

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



**ASSESSMENT OF DIFFERENCES ON STUDENTS' AWARENESS AND  
ATTITUDE TOWARDS DEFORESTATION AND SOIL EROSION IN SHIRE  
AREA HIGH SCHOOLS**

**BY**

**GOITOM TEFAY**

**JUNE, 2011**

**ADDIS ABABA**

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**BY  
GOITOM TESFAY**

**A Thesis Submitted to the Department of Geography and Environmental Education  
in Partial Fulfillment of the Requirements for the Degree of Master of Education in  
Geography and Environmental Education.**

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## **Abbreviations and Acronyms**

|        |   |
|--------|---|
| AAU    | Addis Ababa University  |
| amsl   | above mean sea level  |
| ANOVA  | Analysis of variance  |
| CSA    | Central Statistics Agency   |
| ECLAC  | Economic Commission for Latin American and the Caribbean            |
| EE     | Environmental education   |
| EEPFE  | Environmental Economics Policy Forum of Ethiopia                    |
| FDRE   | Federal Democratic Republic of Ethiopia                             |
| FGD    | Focus Group Discussion  |
| IEEP   | International workshop on Environmental Education Program           |
| IFPRE  | International Food Policy Research Institute                        |
| IUCN   | International Union for the Conservation of Nature                  |
| MOA    | Ministry Of Agriculture   |
| MOE    | Ministry Of Education   |
| MOH    | Ministry Of Health  |
| NGOs   | Non Governmental Organizations                                      |
| SEMH   | Semema High School  |
| SHIH   | Shire Indasilassie High School                                      |
| SIDA   | Swedish International Development Authority                         |
| UNCED  | United Nations Convention in Environment and Development            |
| UNEP   | United Nations Environmental Program                                |
| UNESCO | United Nations Educational, Scientific and Cultural<br>Organization |
| USA    | United State of America   |
| USAID  | United States Agency for International Development                  |
| WUR    | Wageningen University and Research Center                           |

## **Acknowledgments**

First of all, I would like to address my heartfelt gratitude to my advisor, Muluneh Weldetsadik (PhD), who helped me during the various stages of the study and made invaluable suggestions and comments to improve the content and form of the study. My deepest thanks also go to Geography and Biology teachers of Shire Indasilassie highschool for helping me in giving their comments about the instruments of data collection. I also wish to thank the school directors of the study area who allowed me to contact their students. My special thanks also go to my sample respondents for their willingness, commitment and patience to answer all the questions in the Questionnaire and for their active participation in the focus group discussion. Again I would like to express my deepest gratitude to my sister Yeshareg Hagos who encouraged me morally in doing my paper And I want to address my heartfelt thanks to Radae G/ abihher for his support and encouragement while I was doing this research. Last but not list, I would like to thank Saba for her unreserved effort in typing and editing my research and designing the appropriate research format.

## ***Abstract***

*Currently environmental problems are becoming the havoc problems facing our world. Particularly environmental problems like soil erosion and deforestation are serious problems in Ethiopia. Environmental problems only can be solved if citizens develop awareness about environmental problems and brings favorable attitudes which in turn bring behavioral change. In line with this, the study focused on assessment of students' awareness and attitude towards deforestation and soil erosion in Shire Indasilassie and Semema secondary schools to determine their awareness and attitude and identify significant differences based on school type and other subpopulations.*

*The study followed a comparative research methodology. In the study 346 sample respondents were selected using proportional stratified random sampling method. Data was gathered using a set of questionnaire consisted of two sections (one that measure about awareness which comprised of 27 questions and the second section that measure respondents' attitude consisting of 13 questions) and two focus group discussions was used as instrument of data collection. To analyse data the survey has employed qualitative and quantitative methods in that, data gathered through questionnaire and focus group discussion analysed quantitatively and qualitatively respectively.*

*It was also found out that in the awareness test; female, Semema high school students, interested to environment related courses, those rural based students, students from low income and illiterate parents found better of in their awareness to the local environmental problems. Moreover, female, grade ten, rural based, Semema high school students, students from low income and illiterate parents were found to have favorable attitude towards the problem in the attitude test. There was a very weak positive bivariate correlation between students' environmental awareness and attitude. Based on the results of the survey, the researcher concluded that majority of students of the study area have low awareness and unfavorable attitude towards the problem understudy. Furthermore, the study revealed that their source of information about the environment and its allied problem is the formal education system. In addition, review of environment related subjects revealed inadequate and shallow contents targeted to the environment are integrated. Depending on the major finding and conclusions, the survey recommended schools of the study area to do their best to increase students awareness and brings favorable attitude by opening environmental clubs and broadcasting environmental issues through school media. Furthermore, the survey recommended to the curriculum designers to incorporate more environmental contents into Biology and Geography courses which in turn can promote more awareness and positive attitude towards environmental issues.*

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the study**

In this century our world is suffering more because of the connotative environmental issues that make life on earth to undergo from bad to worst through time. These problems were initiated by human activities on his daily basis to achieve his needs and wants. In line with this McKay in 2000 mentioned that the earth is in chaos due to the fact that human beings are pushing it to the limits of its capacity ( Qtd in Malebye, 2005). Furthermore he noted, we abuse the earth to satisfy our selfish needs ignoring the fact that damaging the environment causes irreversible damage to the entire planet. Thus, we disturb the normal functioning of the ecosystem. Because of such act of people life is becoming more harder.

Back to ancient times, people were living in nature, because of their low population pressure and low technological progress ( Miller, 1975). But this trend has changed especially since the introduction of agricultural activities and industrialization which leads to have population explosion and technological progress ( Miller, 1975). Starting from this time, people all over the world started to lead their life by subduing nature. When the time went on environmental problems have become more and more challengeable through out the world. However the problem is world wide, its effect is more observed in developing countries due to their high rate of population growth from time to time and their lower capacity to challenge these problems.

Currently, environmental problems by their nature are very diverse and show differences between developed and developing countries (Alan Reddish, 1996). Alan Reddish further elaborated that in developed countries the worst environmental problems are strongly associated with their development which encompasses climate change, air pollution, biodiversity crisis and extinction, and pollution of water bodies. In contrast to this, environmental problems observed in developing countries are very much related

with their high population pressure consuming the finite natural resource of the earth ( Mayur, 1979). These environmental problems are caused due to their heavy dependence on agricultural activities. Hence, environmental degradation including different types like deforestations, soil erosion, desertification, bush encroachment, loss of biodiversity, and drought are the main threat to those developing world. Coming to the continent of Africa, environmental problems such as deforestation, soil erosion, drought and desertification are the key challenges in the 21<sup>st</sup> century (Africa Society, 2008).

In general the causes of environmental degradation in the third world countries are varied but the bulk of literature attributes it to the high population density (Gaim, 1996). As he indicated it is assumed that the causes of environmental degradation experienced by many countries in the developing world is the high rate of population growth , which is presumed to place a heavy demand on the natural environment. Likewise, to the developing countries, environmental degradations are the most common problems to countries like Ethiopia. This environmental degradation comprises of land degradation in the form of soil erosion, deforestation and nutrient depletion is the problem in our country context. These problems are initiated and accelerated due to the removal of vegetation cover and over cultivation as a result of the rapidly growing population. These all are done for the sake of feeding the rapidly growing population and providing source of energy ( Bielli, et al ,2001).

In Ethiopia in which most of the highland environment is the most pressed by deforestation and soil erosion have confronted serious conditions from its inhabitants. Its people always partake in clearing the vegetation cover to expand agriculture and get source of fuel. This circumstance is happening because the rapidly growing population does not have any means of survival other than agriculture. This in turn opens wide space for soil to erode by wind and water. In connection with this, the Ministry of Agriculture in 1995 pointed out that “out of agriculturally productive lands of the country, 14 millions hectares rendered unproductive (seriously eroded ) and about 2 million hectares of land have reached the point of no return. Annually there have been a loss of about 1,900 million tons of soil from the highlands through erosion which is equivalent to a loss

of 100 tons/ ha per year. And these problems were serious in Wollo, Gondar and Tigray, parts of Shewa and Gojam regions (Qtd in Bielli et al., 2001).

As far as Tigray region is concerned Wolde and Veldkamp (2005) mentioned that, land degradation which includes degradation of vegetation cover, soil erosion and nutrients depletion is the major ecological problem.

These above mentioned environmental problems in Ethiopia in general and specifically in the highland areas of Ethiopia are caused due to population pressure, poverty and unawareness of those inhabitants about the ultimate consequences of their activities on the environment. This calls that there is an urgent need for critical environmental awareness and better protection of the world around us ( Otiended and Ezaza, 1991). For this reason, environmental education is getting priority overall the world to change this problem. With reference to this, Mekay in 2000 cited the solution to the environmental problems lies much more in people awareness, perception, attitudes, values and expectations (Quoted in Malebye, 2005).

Believing on these above ideas, schools in Ethiopia are providing environmental education in an integrated and interdisciplinary way to make students and the whole communities' key player in combating environmental problems like deforestation, soil erosion and others by disseminating the awareness about the environment they get in their school to their parents, neighbors and communities at large. In connection with this Golltto and Souchon in 1991 (Quoted in Aklilu, 2001) pointed out that schools have great role to contribute to the protection of the environment by designing and implementing strategies aimed primarily at disseminating information and influence the attitudes of parents via their children.

As a result of these all, this study was done to find out students' awareness and attitudes towards deforestation and soil erosion and to investigate if there was significant difference between the two high schools found in the study area.

## **1.2 Statement of the Problem**

Ethiopia is a country of unindustrialized and firm dependent in agriculture in which its economy mostly is derived from the potentially renewable natural resources. However, the economy which heavily dependent upon agricultural sector, it is found severely extracting the soil resources to the level of unrecoverable stage. This circumstance is commonly observed in the form of clearance of vegetation and soil erosion. In these issues several studies were conducted and they revealed that the highland of Ethiopia is facing pandemic destruction of forest cover and soil erosion. These problems are particularly common in northern part of Ethiopia. For instance, the study of (Demel, 2005 and Alicia, 2008) indicates environmental problems are specially severe in northern part of Ethiopia like Wollo, Gonder and Tigray. Similarly, these issues are also common problem in Shire Indaselassie areas. This kind of problem is emerged from the rapid population growth rate that grows by about 3 percent annually and negative attitudes and practices of local peoples in their environment (Ibid). Most of the people that reside in these areas thought as the environment is inexhaustible that can go forever without any short coming (Bielli et al., 2001). In general, the most factors accelerating this problem is due to man's abusive action . To address this problem several studies underlined that the strong desirability of students' awareness and attitudes about the environmental degradation like land degradation and soil erosion. It is because if students have awareness and attitude they can influence their parents and communities.

Supporting this idea Shobeiri et al., (2007 ) reported that, education about, in and for the environment provides students with opportunities to learn about the functioning of natural systems, to identify their beliefs and opinions, consider a range of views, and ultimately make informed and responsible choices for themselves, their families and communities. Moreover, it is also believed that children now at school will become decision making citizens at a time, therefore educating children on these issues becomes of paramount importance. At the same time it is fundamental to know firstly what levels

of awareness, favorable attitude they possess, what they are doing regarding environmental issues those students in school and what is their source of information about the environment if it is needed to foster their awareness and attitude towards environment.

Thus, conducting study on students awareness and attitudes of environmental problems is very worth of today for a lot of catastrophic environmental problems are facing human being. This is because we humans are the only capable of ensuring that the environment remains inhabitable whatever our activities, whatever progress we achieve, we must ensure that the biosphere is neither destroyed nor adversely affected ( Otiende and Ezaza, 1991). The report of Abinet, (2005) cited in Darge Wolke et al., 2006 mentioned that awareness of environmental issues should be established at a very young age in order to achieve the desired effect as far as changes in attitude and behavior patterns are concerned. It is also generally easier to reach more children, including those belonging to poorer social groups, through the general school system. Because of these all, the survey has assessed whether the schools are producing citizens of distractive nature or protective nature toward their environment and thereby explored whether the expected objectives of environmental education underlined by many studies in addressing environmental problem is taking place in reality amongst students of high schools in the study area.

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

#### **1.3.1 General objective of the study**

The overall objective of the study is to assess whether there is significant differences in students' awareness and attitudes towards deforestation and soil erosion amongst students of the two high schools in the study area.

#### **1.3.2 Specific objectives of the study**

To address the general and main objective of the study, the following specific objectives are set;

- To assess students awareness of and attitude toward deforestation and soil erosion.

- To assess and identify differences in students' awareness and attitude toward deforestation and soil erosion in terms of sex, age, class level, place of birth, access to media , interest to environment related courses, participants' parents educational background and income level.
- To determine the relationship between students awareness and attitude.

#### **1.4 Hypotheses of the study**

The survey tested the following hypotheses:

- There is a significant differences ( 5% significance level ) in students awareness and attitudes towards deforestation and soil erosion in terms of sex, age, class level, interest to environmental related courses, access to media and students place of birth (urban versus rural), participants' parents income level and educational background. This is because even if learners have been exposed to environmental education, they are influenced by different variables. Fore example, place of birth influences significantly whereby these from rural area are aware of and have favorable attitude about environmental issues. Class level and age difference also affect in that these who spent more years in education and older age groups could have better environmental awareness and favorable attitude towards the problem. This may be due to getting more environmental related courses. Similarly, gender also affect individual awareness towards environmental issues to differ between male and female, in which female can have higher awareness and favorable attitude due to their care taker nature they inherited from their mothers. Moreover participants' parents educational level and income level affects students to have environmental awareness and favorable attitude than these who have low parents income level and illiterate parents.
- Students of the study area have an average awareness and favorable attitude towards the local environmental problems. Because they have been attending issues of the environment through environment related courses like Biology ang Geography.

- There is strong correlation between students awareness and attitude. This is attributed students who have awareness influence them to develop favorable attitude. As a result of this, there could exist strong correlation between students awareness and attitude.

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

Environmental problems like deforestation and soil erosion are the major problems facing Ethiopia. Even though, these problems are a country wide phenomena, they are more manifested in the Northern part of Ethiopia. Likewise, land degradation that involves the clearance of vegetation cover and soil erosion is the most critical environmental problem in Tigray region. In the same way, in Shire Indaselassie area, found in Tigray region, local people clear forests to meet their short term benefits which in turn accelerated soil erosion at a faster rate. This heavy exploitations of forests for wood fuel, sell to market as source of income, and agricultural activities and the cultivation fields unconducive to plough, do not only make to decrease its productive capacity to the present inhabitants but also it will endanger the future generations their existence on such like environment.

Though, rehabilitation of degraded lands through area closure, planting seedling and building stone bunds are taking place the problem is still escalating from time to time. As a result of this, promoting students awareness and attitudes of these problems is paramount besides to the rehabilitation activities.

Therefore, the survey by assessing students' awareness, and attitude of deforestation and soil erosion, it is hoped to be a valuable source of information that maybe considered by all organizations which claim to have an interest in making school more productive. In addition, it may also help for future researchers as source of data for those who want to conduct an in depth study on similar issues.

### **1.6 Limitation of the Study**

In this survey time shortage was one of the main limitation of the study that forced the researcher not to make pilot study in some target population before the actual data

collection from the respondents. Furthermore, reference materials in relation to environmental awareness and attitude in Ethiopian context was another constraint.

### **1.7 Delimitation of the Study**

In its geographical scope the study was done in two first cycle secondary schools of Shire Indaslassie area. Conceptually, the present study is an attempt to examine the environmental awareness and attitude of secondary school students in relation to place of birth, sex, grade level, interest to environmental related courses, access to media and participants' parents income level and educational background. On top of this, the study was limited to grade nine and ten students in both schools of the area.

### **1.8 Operational Definition of Terms**

1. **Awareness of deforestation and soil erosion** : of students' consciousness, understanding and recognition of the causes and consequences of deforestation and soil erosion experienced by local people.
2. **Attitudes towards deforestation and soil erosion:** a feeling or opinion or tendency of students' concern and recognition of deforestation and soil erosion.
3. **Deforestation:** Cutting down of trees for either to clear land for cultivation or charcoal making, and construction purpose.
4. **Soil erosion:** is the process of wearing away of the soil due to human activities in his/her daily basis.
5. **Environmental problems:** are the adverse consequences of man on the environment which manifested in the form of soil erosion, deforestation, recurrent drought and loss of biodiversity.

## **1.9 Organization of the Study**

This research study is arranged into five chapters. These are, chapter one deals about the introduction of the study, chapter two about review of related literature, chapter three about research methodology and description of the study area; chapter four about findings and discussion and chapter five deals about summary, conclusions, recommendations and research implications.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 Overview of Environmental Issues**

The environment which consists of all biotic and abiotic things is the basic residence for humans to live. Though, humans differ in various ways in their state of development, in terms of language, race and culture, this creature can not exist without the support of the environment (Maleby, 2005). However, humans are dependent on the services of the environment, they are still found harming the environment to the level of irretrievable (unreversible) easily. This catastrophic impact of human on the environment is so complex that it has a very wide range throughout our world. Because of this range environmental problems (issues) manifested due to the state of development and those related with agrarian nature are not the same throughout our world. Those environmental problems caused by developed countries even if severely affecting developing countries include those related to their high stage of development like climate change and global warming, ozone depletion hazardous wastes, loss of biodiversity and extinction and water pollution (Alam Reddish, 1996). In connection with this, Shah (2010) mentioned that, our world is experiencing climate change and global warming due to human intensive use of fossil fuels. Furthermore, he noted that global warming is increasing alarmingly and become the main cause of decline of variety of lives and their habitats continually.

In developing countries environmental problems like deforestation, soil erosion, recurrent drought, and desertification and in whole land degradation are the worst problems. The environmental problems, which we call them environmental degradation many related literature telling us are aggravated by rapid population growth and their intensive dependence on agriculture. According to Guardian (2002), environmental degradation is a condition in which part of the natural environment is destroyed and become unable to satisfy the peoples who depending on it.

The consequences of environmental degradation are now getting into the minds of people but before they did not consider as environment is finite. In line to this, Mayur (1979) explained that, man for the past thousand of years was not conscious the huge product of the environment, but with progress in technology through the world over, he found the environment with many crucial things. This new understanding about the availability of environmental resource imposed to think the environment as infinite provider to him.

Because of this thought of peoples about the environment many types of environmental degradation are exacerbating in overall the world in general and in the developing countries in particular. According to Hurni et al., (2004 ) and Guardian, ( 2002 ) the most pronounced types of environmental degradation which are commonly observed in most developing countries are land degradation that refers to the degradation of soil, water, climate, fauna and flora and soil salinization, desertification and loss of biodiversity .

## **2.2 Environmental Problems in Developing Countries**

As it is highlighted above, environmental degradations are the key challenge to peoples living in developing countries. These environmental problems include desertification, soil erosion, deforestation and drought. These environmental problems are caused by poverty and explosion of population which forces to repetitive use of stressed environment and expansion to marginal and fragile area (Tamene and Velk ,2008 ). Even though, climatic change has negative impact in developing countries like Africa, but the most pressing are deforestation, soil erosion and nutrient depletion. This quite different nature of environmental problems in developing countries from the developed ones is associated with their dependence in agriculture and from the products of natural resources (Mayur, 1979). This dependence on these rich natural resources and agricultural activities found severely endangering the environment. This is happening at a rapid pace since the developing nations are clearing their forests and in turn their soil to step to the level of development. Furthermore, Tamene and Velk (2008) pointed out that, looking soil erosion from the standpoint of economy it is the worst problem for these countries which have lower capacity to cope with it and to replace its lost nutrients. Infact those environmental problems reflected in developing countries are also common to the

continent of Africa ( IFPRI, WUR and EEPFE, 2005 ). Though there are different types of land degradation in the continent of Africa, but the most to African countries are soil erosion and deforestation.

### **2.3 Deforestation and Soil Erosion in Ethiopia**

Ethiopia which is one of the agrarian country in Africa is located between 3<sup>0</sup>N and 15<sup>0</sup> N Latitude and 33<sup>0</sup>E and 48<sup>0</sup> E longitude. The country has a total land area of about 113,000,000 hectares (FDRE, 1997). Being an agrarian country almost all Ethiopia depends on the well being of the environment that includes air, water, land, flora and fauna. Most Ethiopian agriculture is subsistence in which it is obvious that human beings depend heavily on the exploitation of natural resources for the production of their basic needs: food, fibre, energy, building materials and transport. In this endeavour the basic natural resources is the land itself which is farmed, grazed and logged. As human population and livestock increases, the expansion of agricultural land become impossible or fragile marginal lands come under cultivation (Dessaiegn et al., 1988). Even though, most of the inhabitants depend on the agricultural sector, they have been degrading their environment since the beginning of agricultural activities. But this trend is becoming worst currently due to population pressure. This is because when population grows it needs an additional field of growing food. This process pushes cultivation to take place at a rapid rate and over cultivation by clearing vegetation cover and expanding to marginal areas. This in turn promotes to faster rate of soil erosion (Gedion, 2003). Land degradation which manifested in Ethiopia in soil erosion, and nutrient depletion and deforestation are the most serious environmental problem to this country. A lot of literature indicated that during the past few decades, Ethiopia has experienced a massive environmental degradation due to population pressure, unwise use of natural recourse because of preference for short term benefits and over cultivation. But currently this environmental degradation that is deforestation and soil erosion are increasing alarmingly due to population pressure that has been growing at a faster rate. As a result of this circumstance, the environment is reaching to the level of irrecoverable stage (FDRE 1997; Dessaiegn et al., 1988 ;Biell et al., 2001; Gedion, 2003 ).

### **2.3.1 Deforestation in Ethiopia**

Forest have a multiple benefits to human kind since they are source of food, medicine, fuel, lumber, paper and living for variety of life form. In addition to this, they help to protect soil erosion and are grazing for livestock during the dry season. Beyond this, forests play a big role in regulating climate change by taking in carbon dioxide. In the context of our country forest are extensively used for construction purpose and as source of energy for 85 percent of the population who live in rural area. In Ethiopia deforestation has been a continuous process but what is special is that its rate and extent is much higher today than in the past. The main causes for this problem to happen is the combined force of poverty, population growth, the rugged topography of the environment and poor economic growth ( Demel, 2003 and 2005 ).

### **2.3.2 Extent and Causes of Deforestation in Ethiopia**

#### **2.3.2.1 Extent of Deforestation**

As to the extent of deforestation, there is not vivid and commonly agreed explanation since several authors reported differently. Goreki and Tesfaye, (1993) have cited that an estimated 200,000 hectares of forest and woodland are destroyed each year in the highland area of Ethiopia through clearing for cultivation, commercial purposes and for fire. Another study also revealed that deforestation in the Northern highlands of the country was severe and attained alarming rate in which it destroys 75,000 hectares per year (Sahilu, 2003 ; Demel et al., 2003, both in Gedion, 2003). They argued that, although there are ongoing controversies about the extent of past forest cover in Ethiopia, there seems consensus in the fact that high forest might have once covered a large proportion of the land mass of Ethiopia. But today the surface cover remain is only with 2.7%. This increasing rate and extent of deforestation is more common in general in the highland of Ethiopia particularly in Gojam, Gondar, Wollo and Tigray areas (Gorecki, and Tesfaye, 1993; Alicia, 2008; Demel, 2005). More over, Goreki and Tesfaye, (1993) pointed out that in Nothern Ethiopia only aboaut 0.6% of the total ara is now forested, which is about 2 percent of its area above 1500m. The corresponding figure of Eastern Ethiopia are 0.1% and 0.3 % and for central Ethiopia 1.9% and 2.3%. Regarding the

extent of deforestation another study also showed that between 1990 and 2005 the country actually lost 14% percent or 21,000km) of its forest, which means that deforestation increased by 10.4% from 1990 to 2005 (African Society, 2008).

### **2.3.2.2 Causes of Deforestation in Ethiopia**

Several studies have mentioned that deforestation which is the major problem in the highland was caused by un-proportional number of people living on the land which are over 1500 meters above sea level (Alicia, 2008; Sahilu in Gedion, 2003). More over, the ever increasing rate of population growth is believed to be the major cause of deforestation. This is because increased population led to increased need for farmland, wood for fuel, charcoal and construction materials. It is clear that in Ethiopia wood and wood products are the prominent materials for construction of house and sources of energy (Demel, 2005; Aklilu, 2001). It is also true that as the population grows it demands more area for croplands, more fuel timber, forage and browse with out effective management. These are leading to an increasing depletion of the country's natural vegetation particularly from pastures, woodlands and forests ( FDRE, 1997).

In general other studies underlined that the underlying causes of deforestation are the vicious cycle of mutually reinforcing factors of poverty, population growth, poor economic growth and the state of the environment (Demel, 2005; Demel et al., in Gedion, 2003).

### **2.3.3 Soil Erosion in Ethiopia**

As far as soil erosion is concerned it is more prevalent on the highlands of Ethiopia. It is caused due to rapid population growth, cultivation on steep slopes, clearing of vegetation, and overgrazing. The annual rate of soil loss in the country is higher than the annual rate of soil formation rate. Annually, Ethiopia losses over 1.5 billion tons of topsoil from the highlands because of erosion, which could have added about 1.5 million tons of grain to the country's harvest. This indicates that soil erosion is a very serious threat to food security of people and requires urgent management intervention. Soil erosion caused by human activities is the major environmental problem in Ethiopia. This

episode is in fact exacerbated by clearance of vegetation since vegetation cover protects from exposure of soil to heat and raindrop. Soil erosion especially on the highlands is aggravated by the continuing extensive deforestation through clearing and by fire. Furthermore, rapid population growth, cultivation on steep slopes, over cultivation, deforestation and overgrazing are the main factors that accelerated soil erosion in Ethiopia ( Gorecki and Tesfaye, 1993 ). This all was done by humans in their walk of life to meet their day to day activities on the land for the country is predominantly dependent on agriculture.

## **2.4 Deforestation and Soil Erosion in the Northern Highland Tigray**

### **The State of Tigray**

Tigray is located at the northern limit of the central highlands of Ethiopia. Its landform is complex composed of highlands (in the range of 2300-3200 meters above sea level (masl), lowland plains (with an altitude range of <500-1500 masl), mountain peaks (as high as 3935 masl) and high to moderate relief hills (1600-2200 masl). Thus, Tigray has diversified agro ecological zones and niches each with distinct soil, geology, vegetation cover and other natural resources. The climate is generally sub-tropical with an extended dry period of nine to ten months and a maximum effective rainy season of 50 to 60 days. The rainfall pattern is predominantly uni-modal (June to September ). Considering rainfall, atmospheric temperature and evapotranspiration, more than 90 percent of the region is categorized as semi arid. The remaining areas in the region can be categorized as dry submoist (near the central south highlands and the Wolkieta highlands) and arid ( the lower areas of Erob and Hintalo Wajerat Woredas ). There are also some moist zone patches in the Kisad Gudo, Mugulat and the Tsegedie highlands (Belete Taffere, 2002 and Nyssen et al., 2007).

### **2.4 Deforestation and Soil Erosion in the Highlands of Tigray**

Tigray is one of the regions most known for its serious land degradation problem. This is manifested in the form of soil erosion, deforestation, declining bio-diversity resources, and soil moisture stress (Belete, 2002).

### **2.4.1 Deforestation in Tigray Region**

Northern Ethiopia is experiencing severe woody biomass shortages that contribute to land degradation. The clearing of indigenous forest and woodland affects important environmental services that forests provide with respect to maintaining soil fertility and water resources within watersheds as well as biodiversity. Deforestation and overgrazing are the major environmental problems in the region. Currently, forests and woodlots cover only about 1.6% of the Tigray region. Even though the practice of rehabilitating the state of the environment has been taking place since the 1970s through reforestation and enforcement of grazing restrictions, the problem of deforestation is still continuing (Nyssen et al., 2007 and Lunderg and Moberg, 2008). Since the accelerated deforestation has led to severe soil erosion in the Tigray region, it has encouraged the government to undertake a series of conservation measures, like the Tigray reforestation programme. As studies show, heavy deforestation has started as far back as 500 years ago in the northern Ethiopian highlands. Because of this heavy deforestation, currently vegetation cover in Tigray is only observed in protected areas and churchyards.

### **2.4.2 Soil Erosion in Tigray Region**

Though soil erosion is prevalent throughout Ethiopia, it is particularly severe in Tigray. Because of the early human settlement (i.e. all the ancient centers of Ethiopian civilization are located in Tigray) and expansion of agriculture, together with the steep terrain and the erratic and intense nature of the rainfall have resulted in erosion being a major problem. Even if quantitative soil loss estimates are rare in Tigray, but the persistent deterioration of the quality of the cultivated land, the ever expanding gullies and the poor yields, partially explained by the poor water holding capacity of the soil, suggest that soil erosion is a critical problem (Fitsum et al., 2002). Even though, estimates of soil erosion rates in the region vary substantially, but are high in many areas. Berhanu et al., (2002) pointed out that, soil erosion, nutrient depletion, and soil moisture stress are severe interrelated problems of land degradation in the highlands of Tigray.

### **2.4.3 Causes of Soil Erosion and Deforestation in Tigray Region**

The main causes of land degradation which manifested in soil erosion, deforestation and nutrient depletion in the region are the proximate causes (i.e. cultivation of steep slopes, low vegetation cover, erodible soils, using dung and crop residues for domestic fuel, declining fallow periods) and the underlying causes that include population pressures, poverty, limited farmer knowledge of integrated soil and water shed management measures (Belete, 2002 ; Berhanu et al., 2002). Population pressure which is one of the causes of deforestation and soil erosion is more pronounced in Tigray region. The population of Tigray is growing rapidly and, although the average rural population density is 33 persons /km<sup>2</sup>, the population density per unit of arable land is much higher (138 persons /km<sup>2</sup>). As a result, farm sizes are very small and the use of fallow is rapidly disappearing, causing problems of declining soil fertility and erosion. Population growth increases the demand for land and contributes to farming on steep and fragile soils, also leading to erosion. It increases demand for biomass as a source of fuel, leading to deforestation and increased burning of dung and crop residues, thus accelerating the problem of erosion and nutrient depletion. Population pressure also contributes to other socio-economic problems, which themselves contribute to land degradation. For example poverty may be worsened by population growth as a result of resource constraints ( Fitsum et al., 2002 ).

The agricultural system of the region is also another cause for soil erosion to happen. This is because the agriculture is based on ox-plough cultivation that has been used without modification for thousands of years, harvesting the same land over and over again. This practice of not using fallow for along period of time makes the soil susceptible to high rate of erosion ( Belete, 2002 in Berhanu, 2002; Nana-Sinkam, 1995 and Nyssen et al., 2007 ). More over, other study mentioned the causes of deforestation and soil erosion as follows. In Tigray region, the main causes of deforestation are not exception from other parts of Ethiopia. These are population pressure, poverty which people forces to clear forests for expanding agricultural activities, source of income, and source of energy and construction materials have accelerated deforestation in the region ( Esser et al., 2002) and the causes for soil erosion are the mountainous and hilly

topography, high population pressure, torrential rainfall, and low degree of vegetation cover (Esser et al., 2002). This study further showed that soil erosion is severe in all parts of Tigray and poses a major threat to continued agricultural production in the area and it further made cultivation of old farmland impossible.

#### **2.4.4 Conservation Measures**

To reverse the land degradation process, efforts of soil conservation and reforestation have been undertaken in Tigray Region since the 1970s. Terracing and afforestation programmes started in 1970 under a USAID sponsored food for-work programme. In the four years following this programme about 1500 ha were terraced and planted at eleven sites (Nyssen et al., 2007). Following this period that is since the early 1980s soil and water conservation activities have become one of the major preoccupation of the people and the authorities. This has involved mass mobilization of labor during the dry season, and food for work and cash-for-work programmes. The conservation strategy focuses mainly on the construction of physical structures; depending on the topography and land use pattern. For steep uncultivated lands, contour stone bunds, cut-off ditches and contour furrows are used. For cultivated lands, contour stone bunds, soil bunds or grass strips, complemented by check dams for gully control are used ( Fitsum et al., 2002). But this practice did not stop soil from erosion and forests from clearing. Since human destruction on the environment partly arise from their attitudes towards the environment, fundamental changes in people's ways of thinking and behaving should get priority to bring significant changes in conservation (Barraza and Pineda, 2003 ).

### **2.5. Development of Environmental Education in World Wide as a Solution to Environmental Problems**

There continues to be a growing concern about the state of the environment, yet we are often confused by the complexities of economic, ethical, political, and issues related to it. Daily, there are references in the news media to environmental issues, such as global climate change, ozone depletion, dwindling resources, famine, disease, loss of biodiversity, pollution, and continuing job losses in over all the world. The

environmental issues we face, both as individuals and within our broader society, are now so pervasive and ingrained within our cultural ways of being that we can no longer look to science and technology alone to solve these problems. On this issue many countries of the world believed to have sustainable development that can meet sufficiently the ever-increasing human needs, has to be accompanied by wise and careful management of the earth's natural resources. Thus, to conserve natural resources they have developed and have been teaching environmental education (Aklilu, 2001; Malebye, 2005).

Environmental education aims to induce social dynamics' first in the local community and subsequently in wider networks of solidarity, fostering a collaborative and critical approach to socio-environmental realities and an autonomous and creative grasp of current problems and possible solutions. Besides to this, the study also revealed that environmental education implies education for conservation as well as education for responsible consumption and solidarity with equitable sharing with in and among societies and between present day and future societies (UNESCO, 2002). Environmental Education means learning how to employ new technologies, increase productivity, avoid environmental disasters, alleviate existing disasters, see and utilise new opportunities, and make wise decisions from a philosophical basis of holism, sustainability, enhancement, and stewardship.

### **2.5.1. The concept of Environment**

As far as the concept of this terminology is concerned several authors have reported various definitions almost similar. As to the UNESCO (2000:7), the term environment is considered as follows:

*Environment is defined as the sum total of all conditions and influences which affect the development and life of all organisms. This concept is now being extended to include not only the bio-physical natural environment, but also the man made physical environment as well as the political, economic, cultural, technological, social and aesthetic environment.*

In this elaborated above environment, living organisms which vary from the lowest micro-organisms such as bacteria, fungi etc, to the highest including man have been facing many challenges to their existence. This problem is attributed due to man act on the environment (Kumar, 2004). By many authors education is believed as the better way to minimize man's impact on the environment. In connection with this, Abdullahi (2010) argued that education is generally regarded a major protector of the environment and indicator of a community's social well-being, standard of living and social justice. This education serves society by providing critical reflection on the world, especially its failures and injustice by promoting consciousness and awareness of the world man on the environment. On this issue UNESCO, (1977) reported that the task of education is to make people aware of their responsibilities. To do so education must first be reoriented and based on an ethos of the environment.

### **2.5.2 The Concept of Environmental Education**

Because of the ever-increasing threats to the resources of the earth and to the healthy and stability of its societies which justify the urgent need for an informed global citizenship paves the way environmental education to emerge. This event becomes a land mark for the development of environmental education in world wide. Several studies' have mentioned the process of how environmental education came into being in the world.

There is a contrast among authors regarding the use of the term environmental education for the first time. For instance, the first attributed use of the term environmental education in the United Kingdom (UK ) was in the 1995 at Keele conference. But, internationally it is claimed that it was first used in Paris, in 1948, by Thomas Pritchard at a meeting of international union for the conservation of nature and natural resources (IUCN), whilst Wheeler in 1985 suggests that the term first appeared in the book "communitas: by Paul and Percival Goodman, published in 1947 (Palmer, 1998).

According to Palmer (1998) reported, the evolution of environmental education has incorporated the significant influence of some of the 'great' eighteenth and nineteenth-century thinkers, writers and educators, notably Goethe, Rousseau, Humboldt, Haeckel, Froebel, Dewey and Montessori. Contrary to this the UNESCO (2000) indicated that,

environmental education came into common usage in the seventies. Furthermore, the organization noted that though the term environmental education as a distinct entity is of recent origin, the environment had been associated with and had been a source of education from the early days of human civilization. To grasp the intricate interactions and interrelationships in man's environment, the science of ecology evolved first. Originally this term was used in biology in the restricted sense of the study of a plant and its environment before it came to describe the totality of complex interdependencies in an environment.

Ecology as the science of man and his environment was mainly used to detect problems in the outside world before one came to realize that basically man himself was the cause of these problems (Palmer and Neal, 1994; UNESCO, 2000 ). Thus, the roots of environmental education could be traced back to school curricula where certain elements of the environmental education concept existed in the school subjects under various names like nature study, rural study, conservation education, field studies, Geography, and Biology. However, these curricula were concerned only with two dimensions related to the environment viz learning from or through the environment and learning about the environment. In this, the vital third dimension, education for the environment was missing. But, this situation began to change in the seventies, when in response to ecological considerations highlighted primarily by conservationists, school curricula became more and more concerned with environmental problems. As a result of this, the third dimension education for the environment became gradually incorporated into the school curriculum through some of the traditional school subjects such as science, Geography and Nature study. This process led to the evolution of the concept of environmental education as a definite entity, giving it a wider interpretation where in addition to the mere acquisition of knowledge (cognitive domain), skills and attitudes (psycho-motor and affective domains) related to environmental problems were also incorporated (UNESCO-UNEP, 1995).

Soon after the acknowledgment of the term environmental education and its ways of evolution, organization concerned with the development of environmental education moved towards defining its meaning and promoting its legitimacy. For instance the

IUCN, otherwise known as world conservation union, that was established in 1949 as a major international union of both government and non governmental organizations (NGOs) concerned with conservation and UNESCO played a critical role in defining environmental education. It was also reported that the greatest land mark in the history of attempting to define the term ‘environmental education’ was an IUCN/ UNESCO’ international working meeting on environmental education in the school curriculum’ held in 1970 at the Foresta Institute Carson city, Nevada, USA. There all influential and what might be described as the ‘classic’ definition of environmental education was formulated and adopted as follows:

*Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings (Palmer, 1998: 55).*

On top of the above, another study also pointed out a more extensive definition evolved in the seventies in the light of the broader definition given to the term environment to include, in addition to the concern for the natural environment, the consideration of all aspects of the social environment as well as the man-made environment and the interaction between man and the environment in its totality. Hence environmental education has been described as “the result of the re-orientation and dovetailing of different disciplines and educational experiences which facilitate an integrated perception of the problems of the environment, enabling more rational actions to be taken, which are capable of meeting social needs.”

In short, out of several definitions found in the literature, the following seems to present a rough approximation of the interpretation given by many countries to environmental education:

*Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes’ necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. It also entails practice in decisions-*

*making and self-formulation of a code of behavior about issues concerning environmental quality (UNESCO, 2000).*

This gradual evolution of environmental education throughout the world is intended to solve environmental problems. In line to these emergences of environmental issues several conferences were held to underline the approximate definition of environmental education and its role in promoting environmental awareness, attitude and practices which can make peoples to be responsible enough to their consequences and be committed to improve the environment. Due to the support of key international institutions that made to rise the profile of environmental education during the 1970s, leads to a great deal of common understanding of the aims, objectives and approaches to the subject. These conferences are the Stockholm, Belgarde and Tbilisi.

The Stockholm conference held in Sweden in 1972 which is the first world meeting on the state of the environment endorsed the need for environmental education, thus greatly enhancing its international status and perceived importance. This Stockholm conference reflected the rapidly growing global interest in and concern for the environment of the 1970s. It led to the establishment in 1975 of the United Nations Environment Programme (UNEP), which together with UNESCO founded the UNESCO/UNEP International Environmental Education Programme in 1975. This programme (i.e. IEEP) was launched at an international workshop on Environmental Education that held in Belgrade by UNESCO/UNEP. It produced the first intergovernmental statement on environmental education. It listed the aims, objectives, key concepts and guiding principles of it in a document prepared at the meeting known as “The Belgrade Charter-A Global Framework for Environmental Education’. Its brief but comprehensive set of objectives for environmental education that prepared under this meeting are summarized as follows. The first one is to foster clear awareness of and concern about economic, social, political, and ecological interdependence in urban and rural areas. Secondly, to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and the third one is to create new patterns of behavior of individuals, groups and society as a whole towards the environment ( UNESCO, 1975 ).

Following the Belgrade meeting, the Tbilisi conference held in Tbilisi, Georgia, USSR in October 1977. This was the UNESCO first Inter-governmental conference on environmental education, attended by official government delegations of 66 UNESCO member states together with representatives of numerous NGOs. The conference prepared recommendations for the wider applications of environmental education in formal and non-formal education. Its final report contains a declaration-largely based on the principles outlined at the Belgrade conference. This established a framework for an international consensus which without doubt has been the seminal influence on the development of environmental education policies around the globe. Besides the Tbilisi event and the subsequent publications based on it continue to provide the blueprint for the development of environmental education in many countries of the world to day (UNESCO, 1977). The final report of the Tbilisi conference set out three 'goals of environmental education', as similar as those identified at Belgrade. Further, this conference identified the following categories of environmental education objectives which get priority in all over the world. These are : awareness, knowledge attitudes, skills and participation .

Even though environmental education is a relatively young, new and a product of out growing concern for the environment, now it is well recognized in schools and colleges world wide and firmly established. It is dynamic and immensely complex field of study and interpretation ( Palmer and Neal, 1994 and Palmer, 1998).

### **2.5.3 Environmental Problems and the role of Environmental Education**

Environmental problem which is the adverse consequence of human kind on the environment shows variation from one country to another and from continent to continent. The catastrophic environmental problem throughout the world is the reason behind for the promotion and development of environmental education on a major global scale. The pace of change of the environment has been very rapid as the time went on. Human life has inhabited the planet for some 2 to 3 million years, and for almost all of that time, existed in harmony or sustainable equilibrium with other forms of life. It is only with in the last two centuries that human activity has had what might be described as

a significant impact upon the environment and its resources; and perhaps only in the last half century it has been evident that this impact is extremely serious ( UNESCO,1977 ). As the impacts of human activities and influences have escalated, so too have the risks and threats associated with those impacts ( Palmer, 1998 ). This environmental problems due to man calls, the need for widespread education relating to human responsibilities towards keeping the balance of the environment. It is now recognized that many human activities, collectively, have detrimental and possibly irreversible consequences. Because of these problems, environmental education has got a world wide recognition and is found taught to peoples to feed them awareness of their environment and acquire the knowledge, values, skills, experiences and also the determination which will enable them to act-individually and collectively to solve present and future environmental problems ( UNESCO-UNEP, 1987 ). Likewise, the declaration of the United Nations conference on human environment 1972, proclaimed that “defending and improving the environment for present and future generations has become an imperative goal of mankind”. Thus, education utilizing the findings of science and technology should play a leading role in creating awareness and a better understanding of environmental problems. It must foster positive patterns of conduct towards the environment and the nation’s use of their resources ( UNESCO, 1977).

According to Gokhan (2010) reported, the basic for many environmental problems are irresponsible environmental behavior. He further noted that attitude is one of the most important influential on behavior. To avert this irresponsible human behavior on the natural environment, environmental education has been introduced to promote attitudes which would encourage individuals to discipline themselves in order not to impair the quality of the environment and to play a positive role in improving it (UNESCO, 1987). This is the reason behind that environmental education is developed in schools to promote students positive attitude and ultimately responsible behavior.

In line to this the study of Rickinson (2001 and 2002) studies of intergenerational influence suggest that, students after participating in environmental education activities, are capable of influencing the environmental attitudes and/or behaviours of their parents. In other words, environmental education programmes can have an impact not only on

students, but also indirectly on parents. Such influence, however, is not an automatic process, and appears to be facilitated by programmes being enjoyable for students, including tasks that can involve parents and dealing with actual local problems, in addition to students and parents having an interest in the environment and good communication patterns. Thus, providing environmental education to students is one of the way of influencing their parents and communities to protect the environment from destructions. Therefore, students should not only given environmental education at school but also encouraged to disseminate it at home and in the community, and this would be an extremely effective way of influencing and educating parents to sustainable environmental behaviours' (Ibid).

#### **2.5.4 Environmental Awareness**

Environmental awareness is defined as an understanding of natural systems and human effect on the environment (Aminrad et al., 2008). Based on the intergovernmental conference on environmental education (UNESCO, 1977) recommended the primary categories of environmental education curriculum goals and objectives are (1) awareness, (2) knowledge, (3) attitudes, (4) skills and (5) participation. All these components have been mentioned in many books, articles and documents so far (UNESCO, 1977; Sutton, 2004; Aminrad et al., 2008; UNESCO-1975, Palmer, 1998), but not all authors agree upon the degree of importance of one objective over the others (Aminrad et al., 2008). According to the study made by Madsen et al., (1996), environmental awareness is necessary to achieve environmental protection and restoration. They emphasized that the public must have basic grasp of environmental problems. Awareness is the ultimate driving force that stimulates knowledge which finally influence peoples' attitude towards responsible concern for the environment. Environmental awareness is a broader term than environmental attitude as it is treated as an integral component of broader social awareness. It is shaped from the earliest age, and the factors that are particularly important for its creation include the system of values and norms of a given community, tradition passed down in the family, in the education process, information provided by the media and the person's individual experience (Grodzieska-Jurczaka et al., 2006).

Therefore high school students should have sufficient environmental awareness if they are to solve environmental problems and prevent others from occurring.

Regarding the environmental awareness, individual students including boys and girls and older and younger students may differ considerably. In line with this several studies, suggest that girls are more aware of immediate, local problems relating to human health, while boys focus more on longer-term and more abstract issues (Laboy-Nieves and Schaffner, 2009 ; Rickinson, 2002 and Dietz and Stern, 2002). In general, in the long run nothing significant will happen to reduce local and international threats to the environment unless widespread public awareness is aroused concerning the essential links between environmental quality and the continued satisfaction of human needs. In this issue students have a critical role to influence the public awareness of the environment after they have experienced environmental awareness in their school (Palmer and Neal, 1994 and Rickinson, 2001 and 2002).

### **2.5.5 Environmental Attitude**

Attitude is defined by social psychology and environmentalist as “favorable or unfavorable evaluations of and reactions to objects, people, situations, or any other aspects of the world”, that enable us to predict and change people’s behavior (Aminrad et al., 2008 ; Rekinson, 2001). Others also suggested that attitudes, which are derived from life experiences and education, markedly influence behavior. It is often ascertained that one barrier for attitude change is insufficient information about a certain aspect of life, exposure to new information (Oweni and Hour, 2010).

Environmental education must be seen as not merely a strategy for creating awareness of the environment, but also as a means towards developing positive concern for maintaining the quality of our life on earth (Otiende and Ezaza, 1991). Environmental education by many scholars is believed that, it plays a major role in achieving changes in attitudes that contribute to environmental awareness in society (Laboy-Nieves and Schaffner, 2009). In line to this, students’ attitude in this study toward deforestation and soil erosion is treated as their verbal commitment, motivation to act and their readiness to solve these environmental problems.

When we think about attitudes toward environmental issues, we often assume that these attitudes fall along a continuum from low (not concerned) to high (very concerned). They further indicated that environmental attitude of young people appears to be crucial as they ultimately play a direct role in providing knowledge-based solutions to in-coming environmental problems. Moreover, schools by teaching environmental education can have an important influence on the environmental knowledge, attitude and behavior of parents and the local community. It is logical that the behavioral changes towards the environment will be easier and more effective if students are environmentally knowledgeable, concerned, and initiated.

Concerning these environmental attitudes and behaviors, there are certain influential factors which makes to increase or decrease. These are gender, age, socio economic grouping, geographical location and schooling. In relation to gender, for example, findings from several studies show girls to be more pro-environmental than boys in their attitudes' and behaviors (Rickinson,2001 and 2002).

Relating the terms environmental attitude and behavior Oweni and Hauri (2010) pointed out that, although attitudes are requisite for positive actions, this alone may not push the individual to act. As a result of this environmental awareness has a significance contribution towards responsible behavior.

## **2.6.Environmental Education in Ethiopia As a remedy to Environmental Problem**

Ethiopia is among the countries which have been facing environmental problems mainly land degradation in the form of soil erosion and deforestation and others like overgrazing, loss of biological diversity, population growth. These all problems are initiated due to poverty and rapid population growth. In response to these environmental problems, environmental education has been introduced in 1985 at the time when the northern part of the country was hard hit by sever drought ( Beletu et al., 1988). The study reported that environmental education was operating under the Ministry of education (MOE ) with financial assistance from the Swedish International Development Authority (SIDA). The programme of Environmental education has been processing as a pilot project and was working in collaboration with the Ministry of Agriculture (MOA), the Ministry of Health

(MOH), and other national and international institutions. The project was targeted firstly in teacher training institutes and secondary schools. The reason behind involving schools in the project was to enable students and teachers develop environmental awareness, knowledge, attitude and practice and in turn to disseminate to the general public.

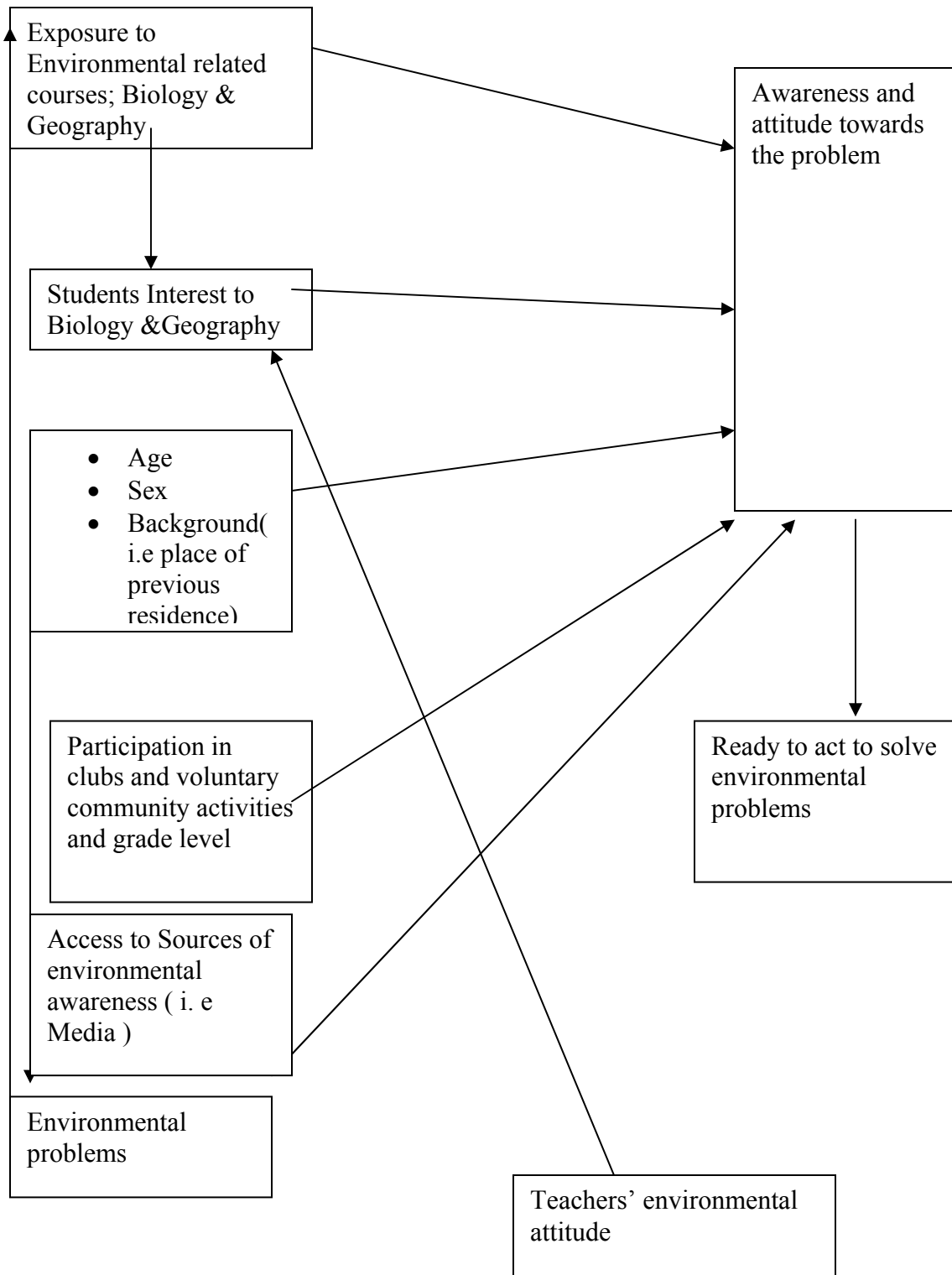
Beletu and Yosef (1990), reported that environmental education was conducted both in theory and practice to enable learners to apply their knowledge in solving environmental problems. In this issue, the traditional subjects such as Biology, Agriculture, Geography and Home-economics were used for teaching of environmental problems and followed by practical activities such as tree planting, terracing and vegetable gardening. Moreover conducting seminars and orientation programs, and preparation and distribution of reading materials' were other means used in disseminating environmental education. It is obvious that, Ethiopia's economy is largely agricultural based for over 85% of Ethiopian's depend on agriculture for their livelihood. But this agriculture has been facing serious environmental degradation due to lack of awareness (Daniel, 2009). To combat environmental degradations like soil erosion and deforestation conservation works like planting seedlings and construction of terraces, earth bunds and check-dams have been undertaken by the Ministry of Agriculture since the mid 1970s. But these efforts did not bring sufficient rehabilitation of the environment. Because of this environmental education was introduced in Ethiopia in the 1980s (Ibid).

## **2.7 Conceptual Framework and Factors Affecting Students**

### **Environmental Awareness and Attitude**

#### **2.7.1 Conceptual Framework**

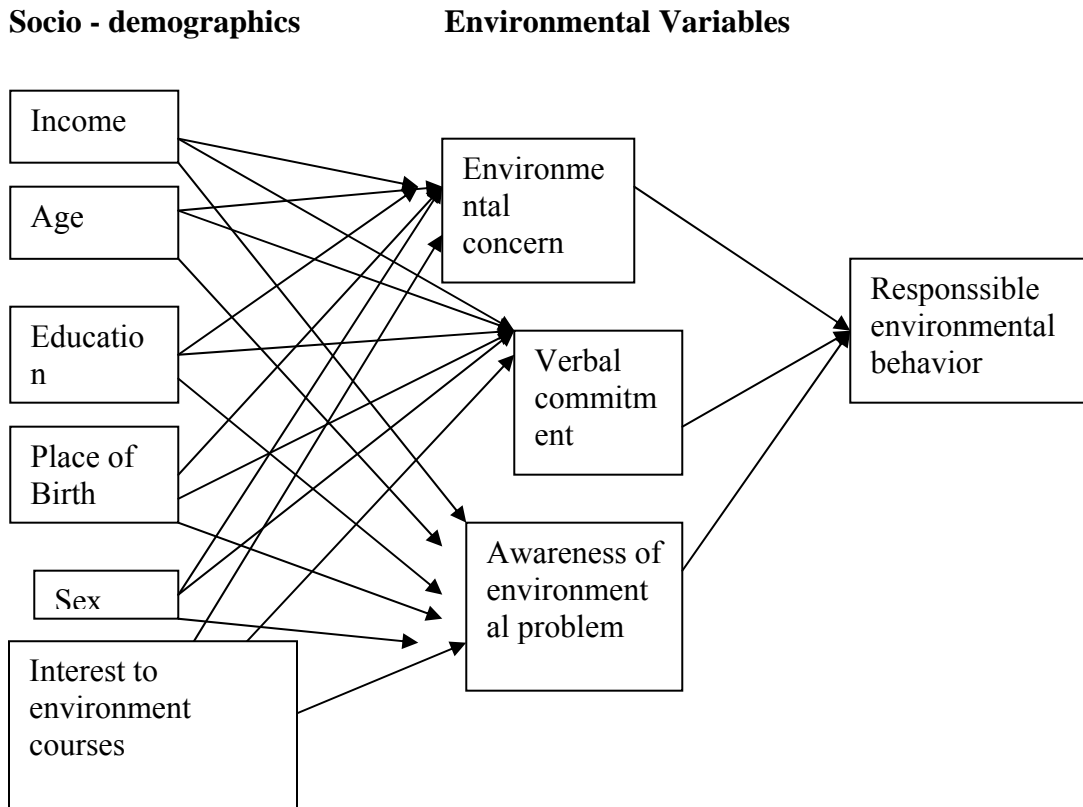
Many studies cited that environmental awareness is the base for positive attitudes and this inturn is recognized as an indicator and components of environmental behavior. This is elaborated below in figure with its creation and influencing variables.



**Figure 1. The effect of education on changing awareness and attitude**  
**Source : Adapted from Kalantari et al., ( 2007) and Barr and Gilg, 2007**

Besides to the above figure, the study conducted by Lakhan and Lavalle ( 2002) loglinear reported that there is a direct relationship between education and personal concern for the environment. Age has an interaction with education, and some influence on environmental concern, with younger respondents expressing higher concern for the environment than older respondents. Other results from this study demonstrate that residential location and the gender of the respondents do have statistically significant association with personal concern for the environment. **In addition to the other variables, teachers' attitude to environmental issues also leads significant influence on students acquisition of environmental awareness and attitude.**

More over the findings of Cottrell (2003) indicated that there is a relationship between cognitive (professed knowledge of environmental issues), and affective (environmental concern), and conative (verbal commitment) components of attitudes with pro-environmental behavior. This is figured below:



**Figure 2. Model of factors affecting Environmental awareness, attitude and responsible environmental behavior**

**Source Adapted from Cottrell ( 2003 )**

The model shows three levels of variables arranged from left to right to represent an increasing strength of relationship between these variables and the primary dependent variable. The first level includes four sociodemographic variables that have been predictors of proactive behavior in previous research. The general environmental group includes awareness of environmental issues (cognitive component), environmental concern (belief/affective component), and verbal commitment (conative component ). Awareness of environmental issues is included because prior research indicates that there is a relationship between this variable and environmental concern, and when combined, these variables contribute to the responsible environmental behavior. As concern for different aspects of the environment develops, more specific attitudes about specific acts (e.g., water pollution) will evolve and influence feelings of personal responsibility toward an action and verbal commitment to an issue or problem resolution. Intrinsic motives to courses related with environmental education has also a significant role to influence the construction of attitude.

**2.7.2 Factors Affecting Students Environmental Awareness and Attitude**

Environmental education programmes which is delivered from primary to tertiary level in the formal as well as informal sectors ( like, school clubs, mass media and magazines ) is targeted to enable peoples to have environmental awareness, favourable attitude and responsible behavior towards the natural environment. These key variables of environmental education are necessary to all peoples of the world to solve current environmental problems and prevent the new ones. Though, environmental education is taught in schools to enable students develop environmental awareness, favourable attitude and behavior, they show variation from individual to individual due to certain factors. These factors as reported by different literatures are exposure to ideas of the environment with in the media, experience of nature, environmental education programs (like field trip, co-curricular activities, voluntarily and community related works), socio

demographic factors (such as age, economic factor and education level), location difference; proximity and exposure to natural features and gender etc (Samuel et al., 2004; Oweni and Hourri, 2010; and Rickinson, 2001 and 2002). Besides this they have also reported that students source of environmental information can also be affected by differences in location like urban and rural and due to their age variation.

Detail of these factors affecting environmental awareness and attitude to vary from individual to individual are presented below.

### **2.7.2.1 Gender**

Regarding this variable several studies conducted in developed and developing countries showed it has a significant influence on environmental awareness and attitude. A review of research that conducted from 1988 to 1998 on gender differences in environmental attitude and behavior showed that women stronger environmental attitude and behavior than men (Zelenzny and Adrich, 2000). As to this study reported, from six studies four of them found that females expressed significantly greater environmental concern than male. It also suggested that, no study found that males' had significantly greater environmental awareness and concern. Out of the six study reviewed by Zelenzny and Adrich (2000), the two study found no significant difference between males and females' on environmental awareness and attitude. Concerning the reason why females show more environmental concern, a variety of theories have been used to explain.

One widely used approach is based on gender roles and socialization (Eagly, 1987; Howard and Hollander, 1996; Miller, 1993; Unger and Crawford, 1996; Wilkinson and Kitzinger, 1996 Qoted in Zelenzy and Adrich, 2000). These authors reported that females across cultures are socialized to be more expressive, to have a stronger "ethic of care," and to be more interdependent, compassionate, nurturing, cooperative, and helpful in care giving roles. On the other hand, males are socialized to be more independent and economically competitive. Based on socialization theory, Zelenzy and Adrich (2000), predicted that, compared to males, female students in primary and secondary schools would have significantly stronger environmental awareness, attitude and greater participation in pro environmental behaviors. Other study that conducted in American

public on the effect of gender on environmental awareness and attitudes is explained in connection to the socialization perspectives. In the United States boys learn that masculinity means being competitive, independent, and unemotional and entails objectively exerting mastery and control over other people and things. Also boys realize they are expected to economically provide for their family when they grow up and become fathers. On the other hand, girls learn that femininity in the United States means being compassionate, cooperative, and sympathetic and entails connection with other people and expressing concern about their well-being. Also, girls realize they are expected to enact an ethic of care as a nurturing caregiver when they grow up and become mothers ( McCright, 2010 ).

Further, it also revealed that few scholars reviewed in 1997 by Blocker and Eckberg argue that differences between men and women in religious beliefs and religiosity explain gender differences in environmental concern. Briefly, women tend to express stronger religious beliefs and greater levels of religiosity than do men and religiosity is associated negatively with environmental concern. Besides to the socialization perspectives, parenthood has significance in favor of females' environmental awareness and attitude. Parenthood triggers the nurturance mentality of mothers who become more concerned about the environment. On the other hand, parenthood triggers the market place mentality of fathers who become more concerned with economic growth because of their conventional role as economic provider, leading fathers to be less concerned about the environment (Qtd in McCright, 2010). Findings in this area seem to be consistent with the theoretical expectation that motherhood increases environmental concern for women, though slightly fewer studies find that fatherhood decreases environmental concern for men (Ibid). In contrast the above findings, Samuel et al., (2004) reported that most research finds slight evidence that women are more environmentally concerned or possess stronger environmental attitudes than men. But according to the study made by Oweni and Hourri (2010) women tend to be more concerned with their surrounding environment due to their sex-role socialization, whereas men's role and their preference towards economic growth diminishes their sense of environmental awareness. Similarly other study made in the third world country/Jordan reported that female has better

awareness than men (Ziadat, 2009). Hence, gender is the factor affecting environmental awareness.

### **2.7.2.2 Place of Birth**

Researchers in the field of environmental psychology have explained environmental awareness primarily through socioeconomic and demographic factors. However, knowledge of and support for protecting specific natural features of the landscape should also be influenced by one's location, setting and proximity to such features (Samuel et al., 2004). The field of environmental psychology has a long tradition of explaining the factors influencing environmental attitudes and awareness. And it is indicated that socio demographic factors such as age, income and education are the drivers of awareness and concern for the natural environment. Though this is so, knowledge of and support for protecting even general features' of the environment can also be influenced by location, place, and space. Proximity and exposure to natural features, such as wildlife habitat or water bodies, may be important factors in forming an individual's understanding and views toward maintaining the quality of the surrounding natural environment (Samuel et al., 2004). Contrary to this, the study of Tremblay and Dunlap in 1978 cited that proximity to environmental problems do not have a significant role in environmental awareness and attitude. To strengthen their idea, they have found that rural residents were less concerned with environmental problems than those living in urban settings and those rural farmers were particularly uninterested in protecting the environment (Qtd in Samuel et al., 2004). Opposing this argument, more recent empirical research disputes the rural-anti environment hypothesis and instead suggests increasing environmental awareness (Ziadat, 200 ). The study demonstrated that rural resident are more likely to be concerned with local environmental issues. Likewise, Rickimson (2001 and 2002) and Oweni and Hourri (2010) are among the first to directly link environmental attitudes to location and distance. These authors noted that proximity factors play a critical role in determining how individuals' view physical place. These authors associated that those more near to the environmental problems could have better awareness and favourable attitude. In general many authors pointed out that place of residence is one of the important factors affecting environmental awareness and attitudes among different societies. And they have

reached into their conclusion saying proximity to the specific environmental problems makes society to have awareness about the problem and more environmentally concerned (Aminrad et al., 2011; McCright, 2010; Nisbet et al., 2009 and Ziadat, 2009).

### **2.7.2.3 Age and Educational Level**

Environmental education which plays a significant role in encouraging and enhancing people's participation in activities aimed at conservation, protection and management of the environment began in the 1970s. This environmental education is supported to be provided during the early years' of individual's life. The main reason for this according to this study is if a child does not develop a sense of responsibility, respect and positive attitude towards nature in his/her childhood stage, he/she will not form environmental attitude later in life.

Regarding the impact of age and educational level in an individual's environmental awareness and attitude various studies have been conducted till to day. For instance the study applied in 1992 and 1994 by Jones and Dunlap and Scott and Willets respectively reported that young, highly educated and liberal minded individuals demonstrate greater recognition of and concern for environmental problems (Qtd in Samuel et al., 2000 ). Another, more recent studies focusing on the role of socio - economic factors find evidence that younger age and higher levels of education are significant drivers' of environmental awareness and concern. Although not as pronounced in the literature as other socio - economic factors, income is another variable observed to explain environmental perception and attitudes (Sutton, 2004). In contrast to this investigation, another survey of young people in several countries reported as generally low levels of factual knowledge relating to environmental issues. On such survey more detailed investigations of students' awareness about environmental phenomena (e.g. the greenhouse effect) found there to be considerable misunderstanding (Rickinson, 2002). However the report is changing from one study to another, a more recent investigation by Oweni and Hourri (2010), revealed that favorable environmental attitudes are negatively correlated with age. Likewise, the study conducted in Jordan by Ziadat, (2009) showed that, age and educational level are the most influential in individuals' environmental awareness and concern, in that environmental awareness and attitude decrease as the age

increase but increase with increasing educational level. In support of this argument, a literature reviewed by Aminrad, et al., (2011) reported decreased levels of environmental concern in almost all increasing age groups since the 1970s. This study further showed that, education is positively related to environmental knowledge in that people with more years of formal schooling have a higher incidence of pro-environmental behavior than did less educated and older peoples.

Hence, younger persons are more environmentally concerned than older persons because environmentalism is an appropriate outlet of younger persons' relatively low commitment to the social order and lower regard of dominant value system. Finally they have concluded that age and educational level are important influential factors in peoples environmental awareness and attitude.

#### **2.7.2.4 Extracurricular Activities**

Extracurricular activities have significance contribution in shaping and influencing peoples actions and attitudes towards environmental protection (Palmer, 2004). Mass media which is the one part of non-formal education play a key role in creating widespread environmental awareness and concern. In several countries many extracurricular or informal environmental education have been carried out. These include school clubs, excursions; study tours, field studies, lectures on environmental topics, for the sake of increasing environmental consciousness (UNESCO, 1977). Besides to this mass media, radio, television, films and the press have played a very important role in many countries for the dissemination of environmental information. As a result of this, the mass media are being increasingly used for sensitizing and informing broad sectors of the public about the environment. According to Owni and Hourri (2010) reported, environmental education programs (i.e. field trips, hiking and camps) purport to enhance students' appreciation and sensitivity towards the environment outdoor behavior and social relationship. Rickinson (2002) noted that, across several studies, the main sources of young people's environmental information are found to be television and school. Other sources include the print media, family and friends, environmental experience and environmental nongovernmental organizations ( NGOs). He also suggested that students' environmental knowledge and information sources can be affected by gender, age, socioe

conomic grouping, geographical location and schoolig. According to Halbe (2011) mentioned, Environmental clubs generally serve several basic purposes. Most often, these groups help to create awareness of environmental issues, increase the knowledge of club members of the broader community about the issues, influence local attitudes toward the environment in a positive way, help people gain skills that benefit the environment, show by example with group participation in meaningful activities that improve the environment or environmental conditions. Thus, involving school students in environmental clubs is crucial.

## **2.8 The Relationship between Environmental Awareness and Attitude**

Environmental educators hope that education can help participants develop a more internal locus of control, and acquire a strong environmental awareness so that their environmental attitudes, and ultimately behaviour, will be environmentally mindful (Rickinson, 2001 and 2002 and Kalantari, et al., 2007). Previous research defined environmental awareness as being subdivided into three parts: environmental awareness, environmental attitude, and environmental behaviour Schmitt (2002). Environmental awareness is in fact considered to be an important determinant of environmental attitude and behaviour in the first place. It is believed that environmental awareness influences environmental attitude which inturn affect environmental behaviour. Aminrad, et al., (2010) reported that environmental awareness is necessary to achieve environmental protection and restoration. Student's environmental awareness is one of the most important indicator for displaying national civilization. It reflects many aspects of environmental status, such as personal consideration and behaviour, public capacity and the local citizens' attitude towards sustainable society as a whole. The study further stated that , environmental awareness of processes and systems play an important role in environmental education. However , this is not the only factors affecting the behaviour outcome. Behaviour is what people do, whether it is environmentally appropriate or inappropriate. Behaviour in general is supported by awareness and attitude but there is not a direct cause and effect progression from awareness to attitude to behaviour . Regarding awareness, Palmer (1998), emphasized that students should acquire appropriate range of awareness, understanding and concepts about the environment so

that critical judgement can be achieved. The study also mentioned that increased public awareness and knowledge about the environment would foster more positive attitudes.

## **2.9 Review of topics Related to Environmental Issues in Biology and Geography Ethiopian Student Text Book**

In our country context environmental education has been taught in all Schools in the form of integration with some subjects. For example, in senior secondary schools Biology and Geography deals to some how about the environment, environmental problems and their solutions than the other courses. Standing from this point, the researcher tried to review to what extent Biology and geography courses of both grades ( i. e grade 9<sup>th</sup> and 10<sup>th</sup> ) addressed topics linked to environmental issues. The researcher believed if students wanted to have awareness and attitudes of environmental problems and protecting their environment, the subjects they gain in their school should have adequate topics related to environmental issues. As a result of this, environmental related courses like Biology and Geography of grade 9<sup>th</sup> and 10<sup>th</sup> were reviewed as follows.

### **Biology grade nine**

As it was examined the newly revised grade nine and ten Biology textbooks, there were no sufficient environmental issues in both grades. The topics that address environmental issues in grade nine Biology text book are rare and only deals in chapter six. But the rest units did not.

**Table 2.1 topics related to environmental issues in the revised grade nine Biology**

| Unit     | Topics related to environmental issues   |
|----------|--|
| Unit six | <ul style="list-style-type: none"> <li>• Ecosystem</li> <li>• Abiotic and biotic components of an ecosystem</li> <li>• Food chain and food webs</li> <li>• Pyramids of biomass and energy</li> <li>• Recycling in nature</li> <li>• Adaptations</li> <li>• Importance of planting and growing trees</li> <li>• Ways of planting and growing trees in your community</li> </ul> |

## **Biology grade ten**

Like wise to the biology grade nine student textbook, there are no adequate environmental topics addressed in the revised grade ten biology textbook. Except in unit five the rest four units do not deal about the environment. Unit five which is placed in the last part of the book deals about conservation of natural resources.

**Table 2.2 topics related to environmental issues in the revised grade ten Biology.**

| Unit      | Topics related to environmental issues   |
|-----------|--|
| Unit five | <ul style="list-style-type: none"><li>• Resources, renewable and non renewable resources</li><li>• Conservation as the preservation and protection of natural resources</li><li>• Use of vegetation and impacts of human activity on natural vegetation</li><li>• Methods of conservation vegetation</li><li>• Uses of wild life and the effects of human on wild life and its status in Ethiopia</li><li>• Historical explanation of how Ethiopian vegetation was affected</li><li>• Methods of conservation wild life and the uses of national parks of Ethiopia</li></ul> |

Comparing from the rapid deterioration of the environment, the topics addressed in both subjects are not adequate and even these topics are placed in the last section which can not be covered in the teaching – learning process. Instead of this it would be better if they had inserted in the introduction or in the middle part.

## **Geography grade nine**

Similar to Biology courses, in Geography of both grades topics related to environmental issues are not sufficient. For instance, Geography grade nine only deals about the environment in unit four ( i.e natural regions of the earth) and in unit five ( i.e Humans and the environment). But the rest units are non inclusion of environmental topics.

**Table2. 3 topics related to environmental issues in grade nine Geography**

| Units                        | Topics related to environmental issues  |
|------------------------------|---|
| Interdependence<br>Unit four | <ul style="list-style-type: none"> <li>• natural regions of the earth</li> </ul>  |
| Unit five                    | <ul style="list-style-type: none"> <li>• Interdependence among the components of an ecosystem</li> <li>• Practice of preserving and protecting natural regions in Ethiopia</li> <li>• Soil erosion in Ethiopia and soil conservation campaign</li> <li>• Deforestation ,causes and consequences in Ethiopia</li> <li>• Participation in tree planting campaigns</li> <li>• Ways of managing wild life</li> <li>• Practice of water conservation measures through school clubs or community campaigns</li> <li>• Major environmental hazards</li> <li>• Water pollution,forms ,sources of pollution and controlling measures</li> <li>• Air pollution : sources, consequences and controlling methods</li> <li>• Environmental hazards</li> <li>• Drought in Ethiopia,causes,consequences and controlling measueres</li> <li>• Environmental policy of Ethiopia</li> </ul> |

**Geography grade ten**

As to grade nine geography student text book, in grade ten there is no much concern devoted topics related to environmental problems. In general grade 10<sup>th</sup> geography student textbook has six units but from this it is only in chapter three that exist topics related with environmental problems. These topics are listed below in Table 2. 4.

**Table 2. 4 topics related to environmental issues in grade ten Geography**

| Units      | Topics related to environmental issues   |
|------------|--|
| Unit three | <ul style="list-style-type: none"><li>• Factors responsible for climate change</li><li>• Causes of drought in Ethiopia</li><li>• Consequences of drought in Ethiopia</li></ul> |

**Source: student text books, Biology and Geography grade 9<sup>th</sup> and 10<sup>th</sup>**

In general to evaluate whether or not students have awareness and attitude towards deforestation and soil erosion specifically and generally to protect the environment, topics related with the issue must be integrated into their courses sufficiently. But as the reviewed topics of Biology and Geography grade 9<sup>th</sup> and 10<sup>th</sup> revealed us there are no extensive and deeper covers of topics related with environmental issues. Even the rare and shallow topics of the environment are theoretical which do not have any association with practical activities that can facilitate students to have interaction with their environment and communities. Hence, the present researcher noted that much more environmental contents focused on practical instead of theoretical to be integrated into Biology and Geography courses.

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHODOLOGY**

As noted earlier, the main purpose of the study was to identify students' awareness and attitudes toward deforestation and soil erosion and then find out difference between the two study groups and other subpopulations. This chapter incorporated description of study area, research design, study population, sample design and sampling procedures, sources and instruments of data collection, description of variables and method of data analysis.

#### **3.1 Description of the Study Area**

Shire Indasilassie is the zone level administrative region of north western Tigray. It is located at the northern tip of Ethiopia. It is 1080 kilometers away from Addis Ababa. Northwestern Tigray zone has seven woredas: Woreda Medebay Zana, Tahtay Koraro, Woreda Shire Indasilassie, Asgede Tsimbla, woreda Tselemti, Laelay Adyabo and Tahtay Adyabo. As far as the availability of first cycle high school is concerned, all of the weredas listed above each has high school. Besides to those, some kebeles also have high schools. These are Dima first cycle secondary school and Ksad Gaba first cycle secondary school. Woreda Tahtay Koraro has the following Kebeles: Adikokob, Adigebaro, Adigdad, Beles, Lemlem, Kelakel, May Dimu, May Adrasha, May Liham, Sekela Koyesta and Semema. From these kebeles only Semema has high school.

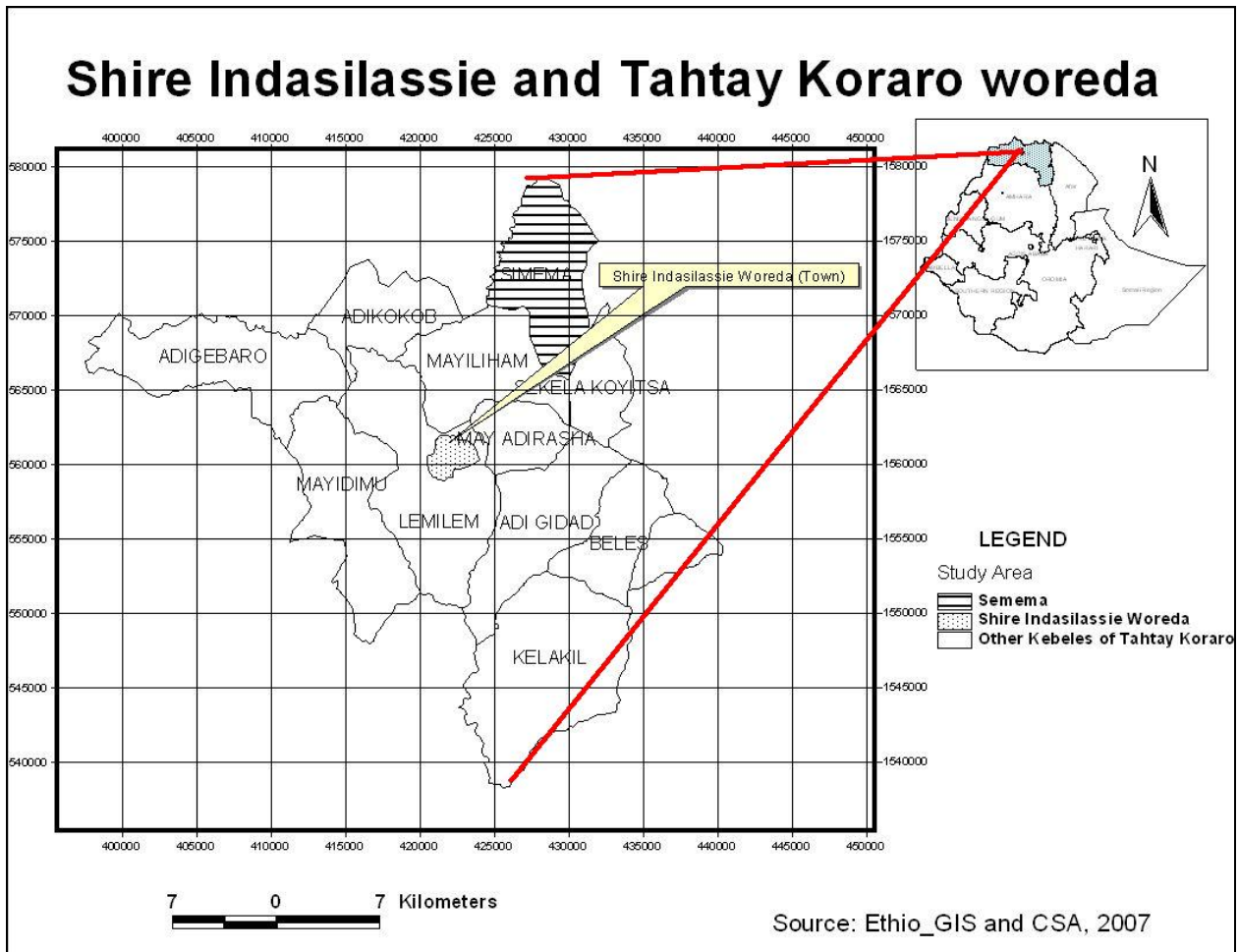


Figure 3. Map of the study Area

Shire Indasilassie ( Town woreda) and Tahtay Koraro (rural woreda) are the two woredas of North Western Zone Administration. Shire Indasilassie is located in  $14^{\circ} 6'$  north latitude and  $38^{\circ} 17'$  east longitude. Where as Tahtay Koraro woreda lies in  $13^{\circ} 59' - 14^{\circ} 13'$  north latitude and  $38^{\circ} 20' - 38^{\circ} 21'$  east longitude.

Tahtay Koraro (Tigrinya "Lower Koraro") is one of the 36 woredas in the Tigray Region of Ethiopia part of the North Western Zone. Tahtay Koraro is bordered in the southwest by Asigede Tsimbela, in the north by La'ilay Adiyabo, and in the southeast by Medebay Zana. The administrative center of this woreda is Inda Selassie. Where as woreda Shire Indasilassie is bordered in the west by Dobaguna, in the east by My adrasha, in the north by

Adihano and in the south by Adiembilu. Altitudinally Tahtay Koraro has an altitude ranging from 1800 meter – 2398 meters above sea level with its minimum and maximum annual temperature 12<sup>0</sup> C and 28<sup>0</sup> C respectively and total annual rainfall of ranging 700 mm to 900 mm. Shire Indasilasie has an altitude of 1953 meters above sea level with an average annual temperature of 25<sup>0</sup> C and 850 mm average annual rainfall. 75 % of Tahtay Koraro woreda is covered by sub tropical (locally called, Woinadega) 23% tropical (locally called, Kolla) and 2% temperate (locally named, Dega). But, Shire Indasilasie is totally situated in woinadega agro (sub tropical) climatic zone (source: Woreda Tahtay Koraro Agricultural office).

### **3.1.1 Landforms, Soil, Vegetation and Climate**

Tahtay Koraro woreda as noted earlier has an altitudinal range that stretches from 1800 meter to 2398 meter amsl. The climate is generally sub-tropical with an extended dry period of nine to ten months and a maximum effective rainy season of 50 to 60 days. The rainfall pattern is predominantly uni-modal (June to early September). The soil type of the woreda is of sand-silt, silt-clay and clay. But this resources (i.e soil) has been depleted by many centuries continuous cultivation. Using methods that are thousands of years old, farmers plow their fields with oxen, sow seeds and harvest by hand. This woreda had good vegetation cover made up of bush scrubs, scattered acacia and gum trees. Though the woreda had vegetation cover previously, now it is highly depleted and remain almost barren due to heavy exploitation by the inhabitants for expansion of agriculture, construction purpose, charcoal making and fuel wood sell to market as source of income to buy some items from the market. Drought is an occasional hazard that occurs once every three to five years in the woreda that leads moisture stress and water scarcity situation.

### **3.1.2 Demographics**

Based on the CSA (2007) national census reports, Tahtay Koraro woreda has a total population of 68,989, of whom ( 34,477) 49.97% are men and (34,512 ) 50.02% women are rural inhabitants. With an area of 1,940.38 square kilometers, Tahtay Koraro had population density of 35.55 persons per sq.km, which is less than the Zonal average

of 40.21 persons/km<sup>2</sup>. A total of 14,273 households were counted in this woreda, resulting in an average of 4.83 persons in a household, and 13,842 housing units. On the other hand Shire Indasilassie woreda has a total population of 46,382, of whom (25,053) 54% female and (21,329) 46% male urban inhabitants.

The largest 98.98% ethnic group reported in Shire Indaselassie and Tahtay Koraro were the Tigrayans and Tigrinya was spoken as a first language. The majority 92.27 % of the inhabitants practiced Orthodox Christianity, while 7.67 % Muslim.

Regarding education, 20.8% of the population were considered literate, which is greater than the Zone average of 9.01%; 33.01% of the children aged 7-12 were in primary school, which is greater than the Zonal average of 11.34%; 3.38% of the children aged 13-14 were in junior secondary school, which is also greater than the Zonal average of 0.65%; and 4.11% of the children aged 15-18 were in senior secondary school, which is greater than the Zone average of 0.51 %. In woreda Tahtay Koraro each kebele has elementary school and only one highschool in Semema kebele.

### **3.1.3 Agriculture**

Most of the inhabitants of the woreda practice mixed farming system, with both crop production and livestock rearing activities. The farming is entirely dependant on the summer (i.e kiremet) rains from June to September. The main crops grown are maize, teff, sorghum and finger millet. Maize and sorghum are staple food crops. Teff is a high value crop, which is consumed, and mainly sold to earn income to purchase cheaper staples. The agricultural system is rainfed and its rainfall is relatively dependable as compared to the other woredas in the center and east of Tigray.

A sample enumeration performed by the CSA in 2001 interviewed 13,859 farmers in this woreda, who held an average of 0.85 hectares of land. Of the 11,765 hectares of private land surveyed in Tahtay Koraro, 91.76% was under cultivation, 0.68% pasture, 5.3% fallow, 0.01% woodland, and 2.25% was devoted to other uses. 82.94% of the land under cultivation in this woreda was planted cereals, 7.01% in pulses, 0.97% in oilseeds, and 0.42% in vegetables. Eight hectares were planted in fruit trees. 80.27% of the farmers

both raise crops and livestock, while 17.99% grow only crops and 1.74% raise only livestock. Land tenure in this woreda is distributed amongst 79.65% holding, 18.84% renting, and those holding their land under other forms of tenure 1.5%. The main livestock types are cattle, sheep, goats, and donkeys. Plough oxen ownership is important for providing draught power for land utilization and oxen are used to provide traction power for land preparation activities. In the woreda Livestock holdings are restricted by the limited availability of pasture. Households of the poor and very poor categories heavily depend on wage labor opportunities, cutting of trees for charcoal making, fuel wood sell to the market as a source of income. Besides, they partake in labor opportunities which are available in the nearby urban areas, and also in Humera during the sesame weeding and harvesting season. Some residents even migrate as far to Afar region to participate in salt extraction activities.

#### **3.1.4 Source of Income**

The main food crops in woreda Tahtay Koraro include maize, sorghum, millet, and teff are sold as source of income. Pulses such as beans and chick peas are also sold in the market, but they are available in small quantities. In the post harvest season, maize is the cheapest cereal. Finger millet is also available. More over, livestock sales are a significant source of income in the woreda. Shoats (sheep and goats) are commonly sold livestock, providing regular income for household expenses. But cattle are valuable assets that are rarely sold, particularly productive oxen and mature females

#### **3.1.5 Farming Season in the Woreda**

The agriculture season is planned around the Summer (kiremti rains in Tigrigna), which fall from mid-May to mid- September. A brief rain spell starts at the beginning of May and lasts for two weeks, until the middle of the month. The initial showers allow for land preparation and planting of long season crops such as maize, sorghum and millet. The rain resumes for the main season in mid-June and lasts until mid-September. Land preparation, particularly for teff, starts intermittently in February, and becomes more frequent as May rains approach. Teff requires repeated plowing of the land before planting to enhance the soils' capacity to absorb moisture and improve harvest. During

land preparation, the demand for plough oxen increases, as households with plough oxen can cultivate larger pieces of land. Planting of maize, sorghum, finger millet, teff and pulses occurs between May and July.

Weeding follows in July and August, and continues up until September. The consumption year begins with green consumption of maize in September, thus breaking the hunger season. Household expenditure on food declines with the onset of green consumption. The pulses harvested in September supplement household food consumption. The main harvest for all crops is from October to November just before the harvest, farmers are concerned that a late rain spell could destroy the drying crop.

### **3.1.6 Rehabilitation of the State of the Environment**

According to the administration office of the woreda, there are about 13,725 household heads, of whom 2446 get their daily income less than one dolar, 1637 household heads get one dolar, 9555 household heads get above one dolar and 87 house holds get above two dolar. As the figure indicates most of the house holds have lower income level. Because of this and increasing number of people and partly due to physical features of the environment in the rural woreda, deforestation and soil erosion is becoming serious as the time went on. To rehabilitate this environment, peoples of the woreda have been participating in a compulsory soil conservation in the winter (Hagay in Tigrigna) season with out having payment. This makes to have participation for both sexes whether he/she is poor, rich and rural residents but excluding those students, pregnant woman, disabled peoples, young peoples, elderly peoples and peoples who are diseased. Soil conservation is usually done on the communal land. Out of this compulsory soil conservation practices, most people participate in soil conservation activities under Safety-net. The Safety net is usually given to those poor people aiming dual benefits one recovering the environment and secondly taking out peoples out of poverty. In addition to the safety net, food for work is also practiced in the woreda. Food for work has no limitation to any body and hence every body can partake in conservation and get payment of that.

## **3.2 Research Design**

Comparative research design serves to determine differences and similarity between groups of study. Because of this, the study followed comparative research methodology approach in order to determine the likeness and difference of the two high schools.

### **3.2.1 Study site and Target Population**

Since the writer is more familiar with the two woredas (Shire Indasilassie and Tahtay Koraro), he purposefully selected the high schools which are found in the two weredas. As a result of this, the study focused on wereda Shire Indasilassie and Semema high schools. Semema high school is found 20 kms north of Shire Indasilassie, seat of zonal level administration under Tahtay koraro woreda. The reason behind selecting the study area is because of familiarity with the area that the researcher is aware of the culture of the people which in turn help to get cooperation from school communities during data collection. In addition to this, the researcher has been questioning his mind why the environment is degraded and why peoples are destroying forests in a way that compromise their children and do students aware of this problem? Moreover, the researcher has been listening local people anger for productivity is declining through time.

In the study area, though local people partake in conserving the environment through planting of seedling and construction of terracing specially these days, but they do not protect seedlings to grow and terraces not to ruin. Besides to this, they heavily involve in clearing forests for agricultural activity, market as a source of income and construction. All such impact on the environment leads to have profound deforested areas and degraded soil from time to time. Moreover, local people of Shire area migrate seasonally to Western Tigray low lands for seasonal labor. This problem, if it continues in the same pace that hold, it may change the existing area into dessert and becomes much difficult for existence of people there. These problems of soil erosion and deforestation may be

caused due to having more population pressure and giving priority for short term benefits instead of long term.

In association with this, the researcher thought that high school students will have important role in helping to solve local environmental problems in the future, because some of them will be key decision makers in certain issues of the country. Therefore these students should develop awareness and attitudes towards the problem of soil erosion and deforestation from now on wards. Taking this view into consideration, the paper assessed whether students of the study area have the expected awareness and favourable attitude toward the problem under study.

On top of the above, these two high schools are purposefully selected for the sake of examining whether there is a significant difference spatially in students' awareness and attitude of the problems. This is because, one high school of the study area is situated in the down town of shire Indaselassie, but the other one is located at the periphery nearby rural areas. From these high schools grade nine and grade ten students of Shire Indasilassie and Semema were the target population. It was because both high schools were providing teaching learning process to grade nine and ten. Besides, the researcher wanted to see whether there was difference in students' awareness and attitude of the problem under investigation due to grade difference or else.

### **3.2.2 Sample Design and Sampling Procedures**

The sampling design of the study is proportional stratified random sampling from the propability sampling method. Since the study investigated whether there was a difference in the target populations' awareness and attitudes towards the problem based on sex, gade evel and age in part and others and identify differences between the two study areas, it was needed to have representative sample from the three strata (School, gender and grade level strata). That is why, the study designed proportional stratified random sampling in order to take proportional samples study from the target group of different sex, grade level and school location. Hence, it took sample respondents independent of the strata. To accomplish this, the procedure that followed was firstly grouping of the target population into three independent strata through the stratification variable sex,

grade level and school in the sample frame. After doing this each sample from the subgroups was selected based on systematic random sample of ten interval in all the strata.

### **3.2.3 Sample Size Determination**

In general the total number of students in Shire Indasilassie and Semema high school were 3001 and 587 respectively. Out of this population distribution 1296 Male and 2292 Female students were available in both schools. Depending on grade level, there were 1831 grade nine and 1170 grade ten students in both high schools. To take representative samples there are several approaches recommended by a lot of literature. Some of these include using a census for small populations, imitating a sample size of similar studies, using published tables, and applying formulas to calculate a sample size. From these, the study has used published tables by Johnson and Christen (2011) (Appendix II). Hence, the sample size was chosen based on table of sample value with 95 confidence level. For the sake of taking proportional sample respondents, the researcher has used proportional stratified simple random sampling through the stratification variable of sex, school and grade level. As a result of this, the determined sample respondents are 152 Male and 194 Female from both schools. Based on School, 290 from Shire Indasilassie and 56 from Semema high school and based on grade level 177 and 169 sample respondents from grade nine and ten respectively. This gives total sample size of 346.

**Table 3.2 Population and Sample distribution**

| Grade            | Shire Indaselassie high school | Available number of students | Taken Sample size      | Sample size in % |
|------------------|--------------------------------|------------------------------|------------------------|------------------|
|                  |                                | 3001                         | 290                    | 83.81            |
| 9th              | F                              | 852                          | 83                     | 23.98            |
|                  | M                              | 649                          | 62                     | 17.91            |
| 10 <sup>th</sup> | F                              | 846                          | 83                     | 23.98            |
|                  | M                              | 654                          | 62                     | 17.91            |
| Sub total        | Both sex                       | 3001                         | 290                    | 83.81            |
|                  | Semema high school             | Available number of students | Taken Sample in number | Sample size in % |
| 9th              | F                              | 178                          | 17                     | 4.9              |
|                  | M                              | 152                          | 15                     | 4.3              |
| 10th             | F                              | 119                          | 11                     | 3.1              |
|                  | M                              | 138                          | 13                     | 3.75             |
| Sub total        | Both sex                       | 587                          | 56                     | 16.18            |
| Grand Total      | Both sexes                     | 3588                         | 346                    | 100              |

F= female  
M =male

source: Own Field survey data, 2011

### **3.3 Source and instrument of data Collection**

#### **3.3.1 Source of data for the study**

##### **3.3.1.1 Primary Sources**

In this source, questionnaire that administered to the sample students and focus group discussion held with two groups served as primary sources of data for the investigation from the sample groups. Therefore grade nine and ten students from both high schools were primary sources of the data.

##### **3.3.1.2 Secondary Sources**

Besides to the primary sources, secondary sources like grade nine and ten Geography and Biology subject text books were reviewed and other different related literatures that were assumed appropriate to the topic gathered from journals, books, thesis and dissertations.

#### **3.3.2 Instrument of data collection**

In conducting the survey, data was collected through the application of preestablished questionnaires and focus group discussion. The reason behind taking of preestablished instrument is that they are considered standardized measures and that kept their reliability. And these were adapted from relevant materials like international research journals of Geography and environmental education. These adapted questionnaire and focus group discussion were translated into the mother tongue of the target population- Tigrigna language and before collecting the actual data, the researcher has showed the instrument to Geography and Biology teachers of the study area to screen out difficult words and questions. In short, each description of instrument of data collection are listed as follows.

### **3.3.2.1 Questionnaire**

The questionnaire was adapted from Chinviy et al . , 1998 ; Mansaray et al., 1998 and Malebye, 2005. In the study two questionnaires were used to collect the required data from the respondents. The questionnaire which was the main instrument of data gathering had four parts. The cover page devoted to information regarding the aim of the study and it carried messages of not having anything negative impact upon the respondents. Moreover, it underlined that, there would not have time limit to answer the questionnaire and they can also ask freely for any kind of clarification by raising hands from the researcher.

In the main body of the questionnaire that was part two, students were requested to provide personal information like age, sex, grade level, place of birth, interest to environment related courses, access to media, their parents educational background and income level. The questionnaires were administered in face-to face interaction with the sample respondents who were selected. The first questionnaire was used to measure awareness that defined as concern for what is happening in the local environment. The concept was examined with a series of questions inquiring about the local environment. The awareness questionnaire held fixed questions where the sample respondents were required to answer by choosing an option from a number of given alternatives. These types of data were quantitative data that involved quantitative analysis. The awareness of environmental scale (that encompasses 27 items ) was used to measure actual awareness of students about the local environment ( deforestation and soil erosion). The awareness test was scored 8 items into 2 point ( i.e 2 carries for being aware of the issue, 1 carries for not aware), 7 items into 3point( 3 carries for high awareness, 2 carries for aware of the problem, 1 carries for not aware of the problem) and 12 items into 4 point ( 4 carries for very high awareness, 3 carries for high awareness, 2 carries for aware of the problem and 1 carries for not aware) in the alternatives. Cumulatively the awareness items were scored out of 85. The second questionnaire was used to measure attitude defined as the acquisition of values, feelings and motivations towards the environment. Regarding this

part four, in determining students attitude towards the problem, likert scale of five point categorical scale ( i.e. strongly agree (5) , Agree (4), uncertain (3), Disagree(2), and strongly disagree (1) that ranged from five to one was applied for the questions requiring positive responses whereas for the questions requiring negative responses the scoring was reversed. Hence, high score indicates favorable attitude while low score represented unfavorable attitude. The reason behind using categorical scale instead of numerical scale was that it was believed that the categorical scale can be an easy to the respondent to respond. These likert test scale questions are closed- ended items where by sample students opted the alternative and they were quantitative data that seek quantitative analysis.

### **3.3.2.3 Focus Group Discussion**

Focus groups here used as a means of triangulation with questionnaire data collection method. This focus group discussion was structured in that participants were asked a pre-determined set of questions, using the same wording and order of questions. The Focus group discussion was held independent of the two high school respondents by taking the homogeneity of school. It was used as a backing up to the questionnaire to gather necessary information. It had advantage for it encouraged participation from sample students who may be reluctant to be interviewed alone and by forming group interaction it generates their awareness and examines what they think and how they think as far as the problem under study was concerned. The focus group discussion used two groups, each consisting of 10 students in mixed age group and gender. The selection of the focus group participants were done through stratified random sampling method with systematic random sampling techniques from the respondents of the questionnaire. In this the stratification variable is sex. In each FGD the number of female and male were equal. And in each groups, two facilitator one male and female were selected among them. The selection of the facilitator in each FGD was done with the help of their teachers in selecting those individuals who did better academically among the FGD participants.

### **3.4 Description of Variable**

The variables that treated in the study were the following;

### **3.4.1 Dependent Variable**

The dependent variable which was evaluated under the study is awareness and attitude of students to deforestation and soil erosion. Hence, to measure students' awareness factual information of the problem were asked in question form through the third part of the questionnaire. In order to identify students' attitude to the specified problem a five point categorical likert scale attitude questions were provided to them in the fourth part of the questionnaire.

### **3.4.2 Independent Variables**

Though all students of the study area have access to Geography and Biology courses related to environmental education, various independent variables bring differences in students' awareness and attitude to deforestation and soil erosion. Some of the independent variables reported by different authors are: gender, age, interest to Geography and Biology, access to media and location differences (i.e urban and rural background), participation in voluntary community related works and in co-curricular activities and participants' parents educational background and income level influence on students awareness and attitudes to environmental problems.

### **3.5 Method of Data Analysis**

Data of the present study were analyzed utilizing descriptive statistics ( i.e., percentages, means and standard deviations) and inferential statistics by using a statistical analysis package SPSS 13.0. Moreover, descriptive analysis was used to describe, summarize and explain data from both the preestablished quantitative and qualitative data. Whereas, inferential statistics was applied to determine differences and infer the characteristics of the study area population based on samples. To analyse the collected data from the respondents the survey utilised quantitative and qualitative method of analysis for the gathered data through questionnaire and focus group discussion respectively.

Specifically, the collected data of the questionnaire was coded to each independent variable . Following this the data was imported into a research data base utilizing the statistical package for the social science: SPSS ( version 13.0 ) under the windows

computer operation system for the purpose of analysis. Each case was entered into a database assigning a code to identify each participant. The data was sorted to analyse the characteristics of participants with respect to the hypotheses. Significance for all statistical measures was determined at alpha level of 0.05. But the significance level for correlation was set at 0.01. Independent samples t-test was used as a test of statistical significance. The procedure was applied to compare means in case of two independent variables like gender ( female/male ). If the observed pvalue from the result of the table exceeds the significance level ( 0.05 ), the alternative hypothesis was rejected and this infers that there is no significant difference between the two variables. For more than two groups one way analysis of variance was applied. In addition to the above analysis mothed pearson correlation was computed to find out whether there is significant relationship between respondents' awareness and attitude.

## **CHAPTER FOUR**

### **FINDINGS AND DISCUSSIONS**

This chapter which is the integral part of the research deals about socio – demographic description, data presentation and discuss major research findings on students awareness and attitude towards deforestation and soil erosion. This is the base to make conclusion, recommendations and indicate research implication for further investigation on the issue.

#### **4.1 Socio-Demographic Profile of the Participants**

In the study, about 346 respondents were considered, representing both rural and urban woreda; 16.2 % are from Semema high school and 83.8 % are from Shire indasilasiea high school. Gender wise 56.0% of the respondents were females and 43.9 % were male respondents. Age wise 67.3 % were in the range of 14-18 years old and 32.6 % were above 19 years. By growing area, 61.5 % are urban based and 38.4 % are rural based. By grade level, 51.15 % are grade tenth and 48.8 % are grade nine. Based on their parents educational background, 41.3% are from non-literate, 29.4 % attained less than high school, 18.2 % attained high school, 10.9 % attended college. Based on their parents income level, 9.8 % are from very low income level, 40.7 % from low income level, 41.6 % medium income level and 7.8 % from higher income level. Based on access to media, 59.5 % do not have and 40.4 % have access to media. Based on interest to Biology and Geography courses 53.4 % have and 46.5 % do not have interest ( see Table 4.1).

Looking gender wise in the study area seems uncommon in which female students outnumbered male students. This may be associated partly with the affirmative action that initiates female students to learn. But largely as the researcher asked some individuals of the study area the main reason for this underlined that, male students do not attend their education instead they involve in work. For example in the urban males partake mostly in daily laborer and some in small industries. Whereas the rural male participate in gold mining and seasonal labor of agricultural activities in Western Tigray. It is also suggested by the researcher the main reason that may forces male students to decrease in

school relates with the increasing jobless highschool, preparatory and University graduated students. Thus, local students when they look this situation they participate in other alternatives instead of following their school.

**Table 4.1 Summary of the sub populations mean score and standard deviation**

| Sub population by                     |                  | N   | N in % | Awareness | SD    | Attitude |       |
|---------------------------------------|------------------|-----|--------|-----------|-------|----------|-------|
|                                       |                  |     |        | Mean      |       | Mean     | SD    |
| Age                                   | 14-18 yrs        | 223 | 67.3   | 44.78     | 7.22  | 38.69    | 4.27  |
|                                       | ≥19              | 113 | 32.7   | 43.57     | 6.38  | 36.61    | 3.26  |
| Gender                                | Female           | 194 | 56.1   | 45.26     | 6.98  | 39.03    | 3.79  |
|                                       | Male             | 152 | 43.9   | 43.27     | 6.88  | 36.71    | 4.03  |
| Grade                                 | 9 <sup>th</sup>  | 177 | 51.2   | 43.51     | 6.57  | 36.69    | 3.78  |
|                                       | 10 <sup>th</sup> | 169 | 48.8   | 45.30     | 7.28  | 39.39    | 3.94  |
| Place of birth                        | Rural            | 133 | 38.4   | 46.54     | 70.66 | 39.32    | 4.19  |
|                                       | Urban            | 213 | 61.6   | 43.04     | 6.15  | 37.19    | 3.803 |
| Interest                              | Having           | 185 | 53.5   | 45.76     | 7.77  | 38.25    | 4.38  |
|                                       | Not having       | 161 | 46.5   | 42.8      | 5.54  | 37.73    | 3.705 |
| Access to media                       | Access           | 140 | 40.5   | 45.22     | 6.62  | 38.17    | 4.15  |
|                                       | Not access       | 206 | 59.5   | 43.82     | 7.66  | 37.90    | 4.04  |
| Participant parents educational level | Not literate     | 143 | 41.3   | 45.53     | 7.15  | 38.55    | 4.28  |
|                                       | <high school     | 102 | 29.5   | 40.67     | 7.19  | 38.07    | 4.05  |
|                                       | High school      | 63  | 18.2   | 42.87     | 6.08  | 37.80    | 3.65  |
|                                       | College attended | 38  | 11.0   | 41.84     | 6.15  | 36.15    | 3.65  |
| Participants parents income level     | Very low         | 34  | 9.8    | 43.82     | 6.97  | 38.47    | 4.35  |
|                                       | Low              | 141 | 40.8   | 46.02     | 7.36  | 39.08    | 4.40  |
|                                       | Medium           | 144 | 41.6   | 42.97     | 6.47  | 36.08    | 3.18  |
|                                       | High             | 27  | 7.8    | 44.11     | 5.87  | 38.03    | 4.82  |
| School                                | SHIH             | 290 | 83.8   | 43.74     | 6.76  | 37.40    | 3.75  |
|                                       | SEMH             | 56  | 16.2   | 47.71     | 7.1   | 41.17    | 4.31  |

Source: field survey data, 2011

N=Sample Respondent, SD=Standard Deviation, Yrs = years

SHIH=Shire Indasilasie High School, SEMH=Semema High School

## 4.2 Deforestation and Soil Erosion Awareness SubPopulation Analysis

### 4.2.1 Gender Sub-population Analysis

Awareness about deforestation, and soil erosion among respondents was assessed based on the responses to 27 questions.

**Table 4.2: T-test for Comparing Awareness about Deforestation and Soil Erosion by Gender Assuming Equal Variance**

| Variable | N   | Mean  | Std. deviation | t    | df  | P    | Mean difference | t cr |
|----------|-----|-------|----------------|------|-----|------|-----------------|------|
| Female   | 194 | 45.26 | 6.98           | 2.65 | 344 | .008 | 1.9865          | 1.96 |
| Male     | 152 | 43.27 | 6.82           |      |     |      |                 |      |

p < 0.05

Source: field survey data, 2011

N = Sample                      t cr = t critical                      , significance level = 0.05

t = t calculated                      df = degree of freedom

From the above independent sample t-test table (4.2) that was done to evaluate whether there are any difference between gender groups female and male respondents regarding their awareness. The mean awareness score for females was 45.26 whereas the mean awareness score of males was 43.27. Therefore, it was found that females score significantly more than males (t=2.65, p<0.05, df=344). This mean that females have more awareness about environmental issues than male. This may be connected with theories of socialization whereby individuals are shaped by gender expectations within the context of cultural norms. In this theory females across cultures compared to males are socialized to be more expressive and to have a stronger ethic of care taker they inherited from their mothers and affects them to be sensitive to environmental issues better than males.

## 4.2.2 Grade level sub-population analysis

**Table 4.3 : T-test for Comparing Awareness about deforestation and soil erosion based on grade level assuming equal variance**

| Variable         | N   | Mean    | Std. deviation | t      | Sig (2-tailed) | Df  | Mean difference | t critical |
|------------------|-----|---------|----------------|--------|----------------|-----|-----------------|------------|
| 9 <sup>th</sup>  | 177 | 43.5141 | 6.57           | -2.407 | .017           | 344 | -1.79357        | 1.96       |
| 10 <sup>th</sup> | 169 | 45.30   | 7.28           |        |                |     |                 |            |

p>0.05

Source: field survey data, 2011

The statistical t-test in this survey between grade 9 and 10 groups shows the mean for grade tenth is slightly more than for grade ninth, 45.30, 43.51 and with standard deviation 7.28 and 6.57 respectively, and with mean difference of -1.79. This rejects the true hypothesis and indicated there is no statistically significant difference (  $t=-2.407$ ,  $p>0.05$ ,  $df=344$ ). This implies grade level do not brings change in respondents' awareness to the environment. It may mean the courses they take in grade ten specially environment related subjects do not have adequate environmental contents than grade nine environment related courses have. That is why as grade level of respondents' increase there show no difference on respondents awareness of environmental problems from grade nine respondents.

## 4.2.3 Age Sub-Population Analysis

**Table 4.4 : T-test for Comparing Awareness based on Age by Assuming Equal Variance**

| Variable  | N   | Mean  | Std. deviation | t     | Sig (2-tailed) | Df  | Mean difference | tcr  |
|-----------|-----|-------|----------------|-------|----------------|-----|-----------------|------|
| 14-18 yrs | 233 | 44.78 | 7.22           | 1.516 | .130           | 344 | 1.210           | 1.96 |
| ≥19 yrs   | 113 | 43.57 | 6.38           |       |                |     |                 |      |

p>0.05

Source: field survey data, 2011

As shown in the independent t-test ( Table 4.4 ) awareness section those in 14-18 years age group had a mean score of 44.78 and ≥19 years age group had a mean score of 43.57 with a mean difference =1.210. Thus, it revealed that there was no significant difference between the two groups (  $t=1.516$ ,  $p>0.05$ ,  $df=344$  ). The statistical test of Table 4.4 show that there is no difference due to age differences. But as different literature such as (Oweni and Hourri, 2010 and Ziadat, 2009) reported age has an effect whereby older age groups could have better environmental awareness about the environment. It is because when peoples gets older they increase their educational level and participate in different social activities. This all can help them to have more awareness of the environment than younger age groups. Contrary to this the study of (Aminrad et al., 2011) underlined younger persons are more environmentally concerned than older persons because environmentalism is an appropriate outlet of younger persons low commitment to the social order.

#### 4.2.4 School Sub-Population Analysis

**Table 4.5 : T-test for Comparing Awareness based on School Assuming Equal Variance**

|           | Variable | N   | t  | Mean  | Std. deviation | df  | Sig (2-tailed) | Mean difference | tcr  |
|-----------|----------|-----|----|-------|----------------|-----|----------------|-----------------|------|
| Awareness | Sh.H     | 290 | -3 | 43.74 | 6.76           | 344 | .000           | -3.966          | 1.96 |
|           | Sem.H    | 56  |    | 47.71 | 7.14           |     |                |                 |      |

p <0.05

Source: field survey data, 2011

Sh. H = Shire High School, Sem. H= Semema High School , Std. D = Standard Deviation

As it is shown in Table 4.5 independent t-test awareness, Semema high school had a mean score of 47.71 significantly greater than Shire highschool which scored 43.74 with a mean difference -3.966. As a result, there is significant difference in which Semema high school score significantly more than Shire high school (  $t=-3$ ,  $p<0.05$ ,  $df=344$  ) in the awareness section. The result reveals Semema high school students are better aware of local environmental issues than their counterparts. The possible reason could be related with the growing area in that all students in Semema highschool are rural based. On the contrary most students from Shire highschool are urban based.

#### 4.2.5 Growing Area Sub-Population Analysis

**Table 4.6 : Independent Sample T-test for Comparing Awareness by Growing Area Assuming Equal Variance**

| Awareness | Variable | N   | t     | Mean  | Std. deviation | df  | Sig (2-tailed) | Mean difference | tcr  |
|-----------|----------|-----|-------|-------|----------------|-----|----------------|-----------------|------|
|           | Rural    | 133 | 4.685 | 46.54 | 7.6638         | 344 | .000           | 3.50662         | 1.96 |
|           | Urban    | 213 |       | 43.04 | 6.152          |     |                |                 |      |

$p < 0.05$

Source: field survey data, 2011

From the independent t-test table 4.6, the mean awareness score for rural was 46.54 whereas the mean awareness score for urban was 43.04 with a mean difference of 3.50 and there is significant difference in respondents' awareness about deforestation and soil erosion (  $t=4.685$ ,  $p<0.05$ ,  $df=344$  ). The reason that may enable rural based to have better awareness than urban based, seems influenced due to their proximity to environmental problems. Because growing and living in a place or near particular environmental features may affects students to have more awareness and favorable

attitude of environmental problem. In the same way, rural based students could have more interaction with the environment because they born and grew in the rural environment and also their parents depend on the agricultural system. Therefore, all these conditions may help rural based students to have awareness and favorable attitude about the environment.

#### 4.2.6 Media Sub-population Analysis

**Table 4.7 : Independent T-test for Comparing Awareness Based on Access to Media Assuming Equal Variance**

| Awareness | Variable            | N   | t     | Mean  | Std. deviation | df  | Sig (2-tailed ) | Mean difference | tcr  |
|-----------|---------------------|-----|-------|-------|----------------|-----|-----------------|-----------------|------|
|           | Access to media     | 140 | 1.834 | 45.22 | 6.627          | 344 | 0.068           | 1.396           | 1.96 |
|           | Not access to media | 206 |       | 43.82 | 7.16           |     |                 |                 |      |

p>0.05

Source: field survey data, 2011

Results of the statistical test shown in Table 4.7 reveals that the mean for those groups who have access to media is slightly more than those who have not access to media , 45.22 , 43.57 with a mean difference 1.396 in which it rejects the true hypothesis and indicated there is no significant differences between the two groups in their awareness (t=1.834, p>0.05 at 344=df). The statistical test indicate that access to media do not influence students awareness towards the environment and its related problems in the study area. But, looking from the reality and different report of related literature such as (Rickinson, 2001 and 2002) access to media has a significant impact to increase awareness of the environment. Hence, the result may mean eventhough students have access to media, they may not give emphasis to listen issues of the environment or else there may be a low concern of Media Organisations in disseminating environmental news. Due to this the researcher pointed out for further in vestigation on this issue.

#### 4.2.7 Interest Sub-population Analysis

**Table 4.8 : T-test for Comparing Awareness Based on Participants Interest to Environment Related Courses ( Biology and Geography )**

| Awareness | Variable          | N   | Mean    | Std. deviation | t      | Sig (2-tailed) | Df  | Mean difference | t cr |
|-----------|-------------------|-----|---------|----------------|--------|----------------|-----|-----------------|------|
|           | Have interest     | 185 | 45.7622 | 7.77           | -4.007 | .000           | 344 | -2.948          | 1.96 |
|           | Not have interest | 161 | 42.81   | 5.54           |        |                |     |                 |      |

p<0.05

Source: field survey data, 2011

The results of the independent t-test that is presented in Table 4.8 reveals that the number of participants who have interest with average awareness ( 45.76 ) is more than their counterparts ( 42.81 ) with a mean difference – 2.948. This inturn shows there is significant difference (  $t=-4.007$ ,  $p<0.05$ ,  $df=344$  ) between those group who have interest and do not have interest. The results of Table 4.8 reflects that those groups interested in environment related courses have superior awareness than students who have not interest. It seems that the environment related courses like Biology and Geography help interested students to acquire awareness of the environment and its related problems.

#### 4.2.8 Analysis of Respondents Awareness based on their Parents income level and Educational background

**Table 4.9 : One Way ANOVA by Participants Parents Educational Background**

|           | Sources of Variation | Sum of squares | Df  | Mean square | F     | Sig  | F cr |
|-----------|----------------------|----------------|-----|-------------|-------|------|------|
| Awareness | Between groups       | 586.358        | 3   | 195.453     | 4.127 | .007 | 2.62 |
|           | Within groups        | 16197.969      | 342 | 47.362      |       |      |      |
|           | Total                | 16784.327      | 345 |             |       |      |      |

F = F calculated,

p<0.05

significance level = 0.05 , Fcr = F critical

df = degree of freedom

Source: field survey data, 2011

According to Table 4.1 the mean and standard deviation score of the four groups from the lowest to the highest educational level of parents is: 45.53, 7.1; 40.67, 7.19; 42.87, 6.08 and 41.84 , 6.1 respectively. The ANOVA Table 4.9 reveals that the difference between the means of the four groups regarding awareness test is not a reflection of sampling error or attributed to sampling error rather the table shows the existence of statistically significant difference between the mean score of the four groups since p value is less than the significance level ( 0.05 ) Table 4.9 ( F.05 ( 3,342 ) = 2.62, P < 0.05 and F = 4.127 ).

The mean score of Table 4.1 revealed a noticeable trend of vis-versa relationship in which as the educational background of parents increase students level of awareness decrease. This may mean even if parents have educational background they did not influence their children to have awareness about the environment. It might be parents also do not have awareness about the environment and connected problems that is why in this investigation as the educational level of parents increases their students awareness about the environment decreases. Therefore further investigation should be conducted about parents educational influence on their children and their own awareness about environment and associated problems.

**Table 4.10 : One Way ANOVA Participants' Parents Income Level**

|           | Sources of Variation | Sum of squares | Df  | Mean square | F     | Sig  | F cr |
|-----------|----------------------|----------------|-----|-------------|-------|------|------|
| Awareness | Between groups       | 680.943        | 3   | 226.981     | 4.821 | .003 | 2.62 |
|           | Within groups        | 16103.383      | 342 | 47.086      |       |      |      |
|           | Total                | 16784.327      | 345 |             |       |      |      |

$p < 0.05$

Source: field survey data, 2011

Here the pvalue (.003 ) is less than the significance level ( 0.05). Therefore, the above analysis of variance (ANOVA) shows that, there is significant difference between the mean score of the four groups ( i.e. participants from very low income, low income, medium income and high income parents in their awareness ( F.05 ( 3,342 )= 2.62 ,P < 0.05, F= 4.821 ). Income level of households can influence access to media and information, which can affect awareness of household members.

### **4.3 Analysis of sub-population Attitude about Deforestation and Soil Erosion**

Participants' attitude to deforestation and soil erosion in this study was studied by analyzing the responses to 13 questions on attitude.

#### **4.3.1 Gender Sub-population Analysis**

**Table 4.11 : Independent T-test for Comparing Attitude about Deforestation and Soil Erosion based on Gender by Assuming Equal Variance**

| Total attitude score | Gender | N   | Mean  | Std. deviation | t    | df  | Sig (2-tailed) | Mean difference | t crl |
|----------------------|--------|-----|-------|----------------|------|-----|----------------|-----------------|-------|
|                      | Female | 194 | 39.03 | 4.03           | 5.43 | 344 | .000           | 2.31            | 1.96  |
|                      | Male   | 152 | 36.71 | 3.79           |      |     |                |                 |       |

$p < 0.05$

Source: field survey data, 2011

The statistical t-test in this survey between female and male groups shows the mean of 39.03, 36.79 and with SD=4.03 and SD=3.79 respectively, which indicate significant difference of mean between the two groups ( $t=5.43$ ,  $p<0.05$  and the  $df=344$ ). This indicates that female respondents have slightly better attitude than their counterparts. The finding is in line with the observations made in other studies in other parts of the world.

### 4.3.2 Grade Sub-population Analysis

**Table 4.12 : Independent t-test for Comparing Attitude Based on Gender**

| Total attitude score | Grade            | N   | Mean  | Std. deviation | t     | df  | Sig (2-tailed) | Mean difference | t cr |
|----------------------|------------------|-----|-------|----------------|-------|-----|----------------|-----------------|------|
|                      | 9 <sup>th</sup>  | 177 | 36.59 | 3.78           | -6.50 | 344 | .000           | -2.7015         | 1.96 |
|                      | 10 <sup>th</sup> | 169 | 39.39 | 3.94           |       |     |                |                 |      |

$p < 0.05$

Source: field survey data, 2011

As can be seen from Table 4.12, the mean score of the groups is 39.39, 36.594 with SD=3.94 and 3.78 of grade ten and nine respectively. The difference appears significant of the mean between the two groups ( $t=-6.50$ ,  $p<0.05$  and  $344=df$ ). This shows that grade ten have better attitude than grade nine for they were exposed more to environment related issues and have had more information about the environment because they attended more lessons of biology and geography which dealt with the environment.

### 4.3.3 Age Sub-population Analysis

**Table 4.13 : T-test for Comparing Attitude Based on Age by Assuming Equal Variance**

| Total attitude score | Variable      | N   | Mean  | Std. deviation | t     | df  | Sig (2-tailed) | Mean difference | t cr |
|----------------------|---------------|-----|-------|----------------|-------|-----|----------------|-----------------|------|
|                      | 14-18 yrs     | 223 | 38.69 | 4.27           | *4.57 | 344 | .000           | 2.08466         | 1.96 |
|                      | $\geq 19$ yrs | 113 | 36.61 | 3.26           |       |     |                |                 |      |

\* $p < 0.05$

Source: field survey data, 2011

In the attitude section, those in 14-18 years had a mean score of 38.69 and 4.27 standard deviation. Whereas those 19 and above years old had a mean score of 36.61 with 3.26 standard deviation. It reflected that there is significant difference between the two groups on the attitude score in favour of the younger age (Table 4.13) ( $t=4.57$ ,  $p<0.05$ ,  $df=344$ ). It is likely that as one gets older one gets also richer in life experiences because exposures and participation in environment related issues and activities increases. But, the finding of Table 4.13 shows contrary to this view. Therefore, the researcher doubts this and pointed out for further investigation on the issue.

#### 4.3.4 Growing Area Sub-population Analysis

**Table 4.14 : Independent T-test for Comparing Attitude Based on Growing Area by Assuming Equal Variance**

|                | Variable | N   | Mean  | Std. deviation | t     | df  | Sig (2-tailed) | Mean difference | t cr |
|----------------|----------|-----|-------|----------------|-------|-----|----------------|-----------------|------|
| Attitude score | Rural    | 133 | 39.32 | 4.19           | *4.85 | 344 | .000           | 2.126           | 1.96 |
|                | Urban    | 213 | 37.19 | 3.80           |       |     |                |                 |      |

\* $p<0.05$

Source: field survey data, 2011

From the independent t-test (see Table 4.14), the rural and urban groups have a mean score of 39.32, 37.19 and 4.19 and 3.80 standard deviation respectively, which indicates there is significant difference ( $t=4.85$ ,  $p<0.05$  and  $df=344$ ). This revealed rural background participants have better attitude than their counterparts (for more explanation see statement under Table 4.6). This may be related with proximity of the problem that can influence persons to develop favorable attitude.

#### 4.3.5 School Sub-population Analysis

**Table 4.15 : Independent T-test for Comparing Attitude Based on School Assuming Equal Variance**

| Attitude score | Variable | N   | Mean  | Std. deviation | t    | df  | Sig (2-tailed) | Mean difference | t cr |
|----------------|----------|-----|-------|----------------|------|-----|----------------|-----------------|------|
|                | Shire H  | 290 | 43.74 | 6.76           | -3.9 | 344 | .000           | -3.96           | 1.96 |
|                | Semema H | 56  | 47.71 | 7.14           |      |     |                |                 |      |

$p < 0.05$

Source: field survey data, 2011

The statistical t-test in this survey between Shire Indasilassie and Semema high school shows the mean for Semema high school is more than Shire high school, 47.71, 43.74 and with standard deviation 7.14 and 6.76 respectively, which indicates significant differences in favour of Semema high school ( $t=-3.9$ ,  $p<0.05$  and  $df=344$ ). This finding may be caused due to the effect of growing area.

#### 4.3.6 Media Sub-population Analysis

**Table 4.16 : Independent T-test for Comparing Attitude Based on Access to Media**

**Assuming Equal Variance**

| Attitude score | Variable            | N   | Mean  | T     | Std. deviation | df  | Sig (2-tailed) | Mean difference | tcr  |
|----------------|---------------------|-----|-------|-------|----------------|-----|----------------|-----------------|------|
|                | Got access to media | 140 | 38.17 | 1.615 | 4.15           | 344 | 0.539          | .27566          | 1.96 |
|                | No access to Media  | 206 | 37.90 |       | 4.04           |     |                |                 |      |

Source: field survey data, 2011

The independent t-test in (Table 4.16) revealed that the mean for the group who have access to media and those do not have is 38.17, 37.90 with standard deviation of 4.15 and 4.04 respectively. This mean difference is slight which rejects the true hypothesis there is significant difference. Thus, as the table shows there is no significant difference ( $t=1.61$ ,  $p>0.05$ ,  $df=344$ ). The result of Table 4.16 links with the explanation of Table 4.7.

#### 4.3.7 Interest Sub-population Analysis

**Table 4.17 : Independent T-test for Comparing Attitude Based on Interest Assuming Equal Variance**

| Attitude score | Variable       | N   | Mean  | Std. deviation | t      | df  | Sig (2-tailed) | Mean difference | t cr |
|----------------|----------------|-----|-------|----------------|--------|-----|----------------|-----------------|------|
|                | Interested     | 185 | 38.25 | 4.388          | -1.170 | 344 | .243           | -514            | 1.96 |
|                | Not interested | 161 | 37.73 | 3.705          |        |     |                |                 |      |

P>0.05

Source: field survey data, 2011

The statistical t-test in this survey ( Table 4.17 ) between the groups who have interest to Biology and Geography and those who have not, shows the mean for those who have interest is slightly more than those who have not ( 38.25 and 37.73 with standard deviation 4.38 and 3.70 respectively), which rejects the alternative hypothesis and identified no significant difference in their attitude (  $t=-1.170$ ,  $p>0.05$  and  $df=344$  ). This investigation reflects interest to environment related courses did not bring changes in respondents awareness in students attitude towards the environment.

#### 4.3.8 Analysis of subpopulation attitude based on participants' educational background and income level

**Table 4.18 : One Way ANOVA Based on Participants' Parents Educational Background**

| Variable       | Sources of variation | Sum of squares | Df  | Mean square | F     | Sig  | F cr |
|----------------|----------------------|----------------|-----|-------------|-------|------|------|
| Attitude score | Between groups       | 175.432        | 3   | 58.477      | 3.579 | .014 | 2.62 |
|                | Within groups        | 5587.496       | 342 | 16.338      |       |      |      |
|                | Total                | 5762.928       | 345 |             |       |      |      |

Source: field survey data, 2011

As to the Table (4.1) indicated the mean score of respondents from different parents educational background is 38.53, 38.07, 37.80, and 36.15 for those not literate, less than high school, high school and college attended respectively. The result is so surprising in

that the group who were from not literate better in their attitude score. It reflected parents educational level do not have influence on their children attitude to environmental problems. Eventhough there is mean difference among the four groups, the ANOVA ( Table 4.18) reveals that the pvalue (0.14) is greater than the significance level (0.05). Hence the difference between the four groups based on their parents' educational background is not significant on the mean attitude score (  $F_{0.05} ( 3, 342 ) = 2.62$  ,  $P > 0.05$  and  $3. 579$  ). This might mean even if parents are educated, they may not have awareness and favorable attitude towards the environment. That is why as parents' educational level increase their children attitude to the environment and its related problems decrease in this investigation.

**Table 4.19 : One Way Analysis of Variance (ANOVA) Based on Participants' Income Level**

| Variable       | Soruces of variation | Sum of squares | Df  | Mean square | F     | Sig  | Fcr  |
|----------------|----------------------|----------------|-----|-------------|-------|------|------|
| Attitude score | Between groups       | 362.578        | 3   | 120.859     | 7.654 | .000 | 2.62 |
|                | Within groups        | 5400.350       | 342 | 15.79       |       |      |      |
|                | Total                | 5762.928       | 345 |             |       |      |      |

$p < 0.05$

Source: field survey data, 2011

The ANOVA noted in Table 4.19 reveals that the difference between the mean of the four groups ( i.e. participants from very low income level, participants from low income level parents, participants from medium income level parents and participants from high income level parents ). It indicates that their attitude test is not a reflection of sampling error. Rather, the table indicates the existence of statistically significant difference between the mean score of the four groups (  $F_{0.05} ( 3,342 ) = 2.62$  ,  $P < 0.05$  and  $F = 7.654$  ). The result of Table 4.19 pinpoints parents' income has an impact on their children concern to the environment.

#### 4. 4 Respondents Level of Environmental Awareness and Attitude

To judge respondents level of awareness (low level, average and high) and favourable attitude, the researcher has consulted the two geography teachers in Shire Ind -asilassie. Those teachers looking the items of the questionnaire decided the score points of low awareness below 45.00, average awareness in the range 45.00 – 55.00 and high awareness those respondents who scored 56.00 and above. Similarly they have also set the unfavorable and favorable score limit; average score and below as unfavorable attitude and above the average score as favorable attitude.

**Table 4. 20 Number and percentage of students falling under different levels of environmental awareness**

| Level of score limit awareness of students |        | Low awareness ( average ( 44.39 )and below the average score) | Average awareness ( 45.00 – 55.00) | High awareness ( 56.00 – 85.00) |
|--|--------|---|------------------------------------|---------------------------------|
| Respondents                                | Number | 220   | 99                                 | 27                              |
|  | %      | 63.58   | 28.61                              | 7.8                             |

Source: field survey data, 2011

As table 4. 20 indicates majority of the respondents ( 63.58 % ) have lower awareness, 28.61 % average awareness and 7.8 % have high awareness. This indicates students of the study area have lower awareness to deforestation and soil erosion. In the same way the number and percentage of respondents falling under favourable and unfavourable attitude to deforestation and soil erosion are (148 ) 42.77 % and (198 ) 57.22 % respectively.

Computed values show that about 57.22 % of the respondents have unfavorable attitude and 42.77 % have favorable attitude to the problem under study. Thus, the table shows most students of the study area seems did not develop favourable attitude to the local environmental problems.

In general it was found that students of the study area have low awareness and unfavourable attitude to deforestation and soil erosion. This implies that the formal education system in the study area did not contribute to students to have high awareness and favorable attitude towards the local environmental problems. The concentration of 63.58 % and 57.22 % of the respondents in low awareness and unfavorable attitude respectively may be associated with lack of in-depth exposure to environmental contents in Bioilogy and Geography, schools low concern to open environmental clubs, involve students in environmental training and broadcast environmental problems through school minimedia.

#### **4.5 Analysis of the relationship of Respondents Awareness and Attitude Score**

To find out what types of relationship exist between the two dependent variables ( i.e. awareness and attitude score to each other), Pearson correlation coefficient was calculated. In the computed value of Pearson (r) positive value indicates as one variable increases the other also increases, whereas if the r value is negative between the two variables, it implies as one variable increases the other variable in contrast decreases.

**Table 4.21 : Pearson Correlation for Students’ Awareness and Attitude about the Problem**

|           |                     | Awareness’ | Attitude |
|-----------|---------------------|------------|----------|
| Awareness | Pearson correlation | 1          | .385**   |
|           | Sig. (2-tailed)     |            | .000     |
|           | N                   | .346       |          |
| Attitude  | Pearson correlation | .385**     | 1        |
|           | Sig. (2-tailed)     | .000       |          |
|           | N                   | 346        | 346      |

\*\* correlation is significant at the 0.01 level (2-tailed)

Source: field survey data, 2011

In this research finding as presented above in Table 4.21 the correlation between awareness and attitude, there is significant correlation ( $r=0.385$ , at 0.01 level (2-tailed). In interpreting the value of Pearson correlation it is commonly used the range ( r ) value less than or equal to 0.05 as very low , r value 0.051 – 0.79 low, 0.80 - 0.89 moderate , r value 0.90 and above very high relationship.

Though there is significant correlation between the two variables, the relationship that exist between them is positive and very low. As the table revealed the relationship between the two dependent variables based on the computed coefficient of correlation  $r=.385$  is very low at 0.01 significance level.

Hence, the finding of this came up with unsatisfactory result when it is looked from the objectives of environmental education that considers these elements of awareness and attitude as a combined which would have strong relationship and move together instead of independent to each other in addressing environmental protection by developing communities awareness and attitude. To meet the target of environmental education successfully, there should exist a strong relationship between these variables. Therefore, to have a strong relationship between the variables and in turn to make students pro-environmental protective, the school systems should play active role in achieving environmental education objectives.

#### **4.6 Results of Focus Group Discussion**

The purpose of the focus group was to gain a deeper insight into students awareness and attitude of environmentally-related problems in the local environment through the eight questions addressed in the focus group discussion.

The information gathered from the focus group discussion were of significant value to this research as the information provided a qualitative dimension that enabled to substantiate the data gathered by the questionnaire.

Two FGD were conducted, one each with Shire Indasilassie secondary school with 10 students, Semema secondary school to share about their personal observations, reflections

and opinion about the local environmental problems, their causes, consequences and their solutions, membership of students in voluntary community clubs and other school clubs, students participation in environmental clubs and training and students sources of information about the environment. In analyzing the FGD points of the two groups more or less their response to the eight questions were similar. As a result of this it was analysed collectively.

Basically, the focus group discussion results were not just like the responses gathered through questionnaires in that respondents in the FGD have showed active participation to most questions and are aware of the local environmental problems. The results of FGDs No.1 and 2 are summarized in the following section by condensing each questions posed one after a time.

The first two questions posed were: In what club and activities are you involving ? If you are not member of any club,environmental club in particular, why ?

The most commonly noted responses were “we are not a member of any club in our school and this is mainly associated with lack of motivation by the school concerned bodies. But some of them mentioned that they are members of anti-HIV/AIDS club although they did not participate in any related activities. Then, almost all the participants of the FGD.2 expressed that they need to learn more to protect environment mainly soil erosion deforestation and climate change. Because, these environmental problems are increasing from time to time in the locality and region. If we learn more about these problems we can participate in conservation activities and making our community to preserve the natural environment and participate ourselves in planting seedlings’ (trees ) in barren area. And all these can conserve the environment.

FGD No. 3, What are the major environmental problems in your locality and what do you think the solution to them?

Similar to the other FGD points participants have showed very hot and warm discussion up on this problem. And they have stated as follows:

The main environmental problems which are observed widely in our surrounding are deforestation and soil erosion and sometimes drought. They have pointed out that, these problems came into being due to the interference of local community to nature beyond its carrying capacity. And we believe that the solution to these problems the first and foremost is, to make the community members to have awareness what will happen to the local area if they proceed in this way by destroying the natural environment. Secondly planting of trees, building dams and protecting these conservation measures not to ruin.

FGD No. 4, Is there voluntary community club in your school? If yes, what activities it play?

Regarding this FGD among the participants there was not hot participation as the other above mentioned FGDs and all of them replied that there was no voluntary community club in both schools.

This is not good for students now at any school level because these students' will be tomorrows' decision makers. Therefore, they have to have access to voluntary community club in their school that can help them to have insight about their local environment activities and even they can participate to help the communities in addressing environmental problems.

FGD No. 5, How population pressure can contribute to deforestation, soil erosion and other environmental problems?

In this issue, most of the participants mentioned in their discussion that, population pressure ( i.e. stated according to the respondents each community having many children ) is to be blamed for making our environment to underwent from bad to worst through deforestation and soil erosion for the sake of agricultural activities and settlement purpose.

FGD No.6, Have you ever participated in any training related to preserve the environment?

As almost all group participants indicated not to speak of participation in training related to the environment even we did not ever heard the idea of training to preserve environment in our school.

FGD No. 7, What are the most important sources of your information about the environment and man's impact on the environment?

Concerning this discussion point majority of the participants explained that, the only source of our information about the environment and its related problems are subjects like biology and geography. But, some group participants said we get through personal media in addition to the school subjects like biology and geography.

FGD No. 8, Does your school Mini media partake (involve) in broadcasting information related to environmental problems? If yes, explain the environmental problems which get priority?

In this issue, most of the FGD participants have pour out their dissatisfaction with the school mini media in pronouncing the issue of the environment in the following ways: "in our school, the mini media do not give any concern to environmental problems even per month one day, it only deals to some extent about HIV/AIDS and Red Cross Club.

In short, the FGD that was held in the study area was hot and debating to most FGD points (questions ) and it has revealed that the study area Schools low emphasis to disseminate ideas of environmental problems to their school children through extracurricular activities.

#### **4.7 Discussion of Major Findings inline with the available Literature**

This section of the research deals about the discussion of major findings in relation to available literature.

##### **Effects of Gender and Grade Level**

The gender sub-population analysis using independent t-test revealed that there was a significant difference in their awareness and attitude respectively ( Table 4.2 and 4.11 ).

In two of the components female groups scored better than the male groups. This finding was in support of the study made by Cavas, (2009) in which he got a statistically significant difference in favor of girls. Similar to this, other investigation reported by Aminrad et al., (2011) reported that as he found significant difference in favor of female in both their awareness and attitude.

In contrast, the study of Bhawana (2011), on student teacher environmental awareness indicated that there was no significant difference due to gender differences. This investigation in relation to available literature seems inconsistent. Therefore it would be good if conducted further research on gender effect on students' awareness and attitude in our country context.

Regarding grade level sub-population analysis using an independent t-test Table 4.3 showed that there is no significant difference in their awareness between grade ninth and tenth. Whereas there was found a significant difference between the two groups in their attitude in favor of grade ten (Table 4.12). The finding of the attitude in this research is in support of the finding made by Aminrad et al., (2010) who reported the more educated (that spent more years) in their education level were better in the attitude score. Similarly, the study done by Taye (2008) among University students in Ethiopia revealed that those who spent more years in education system would have better awareness, knowledge and attitude about the environment than those who spent less year. In line with these studies the researcher believed grade ten could have better awareness and attitude since they took more environment courses than those in grade nine. As a result the researcher pointed out further research to be done on students awareness of environmental issues based on educational level differences.

### **The Effects of Place of Birth and School**

The place of birth sub-population analysis using independent t-test in Table 4.6 and 4.14 indicated that there was significant difference in which those from rural backgrounds have scored higher than their counterparts in their awareness and attitude respectively. This finding was in contrast of the investigation reported by Berenguer et al., (2005) who found out, urban students have better environmental concern and attitudes than those

rural background. He elaborated the reason for this saying urban students always interact with media and magazines that help them to develop awareness and attitude to the environment. Where as, the study of Bhawana, (2011) find out that there is no significant difference between the two groups by underlying those groups have studied the same course in the same school. Therefore, they have similar awareness and attitude. But, contrary those reviewed findings other literatures reported rural backgrounds have better awareness and attitude instead of the urban students. For instance, Ziadat (2009) mentioned that rural residents are better in their awareness and attitude than their counterparts. Other study also point out proximity to any environmental issue makes students to have awareness and attitude in addition to the course they take in school ( McCright, 2010 and Nisbet et al., 2009). Studies conducted in Ethiopia by Taye (2008) among University students and by Asmare ( 2007) in grade nine and ten students reported students with rural background scored better than respondents with urban background in environmental awareness, attitude, knowledge and behaviour.

Regarding school sub-population analysis using independent t-test in Table 4.5 and 4.15 showed there was a significant difference in that respondents from Semema Secondary school scored better than those from Shire Indasilassie in their awareness and attitude respectively. This finding may be associated with the growing area analysis. Because, those respondents from Semema secondary schools were from rural background in which their high school is situated in the rural area. But in Shire IndsilasSie secondary school most of the respondents were with urban background.

### **The Effect of Age, Access to Media and Interest to Biology and Geography Courses**

The age sub-population analysis using independent t-test in Table 4.4 confirmed that there was no significant difference between the age groups 14-18 years and 19 years and above in the awareness test. Whereas in the attitude score there was investigated significant difference between the two groups. As table 4.13 revealed those age group from 14-18 years old had score better than 19 years old and above. This finding is in support of the investigation made by ECLAC, (2000) who came up younger persons tends to be more aware and concerned about environmental quality than older persons.

Similar to the above finding the result of Larijani ( 2010 ) indicated that among higher primary school teachers, there found better awareness in the young groups than the older groups. Contrary to this, the finding of Aminrad et al., ( 2010 ) on Iranian students' environmental awareness and attitude reported that, older age groups respondents have more awareness towards the environment than the younger groups. Although the link between age and environmental awareness and attitudes is suggested by various scholars in different way, there are inconsistencies in their findings.

Concerning access to media sub-population analysis through independent t-test, Table 4.7 and 4.16 there was no significant difference in awareness and attitude test between those groups who have access to media and those do have not access to media respectively. This result is in contrast to the available literature which assume those access to media are better in the environmental awareness, knowledge, attitude and behavior (Rickinson, 2001 and 2002 ).

As far as the interest sub-population analysis is concerned, using independent t-test in Table 4.8 there was found significant difference in the wareness test between those group who have interest to environmental related coruses ( i.e. Biology and Geography ) and who do not have. In this, the group who have interest have scored better than their counterparts. Whereas, in the attitude test Table 4.17 even if the mean score of the group who have interest is slightly higher than the other groups but it was not revealed significant difference.

### **The Effects of Participants' Parents Educational Background and Income Level**

The analysis of participants' parents educational background using one-way analysis of variance (ANOVA) indicated in Table 4.9 shows that there was significant differences on the responding to awareness score among those four levels of educational groups. As to the Table (4.1) shows the mean for respondents from not literate is 45.53 awareness and 38.55 attitude score (n=143); Lessthan high school, 40.67 awareness and 38.07 attitude score ( n=102); high school 42.87 awareness and 37.80 attitude score (n=63) and college attended 41.84 awareenss score and 36.15 attitude score (n=38). But the groups attitude score was insignificant in ANOVA Table 4.18. The computed mean score of the

respondents is very surprising when educational level of their parents increases their score decrease. Even though, the mean score of the four groups is different to each other but in their attitude score, it was confirmed that, there is no significant difference since the p value ( 0.234 ) is greater than the significance level ( 0.05 ) in Table 4.18.

Regarding the analysis of respondents' based on their parents income level, Table (4.1) shows that, the mean score of the respondents for very low income level is 43.82 and 38.47; low income level 46.02 and 39.08; medium income level 42.97 and 36.08 and high income level 44.11 and 38.03 in the awareness and attitude score respectively. In the survey, the group who were from low income level parents have scored better than the other groups in the awareness and attitude score test. Hence Table 4.10 and 4.19 reflected that there is significant difference responding to environmental awareness and attitude score among the four groups based on their parents income level respectively.

On the effects of parents educational background and income level different literatures provide different ideas. For instance, the study of Feinstein and Duckworth, (2006) reported that children of parents with longer participation in education do better in standard tests of school attainment than those whose parents have had less education. The study further reported that parents with more education are more likely to have children who will do well academically and pro – environmental. Parents are a product of their surroundings, just as children are. When parents are educated they could create to their children good learning environments at home, which increase their knowledge concerning environment. They also make to participate in world Environment day and environmental protection day which can help in creating awareness about environment among school students.

On the contrary, school students from not educated and lower income parents and those who have low education level do not have such facilities. Their home environments are also where they strive to live by extracting the natural environment. Due to that they do not get any awareness about the environment what will happen. They are not aware about the various threats to the environment. Similar to parents educational influence, their income play a significant role students to develop consciousness and favourable attitude

toward their environment. For instance, the study of Cotrrel (2003) found that students from higher income families were more aware of humans impact on the environment than were students from lower income families and income was positively related with pro-environmental behaviour. It further reported that the more well-to-do financially were more inclined to participate in pro-environmental behavior. In contrast to this, other study found that concern for environmental protection is something a mandate of those peoples who have lower income (Palmer, 2009). Due to the controversial reported related literature on parents educational and income level in influencing their children environmental awareness and attitude, the result of the survey is inconclusive.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND RESEARCH IMPLICATIONS**

#### **5.1 Summary**

Nowadays, environmental problems have increased rapidly. Therefore, educating people is the main way to reduce environmental problem by creating consciousness and sensibility toward environment. Education is a long-life process, so it is crucial to teach related subjects about environment beginning from elementary and continue up to the University level.

Our country Ethiopia is experiencing environmental problems mainly related with the agricultural activities for it is a developing country. Therefore, the main environmental problems are soil erosion, deforestation and recurrent drought in the rural areas of the country. The environmental problems which are observed in the rural areas are exposing the country to poverty. Thus, these problems call for people aware of the problem and those who have favorable attitude as well as positive behavioral practice. And this can be achieved in collaboration with the whole community including students at any level. Particularly students who are at school will drive our life in the future. Because, in the future some of these students may be engineers in large factories, or administrative staff in private and public places, directing policy makers or enforcing pressure on policy makers in demolishing environmental problems. As a result of this, schools should provide an education system that can address environmental issues in the formal and informal sector to make students conscious and those who have favorable attitude and practice to mitigate environmental problems. Therefore, students at any level should have awareness, favorable attitude and behavioural change towards the environment if they are going to play a key role in the future.

In the light of what is noted above, the main objective of this study was to determine students' awareness and attitude and thereby assess differences that exist between the

two high schools on their students' awareness and attitude. And to examine if the schools are producing students pro-environmental or destructive of the environment.

Besides, it was sought to analyze differences in awareness and attitude score by school, grade level, age, gender, place of birth, interest to environmental related courses, access to media, participants' parents educational background and income level sub-populations. In order to achieve the general objectives this study formulated the following specific objectives:

- ✓ To assess students awareness of and attitude toward deforestation and soil erosion.
- ✓ To assess and identify differences in students' awareness and attitude toward deforestation and soil erosion in terms of sex, age, class level, place of birth, access to media , interest to environment related courses, participants' parents educational background and income level.
- ✓ To determine the relationship between students awareness and attitude

In line with the above objectives, a comparative descriptive survey methodology was employed. The main source of data for this research were grade 9<sup>th</sup> and 10<sup>th</sup> students from Shire Indaselassie and Semema secondary schools of the academic year 2010/2011. Before collecting the actual data, the researcher has showed the instrument to Geography and Biology teachers of the study area to screen out difficult words and questions. The instrument consists of questionnaire and FGD as the main data gathering tools from the respondents. The two high schools were purposefully selected to see if there was differences. This was because Semema secondary was located in the rural area, whereas Shire Indasilassie high school is found in the Zonal town. The sample size considered was 346 respondents selected from the two schools ( 290 from Shire Indaselassie high school and 56 from Semema general secondary high school, using proportional stratified sampling technique taking gender, school, and grade level as stratum. To analyze data, both descriptive ( mean and standard deviation ) and inferential (simple correlation, independent t-test and one way ANOVA ) statistics methods were employed.

Through the data analyses and discussions, the researcher came up with the following major findings.

- The respondents source of information about their environmental awareness and attitude are the environment related courses like Biology and Geography in the formal education system.
- Respondents of the study area were not members of voluntary community, and environmental club.
- As the result of FGD showed respondents of the study area are eager to learn ways of protecting their environment.
- The results of FGDs showed that, respondents were aware of deforestation, soil erosion and drought as the main environmental problems in the local area. These problems are exacerbating from time to time due to growing population pressure manifested by expansion of agricultural land and settlement .
- In the study area schools, students do not get the chance of training in environmental related problems.
- School media seems do not give considerable attention to broadcast environmental issues (problems) to school communities.
- Based on the average score of respondents in awareness and attitude test, 63.58% have low awareness, 28.61% respondents have moderate awareness and 7.8% have high awareness about environmental issues. In the attitude score, 57.225% of the respondents have unfavorable attitude and 42.77% have favorable attitude to wards environment.
- There was found very low positive relationship between awareness and attitude score (  $r=0.389$  ).
- It was also found that in the awareness test; female, Semema highschool students, interested in environment related courses, those rural based students,

students from low income and illiterate parents found better of in their awareness to the local environmental problems. Moreover, female, grade ten, rural based, Semema highschool students, students from low income and illiterate parents were found to have favorable attitude towards the problem in the attitude test.

- As the reviewed environmental related courses of the Biology and Geography revealed, there are no adequate topics related to the environment, environmental issues and their solutions.

## **5.2 Conclusions**

Based on the findings of the study, the following conclusions are drawn.

- ❖ Formal education system through environment related courses like Biology and Geography is the main sources of information about the environmental problems for the students of the study area .
- ❖ Students of the study area at Shire Indasilassie and Semema secondary schools have low awareness and unfavorable attitude towards soil erosion and deforestation. This may mean that students showed no concern about issues of environment – soil erosion and deforestation in this case to the expected level.
- ❖ The correlation between the two variables awareness - attitude seems weak . And yet the two are positively correlated which may mean awareness one has can influence once attitude toward the environment.
- ❖ As the reviewed environmental related courses of Biology and Geography revealed, there are no adequate topics related to the environment, environmental problems and their solutions. Even topics which are addressed in the subjects, limited to cognitive domain development instead of practical activities which can involve students in their local environmental problems conservation practice. In line with this focus group discussion participants commented on saying we are only concentrating in our classroom teaching

without touring our severely affected environment. Hence the topics treated seems meant more for the development of cognitive domains than the affective and psychomotor domain.

- ❖ The effects of age, grade level, gender, interest, access to media, place of birth, school, participants' parents educational background and income level in connection to available literature reports and results of this study are inconclusive on the awareness and attitude about deforestation and soil erosion. Thus, there is a room for further research to be undertaken for the above listed variables in Ethiopian context.

### **5.3 Recommendations**

The current environmental crisis has its origin in human attitudes towards the environment. Unless something is done to change these attitudes and to establish a positive relationship between human communities and nature, environmental quality, and consequently, quality of life may continuously deteriorate. The progress and welfare of present and future generations depends to a great extent on positive and timely solutions to socio-economic and ecological problems which arise from the relationships between humans and nature . Unless we understand the future for which we are preparing, we may do tragic damage to those we teach . One of the major goals in education is to prepare young children for the future. Environmental education is the one that strives to educate communities about the environment and its problems. It should be provided to students sufficiently in the formal and informal sectors to produce responsible future citizens . Hence, schools need to pave ways of school children to have awareness and favourable attitude about their environment. As a result of this, the study was done to determine school children awareness and attitude, identify differences among subpopulations and factors that can make differences.

On the basis of the findings, discussions and conclusions drawn so far the following recommendations hoped to alleviate the existing gap ( problem ). Therefore, the following points are forwarded to the study area high schools and curriculum designers.

- ❖ The schools should play active role to improve their students awareness and attitude to environmental problems by opening environmental clubs, voluntary community clubs, training of students in environmental related issues and motivating students to involve in environment clubs and serve communities .
- ❖ We should not receive services from the environment but we should serve our environment by planting trees and do conservation activities.
- ❖ It seems essential if the study area schools ( Shire Indasilassie and Semema Secondary Schools ) give priority to provide up-to-date information upon environmental problems mainly soil erosion, deforestation, drought and others through school mini media and by bringing magazines to their school.
- ❖ It seems important if the curriculum designres give due attention to incorporate more environmental related topics into school subjects like Geography and Biology and give concern the topics to be more of practical than theoretical.

#### **5.4 Research Implications**

The results of this study suggest the following implication for further research regarding awareness and attitude about deforestation and soil erosion in Shire Indasilassie and Semema Secondary School.

- ✓ Since the bivariate coefficient of awareness versus attitude is weak positive, further study should be undertaken to assure it.
- ✓ Since this investigation involved a survey instrument consisting of Questionnaire and Focus group discussion adapted from other studies, further investigation would be good if conducted using direct observation and interview methods to determine each individual student's awareness and attitude and sub-population differences.

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**APPENDIX I**  
**ADDIS ABABA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDY**  
**COLLEGE OF EDUCATION**

**DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL EDUCATION**

**Questionnaire filled by Semema and Shire Indaselassie first cycle secondary school.**

The main objective of the Questionnaire is to gather students' awareness and attitude to deforestation and soil erosion and find out differences that exist between the two high school students'. This investigation will not have any kind of impact with your class courses that you are undertaking right now. As a result of this, it will contribute nothing in your mark whether you participate or not in answering to the listed below questions.

NOTE: Read carefully each instruction before you start to answer.

**You don't have time limit in answering these questions**

**INSTRUCTION**

**INSTRUCTION ONE:** This questionnaire has four parts:

Part I: objectives of the study and instructions

Part II: Students' profile

Part III: Awareness questions

Part IV: Attitude questions

**INSTRUCTION TWO:** No need of writing your name

**INSRUCTION THREE:** Answer each question following their instructions

**Thank you very much indeed for your participation in this Survey**

By:

Goitom Tesfay

**Part one**

**Part Two**  
**Students' Profile**

**A Questionnaire for grade 9<sup>th</sup> and 10<sup>th</sup>**

Please answer each question by drawing neat circle (0) around a number in a box.

1. What is your Gender?

|        |   |
|--------|---|
| Male   | 1 |
| Female | 2 |

2. In what grade are you?

|                  |   |
|------------------|---|
| 9 <sup>th</sup>  | 1 |
| 10 <sup>th</sup> | 2 |

3. Please indicate your age in years.

|                 |   |
|-----------------|---|
| 14 - 18 age     | 1 |
| 19 and > 19 age | 2 |

4. From which area do you come?

|       |   |
|-------|---|
| Rural | 1 |
| Urban | 2 |

5. Which high school do you attend?

|                   |   |
|-------------------|---|
| Semema Highschool | 1 |
| Shire Highschool  | 2 |

6. What is your parents' income level?

|          |   |
|----------|---|
| Very low | 1 |
| Low      | 2 |
| Medium   | 3 |
| High     | 4 |

7. What is your parents' educational background?

|                  |   |
|------------------|---|
| Not literate     | 1 |
| < High school    | 2 |
| High school      | 3 |
| College attended | 4 |

8. Do you have TV or Radio at your home?

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

9. Are you interested to learn Biology and Geography courses?

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

### Part Three

#### Environmental Awareness Questions

Please answer each question by drawing neat circle around a number in a box.

1. Is there the problem of deforestation in your local area?

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

2. How serious is deforestation and soil erosion in your local area?

|              |   |
|--------------|---|
| Very Serious | 3 |
| Serious      | 2 |
| Less serious | 1 |

3. Is there the problem of Soil erosion in your local area?

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

4. How serious is soil erosion in your local area?

|              |   |
|--------------|---|
| Very serious | 3 |
| Serious      | 2 |
| Not serious  | 1 |

5. Are you worried about the degradation of the environment through deforestation and Soil erosion?

|               |   |
|---------------|---|
| Yes very much | 3 |
| Yes           | 2 |
| No            | 1 |

6. If your answer to question number “5” is yes very much and yes, please elaborate why you are worried about those problem by selecting the listed below alternatives?

|   |   |
|---|---|
| Because our environment is facing catastrophic consequences from soil erosion and deforestation mainly due to human activity  | 3 |
| Because our environment is facing catastrophic consequences from deforestation mainly by the combination of nature and human, | 2 |
| Because our environment is facing catastrophic consequences from soil erosion only by the force of nature                     | 1 |

7. Please choose the correct definition of soil erosion

|  |   |
|--|---|
| Process by which soil particles are detached and transported by wind and water as a result of human kind | 3 |
| Is the geological process by which material is added to a landform or land mass                          | 2 |
| Is the clearance of naturally occurring forests by human being   | 1 |

8. Do you know the causes of soil erosion?

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

9. If your answer is yes, please choose from below alternatives?

|  |   |
|--|---|
| Deforestation and Cultivation with out fallowing | 3 |
| Cultivation on steep slopes and over grazing     | 2 |
| Housing construction and mining                  | 1 |
| All of the above                                 | 4 |

10. What is deforestation?

|  |   |
|--|---|
| Is the clearing of forests to improve their growing period                       | 1 |
| It is the clearance of naturally occurring forests by logging and burning        | 2 |
| It is the permanent clearing of forestland for agricultural uses and settlements | 3 |
| All of the above   | 4 |

11. What are the causes of deforestation?

|  |   |
|--|---|
| Expansion of agricultural activities and grazing lands | 3 |
| Clearing of plants For fuel wood and charcoal making   | 2 |
| Urban expansion and construction purposes              | 1 |
| All are answers  | 4 |

12. Deforestation is responsible for

|   |   |
|---|---|
| The distortion of rainfall and Declining of agricultural productivity | 3 |
| Climate change, drought and flooding                                  | 2 |
| The destruction of Soil and different animals                         | 1 |
| All of the above  | 4 |

13. What is the main environmental problem in the local area of woreda Tahtay koraro?

|                                |   |
|--------------------------------|---|
| Soil erosion and Deforestation | 4 |
| Deforestation mainly           | 3 |
| Soil erosion mainly            | 2 |
| Climate change,                | 1 |

14. What is the main environmental problem in the local area of Shire Indasilasie?

|                                |   |
|--------------------------------|---|
| Soil erosion and Deforestation | 4 |
| Deforestation mainly           | 3 |
| Soil erosion mainly            | 2 |
| Climate change,                | 1 |

15. Participation in School clubs can help to have students' better awareness about their local environment.

|                    |   |
|--------------------|---|
| Yes sufficiently   | 2 |
| Yes to some extent | 1 |

16. If your answer to question number fifteen is yes sufficiently, every students' should be member of environmental clubs.

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

17. If your answers to question number fifteen is yes to some extent why?

|  |   |
|--|---|
| Participation in clubs may be helpful, but I did not do it | 2 |
| It can not contribute more than I have                     | 1 |

18. Becoming member of co- curricular activities (school clubs) is \_\_\_\_\_

|                |   |
|----------------|---|
| Very necessary | 4 |
| Necessary      | 3 |
| Not necessary  | 2 |
| I do not know  | 1 |

19. Watching TV or listening Radio increases about environment and human impact up on it.

|                |   |
|----------------|---|
| Yes very much  | 3 |
| Yes to somehow | 2 |
| No it can not  | 1 |

20. School mini media which broadcast issues and news related to the environment is good at any school?

|               |   |
|---------------|---|
| Yes certainly | 3 |
| Yes           | 2 |
| No            | 1 |

21. If your answer to question number nineteen (“20”) is yes certainly and yes, environmental problems like global warming, climate change, soil erosion, deforestation and animal extinction should be broadcasted\_\_\_\_\_

|               |   |
|---------------|---|
| Always        | 4 |
| Occasionally  | 3 |
| No need       | 1 |
| I am not sure | 2 |

22. Reading published materials in the school or outside which focus on environmental issues helps to substantiate students awareness about human impact on the environment.

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

23. Students can develop their awareness more about the environment, environmental problem and their solutions through \_\_\_\_\_

|  |   |
|--|---|
| Through all subject school and and magazines | 1 |
| Through Biology and Geography                | 4 |
| By the help of clubs and media               | 2 |
| By all of the above                          | 3 |

24. Active participation of all communities including students in reforestation, terracing, dam building and other conservation measures to minimize soil erosion is \_\_\_\_\_?

|                |   |
|----------------|---|
| Very important | 4 |
| Important      | 3 |
| I don't know   | 2 |
| Not important  | 1 |

25. What should be done to reduce deforestation?

|   |   |
|---|---|
| Expanding area closure                                | 1 |
| Planting trees in farmlands and naked areas           | 2 |
| Telling communities the consequences of deforestation | 3 |
| All are answers                                       | 4 |

26. Poverty, lack of awareness of man's impact on the environment and over population are some of the factors that forces local people to clear forests and accelerate soil erosion.

|               |   |
|---------------|---|
| Yes very much | 4 |
| Yes           | 3 |
| I am not sure | 2 |
| No they don't | 1 |

27. Participation in training related to preservation the environment is important currently.

|     |   |
|-----|---|
| Yes | 2 |
| No  | 1 |

## Part Four

### Environmental Attitude Questions

Please indicate by selecting one from the listed numbers whether you agree or disagree to each question.

Strongly Agree (SA) = 5

Agree (A) = 4

Uncertain (U) = 3

Disagree (DA) = 2

Strongly Disagree (SD) = 1

- 1) Peoples of the local area are severely abusing the local environment by deforestation and soil erosion.  
A) SA    B) A    C) U    D) DA    E) SD
- 2) It is right peoples to clear Forests.  
A) SA    B) A    C) U    D) DA    E) SD
- 3) For preventing Soil erosion, more trees should be planted.  
A) SA    B) A    C) U    D) DA    E) SD
- 4) Natural resources like Forests and Soil should be care fully used.  
A) SA    B) A    C) U    D) DA    E) SD
- 5) Protecting clearance of forests and soil erosion is the combined responsibility of local peoples, students and governments.  
A) SA    B) A    C) U    D) DA    E) SD
- 6) Cutting down forests has positive consequences like increasing income to local peoples and the country at large.  
A) SA    B) A    C) U    D) DA    E) SD
- 7) The remaining forests in the local area and in other parts of Ethiopia should be Conserved at all costs.  
A) SA    B) A    C) U    D) DA    E) SD
- 8) Whether we take care of our environment or not to recover from environmental degradations like soil erosion and deforestation will not result any positive consequence.  
A) SA    B) A    C) U    D) DA    E) SD

9) Population pressure, Poverty and lack of awareness about the long-term consequences of local peoples ' influence on the environment is the main causes of deforestation and soil erosion.

A) SA    B) A    C) U    D) DA    E) SD

10. Humans are destroying the environment by altering the habitat for agriculture to feed the increasing number of people from time to time.

A) SA    B) A    C) U    D) DA    E) SD

11. Daily actions of individuals cannot make enough of a difference to actually help the environment rehabilitate.

A) SA    B) A    C) U    D) DA    E) SD

12. Earth is here for us to use to our maximum benefit. We only have obligations to people, not plants or animals.

A) SA    B) A    C) U    D) DA    E) SD

13. The environment is changing as the time went on.

A) SA    B) A    C) U    D) DA    E) SD

## **Students' Focus Group Discussion**

### **Focus Group Discussion Guide**

#### **Introduction**

Good morning, my name is Goitom Tesfay, I would like to start off by thanking each of you for taking time to come today. We will be here for about an hour and a half. The reason we're here today is to get your opinions and attitudes about issues related to local environmental problems, your involvement in different clubs and the school activity. I am going to lead our discussion today. I am not here to convince you of anything or try to sway your opinion. My job is just to ask you questions and then encourage and moderate our discussion. I also would like to introduce name of note taker among you. He or she will write down our discussion today for my report.

To allow our conversation to flow more freely, I would like to go over some points.

1. Please talk one at a time and avoid side conversations.
2. This will be an open discussion and feel free to comment on each other's remarks.
3. There are no "wrong answers," just different opinions. Say what is true for you, even if you're the only one who feels that way. Do not let the group sway you. But if you do change your mind, just let me know.
4. Just let me know if you need a break.

Before we start our group discussion, I would like to know each of your names. Please tell me?

**Now let we start our discussion one by one as the sequence of the discussion points.**

1. In your school in what clubs or activities are you involved in? If you are involved why do you participate and in what aspects, if you are not a member why not?
2. Do you want to learn about ways of protecting environmental problems like deforestation, soil erosion and others? Why or Why not?
3. What are the major environmental problems in your locality and what do you think the solution to them?
4. Is there Voluntary Community club in your school? If yes, what activity it play?
5. How population pressure can contribute to Deforestation, soil erosion and other environmental problems?
6. Have you ever participated in any training related to preserve the environment? if yes in what issues ?
7. What are the most important sources of information the awareness you have got about the environment?
8. Does your school mini-media involve in disseminating information related to environmental problems? If yes, explain the environmental problems which get priority in your school mini-media.

## APPENDIX II

### TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

| N  | S  | N   | S   | N   | S   | N    | S   | N      | S   |
|----|----|-----|-----|-----|-----|------|-----|--------|-----|
| 10 | 10 | 100 | 80  | 280 | 162 | 800  | 260 | 2800   | 338 |
| 15 | 14 | 110 | 86  | 290 | 165 | 850  | 265 | 3000   | 341 |
| 20 | 19 | 120 | 92  | 300 | 169 | 900  | 269 | 3500   | 346 |
| 25 | 24 | 130 | 97  | 320 | 175 | 950  | 274 | 4000   | 351 |
| 30 | 28 | 140 | 103 | 340 | 181 | 1000 | 278 | 4500   | 351 |
| 35 | 32 | 150 | 108 | 360 | 186 | 1100 | 285 | 5000   | 357 |
| 40 | 36 | 160 | 113 | 380 | 181 | 1200 | 291 | 6000   | 361 |
| 45 | 40 | 180 | 118 | 400 | 196 | 1300 | 297 | 7000   | 364 |
| 50 | 44 | 190 | 123 | 420 | 201 | 1400 | 302 | 8000   | 367 |
| 55 | 48 | 200 | 127 | 440 | 205 | 1500 | 306 | 9000   | 368 |
| 60 | 52 | 210 | 132 | 460 | 210 | 1600 | 310 | 10000  | 373 |
| 65 | 56 | 220 | 136 | 480 | 214 | 1700 | 313 | 15000  | 375 |
| 70 | 59 | 230 | 140 | 500 | 217 | 1800 | 317 | 20000  | 377 |
| 75 | 63 | 240 | 144 | 550 | 225 | 1900 | 320 | 30000  | 379 |
| 80 | 66 | 250 | 148 | 600 | 234 | 2000 | 322 | 40000  | 380 |
| 85 | 70 | 260 | 152 | 650 | 242 | 2200 | 327 | 50000  | 381 |
| 90 | 73 | 270 | 155 | 700 | 248 | 2400 | 331 | 75000  | 382 |
| 95 | 76 | 270 | 159 | 750 | 256 | 2600 | 335 | 100000 | 384 |

Source : Johnson and Christensen ( 2011 )

Note: “N” is population size

“S” is sample size.

NB. To draw sample based on the table, is depending on the approximate size of the population listed above.

## **Declaration**

This thesis is my original work and that all resources consulted for the work have been properly acknowledged.

Submitted by: \_\_\_\_\_  
Student name                      Sign.                      Date

Approved by: \_\_\_\_\_  
Adviser                      Sign.                      Date