

**ADDIS ABABA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**



**STUDENTS' AWARENESS AND ATTITUDE TOWARDS LAND  
DEGRADATION AND DEFORESTATION  
(IN THE CASE OF ADDIS ABABA UNIVERSITY)**

**BY**  
**BELAYNESH KEBEDE**

**JUNE 2010**  
**ADDIS ABABA**

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**ADDIS ABABA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**  
**DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL**  
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## Declarations

I, the undersigned, declare that this is my work and that all the sources of material used for this thesis have been duly acknowledged.

Name of student	Signature
Name of Advisor	Signature

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## **Abbreviations**

Acc. and F: Accounting and Finance

ANOVA: Analysis of variance

EA: Environmental Attitude  
ECA: Economic Commission of Africa  
EE: Environmental Education  
EPA: Environmental Protective Authority  
FDRE: Federal Democratic Republic of Ethiopia  
GES: Geography and Environmental Studies  
IER: Institution of Educational Research  
LDCS: Least Developing Countries  
PADM: Public administration and Development Management  
PSIR: Political Science and International Relation  
SOSA: Sociology and Social Anthropology  
UN: United Nations  
UNCCD: United Nations Conservation to Combat Desertification  
UNEP: United Nations Environmental Programme  
UNESCO: United Nations Educational, Scientific, and Cultural Organization  
UNFPA: United Nations Population Fund  
UNV: The United Nation University

## **Abstract**

*The purpose of this study was to investigate university students' awareness and attitude towards rural environmental degradation. To achieve the objectives of the study 289 students were selected through stratified sampling from three faculties in Addis Ababa University. Students were assessed using multiple choice awareness test and Likert type of attitude scale. The data were analyzed using descriptive statistic; t-test, Pearson correlation coefficient and ANOVA. All statistical manipulations were done by SPSS 15 version for windows.*

*The result of the study revealed that generally the students found to have moderate level of awareness and favorable attitude towards land and forest resources. In the case of item by item analysis students found to have less*

awareness for some of the environmental issues raised in the study. Students also have unclear stand for some of the issues raised in the attitude items.

The study also revealed that there was statistically significant difference in mean awareness score of students in terms of gender and age. It shows that male and relatively old age students found to have better awareness about the problem, causes, consequences and solution of land degradation and deforestation. In addition, statistically significant mean awareness difference was observed between students from urban and rural areas. This indicated that students from rural areas had better awareness to land and forest resources. On the other hand, the mean awareness score difference between second and fourth year students was significant. That fourth year students found to have better awareness for land and forest resources. The ANOVA summary for awareness also showed the existence of significant mean difference among faculties and departments. Thus the sampled students in Social Science College and departments of PSIR and GES found to have better awareness to land and forest resources.

Moreover, the analysis of attitude based on the independent variables shows the absence of significant difference between male and female, second year and fourth year students' mean score. It was also insignificant between urban and rural, and age of students. Thus, male and female, second year and fourth year, relatively old and young, rural and urban students found to have similar attitude towards land degradation and deforestation. The ANOVA summary for attitude also did show the existence of significant mean difference among faculties and departments'. Thus, the sampled students in Social Science College and departments of PSIR and GES found to have more favorable attitude to land and forest resources. The correlation coefficient also revealed that there was a significant positive correlation between environmental attitude and awareness, but it is weak. This implies that to some extent awareness may lead to an initial development of attitude which in turn may result in increasing awareness. Generally integration of environmental education is a must to bring similar and high level of awareness and favorable attitude among students.

# CHAPTER ONE

## Introduction

### ***1.1 Background of the Study***

In the world of increasing population coupled with the increase in human activities which is carried out using modern technology, resources, and energy for development result in environmental quality deterioration. Especially now at global level degradation of natural resources and environment has been a serious threats to the survival of human being. This has happened due to accelerated rate of deforestation with rapid industrialization and urbanization, intensive agriculture, over exploitation, overgrazing, mining and other human activities which result in the degradation of land and other natural resources (Jahi *etal.*, 2009).

However environmental degradation for some places may not be a problem for others. In developed part of the world the major environmental degradation are pollution, toxic and other wastes, and loss of biodiversity which are caused by rapid urbanization and industrialization. Despite these problems are recently become an increasing problems in the industrializing part of developing countries, environmental degradation for developing countries strongly related with the degradation of rural environment where most of the population and rural poor involves in agricultural economic activity (Adams, 2001).

According to Strong (1992), in developing countries, environmental degradation means the deterioration of natural resources in quality and quantity. Mostly, the depletion of renewable resources of energy, land degradation, destruction of forests and degradation of soil are the major environmental degradation problems. Almost in all parts of these countries result in serious and accelerating rate of deterioration of the carrying capacity of the principal resource and ecological systems on which human survival and development depend on. Not only this, in this part of the world environmental deterioration is seriously threatening the majority of rural poor who are dependent on the

natural resources (such as land, water, forests) for survival and which makes them the most exposed people to the consequence of environmental disaster and pollution ( EU,2005). Especially, the vast scale of exhaustion and degradation of environment as a result of over exploitation or misuse of the natural environment is an even more serious problem in developing countries. Africa, as one of the continent in developing part of the world also, suffers from diverse environmental problems which hinder it from making any change in economic development. The environmental problems of the continent include deforestation, degradation and fragmentation of land, desertification, loss of soil fertility, dramatic decline and loss of biodiversity, and water pollution. For more than 30 years the environment of Africa has continued to deteriorate causing a death of thousands of people due to starvation which is brought by environmental degradation. Million more people are also encountered with impending environmental disaster due to the fact that water source have run dry, land has become severely denuded it cannot provide food for rearing of livestock, and the soil is so poor it can not provide nutrient for crop cultivation(*Conserve Africa Foundation, 2009*).

Ethiopia is currently facing serious challenges of environmental degradation evidenced in the form of land degradation, deforestation and degradation of water resources being as one of the African countries which is striving for development (Demel, 2001). As stated by EPA (2003), the extent of environmental degradation is especially severe in Ethiopia and the country is grieving from excessive land degradation which is manifested in loss of vegetation cover, loss of biodiversity; depletion of soil fertility, massive soil erosion and disruption of water system from water bodies. Particularly land degradation is one of the most sever environmental challenge of the country. The problems have been highly pronounced in the highlands of Ethiopia where land degradation due to destruction of forest and soil erosion reached to its chronic stages which is evidenced by drought and famine that have taken the lives of hundred of thousands and highly affected millions of people (Terrefe,2002;FDRE,2006).

In addition, in the country forest destruction stripped out the resilience capacities of forests for the last several decades. Thus, forests are mostly found far from settlements in the western and south-western part. This destruction of forest has a direct impact on rural population livelihoods and agricultural production through change in microclimate, shortage of fuel and construction wood, and removal of top soil (Tadele, 2008).

These environmental problems are directly or indirectly responsible for the challenges that Ethiopia is facing every day to feed its own population. Beside it held back the over all development of the country in many ways. Causing recurrent droughts, associated food insecurity and the degradation of the natural resource base which result in declining agricultural production and living standard of the rural community with threatening their survival are partly the result of long term environmental problems (Wood, 1990; Hailu, 2007).

Today the problems of environmental degradation become worst than ever before posing serious threat on the sustainable existence of life on the surface of the earth. This result in rising environmental concerns among people for the last few years, especially, now environmental degradation becomes matter of concern for many people and most of them have an immediate and intuitive sense of urgent need to built sustainable future (Wright, 1993).

This urgent need for finding a solution to the pressing environmental problems leads to the recognition of the importance of education as one of the solution to the problem in the world. Because education is very important in shaping the ethical values and consciousness within the human self towards their surroundings, as education includes knowledge and awareness of individual towards the significance of environment. Thus the awareness towards the protection and conservation should be developed with in each human self, so that they can prevent themselves from ruin the chain of ecology. Besides, people will make an effort to protect and conserve this nature once they realize their responsibility towards their environment. Within the perspective of

students, their awareness about the importance of environment enables them to protect this earth from the entire degradation (Hassan *etal.*, 2009).

Not only this, the management of environment can only possible through having a right type of attitude and awareness towards such issues and related matter. Accordingly development of such awareness and attitude can be possible through environmental education. Because education is a very important social instrument and means that serves as a catalyst in changing all aspects of life. Mostly education provides knowledge, awareness, skills, attitude and values that are helpful to have a quality of life (Larijani and Yeshodarak, 2008:195). This is supported by Suneetha, (2007: 1)

*Environmental education seeks to make pupils fully aware of the problems connected with the environment and motivate them to tackle those problems with a sense of responsibility and with technical skills that will enable them to contribute to the solution for those problems.*

It is in light of this, the general objective of Ethiopian educational and training policy (1994:7) states the necessity of “Bring up citizens who can take care of and utilize resources wisely.” One of the specific objectives to elaborate it is necessity “to provide education that can produce citizens who possess national and international outlook on the environment, protect natural resources and historical heritages of the country ” (TGE,1994:11) In addition to this the present government designed a policy on environmental education and awareness to create a society that has knowledge, attitude, skill, motivation and commitment to enable them to work individually and collectively towards the solution of the current and future environmental problems. In this case one of the policy issues shows the initiation to inclusion of EE in the formal education that “to promote the teaching of environmental education on a multi disciplinary basis and to integrate into the ongoing curricula of schools and colleges and not treat it as a separate or additional subject, though this should also be done at tertiary level” (EPA, 1997). These shows that the country is

determined to have citizens that have the right knowledge, awareness, attitude, skill and behavior towards the environment. In addition this policy issues shows that integration of EE is a must not only at schools and colleges but also at the tertiary level.

Here, the researcher is convinced that, it is important to study students' awareness and attitude towards environmental degradation in higher educational institution in Ethiopia, particularly in Addis Ababa University. Because there are only few studies conducted on students' awareness and attitude about environmental degradation specifically on university students in the country.

### ***1.2. Statement of Problem***

Logically the then university students are tomorrow's leaders and decision makers in every development sector. Thus it is reasonable that behavioral change towards the environment will not be difficult and more effective if students are environmentally well informed, aware, initiated and had attitudinal change (Oweini and Hour, 2006). Beside, it is often ascertain that one barrier for the environmental attitude change is insufficient information about a certain aspect of life, and that the strategy of choice to effect a change of attitude is exposure to new information (Wade et al, 1994 cited Oweini and Hour, 2006).

Especially it is essential for students to develop literacy and understanding about the relationship of sustainability and human-environmental relations. Because the success of determining the issues and concerns governing the environment depends on how well students understand and view the environment and its complex processes. Students need not only be aware but more so, they need to comprehend their environment so that, in the future, they can become better stewards. Especially students' attitudes and perceptions toward the environment could significantly influence sustainability of life in the future (Glenn, 2008).

Thus, to achieve in tackling the environmental problems in Ethiopia, developing the right attitude, knowledge and awareness at every level of education needs a study and analysis of students' awareness, knowledge, attitude, behavior and intention about the environment. However, there are few studies conducted on students' awareness and attitude about environmental degradation specifically on university students. So, the researcher is interested in conducting a study on students' awareness and attitude about environmental degradation in higher educational institution in Ethiopia, particularly in Addis Ababa University. It is understandable that there are numerous environmental degradation in Ethiopia. However the research is based on environmental degradation in rural Ethiopia focusing only on land degradation and deforestation.

### ***1.3 Objective of the Study***

#### **1.3.1 General Objective**

The general objective of the study is to assess students' awareness and attitude about rural environmental degradation.

#### **1.3.2 Specific Objectives**

The specific objectives are to:

1. Examine the level of students' awareness and attitude about land degradation and deforestation.
2. Compare the similarities and difference in students' awareness and attitude about land degradation and deforestation based on: gender, age, year level, academic stream and growing up areas.
3. Examine the relationship between students' environmental awareness and attitude.
4. Identify the source of students' environmental information.

### ***1.4 Research Question***

To achieve the intended general and specific objectives of this study the following basic research questions are raised.

1. What are the level of students' awareness and attitude about land degradation and deforestation?
2. Are there differences in students' awareness and attitude towards land degradation and deforestation according to: A. Gender, B. Age, C. year level, D. Academic stream, and E. Urban rural residential base?
3. What type of relation exists among students' environmental awareness, and attitude?
4. What are the main sources of students' environmental information?

### ***1.5. Significance of the Study***

Ethiopia is one of the countries of Sub-Saharan Africa which is affected by serious environmental degradation. Therefore, to have successful conservation and rehabilitation of the environment, there is a need of having the right type of awareness and attitude about the environment by the citizens. Thus, this study provides information about students' awareness and attitude about rural environmental degradation for curriculum designers whether environmental education should be incorporated in the curriculum of university education in the country or not. In addition it gives information that may initiate other researchers to investigate deeply on the problem.

### ***1.6 Delimitation of the Study***

The study focuses on the awareness and attitude towards environmental degradation in some selected faculty students in Addis Ababa University. In addition, the study includes only second and fourth year students of the selected departments.

### ***1.7 Limitation of the study***

Shortage reference materials in relation to environmental awareness and attitude in Ethiopian context were one of the major constraints in this study.

### ***1.8 Operational Definition***

**Environmental awareness:** is concern towards environment or environmental problems. In other word it is defined as “an idea holding a general impression or consciousness about something with out having to know much about it.”(Roberta, 2009)

**Environmental attitude:** “a learned predisposition to respond consistently favorable or unfavorable manner with respect to the environment” (Uitto, 2004).

**Environmental degradation:** is the decline of land productivity and forest cover due to human and environmental factor.

**Second year Students:** are students who had finish pre-college and join the university in the academic year 2009/2010.

**Fourth year students:** are students who are going to finish university education in the academic year 2009/2010.

**Favorable Attitude:** is students’ approval for positive environmental opinion and disapproval for negative.

**Unfavorable Attitude:** is students’ disapproval for positive environmental opinion and approval for negative environmental issue.

## CHAPTER TWO

### 2. Conceptual Framework and Review Literatures

#### 2.1 Conceptual Framework of Environmental Concern and Education

##### 2.1.1 Environmental concern

Environmental concern defined as “the degree to which people are aware of the problems regarding the environment and support efforts to solve them and indicate the willingness to contribute personally to their solution” (Dunlap and Jone 2002). In addition, it is also defined as, “attitude towards a general or specific environmental issues” (Frannsson and Garling, 1999). Moreover, environmental concern is elaborated as “the affect or the emotion associated with belief about the environment” (Schltz, *etal.*, 2004 cited in Jannsson, 2009). These definitions explain that environmental concern includes awareness, attitude, willingness and behavior to wards the environment. However the concern for the environment affected by the values people is giving to the environment. This means “awareness of the consequences of environmental problems and as to how these consequences valued for self, other people and for all living things determine the willingness to carry out environmentally friendly behavior” (Jannsson, 2009). Based on this people’s environmental concern has classified as follows:

**Egoistic environmental concern:** is a concern by a person for the environment because of the fear that problems of environmental damage can have an effect on his or her personal life for example own health.

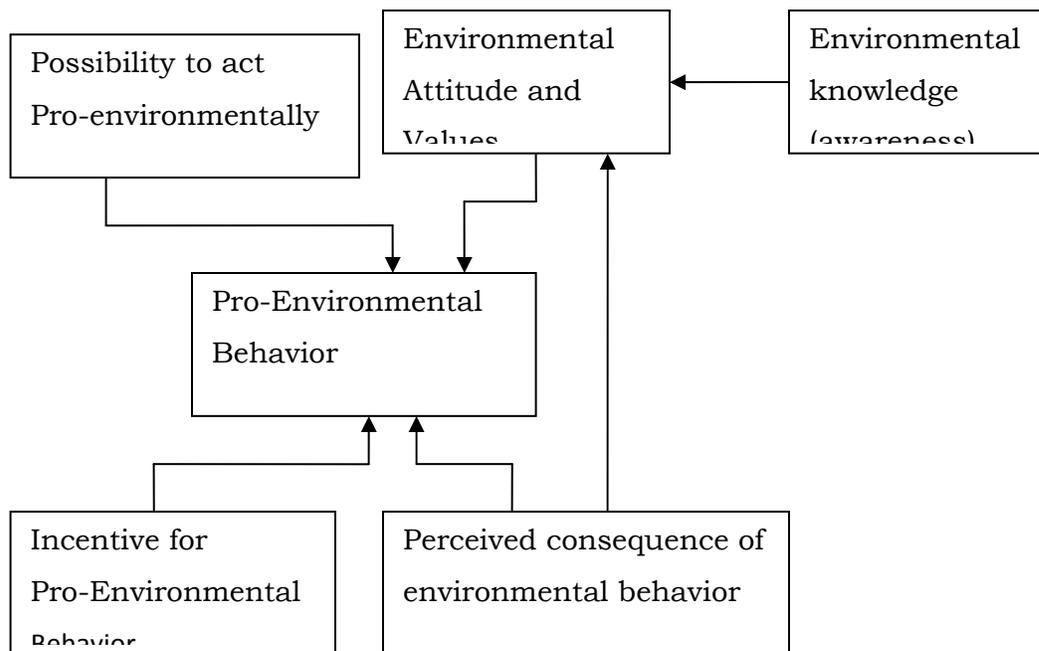
**Social – altruistic environmental concern:** is a concern by people for environmental problems because the problems can be harmful to the whole society.

**Biospheric environmental concern:** is a concern of people for environment based on the concern to all living things (Jannsson, 2009). Every one has all three orientations with different strength. According to, Stern *etal.* (1993 cited in Kollmuss and Agyeman, 2002) environmental concern caused by the combination of these three factors:

Environmental concern= Egoistic concern + social concern + Biospheric concern

Even though, people are concerned for the environment based on their own value of it, an increasing concern about environmental protection and management is important to speedup the motivation of people to pay attention about their influence on the environment and sustainable existence of life .And to acquire more rational and imaginative management which become fundamental to more sensitive attitude (Tylor, 1993). Because more concern about the environment would promote more positive attitude (Arcury, 1990). Not only this according to Sánta (2007), “A high level of environmental concern is likely to be an important prerequisite for long- lasting pro-environmental behavior, and thus long- lasting decrease in environmental impact.”

The model shown in Fig. 2.1 was adopted and taken into consideration of awareness and attitude as a prerequisite for long-lasting pro-environmental behavior in this study.



**Figure 2.1 Model of ecological behavior adopted from (Fietkau & Kessel, 1981 cited in Kollmuss and Agyeman, 2002).**

**Possibilities to act ecologically:** These are external, infrastructural and economic factors that enable or hinder people to act ecologically

**Behavioral incentive:** These are more internal factors that can reinforce and support ecological behavior (e.g. social desirability, quality of life, monetary savings).

**Perceived feedback about ecological behavior:** A person has to receive a positive reinforcement to continue a certain ecological behavior. This feedback can be intrinsic (e.g. satisfaction of ‘doing the right thing’), or extrinsic (e.g. social: not littering or recycling are socially desirable actions; and economic: receiving money for collected bottles).

**Knowledge:** does not directly influence behavior but acts as a moderator of attitudes and values (Kollmuss and Agyeman, 2002:246).

Thus, increasing environmental concern is important in order to have citizens, who are active, knowledgeable, caring and well informed decision makers who are able to make the right choices regarding the complex and interconnected economic, social and environmental issues which are faced by human being to

bring sustainable development. In this case education has huge potential that it can increase people's concern about the unsustainable influence of economic, social and environmental practices and also increases people's ability to fight and adopt and overcome changes. This means that education is not only information giver to people but also, it can change them (UNESCO, 2002).

Not only this according to Gathoni and Belinda , (2009:1)

*Education is a key process in development. In terms of increasing environmental awareness, it is a dynamic process aimed at improving our knowledge and understanding of the environment. This in turn-should arouse our concern regarding the state of the environment which translates itself in to commitment to do something for the environment. The actions involve the acquisition of the desired attitudes and behavior in relation to the environment. The main goal is to make people aware of the process and consequences of their activities on the environment. There is increasing awareness that human activities alter and are already altering the global environmental system. At the same time, people possess the technical means to halt the damage, to conserve and even to enhance natural systems.*

Further more in Agenda 21 issued by UN, education is taken as crucial instrument for the progress of sustainable development and building and improving the capacity of the people in the world to address environmental and developmental issues. While basic education provides support for any environmental and developmental education, environmental education needs to be included as an important part of teaching and learning. Education be it formal or non formal has irreplaceable role in changing attitudes of people so that, they can have a capacity to identify and address the main concern of sustainable development. It is also essential to have environmental and ethical awareness, values and attitudes, skills and behavior consistent with

sustainable development and for effective public active participation in decision making (UN, 2004).

According to UNESCO (1980) education has a major contribution to make the vital task of improving the management of the earth. It can awake all part of the society towards the most sever environmental problems which human kind facing now. Not only this, it can provide various concepts and methods for consideration of the problems and can draw attention and values to the situation. Above all education can provide information, awareness, skill and courage to resolve the existing environmental problems.

Especially, Education which aims at creating and developing awareness among people about the economic, political, social ,cultural and environmental forces that can foster or impede sustainable development and initiate for appropriate action. It also develops people's awareness, competence, attitudes and value that give them ability to be more effectively involved in sustainable development at local, national and international level, and support them to work towards to more equitable and sustainable future is important (Bidyahar Sa, 2006).

At this point environmental education plays a key and strategic role in rising people's awareness and encouraging the protective attitude towards environmental problems .The aim of environmental education is to increase environmental awareness among human population and giving a chance to develop knowledge, value, attitude and skills needed to protect the environment (Onder, 2006).

### **2.1.2 Environmental Education**

Environmental education has a various definitions that are given by different people in a number of ways. For the first time EE defined as “is aimed at producing a citizenry that is knowledgeable concerning biophysical environment and its associated problems, aware of how to help to solve these problems, and motivated to work to wards their solution” (Stapp., 1969:34).

The other definition given by the International Union for the Conservation of Nature (IUCN) 1970 for EE is:

*Environmental Education (EE) is the process of recognizing values and clarifying concepts to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surrounding. EE also entails practice in decision making and self-formulation of a code of behavior about issues concerning environmental quality.*

With the understanding of the definition given by IUCN's in the Belgrade Charter, 1975 EE was defined as "a learning process that increase people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenge, and foster attitude, motivations and commitments to make informed decisions and take responsible action" (UNESCO, 1976 cited Hailu, 2007).

#### **2.1.2.1 Objectives of Environmental Education**

The goals of environmental education are to develop a world population that is aware of and concerned about the total environment and its associated problems, and develop a sense of responsibility and commitment to work individually and collectively towards a solution for current problems and the prevention of new ones. Specifically the major objectives of environmental educations are the following:

**Awareness** To help social groups and individuals acquire an awareness and sensitivity to the total environment and issues, questions and problems related to environment and development.

**Knowledge** To help individuals, groups and societies gain a variety of experience in, and acquire a basic understanding of what is required to create and maintain a sustainable environment.

**Attitudes** To help individuals, groups and societies acquire a set of values and feelings of concern for the environment, and motivation for actively participating in environmental improvement and protection.

**Skills** To help individuals, groups and societies acquire the skills for identifying, anticipating, preventing and solving environmental problems.

**Participation** To provide individuals, groups and societies with an opportunity and the motivation to be actively involved at all level in working toward creating a sustainable environment (Lasso, 2004:11).

These objectives of environmental education, in particular, can be subdivided in to three domains which are cognitive, affective and psychomotor.

**1. Cognitive Domain:** includes the objectives EE that deals with specifications of recall and recognition of knowledge or intellectual skills. The aims of environmental education in this domain are to acquire knowledge of the immediate and surrounding environment, to understand the biotic and abiotic environment, to understand the interdependence of life at different levels, to understand the effect of overwhelming population on resource utilization, to suggest remedial measures, to develop observational skills for the identification of environmental disequilibrium.

**2. Affective domain:** The objectives of affective domain relates to creation of interest, formation of attitudes, fostering values, development of appreciation and making behavioral adjustments. The specific objectives of this domain are to acquire interest in the flora and fauna of the natural environment, to show interest in the people and problems of the community and society.

**3. Psychomotor domain:** The objectives of psychomotor domain are achieved through participation in various activities related to the environmental education, through field trips, excursions, practical oriented activities. The purpose in this domain is to stimulate the population to participate in

afforestation programmes, to participate in activities aimed at prevention of soil erosion, to participate in activities meant for conservation of natural resources. The chief objectives of environmental education are that individuals and social groups should acquire awareness in addition to knowledge, develop attitudes, skills and acquire the ability to participate in solving real problems with a practical basis. The perspective should be integrated, interdisciplinary and holistic in character (Vijayalakshmi S, 2003, cited in Abhishek, NG).

### **2.1.2.2 Approaches in Environmental Education**

In order to develop the three domains and to attain its goals in the population especially students' environmental education gives basic attention to environment by having three major approaches (content) that:

**Education about the Environment:** Provides understanding and basic knowledge how environmental system work, and the impact of human activities upon the environment. It also develops environmental investigation and thinking skill in students.

**Education for the Environment:** the approach aims at developing concern, responsibility, ethics, motivation and skills to participate in environmental improvement. It also promotes willingness and ability to make lifestyles choices compatible with the wise use of environmental resources.

**Education, in or from the environment:** it gives reality, relevance and practical experience to learning through direct contact with the environment. This approach also develops skills of students for data gathering and analysis and aesthetic appreciation towards the environment (Plamer, 1998).

In general the definitions, objectives and approach of environmental education show that "EE is potentially a powerful and cost-effective tool in environmental management" (Schneider, 1991:403). Thus EE is essential at all level of the society that for those who are making national decision and to the public at large. Because EE can produce awareness, knowledge and attitude which are important in the formulation of environmental policies at the national and

sectoral level and motivate the public to support these policies and to take measures to protect the environment (Schneider, 1991).

## **2.2. Review of Related Literature**

### **2.2.1 Environmental Awareness**

Environmental awareness defined as, “the state of being conscious of environment or environmental related issues.”(Willets, 1996 cited in Lasso 2004:13) Madsen, (1996 cited in Lasso, 2004:15) defined environmental awareness as:

*Awareness is the ultimate driving force that stimulates knowledge. The acknowledgement that an environmental problem existing entails being more cognizant of the facts about the state of the environment. This degree of environmental awareness involves a personal commitment to work to solve environmental problems.*

Further more Kollmuss and Agyeman, (2002:253) defined environmental awareness as “knowing of the impact of human behavior on the environment” Environmental awareness has both cognitive, knowledge based component and an affective perception based component.

One of the best means for preservation of natural environment is environmental awareness created among society mostly students as they are future decision makers, leaders, planners, policymakers and educator of environment and related issues. This is due to the fact that Students’ awareness towards the importance of environment enable them to conserve and protect the entire earth from pollution and environmental degradation (Haussan *etal.*, 2009) .It is also believed that environmental awareness is the key part for understanding and addressing the problems of environmental degradation in the contemporary society (Wald, 2007).

In addition awareness and knowledge play a very important role in shaping students role on the environment through out their live inside and out side the classroom (Lasso, 2004). Not only this human awareness and their measure to

protect environment are positive aspects of human contribution for environmental change. These can slow down, stop or reverse environmental degradation (UNV, 1995). Madsen (1996) cited in Lasso (2004:2) explained that “environmental awareness, knowledge, and commitment, are necessary to achieve environmental protection and restoration.”

Thus “education and awareness towards environmental protection and conservation require knowledge, understanding and change of attitude by each individual.” (Haussan *etal.*, 2009:52). However without these elements awareness by it self is not sufficient for environmental protection (Haussan *etal.*, 2009).

### **2.2.2 Environmental Attitude**

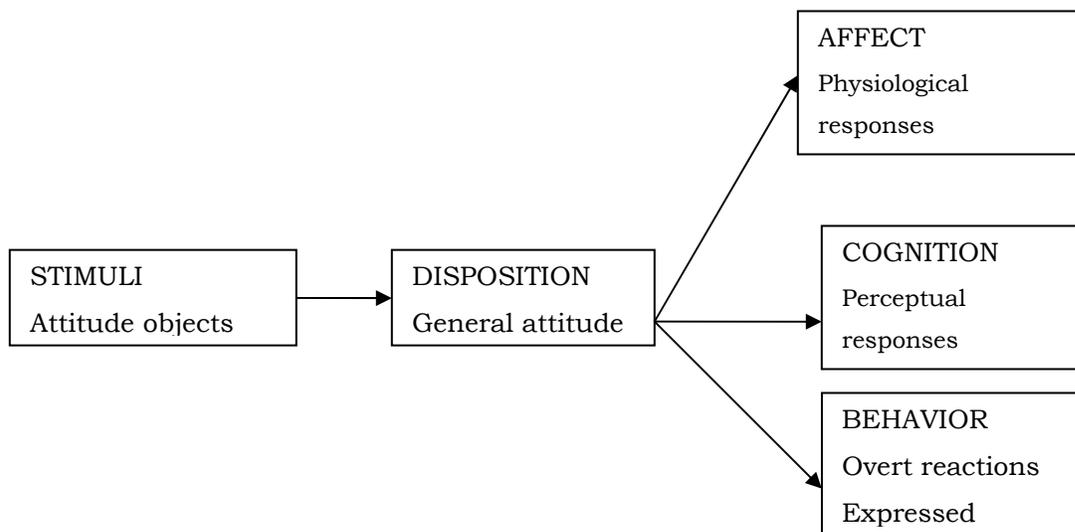
There are many attitude definitions and attitudes have been conceptualized in different ways by researchers. However, there appears to be a current general agreement that attitudes can be viewed as “an evaluative judgment summary of attribute dimensions (e.g, good-bad, likable-dislikable) of a particular psychological object” (Ajzen, 2001; Albarracin, *etal.*, 2005, cited in Milfont, 2009:237). Based on this approach Eagly *etal.* (1993:1 quoted in Milfont 2009:237) have defined attitude as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor.” It is also defined as, “learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object” (Fishbein *etal.*, 1975 cited in Uitto *etal.*, 2004:82).

Taking in to account of the above definition for attitude Milfont (2009:238) defined environmental attitude as “a psychological tendency that is expressed by evaluating perceptions of (or beliefs regarding) the natural environment, including factor affecting its quality, with some degree of favor or disfavor.” Environmental attitude also defined as “a learned predisposition to respond consistently favorable or unfavorable manner with respect to the environment.” In other way environmental attitude defined as “a learned belief which

developed from an individual's knowledge and values, about the environment and governs action to support or sustain environment.”(Uitto *et al.*, 2004:82-83)

### 2.2.2.1 Structure of attitude and environmental attitude

Concerning the structure of attitude and environmental attitude the most widely-held view has been the three component model. This model assume that attitude have cognitive, affective and behavioral components as shows in figure 2.2.



**Figure 2.2 Classification of responses that serve as indications to infer attitudes based on Rosenberg and Hovland's, (1960) tripartite theory cited in Byrka (2009:4)**

**Cognitive attitude**-: beliefs and thoughts about the attitude object

**Affective attitude** -: emotions or feelings about the attitude object leads to positive or negative evaluation of the attitude object

**Behavioral** -: refers to the predisposition to respond, which reflect beliefs and feeling according to Byrka, (2009:3)

Some studies also examined the structure of environmental attitude in based on the three attitude components, for example ecological scales has items measuring the cognitive (i.e. knowledge subscale), affective (i.e. affect subscale), and behavior (i.e verbal commitment and commitment subscale) components of attitude (Malonoy et al., 1973; Maloney *et al.*, 1975.cited in Milfont ,2009).

However, current theorists prefer new theoretical approach which conceptualize attitude as evaluative tendencies that can both be inferred from and have an influence on beliefs, affect, and behavior (Albarracín, Zanna *et al.*, 2005 cited in Milfont ,2009).In the case of environmental attitude the contemporary approach shows the multidimensional and hierarchical nature of environmental attitude.

This means (1) the perception or beliefs people have regarding the natural environment are relatively wide (large), but they can be studied in terms of dimension. Thus EA, have a multidimensional nature because these attitudes can be expressed in terms of several dimension. (2) One can investigate how these dimensions related to each other and how they can be grouped in to fewer dimensions. So, EA also have hierarchical nature because the dimensions that underlie these attitudes are grounded in fewer values. Not only this, according to Milfont (2009:240)

*The multidimensional and hierarchical nature of EA expresses their horizontal and vertical structures, respectively. The horizontal structure refers to the number of specific evaluating perceptions of or beliefs regarding the natural environment that underlie the overall EA, and the vertical structure refers to the hierarchical cognitive organization of the horizontal structure. In psychometric terms, the horizontal structure refers to the primary order or first-order factor(s) forming the structure of EA, while the vertical structure refers to the higher order or second-order factor(s)*

The research conducted by Milfont (2009:240-241) has revealed that the horizontal structure of EA is consist of at least twelve major magnitudes .These magnitudes are: (1) Enjoyment of Nature, (2) Support for Interventionist

Conservation Policies, (3) Environmental Movement Activism, (4) Conservation Motivated by Anthropocentric Concern, (5) Confidence in Science and Technology, (6) Environmental Fragility, (7) Altering Nature, (8) Personal Conservation Behavior, (9) Human Dominance Over Nature, (10) Human Utilization of Nature, (11) Ecocentric Concern, and (12) Support for Population Growth Policies.

#### **2.2.2.2 Function of environmental attitude**

Environmental attitude have three main function .It helps to (1) understand the world (object appraisal, utilitarian, and knowledge functions) and, (2) express our basic values (social -adjustment and value- expressive functions),and (3) enhance and maintain our self-esteem (externalization and ego-defensive function) (Milfont ,2009: 244)

In addition attitudinal change of world citizens in most cases is important requirement to change behavior. Even though people always do not act consistently with their beliefs and attitude, changing attitude can alter behavior (Nickerson, 2003 cited Arbuthnott, 2009).

Thus attitude and behavioral changes promoted by environmental education is important to solve environmental problems and avoid the occurrence of new environmental problems. So “promoting positive attitude to the environment is essential if pupils are to value it and understand their role in safeguarding it for the future” (Palmer, 1998:140\_141). Mostly, promoting attitude and personal quality development which are listed below as to Palmer have a very important contribution to people’s value and understanding in the protection of environment. These are: (Palmer, 1998:141-142)

- ◆"Appreciation of and care and concern for the environment and for other living things
- ◆ Independence of thought on environmental issues
- ◆ A respect for evidence and rational argument
- ◆ Tolerance and open-mindedness”

### **2.2.3 Research Findings on Environmental Awareness and Attitude**

According to Roberta's (2009) research result on the indication of environmental literacy: using a new survey instrument to measure awareness, knowledge and attitude of university aged students in Iowa state university shows that from the total of 2,793 respondents, 1,367 students (48.9%) have intermediate position to environmental issues which is explored in the study. While 1,097 students (39.3%) have over all a positive attitude to environmental issues raised in the study. Only 50 students (1.8%) have a negative attitude towards environmental issues. In case of knowledge survey 52.92% of students in this study have moderately high and high level of knowledge, 33.12% of students have moderate level of knowledge and 3.94% have low level of knowledge about the environment.

In Sultanate of Oman also a study was conducted on university students' attitude towards some environmental problems reveal that students hold high level of positive attitude particularly in the problems connected with water having a mean of 3.62 and (3.49) waste (Al\_ Rahaani and Al\_Mekhlaf, 2009). In other study on Turkish agricultural faculty students' behavior and attitudes towards environmental issues indicate that students have positive attitude towards the environment (Budak *etal.*, 2005).

A study report on environmental awareness of middle school and university students' in China also revealed that 91% of students have high environmental awareness about the concept of environment, 87% differentiate between environmental protection and public sanitation (Blasum, 1997). In a comparative study of environmental awareness between Iran and India secondary school students' found also that the number of Indian students with average level of environmental awareness (44%) is more than students in Iran (14.9%). Whereas the number of Iranian students with high level of environmental awareness (85%) is more than Indian student with high level of environmental awareness which account 56 %.( Shobeiri, *etal.*, 2007)

In Ethiopia some studies were carried out in relation to environmental awareness, knowledge and attitude on university students. For example a study on learners and academic staff environmental knowledge, attitude, intention and behavior was conducted as a case study in Adama University. The study findings reveal that both students and academic staff have high level of environmental knowledge. In contrast both groups found to have neutral attitude. In addition, both groups have an infrequent habit of environmental practice (Atlabachew, 2007).

Further more, a study conducted by Taye (2008) indicated that undergraduate students at Bihar Dar University have a moderately favorable environmental attitude (62.3%) followed by nearly moderate environmental knowledge (52.4%) but below average accounting 46.1% on environmental friendly practices.

## **2.2.4 Factors Influencing Environmental Awareness and Attitude**

### **2.2.4.1 Gender**

Budak *etal.*, (2005) research finding in Turkey for environmental attitude found out male students were reluctant to environmental issues than female students'. Other research finding by Roberta (2009) also identified a significant difference between male and female students in relation to environmental knowledge. Male students scored significantly higher than female students in the case of environmental knowledge. Moreover, in the study of Al\_ Rahaani, and Al\_Mekhlaf, (2009) female students had a high level of positive attitude to environmental issues than male. On the contrary a study finding by Shobeiri *etal.*, (2007) indicated that in total there is no significant difference between male and female students in their level of environmental awareness.

### **2.2.4.2 Age and Year Level**

As to Gifford *etal.*, (1982) with taking other variable constant, there are no relation ships between age and year level of students in the university with attitude and knowledge about the environment .This shows that students appear to have not such change or improvement in their knowledge and

attitude as they move from first year to fourth year of university. In contrary a study done by Roberta (2009) indicate that there is a significant difference between student year level and their level of environmental knowledge that senior students found to have highest mean of environmental knowledge followed by graduate students. The lowest mean of correct answer belongs to freshman students. This is also supported by Ziadat (2009) research finding which suggested environmental awareness increase together with year level among university student

Age also influences environmental knowledge when other factors are constant as to Gifford *etal.* (1982) older students found to be more knowledgeable than younger students about environment having greater knowledge score. This is supported by the research findings of Roberta (2009) students who are over 40 years of age scored the highest and youngest students whose age is between 17 to 20 year score the lowest for environmental knowledge.

#### **2.2.4.3 Academic Stream**

According to Gifford *etal.* (1982) students majoring in natural science have more environmental knowledge than those students whose major are social science or non science. The study finding by Al\_ Rahaani, and Al\_Mekhlaf (2009) indicated that students' attitudes towards environmental problems did not appear to be influenced by the university faculties they are studying .This is opposed by the finding of Roberta (2007)which revealed the existence of significant difference between students attitude and their respective college enrollment.

#### **2.2.4.4 Place of Residence**

As to the research finding of Budak *etal.*, (2005) there is no significant difference found between students' attitude score based on their urban and rural growing up areas. However significant difference found between students' behavior score and their growing up areas. The score of students' who grew in rural place was significantly higher than those grew in urban. However the

study findings of Roberta (2009) showed that there was a statistically significant difference in attitude score and the type environment the students spent the majority of their life.

### **2.2.5 The Role of Universities in Sustainable Development**

Since universities are giving education to young generation who are going to be leaders in different position with in the society and make decision, they have too much responsibility in training the young generation about the environment. Because the future decision of these students will affect the existence of human sustainability with protecting the environment (Onder, 2006).

Thus, Universities have a great role to play in the development of such education (EE) that involved in shaping, directing and facilitating education as well as research activities which give much attention to the development of preventive and remedial solutions to different forms of environmental and sustainability problems. In all universities without the consideration of departments and disciplines, all students should need to posses, knowledge, awareness, attitude, behavioral change and responsibilities, for the environment and sustainable development (Onder, 2006).

Furthermore, according to university of Alberta office of sustainability 2002-2009, universities have different responsibilities as institution of higher education in providing leadership with in the university and to the societies as role model and training and equipping the students that will become leader in the society with developing social, economic, and technological solutions to address environmental problems including climatic change through change in attitude, knowledge and awareness.

Based on, the above mentioned role of university or higher education for the development. There are some efforts which are made in Ethiopia in the integration of education for environmental awareness, knowledge and attitude at primary and secondary school level. However in higher education in Ethiopia, environmental education could not get a chance and power to pass

through the curricula which are strongly discipline oriented. In these institutions, prospective teachers ignored to design a course that can provide awareness, attitude and knowledge about the environmental dangers which are threatening the life of the people in world wide (Aklilu, 2006).

Not only these, the level of awareness about environmental problems like environmental degradation and particularly climate change is still very low among most Ethiopian. Graduate and undergraduate courses or programs including research in climate change are not yet included in the education system of relevant higher education and research institutions of the country except the post graduate program of IER and newly established department of geography and environmental education for undergraduate as well as graduate which are the leading in the beginning of environmental educational program in higher education in the country (Aklilu, 2006).

Further more, in Ethiopia, there are ample studies which focused on the various aspects of education but studies in relation to environmental education are poorly addressed. Even though there are a number of studies done in relation to environmental oriented studies from non pedagogical perspective it focuses on the quantification of the level, causes and solutions of various environmental degradation. However, there are very little attempts made to link educational aspect with the environment in Ethiopia with the exception of report of Aklilu (2002) which addressed the education's perspective on the Protection of natural vegetation, where the educational curriculum, the college environment and the school is not addressed (Daniel, 2009).

## **2.2.6 Environmental Degradation**

### ***Definition of Environmental Degradation***

Environmental degradation has been defined as a process of “deterioration of the environment through depletion of resources such as air, water, and, soil; the destruction of ecosystems and the extinction of wild life.” (Wikipedia Encyclopedia, 2009). In a similar way Panayotou, (1993:317) has been define

environmental degradation as, “the diminution of the environment in quantity and its deterioration in quality.

### **2.2.6.1 Environmental Degradation and Overview of the World**

Environmental degradation is not a recent phenomenon in the world rather it has been happening for centuries. In the present time the problem of environmental degradation get much emphasis due to its occurrence at alarming and much faster rate without leaving enough time for the environment to recover and regenerate naturally. Mostly the higher demand that burdened the earth’s environment by rapidly increasing human population put a great strain and drains on the earth’s limited natural resources. Environmental degradation became one of the major threats in the world to all living things, such as people, animals, and plants now a day (Wikipedia Encyclopedia, 2008). Not only these, in the world according to university of Alberta (2002-2009:2)

*Ever increasing environmental degradation and resource consumption have leaded to state of ecological over shoot, meaning that humanity is consuming resources faster than they can replace. Human population is placing unprecedented pressure on the planet’s lands, water, fisheries, and other natural resources.*

Now with the increasing extent of environmental deterioration which changes regional problems to global level that has brought serious devastating impacts on the original prerequisite of life on earth. These issues become not any more the only concern of industrialized nations but also the concern of developing countries. Environmental issues that related with water pollution due to dumping of solid and liquid waste, gaseous emission in to the atmosphere and seepage into potable water systems which result in epidemic as well as deforestation, land degradation in developing world together with excessive exploitation and consumption of natural resources are major causes that are destroying the livelihood for human being (Schneider, 1991).

However, environmental degradation in least developing countries mostly associated with the environmental problems that occur in rural part where most of the population engaged in agricultural economic activity and lives. Thus, the most chronic environmental degradation such as land degradation in the form of loss of vegetation and soil degradation exists in rural parts of LDCS. Loss of vegetation in these countries includes deforestation, over grazing and loss of biodiversity where as soil degradation consists of wind erosion, physical and chemical degradation types (UN, 1997).

Africa also faces most of the environmental problems common to least developing countries. Although the continent is richly endowed with resources, it faces serious environmental, food, energy, and, population and poverty related problems. The rapid growth of population in the continent has brought devastation of soil, water, vegetation and wildlife to the growing demand for food and energy. These result in fast deterioration of environmental quality and migration of people from rural part to urban areas, due to poverty, food insecurity and drought and desertification (Ezaza, 1991).

Nevertheless the threat to Africa's environment ignored until they began to affect agricultural production like the population explosion which later translates to food shortages except in Ethiopia where environmental degradation has been dramatic in the form of erosions and deforestation in the high lands with losses of soil and tree cover. However, one of the most serious long-term threats posed on the environment in sub-Saharan Africa is the pressure created by extraordinary rapid population growth rate (Mcnumarru, 1990: 13-14).

In general, Africa, as one of the least developing continent where the vast majority of countries highly depend on the natural resource as a base for economic development than any part of the world, face the same environmental degradation problems such as land degradation, deforestation, degraded water and air quality, and decline of marine resources which are the top priority environmental problems. Mostly environmental degradation become severe in sub-Saharan Africa where two-third of the population lives in the rural part

that create more dependency on natural resource for getting income and agricultural practices (Andrew, 2009).

### **2.2.6.2 Population Growth and Environmental Degradation**

The relationship between population, environmental degradation and management of natural resources tend to be regional and local rather than global in expression, even though there are some condition human activities in one area have contribution to the environmental problems of another area. Environmental degradation in relation to water, air and land is inevitable wherever human beings densely settled. Because rapid population growth has an impact on the decline of environmental quality and quantity through demand for further expansion of production, and introduction of new technique to prevent soil erosion as well as production decline (World Bank, 1994).

Mostly in a majority of developing countries, the main cause for environmental degradation is the rapidly growing number of poor people through urban expansion, deforestation, and cultivation of marginal land. In the present time due to rapid population growth much of rural Africa is facing environmental problems such as over grazing, depletion of water resources and loss of biodiversity. Not only this, the unsustainable pattern of consumption by the affluent group of people in both developed and developing countries is also another cause for environmental degradation at all level (UNFPA, 1994 and World Bank, 1994). Further more according to Kirdar, (1992:5)

*A rapidly growing population puts pressure on the natural resources of a country. The increasing demand for food and basic energy needs for cooking and heating result in the destruction of forests, degradation of soil, and depletion of water supplies. Most of the sub-Saharan African countries can be cited as prime examples of this phenomenon. These countries are deficient mostly in usable energy resources. The largest parts of their populations, until recently, were rural*

*people, mostly farming families, who, for numerous reasons, are now becoming migrants and urban poor.*

As a part of Sub Saharan Africa recently Ethiopia's population is increasing with the growth rate of 3.1% per year. If this rapid rate of population growth continues with out any measures taken the pressure on already stressed natural environment would lead to sever degradation with high effect on sustainability (Puefliong, 2008). Especially high population pressure in the highlands of the country has led to the practices of agriculture in marginal areas result in destruction of forest and wood land resource which is already declining in order to get land for agriculture (UNCCD, 1997). Moreover, high rate of population growth has caused unwise and unsustainable use of soil, and forest resources. Continuous increase demand of energy for home consumption has led to the use of crop residues and cow dung for fuel. These results in the breaking of the nutrient cycle in the soil (Puefliong, 2008).The effect of population on land resource more elaborated by Demel, (2001:66) as follow:

*The availability of land for agriculture is shrinking. At the same time, the amount of land required to feed the growing populations steadily increasing .With agricultural productivity increases lagging behind population growth rates, the gap between the availability and the demand for agricultural land continues to grow ,resulting in severe land use conflicts between crop farming ,animal grazing, and forestry. Natural high forests and plantation are encroached up on and cleared for cultivation or grazing by local residents.*

Generally rapid rate of population growth has different impact on resource degradation, mainly depending on the technological availability of the region. When the increasing population intermingled with mass poverty and few technological choices to increase productivity, degradation and poverty can spiral down wards (World Bank 2007).

### **2.2.6.3 Poverty and Environmental Degradation**

Poverty and environmental degradation have two way relationships. In one way, environmental degradation like deforestation, soil erosion, water and air pollution, and loss of biodiversity etc. have a declining impact on the potential production capacity of individual and society, resulting in different degree of poverty. For the individual the resulting poverty may be dramatic, while for millions of people, it becomes environmental refugees. To the whole society it seen as a decline in the potential of natural resources and as an increase in the cost to tackle environmental degradation (Tham, 1992: 26).

In the other way poverty is the cause of environmental degradation. Poverty together with other factors may foster unsustainable development due to the fact that poor are mostly directly dependent on the natural resources than the rich. Thus, they degrade the natural resources to get food, fuel woods and income as well as to survive since poor people do not have access to modern and, efficient technologies (Das Sharama, 2008;Tham, 1992).

However, the link between poverty and environmental degradation is not simple. There are other factors that contribute for poverty and environmental degradation to have a complex relationship. Because there are many examples of people who, live in extreme poverty according to traditional standard but who do not destroy their environment in which they live (Tham, 1992). Thus, “it is not only the poor who over use environmental resources but the rich as well” (Dobson, 1998 Cited in Baker, 2006: 40).

In the case of Ethiopia mass poverty and accelerating rate of environmental degradation and natural resource depletion have a relation in vicious circle. Especially in part of Ethiopia where people are forced to over use and exploit the environment because poverty forced them to do so and they also become poor because of environmental degradation. The relationship between poverty and environmental degradation become severe when it is linked with rapid population growth. Ethiopia has close to 3% population growth rate annually that leads to mass poverty because economic or natural resource development

is not going as the same rate as population growth. This in turn reinforces environmental damage and natural resource degradation (Daniel, 1990).

#### **2.2.6.4 Economic Activity and Environmental Degradation**

Agricultural activities fundamentally create pressure on the nature of soil for centuries. Positively farmers use manure or fertilizer to improve the nutrient level of the soil, and increase water availability in the soil through irrigation. However, agriculture causes soil degradation processes a lot through: clearing of natural vegetation, weeds, over grazing and removal of crop remnants (Coxhead and Oygard, 2008:2).

#### **2.2.7 Environmental Degradation in Ethiopia**

Environmental degradation in Ethiopia is replicated in the form land degradation and degradation of water resources as well as loss of biodiversity (Demel, 2001). Here the focus will be on land degradation and deforestation

##### **2.2.7.1 Land Degradation in Ethiopia**

Land degradation, defined as "a temporary or permanent decline in the productive capacity of land" (Paulo, 2001:36). In addition "Land degradation means reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated crop land, or range, pasture, forest and wood lands, resulting from land uses or from a process of combination of processes, including processes arising from human activities and habitation pattern, such as: (UN, 1996)

- Soil erosion caused by wind and water
- Deterioration of the physical, chemical and biological or
- Economical properties of soil and
- Long term loss of natural vegetation".

Further more, land degradation is a reduction of the quality and quantity of soil which is one of the basic inputs to an agricultural crop production has basic relation with land degradation (Coxhead and Oygard 2008).

Land degradation including desertification and deforestation occurs in world wide with its most severe negative implication on the rural communities. The problem is more diverse in Africa; where 43% of the land is affected by land degradation ranging from moderately to severely due to human activities and it threatens million of people by starvation. Annually \$42 billion income and 6 million hectare of land are lost globally due to land degradation and decline in agricultural production .The degradation is caused by soil erosion, loss of soil fertility and soil cover and chemical pollution. Furthermore, over cultivation, overgrazing, and deforestation are the underlying causes of land degradation in rural areas (UNDP, 2004).

Mostly, Land degradation which manifested in the form of soil erosion, soil nutrient depletion and soil moisture stress is a major challenge facing many East African countries. In the last several decades one of the most challenging issues Ethiopia as one of East African countries, has faced is the problem of environmental degradation. The problem has been highly pronounced in the highland parts of the country. However, there is still a belief that the high lands are not as such degraded, rather they have adequate fauna and flora, dependable soil and climatic condition which is suitable to gain high level of agricultural production. In the long run the highlands would become one of the most degraded areas in sub-Saharan African, if it is not in world wide (Constable, 1984, ONCCP, 1985, Rubenson, 1988, cited in Terrefe, 2002).

Moreover, Ethiopia is losing 1.5 to 2, billion tones of top soil annually which is equivalent to a monetary value of US \$1to2 billion per year by erosion. If this soil is conserved, it could have produced 1to1.5 million tons of grain that can be added to the country's harvest. Further more the country losses around, 4mm depth of soil as estimated per year exceeding the rate of soil formation in Africa which is more than 0.25 mm annually. If this loss of soil depth continued without taking any measures to conserve it, Ethiopia could losses almost all of its top soil with 100 to 150 years (Girma 2001).

Not only this according to EPA state of environmental report in (2003), in Ethiopia, in the lands which is not covered by vegetation and where there is no

soil conservation practice nearly 400 tons of fertile soil is lost per hectare annually. Such kind of land degradation has been resulted in the decline of agricultural yield and to a complete loss in the productive capacity of the land and death of people due to famine and starvation in the high lands of country where 95% of crop cultivation practiced. It has also serious effect on social and economic development of the country due to the fact that development activities totally rely on its land resources (Nurhussen, 2002).

Further more, as estimated the amount of soil the country losses as a result of water and wind erosion reaches 1.5 to 1.9 billion tones per year. Out of this total loss 45% of soil degradation occurs in cultivated land and 21% occurs on overgrazed rangeland (EPA, 2003).

Generally this severe land degradation is a direct outcome of unwise agricultural activities in the past. Especially soil erosion taken as one of the major of all environmental degradation processes that severely threaten the survival of life in Ethiopian high lands (Zealelem, 2007). In addition, there are various cause which result in land degradation in Ethiopia which are:-

### **Causes of land degradation**

In eastern Africa the cause of land degradation can be grouped in to proximate and underlying causes. The proximate causes are cultivation of steep slops, repeated cultivation of land, clearing of forests or wood lands, use of dung and crop residues, decline fallow period and limited application of organic fertilizers .These cause of land degradation are the indicator of inappropriate land management practices. The underlying cause of land degradation includes population pressure, poverty and high costs of fertilizers (B.Gebremedin, 2004). In Ethiopia both causes are the reason for land degradation

- Some of the proximate causes of land degradation in Ethiopia are:

#### **A. Wood land clearing**

In the rural area clearing of forest take place in order to have cultivable land for increasing rural population. This conversion of forestland to cropland accelerates soil erosion by wind and running water. The change in land use

can also change the hydrological run off by declining infiltration and increasing surface run off (Grima, 2001, Berry, 2003).

### **B. Use of dung and crop residues**

Loss of soil fertility also occurs when organic content of the soil is low due to wide spread uses of animal dung and crop residues for domestic fuel consumption than it is left on the land as manure for the soil. As fuel wood supply decline grows worse, rural communities have to collect fuel wood from very far distance and this result in substitution of fuel wood by animal dung and crop residues. Especially, in intensively cultivated rural areas and in the drought prone degraded areas of the North and the East animal dung almost has already replaced fuel wood as a main house hold energy source (Demel,2001).

The underlying causes of land degradation in Ethiopia are: (Berry, 2003:8-9).

- Natural cause like periodic drought and inaccessibility of rural area due to topographic constraint
- Growing of population and livestock
- Poverty
- Land tenure (land ownership)
- Low agricultural technology
- Lack of rural infrastructure and market
- Overgrazing of pasture lands
- Lack of awareness for the environment, etc.

### **Natural Conditions**

The physical environmental conditions of Ethiopia, which causes land degradation, include rainfall variability from year to year and place to place, particularly in the drier parts of the highlands. The sequence of drier years with reduced vegetation cover followed by wetter years with heavy rainfall is favorable to high levels of soil loss. Additionally, the physical landscape of the Ethiopian Highlands with gorges, steep slopes and other topographic barriers restricts the development of effective internal marketing systems in some areas.

### **Population Growth**

In Ethiopia high rate of population growth is inversely related with the pattern of agricultural production, which is still essentially small holder relying on expanding the farmland, often into marginal land, rather than adopting intensification techniques. There is also still a strong tendency to hold wealth as livestock, often cattle, further impacting grazing land.

### **Land Ownership**

Ethiopia has seen a number of changes in land ownership, which continue to provide uncertainty to the farmer and to rural communities. The traditional feudal system was followed by a communal form of government ownership and while policies now have changed, that land owners allowed to pass user right to legal heirs at the regional and local level.

### **Rural Markets**

An important part of moving to sustainable land management is the development of an appropriate rural infrastructure to encourage alternative livelihoods and to develop local and regional markets. This infrastructure is lacking in Ethiopia greatly restricting the flow of economic goods and agricultural production from areas of surplus to areas of deficit.

### **Backward Agricultural Technology**

As illustrated above most of agriculture in Ethiopia is still low technology and is inadequately equipped to deal with drought and famine. Fertilizers because of cost or availability factors are not in general use and traditional organic fertilizer is increasingly being used as fuel. A modest transformation in technology is likely to be an important component of successful sustainable agriculture (Berry, 2003).

### **Lack of awareness for the environment**

Lack of environmental awareness concerning the linkage between environment and development in general, weak participation of the people and community based organization in environmental management activities are some of the environmental challenges of Ethiopia face now days. In addition poor agricultural practices together with lack of awareness and consciousness contribute a lot to the degradation of natural resources such as destruction of forests, degradation of soil and water resources. (Girma, 2001)

### **The Cost of Land Degradation in Ethiopia**

The costs of land degradation in Ethiopia include:

#### **Direct Costs -**

- Costs of nutrients lost with top soil erosion (or the replacement costs of these nutrients)
- Lost production due to nutrient and soil loss
- Costs of forest removal
- Loss of livestock carrying capacity

#### **Indirect Costs –**

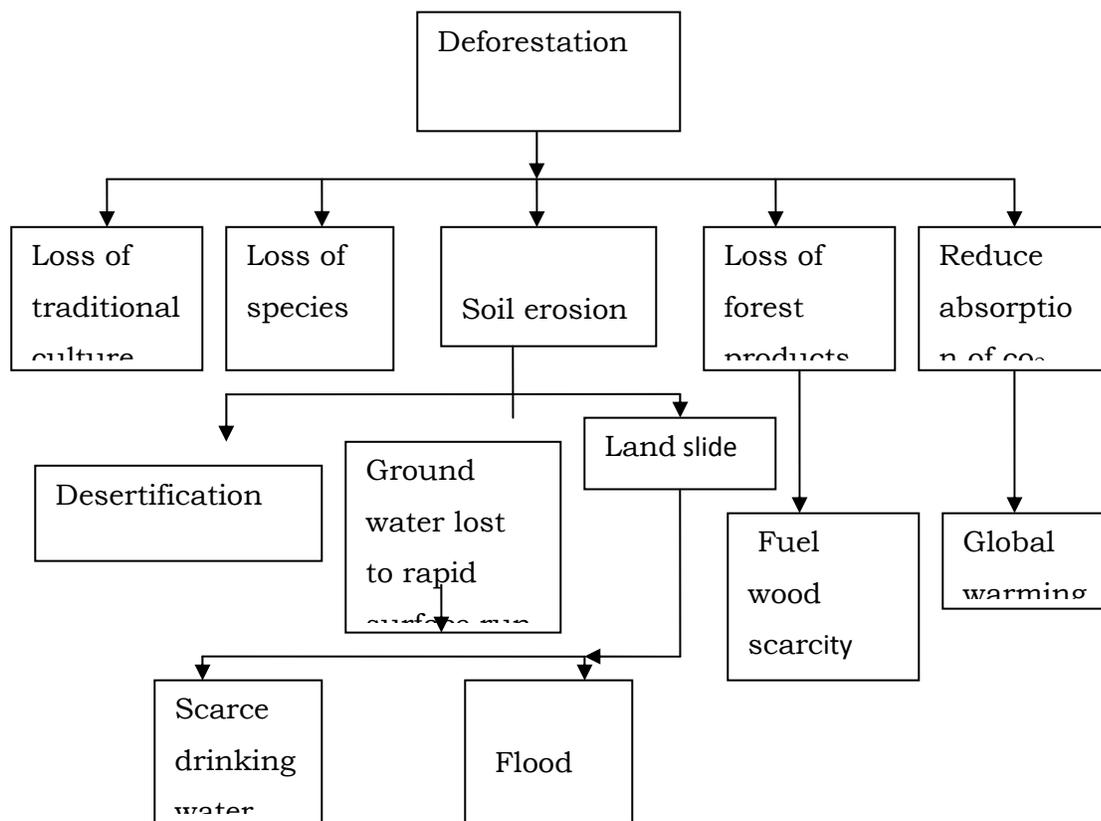
- Loss of environmental services
- Silting of dams and river beds
- Increasing irregularity of stream and rivers and reduced groundwater capacity

Not only this, land degradation have other indirect costs relate to social and community losses due to malnutrition, death, poverty and migration, while poverty is compounded by the lack of economic marketing structure. Some of these costs can and have been quantified, others are more difficult (Bojo and Cassells. 1995 cited in Berry, 2003:5).

### **2.2.7.2 Deforestation in Ethiopia**

Forests have significant value as a contributor for economic development and environmental protection of any country in the world especially if they are

naturally high forests. Forests support farmers, rural communities, urban dwellers and forest dwellers by providing important environmental services such as, absorbent of CO<sub>2</sub>, water shed, protection of wild life, employment and capital. Despite of these importances “the deliberate removal of trees through a combination of burning and cutting has formed one of the most long-standing impacts that human kind has made up on the landscape.” (Jone and Hollier, 2002:315). Now a days, in the world, there are unprecedented rate of deforestation and degradation of forests which became a major concern because it reduces biodiversity and increase the concentration of CO<sub>2</sub> in the atmosphere, which has a contribution to climatic change. In least developing counties loss of biodiversity considered as a serious problem because out of the seven “mega diversity” countries in the world two are found in these countries (UN, 1997: 74).



**Figure 2.3 Example of environmental degradation**

**Source: [WWW.reliefweb.int/library/meda/refman/chapt6.htm](http://WWW.reliefweb.int/library/meda/refman/chapt6.htm)**

Ethiopia as part the world also faces increase in high rate of deforestation through time due to many factors that contribute to the decline of forest resources. In the country in the year 2005, the total forest area in hectare accounts 13 million which is declined by 705,000 hectare from the year 2000 forest cover. This shows the country is losing 141,000 hectare of forests annually between the years 2000 to 2005 (Mongabay, 2006).

Now in Ethiopia the high forest cover estimates account to be nearly 2.7% and the annual loss of forest areas estimated between 160, 000 to 200, 000 hector. Because uncontrolled population growth that goes with overstocking has led to the encroachment of marginal areas such as steep slopes and unstable land to fulfill the need for food, fuel wood and grazing led to rapid deforestation and degradation of land. This has worsened food insecurity, water and fuel (Medin, 2002).According to Demel (2001:66)

*The massive removal of vegetation cover is the driving force behind land degradation. This loss is largely due to an expanding population, with its corresponding increased demand for crop, grazing land, and fuel wood. The removal of vegetation cover for the use as fodder, and fuel leads to an increasing surface runoff and, to high soil erosion. With the removal of top soil a reduction in soil depth), there is less root anchor age for plants .In addition, there is a loss of soil nutrient and a reduction in water holding capacity.*

Further more, based on the estimated wood consumption per capita in 1992 the total demand for wood and products accounted 47.5m<sup>3</sup> of which 45 million m<sup>3</sup> (94.7%) was fuel wood. Despite the actual consumption in this year was not known, it was assumed to have been between 13.8 and 47.5 million m<sup>3</sup> .with the consideration of population increase in the future demand for fuel wood is estimated to increase to 95 million m<sup>3</sup> in the year 2014 (EPA ,2003).

### **Cause of deforestation**

There are several causes for forest resource depletion, but the main causes are the following: (EPA, 2003, Demel, 2001)

- Rapidly increasing population and resulting demand increase for cultivable land, construction, fuel wood and input for industry.
- Occurrence of forest fire and new settlements
- Increasing of commercial farm lands in forest areas
- Lack of participation by the communities in forest protection and conservation with sharing benefits
- lack of awareness
- Poverty
- Poor economic growth.

### **2.2.8 General Consequence of Environmental Degradation**

Environmental degradation has an effect on every one who lives on the surface of the earth even though the degree is different. Because a degraded environment is an environment which is left with poor soil, Water, vegetation and also with poor physical and biological condition that is not suitable for innovation. The reduced biotic potential of the environment results in affecting the resilience and regeneration capacity of the ecosystem that results in extinction and decline of ecosystem population. In turn this has effect on human economic improvement and development there by resulting in extreme form of poverty (Zemedu and Endeshaw, 1996).

Furthermore, in a degraded environment life is related to poverty, misery, famine and death which are an inevitable end product of degradation. Not only this degraded environment unable to support life that exist with in it due to the sever damage which occurred on its component resulting in carrying capacity reduction (Zemedu and Endeshaw, 1996).

#### **2.2.8.1 Social Consequence of Environmental Degradation**

##### **A. Population Displacement**

Population displacement due to environmental degradation is not a recent phenomenon in the world. In the past people have had to leave their land due to land degradation as a result of natural disasters, war or over-exploitation

and when the land is unable to give production that sustain them. However, recently a large number of people move from their place as a result of resource depletion, the irreversible destruction of the environment, and population growth. The physical environment in present day is losing its carrying capacity in the way that makes human population exposed to environmental problem and stress. That deforestation, desertification, land degradation, global warming and other environmental threats occurred people become “Environmental refugees.” (Lonergrn, 1999).

### **B. Disrupted Institutions and Social Relations**

In developing society’s environmental degradation disrupt institutions and legitimized, accepted and authoritative social relation. For example as agricultural production decline the rural communities can be weakened due to the occurrence of malnutrition and disease, and also forces people to migrate; economic decline may also spoil confidence in the national purpose, by weakening the tax base and undermine financial, legal, and political institutions; and mass migrations of people in to a region may disrupt labor markets, shift class relations, and upset the traditional balance of economic and political authority between ethnic groups (Home-Dixon, 2003).

## **2.2.8.2 Economic Consequence of Environmental Degradation**

### **A. Declines in Agricultural Production**

Environmental degradation has a direct effect on agricultural productivity of farmers because it decline the main input for future agricultural production through soil erosion and depletion of soil nutrients. Estimates of the magnitude and productivity impact of land degradation is a debatable issue in the world, but in the ‘hotspot’ part of the world such as Ethiopian highlands the degradation may be high enough not to give production even though there is change in technical implementation of farming system (World Bank, 2007).

Thus environmental degradation for the rural communities mean reduction in the households’ production from agriculture or income obtained from the

environmental resources. Hence, environmental degradation directly affects food security. Through its effect on soil degradation or worsening climatic condition for the cultivators. Thus, “the distinction between food insecurity and environmental degradation is not clear-cut to poor rural people” (IDS, 2001). Especially there is a direct link between land degradation and rural livelihood through three pathways. Firstly decline in soil fertility as a result of land degradation decreases farm productivity and income. As crop and livestock production is the major source of household income in the highlands, decline in soil fertility, through nutrient depletion and poor soil water holding capacity affects the on-farm income significantly. Secondly decline in soil fertility affects productivity of labour; a degraded land requires much more labour per unit area than a well managed land. Operation related to soil and water conservation and soil fertility management may compete with off-farm labour thereby reduce an off-farm income of the household. Thirdly land degradation reduces the underground and above ground biodiversity of the system, which in turn, affects the bio-chemical process of the vegetation cover of the land (Demel, 2001).

## **CHAPTER THREE**

### **Research design and Methodology of the study**

#### ***3.1 Design of the Study***

This study examines level of students' awareness and attitude about environmental degradation among three faculties in Addis Ababa University. Thus, the study employed descriptive method to see the level, difference and similarities of students' environmental awareness, and attitude. In the study review of literature in relation to environmental degradation (land and forest) that exists in the rural part of Ethiopia was taken to develop instruments of data collection. Awareness test and Likert type of scale was prepared to collect data from the students about their environmental awareness and attitude. Then appropriate methodology was developed for the analysis and interpretation based on the data .Finally, findings was summarized and appropriate conclusions and recommendation was made based on the findings of research.

#### ***3.2 Data Sources***

The data sources for the study were obtained from primary and secondary sources. The primary data source was the information obtained through awareness test and Likert type of scale from students' enrolled in 2009/2010 in the three faculties based on the selected department .While the secondary data sources were books, journals, unpublished and published documents and internet web site.

### **3.3. Study Site and Target Population**

Addis Ababa University was selected as a place where to conduct this research due to its convenience in relation to time, money and work place for the researcher.

In the university, there are 17 faculties and colleges in the graduate and undergraduate level in different campuses. The campuses are located at different areas of Addis Ababa city except one is located in Debrezeit. Out of 17 faculties and colleges 14 offers under graduate programs and the rest are only at graduate level. Therefore, using random sampling method from the total 14 faculties and colleges only three were selected. These are College of Social Science, Faculty of Business and Economics and Science Faculty. Then the researcher purposefully selected second and fourth year students from College of Social Science, Faculty of Business and Economics, and Science Faculty in order to study students' awareness and attitude towards land degradation and deforestation. The study focus on second year and fourth year students based on the reason that second year students took different lesson in relation to environment in pre-college education and fourth year students specialize in specific field of study in the university.

Furthermore, simple random sampling was also made from the departments. From seven departments in Social Science College the researcher selected department of Geography and Environmental studies, Psychology, PSIR (Political Science and International Relation), Sociology and Social Anthropology.

In the case of Faculty of Business and Economics, departments of Economics, Accounting and Finance, Management and PADM (Public Administration and Development Management) were selected. Then from Science Faculty departments the researcher selected Biology, Chemistry and Earth Science randomly.

### **3.4 Sampling Technique**

According to the registrar office of each faculty and statistical office of Addis Ababa University, there was a total population of 2226 (second and fourth year students) in the eleven departments of the three faculties enrolled in the academic year 2009/2010. This total number was classified based on year level (second and fourth), gender, departments and faculty. There were 1466 (Male=987 and Female=479) second year and 760 (Male=531 and Female=229) fourth year students' respectively. From the total population a sample size of 289 students were selected using a sample size determination formula  $n = n_0 \frac{N}{n_0 + (N-1)}$  to make the sample size representative of the total population adopted from Geoff and Judy (2004). Thus:

$n$  = sample size of the study

$n_0$  = sample size based on the pilot study result (see appendix C)

$N$  = Total population

First  $n_0$  was calculated using the formula  $(z/e)^2 p (p-1)$  and the result is 332 (see the steps of the calculation in appendix C). Then using  $n_0$  and the total population ( $N$ ) the sampled size was determined as follows:

$$n = n_0 \frac{N}{n_0 + (N-1)}$$

$$n = 332 \times 2226 / 332 + (2226 - 1)$$

$$n = 289$$

Furthermore, using the proportion  $(289/2226) = 0.13$  stratified sampling method was employed to determine the sample size based on faculty, gender, year level and departments. This means that from the total sample size 92 ( $0.13 \times 708$ ) are female and 197 ( $0.13 \times 1518$ ) are male students, 191 ( $0.13 \times 1466$ ) are second and 98 ( $0.13 \times 708$ ) are fourth year students. (See table 3.1 for the sample size based on faculty and departments) .Then using random sampling method the questionnaires were distributed to the proportioned sampled students in the selected departments of the three faculties.

**Table: 3.1 Distribution of Sample of Students in the Study by Departments, gender and year level**

Faculty	Number of students					Number of sampled students				
	Second Year		Fourth Year		Total	Second Year		fourth Year		Total
	Male	Female	Male	Female		Male	Female	Male	Female	
<u>Social science</u>	335	135	127	80	677	44	18	16	10	88
GES	50	20	19	24	113	7	3	2	3	15
Psychology	45	13	12	14	84	6	2	1	2	11
PSIR	103	13	50	9	175	13	2	7	1	23
SOSA	137	89	46	33	305	18	11	6	4	39
<u>Science</u>	193	139	153	39	524	25	18	20	5	68
Biology	45	57	44	27	172	6	7	6	3	22
chemistry	49	45	53	6	152	6	6	7	1	20
Geology	99	37	56	6	197	13	5	7	1	26
<u>FBE</u>	459	205	251	110	1025	59	27	33	14	133
Economics	104	55	69	30	258	13	7	9	4	33
Management	103	77	67	36	283	13	10	9	5	37
ACC. and F	96	51	34	10	191	13	7	4	1	25
PADM	156	22	81	34	293	20	3	11	4	38
TOTAL	987	479	531	229	2226	128	63	69	29	289

**Source Registrar and statistical office of AAU**

GES=Geography and Environmental Studies

PSIR=Political Science and International Relation

SOSA=Sociology and Social Anthropology

Acc.and F=Accounting and Finance

PADM= Public administration and Development Management

FBE=Faculty of Business and Economics

**3.5 Instrument of Data Collection**

In the preparation of the instruments of data gathering to study students' awareness and attitude about environmental degradation (land degradation and deforestation) awareness test and Likert type of scale were developed and

adopted based on the review of literature in chapter two focusing on the problem, causes ,consequences and solution of land degradation and deforestation.

### **3.5.1. Piloting Instruments**

Data collection instruments were piloted to check whether they can generate the expected information and to consider their internal consistency. In this respect, the instruments were given to the advisor and professionals in the field to judge the content validity. Besides, the tests were distributed to 30 second year Geography and Biology students in Addis Ababa University. Moreover the analysis of the pilot data was made to examine the relevance of each item to answer the research question.

### **3.5.2. Awareness Test**

To investigate students' environmental awareness, first 32 multiple choose type of items were developed about the problem, cause, consequence and solution of land degradation and deforestation. After, the test was piloted on 30 second year geography and Biology students the items were refined to 23 by examining the relevance and reliability of each item to the research question. Then, the correct responses were assigned a score of one and incorrect responses as a score of zero. The lowest possible total score is zero and the highest total score is 23(23x 1). However testing and measuring awareness is not as such an easy task due to the subjective and judgmental means of measurement done by different researchers. This study also faces the same constraint. Thus in this research students who responded to less than 9 questions correctly were classified as having “low” level of awareness regarding land degradation and deforestation issues explored in the study; students who answered 9-14 questions correctly were considered to have “moderate” level of awareness where as students who answered correctly from 15-18 questions were placed to have relatively “moderately high” level of awareness; and students who answered 19 or more classified as having “high” level of such awareness.

### **3.5.3. Attitude Inventory**

To identify students' attitude towards environmental degradation Likert type of scale was adopted and modified from Dunlap and VanLiere, (1997) New Environmental paradigm scale (NPE) and Aklilu (2001) based on the research objectives. Likert type of scale was used due to the reason that direct self-report techniques, such as scales and inventories are the most widely used methods for measuring both attitudes and environmental behavior. The scale consists of 20 items that measure students' attitude towards the problem, cause, consequence and solution of rural environmental degradation. From the total items some of the items forwards favorable attitude and other items forwards unfavorable attitude. Then, responses were scored using five-point Likert scale from strongly agree to strongly disagree. In the scoring of favorable items, the alternatives were weighted going from strongly agree to strongly disagree, having 5, 4,3,2,1 values. On the other hand, unfavorable items were weighted by reversing the above value. Then sum of the highest score for responses of an individual accounts  $20 \times 5$  (100) and the lowest possible score  $20 \times 1$ (20) and the average score is  $20 \times 3$ (60). The highest score shows the most favorable attitudes and average score shows neutral attitude, whereas, the lowest score shows the most unfavorable attitude. A score of less than 60 shows unfavorable attitude and a score of greater than 60 shows favorable. However testing and measuring attitude is also not as such an easy task due to the subjective and judgmental means of measurement done by different researchers. This study also faces the same constraint. Thus judgmental means of measurement was used based on the particular situation of students' scores.

### **3.5.4 Reliability and Validity of the Instrument**

The first version of awareness test and Likert scale instruments were piloted on second year Geography and Biology students in Addis Ababa University. The awareness test and Likert scale were completed by 30 students .Then item

analysis was made to check the reliability of awareness test and attitude scale items using SPSS version 15. In the awareness test split half method was used as advised by Koul, (1998). Thus the reliability of awareness items found to be  $r = .77$  in both Guttman split half and Spearman Brown coefficient. In the case of attitude scale Cronbach Alpha was used to identify the reliability. Thus the reliability of the attitude scale items as calculated for the pilot study of 26 items found to be 0.76 that is reliable according to the standard set above 0.5 are adequate for research purpose (Monette,etal. 1990:375).

Instrument of data collection was also given to four geographers and environmental educator at Addis Ababa University to check the content validity of the awareness test and Likert scale which were prepared based on the review of literature. Comments were provided on the content of the instrument by these experts. Then all the comments were included by the researcher while improving the instrument.

### ***3.6 Administration of the instruments***

Regarding the administration of the instrument, first the researcher collected information about the students' class schedule and identified free periods after completing the regular class hour from each department's secretarial office for all departments under the study. Then in the first week of the administration with help of assistants the questionnaire was completed by the selected department sampled students in the Social Science College after the regular class hours. In the second week of the administration questionnaire was completed by the selected department sampled students in Science Faculty after the regular class hours with help of assistants and one coordinator from fourth year students. In the third week the instrument was administered on sampled students in Faculty of Business and Economics after the regular class hours with assistants. In all cases of the administration of the instrument brief orientation was given to the students about the purpose of the study. In general the questionnaires were filled out by the students in the presence of

researcher and assistant. During the completion of the questionnaire no time limit was fixed.

### ***3.7 Data Analysis***

In this research data analysis was made using descriptive statistics such as percentage, mean, standard deviation and frequency table. In addition inferential statistics like independent sample t-test, Pearson correlation coefficient and one-way ANOVA were used to see the difference in attitude and awareness was statistically significant.

### ***3.7 Variables***

In this study the dependent variables are environmental awareness and attitude. The independent variables are academic stream, gender, age, year level and growing up areas.

## CHAPTER FOUR

### Data Analysis, Presentation and Interpretation

In this chapter data analysis and interpretation in relation to profile of the sampled students and students' awareness and attitude for the general awareness and attitude items, for individual awareness and attitude items ,comparison using independent factors and the relationships of awareness and attitude towards land and forest resource issues was made based on the data. Then using the findings appropriate discussion was made

#### 4.1 Profile of the Sampled Students

##### 4.1.1 Faculty

**Table 4.1 Distributions of Respondents Based on Faculty and Residence**

Faculty	Growing up areas					
	Urban		Rural		Total	
	F	%	F	%	F	%
Social Science	44	15.2	44	15.2	88	30.4
Science	49	16.6	19	6.6	68	23.5
Business and Economics	72	24.9	61	21.1	33	46
Total	165	57.1	124	42.9	289	100

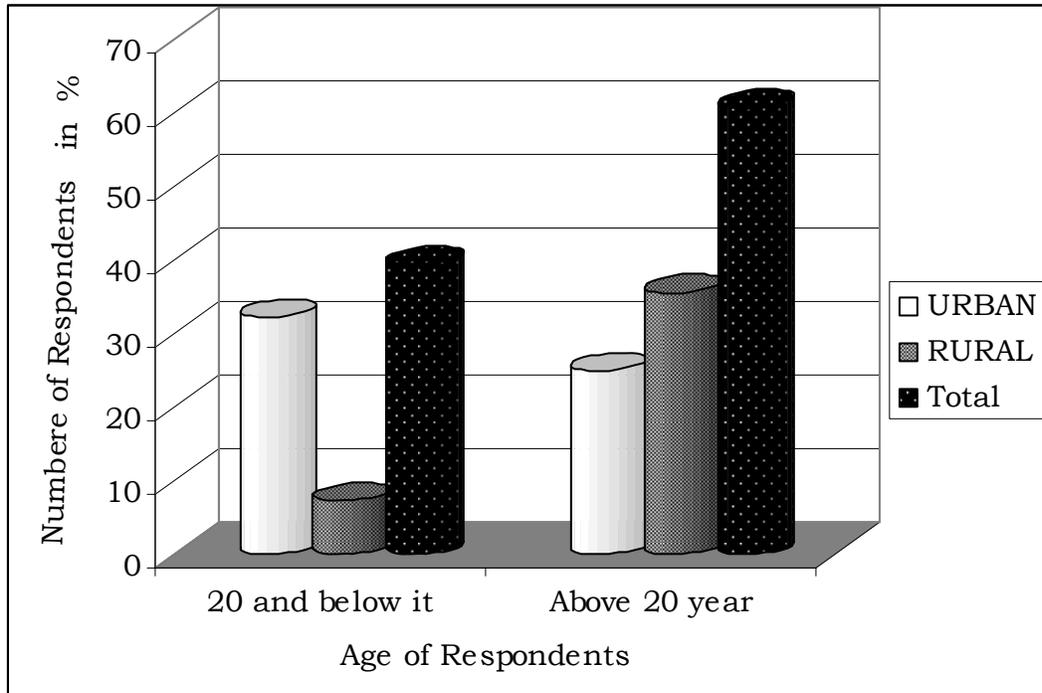
Source: Field survey, 2002E.C and Registrar office

F= Frequency

As can be seen from Table 4.1 out of the total 30.4%, 23.5% and 46% of the sampled students are from Social Science College, Science Faculty and Faculty of Business and Economics respectively .Out of the sampled students in Social Science College 50% of the sampled students grew up in urban

areas and the rest 50 % of the sampled students grew up in rural areas. In Science faculty 16.6 % and 6.6% of the sampled students grew up in urban and rural areas respectively. In the faculty of Business and Economics also 24.9% and 21.1% of the sampled students are from urban and rural areas respectively.

#### 4.1.2 Age Composition



Source: Field survey, 2002E.C

**Figure 4.1 Distributions of Respondents Based on Age and Residence**

Figure 4.1 illustrates that 39.5% of the sampled students of which 32.2% and 7.3% are from urban and rural areas respectively are at the age of 20 year and below it. Whereas, 60.7% of the sampled students are at the age above 20 Year, out of this 24.9% and 35.6% of the sampled students are from urban and rural areas respectively.

#### 4.1.3 Year Level

**Table 4.2 Distribution of Respondents Based on year level and Residence**

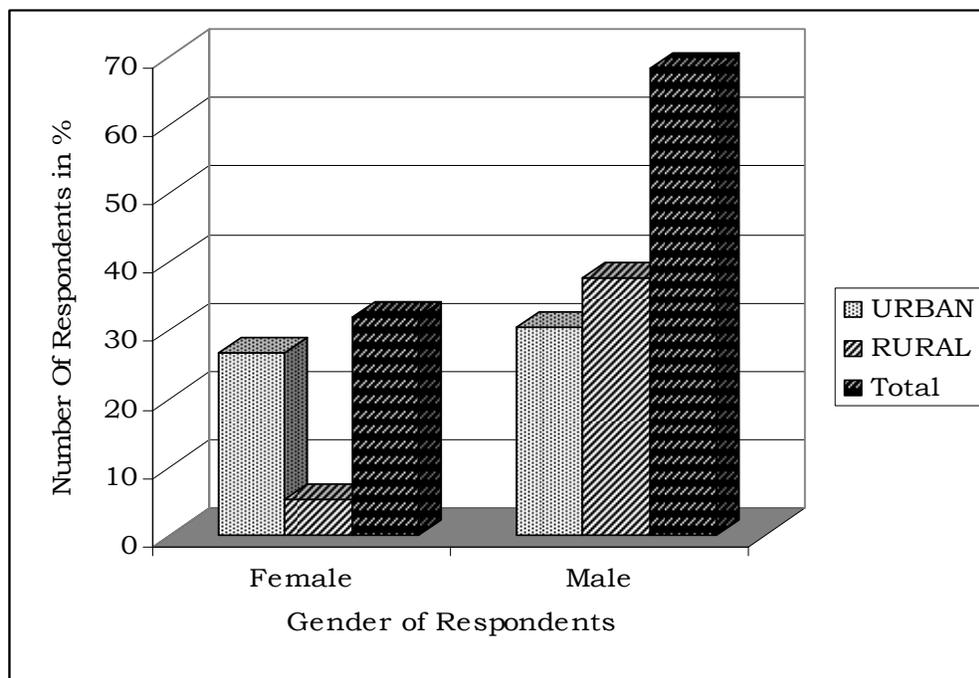
Year Level	Growing up areas					
	Urban		Rural		Total	
	F	%	F	%	F	%
Second	117	61.3	74	38.7	191	66.1
Fourth	48	49	50	51	98	33.9
Total	165	57.1	124	42.9	289	100

Source: Field survey, 2002E.C and Registrar office

Table 4.2 indicates 66.1% and 33.9 % the sampled students are second year and fourth year respectively. From second year students 61.3 %of the sampled students grew up in urban areas and 38.7 % of the sampled students grew up in rural areas. In the case of fourth year sampled students 49 % and 51 % of the students grew up in urban and rural areas respectively.

#### **4.1.4 Gender composition**

As shows in Figure 4.2 below out of the total 289 sampled students 68.2% of the sampled students are male while 31.8% are female students. Out of 68.2% of male sampled students 30.4% and 37.7% of the students grew up in urban and rural areas respectively. Whereas, out of the total 31.8% of female students 26.6% and 5.2% of the students grew up in urban and rural areas respectively.



Source: Field survey, 2002 E.C and Registrar office

**Figure 4.2 Distribution of Respondents Based on Gender and Residence**

The demographic information reported in this section is used in the analysis of awareness and attitude items. For more information (see appendix D).

## **4.2 Analysis of Students Environmental Awareness**

### **4.2.1 Students' Sources of Environmental Information**

**Table 4.3 Students Source of Environmental Information**

No.	Sources of information	No. of Students	%
1	Various school subjects in the educational system	178	61.6
2	Electronic media (TV, Radio etc)	121	41.9
3	Printed materials (books, newspaper , magazine)	45	15.6
4	All	24	8.3
5	Others	13	4.5

Source: Field survey, 2002E.C

Not: The total is greater than 289 due to multiple responses

Table 4.3 shows that 61.6% of the students responded that various school subjects in the educational systems (primary, secondary and higher education) are their primary source for environmental information. Whereas, 41.9 % of the students responded that electronic media (TV, radio etc.) is their major source of environmental information. The rest 15.6%, and 4.5% of the students responded that printed material and others (parents, friends and practical observation) are their primary source of environmental information respectively. This implies that relatively for most of the students, the primary source of environmental information is various school subjects in the educational systems (primary, secondary and higher education). This notifies that formal education has contributed in providing information about the environment.

#### **4.2.2 Students' Environmental Awareness for Entire Items**

In this study 23 multiple choice types of awareness items used to test students awareness about the problems, causes, consequences and solution of land degradation and deforestation. The analysis of these awareness items was made based on the judgment of the practical situations of students score for the test due to the reason that studying awareness and attitude is not an easy task and to some extent it is difficult to measure as they are an elements of human behavior. This makes the measurement of awareness and attitude subjective and judgmental. In this case table 4.4 summarized the correct responses of total sampled students and students' based on their respective faculty. Subsequent tables also (table 4.5 4.6 and 4.7) take analysis of students' awareness performance based on departments of each faculty.

As Table 4.4 displays below from the total of 289 respondents, 10% of students were found to have low level of awareness about rural environmental degradation and 22.8% students showed moderate level of awareness. 51.2 % and 15.9% students were found to have moderately high and high level of awareness about rural environmental degradation respectively. This shows that 67.1% of students were classified as having 'moderately high' and 'high'

awareness level. However an over all mean score of (14.87) questions were responded correctly, which suggests that the students found to have average an over all “moderate” awareness level. This shows that generally the students found to have moderate level of awareness about the issues of land degradation and deforestation raised in the study. However, the result was not encouraging as these students are tomorrow’s leader and decision makers; they are expected to have high level of awareness about the environment to make the right decision with considering its effect on the environment in the future.

In the case of faculties, 27.9% of the sampled students in Science Faculty found to have low level of awareness on the issues of land degradation and deforestation raised in the study. Whereas, 60% and 53.4% of the students in Social Science College and Faculty of Business and Economics found to have moderately high level of awareness.

This shows that relatively more students in Social Science College found to have moderately high level of awareness about the issues of land degradation and deforestation. In contrary more students in Science Faculty had low level of awareness about land and forest resources. The difference in the students’ awareness level in these faculties could be due the difference in courses they are taking in their respective faculties.

**Table 4.4 Awareness about Land and Forest Resources**

Awareness score	No. of respondents in %			
	Social science	Science faculty	FBE	TOTAL
< 9	4.5	27.9	4.5	10
9-14	9.1	33.8	26.3	22.8
15-18	60	35.3	53.4	51.2
19-23	26.1	2.9	15.8	15.9
Total	100	100	100	100

Source: Field survey, 2002E.C

In the case of departments, difference in the awareness score was observed as shown in tables (4.5, 4.6 and 4.7)

**Table 4.5 Awareness about Land and Forest Resources: Social Science College**

Departments	Awareness scores in %					
	<9	9-14	15-18	19-23	Total	Average
GES N=15	6.6	6.6	46.8	40	100	17.3
PSIR N= 23	4.3	0	60.9	34.8	100	17.7
Psychology N=11	0	9.1	81.8	9.1	100	16.6
SOSA N=	5.1	15.4	58.9	20.5	100	15.7
Total	4.5	9.1	60	26.1	100	

Source: Filed survey, 2002E.C

**Table 4.6 Awareness about Land and Forest Resources: Science Faculty**

Departments	Awareness scores in %					
	<9	9-14	15-18	19-23	Total	Average
Biology	40.9	18.2	40.9	0	100	10.8
Chemistry	30	25	45	0	100	12.5
Erath science	15.4	53.8	23.1	7.7	100	12.2
Total	27.9	33.8	35.3	2.9	100	

Source: Filed survey, 2002E.C

**Table 4.7 Awareness about Land and Forest Resources: FBE**

Departments	Awareness scores in %					
	<9	9-14	15-18	19-23	Total	Average

Economics	3.0	24.2	39.4	33.3	100	16.8
Management	5.4	37.8	51.4	5.4	100	14.1
PADM	5.3	18.4	60.5	15.8	100	15.3
Acc. and F.	4	24	64	8	100	15.4
Total	4.5	26.3	53.4	15.8	100	

Source: Filed survey, 2002E.C

As indicated in Table 4.6, 40.9% and 30% the sampled students in the departments of Biology and Chemistry respectively found to have relatively low level of awareness for land and forest resource issues raised in the study. In the case of Faculty of Business and Economics 33.3% of students in Economics department found having high level of awareness. Whereas, more the students in the departments of Management, PADM and Acc. and F. found to have moderate level of awareness for land and forest resources (see table 4.7). In contrary, all (four) departments of Social Science College had average scores of greater than 50% as shows in table 4.5. The first relatively high average score was occupied by department of PSIR (Political Science and International Relation) (17.7) which is followed by department of GES (Geography and Environmental Studies). Thus the sampled students in the departments of PSIR and GES have relatively better awareness about land degradation and deforestation issues raised in the study. This shows that courses in the departments of PSIR and GES might have more environmental issues.

### **4.2.3 Analysis of Students Awareness for Individual Items**

In this part rural environmental issues raised in the 23 awareness items classified as, awareness for problems, causes, consequences and solution to land degradation and deforestation.

#### **4.2.3.1 Students' Awareness about the Problems of Land and Forest Resources**

**Table 4.8 Students' Awareness about the Problems of Land and Forest**

Item	Paraphrased awareness questions	Number of respondents in % for correct answers	
		F	%
*1	Environmental problems in rural Ethiopia	243	81
2	Problems of land and forest	180	62.2
3	Land degradation in Ethiopia	187	64.7
4	Rate of deforestation in Ethiopia	235	81.3

Source: Field survey, 2002E.C

\* The items are Paraphrased and coded in manner of the questionnaire

As shown in table 4.8, 81% of students were found to be aware that land degradation, deforestation, and overgrazing as the major rural environmental problems in Ethiopia. Here the awareness of the students about the major rural environmental problems is very much encouraging. 62.2% of students were also aware that the problems of land and forest resources have direct relationship. This shows that students have better awareness about the effect of deforestation on the land. Not only this, 64.7% students were aware of that land degradation is not occurring only in the form of soil erosion in Ethiopia. Moreover, 81.3% of students were correctly responded that the rate of deforestation is increasing in Ethiopia. This shows that relatively more students found to have better awareness about land degradation and deforestation.

#### **4.2.3.2 Students Awareness on the Causes of Land Degradation and Deforestation**

**Table 4.9 Students' Awareness on the causes of Land and forest Degradation**

Item	Paraphrased awareness questions	Number of respondents in % for correct
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		answers	
		F	%
*5	Land and forest degradation pronounced	181	62.3
6	Causes of land degradation	186	64.4
7	The main agents of soil degradation	178	61.9
8	Population growth and land degradation	173	59.5
9	Major cause of deforestation in Ethiopia	205	70.9
11	Deforestation as cause for land degradation	161	55.4
12	Agriculture and soil degradation	196	67.8
21	Effects of over grazing on land and forest	229	79.2
23	Least cause of land degradation	200	69.2

Source: Field survey ,2002E.C \*The items are coded in manner of the questionnaire

As revealed in table 4.9, 62.3% of students were correctly chose ‘deep rooted poverty’ and ‘intensive agricultural practice’ as a reason for severe land degradation and deforestation in rural areas. In addition 64.4% of students were aware of that population pressure, lack of awareness and deforestation as major causes of land degradation in Ethiopia. Not only this 59.5% and 67.8%of students correctly chose that ‘exploitation of natural resources’ and ‘repeated cultivation of particular types of crops’ which are caused by rapidly growing population and agricultural activities result in land degradation in Ethiopia respectively.

Out of the total 79.2% of students also correctly identified ‘decrease in forest cover’, ‘change fertile land to desert’, and ‘pressure on land and forest’ as the effect of overgrazing on the land and forest cover in Ethiopia, and 69.2% students also correctly identified ‘road construction’ as least contributor to land degradation in Ethiopia. In other case 61.9% of the students correctly chose “running water” as the main agent for soil degradation in Ethiopia.

Furthermore, 70.9% of students correctly chose ‘high demand for agricultural land and fuel wood’ as major causes for deforestation in Ethiopia. Deforestation accelerate land degradation by ‘exposing the land to wind and water erosion’, ‘reducing organic matter’ and ‘removal of animal dung and crop residues from

the land for cooking' were correctly responded by 55.4% of the students . Generally more than half of the students found to have better awareness about the causes of land degradation and deforestation.

### 4.2.3.3. Students Awareness on the Consequences of Land Degradation and Deforestation

**Table 4.10 Students' Awareness on Consequences of Land and forest Degradation**

Item	Paraphrased awareness questions	Number of respondents in % for correct answers	
		F	%
*10	Economic consequence	201	69.6
16	Effect of land degradation on rural communities	159	55
17	consequence of deforestation on rural communities	111	38.4
18	consequence of natural resource degradation	226	78.2
19	land degradation and deforestation contributes	221	76.5
20	consequence of deforestation on the physical environment	198	68.5

Source: Field survey, 2002E.C

\* The items are Paraphrased and coded in manner of the questionnaire

Table 4.10 revealed that 69.6% of students were correctly chose 'decline in agricultural production' as economic consequence of land degradation and deforestation in Ethiopia. In addition natural resource base degradation results in, 'food insecurity', 'famine and drought' and 'migration of people' were correctly chosen by 78.2% of students under the study. Particularly 76.5% and 55% of students were correctly identified that land degradation and deforestation result in 'low level of household income' and 'low living standard' as well as poverty and death in the rural community respectively. In other case, 68.5% of the students were correctly chose climatic change, desertification and lose of wild life as the main consequences of deforestation on the physical environment. Whereas, less than half of the students were correctly identified that flooding and drought, loss of soil fertility and lack of building material as main consequence of deforestation in Ethiopia. In this case students did not aware of the consequence of land degradation and deforestation. Generally

relatively more than half of the students found to have better awareness about the consequences of land degradation and deforestation except for item17.

#### **4.2.3.4 Students Awareness about the Solution of Land and Forest Degradation**

**Table 4.11 Students' Awareness about the Solution of Land and forest Degradation**

Item:	Paraphrased awareness questions	Number of respondents in % for correct answers	
		F	%
*13	Solution to land degradation	219	75.8
14	Conservation methods to control soil erosion	138	47.8
15	Solution to deforestation problem	224	77.5
22	Means to fight environmental degradation	218	75.4

Source :Field survey, 2002E.C \* The items are Paraphrased and coded in manner of the questionnaire

As indicated in table 4.11, 75.8% of students were aware of that afforestation, reforestation and family planning as means to halt land degradation in Ethiopia. 77.5% of students also correctly responded that planting of trees on the degraded areas, creating awareness and use of controlled grazing as a solution to deforestation in Ethiopia. 47.8 % of students were also correctly chose contour ploughing and terracing as useful practice to control land degradation caused by soil erosion in steep slope areas. In addition 75.4% of the students were correctly chose education as the most important way to fight land degradation and deforestation (environmental degradation). This implies that students are aware of the importance of education to change the awareness and attitude of the society towards the environment.

### **4.3 Analysis of Students' Attitude for Individual Items**

#### **4.3.1 Students Environmental Attitude**

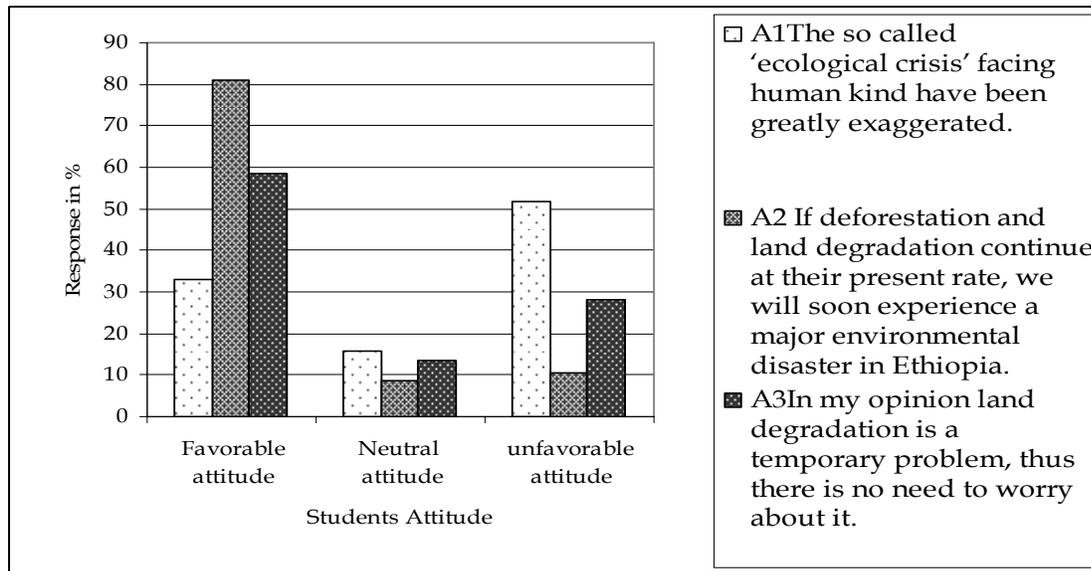
As indicated in the methodology part hundred is the maximum score which shows the most favorable attitude if students scored 5 for the 20 attitude inventory items. Whereas, a score of twenty revealed the most unfavorable

attitude if students scored 1 for the 20 attitude inventory items. In between the two extremes, a score of 60 had taken as neutral attitude if students scored 3 for the 20 attitude inventory items. A score of less than 60 were taken as unfavorable attitude and a score of greater than 60 were considered as favorable. Thus, the calculated mean attitude score result revealed that the total sampled students found to have a mean attitude score of (M=72.79) for land degradation and deforestation issues raised in the study. This indicates that generally the total sampled students in the study have favorable attitude towards land and forest resource issues raised in the study.

In addition item by item analysis was made on the specific issues in the attitude inventory items. In this case issues are classified as attitude towards problems, causes, consequences and solution to land degradation and deforestation.

### 4.3.2 Analysis of Students' Attitude for Individual Items

#### 4.3.2.1 Student Attitude towards the Problem of Land and Forest Resources

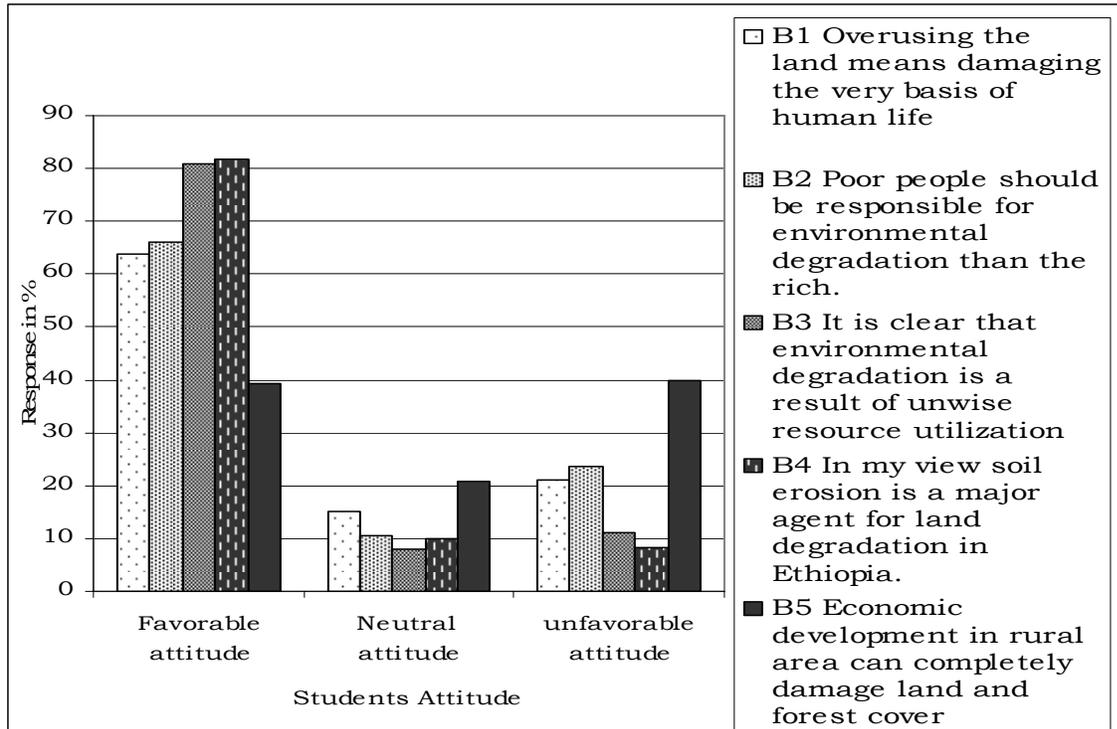


Source: Filed study, 2002E.C

**Figure 4.3 Students' Attitude towards the Problem Land and Forest Resources**

As illustrated in figure 4.3, 51.6% of the students had agreed (unfavorable attitude) towards the problem of environment as viewed " the so called ecological crisis facing human kind have been greatly exaggerated" (A1). This shows that students had a view that environmental problems are not as such serious which is a discouraging view to protect the environment. While, only 32.9% of students had positive attitude (disagreement) to this view. In addition, 81% of students also had favorable attitude on the issues that " if deforestation and land degradation continue at their present rate, we will soon experience a major, environmental disaster in Ethiopia " (A2). This shows that students have good view about the seriousness of land degradation and deforestation in Ethiopia. In case of the issue that " In my opinion land degradation is a temporary problem, thus there is no need to worry about it " A3, 58.5% of the students had favorable attitude (disagreement) to this view. This shows relatively more than half of the students have concern towards the problem of land degradation. In contrary 28% of the students agreed that there is no need to worry about land degradation because they might felt that it is not long lasting problem. This shows relatively more than half students found to have favorable attitude towards land and forest resources except to statement A1 that half of the students found to have unfavorable attitude. Thus to bring the same level of environmental concern (attitude) within students about the environment environmental education can play a greater role.

### 4.3.2.2 Attitude of Student towards the Causes of Land Degradation and Deforestation



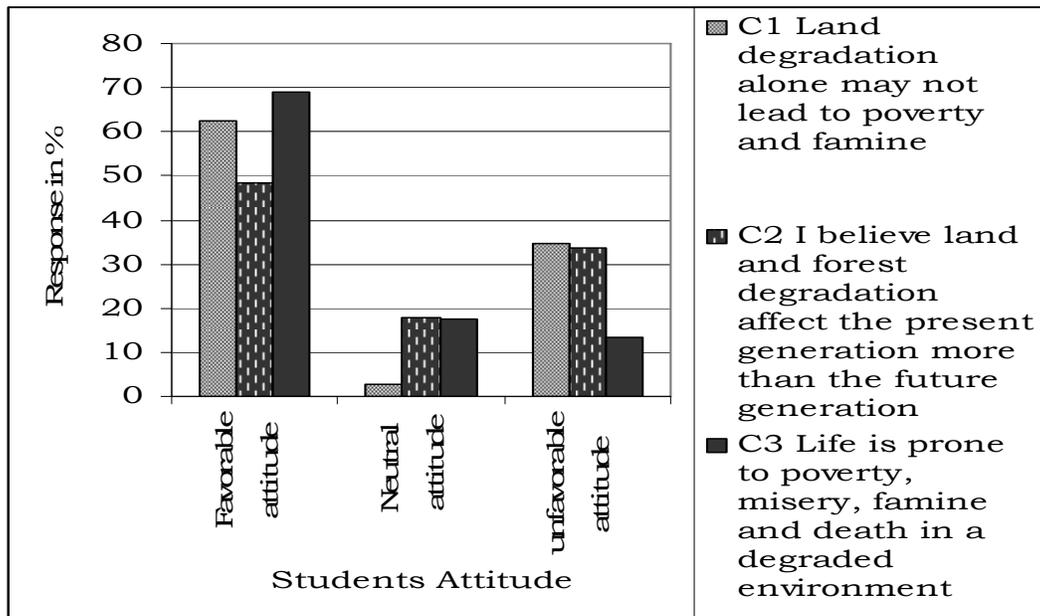
Source: Filed study, 2002E.C

**Figure 4.4 Students' Attitude towards the Causes of Land Degradation and Deforestation**

Figure 4.4 depicts students' attitude towards the causes of environmental degradation on five statements (B1, B2, B3, B4 and B5). The majority (81%) of students had positive attitude to the statement which says environmental degradation caused by unwise natural resource utilization (B3). This implies that the majority of students have an understanding about the effect of unsustainable use of resources on the environment. Similarly 81.7% and 63.7% of the students had positive attitude that soil erosion (B4) and over using of land (B1) are the causes for land degradation respectively. Furthermore, 66.1% of students also had encouraging attitude opposing the view " poor people should be responsible for environmental degradation than rich." In this case students have good attitude that every one is responsible for the problem but not only the poor. However, almost equal number of students found to have favorable attitude (39.4%) and unfavorable attitude (39.8%) for the statement that "

economic development in rural area can completely damage land and forest cover." This shows that students have unclear stand about the impact of economic development on land and forest resource in rural areas. Thus more than half of the students have positive attitude for the causes of land degradation and deforestation except for the view in B5 which they have intermingled position in attitude.

#### 4.3.2.3 Students Attitude towards the Consequence of Land Degradation and Deforestation



Source filed study 2002E.C

**Figure 4.5 Students' Attitude towards the Consequences in Percentage**

As to the consequences of land degradation and deforestation more than half of the students agreed to the statement "land degradation alone may not lead to poverty and famine" (C1). It imply that students have a view that together with land degradation there are other factors which contribute for the occurrence of poverty and famine. 68.9% of students also shared the view, life in a degraded environment is exposed to poverty, misery, famine and death (C3). More over 48.4% of students' found to have positive attitude (disagree) to the view land and forest degradation affect the present generation more than the future generation (C2). This revealed that relatively more than half of the students

found to have positive attitude (disagreement) for consequences of land degradation and deforestation except for the view that 34% have agreed that land and forest degradation affect the present generation more than the future generation. The view about the effect of land degradation and deforestation are more on the present generation could result in lack of concern to protect land and forest resources for the coming generation. It also shows that the students have misunderstanding about one of the major principles of sustainable development. (See figure 4:5 above).

#### **4.3.2.4 Students Attitude towards Protection and Solution of Land Degradation and Deforestation**

**Table 4.12 Students' Attitude towards the Protection and Solution of Land Degradation and Deforestation**

code	Statement	Favorable attitude	Neutral attitude	unfavorable attitude
D1	Considering the problem of deforestation in our country, we need to substitute the uses of fuel wood by alternative energy source.	83	9.3	7.6
D2	It is the responsibility of rich country to solve the problem of environmental degradation of the world.	68.2	13.1	18.7
D3	This generation should take a responsibility for conserving the natural resource needed by the next generation	33.9	39.1	33.6
D4	Maintaining agricultural production is more important for our country than protection of land and forest in rural areas	54	15.6	30.4
D5	Land degradation and deforestation should be left to agricultural experts who are dealing on rural development.	58.5	12.1	29.4
D6	Land degradation and deforestation in rural Ethiopia can be solved with out big change in traditional agricultural practice	50.5	16.6	32.9

D7	Science and technology can solve all environmental degradation	39.4	20.8	39.8
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Source filed study 2002E.C

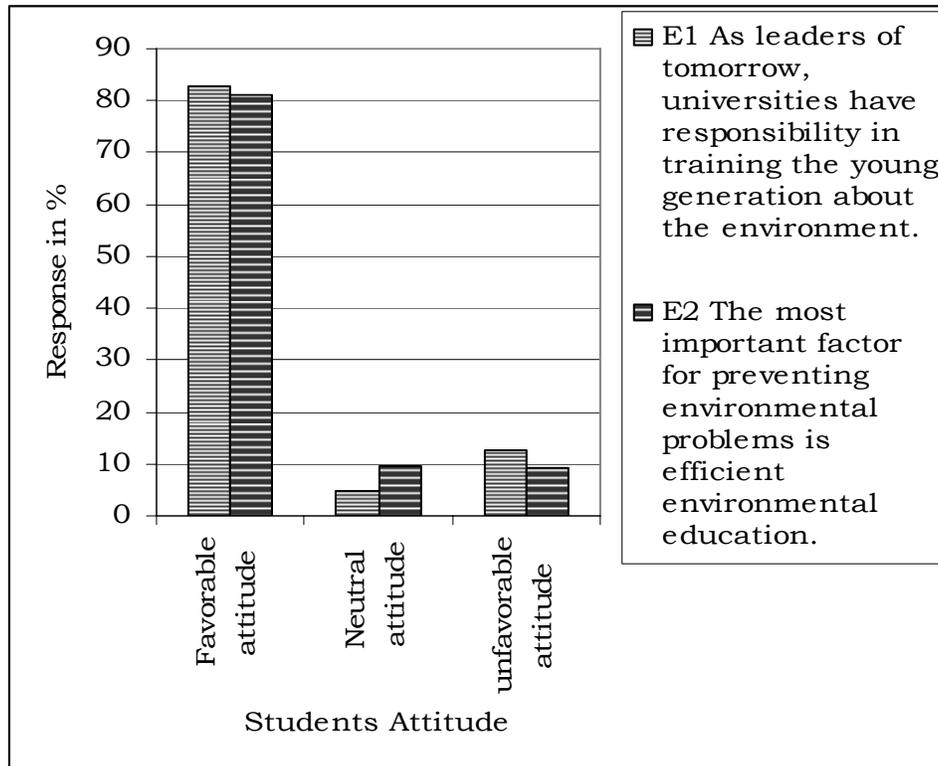
Table 4.12 shows that 83% of the students found to have favorable attitude towards the substitution of fuel wood by alternative energy source to prevent deforestation (D1). In other way 68.2% of students had favorable (disagreement) attitude to the view "it is the responsibility of rich countries to solve the problem of environmental degradation of the world" (D2). In contrary only 33.9% of students out of the total had positive attitude towards the responsibility of present generation to conserve the natural resource for the next generation and 33.6 % of students disagree to the view in (D3). Here students lack clear stand to the ethical basis of sustainable development which is related to fulfillment of the need of the present without compromising the need of future generation. More over 54% students had a positive attitude (disagreement) to the view " maintaining agricultural production is more important for our country than protection of land and forests in rural areas." (D4). This shows that students have concern to the need of equilibrium in agricultural production and protection of land and forest.

Out of the total 58.5% of the students also had favorable attitude (disagreement) to the issues "Land degradation and deforestation should be left to agricultural experts who are dealing on rural development" (D5). This shows that students have better attitude towards the responsibility of every one to solve and protect the natural resources and it should not be left to few people in case of items D4 and D5. But in the case of their responsibility to conserving the environment students did have discouraging view in item D3.

Not only this, 50.5% of students opposed the view that the problem of land degradation and deforestation can be solved with out big change in traditional agricultural practice (D6). In the case of the statement D7 " science and technology can solve all environmental degradation" 39.8% of students had

unfavorable attitude with this view (D7). Here also students lack clear stand that some of the students agree that science and technology can solve all environmental problems and other disagree on this point of view. Thus environmental education is important to fill the gap in the areas where students lack clear concern to environmental protection.

#### 4.3.2.5 Attitude of Students towards Environmental Education



Source: Filed study, 2002E.C

**Figure 4.6 Students' Attitude towards the EE in Percentage**

Figure 4.6 depicts that 82.7% of the students had positive attitude towards the opinion that universities have a responsibility to educate students' who are leader and decision makers of tomorrow about environment E1. In addition, 81% of the students had favorable attitude about the contribution of environmental education to prevent environmental degradation E2. Thus students have positive attitude about the contribution of EE. This implies that if environmental

education provided with better instructional approach, they might become willing to learn and change their action to improve environmental quality.

#### **4.4 Comparison of Students Awareness and Attitude**

##### **4.4.1 Comparison of Students Awareness and Attitude based on Faculty**

Table 4.13, depicts that the mean awareness and attitude score performance of the sampled students based on faculty. The sampled students in Social Science College were preformed relatively higher (16.61) than Science Faculty (11.62) and Faculty of Business and Economics (15.38) in mean awareness score. Particularly the mean awareness score performance of students' in Science Faculty was less than Social Science College and Faculty of Business and Economic with a mean difference of 4.99 and 3.76 respectively.

**Table 4.13 Mean Awareness and Attitude Score of Students based on Faculty**

Variables	Faculty	N	Mean	Standard Deviation
Awareness	Social Science(SS)	88	16.61	3.88
	Science Faculty (NF)	68	11.62	4.98
	Business and Economic (FBE)	133	15.38	4.22
	Total	289	14.87	4.69
Attitude	Social Science(SS)	88	75.77	8.31
	Science Faculty (NF)	68	66.43	10.24
	Business and Economic (FBE)	133	74.07	8.83
	Total	289	72.79	9.69

Source: Filed study: 2002E.C

Similarly, the mean attitude score performance of the sampled students in Social science College was higher (M=75.77) when it is compared to the mean score of Science Faculty (M=66.43) and Faculty of Business and Economics

(M=74.07). In this case the mean attitude score performance of the sampled students' in Science Faculty was less than Social Science College and Faculty of Business and Economic with a mean difference of 9.94 and 8.82 respectively. The standard deviation also shows that more students had scores distributed around the mean in Social Science College than Faculty of Business and Economics and Science Faculty in both cases. To see if the difference that is existed in the mean awareness and attitude score among the three faculties were statistically significance one- way ANOVA was computed.

**Table 4.14 ANOVA Summery For Students Awareness and Attitude Based On Faculty**

Variables	Source of Variation	Sum of Squares	df	Mean square	F cal	Sig	Fcrit
Awareness	Between groups	1020.878	2	510.439	27.451	*.000	3.03
	Within groups	5318.125	286	18.595			
	Total	6339.003	288				
Attitude	Between groups	3753.65	2	1876.82	23.03	*.000	3.03
	With in groups	23312.48	286	81.51			
	Total	27066.13	288				

\*P<.05

df= degree of freedom

Fcal= F calculated

sig = significant

Fcrit = F critical

The result in Table 4.14 indicates that the existed mean difference in awareness score among faculties was statistically significant at (Fcal= 27.451, p<0.05, F Cri=3.03). It was also statistically significant difference for attitude towards land degradation and deforestation among students in the three faculties (Fcal=23.03 df=286, P<.05). This implies that there was difference in the sample students' awareness and attitude towards the problems, causes, consequences and solution of land degradation and deforestation among the three faculties. In this case, environmental awareness have relation with

environmental attitude .Thus the sample students in Social Science College had better awareness and more favorable attitude towards land and forest resource than in Science Faculty, and Faculty of Business and Economics. The reason for this difference might be the courses given in Social Science College have more contribution in providing environmental information and through the lesson using fieldtrip method of teaching which allows the students to observe the real environmental situation. Thus studying environmental issues together with major felids of study in each faculty has importance to create awareness and develop attitude towards the environment among students. The finding of this study supported by the research finding of Roberta (2007) that reported the existence of significant difference between students' attitude and their respective college of enrollment. However, this research finding opposed the findings of (Al-Rabaani et-al, 2009) which indicated that students' attitudes towards environmental problems did not appear to be influenced by the university faculties in which they are studying.

#### **4.4.2 Comparison of Students Awareness and Attitude based on Departments**

As shown in Table 4.15, the mean awareness score of students in the department of PSIR was relatively higher (M=17.70) which was followed by the mean awareness score of students in the department of Geography and environmental studies (M=17.27). Whereas, the mean awareness score recorded by the sampled students in the departments of Biology (M=10.18) was relatively low. Thus, the mean difference among these departments showed that the sampled students in the department Biology had very low mean performance than PSIR and Geography and Environmental Studies by 7.52 and 7.09 respectively. Generally there were observable mean differences among eleven departments under the study.

**Table 4.15 Mean Awareness and Attitude Score of Students based on Departments**

Departments	Variables					
	Awareness			Attitude		
	N	Mean	Standard Deviation	N	Mean	Standard Deviation
GES	15	17.3	4.79	15	72.07	8.89
PSIR	23	17.7	3.34	23	78.74	8.96
Psychology	11	16.6	2.20	11	74.18	6.93
SOSA	39	15.7	4.07	39	75.90	7.64
Biology	22	10.2	4.84	22	62.50	8.93
Chemistry	20	12.5	6.00	20	66.05	8.17
Earth science	26	12.2	4.09	26	69.77	11.84
Economics	33	16.8	4.54	33	73.97	9.26
Management	38	14.1	3.85	37	74.24	9.30
PADM	25	15.3	4.12	38	72.58	8.23
Acco.and fin.	25	15.4	4.07	25	76.20	8.47
Total	289	14.9	4.69	289	72.79	9.69

Source: Filed study, 2002E.C

Similar to awareness the mean attitude score of students in the department of PSIR was relatively higher (M= 78.74) which was followed by a mean score performance of students in the department of Geography and Environmental Studies (M=72.07). Whereas, the mean attitude score recorded by students in the departments of Biology (M=62.50) was relatively low. This shows the existence of observable mean differences among the eleven departments under study.

To conclude that the difference observed among departments was statistically significant one-way analysis of variance (ANOVA) was computed.

**Table 4.16 ANOVA Summary For Students Awareness and Attitude Based On Departments**

Variables	Source of Variation	Sum of Squares	df	Mean square	F cal	Sig	Fcrit
Awareness	Between groups	1284.118	10	128.412	*7.06	.000	1.88
	Within groups	5054.885	278	18.183			
	Total	6339.003	288				
Attitude	Between groups	4991.92	10	499.19	*6.29	.000	1.88
	With in groups	22074.21	278	79.40			
	Total	27066.13	288				

\*p <0.05

As indicated in Table 4.16, there was a statistical significant difference in students awareness about land and forest resources among the departments at (F= 7.06, p <0.05, F critical = 1.88). Likewise mean score of students attitude also showed statistically significant difference towards the problem, causes, consequences and solution of land degradation and deforestation among departments (Fcal=6.29 df=278 P<.05 F critical = 1.88). In this particular situation the results of environmental attitude agree or related to environmental awareness.

Thus the sampled students in departments of PSIR (Political Science and International Relation) and Geography and Environments Studies (GES) had better awareness and more favorable attitude than sampled students in the other departments. This implies that the courses and method of teaching in these departments might give information about the environment that could develop their attitude and awareness about the issues raised in the study. This is supported by the research finding of Al-Rabaani et-al (2009) which indicated students attitude were affected by the course of study.

#### **4.4.3 Comparison of Students Awareness and Attitude based on Gender**

**Table 4.17 Independent Sample t-test for Students' Awareness and Attitude Score based on Gender**

Variable	Gender	N	Mean	Standard Deviation	tcal	df	sig	Mean Difference
Awareness test score	Male	197	15.34	4.75	*2.50	287	.013	1.47
	Female	92	13.87	4.42				
Attitude	Male	197	72.92	9.44	**0.33	287	.74	0.41
	Female	92	72.51	10.27				

\*\*P >0.05 and \* P <0.05

Source filed study 2002E.C

Table 4.17, indicated that the mean awareness scores of male and female students were (M=15.4) and (M=13.87) respectively. This shows the existence of an observable mean difference (1.47) between male and female students for awareness mean scores. In addition the mean attitude score of male and female students were 72.92 and 72.51 respectively. This shows that there is a slight mean difference between male and female students' attitude mean scores. To see if these mean differences were statistically significant independent t-test was employed.

The result of the mean comparison showed that there was statistically significant difference between male and female students environmental awareness ( $t=2.50, df=287$   $P<0.05$   $t_{cri}= 1.97$ ). However, there was no statistically significant difference between male and female students attitude towards land and forest resources ( $t_{cal}=0.33, df=287, P >0.05$ ). This shows that male students had better awareness than female students but they have similar attitude towards the problem, causes consequences and solution towards land degradation and deforestation. These results revealed that students' environmental awareness and attitude are not necessarily related. Because awareness for the environment does not always leads to attitudinal change due to the existence of other factors such as the value given to the environment based on the consequences for self, other people and for all living things as it is discussed in the review literature. In addition development of environmental friendly attitude takes longer time and slower process of socialization (Monostorl, 2008).

In addition the result implies that female found to have less awareness compared to male but the same attitude as male students. The reason for this may be due to some cultural barrier and back ground of female students which did not give them a chance to have exposure to environmental information. Thus to change female students awareness about the environment and to make it the same with male students environmental education is mandatory in every level of education.

This study finding supported by the findings of some studies which indicated males are more aware and sensitive to environmental issues than females (Arcury et-al, 1986; Hos-Quimbian et-al, 1996, cited in Ozden, 2008). Nevertheless, this study fails to conform the finding of Shobeiri, et-al (2007) which found that male and female students have the same level of environmental awareness and gender is not a factor. The study result also differed from the findings of Ziadat, (2009) which showed female students had better awareness than male students about the environment. The result of the attitude also supported by the finding of Aklilu (2001) which indicated the absence of significant difference between male and female student in their views about the use and management of natural resource. In similar way the research finding of Asmare (2007) revealed that the attitude of male students' towards the environment was not different from that of female students. However this finding disagrees with the findings of Roberta, (2007) that found out the existence of significant difference between male and female students' attitude scores.

#### ***4.4.3 Comparison of Students Awareness and Attitude based on Year Level***

As can be see from Table 4.18, the mean awareness scores of second and fourth year students were (M=14.72) and (M=15.16) respectively. The mean scores of both year students' shows the existence of slight mean difference (0.44) between second and fourth year students in awareness scores. The mean

attitude scores of second and fourth year students also were (M=72.35) and (M=73.65) respectively. The mean scores of both year students' shows the existence of slight mean difference (1.31) between second and fourth year students in attitude scores. This also supported by the result of independent t-test that there was no statistically significant difference between second and fourth year students mean awareness and attitudes scores at (t=0.76 p>0.05 df=287 t cri = 1.97) and (t=1.09 p>0.05 df=287 t cri = 1.97) respectively. Thus second year and fourth year students had similar awareness and attitude towards the problem, causes, consequences and solution to land degradation and deforestation.

**Table 4.18 Independent Sample t-test for Students' Awareness and Attitude Score based on Year Level**

Variable	Year level	N	Mean	Standard Deviation	t	df	sig	Mean Difference
Awareness	Fourth	98	15.16	4.71	*0.76	287	0.45	0.45
	First	191	14.72	4.69				
Attitude	Fourth	98	73.65	9.75	*1.09	287	0.28	1.31
	second	191	72.35	9.66				

\*P >0.05 Source: Filed study, 2002E.C

In this particular case the result agree with the idea that environmental attitude is related to environmental awareness. The finding in this study implies that environmental awareness and attitude were not affected by year level. This may be due to the effect of some environmental lessons that second year students took in Pre College education and specific field of specialization for fourth year students may not gave them lesson about the environment. This shows the importance of environmental education to generate awareness and to develop attitude about the environment in every level of education in the university. This finding of the study is inconsistent with the findings of Ziadat (2009) which found out environmental awareness among university students increase linearly as they proceeded from first year to fifth year. The findings of

this study also disagree with the findings of Roberta (2007) which revealed the existence of significant difference between students' attitude and year level.

#### **4.4.3 Comparison of Students Awareness and Attitude based on Age**

Table 4.19, depicts the mean awareness score of students whose age was above 20 year, and 20 and below it regarding land and forest resources. Thus students with the age above 20 year had a mean performance of (M=15.59) and students with age of 20 and below it also had a mean performance of (M=13.76). This performance of both age groups shows a mean difference of (1.83) which was an observable difference between age above 20 year, and age 20 and below it in mean awareness scores. Students with the age of above 20 year had also a mean attitude performance of (M=73.53) and students with age of 20 and below it had a mean performance of (M=71.66). This performance of both age groups shows a mean difference of (1.87) between age above 20 year, and at 20 year and below it in their mean attitude scores.

**Table 4.19 Independent Sample t-test for Students' Awareness and Attitude Score based on Age**

Variable	Age	N	Mean	Standard Deviation	t	df	sig	Mean Difference
Awareness	Above 20 year	175	15.59	4.46	*3.29	287	.001	1.83
	20 year and below it	114	13.76	4.84				
Attitude	Above 20	175	73.53	9.50	1.61	287	.110	1.87
	20 year and below it	114	71.66	9.92				

\*P <0.05

Source: Filed study, 2002E.C

However, it is difficult to conclude whether there was a significant difference between the two age groups. Thus, independent t-test was employed to see the observable mean difference was statistically significant. The result displays that there was statistical significant difference between students mean awareness scores at ( $t=3.287$   $df=287$   $p < 0.05$ ,  $t$  critical = 1.97). On the other hand, there was no statistically significant difference between students in the mean attitude scores ( $t=1.61$   $df=287$ ,  $P > 0.05$ ,  $t$ critical = 1.97). In this particular case environmental attitude result did not related with the result of environmental awareness. This may be due to some situational factors that can influence the attitude of students towards the environment.

Thus students with the age of above 20 year had relatively better awareness than students with the age of 20 year and below it. In contrary students at both age groups found to have similar attitude towards land and forest resources. Thus, age difference is factor for environmental awareness but not for environmental attitude. This implies that more information may be acquired about the environment with increasing of age; it could make students to have

better awareness about the environmental issues. Thus to close the gap which exist in awareness between different age groups providing more information about the environment is important .This can be done through environmental education

This finding supported by the findings of Ziadat (2009) reported that environmental awareness affected by the difference in age range, in which older groups had higher environmental awareness than younger age groups. In addition the finding in relation to attitude also supported by finding of Budak, (2005) that “attitude towards the environment has no relation with students’ age.” Nevertheless, this finding fails to agree with Lizuka, (2000) which found out younger generation tends to be more concerned about environmental quality than older generation

#### **4.4.3 Comparison of Students Awareness and Attitude based on Residence**

**Table 4.20 Independent Sample t-test for Students’ Awareness and Attitude Score based on Residence**

Variable	Residence	N	Mean	Standard Deviation	t	df	sig	Mean Difference
Awareness	Urban	165	14.01	4.70	*3.66	287	.000	1.99
	Rural	124	16.01	4.45				
Attitude	Urban	165	72.99	10.07	0.40	287	.688	0.46
	Rural	124	72.52	9.21				

Source filed study 2002E.C

As indicated in Table 4.20, the mean awareness scores of rural and urban students were (16.01) and (14.01) respectively. This shows the existence of an observable mean difference (2.0) between rural and urban students mean awareness scores. The mean attitude scores of students who grew up in rural and urban areas were also (72.52) and (72.99) respectively. This shows the existence of a slight mean difference (0.46) between the mean attitude score of students who grew up in rural and urban areas.

To see if the existing mean differences were statistically significant an independent t-test was employed. Thus the result revealed that there was statistically significant mean difference between rural and urban students mean awareness score ( $t=3.656$ ,  $df=287$   $P<0.05$   $t=1.97$ ). Whereas, there was no statistically significant mean difference between students who grew up in rural and urban areas mean attitude scores ( $t=0.40$ ,  $df=287$   $P>0.05$   $t=1.97$ ). This indicates that rural students had better awareness about land and forest resources than students with urban background. Nevertheless, students from rural and urban areas found to have similar attitude to land and forest resources. These results demonstrate that students' environmental awareness and attitude are not necessarily correlated in all cases.

The reason for rural students' better awareness about rural environmental degradation might be because of their accesses to observe the real environmental situation in their living areas. This shows the importance of the environmental education approach that education in or through the environment. In the case of attitude the reason for students from rural and urban background to have similar attitude could be due to the effect of other factors like social, economical and internal factors like motivation and environmental knowledge. This research supported by Delavega (1985) which found out that there was no statistically significant difference when attitude compared with rural and urban background among the entire participant groups in the study. Another finding of Budak, (2005) also revealed that no significant differences were found between students attitude score with their growing up areas ranked from urban to rural.

#### ***4.5 The Relationship between Students Awareness and Attitude***

**Table 4.21 Pearson Correlations for Students' Awareness and Attitude**

Variables	Attitude	Awareness
Attitude	1	.446**

Awareness	.446**	1
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\*\*Correlation significant at 0.01 level (2-tailed) N=289

Table 4.21 shows the bivariate correlation of students' environmental awareness and attitude. Thus, there was significant positive relationship between environmental awareness and attitude of students at the value of r is (r= .466). In general the relationship between these dependent variables is weak. This implies that to some extent environmental awareness might leads to an initial development of attitude which in other case could bring increasing of environmental awareness. However increase in environmental awareness does not necessarily leads to change in environmental attitude. Since, environmental attitude of students could be influenced by other factors.

## **CHAPTER FIVE**

### **Summary, Conclusion and Recommendation**

#### ***5.1 Summary and Conclusion***

The study was designed to examine the level, difference and relationships of students' awareness, and attitude towards issues related to rural environmental degradation in Ethiopia. It has aimed to identify university students' awareness and attitude towards environmental degradation.

To realize the above objectives, pertinent review of related literature on issues associated with environmental degradation in the world, and its relation with population, poverty and economic activity; land degradation and deforestation in Ethiopia, Environmental awareness and attitude, the role of university education in the development of students environmental awareness and attitude ,and research findings on environmental awareness and attitude as well as factors affecting environmental awareness, and attitude were assessed to be familiar with what is already known.

Based on the Review of related literature awareness test and attitude inventory were prepared to collect the required data for the research. Samples of 289 students were selected from three faculties in Addis Ababa University. Stratified sampling technique were employed to select a representative sample of students based on age, gender, academic stream ,year level and growing up area and departments. Then the data was analyzed using percentage, mean, standard deviation, t-test, and ANOVA and Pearson correlation coefficient.

The result of the study revealed that generally the students found to have moderate level of awareness on the issues of land degradation and deforestation raised in the study. However, the result was not encouraging as these students are tomorrow's leader and decision makers; they are expected to have high level awareness about the environment to make the right decision with considering its effect on the environment.

Based on faculty, the result of the study shows that relatively more students in Social Science College had moderately high level of awareness about land and forest resources. In contrary more students in Science Faculty had low level of awareness about the problems causes, consequences and solution of land degradation and deforestation. The reason for this difference might be due the presence of courses in Social Science College incorporating more environmental related information than the other faculties. In the case of individual item analysis students found to have less awareness for some of the issues in relation to the problems, causes, consequences and solutions of land degradation and deforestation.

The study also showed that there was statistically significant difference in mean awareness score of students in terms of gender and age. It shows that male and relatively old age students found to have better awareness about the problem, causes, consequences and solution of land degradation and deforestation. In addition, statistically significant mean awareness difference was observed between students from urban and rural areas. This indicates that students from rural areas had better awareness to land and forest resources. Thus students from rural areas get more information about land degradation and deforestation by observing the real environmental condition.

On the other hand, the mean awareness score difference between second and fourth year students was not significant. Thus increases in the level of education did not bring as such difference in the environmental awareness of students. The ANOVA summary for awareness also showed the existence of significant mean difference among faculties and departments. Thus the sampled students in Social Science College and departments of PSIR and GES found to have better awareness about land degradation and deforestation.

In the case of attitude generally students found to have favorable attitude towards land and forest resources. However in the case of individual item analysis students also found to have unclear stand for some items especially

on the items which shows the responsibility of this generation in conserving the natural environment for the coming generation and on the view that science can solve all environmental problems.

Moreover, the analysis of attitude based on the independent variables shows the absence of significant difference between male and female, second year and fourth year students. It was also insignificant between urban and rural, and age of students. Thus, male and female, second year and fourth year, rural and urban students found to similar attitude towards land degradation and deforestation. The ANOVA summary for attitude also did show the existence of significant mean difference among faculties and departments'. Thus, the sampled students in Social Science College and departments of PSIR and GES found to have more favorable attitude towards land and forest resources.

The correlation coefficient also revealed that there was significant positive correlation between environmental attitude and awareness, but it is weak. However, this is against the major principle of environmental education which is intended to bring attitudinal change and pro-environmental behavior through creating awareness. And this can be possible if the relationship between these variables is strong enough. But there might be other internal and external factors that make the relationship weak. Thus increase in environmental awareness does not necessarily leads to change in environmental attitude. The research also indicated that various school subjects in the educational systems were the main source of information for students' environmental awareness.

## **5.2 Recommendation**

Based on the objectives, findings and the conclusions of the study the following suggestive solutions are forwarded.

1. In the study generally the students found to have moderate level of awareness and favorable attitude about the issues explored in relation towards land degradation and deforestation. However, the result was not encouraging as these students are tomorrow's leader and decision makers, they are expected to have high level of awareness and most favorable attitude about the environment to make the right decision considering its effect on the environment in the future. Thus environmental event and activities like special environmental lectures and seminars which are appropriate to reach the general students population in the university should be conducted involving different clubs and organization to create high level of environmental awareness and most favorable attitude towards the local and global environment.

2. Students with rural background found to have better awareness about land degradation and deforestation than students with urban background. This is due to the fact that students with rural background have more opportunity to observe the actual environmental situation than students with urban background. Thus to narrow the existing gap of students environmental awareness environmental campaign and fieldtrips should be prepared with the coordination of different faculties, clubs and organization in the university.

3. The finding in this study implies that environmental awareness and attitude were not affected by year level. This may be due to the effect of some environmental lessons that second year students took in Pre-College education and specific field of specialization may not address environmental issues for fourth year students. Thus, with increase of year level, environmental awareness and attitude of students are not as such influenced. Thus universities are expected to endeavor towards the integration of environmental

education in every level of education to create citizens that have high level of environmental awareness and positive attitude in the end.

4. The finding of this research also revealed that environmental awareness and attitude found to have weak relationship to each other. However, this is against the major objectives of environmental education which is intended to bring attitudinal change and pro-environmental behavior through creating awareness. And this can be possible if the relationship between these variables is strong enough. But there might be other internal and external factors that make the relationship weak. Thus, major study is needed to identify the reason for the weak relationship between environmental attitude and awareness.

5. Instructors should have to involve in all activities to develop student's awareness and attitudes.

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# **Appendix A**

**Addis Ababa University**

**School of Graduate studies**

## **A Questionnaire for students in Addis Ababa University**

**Dear students**

The purpose of this questionnaire is to examine students' level of awareness about and attitude towards environmental degradation. There is no need to write your name, and the information you provide is highly confidential. It only serves the research purpose. Hence would you mind filling the questionnaire?

**I would like to thank in advance for your cooperation.**

**Note: In this questionnaire Environment refers to land and natural vegetation in the rural setting.**

**PART ONE: Please choose your answer for the demographic and environmental information.**

1. Department \_\_\_\_\_
2. Your age:
  - A. 20 year and below it
  - B. Above 20 year
3. Your student status:
  - A. First year
  - B. Second year
  - C. Third year
  - D. fourth year
4. Your gender:
  - A. Male
  - B. Female
5. Growing up area:
  - A. Urban or city enter like Addis Ababa, Hawas, etc
  - B. Rural farm that is rural village or Woreda Town

6. What are your primary sources for environmental issues information? Circle as more than one.
- A. Various school subjects in educational systems (primary, secondary and higher education)
  - B. Electronic media (TV, radio, etc)
  - C. Printed materials (books, newspapers, magazine)
  - D. All of the above
  - E. Other \_\_\_\_\_

**PART TWO: Choose the best answer of your choice and write your answer on the space provided (Awareness test)**

1. Which of the following are the major environmental problem facing Ethiopia for a long period of time in the rural areas.
- A. Solid waste, liquid waste and overgrazing
  - B. Land degradation, deforestation and overgrazing
  - C. Air pollution, water pollution and chemical waste
  - D. Solid waste, chemical waste and liquid waste
2. The problems of land and forest have
- A. Direct relationship
  - B. Indirect relationship
  - C. No relationship
  - D. Opposite relationship
3. All of the following are correct about land degradation **except one**
- A. Land degradation result in reduction of carrying capacity of land
  - B. In Ethiopia land degradation occurs only in the form of soil erosion
  - C. Land degradation can be a decline in humus content of land.
  - D. Mostly land degradation is a problem for rural community

4. Which of the following is **true** about the rate of deforestation in Ethiopia recently?
- A. Increasing
  - B. Remain the same
  - C. Decreasing
  - D. None of the above
5. Land degradation and deforestation are more pronounced in rural area where there is\_\_\_\_\_
- A. Road construction
  - B. Deep rooted poverty
  - C. intensive agricultural activity
  - D. B and C
6. All of the following are underlying causes of land degradation in Ethiopia **except:**
- A. Population pressure
  - B. Lack of awareness
  - C. Long fallow period
  - D. Deforestation
7. Identify main agents of soil degradation in Ethiopia
- A. Running water
  - B. Natural hazards
  - C. Denudation of land
  - D. Land slide
8. Rapidly growing population contributes to land degradation primarily through:
- A. Abundance of land
  - B. Stripping of crops in the land
  - C. Exploitation of natural resources
  - D. Long fallow periods

9. The major causes of deforestation in Ethiopia is \_\_\_\_\_
- A. Wild fire and desertification
  - B. Absence of forest conservation policy
  - C. High demand for agricultural land and fuel wood
  - D. Commercial timber and lumber production
10. Which one of the following is the economic consequence of environmental degradation in Ethiopia?
- A. Decline in agricultural production
  - B. Problem of health
  - C. Population displacement
  - D. Community disintegration
11. How do you think deforestation accelerate land degradation?
- A. By exposing the land for water and wind erosion
  - B. By reducing litter or organic matter from the land
  - C. Through removal of animal dug and crop residues for cooking
  - D. All are correct.
12. In Ethiopia agricultural activities highly contributes to soil degradation through
- A. Intensive use of modern agricultural inputs.
  - B. Repeated cultivation of particular type of crop
  - C. Having fallowing period for crop cultivation
  - D. Uses of agricultural machinery.
13. Which of the following is a solution to the problem of land degradation in Ethiopia?
- A. Afforestation
  - B. Reforestation
  - C. Family planning
  - D. All are important

14. Which of the following practices is useful to control soil erosion in Ethiopia?
- A. Contour ploughing
  - B. Wind break
  - C. Terracing
  - D. A and B
15. Which one of the following can solve deforestation problem in Ethiopia?
- A. Planting of trees on the degraded part
  - B. Creating awareness
  - C. Using controlled grazing
  - D. All of the above
16. The negative effect of land degradation on rural communities includes
- A. Poor farming practices
  - B. Wide spread of pests
  - C. Death and poverty
  - D. Loss of forest conservation
17. Which one of the following is not the main consequence of deforestation in Ethiopia?
- A. Flood and drought
  - B. Loss of soil fertility
  - C. Lack of building materials
  - D. There is no answer
18. In Ethiopia the natural resource base degradation results in:
- A. Food insecurity
  - B. Famine and drought
  - C. Migration of people
  - D. All are correct

19. In rural area land degradation and deforestation contributes to\_\_\_\_
- A. The initiation farmer to conserve their land
  - B. Low level of house holds income
  - C. Low living standards of the community
  - D. B and C are correct
20. Which of the following is the consequence of deforestation on the physical environment?
- A. Climatic change
  - B. Loss of water
  - C. Loss of wild life
  - D. All
21. Which one of the following is effect of over grazing on land and forest resources in Ethiopia?
- A. Over grazing results in decreasing forest cover
  - B. It changes fertile land to desert
  - C. Cerate pressure on land and forest
  - D. All of the above
22. The most important way to fight environmental degradation is
- A. Legislation
  - B. Education
  - C. Incentives
  - D. Recycling
23. Which one of the following contributes least for land degradation in rural areas?
- A. Road development
  - B. Lack of awareness
  - C. Poverty
  - D. Population growth

## Appendix B

PART Three: Please indicate how much you agree or disagree with the following statements putting X mark in the box.

Ser.No.	Statement	Strongly Agree	agree	undecided	disagree	Strongly disagree
1	Land degradation alone may not lead to poverty and famine.					
2	The so called 'ecological crisis' facing human kind have been greatly exaggerated.					
3	Overusing the land means damaging the very basis of human life.					
4	Poor people should be responsible for environmental degradation than the rich.					
5	It is clear that environmental degradation is a result of unwise resource utilization.					
6	Considering the problem of deforestation in our country, we need to substitute the uses of fuel wood by other alternative energy source.					
7	In my view soil erosion is major agent for land degradation in rural Ethiopia..					
8	It is the responsibility of rich countries to solve the environmental degradation problems of the world.					
9	I believe land and forest degradation affect the present generation more than the future generation					
10	This generation should take a responsibility for conserving the natural resource needed by the next generation					
11	If deforestation and land degradation continue at their present rate, we will soon experience a major environmental disaster in Ethiopia					
12	Maintaining agricultural production more important for our country than protection of land and forests in rural areas.					
13	As leaders of tomorrow universities have responsibility in training the young generation about the environment					

14	Land degradation and deforestation should be left to agricultural experts who are dealing on rural development					
15	Life is prone to poverty, misery, famine and death in a degraded environment					
16	Land degradation and deforestation in rural Ethiopia can be solved with out big change in traditional agricultural practice.					
17	In my opinion land degradation is a temporary problem, thus no need to worry about it					
18	The most important factor for preventing environmental problems is efficient environmental education.					
19	Economic development in rural area completely damages land and forest cover.					
20	Science and technology can solve all environmental degradation.					

## Appendix C

### Sample Size Determination Formula

$$n = (z/e)^2 p (p-1)$$

z= is the value of the confidence level at 1.96(95%)

e= is the sampling error at 0.05(5%)

p= is estimated value for the proportion of sample that was correctly respond to pilot test

$$P = n/N$$

q= (p-1) is the estimated value for the proportion of sample that was wrongly respond to pilot test

n = Number of students who give correct response for qusetion1-10 to pilot test

N = Total number of students in the pilot study

Questions number	Proportion(P=n/N)	q=(p-1)
1	20/30=0.67	0.33

2	20/30=0.67	0.33
3	14/30=0.47	0.53
4	20/30=0.66	0.34
5	23/30=0.76	0.24
6	21/30=0.7	0.3
7	19/30=0.63	0.37
8	20/30=0.67	0.33
9	23/30=0.78	0.22
10	20/30=.66	0.34

$$n_0 = \frac{n_1+n_2+n_3+n_4+n_5+n_6+n_7+n_8+n_9+n_{10}}{10}$$

$$\begin{aligned} n_1 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.67(1-0.67) \\ &= \frac{3.8416 \times 0.67 \times 0.33}{0.0025} \\ &= 339.8 \sim 340 \end{aligned}$$

$$\begin{aligned} n_2 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.67(1-0.67) \\ &= \frac{3.8416 \times 0.67 \times 0.33}{0.0025} \\ &= 339.8 \sim 340 \end{aligned}$$

$$\begin{aligned} n_3 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.47(1-0.53) \\ &= \frac{3.8416 \times 0.47 \times 0.53}{0.0025} \\ &= 382.8 \sim 383 \end{aligned}$$

$$\begin{aligned} n_4 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.66(1-0.34) \\ &= \frac{3.8416 \times 0.66 \times 0.34}{0.0025} \\ &= 344.8 \sim 345 \end{aligned}$$

$$\begin{aligned} n_5 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.76(1-0.76) \end{aligned}$$

$$\begin{aligned} n_6 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.7(1-0.3) \\ &= \frac{3.8416 \times 0.7 \times 0.3}{0.0025} \\ &= 322.7 \sim 323 \end{aligned}$$

$$\begin{aligned} n_7 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.63(1-0.37) \\ &= \frac{3.8416 \times 0.63 \times 0.37}{0.0025} \\ &= 358.2 \end{aligned}$$

$$\begin{aligned} n_8 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.67(1-0.33) \\ &= \frac{3.8416 \times 0.67 \times 0.33}{0.0025} \\ &= 339.8 \sim 340 \end{aligned}$$

$$\begin{aligned} n_9 &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.78(1-0.22) \\ &= \frac{3.8416 \times 0.78 \times 0.22}{0.0025} \\ &= 263 \end{aligned}$$

$$\begin{aligned} n_{10} &= (z/e)^2 p (p-1) \\ &= (1.96/0.05)^2 0.66(1-0.34) \end{aligned}$$

$$= \frac{3.8416 \times 0.76 \times 0.24}{0.0025}$$

$$= 280.3 \approx 280$$

$$= \frac{3.8416 \times 0.66 \times 0.34}{0.0025}$$

$$= 344.8 \approx 345$$

$$n_o = \frac{n_1 + n_2 + n_3 + n_4 + n_5 + n_6 + n_7 + n_8 + n_9 + n_{10}}{10}$$

$$= \frac{340 + 340 + 338 + 345 + 280 + 323 + 358 + 340 + 263 + 345}{10}$$

$$= 332$$

## Appendix D

Profile of sampled students in the study based on age, gender, year, growing up areas and faculties

Characteristics	Level	Number of respondents	Percent of respondents	Total
Age groups	20 year and below it	114	39.4	289
	Above 20 year	175	60.6	
Gender	Male	197	68.2	289
	Female	92	31.8	
Year level	Second	191	66.1	289
	Fourth	98	33.9	
Growing up areas	Urban	165	57.1	289
	Rural	124	42.9	
Faculty or college	Social Science	88	30.4	289
	Science	68	23.5	

	Business and Economics	133	46.0	
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Source field survey and registrar office 2002E.C