

**FACTORS INFLUENCING ENVIRONMENTAL CONCERN  
AND PRO-ENVIRONMENTAL BEHAVIOR AMONG UNIVERSITY OF NAIROBI  
STUDENTS**

**BY  
MICHAEL KABARI WAWERU  
C50/79833/2012**

**RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF ARTS IN  
ENVIRONMENTAL PLANNING AND MANAGEMENT OF  
THE UNIVERSITY OF NAIROBI**

**DECEMBER 2019**

## DECLARATION

### Student Declaration

This research project is my unique effort and has not been presented for an academic degree in any other university.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Michael Kabari Waweru

Reg No. C50/79833/2012

### University Supervisors

Name: Prof. Evaristus M. Irandu

Department of Geography & Environmental Studies, University of Nairobi

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name: Mr. Lincoln. K. Karingi

Department of Geography & Environmental Studies University of Nairobi

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **ACKNOWLEDGEMENT**

My wife and son, thank you for your unequivocal support throughout this period. It would not have been possible to do my work without your help and support. I want to extend special thanks to my supervisors, Prof. Evaristus. M. Irandu and Mr. Lincoln K. Karingi for their relentless assistance and support. They have both devoted a lot of their time in shaping my proposal and in the preparation of this research. I am particularly thankful to all my lecturers, classmates, technical staff from the Department of Geography and Environmental Studies whose assistance and encouragement on the whole programme and on this project cannot be overlooked. I am also thankful to Dr. Boniface Wambua Nzuve, the chairman of my department for allowing me to change my research topic and maintain my supervisors. His wise counsel is very much appreciated.

My deepest gratitude to the students of University of Nairobi for sparing time and providing feedback during my field work; to my research assistants offering their time to administer the questionnaires especially to the female student population within their hostels, that would have been challenging to access.

Finally, thanks to Almighty God for providing me abundant grace, zeal and strength through the programme, especially the later part of my study.

## ABSTRACT

The gap between environmental education or knowledge, awareness and the behaviour that promotes environmental sustainability is an important gap to understand. This study aimed to bring into focus the levels of the variables among individuals i.e., environmental knowledge/awareness, attitudes, motivations to participate in environmental issues, that affect pro-environmental behaviour amongst university students. Specifically, the objective in this research was to assess the level of environmental awareness, attitude and motivation to participate in pro-environmental issues and examine how these factors affect their pro-environmental behaviour, and in addition, evaluate any significant difference in each of these factors among the various university campuses. This study was conducted in five of the University of Nairobi Campuses in Nairobi, including two of its satellite campuses in Kikuyu and Kabete Campuses targeting a population of 60,038 students. This research used descriptive survey design particularly the comparative case study method. Primary data was collected by administration of questionnaires; a total of 384 questionnaires were successfully administered. In the course of the study questionnaires were issued to students in the five campuses through a stratified probability or random sampling method. The sampling frame for the study was the 60,038 students registered under the year 2019/ 2010. The total number of samples collected was 384 samples, collected through randomly sampling students within the campuses. This study utilized the Chi-Square Test as a quantitative measuring technique to assess the differences in the levels of each independent variable among students within the five campuses. The null hypothesis in the Chi-Square test was that there was no relationship or association or significant difference existing on the categorical variables among students in the five University of Nairobi campuses and that they are independent. The study found the student (65%) had little to no knowledge and awareness on environmental challenges, i.e. the causes and effects of behaviour within the university. Majority were found to be intrinsically motivated to participate in pro-environmental behaviour. The study concluded that students' awareness and understanding on ecological issues but were not dependent on the student campus, the study also concluded that students had positive attitude towards environmental conservation and intrinsic motivation to participate on environmental issues. The ministry of environment should partner with institutions of higher learning, introduce programs that could help students to interact more with environmental challenges. Institution of higher learning should embrace environmental talks and implement it through students' leadership to help students have positive attitude towards their involvement on environmental conservation practices; The University of Nairobi can consider having more environmental awareness posters in all buildings in the university campuses, such as those located in the Department of Geography and Environmental Studies corridors, this will increase the curiosity to practice pro-environmental behaviour among all students as well as create a sense of personal responsibility to act, further from just being aware. This can help them develop solution to address these challenges. The study also recommends further studies in the area of gender as a factor to pro-environmental behaviour and environmental concerns in a society.

## TABLE OF CONTENTS

DECLARATION.....	ii
ACKNOWLEDGEMENT.....	iii
ABSTRACT.....	iv
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
1. CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the Study .....	1
1.2 Statement of the Problem .....	9
1.3 Research Questions .....	10
1.4 Objectives of the Study .....	10
1.5 Research Hypotheses.....	11
1.6 Justification of the Study .....	12
1.7 Scope of the Study .....	13
1.8 Definition of operational Terms.....	13
2. CHAPTER TWO: LITERATURE REVIEW .....	16
2.1 Introduction .....	16
2.2 Overview of the global challenge .....	16
2.2.1 Environmental knowledge and importance of education.....	19
2.3 Literature review on study variables.....	21
2.3.1 Awareness .....	21
2.3.2 Attitudes.....	21
2.3.3 Motivations .....	22
2.3.4 Pro-environmental behaviour.....	23
2.4 Theoretical Framework .....	24
2.5 Conceptual Framework .....	26
3. CHAPTER THREE: RESEARCH METHODOLOGY .....	31
3.1. Introduction .....	31
3.2. The Area of Study .....	31
3.3. Research design .....	32

3.4.	Target Population.....	33
3.5.	Sampling Frame .....	33
3.6.	Sample Size .....	35
3.7.	Primary Data .....	37
3.8.	Secondary Data.....	39
3.9.	Piloting.....	39
3.10.	Validity .....	40
3.11.	Reliability .....	40
3.12.	Data Analysis.....	41
3.13.	Ethical Issues.....	42
4.	<b>CHAPTER FOUR: RESULTS AND DISCUSSION.....</b>	<b>43</b>
4.1.	Introduction .....	43
4.2.	Students' basic characteristics .....	43
4.3.	Students' general environmental understanding .....	45
4.4.	Students' Perception on environmental challenges as it affects gender.....	45
4.5.	Level of environmental knowledge and awareness among university students .....	46
4.5.1.	Level of knowledge on environmental issues.....	46
4.5.2.	Level of awareness on environmental issues .....	49
4.6.	University students' environmental attitudes towards pro-environmental issues.....	51
4.7.	Level of motivation to participate in pro-environmental behaviour .....	51
4.10.	Test of hypotheses of this research .....	52
4.10.1.	Test of significant difference in the level of knowledge among students .....	52
4.10.2.	Test of significant difference in the level of awareness among students .....	53
4.10.3.	Test of significant difference in the level of attitude among students .....	54
4.10.4.	Test of significant difference in the level of motivation to participate among students .....	54
4.11	Discussions of the Findings.....	55
5.	<b>CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS.....</b>	<b>58</b>
5.1	Introduction .....	58
5.2	Summary of Findings.....	58

5.2.1. Summary of findings to the first objective of study.....	58
5.2.2. Summary of findings to the second objective of study .....	59
5.2.3. Summary of findings to the third objective of study .....	60
5.3. Conclusion.....	60
5.4. Recommendations .....	61
5.4.1. To policy makers .....	61
5.4.2. To educational institutions .....	62
5.4.3. For further Studies .....	62
REFERENCES.....	64
APPENDICES .....	74
Appendix I Sample Questionnaire.....	74
Appendix II (a): Introduction Letter from the Department of Geography and Environmental Studies to conduct research .....	78
Appendix II (b): NACOSTI License to conduct research .....	79
Appendix II (c): Letter of authority to conduct research.....	80
Appendix III (a): Summary table of student’s environmental attitudes towards pro- environmental issues .....	81
Appendix III (b): Summary table of students’ motivation to pro- environmental behaviour.....	83
Appendix III (c): Environmental awareness with respect to campus .....	84

## LIST OF TABLES

Table 3.1: Sampling Frame.....	34
<b>Table 4.1: Respondents' basic information .....</b>	<b>43</b>
<b>Table 4.2: Gender difference in Perception of environmental impact and gender difference .....</b>	<b>46</b>
<b>Table 4.3: Students' level of knowledge on environmental issues .....</b>	<b>48</b>
<b>Table 4.4: Level of awareness on environmental issues amongst students.....</b>	<b>50</b>
<b>Table 4.17: Association between campus and environmental knowledge .....</b>	<b>53</b>
<b>Table 4.18: Association between campus and environmental awareness .....</b>	<b>53</b>
<b>Table 4.19: Association between campus and environmental attitude .....</b>	<b>54</b>
<b>Table 4.20: Association between campus and motivation to participate.....</b>	<b>55</b>



## LIST OF FIGURES

Figure 2.1: Conceptual Framework .....	27
Figure 3.1: Research Study Area Map.....	<b>Error! Bookmark not defined.</b>
Figure 4.1: Respondent's year of study .....	44
Figure 4.2: Photos of various environmental issues observed during study.....	47
Figure 4.3: Interaction between students' gender and student knowledge on environmental issues .....	<b>Error! Bookmark not defined.</b>
Figure 4.4: Interaction between students' gender and student awareness on environmental issues .....	<b>Error! Bookmark not defined.</b>
Figure 4.5: Interaction between students' gender and students' environmental attitude among UON students.....	<b>Error! Bookmark not defined.</b>
Figure 4.6: Interaction between students' gender and students' motivation to participate in environmental challenge among UON students .....	<b>Error! Bookmark not defined.</b>

# 1. CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

People who are concerned about preserving the environment for present and future generations are more prone to engage in pro-environment lifestyles. Concern around the environment is no longer an issue for those persons considered to be in “environmental circles” to deal with, whether globally or locally in Kenya. It is common to assume, environmental issues are the concern of persons such as climate change scientists, environmental scientists, or conservationists. This dynamic is changing as environmental issues or concerns are being realized to be issues for all individuals living on earth to contend with- as it affects them in one way or the other. These dynamics point to the needs to educate people about the environment and the relationships (causes and effects) around it.

Environmental concern has been treated as an evaluation of, or an attitude towards facts, one's own behaviour, or others' behaviour with consequences for the environment (Weigel, 1983; Ajzen, 1989; Takala, 1991). It seems then as if environmental concern may refer to both a specific attitude directly determining intentions, or more broadly to a general attitude or value orientation. Stern (1992) identified four different such value orientations. In the fact of these, environmental concern represents a new way of thinking called the New Environmental Paradigm (NEP) (Dunlap & Van Liere, 1978). In a second value orientation, environmental concern is tied to anthropocentric altruism; people care about environmental quality mainly because they believe that a degraded environment poses a threat to people's health. Thus, it is not the threat to the environment, but the threat to the well-being of people that is of central concern (Van Liere & Dunlap, 1978;

Black et al., 1985; Hopper & Nielsen, 1991). According to a third value orientation, environmental concern expresses self-interest. For example, Baldassare and Katz (1992) found that perceived personal threats caused by environmental deterioration are an important factor underlying environmentally responsible behaviour. Finally, Stern (1992) identified a view that assumes that environmental concern is a function of some deeper cause, such as underlying religious beliefs or post-materialistic values. More recently, in reviewing public opinion data, Gardner and Stern (1996) noted a gradual shift among people with the second and third value orientations toward what they identify as an ecocentric value orientation, which is similar to the NEP worldview.

Possessing an ecocentric value orientation implies that one is concerned about the ecosystem for its own sake. It should, however, also be noted that in a general population sampled by Stern and Dietz (1994) and Stern et al. (1995) failed to find that the ecocentric value orientation different from the anthropocentric altruism value orientation. This orientation shift is the reason why environmental education is key amongst the young population. Having an ecocentric value orientation is what this study aims to highlight and advocate for; coining it as environmental concern and pro-environmental among university students in Kenya.

The fundamental objective of environmental education (formal or informal) is creating consciousness among human beings. In 1975, a workshop held in Belgrade, Yugoslavia came up with emphasis to the fundamental purpose of environmental education, which is to cultivate a global population that is conscious of and apprehensive around environmental issues; this was later known as the Belgrade Charter, (UNESCO- UNEP, 1990).

An individual's obligation to conserving the environment may take numerous forms, for example, better utilization of water resources, better management of waste, recycling, reusing shopping bags, use of public transportation, buying local or organic products, carpooling as opposed to driving individual cars in one family, advocating for environmental issues, and as recently seen globally, protesting to a cause on climate change. Others may write protest letters to newsrooms or authorities to support the restoration of damaged ecosystems, or make effort to conserve water and energy. However, notwithstanding the proof showing that huge proportions of the public express pledge to the environment, as witnessed in the United Nations Environmental Assembly (UNEA-4) in Nairobi in March, 2019.- In this assembly, nations promised to address the destructions our ecosystems faces, including significantly reducing single use plastics products by the year 2030 (IISD, 2019), participation in environmentally- supportive behavior (or otherwise herein referred to as pro-environmental behavior) seldom reflects the strength of those promises (Schultz and Zelezny 1998, 1999).

In an action plan report by the UNEP and AMCEN, 2017, aiming to highlight the challenges confronting environmental education structures in Africa, notes that environmental knowledge created by environmentalists worldwide is moving quicker than humanity's aptitude to understand and make suitable use of the information being created. These points to the need to create more awareness about how to make use of the knowledge the society has, as well as build individual responsibility that is essential to guaranteeing we practice sustainable behaviour in our daily lives. Information on students 'perspectives and pro-environmental conceptions is fundamental as these young people will be responsible for the environment protection in the future. Since most

environmental programs are designed for school students, information obtained from this study could be useful for policy-makers, environmental learning curriculum developers and trainers

The report further adds that knowledge-based institutions such as universities are confronted to 'keep up' with innovative global environmental information, conceptions and alternate tools, skills and practices suggested. Strong partnerships between global institutions such as the United Nations as well as education and training institutions are required so as to produce knowledge (UNEP and AMCEN, 2017).

According to Lozano et al., (2013), some universities have been involved in sustainable growth, though the development hasn't completely infiltrated all scholarly disciplines. The expansion of a conscience regarding environmental concerns is not observed despite the vast accessibility of ecological material in various media, which is echoed in the behaviour of learners in institutions of higher learning, on the matter (Hartmann and Apaolaza- Ibanez, 2012).

At the University of Nairobi (UON), for example, the College of Biological and Physical Sciences hosts a student led environmental club known as the Chiromo Environmental Awareness Club (C.E.A.C) that embraces activities such as holding inter-university environmental quiz challenges with other environmental clubs from the other Kenyan universities. The objective of these quiz engagements, as is the club, is to enlighten the youth on the environmental issues in Kenya, discuss upcoming issues in the sustainability

field such as new solutions to environmental problems globally and promote green livelihood in a student's daily life (University of Nairobi, 2019).

In relation to the above underlined challenges of keeping up with the new environmental content and solutions, university students increasingly more access to varied types of information channels, which support the access to ecological material (Morigi and Krebs, 2012). Besides contributing to managing environmental challenges, projects established in educational establishments also play a significant function to students by presenting to them the tools on how to handle factual environmental concerns, especially when they leave the institution; emphasis being on the eco-centric approach to daily living and development (Chang, 2013; Barth, 2013).

In a study by Ecem ., et.al, (2018), looking in to the influence cultural difference has on pro-environmental behaviour within university students in Middle East, Turkey and European countries, notes that students from Middle East countries have considerably lower eco-centric concern about environment compared to the students from Turkey and European countries. On the other hand, the study highlights, the substantial difference of anthropocentric worldview between European and Middle Eastern students showing more anthropocentric concern of European students. Ecem concludes that nations' culture on pro-environmental behaviour influences national sustainable development. The study further recommends authorities to advance precise education approaches for sustainable development which turns cultural disparities into gain.

From these studies conducted globally, it is evident that there is a real need for societies to adopt practical measures to ensure adoption of eco-centric or pro-environmental behaviour so as to attain sustainable goals set by us- living on earth. These studies point to the fact that there is a connection between the knowledge we get, the awareness we have about an issue and how we behave, more so importantly, the attitude we have over the environmental issues facing our world once we are aware of those issues.

Zsoka et al, (2012) rightfully highlighted that awareness or education is some of the key dynamics in describing the high levels of environmental concern. Over time, researchers have suggested that the more educated people are, the more concern they express regarding the quality of their surroundings and their behaviour towards that quality. These they do since having better awareness of the potential damage an action may have to disrupt that quality (Lozano, 2006). Schlegelmilch et al., (1996) reiterated this idea by concluding, the more knowledgeable an individual is, the higher the level of eco-friendly behaviour. Importantly, as articulated by Kennedy et al., (2009) while an individual may exercise ecological principles or values in his/ her decision making, in some instance other primacies such as safety or financial well-being may take priority over environmentally-supportive behaviour.

Though environmental knowledge and education appears to be candidly related, the nature of association on how they affect pro-environmental behaviour is not as clear (Zsoka et al., 2012). Universal understanding or awareness and even definite abilities

connected to environmental concerns are habitually learnt through the education system as highlighted by Gracia- Valinas et al., (2010). This study purposes to establish those relational factors that influence such positive (or pro) environmental behaviour among individuals considered educated, particularly in institutions of greater learning in Kenya.

In a study by Muthui (2012) at the University of Nairobi, while assessing awareness levels and environmental management practices in secondary schools, Muthui establishes that a definite relationship between secondary student's level of education (categorised under the student's class) and knowledge/ awareness and environmental management. In his study, one of the resulting recommendations were for the education system (including schools and government ministers involved) to introduce more environmental seminars in schools to further consciously integrate environmental awareness at the early stages of education. This study seeks to assess the environmental factors influencing environmental concern and pro-environmental behaviour among the students in high learning institutions.

As observed in Kenya, environmental content is infused into disciplines or topics imparted in school, with the aim of imparting environmental mindfulness to pupils and students from an early age. Environmental education is explained through subjects like science, agriculture, geography, social ethics, literature and history. Environmental learning is an endeavor to change education so that ecological proficiency is rebuilt as one of its elementary goals along with individual and societal capability. This study inspired to focus stemmed from gaps observed between people's possession of



environmental knowledge and having a strong sense of environmental mindfulness and displaying or practising pro-environmental behaviour in our daily lives.

In an article by the UN Environment in July 2019 (UNEP, 2019) looking at an initiative by the UN Environment in conjunction with Kenyan Government to make Kenyan universities the “greenest in the world”, notes that initiatives such as green structures in university campuses as well as the adoption of solar power sources should be the next frontier of universities and its students as the students obtain comprehension and skills desired to influence the environment positively; it is a huge opportunity for universities in Kenya to operate in a sustainable way. The article further notes that universities in Kenya can also shape the behaviors of the next generation through learning and shaping choices they make outside the institutions (UNEP, 2019).

Studies continue to emphasize what educators world over as well as environmentalists, have constantly highlighted; that sustainable solutions to world’s environmental predicaments requires an environmental mindfulness and proper considerations by citizens. Students within institutions of higher learning need to have deep philosophical understanding of environmental issues and practice pro-environmental behaviour inherently, as only then can we influence the culture and sustainable progress of the country.

## **1.2 Statement of the Problem**

According to a UN Environment report (2017), looking at global consumption patterns notes that if consumption and production habits continue at the increasing rate as is currently, three billion citizens could experience water scarceness by the year 2025; further adding that mining natural resources would increase three times over the Earth's capacity to satisfy the demand at that time. The year 2030 Agenda would only be achieved if we appreciate those practices and behavioural activities that inhibit citizens from completely realising sustainable development (UN Environment, 2017).

The gap between eco-friendly knowledge or education, awareness and the pro-environmental behaviour is a vital gap to appreciate. This study aims to bring into focus the levels of the variables among individuals i.e., environmental knowledge/ awareness, attitudes, motivations to participate in environmental issues, that affect pro-environmental concerns and behaviour among university students.

Appreciating how education influences environmental knowledge and further how this affects the behaviour of university students, is critical. As far as understanding these influences among university student in Africa, few researches have been done to illustrate the transference of their environmental knowledge and awareness into positive attitude towards pro- environmental behaviour within and after studies in institution of higher learning, more so practicing pro-environmental behaviour within universities. Seeing that colleges train people to achieve essential social functions meritoriously, this project will aim to focus on university students as they will be future leaders, policy architects,

doctors, researchers, industrialists and consumers. As such the university students are the future custodians, in different sectors such as in the political, social, economic and ecological areas of our society (Waas et al., 2010).

Consequently, there is no studies that have been conducted in Kenyan universities to study the influence of the level of knowledge regarding environmental issues, the attitudes towards those issues as well as the awareness it brings to individual students so as to promote environmental concern subsequent behaviour that is eco-friendly. This study aims to complement that gap of knowledge by assessing how these factors influences environmental concern and pro-environmental behaviour among university students.

### **1.3 Research Questions**

The research study was directed by the following research questions:

1. What is the level of environmental knowledge and awareness among university students at the University of Nairobi campuses?
2. What are the environmental attitudes towards pro-environmental issues among the university students in the University of Nairobi campuses?
3. What is the level of motivation to participate in pro-environmental behaviour among students in the University of Nairobi campuses?

### **1.4 Objectives of the Study**

The general objective of this study was to assess how factors i.e. the level of environmental knowledge, awareness; attitude and motivation to participate affect

environmental concern and pro-environmental behaviour of students in the University of Nairobi.

Specific objectives that guided this study include:

1. To examine the level of environmental knowledge and awareness of university students at the five University of Nairobi (UoN) campuses.
2. To assess the university students' environmental attitudes towards pro-environmental issues in the five campuses of the UoN.
3. To determine the level of motivation to participate in pro-environmental behaviour among students at the five UoN campuses.

## **1.5 Research Hypotheses**

H<sub>10</sub> There is no statistically significant difference in the level of knowledge and awareness among students at the five University of Nairobi campuses.

H<sub>1a</sub> There is statistically significant difference in the level of knowledge and awareness among students at the five University of Nairobi campuses.

H<sub>20</sub> There is no statistically significant difference in the environmental attitudes towards pro-environmental issues among students in the five University of Nairobi campuses.

H<sub>2a</sub> There is no statistically significant difference in the environmental attitudes towards pro-environmental issues among students in the five University of Nairobi campuses.

H<sub>30</sub> There is no statistically significant difference in the level of motivation to participate in pro-environmental behaviour among students in the five University of Nairobi campuses.

H<sub>3a</sub> There is statistically significant difference in the level of motivation to participate in pro-environmental behaviour among students in the five University of Nairobi campuses.

## **1.6 Justification of the Study**

Efforts to change human conduct, whether at an individual, domestic, or collective scale can result in unpredicted results. Policymakers have a number of tools to inspire behaviour, including through regulations, such as prohibitions, rules and industry-wide principles. While these tools are critical for changing utilisation patterns, a deep understanding of consumer's behaviour is also fundamental (UN Environment 2017).

As suggested in the UN Environment 2017 report, employing behavioural discernments to efforts regarding sustainability within developing countries is critical. The global middle class is projected to grow to three billion middle class consumers by the year 2040. Largely youthful, this population will be in urban and predominantly located in developing countries. Considering how information is processed and how perspective influences our conduct and how we make decisions can offer insight on how to develop more efficient intervention strategies on sustainable utilisation and production (UN Environment, 2017).

In accordance with the suggestion above, this research aimed at assessing some of the behavioural factors or aspects among university students that affect how they view environmental concerns and their pro-environmental behaviour. Furthermore, this research aimed to emphasize how the environmental behaviour of universities are structured and how they transfer their environmental awareness into pro- environmental behaviour, trying to analyse the similarities and differences among University of Nairobi students at the five campuses in Nairobi. Furthermore, the study aims to bring to our conscience the need to re-strategize environmental awareness and knowledge among the millennial generation or those otherwise considered youths in Kenya and globally.

### **1.7 Scope of the Study**

This research was focus on assessing three variables (environmental awareness, attitudes and motivations to participate) among individual undergraduate students from the five campuses of higher learning, namely: The University of Nairobi- Chiromo Campus, Upper and Lower Kabete Campuses, Kikuyu Campus (including the *Kenya Science Teachers College- KTSC*), Kenyatta Hospital Campus and Main Campus. The respondents will be drawn from undergraduate students in various faculties and schools to avoid any biasness projected among environmental based university students.

### **1.8 Definition of operational Terms**

**Environment:** The physical, biological and chemical constituents as well as social, economic and cultural features linked to individuals (UNESCO- UNEP 1985). In the

context of this study, environment considered was the immediate surrounding and general students' interaction with that surrounding.

**Environmental Awareness:** Kollmus and Agyeman, (2002) describe environmental awareness as the consciousness or understanding of how human behaviour impacts the environment around them". The awareness in this study depended on students' level of understanding on general listed activities that humans do and connection on how they impact their surroundings.

**Environmental Knowledge:** In addition, environmental knowledge, in this study, has been used as an operational term used to understand the students' level of knowledge, meaning the level at which they can fully explain, by giving examples and cases on the various listed environmental concepts.

**Attitude:** Milfont and Duckitt (2010) describe attitude as the emotional and mental inclination conveyed in valuing nature with a given degree of esteem or disrespect. Woodgate, (2010), defines attitude as an established mode of thinking or the sensitivity attached to or about something, stereotypically one that is replicated in the individual's outward behaviour. In this study, the context used in regard to attitude is the students' level of agreement or disagreement to a set of environmental based suggestions to highlight the sensitivity they have on such issues described in each statement.

**Motivation to participation:** Motivation is expressed as a convincing inner incentive around which conduct is organized, this is as noted by Wilkie (1990). Participation can be described as the inclination to make decisions to act to safeguard and sustain the earth without intimidation (Fien, 2002). Motivation is consequently assumed to be the reason for a given behaviour (Mosiander 2007). Participation in a given cause is key to the

realisation of the values one poses internally as a human being. In this study, the motivation of the students to participate in ecocentric behaviour has been contextualised using a set of behavioural statements where the students indicate how often they participate in each activity. The indication of frequency by each student, highlights the application of that motive.

**Sustainable Development:** This is progress which rallies the development requirements of an existing generation without bargaining the realisation of needs in the future (WCED, 1987). This study aims to highlight the need for young population to take up the responsibility to create a sustainable future, full of conscience driven people who are well vast on environmental matters and their role in them.

**Pro-environmental Behaviour:** It is defined as the conduct that deliberately pursues to lower the undesirable human effect on the natural or built realm due to one's action (e.g. minimizing the consumption of resources and/or consequently reducing waste production, especially hazardous or toxic waste) Kollmuss and Agyeman, (2002). Similar to the environmental concern (discussed above), pro-environmental behaviour can be evaluated in terms of how a person's attitude, knowledge about and issue and the awareness of the same affects the activities they undertake to impact the environment or surrounding around them. In this study, both environmental concern and pro-environmental behaviour have been assessed together by examining and determining the level of each variable (i.e. knowledge, awareness, attitude and motivation) within the student population under the study i.e. the various campuses in the University of Nairobi.



## **2. CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

Chapter two of this project report presents a criticism of the literature interrelated to this research. It brings to context the concepts of environmental education, the need for environmental knowledge and awareness and the relationship with peoples' mind-sets and motivation to contribute in pro-ecological behaviour. Literature from research from outside Kenya is used as a guide to conduct the researcher's study in Kenyan universities.

### **2.2 Overview of the global challenge**

Across the world, each day individuals make choices that have significant impacts on the world's natural resources. Policies that emphasis on changing our daily behaviour toward more sustainable consequences are essential to achieving more sustainable utilisation patterns (UN Environment 2017).

There are several factors that affect a person, be it positive or negative in pro-environmental behavior, among others; demographic factors (gender and years of education), external factors (institutional, social, economic and cultural); and internal factors (motivation, environmental knowledge, awareness, values, attitudes, emotions, locus of control, responsibility and priority). According to Abedi Sarvestani and Shahvali (2009), human behavior (including pro-environment) influenced by beliefs, one's values and attitudes. Personal values are key to shaping attitudes towards the environment but not always followed by a pro-environmental behavior. Situational factors beyond the control of the poses in pro-environmental behavior. So, we need an intervention strategy

that aims to support and removal of barriers to pro-environmental behaviour (Mtutu & Thondhlana, 2016).

According to Oguz et al., (2010), the young generation are most impacted by ecological challenges being initiated by society's present activities. The two scholars add that it is important for the young to have and access precise information and abilities to advance sustainable solutions. With that in mind, universities have an essential role in driving pro-environmental behaviour and increasing environmental concerns among students. These students in turn grow to become responsible individuals having skills, knowledge, competencies and values that advance the realisation of a sustainable society closer.

Adomssent, (2013) further adds, that the degree of environmental knowledge is changing; focusing more on lifestyle and mind-sets that might be critical in shifting people's conduct and in changing humanity towards sustainability. To understand where this conversation about environmental education started from, I sought to understand the principles that guided this key concept and the relationships between knowledge, awareness and attitudes towards individuals' behaviour towards environmental issues.

In a survey study conducted in European countries by the European Commission, 2005, looking into European residents' mind-sets towards the environment found that the respondents were exceedingly conscious of the environment as a component to the quality of life of an individual. According to the survey, seventy percent of citizens believed that the environment influences their life (EU Special Eurobarometer Survey

217, 2005). The report further suggests that environmental concerns are powerfully related to those concerns that directly affect citizens' day to day life.

The survey study in Europe is a good indicator of the need to have a more informed population in any country- be it a developed or developing country. From the study is also evident that the more knowledgeable people are on environmental issues, the better they are at making day to day decisions.

In the African context, environmental education is crucial in relation to applying values, skills and motivation for young people to act pro-environmentally. A UNEP (2017) report on Africa's environmental and training action plan for the period 2015- 2024, highlights that environmental effects influence gender differently; usually having a unequal influence on women. The report adds that women are likely to gain more from an improved environmental condition; community benefits being passed down more completely by women more than men (UNEP, 2017).

In a study on attitudes and awareness in Ibadan, Nigeria, researchers examined the distribution of attitudes and awareness in Ibadan, south-western Nigeria across various socio-demographic groupings. The study establishes that older respondents were more apprehensive about the environment compared to the younger respondents. The younger respondents were less knowledgeable on environmental causes and effects compared to the older individuals. Another interesting finding from the study was that men were found to have more environmental knowledge than women, however gender as a socio-

demographic factor did not influence environmental attitudes amongst the study population. Further, they add that, the occupation and educational background the study population had a strong influence on their environmental knowledge and attitudes (Charles A. Ogunbode and Kate Arnold, (2012).

Both studies in Africa point to the need to connect environmental education and attitudes to ensure environmental concerns among individuals who in turn form the fabric of institutions in our society and bring about positive change towards sustainable development, especially in the younger population in Africa. Interestingly, the findings from Charles A. Ogunbode and Kate Arnold's study in Ibadan, Nigeria points out to the issue we face as young people in Africa; there is a genuine risk of being highly conversant with environmental subjects, though we do not practice pro-environmental behavior in our day to day lives.

### **2.2.1 Environmental knowledge and importance of education**

Environmental education is part of the education structure in most countries of the world. Development of environmental education within individual countries is dependent on their history in terms of the environmental issues they have faced before, the country's political situation and the economic conditions at that period in time (Burer, 2014).

In Kenya, the study by Muthui (2012) established that there is a substantial association between the students' attitude and awareness on environmental concerns and the practice of managing the environment in the respective schools. In his study, Muthui added that

there is necessity to change behaviour and attitude as a fundamental prerequisite for effectual participation in handling environmental issues, pointing out the need to increase awareness, by holding seminars and workshops organized by the school and administration, among secondary students regarding environmental concern so as to increase their motivation.

The above-mentioned studies indicate the importance of creating environmental awareness among students on different levels of the education system. From their findings, there is indeed need to have more awareness among students in our education system in regards to ways to live more pro-environmentally. In addition, the studies suggest that there is need to highlight the value of attitude change towards people living in a more sustainable way. However, from the study by Muthui 2012, the researcher focused on the attitudes of the students and relating them to their environmental management within the secondary school system.

This study aimed at assessing the level of awareness, attitudes and motivation to participate in pro-environmental behaviour among university students in Kenya. The study also anticipated to add to the frame of understanding on some of the gaps between the knowledge and the motivation to behave pro-environmentally at our day to day work or living environments, both within our universities and beyond. The important question this study aimed to understand, other than the main study questions, is what makes Kenyan university students care about the environment, within and beyond university? why is it that some post-university individuals care and others do not?

## **2.3 Literature review on study variables**

The following sections define and discuss some of the literature critiques on variables this study looks at among peoples (i.e. environmental awareness, knowledge, attitudes and motivations).

### **2.3.1 Awareness**

Kollmus and Agyeman, (2002), describe awareness as “the state of understanding the impact our behaviour has on our environment”. It has an intellectual, comprehension-based element and a sentimental, perception-based element. According to the two researchers, environmental awareness is inhibited by numerous intellectual and sentimental limitations. Diekmann and Preisendorfer (2003), adds to this argument by noting that people with high environmental awareness levels may not necessarily be willing to make major personal routine sacrifices that will enhance eco-friendly behaviour, but may be more willing to accept external factors such as government-imposed higher fuel taxes or as seen in Kenya, a ban on plastic bags.

### **2.3.2 Attitudes**

Milfont and Duckitt (2010) describe environmental attitude as a mental inclination articulated by valuing the natural environment with a certain level of goodwill or lack of it. The association between peoples’ attitude and their consequent behaviour can be viewed as both positive and conflicting. While some studies illustrate a positive association between environmental attitude and pro-environmental behaviour others find

negative relationship (Straughan and Roberts, 1999; Tilikudou, 2007; Cottrell, 2003). However, scholars such as Vermeir and Verbeke, (2006) caution that looking at attitude on its own, is a weak prognosticator to intentional pro-environmental behaviour.

### **2.3.3 Motivations**

Wilkie, (1990) describes motivation as a strong inner impetus around which a given behaviour is ordered. Mosiander (2007), further adds that motivation is typically assumed as the reason for that given behaviour. Two components shapes an individual's motivation, these are intensity or passion and direction or focus. Stern et al. (1993) claims that the deeper the egotistic positioning of a person, the greater the motivation they have to behave in a eco-friendly manner. Key motivation to consumption, however, is the importance given to price. The motivation to purchase or support eco-friendly products and services may be hindered due to the high cost of consuming them (e.g. adoption or use of recycled paper in offices). A study by Diekmann and Preisendoefer (1992) expounds on these factors, noting that individuals take- up the eco-friendly behaviours that demand the least expenditure. They, however point out that the cost in this case is not strictly defined by economic logic but in a wider psychological appreciation that includes, amid other dynamics, the effort and time needed to perform a given pro-environmental behaviour. In their research they demonstrate that environmental attitude and low cost pro-environmental behaviour have a significant correlation. Kollmus and Agyeman, (2002) highlights this argument, noting that individuals who are sensitive to their surroundings tend to take up eco-friendly actions such as using energy saving bulbs,

but do not inevitably take part in behaviours that are pricier and more inopportune such as driving or flying less.

A person's well-being and the well-being of their family is most important when looking at an individual's motivation to do something. When these personal urgencies are affiliated with pro-environmental behaviours, the motivation to action them rises. Though if they controvert the urgencies of life, the engagements will less likely be prioritised (e.g. buying one car for the family even though one could afford to having multiple cars for the family).

#### **2.3.4 Pro-environmental behaviour**

It is possible to find close definitions of pro-environmental behaviour in literature. For Kollmuss and Agyeman (2002), pro-environmental behaviour can be defined as "behavior that consciously seeks to minimize the negative impact of one's actions on the nature and built world". Similarly, Lynn (2014) emphasizes the adverse effect of behavior on nature while defining pro-environmental behaviour as "the behavior that has less of negative impact than an alternative behavior". On the other hand, Steg and Vlek (2009) address desired results of behavior as well as undesired results and define pro-environmental behaviour as "behavior that harms the environment as little as possible, or even benefits the environment". Apart from the pro-environmental behaviour definitions given above, a brief literature review reveals various approaches about environmentally oriented human behavior. For instance; "environmental actions" by Axelrod and Lehman



(1993), “ecological behavior” by Kaiser (1998), “environmentally responsible behavior” by De Young (2000), “environmentally significant behavior” by Stern (2000) or recently “sustainable behavior” by Tapia-Fonllem et al. (2013) are some of the highly refereed concepts similar to pro-environmental behaviour.

## **2.4 Theoretical Framework**

This research adopted the Theory of Planned Behaviour as the context or guide to this research. This theory is a framework used to study societal or human action (Ajzen and Fishbein, 1980). It states that an individual’s motive determines their action, which in turn is determined by their attitude, perceived behavioural control and social support. Ajzen (2002), notes that there are three theoretically impartial predictors of human behaviour specifically behavioral viewpoints, normative principles and control beliefs. Normative beliefs comprise of beliefs concerning the normative anticipations of others and motivation to conform to these anticipations. Behavioral beliefs are deep values concerning the likelihood of a given consequence following behaviour and the estimations of these outcomes. Beliefs on the existence of dynamics that may enable or hamper performance of the behaviour, subjective norms and opinion of behaviour make up control beliefs.

As widely referenced by various scholars, the TPB has been extensively used in environmental conduct/ behaviour research to forecast a person’s resolve to partake in a particular conduct. Boldero, 1995, highlights that environmental management is strongly related to people’s behaviour, which necessitates considerable determination in the part

of the individual; subsequently the management verdict ought to be intricate, as a number of dynamics may be taken into deliberation.

A number of conflicting factors form our daily choices and the execution of those choices. Likewise, there are, among others factors, three aspects that stimulate our concern and decisions towards a pro-environmental conduct that this research will not look at basing on this theory.

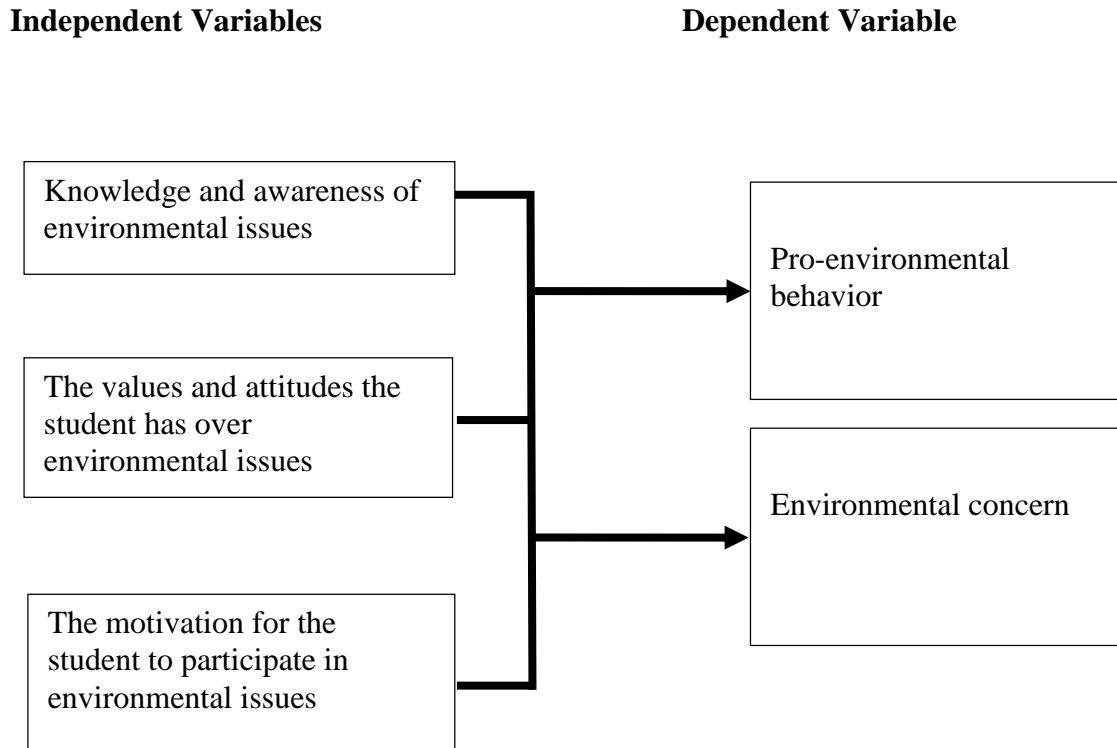
## 2.5 Conceptual Framework

Many researchers in environmental behavior have effectively used TPB empirically and conceptually to investigate the association of beliefs to behavior and the connection to attitude. This research study adopted the TPB adding that individuals (in this case a student) knowledge or awareness around environmental matters as their motivation to take part in behavior that exemplifies environmental concern has a significant relationship. *Figure 2.1* below shows the framework conceptualized adopted by this study to resolve the research questions.

The independent variable in this study was the students' level of knowledge and awareness regarding environmental topics, the values and attitude the students have over environmental issues and lastly, the motivation for the students to participate in eco-friendly actions.

The dependent variable in this research was the students' environmental concern and pro-environmental behaviour. For this study to quantify the dependent variable, the students were queried to indicate their degree of agreement with each statement using the a five-point Likert-type scale, with ranking from 1 (*Strongly disagree*) to 5 (*Strongly agree*). (as shown in Appendix I).

**Figure 2.1: Conceptual Framework**



Source: Researcher, 2019

### **2.5.1. Knowledge and awareness of environmental issues**

Individual knowledge of different environmental issues and infrastructure is often a component of many studies that look at pro-environmental behavior. Knowledge has a relationship to both behavior and intentions (Ajzen 1985). Kaiser et al. (1999a; 1999b) discover knowledge to explain variance in intentions for studies with California college students as well as Swiss adults whereas Levine and Strube (2012) found knowledge of environmental issues to have an independent effect on everyday environmental behaviors like recycling but not on intention to do these behaviors. Few conclusive statements have been made about the role of knowledge overall. Regardless, knowledge can be broken

down into multiple sectors. Sometimes it is divided into normative and factual knowledge (Kaiser et al. 1999a).

### **2.5.2. Values and attitudes**

While value systems, such as worldviews about religion and the role of the environment as compared to mankind, are often measured on a country-wide scale, these ‘centrisms’ filter down to the individual level to affect pro-environmental behaviors and actions. Values are considered to be our ideas about the worth of things; in this case, the worth of our environment as compared to humanity. Higher levels of ecocentric values are related to higher engagement in pro-environmental behaviors (Casey and Scott 2006; Jagers et al. 2016). Similarly, individuals valuing eco-centrism show more pro-environmental attitudes and subjective norms, which then feed into behavior (Soyez 2012).

Attitudes are seen as the expression of beliefs and values, often directed at specific areas or behaviors. The literature about the relationship between attitudes and pro-environmental behavior is extensive, although occasionally researchers will utilize words like personal concern, personal norms, and values to describe attitudes. Research shows that attitudes are a strong predictor of intention (Kaiser et al. 1999a; Kaiser et al. 1999b; Levine and Strube 2012). This could be because attitudes consider the moral realm which means that they utilize feelings of personal obligation towards the environment rather than solely based on rationality (Kaiser et al. 1999a).

### **2.5.3. Motivation to participate in environmental issues**

Motivation may be defined as the willing investment of effort in aim of accomplishing a goal. Motivation, in a broader sense, is the incentive to act. Based on the conditioning of that incentive we can make the distinction between external and internal factors which means we are talking about extrinsic and intrinsic motivation, respectively. Intrinsic motivation relates to the involvement in activities or endeavors for their inherent satisfaction that the individual experiences solely for participating in the act. Extrinsic motivation is related to participating in activities or endeavors for their instrumental value or recognizable expected outcome.

### **2.5.4. Pro-environmental behaviour**

The general domain of individual behaviors that contribute to environmental sustainability is referred to as *pro-environmental behaviors*, which have been defined as “individual behaviors contributing to environmental sustainability (such as limiting energy consumption, avoiding waste, recycling, and environmental activism)” (Mesmer-Magnus et al., 2012: p. 160). These behaviors may be public (for example, taking mass transit, participating in a rally for an environmental cause) or private (for example, composting, not using home air conditioning on a hot day). The positive environmental behaviors individuals engage in as part of their personal lives are volitional actions rooted in their own initiative. Although societal structures, such as the presence of a public transportation system or recycling program in one's city, may support or hinder pro-environmental behaviors, acting in ways that benefit the environment is ultimately a personal choice.

### **2.5.5. Environmental concern**

They seek ways how to behave more responsibly towards the environment (Clayton, 2003) and acquire a whole range of pro-environmental habits – e.g. they separate waste, cut down the consumption of water and energy and purchase environment-friendly products. A person with a greater environmental concern probably will not speak disparagingly of the growing environmental damage (Stern, 1996). The person is aware of the relationship between their behavior and the state of the environment. They see pollution, extinction of species and the disturbance of the natural cycles of the planet as undesirable. They make effort to contribute to the solution of these problems rather than create them (Kals, Montada, 1994). Preservation of the environment is not only a question of intellectual interest for a person with a greater environmental concern but it is also an emotional issue (Schmuck, Schultz, 2002.) They feel sadness over the damage of the environment, they feel sympathy with the suffering nature and at the moment they probably experience certain concern about the environmental future. They are willing to reduce their needs for the preservation of the environment. Sometimes they get involved in public activities for environmental preservation or support political programs aiming at greater environmental preservation (Clayton, Opatow 2003)

### 3. CHAPTER THREE: RESEARCH METHODOLOGY

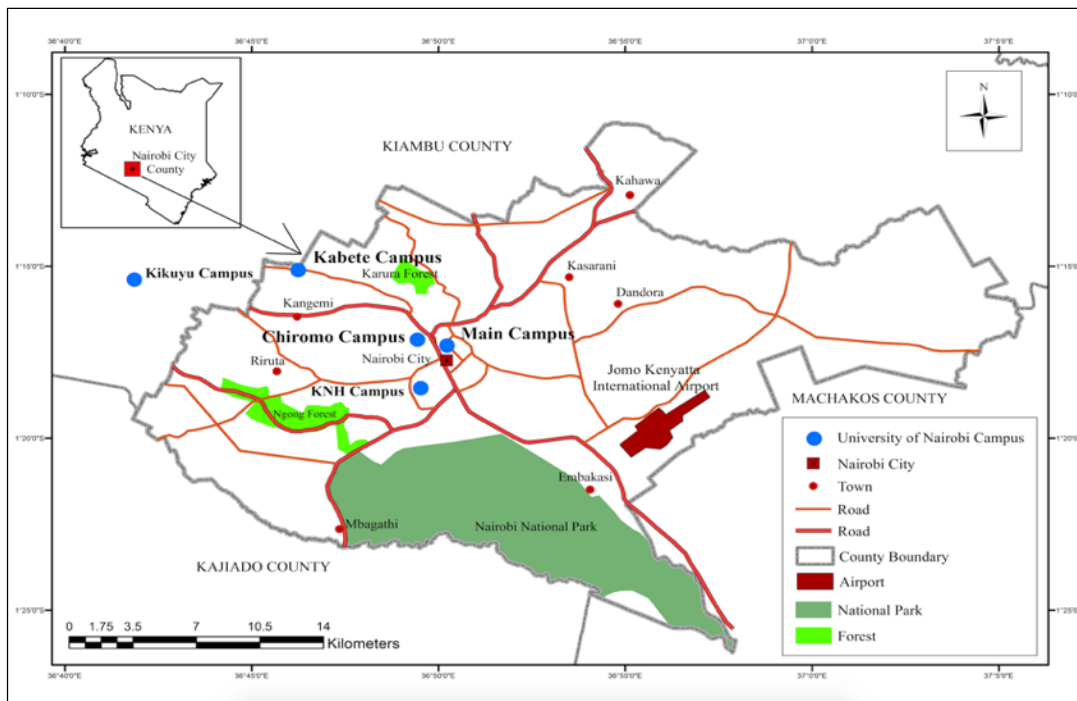
#### 3.1. Introduction

This chapter discusses the study methods used, the design used during the research study, a description of the study area, the population targeted, the techniques adopted to sample in the study, the data gathering tools, and the approaches used to gather data and the procedures used. The presentation methods used as well as the analysed data in this study are also discussed.

#### 3.2. The Area of Study

This study was conducted within the University of Nairobi Campuses in Kenya, namely the University of Nairobi: Kikuyu Campus, Kabete Campuses (Upper and Lower), Chiromo Campus, Kenyatta Hospital Campus and Main Campus, all five located in Nairobi and two satellite towns in Kenya. The *Figure 3.1* below shows the study area map.

**Figure 3. 1: Study Area Map**



Source: Researcher, 2019



The University of Nairobi, established in 1970 as a public chartered university, is a higher education institution situated in the Nairobi City County. The institution has campuses at the Main, Kikuyu, Kenyatta Hospital, Lower Kabete, Upper Kabete, Chiromo, Mombasa, Eldoret and Kisumu (University of Nairobi website, 2019). The study categorised these campuses based on the courses offered. Mombasa and Eldoret campuses offer either of the courses offered by one or more of the campus within Nairobi and therefore students from five selected campus had characteristics of said students in terms of course studied by students. In addition, the study limited its area of study to campuses within Nairobi (Main and Chiromo campuses) and its environs (i.e. Kikuyu and Kabete campuses) due to distance and cost of conducting the study.

The University of Nairobi (UoN) was chosen from a list of accredited higher- learning institutions in the country. The researcher selected the UoN as a representative of universities in Kenya. The UoN being the oldest public accredited university in Kenya, and as such, I choose it as the study area for the research.

### **3.3. Research design**

Descriptive survey design was used in this study. The presence and difference of associations amongst the study variables, enabling the testing of hypothesis around such associations, was provided by the research design. Primary and secondary data was collected during the research. This method was preferred as it allowed the researcher the tractability to embrace both quantitative and qualitative methodologies and employ a variety of data collection procedures (Mugenda and Mugenda, 2003).

### **3.4. Target Population**

As describes by Mugenda and Mugenda (2003), a target population is the number of persons that a study is concerned in unfolding and building statistical interpretations about. The target population were undergraduate students from various colleges and schools in the five University of Nairobi campuses.

According to the University of Nairobi website (2019), there are the six colleges that form the university profile: College of Architecture and Engineering situated at the Main Campus; College of Agriculture & Veterinary Sciences located at Upper Kabete Campus; College of Health Sciences situated at the Kenyatta National Hospital; College of Biological & Physical Sciences located at Chiromo Campus; College of Education & External Studies located at Kikuyu Campus and the College of Humanities and Social sciences located at the Main Campus- Faculty of Arts; Parklands- Faculty of Law; Lower Kabete Campus- Faculty of Commerce. Also included as part of this study is the Open Distance and eLearning (ODEL) Campus which has students in various campuses. The colleges and schools from the five University of Nairobi campuses in this research were chosen using stratified random sampling technique.

### **3.5. Sampling Frame**

The sampling frame, or ‘the universe’ as defined by Kothari C.R., (2004), is the number of all items to be studied, in this case- all the students in the five campuses of University of Nairobi. According to latest figures as provided through the Registrar of Academics at the University of Nairobi, the total figure of undergraduate students in the university, for the year 2019/ 2020, is 60, 038 students, distributed in the five campuses as presented in the Table 3.1 below:

**Table 3.1: The research sampling frame**

No.	Campus	Total Students
1.	Chiromo Campus Students (CPBS)	7,364
2.	Upper Kabete Campus Students (CAVS)	4,326
3.	Lower Kabete Campus Students (School of Business - part of Main Campus)	8,670
4.	Kikuyu Campus Students (CEES including Kenya Science Campus)	5,748
5.	Kenyatta Hospital Campus Students (CHS)	4,592
6.	Main Campus Students (CHSS + CAE + Law Parklands)	25,860
7.	ODEL	3,478
	<b>Total</b>	<b>60,038</b>

*Data received by researcher from the Registrar of Academics, University of Nairobi August,*

*2019*

The list and distribution of all students in Chiromo, Kikuyu, Kabete, Kenyatta Hospital and Main Campuses was sought after from the Registrar of Academic Office at the University of Nairobi, Main Campus. The researcher sought authority to conduct research from the Deputy Vice-Chancellor in charge of Research, Innovation and Enterprise, who is the custodian of all research in the University. An *'Authority to Conduct Research'* letter was approved and given to the researcher following a successful application for a research license to the Director of National Commission for Science and Technology, Nairobi Kenya, by the researcher as shown in *Appendix II*.

Once the sample distribution was established, the questionnaires were distributed in the same proportions. This was done through stratified sampling method followed by simple random sampling technique. The population of each campus (stratum population) was determined and summed up to make the target population of the study. The target population was further used to

compute the desired sample. Using the desired sample of the population and stratum population, the researcher determined the sample size (stratum sample). The table 3.2 below shows the distributed samples as per campus.

**Table 3.2: Sample Distribution**

<b>University of Nairobi Campus</b>	<b>Total Students</b>	<b>Samples</b>
Chiromo Campus Students (CPBS)	7,364	47
Upper Kabete Campus Students (CAVS)	4,326	28
Lower Kabete Campus Students (School of Business -part of Main Campus)	8,670	55
Kikuyu Campus Students (CEES including Kenya Science Campus)	5,748	37
Kenyatta Hospital Campus Students (CHS)	4,592	29
Main Campus Students (CHSS + CAE + Law Parklands)	25,860	165
ODEL	3,478	22
<b>Total</b>	<b>60,038</b>	<b>384</b>

**Source: Researcher, September 2019**

To select the respondents to participate in this study, the researcher used the simple random sampling. In cases where more than five students were found in a group, researcher gave them random numbers and selected at most two participants randomly.

### **3.6. Sample Size**

As noted by Mugenda and Mugenda (2003), a sample should be chosen cautiously as it guarantees the demonstration of the population under study. Kothari C.R., (2004) notes that the size of a sample should be optimum, not unreasonably large nor too small. Kothari C.R., (2004), adds that a target sample fulfils the requirements of representativeness, reliability, efficiency and flexibility.

As first developed by Cochran (1963), a sample size from a normally distributed population, the population proportion can be developed using the Equation 1 below;

$$n_o = \frac{Z^2 pq}{e^2}$$

In this formula,  $n_o$  is the size of the sample collected,  $Z^2$  is the abscissa of the standard curve that cuts off an area  $\alpha$  at the tails ( $1 - \alpha$  equals the anticipated confidence level of 95 percent),  $e$  is the preferred level of accuracy,  $p$  is the likely proportion of a trait that is existing in the population, and  $q$  is  $1-p$ . The value for  $Z$  is established in statistical tables which include the area beneath the normal curve.

According to Cochran (1963), assuming there is a large population among the five University of Nairobi campuses but we have not established the variability in the proportion that were present on campus during the study; therefore, we assume a maximum variability of  $p= 0.5$ . Furthermore, assuming we yearn a 95 percent confidence level with a  $\pm 5$  percent correctness. The subsequent sample size was determined in Equation 2 below.

$$n = \frac{(1.96)^2 \times (0.5) \times (0.5)}{0.05^2}$$

$$0.5^2$$

$$n= 384$$

In the course of this research a total of 384 forms were disseminated to students chosen randomly in the five campuses in Kabete, Kikuyu, Chiromo, Kenyatta Hospital and Main Campuses as shown in *Table 3.2* above.

### **3.7. Primary Data**

Primary data was gathered through observation and by administering questionnaires (*See Appendix I*) to students approached randomly within the given campuses during the study. The questionnaire was designed into five segments; these are personal details and three follow up segments on awareness, attitude and motivation to participation and a final section with open-ended questions to capture the perceptions of the students.

The questionnaire comprised open and close-ended questions to avoid limiting the respondents to pre-populated answer choices. To measure attitude and opinion from the student with greater degree of nuance than a simple “yes/ no” question, a five-point Likert-type scale, with ranking from 1 (Strongly disagree) to 5 (Strongly agree) were utilized for all constructs ranging from one extreme attitude to another- 5 being the highest in agreement.

Primary data was collected during the weeks of 2<sup>nd</sup> and 9<sup>th</sup> September, 2019 from all study areas under this study. Questionnaires were administered by the researcher, assisted by one male and two female research assistants in the course of the field work, the students were then given a given period to answer the questions by themselves and later return the questionnaires to the researcher or assistants standing or seating nearby. Female research assistants supported in the collection of data from female hostels to ensure comfort of the interviewee during the interview.

A total of 384 students were interviewed using the questionnaire during the study. The study used stratified sampling technique to select the number of target samples from each campus and simple random sampling technique to targeting each stratum sample to acquire desired sample

size. Table 3.2 above. See photo plates 3.1- 3.4 in Figure 3.2 below showing data collection exercise at various study areas in the University of Nairobi.

**Figure 3.2: Photos of research data collection**

	
<p>Plate 3.1: <i>Photo of research assistant collecting data from a student at the CEES, Kikuyu Campus</i></p>	<p>Plate 3.2: <i>Photo of students from Chiromo Campus answering the questionnaire by themselves once questionnaires were administered</i></p>
	
<p>Plate 3.3: <i>Photo of students at the Main Campus hostel- area, answering the questionnaire.</i></p>	<p>Plate 3.4: <i>Photo of students answering the questionnaire at the Main Campus (outside hall 13).</i></p>

*Photos taken by the researcher during the field study in September, 2019*

The use of questionnaires was preferred since they provided an efficient means of collecting data from the selected samples within a brief duration and within budget in comparison to other techniques. The researcher printed a total of 390 questionnaires and used 384 of them to collect the information from the target respondents (students). Questionnaires were used because every respondent received similar questions in a similar approach without the interpretation of an interviewer. A total of 384 respondents were handed the questionnaire, and all (384) returned them after filling them, sometimes within the vicinity of the research assistants as shown in photos 3.2- 3.4 above. Questionnaires can thus yield more data than information attained using an interview, though as seen in the *Photo 3.1* above, some students preferred to be asked the questions face to face rather than answer by themselves.

### **3.8. Secondary Data**

Secondary data in the area concerning environmental awareness, attitude and motivation to contribute to an environmental concern and behaving in a manner to exemplify the same within universities and other institutions of higher learning were sought and gathered. This was done through the analyses of both theoretical and empirical data from past literature in the study area and topic, including journals, books, published thesis and research projects and the key websites. This was done with the emphasis on global, regional (Africa) and locally published data sources in Kenya. All secondary data sources reviewed are listed in this report for reference.

### **3.9. Piloting**

The researcher designed the questionnaire in line with the study questions; this was pilot tested to verify and perfect the questions prior to it administering them to the select sample. The aim of



the pilot test was used to uncover and address any faults in the design and instrumentation. Mugenda and Mugenda (2003) emphasize that the precision of the collected data is principally dependent on the instruments used for collecting that data, in terms of reliability and validity. The pilot study was conducted at the Main and Chiromo Campuses in Nairobi.

### **3.10. Validity**

Orodho (2005) define validity as the gradation against which the sample objects being tested is representative of the content that the test is designed to gauge. The researcher sought expert opinion in the area of research particularly the academics in the Department of Geography and Environmental Studies, environmental education, psychology and development studies. Their valuable comments, corrections and suggestions aided to develop the validity of the collected data. This accelerated the essential modification and revision of the study tool thus enriching validity.

### **3.11. Reliability**

Reliability is a gauge of the level to which a study's tools produce dependable information after repetitive tests (Kothari, 2004). The consistency of a given observed outcome verifies the reliability of that study. To check the reliability of the study instruments, the researcher made use of the test-retest procedure. This involved administering similar tools twice to same respondents who were not part of the study sample.

### **3.12. Data Analysis**

The research techniques used in analysing the data from this study were both qualitative and quantitative. Collected data was coded was thereafter using the Statistical Package for Social Sciences (SPSS) by generating classifications using numeric values. Quantitative data was thereafter analysed using the SPSS to generated means, percentages, frequencies and standard deviations. The study variables were measured using a set of predetermined lists of statements and suggested activities that were used as indicators pointing to the variable in question. The response from the students was ranked using a Likert scale as described in *section 3.7* above.

Inferential statistics were also utilized to determine if observed data obtained from the sample of University of Nairobi students interviewed from the five campuses are different from what one would expect by chance alone. The study aimed to determine if the relationships among variables that we see in our sample data are occurring in the entire population of students in the University of Nairobi.

The study variables were assessed using various indicators mainly. These indicators were measured using ordinal likert scale. The variables used in inferential analysis were determined through computation of an index using indicators. These indicators were rounded up to the nearest whole number and ranked using ordinal scale. The values were there after used in computing Pearson Chi-square test of association.

The study adopted the Pearson Chi- square test as a quantitative measure technique to determine the relationships (also referred to or known as significant difference) existing between two categorical variables. The null hypothesis in the Chi- Square test was that there is no relationship

or association or significant difference existing on the categorical variables within the respondents in the five UoN campuses and that they are independent.

### **3.13. Ethical Issues**

This study observed all suitable research practices and each of the sources of information were promptly recognized. Before administering the questionnaire, permission was requested from the respondents. Information was given to the respondents on their right not to take part in the survey or to withdraw their cooperation at any point in the research process. Confidentiality was maintained in full, particularly the identity of the respondents when issuing and receiving the questionnaires.

## 4. CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION

### 4.1. Introduction

This chapter presents the results, discussion and analysis of the research data; data is presented using tables and charts. An attempt has been made to explain the outcome based on the students' data. All questionnaire were filled and returned for data scrutiny.

### 4.2. Students' basic characteristics

This section postulates basic characteristic of the students in the University of Nairobi. This information is presented on a number of basic features, including, gender, education level and age at the period of the study. This information gives the general understanding about the population under the study. An analysis of these variables provides the socioeconomic framework within which other consequent factors falls.

*Table 4.1: Respondents' basic information*

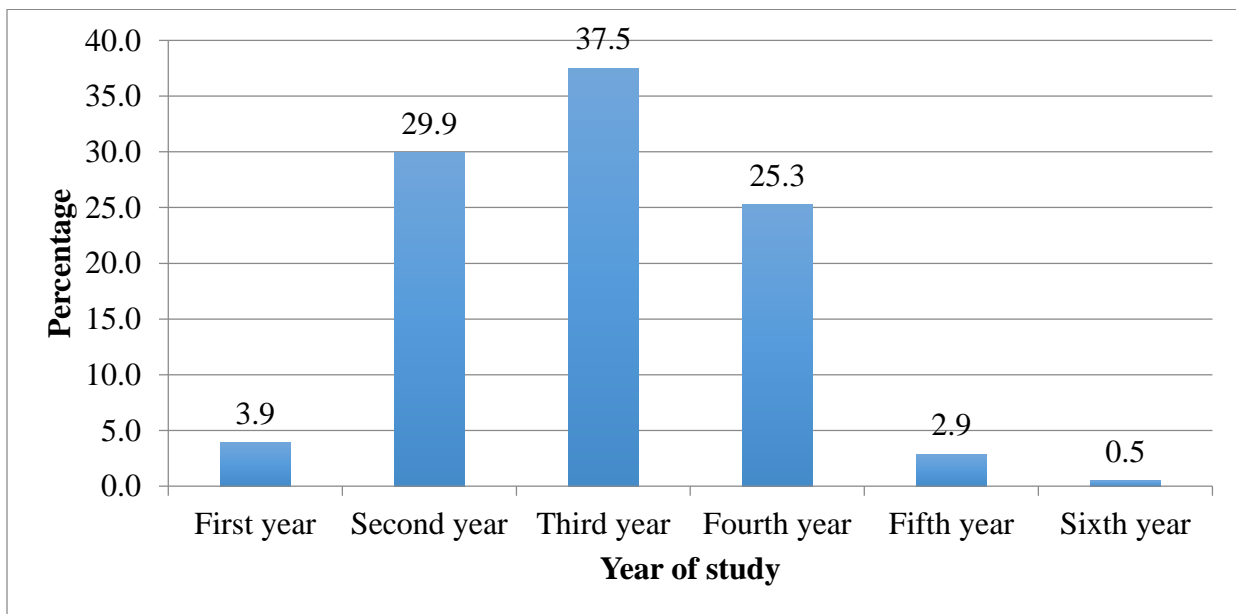
		<b>n</b>	<b>%</b>
<b>Gender</b>	Male	229	59.6
	Female	155	40.4
	Total	384	100.0
<b>Level of education</b>	Tertiary	25	6.6
	Undergraduate	353	92.7
	Postgraduate	3	.8
	Total	381	100.0
<b>Age (years)</b>	18-20	97	26.5
	21-23	233	63.7
	24-26	31	8.5
	Above 26	5	1.4
	Total	366	100.0

Source: Researcher, September 2019

The research found that majority those who responded in this research were male (59.6%) compared to 40.4% of the students were female. The research also found that 92.7% of those who responded were undergraduate students, 6.6% were taking a diploma/ tertiary course while 0.8% reported that they were undertaking post graduate degree. Majority of respondents, in this study were found to be aged between 21-23 years (63.7%) and over 80% to be aged below 24 years.

The researcher also assessed the student's year of study as one of the basic students' characteristics. The study found most the respondents were third year students (37.5%), 29.9% and 25.3% were second year and fourth year students respectively as illustrated in the *Figure 4.1* below.

**Figure 4.1: Respondent's year of study**



Source: Researcher, September 2019

### **4.3. Students' general environmental understanding**

The study also sought to assess the respondents' general environmental knowledge and awareness (i.e. the environmental cause and effect) of activities in their area of academic studies. The aim of this assessment was to highlight the percentage of those aware versus those not aware.

The study established that majority of the respondents (65%) were not aware of any environmental cause and effect of activities in their area of academic study; only 35% described themselves as understanding environmental effects brought about by activities in their area of academic study in the university. Further to this, the research sought to understand, what activities the students perceived as having an environmental effect in their area of study. *Appendix III (c)* of this report gives a summary of the responses collected per the university college under the study.

From the comments highlighted by the students from the various campuses or colleges, it was clear that for those aware of the causes and impacts of human activities to the environment, the perceived issues cut across various themes beyond their area of study. As highlighted above, similar concerns and responses were collected across the seven campuses of the University of Nairobi.

### **4.4. Students' Perception on environmental challenges as it affects gender**

The study also sorts to understand the respondents' perception on gender inequality as stemming from environmental challenges. The students were asked if they perceived environmental challenges as having different impacts on men and women, girls and boys.

The study found majority (81%) of respondents did not perceive environmental challenges as having different impact on different gender while 19% felt that different gender is affected differently by environmental challenges within the university campuses. *Table 4.2* describes how a great percentage of female respondents perceived environmental challenges to affect people differently based on gender as compared to male proportions. To note, 18.1% of male respondents perceived that environmental impacts affected gender differently compared to 21.5% of female respondent's perceiving the same; pointing to the fact that female respondents were more aware that environmental impacts affects gender differently.

***Table 4.2: Gender difference in Perception of environmental impact and gender difference***

	<b>Yes</b>		<b>No</b>	
	n	%	n	%
<b>Male</b>	39	18.10	177	81.90
<b>Female</b>	31	21.50	113	78.50
<b>Total</b>	70	19.40	290	80.60

Source: Researcher, September 2019

#### **4.5. Level of environmental knowledge and awareness among university students**



The first objective of this study was to examine the level environmental knowledge and awareness of university students at the University of Nairobi (UON) campuses.

##### **4.5.1. Level of knowledge on environmental issues**

The *Table 4.3* below represents the respondents' (students') level of knowledge on environmental issues. The environmental issues assessed in this case includes; energy conservation, climatic change (mitigation/adaptation), water conservation, waste (recycling, reusing, reducing), noise pollution, littering in the compound, solid waste segregation at source, tree planting and paper use reduction i.e. using and transmitting soft copy assignments rather

than printing a hard copy. Also, to note, is the positive perception the students had over the ban on plastic bags, noting that there is an optimistic adjustment in the environment with reduced plastic bags (especially the thin low- grade bags) that were a menace. Chiromo and main campus students however noted that the use of disposable plastic cups from the outdoor restaurants near the hotels is becoming a menace to the environment as shown in the *photo plates 4.1* and *4.2* below, taken during the study, close to the Architecture, Drawing and Design (ADD) building, along Mamlaka Road. The University of Nairobi, has made effort to create awareness and infrastructure (dust bins) in the various campuses to keep the environment clean as seen messages written on the dust bins at the School of Business, Lower Kabete Campus as well as on the notice boards at the Kikuyu CEES campus, see photo plate 4.3 and photo 4.4 in *Figure 4.2* below.

**Figure 4.2: Photos of various environmental issues observed during study**

	
<p><i>Plate 4.1: Plastic cups littered along the Mamlaka Road, University of Nairobi</i></p>	<p><i>Plate 4.2: A heap of plastic cups and other waste disposed near the ADD buildings along Mamlaka road. Reportedly awaiting burning.</i></p>





*Photos taken by the researcher during the field study in September, 2019*

**Table 4.3: Students' level of knowledge on environmental issues**

	Have no idea		Have a slight idea		Can fully explain giving examples		mean	Std_Dev
	n	%	n	%	n	%		
Energy conservation	30	7.8	191	49.9	162	42.3	2.34	0.630
Climate change (mitigation/adaptation)	31	8.1	185	48.6	165	43.3	2.33	0.657
Water conservation	20	5.3	127	33.6	231	61.1	2.52	0.670
Waste (recycling, reusing, reducing)	29	7.7	156	41.3	193	51.1	2.40	0.697
Soil conservation	56	14.9	165	43.8	156	41.4	2.22	0.759
Noise pollution	15	4.0	145	38.6	216	57.4	2.48	0.674
Littering in the compound	25	6.6	105	27.6	250	65.8	2.57	0.663
Solid waste segregation at source	105	27.9	175	46.4	97	25.7	1.94	0.773
Tree planting	23	6.1	118	31.1	238	62.8	2.53	0.669
Paper use reduction (soft copy vs hard copy)	60	15.8	164	43.2	156	41.1	2.23	0.744

<b>Knowledge</b>	2.117	0.4002
------------------	-------	--------

Source: Researcher, September 2019

Students' level of knowledge on environmental issues differed from one issue to another. The study found that student had high level of knowledge about littering of compound, water conservation and tree planting as implied by mean of 2.57, 2.52, and 2.53 respectively using a scale of 1 to 3; these can be further explained by 57.4% of students who reported that they could explain littering of compound using examples, 61.1% who reported that they could explain water conservation using examples and 62.8% who reported that they could explain tree planting using examples.

On the other hand, least knowledge on solid waste segregation at the source as implied by a mean of 1.94; most of students report to have a slight idea with 27.9% indicating lack of idea on solid waste segregation. The small value of standard deviations implies that University of Nairobi students have nearly same knowledge concerning environmental issues. The average value of students' knowledge concerning environmental issues (M=2.117, SD=0.4002) implies that students generally had an idea about environmental issues.

#### **4.5.2. Level of awareness on environmental issues**

The second aspect assessed under the first objective was the level of students' awareness on environmental issues. The summary of students' awareness is presented in table 4.4 below. As shown in the table, the students were asked to tick the level of awareness they feel they have among the preset topics and statements listed.

**Table 4.4: Level of awareness on environmental issues amongst students**

	Have never heard about it		Have only heard about it		Know the problem but don't know the cause nor effect		Know the problem and causes and effects alone		mean	Std_Dev
	n	%	n	%	n	%	n	%		
Soil degradation	37	9.7	76	19.9	93	24.4	175	45.9	3.04	1.054
Deforestation	13	3.4	36	9.5	42	11.1	288	76.0	3.55	.892
Solid waste pollution	26	6.9	80	21.1	118	31.4	154	40.6	3.02	1.000
Blocked drainage and flooding	21	5.6	100	26.7	122	32.5	132	35.2	2.90	1.014
Climate change	13	3.5	51	13.6	127	34.0	183	48.9	3.20	0.971
Air pollution	9	2.4	52	13.7	90	23.7	228	60.2	3.37	0.896
Community health & safety	18	4.7	85	22.4	133	35.0	144	37.9	3.03	0.938
Desertification	26	6.8	60	15.8	117	30.8	177	46.6	3.14	0.982
Water pollution	12	3.2	44	11.6	84	22.2	238	63.0	3.40	0.920
Urbanization	17	4.5	49	12.9	97	25.5	217	57.1	3.32	0.930
<b>Awareness of environmental challenge</b>									<b>3.1964</b>	<b>0.69296</b>

Source: Researcher, September 2019

The study established that the students were highly aware of environmental issues related with deforestation, air pollution, water pollution as well as urbanization and could explain the problem's cause and effect as implied in the response percentage of 76.0%, 60.2%, 63.0% and 57.1% respectively as shown in table 4.4 above. This presented the cases where more than fifty percent of respondents reported to know the causes and effects of environmental issues.

Most of respondents also reported to be aware of soil degradation (45.9%), solid waste pollution (40.6%), blocked drainage and flooding (35.2%), climate change (48.9%), community health& safety (37.9%) and desertification (46.6%).

#### **4.6. University students' environmental attitudes towards pro-environmental issues**

The second objective of this research was to examine the university students' environmental attitudes towards environmental concerns among the University of Nairobi (UON) campuses. *Appendix III (a)* of this report represents a summary table of rating of student's environmental attitudes towards pro-environmental issues.

Most students showed a strong- disagreeing perception with the suggestion that cleanliness in the university premises is the responsibility of the university management only (41.2%) with an average of 3.8 which implies disagreement. It was also noted that students strongly disagreed on the perception climate change is not real. There is no evidence of the effects of climate change in present day. It doesn't affect me and should be able to spit at any point in the university campus- it has no effect on my surrounding. Concerning financial donation on environmental issues, most students reported that they could give some donations for environmental protection such as tree planting (36.5%). Students strongly agreed that they had responsibility to switch off the lights of the room or class when not in use (59.7%), to watch out for any excess water dripping from the taps and close them in campus (55.6%) and should brush my teeth using a cup rather than running water (41.7%).

#### **4.7. Level of motivation to participate in pro-environmental behaviour**

The third objective of this research was to assess the level of motivation to participate in pro-environmental behaviour among students at the UON campuses. *Appendix III (b)* of this report represents a summary table of rating of student's motivation to participate in pro- environmental behaviour.

The research found that the value and effort to improve the environment always motivated majority of the students to turn- off the room lights when not using the room (68.0%), throwing of waste papers on dust bin (82.0%), switching off of water taps in the university compound (74.5%) and disposing of food leftovers on segregated waste bin (55.3%).

It was noted most students sometimes picked litter whenever they found them in the school compound (47.9%), using own carrier bag when going for shopping even before the plastic ban (44.1%), avoided using small size disposable plastic bottles to reduce on plastic waste (50.5%) and taking part in tree planting and cleanup activities in the university (39.8%). On the other hand, most students said that they did not belong to an environmental club (43.6%) while 59.7% reported that they had never thrown litters from a car when moving, indicating a high level of awareness amongst students in this regard.

#### **4.10. Test of hypotheses of this research**

This research sought to analyse / test the hypotheses described in the following sections;

##### **4.10.1. Test of significant difference in the level of knowledge among students**

$H_0$ : There is no significant difference in the level of knowledge among students at the University of Nairobi campuses.

The study tested the difference in level of knowledge among students of Nairobi University campuses, the researcher used chi square test at  $\alpha=0.05$ . The study found that computed value of  $X^2 (12) = 20.107, p >.05$  as shown in *table 4.17*. Since the p-value is bigger than our chosen significance level  $\alpha = 0.05$ , the study fails to reject the Null hypothesis in the fervor of the

alternative hypothesis. The study concludes that there was no sufficient evidence to reject the Null hypothesis.

**Table 4.5: Association between campus and environmental knowledge**

<b>Chi-Square Tests</b>			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.107 <sup>a</sup>	12	.065
Likelihood Ratio	19.632	12	.074
N of Valid Cases	384		

a. 7 cells (33.3%) have expected count less than 5. The minimum expected count is .99.

Source: Researcher, September 2019

#### **4.10.2. Test of significant difference in the level of awareness among students**

H<sub>0</sub>: There is no significant difference in the level of awareness among students at the University of Nairobi campuses.

The study also tested the difference in level of awareness among Nairobi University campuses which was tested at  $\alpha=0.05$ . The study found that computed value of  $X^2(18) = 17.708$ ,  $p > .05$  as shown in *table 4.18*. Since the p-value is larger than our chosen significance level  $\alpha = 0.05$ , the study fails to reject the Null hypothesis in the fervor of hypothesis. The study concludes that there was no sufficient evidence to reject the Null hypothesis in favor of alternative hypothesis.

**Table 4.6: Association between campus and environmental awareness**

<b>Chi-Square Tests</b>			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.708 <sup>a</sup>	18	.475
Likelihood Ratio	18.771	18	.406
N of Valid Cases	383		

a. 13 cells (46.4) have expected count less than 5. The minimum expected count is .37.

Source: Researcher, September 2019

#### 4.10.3. Test of significant difference in the level of attitude among students

H<sub>0</sub>: There is no significant difference in the environmental attitudes towards pro-environmental issues among students in the University of Nairobi campuses.

Secondly, the researcher tested the difference in students' environmental attitude among Nairobi University campuses which was tested at  $\alpha=0.05$ . The study found that computed value of  $X^2(18) = 22.318$   $p > .05$  as shown in *table 4.19*. Since the p-value is more than our chosen significance level  $\alpha = 0.05$ , the study fails to reject the Null hypothesis in the favor of the alternative hypothesis. The study concludes that students from different campuses have different environmental attitude.

**Table 4.7: Association between campus and environmental attitude**

	Chi-Square Tests		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.318 <sup>a</sup>	18	.218
Likelihood Ratio	26.307	18	.093
N of Valid Cases	382		

a. 13 cells (46.4%) have expected count less than 5. The minimum expected count is .31.

Source: Researcher, September 2019

#### 4.10.4. Test of significant difference in the level of motivation to participate among students

H<sub>0</sub>: There is no significant difference in the level of motivation to participate in pro-environmental behaviour among students in the University of Nairobi campuses.

Finally, the study tested the difference in student's motivation to participate in environmental challenge among Nairobi University campuses which was tested at  $\alpha=0.05$ . The study found that computed value of  $X^2(12) = 10.431$ ,  $p > .05$  as shown in *table 4.20*. Since the p-value is bigger than our chosen significance level  $\alpha = 0.05$ , the study fails to reject the Null hypothesis in the

fervor of alternative hypothesis. The study concludes that there was no sufficient evidence to reject the Null hypothesis.

**Table 4.8: Association between campus and motivation to participate**

<b>Chi-Square Tests</b>			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.431 <sup>a</sup>	12	.578
Likelihood Ratio	12.828	12	.382
N of Valid Cases	382		

a. 8 cells (38.1%) have expected count less than 5. The minimum expected count is .68.

Source: Researcher, September 2019

#### **4.11 Discussions of the Findings**

Environmental challenges (i.e. the causes and effect) have been on the rise, posing a great threat to humanity. Kenya suffers from rising environmental challenges; today, the effects of environmental unfriendly practices can be witnessed in all sectors posing a great concern on the knowledge, awareness, environmental attitude and the motivation of individuals in these sectors to make decisions that, or participate in pro-environmental practices. This study focused on education sector and particularly students

Unhealthy environmental practices may be linked to the lack of awareness and knowledge, poor environmental attitude and the absence of motivation to participate in environmental issues among society and especially the working society. This study assumes that the larger society comprising of the working class, were once students in a university, such as the University of Nairobi. This could be perceived to have future effect on how the graduates from various institutions of learning approach issues of environmental concern in various industries. This is to say a student who is ignorant about various causes and effects of environmental challenge while



in school may engage in unhealthy practices both during their school years and further into their career after graduating from school.

Students should have knowledge or and/or awareness about environmental issues around them and thus develop attitudes towards pro-environmental behaviour to make their surroundings better. This study found general understanding of awareness of environmental challenge was limited among University of Nairobi students. Though students' knowledge and awareness of environmental issues has become central to education globally through various initiatives, majority of student at the University of Nairobi were familiar with waste management and water resources management within the campus; these issues being closely related to their well-being than others. Some of the globally pushed agendas on environmental challenges and behavioral solutions, such as need for solid waste segregation at the source were less known to the students. The findings were consistent with research by Bilal A. et al (2016) that found that the level of awareness about global environmental issues that are evidently beyond scientific dispute, among students was lacking due to lack of awareness of those environmental challenges. The study adds that lack of skills to identify, debate and solve environmental problems is a major hindrance to the push for simple behavioral solutions to global environmental problems.

Attitude has been expressed as a studied disposition to react in a constantly complimentary or uncomplimentary manner with regard to a given entity (Hines, Hungerford & Tomera, 1986). A study conducted by Cigdem and Gulsen (2018) in Inonu University, Turkey observed that environmental attitudes of first grade students were found to be higher than fourth grade students. Cigdem and Gulsen (2018) also adds that the environmental attitudes of students in the

Faculty of Engineering and those in the Faculty of Economics were found to be higher compared to those at the Faculty of Dentistry. That would be a recommended study to be conducted comparatively among the various colleges in Kenyan universities. In the light of these results, activities may be organized to increase sensitivity and positive attitudes towards the environment by cooperating with voluntary environmental institutions at universities. This study found the campus did not have significant effects on student environmental attitude among the campuses in University of Nairobi.

Motivation plays a major role towards performing of a given act. The motivation of an person to participate in environmental issues can be inherent or acquired. The type of motivation in this study can be referred to as intrinsic motivation; students were found to be self-driven to take part in pro-environmental behaviour. This study found that campus did not have significant effects on student motivation to participate on environmental issues among the campuses in University of Nairobi.

## **5. CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

The chapter recaps, discusses and concludes on this study's findings in connection with the objectives put forward in chapter one. It provides recommendations for further studies and recommendations for policy and practice.

### **5.2 Summary of Findings**

Majority of the respondents who took part in this research were male, aged 21 year in third year of their study. Students understanding of environmental issues in line with their studied course were found to be too low. The respondents also reported low awareness on the cause and effect of various environmental issues and therefore their participation in environmental activities was as well reported to be too low.

#### **5.2.1. Summary of findings to the first objective of study**

As per the objective one of this research, to understand the level of environmental knowledge and awareness of the university students at the University of Nairobi campuses, the researcher tested their knowledge on various aspects of environmental challenges, students were expected to rate these aspects of the environmental challenges (have no idea, have slight idea or can fully explain giving examples). The study found students had high knowledge concerning littering of compound, conservation of water and tree planting, in these cases, students reported to have ability to carefully explain the above environmental issues giving examples. On the other hand, students' knowledge in some other areas such as the solid waste segregation at source recorded low popularity among the students.

In line with objective one, the other aspect of students' level of environmental awareness was examined in this study. Students reported to have, among others, high awareness of cause and effect of deforestation, air pollution, water pollution and urbanization; over fifty per cent of students reported that they knew the problem cause and effect of above environmental issues. Though most students claimed to know the problem cause and effect of all environmental issues outlined in this section, most of them rated below fifty per cent with overall average awareness implying student knew the problem but did not know the cause and the effect of the environmental challenge. Also, to note, is the awareness the students had over the ban on plastic bags, noting that there is a positive change in the environment with reduced plastic bags (especially the thin low- grade bags) that were a menace. Chiromo and main campus students however noted that the use of disposable plastic cups from the outdoor restaurants near the hotels is becoming a menace to the environment.

### **5.2.2. Summary of findings to the second objective of study**

The study, as part of the second objective, also assessed the environmental attitude of the students from University of Nairobi towards pro- environmental issues. Students demonstrated positive attitude towards pro- environmental issues; they considered themselves to have a role in addressing environmental concerns such as switching of power in lecture halls when not in use, switching off water taps in the school compound among others; they did not perceive these practices as the responsibility of the school administration, instead they owned the responsibilities to notable extent.

### **5.2.3. Summary of findings to the third objective of study**

Finally, and as guided by objective three of this research, the study evaluated the students' motivation to participate in pro- environmental behaviour. Students who reported to be motivated to participant in pro- environmental behaviour argued to do so inherently so as to conserve energy by switching off lights in the lecture hall, conserving water resources by turning of taps while not in use, keeping environment clear in and out of school and through affiliation to an environmental club to keep abreast with environmental issues.

### **5.3. Conclusion**

From the findings, the study concludes that students' level of knowledge on the general environmental challenges, that affect students in a campus, was low and did not depend on the campus. The study also concludes student awareness on the environmental challenges to be generally limited and did not depend on students' campus. Student attitude on environmental issues was positive among University of Nairobi Students but did not depend on students' campus. Equally, students were motivated by the need to conserve environment especially energy, water and maintaining clean compound within their environment. However, the practices were not influenced by students' campus. The study also concludes that indeed student's knowledge and awareness, attitude and motivation to participate do influence the pro- environmental behaviour among students. Environmental attitude is a good measure to understand what values a student has in regards to environmental issues around them. Therefore, if universities take up the responsibility and strategy to inculcate more of the positive values and attitudes towards environmental behaviour, they will in turn take an active position in adopting

pro-environmental behaviour, leading to a more promising future as they transit to positions of influence in the global space.

## **5.4. Recommendations**

The study seeks to recommend the following;

### **5.4.1. To policy makers**

The ministry in charge of environment policy in coordination with the ministry in charge of education can make adjustment to the education offered in higher institutions of learning to include basic knowledge on environmental issues, challenges and basic conservation practices to all students as part of the early year- units of study (also known referred to as “university common units”.

Students were found to have clarity of issues that surround them such as water conservation among other, the ministry of environment could partner with institutions of higher learning, introduce programs that could help students to interact more with environmental challenges so as to increase the level of awareness in other critical environmental issues that beyond their campuses. With this increased level of awareness, the students can positively influence pro-environmental behaviour in their area of influence beyond the university. This can also help them develop solution to address environmental challenges facing the world using the tools learnt in their area of study.

#### **5.4.2. To educational institutions**

Institution of higher learning should embrace environmental talks and implement it through students' leadership to help students have positive attitude towards their involvement on environmental conservation practices. These institutions could also put more emphasis and support the existing environmental clubs and associations in their institutions.

The University of Nairobi can consider having more environmental awareness posters in all buildings in the university campuses, such as those located in the Department of Geography and Environmental Studies corridors, this will increase the curiosity to practice pro-environmental behaviour among all students as well as create a sense of personal responsibility to act, further from just being aware. This can help them develop solutions to address these challenges.

#### **5.4.3. For further Studies**

The study also recommends further studies in the area of gender as a factor to pro-environmental behaviour and environmental concerns in a society. Many studies have sought to understand the impacts of environmental challenges on different gender, but few have sought to understand whether gender has a role on pro-environmental behaviour among individuals.

Research on how different gender roles and capacities can lead to a more inclusive sustainable solution should be considered by scholars. Further studies are also recommended on the comparative evaluation of students' attitudes towards environmental issues both within and without their line of studies across various universities in Kenya.

Understanding whether the different years of study in a university has an influence on the level of attitude among students should be researched, specially to comprehend if the levels of attitude ratios among the various class- years of study are similar, and if so, to what degree.



## REFERENCES

- Abedi Sarvestani, A; & Shah Vali, M. (2009). The Role of Promoting Agriculture in promoting Farmer's Environmental Ethics. *Journal of Ethics in Science and Technology*, 1&2:120-13.
- Adomssent, M., (2013). Exploring universities' transformative potential for sustainability-bound learning in changing landscapes of knowledge communication. *J. Clean. Prod.* 49, 11- 24
- Adomssent, M., Godemann, J., Michelsen, G., (2007). Transferability of approaches to sustainable development at universities as a challenge. *Int. J. Sust. High. Educ.* 8 (4), 385-402
- Ajzen, I. (1985). From intentions to action: A theory of planned behaviour. In J. Kuhl & Bechman (Eds), *Action control: from cognition to behaviour*. New York: Springer- Verleg.
- Ajzen, I. (1989). Attitude structure and behaviour. In A. R. Pratkanis, S. J. Breckler & A. G. Greenwald, (Eds), *Attitude structure and function*. Hillsdale, N.J.: Erlbaum, pp. 241-274
- Ajzen, I., & Driver, B. L. (1992). Application of the theory of planned behaviour to leisure choice. *Journal of Leisure Research*, 24, 207- 224.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Prentice- Hall, Upper Saddle River, New Jersey
- Ajzen, I., & Madden, T. (1986). Prediction of goal-directed behaviour: Attitudes, intentions, and perceived behavioural control. *Journal of Experimental Social Psychology*. 22 (5): 453- 474
- Ajzen, I., (2002). Perceived behavioural control, self-efficient, locus of control, and the theory of planned behaviour. *Journal of Applied Social Psychology*, 32, 665-683.
- Armstrong, J. B., & Impara, J. C. (1991). The Impact of an environmental education programme on knowledge and attitude. *Journal of Environmental Education*, 22,36- 40
- Axelrod, L. J., & Lehman, D. R. (1993). Responding to environmental concerns: What factors guide individual action? *Journal of environmental psychology*, 13(2), 149-159.
- Baldassare, M. & Katz, C. (1992). The personal threat of environmental problems as predictor of environmental practices. *Environment and Behavior*, 24, 602-616.

- Ballantyne, R., Connell, S., Fien, J., (1998). Students as catalysts of environmental change: a framework for researching intergenerational influence through environmental education. *Environ. Educ. Res.* 4, 285- 298.
- Bamberg, S., & Moser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psychosocial determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27, 14- 25.
- Barth, M. (2013). Many roads lead to sustainability: a process-oriented analysis of change in higher education. *International Journal of Sustainability in Higher Education*, 14, n. 2, p. 160- 175.
- Bilal A, Badir, Y., &Kiani, U. S. (2016). Linking spiritual leadership and employee pro-environmental behavior: The influence of workplace spirituality, intrinsic motivation, and environmental passion. *Journal of Environmental Psychology*, 45, 79-88.
- Black, J. S., Stern, P. C. & Elworth, J. T. (1985). Personal and contextual influence on household energy adaptations. *Journal of Applied Psychology*, 70, 3<sup>^</sup>21
- Boldero J. (1995). The Prediction of household recycling of newspapers: the role of attitudes, intensions and situational factors. *J Appl Social Psychol*; 25 (5): 440-62
- Burer S. (2014). *Influence of Environmental Education on Conserving Environment in Kenya, Case study of MoibenConstituency,Uasin Gishu County*. University of Nairobi.
- Casey, P. J., & Scott, K. (2006). Environmental concern and behaviour in an Australian sample within an ecocentric–anthropocentric framework. *Australian Journal of Psychology*, 58(2), 57-67.
- Chan, K., (1998). Mass communication and pro-environmental behaviour: waste recycling in Hong Kong. *J. Environ. Manag.* 52, 317- 325.
- Chang, H. C., (2013). Environmental management accounting in the Taiwanese higher education sector. Issues and opportunities. *International Journal of Sustainability in Higher Education*, 14, n. 2, p. 133- 145.
- Charles A. Ogunbode and Kate Arnold (2012). A study of Environmental Awareness and Attitudes in Ibadan, Nigeria p Human and Ecol Risk Assess- *International Journal*. 669- 684
- Cochran, W. G. (1963). *Sampling Techniques*, 2<sup>nd</sup> Ed., New York: John Wiley and Sons, Inc.
- Collins, J., and Hussey, R. (2003). *Business Research: A practical guide for undergraduate and postgraduate students*, Second edition. Palgrave Macmillan, Basingstoke England.

- Cordano, M., Welcomer, S., Scherer, R., Pradenas, L., Prada, V., (2010). Understanding cultural differences in the antecedents of pro-environmental behaviour: a comparative analysis of business students in the United States and Chile. *J. Environ. Educ.* 41 (4), 224- 238
- Cottrell, S.P., (2003). Influence of sociodemographic and environmental attitudes of general responsible environmental behaviour among recreational boaters. *Environ. Behav.* 35, 347 -375.
- Cigdem T., & Gulsen, G. (2018). Environmental awareness in university students and the affecting factors. *International journal of community medicine and public health*, 5(2), 422-429.
- Clayton, S. (2003). Environmental identity: A conceptual and an operational definition. In S. Clayton, & S. Opatow (Eds.), *Identity and the natural environment. The psychological significance of nature* (pp. 45-65). Cambridge: The MIT Press.
- Clayton, S., & Opatow, S. (2003). Introduction: Identity and the Natural Environment.
- Derksen, I., Gatrell, J., (1993). The social context of recycling. *Am. Sociol. Rev.* 58 (3), 434- 442
- Diamantopoulos, A., Schlegemilch, B.B., Sinkovics, R.R., Bohlen, G.M., (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *J. Bus. Res.* 56, 465- 480.
- Diekmann, A. &Frazen, A, (1999). The wealth of nations, *Environment and Behaviour*, 31 (4), pp. 540- 549.
- Diekmann, A. &Frazen, A. (1996). Insight into ecological ecology and environmental behaviour, in: R. Kaufmann- Hayoz& A. Di Giulio (Eds) *Environmental Problem Human: Human scientific contexts on environmental responsibility* (Bern, Verlag Paul Haupt).
- Diekmann, A. &Preisendoerfer, P. (1992). Personal Environmental Behaviour: The discrepancy between demand and reality, 44, pp. 226- 251.
- Diekmann, A., &Preisendorfer, P., (2003). Green and greenback. The behavioural effects of environmental attitudes in low- cost and high- cost situations. *Rationality and Society*, 15 (4), 441- 472.
- Doswell, W., Braxter, B., Cha, E., Kim, K., (2011). Testing the Theory of Reasoned Action in Explaining Sexual Behaviour Among African American Young Teen Girls. *Journal of Paediatric Nursing*.
- Dunlap, R. E., Van Liere, K. D. (1978). The ‘new environmental paradigm’: a proposed measuring instrument and preliminary results. *Journal of Environmental Education*, 9, 10-19

- Dunlap, R. E. & Van Liere, K. D. (1984). Commitment to the dominant social paradigm and concern for environmental quality. *Social Science Quarterly*, 64, 1013-1028
- Dunlap, R.E., Jones, R.E., (2002). Environmental concern: conceptual and measurement issues: In: Dunlap, R.E., Michelson, W. (Eds.), *Handbook of Environmental Sociology*. Greenwood Press, Westport, CT, pp. 482- 524
- Ecem, T., Dr. Mehmet U., Dr. Heyecan G. (2018). Pro- environmental Behaviour of University Students: Influence of Cultural Differences. *European Journal of Sustainable Development (2018)*, 7, 4, 43- 52
- European Commission (2005). The attitudes of European citizens towards environment. A Special Eurobarometer Survey- 217 *Summary Report*.
- Fien, J. (2002). Advancing Sustainability in Higher Education. *International Journal for Sustainability in Higher Education*, 3 (3), 243- 253
- Fietkau, H.- J., & Kessel, H. (1981). *Environmental learning: potential changes in environmental awareness*. Model experiences (Koenigstein, Hain, Germany).
- Fotopoulos, C., Krystallis, A., (2002). Organic product avoidance. Reasons for rejection and potential buyers' identification in a countrywide survey. *Br. Food J.* 104 (3, 4, 5), 233- 260.
- Gamba, R., & Oskamp, S. (1994). Factors influencing community residents' participation in commingled curb-side recycling programs. *Environmental and Behaviour*, 26, 587- 612.
- Gardner, G. T. & Stern, P. C. (1996). *Environmental problems and human behavior*. Needham Heights, MA: Allyn & Bacon
- Gifford, R., Nilsson, A., (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*. Vol. 49, No. 3, 141- 157
- Gracia- Vilinas, M.A., Muniz- Perez, M.A., Cordero- Ferrera, J.M., (2010). The role of schools in providing environmental knowledge in science. *Investigaciones de Economia de la Educacion*, vol. 5 (5). *Asoc. De Econ. De la Educ*, pp. 87- 100
- Hardin, G (1968). "The Tragedy of the Commons". Article
- Hartmann, P., Apaolaza-Ibanez, V., (2012). Consumer attitude and purchase intention toward green energy brands. The roles of psychological benefits and environmental concern. *Journal of Business Research*, 65, p. 1254- 1263.
- Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *The Journal of environmental education*, 18 (2), 1-8.

- Hopper, J. R. & Nielsen, J. M. (1991). Recycling as altruistic behavior: Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior*, 23, 195-220
- International Institute for Sustainable Development (IISD) website, (2019). <https://sdg.iisd.org/news/unea-4-commits-to-global-environmental-data-strategy-reducing-single-use-plastics/>. Accessed on September, 2019.
- Jager, N., Challies, E., Kochskamper, E., Newig, J., Benson, D., Blackstock, K., ... & Fritsch, O. (2016). Transforming European Water Governance? EU Water Framework Directive implementation in 13-member states. *Water*, 8 (4), 156.
- Kaiser, F. G., Wölfing, S., & Fuhrer, U. (1999). Environmental attitude and ecological behaviour. *Journal of environmental psychology*, 19(1), 1-19.
- Kaiser, F. G., Ranney, M., Hartig, T., & Bowler, P. A. (1999). Ecological behaviour, environmental attitude, and feelings of responsibility for the environment. *European psychologist*, 4(2), 59.
- Kaiser, S., & Sachser, N. (1998). The social environment during pregnancy and lactation affects the female offspring's endocrine status and behaviour in guinea pigs. *Physiology & behaviour*, 63(3), 361-366.
- Kaiser, F.G., Fuhrer, U., (2003). Ecological behaviour's dependency on different forms of knowledge. *Appl. Psychol. Int. Rev.* 52 (4), 598- 613.
- Kals, E., & Montada, L. (1994). Umweltschutz und die Verantwortung der Bürger [Pollution control and the responsibility of the citizens]. *Zeitschrift für Sozialpsychologie*, 25, 326-33.
- Kennedy, E.H., Beckley, T.M., McFarlen, B.L., Nadeau, S., (2009). Why we don't walk the talk: understanding the environmental values/ behaviours gap in Canada. *Hum. Ecol. Rev.* 16 (2), 151- 160.
- Kim, Y., Choi, S., (2003). Antecedents of pro-environmental behaviours: an examination of cultural values, self- efficacy, and environmental attitudes. In: *Paper presented in the Annual meeting of International Communication Association*.
- Kollmuss, A., Agyeman, J., (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environ. Educ. Res.* 8 (3), 239- 260
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. New Dehli. New Age International Publishers.
- Kuhlemeier, H., Van Den Bergh, H., & Lagerwenij, N., (1999). Environmental knowledge, attitudes and behaviour in Dutch secondary education. *The Journal of Environmental Education*, 30 (2), 4- 14.

- Laroche, M., Bergeron, J., Barbaro- Forleo, G., (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *J. Consum. Mark* 18 (6), 503- 520
- Lehmann, J. (1999). *Findings of empirical research on environmental education and environmental awareness* (Opladen, Laske and Bundrich).
- Levine, D. S., & Strube, M. J. (2012). Environmental attitudes, knowledge, intentions and behaviours among college students. *The Journal of social psychology*, 152(3), 308-326.
- Lozano, R., (2006). Incorporation and institutionalisation of Sustainable Development (SD) into universities: breaking through barriers to change. *J. Clean. Prod.* 14 (9-11), 787 -796.
- Lozano, R., Lukman, R., Lozano, F.J., Huisingh, D., Lambrechts, W., (2013). Declarations for sustainability in higher education: becoming better leaders, through addressing the university system. *J. Clean. Prod.* 48, 10-19
- Lynn, P. (2014). Distinguishing dimensions of pro-environmental behaviour (No. 2014-19). ISER Working Paper Series.
- Maddan, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behaviour and the theory of reasoned action. *Personality and Social Psychology Bulletin*, 18 (1), 3-9.
- Matsumoto, M. (2009). Second language learners' motivation and their perceptions of teachers' motivation. In International conference on teaching and learning in higher education (pp. 11-24).
- Matsumoto, D. E. (2009). *The Cambridge dictionary of psychology*. Cambridge University Press.
- Mesmer-Magnus, J., Viswesvaran, C., & Wiernik, B. M. (2012). The role of commitment in bridging the gap between organizational sustainability and environmental sustainability. *Managing human resources for environmental sustainability*, 155-186.
- Milfont, T.L., Duckitt, J., (2010). The environmental attitudes inventory: a valid and reliable measure to assess the structure of environmental attitudes. *J. Environ. Psychol.* 30 (1), 80-94
- Mobley, C., Vagias, W.M., DeWard, S.L., (2010). Exploring additional determinants of environmentally responsible behaviour: the influence of environmental literature and environmental attitudes. *Environ. Behav.* 42 (4), 420- 447.
- Molina M. A. V., Sainz A. F., Olaizola J. I., (2013). Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university

- students from emerging and advanced countries. *J. Clean. Prod* 61 (2013) 130-138
- Morigi J., Krebs L. M., (2012). Social mobilisation networks: the Greenpeace informational practices. *Information and Social Educ*, 22, n. 3, p. 133-142.
- Mosiander, J., (2007). Motivation complexity of green consumerism. *Int. J. Consum. Stud.* 31 (4), 404- 409.
- Mugenda, O. M and Mugenda, G. A. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Action Press.
- Muthui, Thomas W. (2012). *An assessment of the level of awareness/ knowledge and practices of environmental management in schools in Kenya; A case study of public secondary schools in Nairobi County*. University of Nairobi, Kenya
- Mtutu, P., & Thondhlana, G. (2016). Encouraging pro-environmental behaviour: Energy use and recycling at Rhodes University, South Africa. *Habitat International*, 53, 142-150.
- National Environment Management Authority (NEMA) Kenya (2019). <https://www.nema.go.ke/>. Accessed in February, 2019
- Oguz, D., Cakci, I., Kavas, S., (2010). Environmental awareness of university students in Ankara, Turkey. *Afr. J. Agric. Res.* 5, 2629- 2636
- Orodho, J. A. (2005). *Elements of Education and Social Science Research Methods*. Nairobi: Masola Publishers
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, 25(1), 54-67.
- Ryan, S., & Carr, A. (2010). Applying the biopsychosocial model to the management of rheumatic disease. *Theory of Planned Behaviour*. Elsevier
- Schlegelmilch, B. B., Bohlen, G.M., Diamantopoulos, A., (1996). The link between green purchasing decisions and measures of environmental consciousness. *Eur. J. Mark* 30, 35- 55.
- Schmuck, Peter, Schultz, Wesley (2002). *Psychology of sustainable development*. Boston: Kluwer Academic Publishers, 344 s.
- Schultz, P. W., &Zelezny, L. C. (1998). Values and pro-environmental behaviour. A five-country study. *Journal of Cross- Cultural Psychology*, 29, 540- 558
- Schultz, P. W., &Zelezny, L. C. (1999). Values as predictors of environmental attitudes: evidence of consistency across 14 countries. *Journal of Environmental Psychology*, 19, 255- 265
- Scott, D., & Willets, F. K. (1994). Environmental attitudes and behaviour. *Environmental and Behaviour*, 26 (2), 239- 261.

- Soyez, K., Francis, J., Smirnova, M., (2011). How individual, product and situational determinants affect the intention to buy and organic food buying behaviour: a cross- national comparison in five nations. *Der Mark* 51 (1), 27- 35.
- Soyez, K. (2012). How national cultural values affect pro-environmental consumer behavior. *International Marketing Review*, 29(6), 623-646.
- Stern, P.S., Dietz, T. & Karlof, L. (1993). Values orientation, gender, and environmental concern, *Environmental and Behaviour*, 25 (3), pp. 322- 348.
- Stern, P. C. (1992). Psychological dimensions of global environmental change. *Annual Review of Psychology*, 43, 269^302.
- Stern, P. & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, 50, 65^84
- Stern, P. C., Dietz, T., Kalof, L. & Guagnano, G. A. (1995). Values, beliefs and pro-environmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology*, 25, 1611^1636
- Straughan, R.D., Roberts, J.A., (1999). Environmental segmentation alternatives: a look at green consumer behaviour in new millennium. *J. Consum. Mark* 16 (6), 558 - 575
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of environmental psychology*, 29(3), 309-317.
- Tanner, T., (1980). Significant life experiences, *J. Edu.*, 11 (4) 20- 21
- Takala, M. (1991). Environmental awareness and human activity. *International Journal of Psychology*, 26, 585^597.
- Tapia-Fonllem, C., Corral-Verdugo, V., Fraijo-Sing, B., & Durón-Ramos, M. (2013). Assessing sustainable behavior and its correlates: A measure of pro-ecological, frugal, altruistic and equitable actions. *Sustainability*, 5(2), 711-723.
- Thamwipat, K., Maneewan, S., Pumiaroen, T., (2012). Behaviour of media exposure and participation in environmental activities of king Mongkut's University Technology Thonburi dormitory students. *World Acad. Sci. Eng. Technol.* 61, 247- 251.
- Tilikudou, I., (2007). The effects of knowledge and attitudes upon Greek's pro-environmental purchasing behaviour. *Corp. Soc. Responsib. Environ. Manag.* 14, 1221- 134
- UN Environment (2017). *Consuming Differently, Consuming Sustainably: Behavioural Insights for Policymaking*. New York
- UN Environment, (2017) UN Environment Annual Report 2017.



- UNEP (2017). *Africa Environmental Education and Training Action Plan 2015- 2024: Strengthening Development in Africa*.
- UN Environment (2019). <https://www.unenvironment.org/news-and-stories/story/kenyan-universities-aim-be-greenest-world>. Accessed September, 2019
- UNESCO (2002). *Environmental Education: possibilities and constraints in connect*. UNESCO Paris
- UNESCO-UNEP (1985). *Interdisciplinary approaches in environmental education*. UNESCO, Paris.
- UNESCO- UNEP (1985). Environmental Education: Module for Pre- Service Training of Social Science Teachers and Supervisors for Secondary Schools. *UNESCO-UNEP International Environmental Education Programme- Environmental Education Series 9*.
- UNESCO- UNEP., (1990). Environmentally educated teachers: the priority of priorities? *Connect*, 15 (1) 1- 3.
- United Nations. (1987) Report on World Commission on Environment and Development, General Assembly Resolution 42/187, 11 December 1987.
- University of Nairobi (2019) website: <http://www.uonbi.ac.ke/>. Accessed March, 2019
- Vermeir, I., Verbeke, W., (2006). Sustainable food consumption: exploring the consumer “attitude – behavioural intention” gap. *J. Agric. Environ. Ethics* 19 (2), 169 - 194.
- Waas, T., Verbruggen, A., Wright, T., (2010). University research for sustainable development: definition and characteristics explored. *J. Clean. Prod.* 18 (7), 629-636.
- Wang, Y., Liu, J., Hansson, L., Zhang, K., Wang. R., (2011). Implementing stricter environmental regulation to enhance eco-efficiency and sustainability: a case study of Shangdong Province’s pulp and paper industry. *J. Clean. Prod.* 19 (4), 303- 310
- Weigel R. H. (1983). “Environmental Attitudes and the Prediction of Behaviour,” In N.R. Feimer and E.S. Geller (eds.), *Environmental Psychology: Directions and Perspectives*. New York: Praeger.
- World Commission on Environment and Development (1987). *Our Common Future- Brundtland Report*. Oxford University Press, Oxford
- Wilkie, W. L., (1990). *Consumer behaviour*, second ed. John Wiley and Sons, New York.
- Woodgate G. (2010). Introduction. In *the International Handbook of Environmental Sociology*, 2nd edn, Redclift MR, Woodgate GR (eds). Elgar: Cheltenham; 1-8.

Zsoka, A., Szerenyi, Z., Szechy, A., Kocsis, T., (2012). Greening due to environmental education? Environmental knowledge, attitudes, consumer behaviour and everyday pro-environmental activities of Hungarian high school and university students. *J. Clean. Prod.*

## APPENDICES

### Appendix I Sample Questionnaire

**DATE:**

<b>PERSONAL DETAILS</b>					
University Campus:					
College:					
School or Department					
Academic Programme:					
Year of Study:					
Gender	Male	( )		Female	( )
Age					
Level of Education					

### SECTION A

<b>START HERE</b>					
<i>Level of Knowledge. Circle appropriate to you</i>				1 - have no idea 2 - have a slight idea 3 - can explain fully giving examples and cases	
1.	Energy conservation	1	2	3	
2.	Climate change (mitigation/ adaptation)	1	2	3	
3.	Water conservation	1	2	3	
4.	Waste (recycling, reusing, reducing)	1	2	3	
5.	Soil conservation	1	2	3	
6.	Noise pollution	1	2	3	
7.	Littering in the compound	1	2	3	
8.	Solid waste segregation at source	1	2	3	
9.	Tree planting	1	2	3	
10.	Paper use reduction (soft copy vs hard copy)	1	2	3	

<i>Level of Awareness. Circle appropriate to you</i>		<i>1 - never heard about it 2 - only heard about it 3 - know the problem but don't know the cause nor effect 4 - know the problem and causes and effects alone</i>			
1.	Soil degradation	1	2	3	4
2.	Deforestation	1	2	3	4
3.	Solid waste pollution	1	2	3	4
4.	Blocked drainage and flooding	1	2	3	4
5.	Climate change	1	2	3	4
6.	Air pollution	1	2	3	4
7.	Community health & safety	1	2	3	4
8.	Desertification	1	2	3	4
9.	Water pollution	1	2	3	4
10.	Urbanization	1	2	3	4

<b>SECTION B: ENVIRONMENTAL ATTITUDE</b>						
<i>Kindly circle the degree to which you agree or disagree</i>						
<i>(SA)- Strongly Agree (A)- Agree (NS)- Not Sure (D)- Disagree (SD)- Strongly Disagree</i>						
1.	Cleanliness in the university premises is the responsibility of the university management only.	SA	A	NS	D	SD
2.	If I get extra pocket money I should donate to environmental protection such as tree planting.	SA	A	NS	D	SD
3.	It is my responsibility to switch off the lights of the room or class when not in use	SA	A	NS	D	SD
4.	I should watch out for any excess water dripping from the taps and close them in campus.	SA	A	NS	D	SD
5.	I should brush my teeth using a cup rather than running water.	SA	A	NS	D	SD
6.	Climate change is not real. There is no evidence of the effects of climate change in	SA	A	NS	D	SD

	present day. It doesn't affect me.					
7.	Talking and playing music loudly should be controlled to reduce noise pollution in campus.	SA	A	NS	D	SD
8.	I should separate solid waste from my room and in class to make it easier to manage solid waste.	SA	A	NS	D	SD
9.	I print my assignments in double side and reuse paper when I can. I prefer sending my assignments in soft copy rather than printing.	SA	A	NS	D	SD
10.	I should be able to spit at any point in the university campus- it has no effect on my surrounding.	SA	A	NS	D	SD

### SECTION C: MOTIVATION TO PARTICIPATE

Extent to which you participate in the mentioned activities. Check the suitable box.				
1- Never				
2- Sometimes				
3- Always				
	<b>ACTIVITY/ ITEM</b>	<b>1</b>	<b>2</b>	<b>3</b>
1.	I must save electricity by switching off the lights when not in use to improve the environment			
2.	I throw my waste paper in the dust bin			
3.	I switch off running water taps in the university compounds regardless if I was using it initially			
4.	I pick litter whenever I find them in the school compound			
5.	I dispose of leftovers in the segregated waste bin, after meals,			
6.	I use my own carrier bags when going for shopping (even before the plastic bag ban)			
7.	I avoid using small size disposable plastic bottles to reduce on plastic waste			
8.	I participate in tree planting and cleanup activities in the university			
9.	I am (or have ever been) a member of an environmental club			
10.	I throw-out litter from the car when the vehicle I am in is moving			

## SECTION D APPLICATION QUESTIONS

*(tick where appropriate)*

1. Are you aware of any environmental cause and effect of activities in your area of study (e.g. health, medicine, physical and biological sciences, law and policy, education, communication) at the UoN?  Yes  No

If your answer is yes, list some of those activities and the causes/ effect that you know of [*use the back of this questionnaire for more space*].

2. From the activities- cause and effects mentioned above have you/ do you participate in any?  Yes  No

If your answer is yes, which ones have you participated in- stating where or how?

3. Do you participate in any environmental volunteering or participate in environmental talks with friends and family?  Yes.  No

If yes, which one? What are some of the activities you have volunteered or talks you have had in the past one year?

4. Do you agree with this statement? *Due to gender inequalities, environmental challenges have different impacts on men, women, girls and boys*  Yes.  No

If yes, comment below. [*Use the back of this questionnaire for your answer*]

THANK YOU FOR YOUR TIME

**Appendix II (a): Introduction Letter from the Department of Geography and Environmental Studies to conduct research**



**UNIVERSITY OF NAIROBI**

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

Telephone: +254 2 318262  
Extension: 28016  
Fax: +254 2 245566  
Email-geography@uonbi.ac.ke

P.O. BOX 30197-00100  
NAIROBI  
KENYA

August 7, 2019

The Director,  
National Commission for Science & Technology  
Nairobi, Kenya.

Dear Sir/Madam,

**RESEARCH PERMIT: MICHAEL KABARI WAWERU**

This is to confirm that the above named is a Master of Arts student (Registration Number – C50/778333/2012) at the Department of Geography and Environmental Studies, University of Nairobi registered.




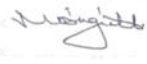

Mr. Waweru is currently undertaking research on a topic titled: **Factors Influencing Environmental Concern and Pro-Environmental Behaviour Among University of Nairobi.**

Any assistance accorded to him will be highly appreciated.

  
CHAIRMAN  
Department Of Geography  
and Environmental Studies  
UNIVERSITY OF NAIROBI

**Dr. Boniface Wambua**  
Chairman, Department of Geography & Environmental Studies

## Appendix II (b): NACOSTI License to conduct research

 <b>REPUBLIC OF KENYA</b>	 <b>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
<b>Ref No: 749610</b>	<b>Date of Issue: 19/August/2019</b>
<b>RESEARCH LICENSE</b>	
	
<b>This is to Certify that Mr., MICHAEL WAWERU of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: Factors influencing environmental concern and pro- environmental behaviour among University of Nairobi students for the period ending : 19/August/2020.</b>	
<b>License No: NACOSTI/P/19/867</b>	
<b>749610</b>	
<b>Applicant Identification Number</b>	<b>Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
	<b>Verification QR Code</b>
	
<b>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</b>	



## Appendix II (c): Letter of authority to conduct research



**UNIVERSITY OF NAIROBI**  
OFFICE OF THE DEPUTY VICE - CHANCELLOR  
(Research, Innovation & Enterprise)

P.O. Box 30197-00100  
Nairobi, Kenya  
Telephone: +254-20-4910000, Ext 28711  
+254-020-4913164 (DL)

Email: [dvcrie@uonbi.ac.ke](mailto:dvcrie@uonbi.ac.ke)  
Website: [www.uonbi.ac.ke](http://www.uonbi.ac.ke)

UON/RPE/3/5/Vol.XIX

August 20, 2019

Michael Kabari Waweru  
PO Box 75742-00200  
NAIROBI.

Dear Michael,

**AUTHORITY TO CONDUCT RESEARCH**

I refer to your request to conduct research at the University of Nairobi, towards your Master's Degree project entitled: "*Factors influencing environmental concern and pro-environmental behaviour among University of Nairobi students.*"

I write to inform you that your request has been approved.

You are however required to share the findings of your study with the University of Nairobi by depositing a copy of your research findings with the Director, Library & Information Services on completion of your study.

**MADARA OGOT**  
DEPUTY VICE-CHANCELLOR  
(RESEARCH, INNOVATION AND ENTERPRISE)  
AND  
PROFESSOR OF MECHANICAL ENGINEERING

Copy to: Director, Library and Information Services

/jwn



ISO  
9001:2015  
CERTIFIED

Quality Management System Excellence in University Education and Training

**Appendix III (a): Summary table of student's environmental attitudes towards pro-environmental issues**

	<b>SA</b>	<b>A</b>	<b>NS</b>	<b>D</b>	<b>SD</b>		
	n (%)	n (%)	n (%)	n (%)	n (%)	mean	SD
<b>Cleanliness in the university premises is the responsibility of the university management only.</b>	37 (9.8)	41 (10.8)	21 (5.5)	124 (32.7)	156 (41.2)	3.80	1.388
<b>Upon getting extra money I should offer to ecological conservation such as tree planting.</b>	60 (15.9)	138 (36.5)	76 (20.1)	51 (13.5)	53 (14.0)	2.69	1.311
<b>It is my responsibility to switch off the lights of the room or class when not in use</b>	227 (59.7)	131 (34.5)	1 5(3.9)	3 (0.8)	4 (1.1)	1.47	.722
<b>I should watch out for any excess water dripping from the taps and close them in campus.</b>	210 (55.6)	127 (33.6)	16 (4.2)	16 (4.2)	9 (2.4)	1.62	.940
<b>I should brush my teeth using a cup rather than running water.</b>	159 (41.7)	144 (37.8)	42 (11.0)	23 (6.0)	13 (3.4)	1.90	1.045
<b>Climate change is not real. There is no evidence of the effects of climate change in present day. It doesn't affect me.</b>	12 (3.2)	26 (6.9)	35 (9.2)	54 (14.2)	252 (66.5)	4.28	1.196
<b>Talking and playing music loudly should be controlled to reduce noise pollution in campus.</b>	0 (0.0)	147 (38.7)	129 (33.9)	26 (6.8)	40 (10.5)	2.17	1.332
<b>I should separate solid waste from my room and in class to make it easier to manage solid waste.</b>	129 (34.0)	173 (45.6)	51 (13.5)	18 (4.7)	8 (2.1)	1.93	.945
<b>I print my assignments in double side and reuse paper when I can. I prefer sending my assignments in soft copy rather than</b>	124 (32.5)	141 (37.0)	59 (15.5)	37 (9.7)	20 (5.2)	2.16	1.157



**Appendix III (b): Summary table of students' motivation to pro- environmental behaviour**

	Never		Sometimes		Always		mean	SD
	n	%	n	%	n	%		
I must save electricity by switching off the lights when <b>not using them to improve the environment</b>	30	7.9	91	24.1	257	68.0	2.56	.705
I throw my waste paper in the dust bin	13	3.4	55	14.6	310	82.0	2.74	.595
I switch off running water taps in the university compounds regardless if I was using it initially	18	4.8	78	20.7	280	74.5	2.64	.671
I pick litter whenever I find them in the school compound	108	28.6	181	47.9	89	23.5	1.92	.755
After meals, I <b>throw leftovers in a segregated waste bin</b>	46	12.2	122	32.4	208	55.3	2.38	.776
I use my own carrier bags when going for shopping ( <b>even before the plastic bag ban</b> )	76	20.2	166	44.1	134	35.6	2.11	.787
I avoid using small size <b>disposable plastic bottles to reduce on plastic waste</b>	82	21.9	189	50.5	103	27.5	2.00	.766
I participate in tree planting and <b>clean-up activities in the university</b>	126	33.7	149	39.8	99	26.5	1.88	.823
I am (or have ever been) a member of an environmental club	160	43.6	108	29.4	99	27.0	1.75	.890
I throw-out litter from the car when the vehicle I am in is moving	222	59.7	101	27.2	49	13.2	1.49	.754
<b>Motivation to participate</b>							2.15	0.405

Source: Researcher, September 2019

**Appendix III (c): Environmental awareness with respect to campus**

<b>College</b>	<b>Perceived activities and their environmental causes and effects in area of study and locality</b>
<i>College of Agriculture and Veterinary Sciences (CAVS)</i>	<ul style="list-style-type: none"> <li>- Increased population leading to more cut-down trees in the surrounding area,</li> <li>- Less dustbins for disposal in the institution compound,</li> <li>- Loud music from student hostels in a bother,</li> <li>- Soil erosion due to bad agricultural practices and land management</li> </ul>
<i>College of Architecture and Engineering (CAE)</i>	<ul style="list-style-type: none"> <li>- In engineering there is forest clearing for road construction hence noise pollution. Construction can also have bad effect to community livelihoods</li> </ul>
<i>College of Biological and Physical Sciences (CBPS)</i>	<ul style="list-style-type: none"> <li>- Dumping of solid waste from canteens and food <i>joints</i> around the hostel areas as well as playing loud music impacts concentration,</li> <li>- Throwing litter in undesignated areas, especially along public areas such as walking paths,</li> <li>- Watering of trees and plants is done well, it brings beauty in the campus</li> </ul>
<i>College of Education and External Studies (CEES) including students from the ODEL</i>	<ul style="list-style-type: none"> <li>- Air and noise pollution have a bad effect on study concentration of students,</li> <li>- Broke water taps leading waste of water. People also leave tap water running leads to misuse of water resources</li> <li>- Improper disposal of litters in and around the campus. Solid waste pollution like littering with polythene bags- used to wrap items and plastics are non-biodegradable thus affects the environment.</li> <li>- Leaving bulbs on when not in use of them after class or leaving a room leads to wastage in energy,</li> <li>- Smoking in an open place leads to secondary air pollution,</li> <li>- Failing to flash the toilet after the use,</li> <li>- Tree planting leads to a cleaner environment in and around the campus compound (the environment at CEES is very different - better- from Main Campus).</li> </ul>
<i>College of Health Science (CHS)</i>	<ul style="list-style-type: none"> <li>- Air pollution from incinerator fumes affects people's respiratory condition,</li> <li>- Burning of waste causing air pollution,</li> <li>- Clean environment is key in promotion of proper disposal of biohazard substances that may lead to disease contamination,</li> <li>- Littering in school leads to pollution,</li> <li>- Noise from vehicle within and outside the campus is a bother,</li> <li>- Exposure to radioactive substance and radiation due to therapy e.g. computed tomography (CT) scans and magnetic resonance imaging (MRI) x-ray can have devastating effects if not done properly,</li> <li>- Water pollution causes several water-borne diseases,</li> </ul>

College	Perceived activities and their environmental causes and effects in area of study and locality
	<ul style="list-style-type: none"> <li>- Smoking has an effect on body and pollution of the air,</li> <li>- Tree planting is good for the society,</li> <li>- Used medicine bottles dumped in water source has a catastrophic effect on human health for those using water downstream.</li> </ul>
<p><i>College of Humanities and Social Science (CHSS)</i></p>	<ul style="list-style-type: none"> <li>- Air pollution from vehicles emission and burning of waste materials. Smokers should only smoke with smoking zones,</li> <li>- Cleaning the campus should consider water sources,</li> <li>- Community service especially by students should be encouraged.</li> <li>- Deforestation causing desertification in our country,</li> <li>- Littering in the compound is bad,</li> <li>- Nearby abandoned construction site full of water is a hazard especially at night,</li> <li>- Noise pollution from construction close or within the campus compound as well as loud music from hostels is a bother,</li> <li>- Planting of trees around the university is a good step- led by the university student environmental clubs,</li> <li>- Poor waste water disposal due to poor condition of toilet, overflowing sewages as a result of blockage in sewage is bad for public health,</li> <li>- Road construction-noise pollution is a big problem in campuses,</li> <li>- Some laws may lead to environmental degradation e.g. laws protecting industrialization; this should be looked into.</li> <li>- Some policies have enabled us to achieve greater level of cleanliness at the university, research has enabled the university to come up with better ways of protecting environment,</li> <li>- The sinks have leakages and in some place's wastage of water due to unclosed taps,</li> <li>- There is disposal of sewerage running almost all over the waters this expose health hazards to individuals &amp; disease i.e. cholera,</li> <li>- Lights in libraries and lecture hall are always on even during the day, this can be improved as it leads to energy wastage,</li> <li>- Use of paper leads to deforestation. Printing of assignment leads to more trees being cut.</li> </ul>