown in Table 4.20.

Table 4.20: Pairwise Comparisons

(I) Education level	(J) Education level	Mean Difference (I-J)	Std. Error	p.	95% Confidence Interval	
					Lower Bound	Upper Bound
Diploma	BSc	.802	.23294	.002	.239	1.36
	MSc	1.618*	.41708	.001	.610	2.62

The mean comparison results for the mean pairs in Table 4.20, indicate that BEMP for the bachelors and masters were statistically significantly lower than for the diploma.

In comparing the mean differences for the diploma and bachelors, the diploma level had significantly higher mean differences .802 (95% CI, .239 to 1.36), $p < .002$ than the bachelors and 1.618 (95% CI, .610 to 2.62), $p < .001$ for masters level.

The BEMP of the secondary school students was analysed in relation to the six areas of **professional specialization** existing in the study area (environment, science, agriculture, education, biology and geography). The analysis was done to determine which of the six areas of specialization in the South Alego secondary schools had the highest mean. An ANOVA was conducted to compare the means of the areas of

specialization. The descriptive statistics (means, standard deviation, standard error and minimum and maximum values) of the six areas of specialization are shown in Table 4.21.

Table 4.21: Descriptive Statistics for BEMP for the Professional Specialization

Area of Specialization	n	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Environment	8	3.28	.600	.212	2.21	4.00
Science	3	3.26	1.459	.842	2.21	4.93
Agriculture	79	2.92	1.338	.150	.00	5.57
Education	24	2.54	1.708	.348	.00	5.50
Biology	28	2.41	1.588	.300	.00	4.93
Geography	26	1.89	1.470	.288	.57	4.79
Total	168	2.64	1.474	.113	.00	5.57

n=number of samples, std. dev =standard deviation, min =minimum, max =maximum

The results (Table 4.21) show that of the six areas of specialization environment had the highest BEMP, followed science, agriculture, education, biology, and finally geography. The main purpose of running the one-way ANOVA was to establish whether there were any statistically significant differences on the dependent variable (BEMP) among the six independent variables (environment, science, agriculture, education, biology, and geography). The research question that was addressed was whether the independent variables were significantly different statistically. The result of the one-way ANOVA for the mean comparisons is shown in Table 4.22.

Table 4.22: ANOVA Table for Mean Comparisons showing the F-test

	Sum of Squares	df	Mean Square	F	p
Between Groups	27.157	5	5.431	2.620	.026
Within Groups	335.880	162	2.073		
Total	363.036	167			

The F-test results (Table 4.22) indicates that there was a statistically significant difference in BEMP for the six professional specialization, $F(5, 162) = 2.62$, $p < .026$). We can therefore conclude that statistically significant differences exist in the BEMP of the different professional specialization (environment, science, agriculture, education, biology, and geography) in South Alego secondary schools.

A post hoc test was then conducted to determine the means that were statistically significant from the others. Post hoc analysis was performed using Bonferroni post hoc tests. The comparison of the mean pairs for environment (I) and seaweed farming (J) and artisanal fishing (J) the 95 % confidence interval for the difference between group I and J, statistical significance value (p value) and standard error are shown in Table 4.23.

Table 4.23: Pairwise Comparisons

(I) Area of Specialization	(J) Area of Specialization	Mean Difference (I-J)	Std. Error	p.	95% Confidence Interval	
					Lower Bound	Upper Bound
Environment	Agriculture	.361	.534	.499	-.693	1.41
	Biology	.875	.577	.132	-.264	2.01
	Science	.023	.974	.981	-1.901	1.94
	Geography	1.395*	.582	.018	.246	2.54
	Education	.738	.587	.211	-.422	1.89

The mean comparison results for the mean pairs in Table 4.23, indicate that BEMP for environment and geography were statistically significantly different from each other, but differences between environment and agriculture, biology, science, and education were not statistically different from each other.

In comparing the mean differences for environment and geography, environment had significantly higher mean differences 1.39 (95% CI, .246 to 2.54), $p < .05$ than geography. The mean differences between environment and agriculture, biology, science, and education were not statistically ($p > .05$) different from each other.

4.7 Contribution of Student Awareness of Environmental Problems to Best Environmental Management Practices

The third objective of this study was to determine the contribution of secondary school student awareness of environmental problems to best environmental management practices in South Alego ward, Siaya County. This relationship was determined using simple linear regression.

4.7.1 Student Awareness of Environmental Problems

The independent variable for this objective was student awareness of environmental problems. The variable was operationalized as an index that combined fourteen (14) indicators of environmental problems (either the consequences of the problem or solution to the problem) in Siaya County, these indicators included the following: (i) tree planting, (ii) solid waste separation, (iii) solid waste collection, (iv) environmental cleanups, (v) manure heaps, (vi) waste policies (3 Rs), (vii) tree nursery management, (viii) soil conservation, (ix) water conservation, (x) gully

control, (xi) biodiversity loss, (xii) advocacy, (xiv) teaching others of environmental problems.

Student respondents rated their level of awareness to environmental problems using a 4-point rating scale, with 1 being low awareness and 4 high awareness level. The scores were then summed up to form the index of the level of student's awareness of environmental problems. The descriptive statistics and frequency distribution of the index of student awareness of environmental problems is given in Table 4.24.

Table 4.24: Descriptive Statistics and Frequency Distribution of Level of student Awareness in Alego Ward

Level	Scores	Frequency	Percent
Low	0-1	8	4.8
Moderate	1.01-2	48	28.6
High	2.01-3	90	53.6
Very high	3.01-4	22	13.1
Total		168	100.0

Mean 2.29 ± 0.4 , median 2.32, mode 2.64, Std. dev. .642, minimum 1, maximum 3.43

The level of student awareness of environmental had a mean of 2.29 and a standard deviation of .642. The majority (53.6 %) of the students had a level of awareness of environmental problems of high.

4.7.2 Determining the Contribution of Student Awareness of Environmental Problems to BEMP in South Alego Ward

The contribution of student awareness of environmental problems to best environmental practices undertaken by students in South Alego was determined was analysed using bivariate liner regression. The independent variable was student

awareness while BEMP was the dependent variable. The results of the regression model are presented in Table 4.25.

Table 4.25: Regression Model Summary for Student Awareness and Best Environmental Management Practices undertaken by Students

R	R Square	Adjusted R Square	Std. Error of the Estimate
.785 ^a	.616	.614	.91646

Predictors (constant): student awareness of environmental problems

Dependent: Best Environmental Management Practices undertaken by students

The model indicates an adjusted R^2 value of 0.614, this means that the independent variable student awareness of environmental problems explained approximately 61 % of the variation in dependent variable level of best environmental management practices undertaken by students. The F test for the regression model is shown in Table 4.26.

Table 4.26: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	df	Mean Square	F	Sig.
Regression	223.612	1	223.612	266.234	.001
Residual	139.424	166	.840		
Total	363.036	167			

Dependent Variable: best environmental practices

Predictors: (Constant), level of student awareness of environmental problems

The results for the ANOVA test indicates that the overall regression model was significant ($F(1, 166) = 266.23, p < .001$). The regression coefficient of the model showing the *beta*, *t* statistics and the collinearity statistics is shown in Table 4.27

Table 4.27: Regression Coefficients for Level of awareness and Best Environmental Management Practices Undertaken by Students

	Unstandardized		Standardized			Collinearity
	Coefficients		Coefficients		Statistics	
	B	Std. Error	Beta	t	p	VIF
(Constant)	-1.477	.263		-5.627	.001	
Awareness	1.801	.110	.785	16.317	.001	1.000

The regression analysis (Table 4.27) shows that student level of awareness of environmental problems has positive significant influence ($\beta=.785$, $t=16.31$, $p<.001$) on the level of best environmental management practices undertaken by students. This indicates that as the more a student is aware of environmental problems contributes more towards the level of best environmental management practices.

4.8 Contribution of Student Environmental Knowledge to BEMP

The fourth objective of this study was to assess the contribution of secondary school student's environmental knowledge to best environmental management practices in South Alego ward, Siaya County

4.8.1 Student Environmental Knowledge

The variable student environmental knowledge was the independent variable of this objective and it was operationalized as an index with fourteen indicators (14) that included: (i) tree planting, (ii) solid waste separation, (iii) solid waste collection, (iv) environmental cleanups, (v) manure heaps, (vi) waste policies (3 Rs), (vii) tree nursery management, (viii) soil conservation, (ix) water conservation, (x) gully control, (xi) biodiversity loss, (xii) advocacy, (xiv) teaching others of environmental management.

Student respondents rated their level of knowledge on environmental management using a 7-point rating scale, with 1 being low knowledge and 7 high knowledge level. The scores were then summed up to form the index of the level of student's knowledge of environmental management. The descriptive statistics and frequency distribution of the index of student knowledge of environmental management is given in Table 4.28.

Table 4.28: Descriptive Statistics and Frequency Distribution of the Variable Student Knowledge of Environmental Management in South Alego

Level	Score	Frequency	Percent
Very low	1-2	30	17.9
Low	2.01-3	36	21.4
Moderate	3.01-4	50	29.8
High	4.01-5	24	14.3
Very high	5.01-6	26	15.5
Extremely high	6.01-7	2	1.2
Total		168	100.0

Mean 2.91 ± 1.10 , median 3, mode 3, Std. dev. 1.34, minimum 1, maximum 6

The mean of the variable level of student knowledge in environmental management was 2.91 on a scale of 1-7 and a standard deviation of 1.34.

4.8.2 Determination of the Contribution of Student Environmental Knowledge on Best Environmental Management Practices

The contribution of student knowledge on environmental management to best environmental management practices undertaken by students in South Alego was analysed using simple linear regression. The independent variable was student knowledge while BEMP was the dependent variable. The results of the regression model are presented in Table 4.29.

Table 4.29: Regression Model Summary for Student Awareness and Best Environmental Management Practices Undertaken by Students

R	R Square	Adjusted R Square	Std. Error of the Estimate
.802 ^a	.643	.641	.88387

The model indicates an adjusted R^2 value of 0.641, this means that the independent variable student knowledge of environmental management explained approximately 64 % of the variation in dependent variable level of best environmental management practices undertaken by students. The F test for the regression model is shown in Table 4.29.

Table 4.29: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	df	Mean Square	F	p
Regression	233.353	1	233.353	298.699	.001
Residual	129.684	166	.781		
Total	363.036	167			

Dependent Variable: best environmental practices

Predictors: (Constant), level of knowledge e

The results for the ANOVA test indicates that the overall regression model was significant ($F(1, 166) = 298.69, p < .001$). The regression coefficient of the model showing the *beta*, *t* statistics and the collinearity statistics is shown in Table 4.30.

Table 4.30: Regression Coefficients for Level of Knowledge and Best Environmental Management Practices Undertaken by Students

	Unstandardized Coefficients		Standardized Coefficients		t	p.	Collinearity Statistics
	B	Std. Error	Beta				VIF
(Constant)	.461	.144			3.209	.002	
Knowledge	.871	.050	.802		17.283	.000	1.000

The regression analysis (Table 4.30) shows that student level of knowledge on environmental management has positive significant influence ($\beta=.802$, $t=17.28$, $p<.001$) on the level of best environmental management practices undertaken by students. This indicates that as the higher the level of student knowledge on environmental management the higher is his contribution to the level of best environmental management practices.

4.9 Contribution of External Assistance to Best Environmental Management Practices

The fifth objective of this study was to assess the contribution of external assistance on the level best environmental practices undertaken by secondary school students in South Alego ward, Siaya County.

4.9.1 Level of External Assistance to Environmental Management

The independent variable for this objective was the level of external assistance to environmental management. This variable was operationalized as an index that involved ten (10) indicators of environmental management, which included : (i) tree planting (afforestation), (ii) water conservation (such as rain water harvesting, (iii) soil conservation, (iv) waste management (provision of bins, collection and disposal), (v) tree nursery creation and management, (vi) clean ups in towns, (vii) training in BEMP, (viii) manure heaps for organic gardens, and (ix) energy conservation (use of energy saving bulbs), and (x) advocacy.

The students rated the ten indicators using a 0, 1 variable or dummy variable, where a score of one (1) was assigned for any indicator was provided for and a score of zero (0) for any indicator that was not provided for. The scores were then summed up to

give the level of external assistance provided to the schools for environmental management.

The ten indicators that formed the index of external assistance for environmental management their descriptive statistics were calculated and are presented in Table 4.31.

Table 4.31: Descriptive Statistics for the Indicators Forming the Level of External Assistance in South Alego Secondary Schools

Assisted activities (Indicators)	Mean	Std. Dev.	Range
Tree planting (afforestation)	.869	.338	0-1
Water conservation	.702	.458	0-1
Soil conservation	.678	.468	0-1
Waste management (collection and disposal)	.523	.500	0-1
Tree nursery creation and management	.523	.500	0-1
Clean ups of towns	.476	.500	0-1
Training in BEMP	.452	.499	0-1
Manure heaps for organic gardens	.428	.490	0-1
Energy conservations	.357	.480	0-1
Advocacy	.345	.476	0-1

n=168

The indicator with the highest mean was tree planting (.869), followed by water conservation (.702) and the least was advocacy (.345). The indicators were then summed up to form the level of external assistance provided for environmental management as shown in Table 4.32.

Table 4.32: Level of External Assistance in Environmental Management Provided to Secondary Schools in South Alego Ward

Scores	Frequency	Percent
.00	18	10.7
1.00	4	2.4
3.00	24	14.3
4.00	26	15.5
5.00	26	15.5
6.00	12	7.1
7.00	14	8.3
8.00	6	3.6
9.00	8	4.8
10.00	30	17.9
Total	168	100.0

Mean $5.35 \pm .23$, median 5, mode 10, Std. dev. 3.109, minimum 0, maximum 10

The level of external assistance provided to secondary school in South Alego by different organization ranged between 0 indicating no assistance provided and 10 showing the maximum assistance provided to the schools. The mean level was 5.35 and the standard deviation was 3.109.

There were four (4) different organizations that were identified as the ones providing the external assistance to schools for environmental management as shown in Table 4.33.

Table 4.33: Organizations Providing External Assistance to Environmental Management in South Alego Secondary Schools

Organization	Frequency	Percent
School Administration	130	77.4
Non-Governmental Organization (NGO)	24	14.3
County Development Fund (CDF)	15	8.9
Commercial Companies	12	7.1

n=168

The highest provider to the external assistance was the school administration (77.4 %), whose funds were from various sources such as the ministry of education, the county government and other sources. Commercial companies such as Coca-Cola, Brookside dairies and food industries were mentioned in 7.1 %.

4.9.2 Assessing the Contribution of External Assistance on BEMP

The contribution of level of external assistance for managing the environment to best environmental management practices undertaken by students in South Alego was analysed using bivariate liner regression. The independent variable was external assistance while BEMP was the dependent variable. The results of the regression model are presented in Table 4.34.

Table 4.34: Regression Model Summary for External Assistance and Best Environmental Management Practices Undertaken by Students

R	R Square	Adjusted R Square	Std. Error of the Estimate
.698 ^a	.487	.484	1.05950

The model indicates an adjusted R^2 value of 0.484, this means that the independent variable external assistance of environmental management explained approximately 48 % of the variation in dependent variable level of best environmental management practices undertaken by students. The F test for the regression model is shown in Table 4.35.

Table 4.35: ANOVA Table for the Regression Testing the Fit of the Model

	Sum of Squares	df	Mean Square	F	p.
Regression	176.695	1	176.695	157.407	.001
Residual	186.341	166	1.123		
Total	363.036	167			

Dependent Variable: best environmental practices

Predictors: (Constant), level of external assistance

The results for the ANOVA test indicates that the overall regression model was significant ($F(1, 166) = 157.40, p < .001$). The regression coefficient of the model showing the *beta*, *t* statistics and the collinearity statistics is shown in Table 4.36.

Table 4.36: Regression Coefficients for Level of External Assistance and Best Environmental Management Practices Undertaken by Students

	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
	B	Std. Error	Beta	t	p	Tolerance	VIF
(Constant)	.876	.163		5.366	.001		
Assistance	.331	.026	.698	12.546	.001	1.000	1.000

The results of the regression analysis (Table 4.36) shows that level external assistance for environmental management had positive significant influence ($\beta = .698, t = 12.54, p < .001$) on the level of best environmental management practices undertaken by students. This indicates that the more the contribution of funds from external sources for environmental management the higher was the level of best environmental management practices undertaken by the secondary school students in South Alege, Siaya County.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, a discussion of the findings, conclusions and recommendations related to the research objectives were provided.

5.2 Discussions

This section provided a discussion of the findings in the following manner: (i) Characteristics of the Secondary School Students in South Alego (ii) Contribution of school administration policies to best environmental management practices (iii) Contribution of leadership characteristics to best environmental management practices (iv) Contribution of environmental awareness to best environmental management practices (v) Contribution of environmental knowledge to best environmental management practices, and (vi) Contribution of external assistance to best environmental management practices.

5.2.1 Characteristics of the Secondary School Students in South Alego

A total of 14 schools in south Alego, Siaya County were selected for this study. The criterion for their selection was the existence of an environmental or wildlife club in the school that was registered. Ten to twelve representatives who were members of the environmental clubs were randomly selected for interview. An equal number of boys and girls was used. The newest school in the region was 4 years and the oldest was 97 years. The average age of the schools in the region was 22 years and 73.8 % of the schools were more than 10 years old meaning that the schools were well established.

The findings of this study are in line with what is currently happening in the County, the county has some schools which are among the best within the county, these include: Ngiya girls, which is a national school, Nyajuok and Ambrose-Adeya schools among others. Miranda and Ngiya girls had high performance nationally in the 2019 Kenya Certificate of Secondary Education (KCSE) with mean scores of 8.9 and 7.0 respectively (Media Team, 2019).

The County's educational statistics as reported by the National council for population and development (NCPD, 2017) show that the county net enrollment rate in secondary schools as 62.6 %, with 32,000 secondary-age children out of school. It also states that the pupil-teacher ratio as 20.8 %. The education in the county is affected mainly by: (i) parents and guardians being unable to pay school fees regularly for their children due to their poor socio-economic status, which leads to high dropouts, (ii) high poverty levels which result in lack of school fees, (ii) early pregnancies, (iii) forced repetitions and indiscipline, (iv) the impact of HIV and AIDS (v) a non-supportive home environment, are key factors that contribute to dropout rate at secondary level education in the County (Mudemb, 2013; Ochanda, 2014).

Public-Private Partnerships (PPP) in form of government funding, parents, religious organizations and other organizations are managing secondary schools in the county are common in the county (Adhiambo, 2016). Apart from these three the county government of Siaya has created Siaya County Educational Bursary Fund (SCEBF) to help improve access and equity in the acquisition of secondary school education (Oketch, Sika & Gogo, 2019) initiative. The county also has benefitted from other non-governmental organizations initiatives such as rural outreach programme (ROP)

dealing with agriculture and environment (Karanu & Oniang'o, 2017). These partnerships contribute to teaching/learning resources, co-curricular resources as well as in food and environmental issues in the enhancement of academic performance in the County. The partnerships can be positively be used to enhance best environmental management practices among the students. The schools in the county lacked policy documents on inclusive education in their custody, which had implications on implementation of inclusive education, and beyond developing policies in inclusive education, educationists needed to come up with implementation strategies as well as enforcement plans for successful uptake in schools (Adoyo, 2019).

5.2.2 Contribution of School Administration Policies to Best Environmental Management Practices

Contribution of school administration policies on environmental management to best environmental management practices undertaken by secondary school students in South Alego Secondary Schools. School administration policies was found to have a positive contribution on the best environmental management practices. This finding is true in many ways and is supported by evidence from literature (Fazio & Xavier, 2018; Huys, De Cocker, & De Craemer, 2017). The implementation of non-compulsory curriculum in environmental management has both benefits and challenges that need to be addressed by the school administration (Eames, Cowie, Bolstad, 2008).

Administration policies can have impact on the management of the environment by providing solutions to challenges facing the students and in negotiating for assistance using their personal initiative such as sharing the requirements of environmental clubs to potential donors (Fazio & Karrow, 2013). Another policy could be the school based

interventions where the school administrations develops specific protocols which are geared towards encouraging students towards best environmental practices (Pradhan, Mughis & Ali, 2020). School gardens can bring beneficial effects on children's dietary behaviors and enhance environmental management (Huys, De Cocker & De Craemer, 2017). (Lynch, Eilam, & Fluker, 2017). Partnerships between the school and the local community (Community-school partnerships) on environmental management by linking with other communities within environmental science education programme which can articulate broader environmental issues (Lynch, Eilam, & Fluker, 2017).

The administration can assist in the environmental education by ensuring the teachers have adequate knowledge and/ or practices for teaching environmental education. Without well trained teachers students cannot receive basic environmental knowledge and hence cannot reflect and think critically on various environmental problems (Edevaldo, Lima & Maia, 2016). Teachers' with low environmental literacy and without enhanced training, have been found to have low confidence to teach environmental education and had low affective dispositions (Dada, Eames & Calder, 2017).

5.2.3 Contribution of Leadership Characteristics to Best Environmental Management Practices

Leadership characteristics had varied contributions to BEMP as (age, sex and professional specialization) were found to have no statistical significant contribution to best environmental management practices undertaken by secondary school students in South Alego Secondary Schools, while the level of formal education was found to have a positive significant contribution. The environmental club Patrons are found to be active in their service through individual and personal commitment to the school

and environmental issues (Fazio & Karrow, 2013). Personal commitment and innovation of the teachers in providing environmental knowledge has a positive contribution to environmental management practices of the students. A study by Basche, Genareo, and Leshem (2016) demonstrated that a project based learning (PBL) approach in a middle school science classroom is a method to stimulate attitudes, engagement, confidence, and comprehension in the study of environmental topics.

Teachers of the surveyed public schools have inadequate knowledge and/or practices for teaching Environmental Education, revealing that, probably, the students are not receiving basic environmental knowledge for their critical and reflective thinking on the various environmental problems.

5.2.4 Contribution of Environmental Awareness to Best Environmental Management Practices

Student awareness of environmental problems contributed positively to the best environmental management practices undertaken by secondary school students in South Alego ward. This finding was in line with Simsekli (2015) who found that the increase in awareness of environmental problems was accompanied by increased volunteerism in environmental activities. It has been demonstrated that students with environmental awareness also develop positive attitudes toward the environment, and the presence of a positive attitude toward the environment leads them to display pro-environmental behaviors and adopt a positive attitude toward environmentally friendly products (Erkan & Veysel, 2017). Significant correlation was also noted between high school student's environmental awareness and practices and attitude (Choe, Kim, Ri, 2020; Ifegbesan & Ayodeji, 2010). This means that high school

student's environmental awareness is related to their practices. Thus, it is about time that schools should advocate and integrate environmental education with emphasis on the greening of the environment (Marpa & Juele, 2016).

The naturalistic intelligence the students possess also develops a positive attitude toward the environment and directs the students to have a pro-environmental behavior, this was concluded by Ningrum, Soesilo and Herdiansyah (2018). They found that the students who had high awareness of the environment also had interest in flora and fauna, understood environmental problems, enjoyed outdoor activities, had scientific hobbies and concern to environmental changes (ibid).

Environmental awareness can be enhanced by the field of study or the course one undertakes at school. The field of study was found to have a much stronger influence on student's level of environmental awareness (Kalinowska, Szkop, & Wiśniewski, 2016). This finding was in line with Simsekli (2015) who concluded that the type of course one undertakes affects the students' knowledge of environmental education.

Improvement in rural infrastructure and a greater amount of information provided to rural residents about the environment can result in an increase in environmental awareness which can be manifested in better environmental behaviour and understanding of the environmental status, as was shown in a study of rural China (Yi Du, Wang, Brombal, Moriggi, Sharpley, Pang, 2018).

Gender differences in environmental awareness exist, though there are variations in different studies in how they are affected. There are studies that report that women

tend to have higher awareness compared to men (Madany & Bugahoos, 1998; Kalinowska, Szkop, Wiśniewski, 2016). This is however disputed by other that found that boys demonstrated higher environmental knowledge and more positive environmental attitudes as compared to girls (Choe, Kim, & Ri, 2020).

5.2.5 Contribution of Environmental Knowledge to Best Environmental Management Practices

The level of environmental knowledge had a positive statistical significant contribution to best environmental management practices undertaken by secondary school students in South Alego ward. These findings are consistent with Seema, Singh, Bhagyashree and Naik (2014), who concluded that the role of education and training in raising environmental consciousness is crucial, as it imbibes the values and beliefs necessary for developing a sense of social and moral responsibility in students towards environmental protection. Secondary school students who were more knowledgeable were also inclined towards pro-environmental behavior (Hammami, Mohammed, Hashem, Al-Khafaji, Alqahtani, Alzaabi & Dash, 2017). Environmental education is essential to ensure that students have required knowledge and positive attitudes toward separation of solid waste campus (Liao & Li, 2019). This idea was not supported by Molapo, Stears and Dempster (2014). Environmental knowledge when acquired early through environmental education creates awareness and enhance practices that can aid in the management of the environmental resources (Hanifah, Mohamad, Ngah, 2016).

Interdisciplinary teaching in Environmental Education generates better knowledge, values and attitudes towards the environment as was demonstrated in a study of sixth grade students (Rivera, Calderón, Salazar & 2016). It is therefore recommended to

implement more interdisciplinary strategies in teaching environmental education. Students' interest in environmental issues influences their environmental literacy level and can directly affect their actual involvement in activities that promote sustainable environment. A study conducted among university business students in Ghana found direct positive relationships between students' interest in environmental issues and their environmental literacy levels (Owusu, Ossei, & Welbeck, 2017)

Knowledge can be influenced by relevant conservation films that can create awareness and influence knowledge. This was evidenced by the conclusion of a study in Uganda for primary school students living adjacent to Kibale National Park (KNP) and Bwindi Impenetrable National Park (BINP), that conservation films made specifically to address regional threats and using local actors and settings can positively influence knowledge of and attitudes toward great apes among students living in a primate range country (Leeds, Lukas, Kendall, Corinne, 2017).

The course a student is undertaking influences the level of environmental knowledge. Low levels of environmental Knowledge were found to exist among university students taking non-environmental degrees such as engineering (Ejlalli & Kahforoushan, 2018). The low level of knowledge tends to lead to low level of participation and engagement in protection and outdoor recreation activities (Christian, Ojha, & Herbert, 2018)

5.2.6 Contribution of External Assistance to Best Environmental Management Practices

External assistance to aid in environmental management from different organization was found to positively contribute to best environmental management practices undertaken by secondary school students in South Alego ward. This is a true reflection of what is found in literature. The external assistance come from various sources that include Non-governmental Organizations (Baddrudin, 2015), public-private partnerships (England, Marcinkowski & Thomas, 2007).

5.3 Conclusions

The following was concluded from the findings of this study:

- (i) School administration policies on environmental management has positive statistical significant contribution to the best environmental management practices undertaken by secondary school students in South Alego, Siaya County.
- (ii) Leadership Characteristics (age, sex, and professional specialization) of environmental club Patrons has no statistical significant contribution, while level of formal education had positive contribution to the best environmental management practices undertaken by secondary school students in South Alego, Siaya County.
- (iii) Awareness of environmental problems has positive statistical significant contribution to best environmental management practices undertaken by secondary school students in South Alego, Siaya County.
- (iv) Knowledge of environmental management has statistical significant contribution to best environmental management practices undertaken by secondary school students in South Alego, Siaya County.

- (v) External assistance provided to environmental management programmes by different organizations has positive statistical significant contribution to best environmental management practices undertaken by secondary school students in South Alego, Siaya County.

5.4 Recommendations

The following were the recommendations for the study:

The administration of secondary schools in South Alego, Siaya County needs to enhance the best environmental management practices of their students through the support of environmental clubs. This move will enable the students who have an advantage of numbers, energy and zeal to embark on sustainable and restoration of environmental resources that will increase environmental services to whole community. Five factors (school administration policy, level of formal education, student awareness, student knowledge and external assistance) studied in this study were found to contribute positively to best environmental management practices.

It would be important therefore for school administration to come up with a comprehensive environmental management plan that will involve all the stakeholders (environmental clubs, parents, government, religious organizations, non-governmental organizations) in a form of Public-Private Partnerships participation that will enhance best environmental management practices of the students. The following specific recommendations can be done by the administration:

- (i) Have organized environmental education programmes that will create awareness and knowledge to the students. The programme will have both

formal and informal aspects. Formal education will involve; classes, school groups, visits to environmental education institution, while the formal education will involve: recreational visits to parks, museums, zoos, and nature centre, non-credit courses, seminars, workshops and seminar groups.

- (ii) Create school enclosures where environmental management practices can be demonstrated for all to see and to participate in.
- (iii) Create manure heaps, where students can participate in decomposing organic materials for use in green gardens.
- (iv) Seek funding sources for environmental programmes by bringing all the external funding and coordinate the use of the funds in environmental practices. The administration can bring in NGOs, companies and the County government.
- (v) Assist environmental management clubs with resources (equipment, tools, and transport) to enhance their best environmental management practices.
- (vi) Have leaders (patrons) that are motivated and willing to assist and motivate the club members in their activities and practical intervention in environmental problems.

5.5 Recommendations for Further Studies

The study focused only on five (5) factors (school administration policy, level of formal education, awareness, knowledge and external assistance). There is an opportunity to examine other factors related to environmental management such as climate and land use activities.

REFERENCES

- Adhiambo, H. A. (2016). *Contribution of selected stakeholders to educational resources and academic performance of girls in public girl's secondary schools in Siaya county, Kenya*. PhD. 2016. Maseno University Repository
- Adoyo, P. (2019). *Implementation status of inclusive education practices in regular primary schools in Siaya county, Kenya*. Pan-Commonwealth Forum 9 (PCF9), 2019 [215]
- Alshuwaikhat, H. M., & Abubakar, I. (2008). An integrated approach to achieving campus sustainability: assessment of the current campus environmental management practices. *Journal of Cleaner Production*, 16(2008), 1777– 1785.
- Altin, A., Tecer, S., Tecer, L., Altin, S., & Kahraman, B. F. (2014). Environmental awareness level of secondary school students: a case study in Balikesir (Turkiye). *Procedia - Social and Behavioral Sciences*, 141(2014), 1208– 1214.
- Avolio, B., Gardner, W., Walumbwa, F., Luthans, F., & May, D. (2004). Unlocking the mask: A look at the process by which authentic leaders impact follower attitudes and behaviors. *Leadership Quarterly*, 15, 801-823.
- Ballantyne R. & Packer, J. (2005). Promoting environmentally sustainable attitudes and behaviour through free-choice learning experiences: what is the state of the game? *Environmental Education Research* 11 (3): 281-295.
- Badrudin, S. T. (2015). |Role of NGOs in the protection of the environment. *Journal of Environmental Research*. 9(3): 705-712.
- Barriball, K. L., & While, A. (1994). Collecting data using a semi-structured interview: a discussion paper. *Journal of Advanced Nursing*, 19, 328–335.
- Boss, J. A. (1994). The effect of community service work on the moral development of college ethics students. *Journal of Moral Education*, 23(2), 183–198.
- Bird, J. J., Wang, C., Watson, J., & Murray, L. (2009). Relationships among principal authentic leadership, teacher trust and engagement levels. *Journal of School Leadership*, 19, 153-171.
- Bradley, J. C., Waliczek, T. M., & Zajicek, J. M. (1999). Relationship between environmental knowledge and environmental attitude of high school students. *The Journal of Environmental Education*, 30 (3), 17–21.

- Bryant, C. K., & Hungerford, H. R. (1977). An analysis of strategies for teaching environmental concepts and values clarification in kindergarten. *The Journal of Environmental Education*, 9(1), 44–49.
- Chawla, L., & Cushing, D. F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13(4), 437–452.
- County Government of Siaya. (2018). *County Annual Development Plan 2019 – 2020*. Retrieved from <https://siaya.go.ke/wp-content/uploads/2018/09/County-Government-of-Siaya-ADP-2019-2020.pdf>
- County government of Siaya (2017). *Annual development plan 2017 – 2018*. Accessed online on 18th May 2019 at: <https://siaya.go.ke/wp-content/uploads/2017/09/SIAYA-COUNTY-2017-18-ADP-FINAL.pdf>
- Dietz, T., Stern, P. C., & Guagnano, G. A. (1998). Social structural and social psychological bases of environmental concern. *Environment and Behavior*, 30(4): 450–471.
- Eric, D. (1995). *Using semi-structured Interviews in small-scale research. A Teacher's Guide*.
- Falk J. H. (2005). Free-choice environmental learning: framing the discussion. *Environmental Education Research*. 11 (3): .265-280.
- Flannery, K. B., Sugai, G., & Anderson, C. M. (2009). School-wide positive Behavior support in high school. *Journal of Positive Behavior Interventions*, 11(3), 177–185.
- Galletta, A. (2013). *Mastering the semi-structured interview*. New York and London: New York University Press.
- Gardner, W. L., Avolio, B. J., Luthans, F., May, D. R., & Walumbwa, F. O. (2005). Can you see the real me? A self-based model of authentic leader and follower development. *Leadership Quarterly*, 16, 343-372.
- Gaudillat, P. (2018). *Best Environmental Management Practices. A toolkit for resource efficiency*. European commission, Joint Research Centre, Prague
- George, B., Sims, P., McLean, A. N., & Mayer, D. (2007). Discovering your authentic leadership. *Harvard Business Review*, 85, 129-138.

- Giles Jr., D. E., & Eyler, J. (1994). The theoretical roots of service-learning in John Dewey: toward a theory of service-learning. *Michigan Journal of Community Service Learning*, 1(1), 77–85.
- Hassan, A., Noordin, T. A., & Sulaiman, S. (2010). The status on the level of environmental awareness in the concept of sustainable development amongst secondary school students. *Procedia - Social and Behavioral Sciences*, 2(2), 1276-1280.
- Japan International Cooperation Agency (JICA) (2002). Country profile on environment in Kenya. Tokyo: JICA.
- Johnson-Pynn, J. S., & Johnson, L. R. (2005). Successes and challenges in East African conservation education. *The Journal of Environmental Education*, 36(2), 25–39.
- Karanu M. N. & Oniang'o, R.K. (2017). Impacting nutrition through schools: rural outreach program (ROP) Africa 4h program profile. *African journal of food, agriculture, nutrition and development (AJFAND)* 17 (3) 1-21
- Kashyap, R., Mir, R., & Iyer, E. (2006). Toward a responsive pedagogy: linking social responsibility to firm performance issues in the classroom. *Academy of Management Learning & Education*, 5(3), 366–376.
- Kayes, C. D. (2002). Experiential learning and its critics: preserving the role of experience in management learning and education. *Academy of Management Learning & Education*, 1 (2): 137–149.
- Karatekin, K. (2014). Social studies pre-service teachers' awareness of solid waste and recycling. *Procedia - Social and Behavioral Sciences*, 116, 1797-1801
- Kashyap, R., Mir, R., & Iyer, E. (2006). Toward a Responsive Pedagogy: Linking Social Responsibility to Firm Performance Issues in the Classroom. *Academy of Management Learning & Education*, 5(3), 366–376.
- Kenya National Bureau of Statistics. (2012). *Population projections*
- Kerlinger F. N. (1986). *Foundations of behavioural research*. 3rd ed, Holt, Rinehart, Winston.
- Kothari, C. R. (2004). *Research methodology: methods & techniques* (2nd revise). New Delhi: New Age International (P) Ltd.

- Kermis, M. H. (2003). Toward a conceptualization of optimal self-esteem. *Psychological Inquiry*, 14, 1-26
- Leroy, H., Palanski, M. E., & Simons, T. (2011). Authentic leadership and behavioral integrity as drivers of follower commitment and performance. *Journal of Business Ethics*. Advance online publication. doi:10.1007/s10551-011-1036-
- Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, 7(1), 24–25.
- Mann, C. J. (2003). Observational research methods. Research design II: cohort, cross sectional, and case-control studies. *Emergency Medicine Journal*, 20(1), 54 LP – 60.
- Markus, G. B., Howard, J. P. F., & King, D. C. (1993). Integrating Community Service and classroom instruction enhances learning: results from an experiment. *Educational Evaluation and Policy Analysis*, 15(4), 410–419.
- Marans, R. W. (2012). Quality of urban life studies: an overview and implications for environment-behaviour research. *Procedia - Social and Behavioral Sciences*, 35, 9-22.
- Mbwesa J. K. (1996). *Integration of Environmental Education into the Secondary Curriculum in Kenya: Strategies and Constraints*. M.Ed. Thesis, Kenyatta University. Nairobi.
- McDuff, M. (2010). Thirty Years of Environmental Education in Africa: The role of the Wildlife Clubs of Kenya. *Environmental Education Research*, 6(4), 383–396.
- Media Team (2019) media team @education news hub.co.ke. December 22, 2019.
- Molapo, L. Stears, M. & Dempster, E. (2014). Does formal environmental knowledge inform the everyday practices of senior secondary biology learners in Lesotho? *Southern African Journal of Environmental Education*, Vol. 30:
- Mudemb, E. V. (2013). *Causes of dropout among boys and girls from secondary schools in Ugenya district, Siaya county, Kenya*. Master of Education in Comparative Education, University of Nairobi 2013
- Muthoka M., Rego A. B. and Rimbui, Z. K. (1998). *Environmental Education: Essential Knowledge for Sustainable Development*. Longhorn Publishers, Nairobi.

- National Council for Population and Development (NCPD) (2017). 2015 *Kenya National Adolescents and Youth Survey (NAYS) Siaya County*. Nairobi, Kenya NCPD.
- Ndaruga A. M. (2004). Use of school based clubs to enhance environmental sustainability in Kenya. Pp.121-128. *In Proceedings of the 14th Annual Conference, EAEN, Nairobi.*
- Ndaruga, A. M. (2003). Use of environmental days to foster environmental conservation by primary schools in Kenya. *Applied Environmental Education and Communication: An International Journal*, 2(2), 107–117.
- Ngigi, T. G., & Tateishi, R. (2004). Monitoring deforestation in Kenya. *International Journal of Environmental Studies*, 61(3), 281–291.
- Nyirenda, G. & Ngwakwe, C.C. (2014) Environmental management practices for sustainable development. Agenda for harmonization. *Environmental economics* 5 (1): 76-85.
- Ochanda A. A. (2014) *Gender dimensions in dropout rates at secondary school in Siaya County, Western Kenya*. Degree of Doctor of Philosophy in Anthropology of the University Of Nairobi
- Oketch, D., Sika, J. O., Gogo, J. O (2019). County education bursary fund influence on access to secondary education in Siaya County, Kenya. *Advances in Social Sciences Research Journal* 6 (3):
- Ozer, E. J. (2007). The effects of school gardens on students and schools: Conceptualization and considerations for maximizing healthy development. *Health Education & Behavior*, 34(6), 846–863.
- Perrot E. (1977). *The education of an ecuador*. In H. Evan, Education: Key Issues of the Future. Pergamon Press, Oxford.
- Pless, N. M., & Maak, T. (2011). Developing responsible global leaders through international service-learning programs: the Ulysses experience. *Academy of Management Learning & Education*, 10(2), 237–260.
- Seema, U., Singh, A., Bhagyashree, S. & Naik, N. (2014). Environmental education and practices in schools. *Journal of Environmental Research and Development* 9 (1) 271-283.
- Sedgwick, P. (2014). Cross sectional studies: advantages and disadvantages. *BMJ*, 348(g2276), 1–2.

- Shumer, R. D. (1993). Describing service-learning: a Delphi study. *Service Learning, General, Paper 146*. Retrieved from <https://digitalcommons.unomaha.edu/cgi/viewcontent.cgi?article=1156&context=slceslgen>
- Sigmon, R. L. (1990). Service-Learning: three principles. In *Combining Service and Learning: A Resource Book for Community and Public Service* (pp. 37– 56).
- Sroufe, R. Narasimhan, F. Montabon, R. & Wang, X. (2002) Environmental management practices. A framework. *Greener Management International (GMI)* 40: 23-44.
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56 (3), 407–424.
- The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). The Belmont report: ethical principles and guidelines for the protection of human subjects of research. *Office of the Secretary*. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/25951677>
- Toili, W. W. (2007). Secondary school students' participation in environmental action: coercion or dynamism? *Eurasia Journal of Mathematics, Science & Technology Education*, 3(1), 51–69.
- UNEP. (2002). *Global Environment outlook 3: Past, Present and future Perspectives*.
- UNEP. (1990). *Children and the Environment*. Nairobi.
- UNICEF (2014). *Basic education statistical booklet*. Accessed online on 18th 2019 at:<https://kicd.ac.ke/wp-content/uploads/2017/10/2014-Basic-Education-Statistical-Booklet.pdf>
- Walumbwa, F. O., Avolio, B. J., Gardner, W. L., Wernsing, T., & Peterson, S. J. (2008). Authentic leadership: Development and validation of a theory-based measure. *Journal of Management*, 34, 89-126.
- Wanjiru, N. R. (2011). *Role of school based clubs in addressing environmental threats in the Nile basin, case of Jinja district, Uganda*. Retrieved from [https://ir-library.ku.ac.ke/bitstream/handle/123456789/3848/Nderitu Ruth Wanjiru.pdf?sequence=3&isAllowed=y](https://ir-library.ku.ac.ke/bitstream/handle/123456789/3848/Nderitu_Ruth_Wanjiru.pdf?sequence=3&isAllowed=y).
- World Bank. (2012). *Information and Communications for Development 2012*. <https://doi.org/10.1596/978-0-8213-8991-1>

Zhang, X., Shen, L., & Wu, Y. (2011). Green strategy for gaining competitive advantage in housing development: a China study. *Journal of Cleaner Production*, 19(2011), 157–167.

APPENDICES

Appendix A: Questionnaire for Students

Section A: School Characteristics

1. Name of School _____
2. Date School was established _____
3. Current Student population _____
4. Current Teacher population _____
5. Type of school:
Mixed Boys and Girls _____; Boys _____; Girls _____
6. Have Environmental Club: Yes _____, No _____

Section B: Student Characteristics

1. Sex : Male _____, Female _____
2. Age _____ years
3. Form _____
4. Member of environmental Club in the school: Yes _____, No _____.
5. What is your level of involved in environmental Club Activities:
Very high _____, High _____, Moderate _____, Low _____, Very Low _____.
- 6.

Section C: Selected Administrative Policies

1. Does the school administration provide any assistance (or inputs) to the environmental club? Yes _____, No _____.
2. Identify the type of assistance provided by the school administration:

Table 1: Type of Assistance Provided

Type of assistance	Yes	No
Transport		
Tools		
Registration fees for the club		
Linking club to other clubs		
Provide guest lecturers		
Land for club activities		
Office for the club		
Class for club meetings		
Training of club leaders		
Knowledge provision to club members		

3. Frequency of the school Administration Assistance to the club

Table 2: Assistance from school administration and rating

Type of Assistance	Frequency of assistance by the school administration			
	Very Frequent	Frequent	Moderately Frequent	Not Frequent
Transport				
Tools (farm, cleaning)				
Registration fees for the club				
Linking club to other clubs				
Provide guest lecturers				
Land for club activities				
Office for the club				
Class for club meetings				
Training of club leaders				
Knowledge provision to members				

Inputs				
Seeds for planting				
Tree seedlings				
Plastic containers				

Section D: Environmental Club Leadership

1. Age _____
2. Sex: Male _____, Female _____
3. Education Level:
P1_____, Diploma _____, Bachelors _____, MSc _____, PhD _____.
4. Area of specialization:
Biology _____, Agriculture _____, Geography _____, Science _____, Environment _____, Education _____, Others _____.
5. Teaching experience (number of years as a teacher in secondary schools _____)
6. Years in leading the club _____
7. Time dedicated to the club in a month _____
8. -

Section E: Student Environmental Knowledge

1. Do you have knowledge of Environmental conservation: Yes ____, No _____.
2. Using the Table 2, rate your level of knowledge for the different environmental concepts listed on a scale of 1 Very Low Knowledge to 7 Very High Knowledge.

Table 2: Level of student environmental knowledge

Type of Knowledge	Level of Knowledge						
	1	2	3	4	5	6	7
Tree planting							
Waste collection (recovery, recycle reuse)							
Clean ups							
Manure heap preparation							
Waste separation							
Nursery management							
Soil conservation							
Water conservation							
Energy conservation							
Watershed management							
Gully control							
Biodiversity conservation							
Recycling of wastes							
Advocacy (community sensitization activities)							
Teaching public and peers							

Section F: Awareness of Environmental problems and management

Rate your level of awareness of environmental problems and management using a 4 point scale (very aware, aware, moderately aware, not aware) on Table 3.

Table 3: Level of Student Awareness of environmental problems and management

Environmental Activities	Student Awareness rating			
	Very aware	Aware	Moderately aware	Not aware
Tree planting				
Waste collection(recovery, recycle reuse)				
Clean ups				
Manure heap preparation				
Waste separation				
Nursery management				
Soil conservation				
Water conservation				
Energy conservation				
Watershed management				
Gully control				
Biodiversity conservation				
Removal of weeds				
Recycling of wastes				
Advocacy (community sensitization activities)				
Teaching communities and peers				

Section G: Best Environmental Management Practices (BEMP) undertaken by the Club

Identify and rate on Table 4 the BEMP undertaken by your environmental club. Rate the practice on a scale of 1 to 7.

Table 4: Student awareness of Best environmental management practices

Best Environmental Management Practices (BEMP)	Student Awareness rating			
	Very aware	Aware	Moderately aware	Not aware
Tree planting				
Waste collection (recovery, recycle reuse)				
Clean ups				
Manure heap preparation				
Waste separation				
Nursery management				
Soil conservation				
Water conservation				
Energy conservation				
Watershed management				
Gully control				
Biodiversity conservation				
Removal of weeds				
Recycling of wastes				
Advocacy (community sensitization activities)				
Teaching communities and peers				

**Section H: External Assistance for Environmental Management Practices:
Partnership and Support from Private (Industries,) and Public (County,
regulators, other schools)**

1. Name the different organization that support your environmental club during functions and or activities.
2. Type support provided to the environmental club by the organization

Table 5: Name of Organization and type of support provided

Best Environmental Management Practices (BEMP)	Name of organization	Type of support	
		Partnership	Support
Tree planting			
Waste collection (recovery, recycle reuse)			
Clean ups			
Manure heap preparation			
Waste separation			
Nursery management			
Soil conservation			
Water conservation			
Energy conservation			
Watershed management			
Gully control			
Biodiversity conservation			
Removal of weeds			
Recycling of wastes			
Advocacy (community sensitization activities)			
Teaching communities and peers			

Table 6; Partnerships

Environmental Activities	Student Awareness rating		
	Partnership	Support	How often (number)
Trees planting			
Waste collection (recovery, recycle reuse)			
Clean ups			
Manure heap preparation			
Waste separation			
Nursery management			
Soil conservation			
Water conservation			
Energy conservation			
Watershed management			
Gully control			
Biodiversity conservation			
Removal of weeds			
Recycling of wastes			
Advocacy (community sensitization activities)			
Teaching communities and peers			

Appendix B: Questionnaire for Patrons

Section A: About the School

1. Which year was this school established? _____
2. What is the current student population size? _____
3. What is the current population size of the teaching staff? _____

Section B: Students Club Activities

4. Which year was the environmental club established in this school? _____
5. How many student environmental club members are there? Boys _____ Girls _____
6. How often and on which days do you meet as environment club members?

7. Which activities do you engage in as environment club members? _____

8. Do you engage in environmental activities outside the school compound, if yes which activities do you engage in outside the school compound? _____

9. Do you undertake activities that involve students' parents or the school's neighboring communities? If yes, which activities do you engage the community?

Section C: Support and Partnerships

10. Which type of support do you receive from the school administration? _____

11. Do you partner or collaborate with other organization(s)/institution(s) in environmental activities?

12. If you have partners or collaborators, in which activities do you partner/collaborate?

Section D: Environmental Management Practices

13. Does the school have a written Environmental Management Policy? _____

14. Briefly describe how solid wastes are managed in the school _____

15. Does the school have an area separated for planting trees? _____

16. How do you conserve water in the school? _____

17. How do you conserve soil in the school? _____

Section E: Benefits and Challenges

18. In your opinion, what opportunities does the environment club present to students?

19. Are there benefits to the school from the existence of the environment club? If yes, which benefits are there for the school?

20. What are the challenges faced by the environment club in this school?

21. What would you recommend for the environment club to have a greater impact on:

a. Students: _____

b. School: _____

c. Neighboring community: _____

THANKS A LOT FOR YOUR SUPPORT

Appendix C: Consent Forms

CONSENT FORM FOR TEACHERS

AFRICA NAZARENE UNIVERSITY, DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT INFORMED CONSENT DOCUMENT FOR TEACHERS

Study Title: An Investigation into the contribution of environmental clubs in environmental best practices in secondary schools in Siaya County Western Kenya

Investigators: Jackline Awuor Okumu, Principal Investigator, Africa Nazarene University

Study Location: Siaya sub-county

PI Version Date: 10th June 2019

Introduction

My name is and I am a student at Africa Nazarene University. I am pursuing a Master of Science Degree in Environment and Natural Resources Management and I am in my final year of the study. Therefore, as part of the Master Degree Programme requirement, I am conducting a research study to enable successful completion of the programme. I am here to inform you about my research study and find out if you could accept to participate in a study that tries to find out contributions of secondary school environmental clubs in the environmental management best practices. I am going to give you some information about the study, if there is anything you don't understand please ask me to stop and I will take time to explain. There will be time at the end for you to ask questions. After answering your questions, I will ask you if you want to join the study.

Purpose of study

The purpose of this study is to understand how secondary school environmental clubs are established, their activities, benefits to students and challenges faced by the clubs. If there is no environmental club, the study is still interest in finding out factors that have limited establishment of the environmental club, environmental activities that students participate despite the absence of the environmental club, students' knowledge and attitudes toward environmental conservation and collaboration with other organizations or institutions in environmental activities. I would like to establish if environmental clubs have impacts on students environmental attitudes and behavior, and if there are any differences among students who are members of the environmental clubs and those that are not.

Why you are being asked to take part

I am asking you to join this study because you are in-charge of an environmental club/a head teacher/deputy head teacher/senior teacher of a school that has been sampled to participate in this study. I have sampled 30 secondary mixed day schools in Siaya sub-county to participate in this study.

Study Procedures

- If you join this study, I will request you to sign this consent form and then interview you using an open-ended questionnaire. I will write down the interview discussion in a note book where your name will not be recorded.
- I will then request you to identify two students, male and female, to complete a structured questionnaire. The students will be consented separately and if they consent, I will guide them on how to complete the structured questionnaire.

Potential Harms, Injuries, Discomforts, Inconveniences or Risks

The risks from being in this study are small. Some people might find the questions asked of them take too much time out of their day. With any research study, there is a small chance your personal information may be revealed to people not in the study. I will do my best to prevent this.

Potential Benefits

There is no direct benefit to you as a participant in this research study. However, the information that I will generate will be useful to inform secondary schools in the benefits of and challenges by secondary school environmental clubs. This information will help strengthen effectiveness of the environmental clubs, which in turn may motivate youths to adopt environmentally sound behaviors.

Confidentiality

I will try to keep your personal information as private as possible. After you decide to take part, you will receive a study number. This number will be used to identify schools where the interviews were conducted but not you as an individual. All study materials will be kept in a locked cabinet or password protected computer. Your name and identity will not be shown in any reports about this study. I will not share your name or mobile phone number to anyone else besides my course supervisors who are responsible to assess my work and further assist in protecting research participants.

Participation

Your choice to participate in this study is voluntary, therefore, you do not have to take part in this study. You can decide to stop being part of this study at any time after you start. You don't have to answer any questions you don't want to. Before deciding whether you want to take part, please feel free to ask any questions.

Who do I call if I have questions or complaints?

If you have questions or complaints as a result of being in this study please contact me, Jackline Okumu, the Principal Investigator at Africa Nazarene University, P.O. Box xxxx or call 0710704778. If you feel you have been harmed in any way, or if you have questions about your rights as a research subject, and want to talk about the study with someone who is not directly involved in this research study, please contact The Secretary, xxxxx University Ethics Review Committee, P.O. Box xxxxxx, Tel: xxxxxxxxxxxx; Email address: xxxxxxxxxxxx.

Do you have any questions for me? Do you want to take part in this research study?

Your signature (or mark) on this form means:

- I have been informed about the study's purpose, procedures, possible benefits, and risks.
- I have been given the chance to ask questions before I sign.
- I have agreed to be in this study of my own free choice.

Name of participant: _____

Name of the school: _____

Signature of participant: _____

Date: _____

Name of Person administering the consent:

Signature of person administering consent: _____ Date:

Give one copy to the participant and keep one copy in study record

Appendix D: Consent Forms for Students

CONSENT FORM FOR STUDENTS

**AFRICA NAZARENE UNIVERSITY, DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES MANAGEMENT**

INFORMED CONSENT DOCUMENT FOR STUDENTS

Study Title: An Investigation into the contribution of environmental clubs in environmental best practices in secondary schools in Siaya County Western Kenya

Investigators: Jackline Okumu, Principal Investigator, Africa Nazarene University.

Study Location: Siaya sub-county

PI Version Date: 10th June 2019

Introduction

My name is and I am a student at Africa Nazarene University. I am pursuing a Master of Science Degree in Environment and Natural Resources Management and I am in my final year of the study. Therefore, as part of the Master Degree Programme requirement, I am conducting a research study to enable successful completion of the programme. I am here to inform you about my research study and find out if you could accept to participate in a study that tries to find out contributions of secondary school environmental clubs in the environmental management practices. I am going to give you some information about the study, if there is anything you don't understand please ask me to stop and I will take time to explain. There will be time at the end for you to ask questions. After answering your questions, I will ask you if you want to join the study.

Purpose of study

The purpose of this study is to understand how secondary school environmental clubs are established, their activities, benefits to students and challenges faced by the clubs. If there is no environmental club, the study is still interested in finding out factors that have limited establishment of the environmental club, environmental activities that students participate despite the absence of the environmental club, students' knowledge and attitudes toward environmental conservation and collaboration with other organizations or institutions in environmental activities. I would like to establish if environmental clubs have impacts on students' environmental attitudes and behavior, and if there are any differences among students who are members of the environmental clubs and those that are not.

Why you are being asked to take part

I am asking you to join this study because you are a student in one of the sampled schools and your teacher your teacher has chosen you to take part in my study. In total, 60 students from 30 secondary mixed day schools in Siaya sub-county will participate in this research study.

Study Procedures

- If you join this study, I will request you to sign this consent form and then guide you to complete a structured questionnaire. Your name will not be written on the questionnaire instead a number will be used to track questionnaires completed in each school. It will take about 30 minutes to complete all study procedures.

Potential Harms, Injuries, Discomforts, Inconveniences or Risks

The risks from being in this study are small. Some people might find the questions asked of them take too much time out of their day. With any research study, there is a small chance your personal information may be revealed to people not in the study. I will do my best to prevent this.

Potential Benefits

There is no direct benefit to you as a participant in this research study. However, the information that I will generate will be useful to inform secondary schools in the benefits of and challenges by secondary school environmental clubs. This information will help strengthen effectiveness of the environmental clubs, which in turn may motivate youths to adopt environmentally sound behaviors.

Confidentiality

I will try to keep your personal information as private as possible. After you decide to take part, you will receive a study number. This number will be used to identify schools where the interviews were conducted but not you as an individual. All study materials will be kept in a locked cabinet or password protected computer. Your name and identity will not be shown in any reports about this study. I will not share your name or mobile phone number to anyone else besides my course supervisors who are responsible to assess my work and further assist in protecting research participants.

Participation

Your choice to participate in this study is voluntary, therefore, you do not have to take part in this study. You can decide to stop being part of this study at any time after you start. You don't have to answer any questions you don't want to. Before deciding whether you want to take part, please feel free to ask any questions.

Who do I call if I have questions or complaints?

If you have questions or complaints as a result of being in this study please contact me, Jackline Okumu, the Principal Investigator at Africa Nazarene University, P.O. Box _____ or call 0710704778. If you feel you have been harmed in any way, or if you have questions about your rights as a research subject, and want to talk about the study with someone who is not directly involved in this research study, please contact The Secretary, xxxxx University Ethics Review Committee, P.O. Box xxxxxx, Tel: xxxxxxxxxx; Email address: xxxxxxxxxxxx.

Do you have any questions for me? Do you want to take part in this research study?

Your signature (or mark) on this form means:

- I have been informed about the study's purpose, procedures, possible benefits, and risks.
- I have been given the chance to ask questions before I sign.
- I have agreed to be in this study of my own free choice.

Name of participant: _____

Name of the school: _____

Signature of participant: _____

Date: _____

Name of Person administering the consent:

Signature of person administering consent: _____ Date:

Give one copy to the participant and keep one copy in study record

Appendix E: Letter of Approval from ANU

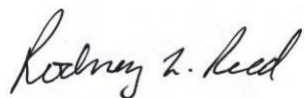


26th May 2020

RE: TO WHOM IT MAY CONCERN

Jackline Awour Okumu (15MO4DMEV001) is a bonafide student at Africa Nazarene University. She has finished her course work and has defended her thesis proposal entitled: - *“Evaluation of the contribution of voluntary environmental clubs to environmental best practices in Secondary Schools in south Alego ward, Siaya County”*.

Any assistance accorded to her to facilitate data collection and finish her thesis is highly welcomed.



Rodney Reed, PhD.

DVC Academic & Student Affairs.

Appendix F: Research Permit from NACOSTI

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 610447	Date of Issue: 30/July/2020
RESEARCH LICENSE	
<p>This is to Certify that Miss. JACKLINE AWUOR OKUMU of Africa Nazarene University, has been licensed to conduct research in Siaya on the topic: EVALUATION OF THE CONTRIBUTION OF VOLUNTARY ENVIRONMENTAL CLUBS TO ENVIRONMENTAL BEST PRACTICES IN SECONDARY SCHOOLS IN SOUTH – ALEGO WARD, SIAYA COUNTY for the period ending : 30/July/2021.</p>	
610447	License No: NACOSTI/P/20/5938
Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	